On the Determinants of Household Debt Maturity Choice

by

Wolfgang Breuer*, Thorsten Hens[#], Astrid Juliane Salzmann[+], and Mei Wang†

Abstract. This paper jointly analyzes a traditional and a behavioral concept to explain household debt portfolio choice. The traditional approach explores the role of time preferences on household debt maturity in a theoretical model and a numerical analysis. We derive a positive relationship between the long-term discount factor δ and the optimal maturity of household loans. The relationship is supported by an empirical analysis with 33 countries, controlling for various demographic and economic variables as well as risk preferences of a country. The behavioral approach examines whether national culture is a reasonable predictor for household debt maturity. We show that culture is an important factor for households' borrowing decisions and has even more predictive power than time preferences. Countries with higher individualism scores tend to have longer household debt maturity. A causality analysis completes the picture about the mechanisms between culture and household debt maturity, and highlights the importance of culture for financial decisions.

JEL classification code: D90, F30, Z10

Keywords: culture, debt maturity, household finance, household time preferences

*Prof. Dr. Wolfgang Breuer, RWTH Aachen University, Department of Finance, Templergraben 64, 52056 Aachen, Germany. eMail: wolfgang.breuer@bfw.rwth-aachen.de

[#]Prof. Dr. Thorsten Hens, Institute of Banking and Finance, University of Zurich, Plattenstrasse 32, 8032 Zurich, Switzerland. eMail: thorsten.hens@bf.uzh.ch

[+]Dr. Astrid Juliane Salzmann, RWTH Aachen University, Department of Finance, Templergraben 64, 52056 Aachen, Germany. eMail: astrid.salzmann@bfw.rwth-aachen.de (corresponding author)

†Prof. Dr. Mei Wang, WHU – Otto Beisheim School of Management, Chair of Behavioral Finance, Burgplatz 2, 56179 Vallendar, Germany. eMail: mei.wang@whu.edu

1 Introduction

During the last decade, asset allocation reemerged at the forefront of financial research (Guiso et al., 2002). In part, this research is due to the multitude of financial innovations offered by the financial services sector and the increased importance of retirement savings because of population aging. It is well documented that both demographic variables (such as age, gender, family size, and education) and economic factors (such as employment, wealth, and private business risk) are important determinants of households' portfolio decisions (Campbell, 2006). However, over the last few years, an expanding literature has investigated less traditional explanations of household portfolio choices. Renneboog and Spaenjers (2011) explore the role of religion on household finance and identify thrift, risk preferences, responsibility, social capital, and planning horizon as main channels through which religion affects household financial decision-making. Hong et al. (2004) evidence that sociability fosters stock market participation. Guiso et al. (2008) show that trust has a significant influence on the level of stockholdings. Puri and Robinson (2007) observe that optimism is related to stock investment and saving behavior. Haliassos and Bertraut (1995) find that inertia arising from cultural influences discourages stockholding. Dimmock and Kouwenberg (2010) contend that loss aversion affects household portfolio allocation. Frijns et al. (2008) maintain risk aversion and market sentiment among the determining factors of portfolio choice.

This overview displays that current knowledge of how human cognitive characteristics influence economic behavior is scattered and incomplete indicating a need for further research. Portfolio choices are among the most important economic decisions which people face; however, as they occur relatively infrequently, there is little data available on which to take a decision. These are the decisions that are most ripe for being influenced by psychological factors like attitudes and emotions (Puri and Robinson, 2007). To the best of our knowledge, no empirical or theoretical work has examined the factors affecting household debt portfolio choice. Our paper jointly analyzes a traditional and a behavioral approach to explain household debt maturity. The *traditional approach* incorpo-

rates the well-known phenomena of time discounting into the analysis of financial decision-making. We present an intertemporal optimization model to derive a relationship between the maturity of loans and subjective discount rates. We extend our theoretical findings by a numerical analysis and derive a testable hypothesis. Combining data on time preferences and household debt portfolios from 33 countries, we then examine empirically whether the decisions households make can be reconciled with their preferences. We find that the long-term discount factor δ has a significantly positive effect on household debt maturity and is much more effective than the present bias β. The *behavioral approach* examines the usefulness of national culture to explain household debt portfolio choice. Culture has emerged as a powerful predictor for financial decision making in recent research. A large body of the literature demonstrates that culture is able to account for patterns in economic activities of individuals, organizations, or nations. We focus on the cultural dimension of individualism and collectivism and show that culture is a substantial factor for explaining debt maturity decisions. Furthermore, using an instrumental variable analysis, we establish a causal link from national culture to financial decision making. The strong effects we estimate for national culture propose that cultural variables possess some additional explanatory power compared to traditional economic preference parameters. Our analysis suggests that culture affects individual decision making through more intricate coherence and multifold channels. Exploring the interrelation of economics and psychology might challenge standard theory and its usefulness to explain real-world economic behavior and provide a notable extension of our understanding of economic decision making.

The balance of the paper is structured as follows. Section 2 describes our dataset. Section 3 develops the theoretical background and derives our main research hypothesis for the traditional approach. In Section 4, we present an empirical analysis of the impact of time preferences on the debt maturity of households. Section 5 discusses the relevance of culture for the maturity of household debt portfolios by developing and testing our main hypothesis for the behavioral approach which also comprises an instrumental variable analysis. A summary section concludes the paper.

2 Data description

2.1 EIU WorldData on household debt maturity

The empirical study of household finance in a cross-country setting is particularly challenging because of poor data availability. Our study uses the Economist Intelligence Unit (EIU) WorldData, which yields unique information for studying these issues. The EIU WorldData compiles data from financial databases and national statistical sources. Its data is reasonably consistent across countries and features a good worldwide coverage. It has data available for 63 countries. Our analysis focuses on household debt maturity choice. We measure the maturity of household debt as the ratio of long-term loans versus short-term loans. Short-term liabilities typically comprise loans with an original maturity of one or two years or less. Long-term liabilities typically comprise loans with an original maturity of more than two years.

We observe a wide range of variation in our key variable among countries. The smallest ratio of long-term to short-term loans can be found in Hong Kong, where it is close to 0, indicating that we find hardly any long-term loans here. The largest ratio of long-term to short-term loans can be found in Japan with 29.7, which is equivalent to a ratio of short-term to long-term loans of about 3 %. Figure 1 overviews the relation of long-term to short-term debt for the G8+5 countries (eight major plus five leading emerging economies).

[Insert Figure 1 about here.]

2.2 INTRA survey on time preferences

Data on time preferences is from the International test of risk attitudes (INTRA) survey carried out among economics students in 45 countries. A total of 5,912 university students participated in the

survey. Each participant was asked to fill in a questionnaire that included several questions on decision making, cultural attitudes, and some information about his or her personal background (Wang et al., 2011). In the following analysis of time preferences, we restrict ourselves to the analysis of 33 countries for which we have data on household finance and time preferences.

To measure the implicit discount rate, participants were asked to give the amount of a delayed payment that makes them indifferent with an immediate payment. The two questions are:

> *Please consider the following alternatives*
> *A. a payment of $100 now*
> *B. a payment of $ X in one year from now*
> *X has to be at least $ ___, such that B is as attractive as A.*
> (one-year matching question)
>
> *Please consider the following alternatives*
> *A. a payment of $100 now*
> *B. a payment of $ X in 10 years from now*
> *X has to be at least $ ___, such that B is as attractive as A.*
> (ten-year matching question)

In order to infer discount rates from intertemporal decisions, the quasi-hyperbolic discounting model of the form

$$v(z_0,\ z_1, \dots, z_T) \coloneqq u(z_0) + \beta \cdot \sum_{t=1}^{\infty} \delta^t \cdot u(z_t) \quad (1)$$

is employed. In this context, z_t is a given individual's exogenous consumption at time t from $t = 0$ to $t = \infty$. Time preferences are described by parameters β and δ. When $0 < \beta < 1$ and $0 < \delta < 1$, people appear to be more patient in the long run and less patient for the immediate future. We rely on the quasi-hyperbolic discounting model that assumes a declining discount rate between this period and the next, but a constant discount rate thereafter. This approach has often been discussed in the context of irrationality. In particular, β refers to the degree of the "present bias", a larger value of β implies a less present bias. δ is called the long-term discount factor. An elaboration of different measures of time discounting can be found in Wang et al. (2011).

When assuming a linear utility function $v(\cdot)$, the two matching questions about time discounting can be represented as follows, where F_{1year} and F_{10year} denote the responses from the respective matching questions.

$$100 = \beta \cdot \delta \cdot F_{1year}, \quad (2a)$$

$$100 = \beta \cdot \delta^{10} \cdot F_{10year}. \quad (2b)$$

Proxies for time preferences can then be calculated as follows:

$$\delta = \left(\frac{F_{1year}}{F_{10year}}\right)^{\frac{1}{9}}, \quad (3a)$$

$$\beta = \frac{100}{\delta \cdot F_{1year}}. \quad (3b)$$

The median value of β across all 33 countries considered is 0.65 (mean = 0.63, standard deviation = 0.20). The median value of δ is 0.84 (mean = 0.82, standard deviation = 0.04). Note that the variation in the present bias β is much higher than the variation in the long-term discount factor δ. The responses to the two questions are highly correlated ($\rho = 0.78$), however, the present bias parameter β and the long-term discount factor δ are only moderately correlated ($\rho = 0.25$), indicating that the two components may correspond to different psychological constructs (Wang et al., 2011).

One might question the validity of the use of student samples in our research, objecting that the value ratings obtained from a student sample are probably not representative of household financial decision makers. In fact, value ratings obtained for any different sample are almost certainly not the same for other types of samples or a representative sample. It is however legitimate to assume that the *order* of countries on the value ratings is reasonably similar to the order one would obtain using other types of samples to represent the nation (Schwartz, 1999). We therefore believe that our dataset is appropriate for analyzing household debt maturity decisions.

3 Theoretical approach

Researchers have long been aware that people can perceive time in various ways, and that these perceptions affect their behavior. Perception of time is an elementary construct in the building of mindsets, and many individual decisions are likely to be biased depending on the person's perception of time (Graham, 1981). Time preference plays a fundamental role in theories of savings and investment, interest rate determination, and asset pricing (Becker and Mulligan, 1997). We develop a theoretical model which links time preferences to household debt maturity choice. We consider an individual with an objective function according to the quasi-hyperbolic discounting model of (1) that takes a loan of amount L at $t = 0$ with maturity M. r_M is the (given) gross interest rate paid per period for loans with maturity M, such that periodical interest payments of $r_M \cdot L$ are made at times $t = 1, \ldots, M$. In addition, at time $t = M$ the loan is redeemed. We assume that the volume L of the loan as well as consumption levels $z_0, z_1, \ldots, z_T$ before borrowing are given. The individual is thus only trying to find the best maturity for his or her loan. While we allow for non-flat term structures of interest rates, i.e. $r_M' \neq 0$, the individual nevertheless acts as a price-taker, which means that the prevailing term structure is exogenously given to him. Summarizing, this yields the following objective which is to be maximized with respect to M:

$$U(M) \coloneqq u(z_0 + L) + \beta \cdot \left[\sum_{t=1}^{M-1} \delta^t \cdot u(z_t - r_M \cdot L) + \delta^M \cdot u[z_M - (1 + r_M) \cdot L] + \sum_{t=M+1}^{\infty} \delta^t \cdot u(z_t) \right]. \quad (4)$$

Apparently, because of the exogeneity of z_0, L, and β, the present bias β is irrelevant for the optimal value of M. Moreover, to simplify the problem and to focus on the impact of δ for the determination of M, we assume u to be linear. As a consequence, consumption values z_t for all t and the loan volume L do not affect the optimal solution for M any longer. Thus our objective function reduces to

$$\widehat{U}(M) \coloneqq -\sum_{t=1}^{M} \delta^t \cdot r_M - \delta^M = -\frac{\delta}{1-\delta} \cdot (1 - \delta^M) \cdot r_M - \delta^M \quad (5)$$

that has to maximized with respect to *M*. Note that $\frac{\partial \delta^M}{\partial M} = \ln \delta \cdot \delta^M$. We thus have:

$$\widehat{U}'(M) = -\left[\delta \cdot \frac{1-\delta^M}{1-\delta} \cdot r_M'\right] + \frac{\ln \delta}{1-\delta} \cdot [\delta^M \cdot (\delta \cdot (1+r_M) - 1)]. \quad (6)$$

For a flat term structure of interest rates, i.e. $r_M = r$ for all *M*, the sign of $\widehat{U}'(M)$ is simply identical to that of $1 - \delta \cdot (1+r)$ because of $\ln \delta / (1-\delta) < 0$ for $0 < \delta < 1$. When switching from maturity *M* to *M*+1, the individual saves \$1 at time *M*, but has to pay an additional dollar amount of 1+*r* at time *M*+1 which is subjectively discounted by the long-term discount factor δ. For rather "impatient" individuals, i.e. individuals with small values of δ, this maturity prolongation will be advantageous. In fact, the sign of $1 - \delta \cdot (1+r)$ is identical to that $1/r - \delta/(1-\delta)$. $\delta/(1-\delta)$ is the subjective net present value (or cumulated utility) of a consumption stream of \$1 from $t = 1$ to ∞, while $1/r$ is the "objective" net present value for a perpetuity of \$1. If the individual thus discounts future payments more than the capital market does (that is, if the individual is sufficiently "impatient"), we get a border solution $M \to \infty$. The opposite ($M \to 0$) is true for $1/r < \delta/(1-\delta)$. For a flat term structure of interest rates, there are thus only border solutions possible, which is intuitively appealing because of *u* being linear. When looking at the term structures of interest rates as of the beginning of 2007 for the 33 countries, there are 17 of them for which the Bloomberg financial database offers data for at least 10 different maturities. For *all* of them (and for all maturities) $1/r_M > \delta/(1-\delta)$ holds. Because of that empirical evidence, we rely on this inequality in the following.

From (6), we obtain the following first order condition for the optimal value of *M*:

$$\delta^M - \frac{r_M'}{\underbrace{\left(r_M - \frac{1-\delta}{\delta}\right) \cdot \ln \delta}_{>0} + r_M'} = 0. \quad (7)$$

Apparently, for an inner solution, i.e. $0 < \delta^M < 1$, we need $r_M' > 0$ and thus an at least locally increasing yield curve. We are mainly interested in the relationship between the optimal value of *M** and preference parameter δ. However, even for interest rates r_M that are linearly increasing in maturity

M, it is not possible to derive an unambiguous sign of $\partial M^*/\partial \delta$. In order to understand this result, once again we have to take a look at (6) which reveals that there are two different marginal utility effects at work when maturity *M* is varied.

The first term in brackets on the right-hand side of (6) is identical to $\sum_{t=1}^{M} \delta^t \cdot r'_M$ and thus describes the negative utility effect of higher periodic interest payments when *M* is increased due to a normal yield curve. Apparently, this negative utility effect of increased periodic interest payments becomes weaker for an individual's smaller patience level δ, as higher periodic interest payments now hurt less.

The second term describes the consequences of a marginal increase in maturity *M* under the assumption of a flat term structure of interest rates. It consists of two components. The difference in brackets characterizes the consequences of switching from *M* to *M*+1 while the factor ln $\delta/(1-\delta)$ corrects for the fact that *M* is indeed only marginally increased. In what follows, we examine somewhat more thoroughly the term in brackets. As already pointed out, $1 - \left(\delta \cdot (1 + r_M)\right)$ simply is (for *L* = 1) the net value of an increase in maturity from *M* to *M*+1 as evaluated at the original time *M* for constant interest rates. Once again, smaller patience levels make higher maturities more attractive. However, in order to compute the net effect as seen from *t* = 0, this difference has also to be discounted by δ^M. For smaller patience levels, the net effect $1 - \left(\delta \cdot (1 + r_M)\right)$ of maturity prolongation is discounted more severely and thus ceteris paribus loses relevance as seen from time *t* = 0. The consequences of varying values of δ on the strength of this second marginal utility effect are thus unclear. In particular, this second positive utility effect of maturity prolongation may also become *weaker* with smaller levels of δ. Therefore, it is an empirical issue whether smaller values of the long-term discount factor lead to higher or smaller optimal maturities *M*.

Against the background of our theoretical considerations, we therefore now turn to a numerical analysis of the decision problem according to (5) based on actual market data. As mentioned above, we obtain historical yield curves from Bloomberg financial database for 17 countries. To alleviate the

effects of the financial crisis, rates are per 01/01/2007. We linearly interpolate yield data for missing maturities but assume constant values before the first and after the last data point reported. As the collected zero-bond rates i_M differ slightly from the r_M in our theoretical model we calculate the correct values using the relationship $\frac{r_M}{1+i_1} + \frac{r_M}{(1+i_2)^2} + \frac{r_M}{(1+i_3)^3} + \cdots + \frac{r_M}{(1+i_{M-1})^{M-1}} + \frac{1+r_M}{(1+i_M)^M} = 1 \; \forall \; M$. For all maturities M = 0 to M = 100 we compute our objective $\widehat{U}(M) := -\frac{\delta}{1-\delta} \cdot (1 - \delta^M) \cdot r_M - \delta^M$ with corresponding values of M, r_M and δ. The optimal maturity M^* is reached where $\widehat{U}$ is maximal. Figure 2 reports the observed relationship

[Insert Figure 2 about here.]

The numerical analysis with real world data clearly exhibits a positive relationship between the long-term discount factor δ and the optimal maturity choice of loans (ρ = 0.7390, p = 0.0007). Individuals exhibiting higher values of δ prefer liabilities with longer maturities. The relation can also be confirmed by a linear regression which estimates $M^* = 392.1 \times \delta - 267.3$. Both coefficients and the F-statistic for the overall fit are highly significant, and R^2 amounts to 0.56 in this simple regression model. Our computations rely on nominal interest rates. However, referring to inflation-adjusted, i.e. real, interest rates would only be necessary if varying inflation rates over time were to be taken into account (i.e. if inflation rates in future years vary considerably from those that prevailed when performing the INTRA survey). Because of a lack of data regarding inflation rates for the very far future, we refrain from such an approach. Nevertheless, we control for cross-country differences in inflation rates in our regressions in the next sections.

From our theoretical model and our numerical analysis we derive a positive relationship between the long-term discount factor δ and the maturity of household loans. Individuals who are more pa-

tient in the long run tend to choose debt portfolios with higher maturities. Thus, we expect that more patient households have more long-term debt, and summarize our findings as follows.

Hypothesis 1: *Countries with higher long-term discount factors δ have more long-term debt. The present bias β does not affect household debt maturity.*

4 Empirical analysis

Cross-correlations for our data support the postulated relationship. Household debt maturity and the long-term discount factor δ are significantly positively correlated ($\rho = 0.4478$, $p = 0.0102$), whereas we observe almost no relationship between debt maturity and the present bias β ($\rho = 0.0780$, $p = 0.6715$). To empirically capture the relationship between household debt maturity, measured by the ratio of long-term versus short-term loans *DMAT*, and time preferences, represented by the present bias parameter β and the long-term discount factor δ, we estimate country-level ordinary least squares regression models. Our basic regression model is of the form

$$DMAT = const + a \times \beta + b \times \delta + \Sigma\, c_i \times Control_i + \varepsilon. \qquad (8)$$

$Control_i$ is a broad set of sociodemographic, economic, and behavioral factors that might influence the borrowing decision. As little research has been conducted on household debt maturity, we use general control variables from the borrowing literature (Cox and Japelli, 1993; Livingstone and Lunt, 1992). A description of our control variables can be found in Table 1.

[Insert Table 1 about here.]

Median household income, education level, age structure, and religious beliefs are used as proxies for the sociodemographic environment of a country. GDP per capita, inflation rate, credit level, and the lending interest rate capture the economic development of a country. We include measures of

risk preferences as further behavioral variables, in order to check the relationship of time preferences to risk preferences. These measures were derived from hypothetical lottery questions in a section of the INTRA survey. According to basic prospect theory, these parameters are risk aversion towards gains, risk seeking towards losses, probability bias, and loss aversion (Tversky and Kahneman, 1981). Table 2 illustrates the main summary statistics for our data.

[Insert Table 2 about here.]

The regression results for our basic model can be found in Table 3. The dependent variable is household debt maturity. The main independent variables are time preferences of households, represented by the present bias parameter β and the long-term discount factor δ. The table reports the ordinary least squares estimates. To ensure that our results are not driven by outliers, we remove all data that depart from the mean of the data by more than three times the standard deviation. We standardize all independent variables before we estimate the regression models so that coefficients can be compared directly.

[Insert Table 3 about here.]

The first column reports the estimates of the baseline specification, where we insert both variables for time preferences. In this basic specification we control for income and education level, age structure, and religiosity in a country as major control variables. While the present bias parameter β turns out to have little predictive power, the effect of the long-term discount factor δ is positive and highly significant. In countries where we have higher values of the long-term discount factor δ we find

higher ratios of long-term to short-term loans. These findings turn out to remain stable throughout all other specifications where we include control variables for the economic background and individual risk preferences. Among the three models, the absolute value of the coefficient of the long-term discount factor is among the highest of all variables, underlining the importance of our key variable for household debt maturity. Individuals who are more patient in the long run tend to have more long-term debt. The coefficient estimate of the long-term discount factor δ in the baseline specification shows that a one standard deviation increase in the long-term discount factor δ is associated with an increase in household debt maturity of 4.76 which amounts to 60.48% of its mean value. This is clearly economically significant.

5 Cultural explanations

Our previous analysis contends that household time preferences measured through the long-term discount factor are a determining factor for household debt maturity choice. However, overall explanatory power in the above models is rather low, demanding some further analysis. There may be different factors important for household finance that have not been among the previous controls. National culture has recently emerged as a powerful determinant in financial studies. Hofstede (1983) defines culture as "the collective programming of the mind", indicating that cultural values are the essential core of an individual's psychology guiding one's attitudes and behavior. In this vein, Livingstone and Lunt (1992) allow for enduring psychological traits and attitudes in their analysis of household debt and find them as important predictors.

The awareness of the importance of culture at the economic level is increasing, as more and more research includes cultural values into the analysis of economic decision making in recent years. A large body of literature maintains culture as a determining factor for economic outcomes such as capital structure (Chui et al., 2002), cash holdings (Ramírez and Tadesse, 2009; Chang and Noorbakhsh, 2009), corporate debt maturity (Zheng et al., 2011), earnings management (Han et al.,

2010), dividend policy (Fidrmuc and Jacob, 2010; Shao et al., 2010; Bae et al., 2011), board composition (Li and Harrison, 2008), governance codes (Haxhi and van Ees, 2010), financial disclosure (Hope, 2003), portfolio management (Beckmann et al., 2008), momentum strategies (Chui et al., 2010), and asset allocation (Beugelsdijk and Frijns, 2010). However, it is still unclear how far culture drives individual's financial decisions (Hens and Wang, 2007). In order to investigate the effect of culture on household debt maturity, we repeat the above analysis using direct measures of culture as main explanatory variables.

One of the most influential approaches to characterize cultures has been developed by the Dutch sociologist Geert Hofstede during his cross-country research on organizational cultures. The Hofstede (1983) cultural theory introduces four cultural dimensions that address basic societal problems. *Individualism and collectivism* describes the relationship between the individual and the collectivity that prevails in a given society. *Power distance* is the extent to which different societies handle human inequality differently. *Masculinity and femininity* refers to the distribution of roles between genders. *Uncertainty avoidance* deals with a society's tolerance for uncertainty and ambiguity and refers to its search for truth. In his later research, Hofstede added a fifth dimension labeled *long-term orientation*. Due to controversial findings on this dimension we are excluding this dimension from our analysis (Yeh and Lawrence, 1995).

Our analysis focuses on the cultural dimension of individualism and collectivism, which is found as the most significant difference among cultures (Schwartz, 1999; Triandis, 2001). People in different cultures hold divergent views about the self, resulting in distinct conceptions about the relatedness of individuals to each other. The varying degrees to which individuals see themselves as separate from others have a systematic influence on fundamental aspects of cognition, emotion, and motivation (Markus and Kitayama, 1991). Individualism emphasizes personal freedom and independence, whereas collectivism endorses social relatedness and interdependence. People in individualistic cul-

tures appear as individualistic and egocentric, while people in collectivistic cultures seem sociocentric and connected (Hofstede, 2001).

We propose two potential mechanisms through which individualism and collectivism affects household debt maturity.

First, people in individualistic societies desire to assert their individuality and appreciate one's difference from others through expressing unique inner attributes (Heine et al., 1999). As people are more concerned with self-interest, they act in accordance with internal wishes. Others are important for social comparison, and standing out is intrinsically rewarding eliciting pleasant ego-focused emotions (Markus and Kitayama, 1991). People need to acquire goods necessary to keep up with their reference group. To maintain high consumption levels people will choose lower repayment rates for household debt. In this vein, Livingstone and Lunt (1992) recognize the importance of social influences in their study of household debt and find that individuals who place more value on self-indulgence and recklessness have lower repayment rates. The primarily selfish side of individualism receives further support from Yeh and Lawrance (1995) arguing that people in individualistic cultures are mainly interested in satisfaction in the present.

Second, people in collectivistic cultures emphasize collective welfare and show a sympathetic concern for others, promoting other's goals by restraining the self (Markus and Kitayama, 1991). The strong social bonding among individuals in a collective culture allows jointly developing mechanisms to hedge against risk. If someone is in need, he can turn to his social network for support. Members of a collectivistic society can receive substantial material and financial assistance, as they have a large and close social network to count on. Weber and Hsee (1999) label this mechanism "cushion hypothesis", the network would serve as a "cushion" that would hold its members in case they "fell". An individual taking out a loan has to evaluate the level of the repayment rate also in terms of his ability to service the debt. As the contractual payments have to be met on a regular basis, people in collectivistic societies may choose higher repayment rates. In case they are incidentally not able to

pay the amount from their own income, they can turn to their social network. Aggarwal et al. (2011) support that reasoning discovering that strong social networks are associated with relatively low levels of consumer bankruptcy. Besides, Yeh and Lawrance (1995) find that collectivistic cultures tend to spend not more than necessary, yielding that they would choose higher repayment rates and hence are expected to prefer short-term debt.

Based on the above two arguments, we conjecture a positive relationship between the level of individualism and household debt maturity in a country.

Hypothesis 2: *Countries with higher levels of individualism have more long-term debt.*

In order to capture the influence of culture on household debt maturity empirically, we replace the variables representing time preferences by the cultural dimensions of Hofstede in our above regression model. This leads to regression models of the form

$$DMAT = const + \Sigma\, a_i \times CulturalDimension_i + \Sigma\, c_i \times Control_i + \varepsilon. \quad (9)$$

$CulturalDimension_i$ refers to the four cultural dimensions, individualism and collectivism, power distance, masculinity and femininity, uncertainty avoidance. Although our analysis focuses on the cultural dimension of individualism and collectivism exclusively, we include the remaining cultural variables, to avoid an omitted variables bias. $Control_i$ is the same set of control variables as above. The baseline regression includes cultural and demographic variables, and we subsequently add economic controls. The results are reported in Table 4.

Our regression analysis yields substantial support for Hypothesis 2. The cultural dimension of individualism has a considerable influence on household debt maturity. The variable for individualism is significantly positive in all three regression models. Countries with higher levels of individualism tend to prefer long-term debt. Cultural variables have high explanatory power for household debt maturity. The first model compares directly to the baseline specification of Table 3, as we are using the same 33 countries in these two regression models. We find larger R^2-values in this regression, indi-

cating that cultural variables are better able to explain household debt portfolio choice. The effects become even stronger when we use the full sample size, as cultural variables feature better data availability than time preferences. Compared to our previous models, the regression models generate good overall fit and the explained variance is considerable. A one standard deviation increase in the individualism index is associated with an increase in 4.42 of household debt maturity, which corresponds to 56.16% of its mean value. Once again, this is an economically significant result. Besides, the cultural analysis substantiates the robustness of time preferences. Our above argument links individualism to more patient behavior, and individualistic countries prefer long-term debt.

[Insert Table 4 about here.]

Our analysis suggests that cultural variables are better able to explain household debt maturity choice than time preferences. The findings indicate that culture exhibits more intricate effects than traditional economic parameters. The derivation of our hypotheses contends that cultural dimensions combine several effects of economic decision making, and that interaction effects among single determinants occur. The argument using the cushion hypothesis suggests that the cultural dimension of individualism contains some aspect of risk taking. However, as risk preferences do not have a significant influence in Table 3, the risk component of individualism appears to operate through a different channel and in conjunction with further effects. We believe that such elaborate relationships elicit the substantial explanatory power of the cultural dimensions.

The preceding analysis suggests that culture does have a significant effect on economically relevant beliefs and attitudes. Variation in these preferences directly impacts the financial choices individuals make. Culture is defined as a collective programming of the mind, and deeply rooted in every society. The mental programming is learned from and shared with people from the culture one lives in,

and who have gone through the same learning process (Hofstede, 2001). Hence culture has relatively stable and long-term effects on how individuals understand the world, think, and make decisions.

We aim to formally substantiate the fundamental constitution of culture using an instrumental variable approach. Does culture affect debt maturity only through the channel presumed in the regression? Our instrumental variable approach establishes an exogenous source of variation in culture to address this issue. Our instrument for the cultural dimensions of individualism is obtained by examining the language spoken in a country. A large body of work demonstrates that culture and language are inseparable and mutually constitute one another. Though a detailed discussion of this literature is beyond the scope of this paper, there is considerable evidence that language affects people's social beliefs and value judgments (Whorf 1956, Sapir 1970). Culture and language may be connected through the conception of the person, which is coded in the use of person-indexing pronouns, such as "I" and "you" in English. Major differences arise from the question of "whether to use a pronoun" and "which pronoun to use".

The cultural dimension of individualism addresses the relationship between the individual and the collective. Kashima and Kashima (1998) relate this dimension to the linguistic practice of pronoun drop, in particular the omission of the first-person singular pronoun ("I" in English). In some languages (like English, for example) it is mandatory to include a subject pronoun in most sentences, while it is not required in other languages (in Mandarin, for example) where these pronouns can be dropped. An explicit use of "I" emphasizes the speaker's person, whereas a language that allows pronouns to be dropped reduces its prominence. Kashima and Kashima (1998) analyze major languages and code a language as "2" if it almost always requires a first-person singular pronoun in an independent clause and as "1" otherwise, and label the variable as pronoun drop. Therefore, we expect a positive relationship between pronoun drop and individualism ($\rho = 0.8277$, $p = 0.0000$).

In our two-stage least squares instrumental approach, our first step is to treat individualism as a dependent variable and use pronoun drop as the instrumental explanatory variable. In the second

step, we then insert the predicted values of individualism back in our regression with household debt maturity as the dependent variable, together with other explanatory variables we use in the regression. The results are shown in Table 5. The coefficient of individualism using this instrumental variable approach is considerably bigger than the coefficient using the ordinary least squares approach, suggesting that endogeneity is not a major concern. The coefficient remains highly significant.

[Insert Table 5 about here.]

6 Conclusion

Our paper proposes a traditional and a behavioral approach to explain household debt portfolio choice. The *traditional approach* follows standard finance theory and develops a relationship between the maturity of loans and time preferences in a theoretical setting and a numerical analysis. We derive a testable hypothesis and test our theory in an extensive empirical investigation. Controlling for various demographic and economic variables as well as risk preferences of a country, we show that the long-term discount factor δ is a sound predictor for the household debt maturity. Household debt portfolios are well reconciled with time preferences of households. The *behavioral approach* incorporates national culture into the analysis of household financial decision making. Despite its fundamental status, culture has long been neglected in finance research, but gained attention in the last few years. Although there is little guiding theory on how culture impacts economic behavior, an extensive body of empirical research documents the importance of culture for financial decision making. We focus on the cultural dimension of individualism and collectivism and show that culture is an important predictor for household debt maturity. Countries with higher levels of individualism prefer long-term debt. In an instrumental variable approach, we establish culture as the

essential and constitutional element and driving force for maturity decisions in household debt portfolios.

This paper highlights the importance of culture for financial decisions. As we are provided with a unique dataset that combines data from the cultural level, time preferences and financial outcomes, we are able to derive a number of meaningful relationships between the variables. Our results support the traditional approach and document that time preferences are able to explain household debt portfolio choice. Moreover, our cultural analysis documents that cultural variables are at least equally or even more important than individual preferences for household financial decision making. Cultural variables involve more intricate relations and function through miscellaneous channels, resulting in an additional explanatory power exceeding that of standard preference parameters. The inclusion of culture can substantially extend our current models of economic decision making leading to an improved understanding of how psychological factors affect economic behavior.

References

Aggarwal, S., Chomsisengphet, S, Liu, C. (2011): Consumer Bankruptcy and Default: The Role of Individual Social Capital, in: Journal of Economic Psychology, 32, 632-650.

Bae, S.C., Chang, K., Kang, E., Park J.C. (2011): Dividend Policy, Corporate Governance, and Culture, in: Journal of Financial Research, forthcoming.

Becker, G.S., Mulligan, C.B. (1997): The Endogenous Determination of Time Preference, in: The Quarterly Journal of Economics, 112, 729-758.

Beckmann , D., Menkhoff, L., Suto, M. (2008): Does Culture Influence Asset Managers' Views and Behavior?, in: Journal of Economic Behavior and Organization, 67, 624-643.

Beugelsdijk, S., Frijns, B. (2010): A Cultural Explanation of the Foreign Bias in International Asset Allocation, in: Journal of Banking and Finance, 34, 2121–2131.

Campbell, J. (2006): Household Finance, in: The Journal of Finance, 56, 1553-1604.

Chang, K., Noorbakhsh, A. (2009): Does National Culture Affect International Corporate Cash Holdings?, in: Journal of Multinational Financial Management, 19, 323-342.

Chui, A.C.W., Lloyd, A.E., Kwok, C.C.Y. (2002): The Determination of Capital Structure: Is National Culture a Missing Piece to the Puzzle?, in: Journal of International Business Studies, 33, 99-127.

Chui, A.C.W., Titman, S., Wei, K.C.J. (2010): Individualism and Momentum around the World, in: The Journal of Finance, 65, 361-392.

Cox, D., Jappelli, T. (1993): The Effect of Borrowing Constraints on Consumer Liabilities, in: Journal of Money, Credit and Banking, 25, 197-213.

Dimmock, S.G., Kouwenberg , R. (2010): Loss-Aversion and Household Portfolio Choice, in: Journal of Empirical Finance, 17, 441-459.

Fidrmuc, J.P., Jacob, M., 2010. Culture, Agency Costs, and Dividends. Journal of Comparative Economics, 38, 321-339.

Frijns, B., Koellen, E., Lehnert, T. (2008): On the Determinants of Portfolio Choice, in: Journal of Economic Behavior and Organization, 66, 373-386.

Graham, R.J. (1981): The Role of Perception of Time in Consumer Research, in: Journal of Consumer Research, 7, 350-401.

Guiso, L., Haliassos, M., Japelli, T. (2002): Household Stockholding in Europe: Where Do We Stand and Where Do We Go? SSRN Working Paper.

Guiso, L., Sapienza, P., Zingales, L. (2008): Trusting the Stock Market, in: The Journal of Finance, 63, 2557-2600.

Haliassos, M., Bertaut, C. (1995): Why Do So Few Hold Stocks?, in: The Economic Journal, 105, 1110-1129.

Han, S., Kang, T., Salter, S., Yoo, Y.K. (2010): A Cross-country Study on the Effects of National Culture and Earnings Management, in: Journal of International Business Studies, 41, 123-141.

Haxhi, I., van Ees, H. (2010): Explaining Diversity in the Worldwide Diffusion of Codes of Good Governance, in: Journal of International Business Studies, 41, 710-726.

Heine, S.J., Lehman, D.R., Markus H.R., Kitayama, S. (1999): Is There a Universal Need for Positive Self-Regard?, in: Psychological Review, 106, 766-794.

Hens, T., Wang, M. (2007): Does Finance have a Cultural Dimension? FINRISK Working Paper, No. 377.

Hofstede, G. (1983): The Cultural Relativity of Organizational Practices and Theories, in: Journal of International Business Studies, 14, 75-89.

Hofstede, G. (2001): Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations across Nations, Sage Publications, Thousand Oaks, CA.

Hong, H., Kubik, J., Stein, J. (2004): Social Interaction and Stock-Market Participation, in: The Journal of Finance, 54, 137-163.

Hope, O.-K. (2003): Firm-level Disclosures and the Relative Roles of Culture and Legal Origin, in: Journal of International Financial Management and Accounting, 14, 218-248.

Kashima, E., Kashima, Y. (1998): Culture and Language: The Case of Cultural Dimensions and Personal Pronoun Use, in: Journal of Cross-Cultural Psychology, 29, 461-486.

Li, J., Harrison, J.R. (2008): National Culture and the Composition and Leadership Structure of Boards and Directors, in: Corporate Governance: An International Review, 16, 375-385.

Livingstone, S.M., Lunt, P.K. (1992): Predicting Personal Debt and Debt Repayment: Psychological, Social and Economic Determinants, in: Journal of Economic Psychology, 13, 111-134.

Markus, H., Kitayama, S. (1991): Culture and the Self: Implications for Cognition, Emotion, and Motivation, in: Psychological Review 98, 224-253.

Puri, M., Robinson, D. (2007): Optimism and Economic Choice, in: Journal of Financial Economics, 86, 71-99.

Ramirez, A., Tadesse, S. (2009): Corporate Cash Holdings, Uncertainty Avoidance, and the Multinationality of Firms, in: International Business Review, 18, 387-403.

Renneboog, L., Spaenjers, C. (2011): Religion, Economic Attitudes, and Household Finance, in: Oxford Economic Papers, forthcoming.

Sapir, E. (1970): Language, in: Mandelbaum, D. (Ed.): Culture, Language and Personality: Selected Essays, University of California Press, Berkeley, 1-44.

Schwartz, S. (1999): A Theory of Cultural Values and Some Implications for Work, in: Applied Psychology: An International Review, 48, 23-47.

Shao, L., Kwok, C.C.Y., Guedhami, O. (2010): National Culture and Dividend Policy, Journal of International Business Studies, 41, 1391-1414.

Triandis, H. C. (2001): Individualism-Collectivism and Personality, in: Journal of Personality, 69, 907-924.

Tversky, A., Kahneman, D. (1981): The Framing of Decisions and the Psychology of Choice, in: Science, 211, 453–458.

Wang, M., Rieger, M., Hens, T. (2011): How Time Preferences Differ: Evidence from 45 Countries, Swiss Finance Institute Research Paper, No. 09-47.

Weber, C.K., Hsee, E.U. (1999): Cross-National Differences in Risk Preference and Lay Predictions, in: Journal of Behavioral Decision Making, 12, 165-179.

Whorf, B.L. (1956): Language, Thought and Reality, MIT Press, Cambridge, MA.

Yeh, R., Lawrence, J. (1995): Individualism and Confucian Dynamism: A Note on Hofstede's Cultural Root to Economic Growth, in: Journal of International Business Studies, 26, 655-669.

Zheng, X., El Ghoul, S., Guedhami, O., Kwok, C.C.Y. (2011): National Culture and Corporate Debt Maturity, in: Journal of Banking and Finance, forthcoming.

Variable	*Description*
Median household income	Median nominal disposable income earned by households per annum (US$). Data for 2008. *Source: EIU WorldData 2010*
Tertiary education	Gross tertiary education enrollment rate (%). Data for 2008. *Source: The Global Competitiveness Report 2010-2011*
Dependency ratio	The dependency ratio is the sum of the ratio of the population under age 15 to the population ages 15 to 64 and the ratio of the population over age 64 to the population ages 15 to 64. Data for 2008. *Source: EIU WorldData 2010*
Religion	The percentage of the population with Protestant, Catholic, Muslim, Hindu, Buddhist, or Orthodox beliefs. *Source: CIA World Factbook 2010*
GDP per capita	Gross domestic product per capita in current US dollars. Data for 2009. *Source: The Global Competitiveness Report 2010-2011*
Inflation rate	Annual percent change in consumer price index (year average). Data for 2009. *Source: The Global Competitiveness Report 2010-2011*
Bank credit/bank deposits	Private credit by deposit money banks as a share of demand, time and saving deposits in deposit money banks. Data is averaged over 2000 to 2008. *Source: Beck/Demirgüç-Kunt (2009)*
Lending interest rate	Weighted average rate (%) charged by commercial banks on local currency loans of up to one year. Data for 2008. *Source: EIU WorldData 2010*

Table 1: Variables and sources. The table lists the descriptions of control variables and its sources.

Variable	*Mean*	*Median*	*S.D.*	*Min*	*Max*
Planning horizon and time preferences					
Household debt maturity *DMAT*	7.87	4.74	7.67	0.00	29.73
Present bias parameter β	0.63	0.65	0.20	0.15	0.98
Long-term discount factor δ	0.82	0.84	0.04	0.77	0.90
Control variables					
Median household income	34970	31640	25334	2210	89210
Tertiary education	55.63	58.30	21.67	5.20	98.10
Dependency ratio	0.49	0.50	0.08	0.31	0.72
Protestant	0.16	0.02	0.26	0.00	0.95
Catholic	0.36	0.24	0.37	0.00	0.96
Muslim	0.10	0.02	0.24	0.00	1.00
Hindu	0.02	0.00	0.12	0.00	0.81
Buddhist	0.07	0.00	0.21	0.00	0.95
Orthodox	0.07	0.00	0.24	0.00	0.98
GDP per capita	24122	18557	18930	1017	79085
Inflation rate	3.20	1.70	5.33	-1.70	27.10
Bank credit/bank deposits	1.10	0.98	0.47	0.56	3.02
Lending interest rate	9.83	7.40	7.57	1.84	47.25
Risk aversion towards gains	0.45	0.46	0.07	0.30	0.58
Risk seeking towards losses	0.72	0.73	0.11	0.50	0.89
Probability bias	0.59	0.61	0.07	0.47	0.71
Loss aversion	4.18	2.90	3.45	0.43	13.66
Cultural variables					
Hofstede power distance index	56.77	60.00	23.23	11.00	104.00
Hofstede individualism index	49.60	51.00	24.17	12.00	91.00
Hofstede masculinity index	52.85	56.00	20.96	5.00	110.00
Hofstede uncertainty avoidance index	64.79	70.00	24.20	8.00	112.00
Pronoun drop	1.42	1.00	0.50	1.00	2.00

Table 2: Summary statistics. This table presents descriptive statistics for the variables. S.D. indicates the standard deviation. Household debt maturity is measured by the ratio of long-term versus short-term loans.

Independent variables	*Dependent variable: Household debt maturity DMAT*								
Constant	7.47	*0.12*	(4.66)	5.58	*0.39*	(6.30)	0.15	*0.98*	(6.68)
Present bias parameter β	-0.03	*0.99*	(2.62)	-1.00	*0.76*	(3.18)	0.98	*0.78*	(3.44)
Long-term discount factor δ	4.76**	*0.02*	(1.96)	5.19*	*0.06*	(2.51)	5.59*	*0.06*	(2.72)
Median household income	1.58	*0.31*	(1.53)	0.78	*0.80*	(2.96)	-2.42	*0.48*	(3.30)
Tertiary education	-2.50	*0.31*	(2.43)	-1.75	*0.61*	(3.36)	1.21	*0.76*	(3.87)
Dependency ratio	1.09	*0.54*	(1.73)	0.97	*0.63*	(1.96)	-0.63	*0.78*	(2.17)
Protestant	1.26	*0.79*	(4.63)	0.36	*0.95*	(5.73)	1.27	*0.84*	(6.06)
Catholic	-1.95	*0.71*	(5.23)	-1.52	*0.82*	(6.65)	1.14	*0.87*	(6.81)
Muslim	0.46	*0.95*	(6.68)	-0.03	*1.00*	(8.41)	8.17	*0.40*	(9.24)
Hindu	-1.41	*0.30*	(8.17)	1.15	*0.81*	(9.52)	0.93	*0.69*	(2.27)
Buddhist	2.04	*0.72*	(5.60)	2.69	*0.72*	(7.42)	-5.31	*0.53*	(8.24)
Orthodox	10.28	*0.22*	(8.20)	11.08	*0.31*	(10.50)	16.73	*0.14*	(10.56)
GDP per capita				0.59	*0.82*	(2.57)	-0.88	*0.76*	(2.78)
Inflation rate				-3.66	*0.34*	(3.69)	-11.07**	*0.05*	(5.00)
Bank credit/bank deposits				0.48	*0.78*	(1.66)	0.46	*0.80*	(1.75)
Lending interest rate				1.39	*0.56*	(2.31)	2.29	*0.35*	(2.34)
Risk aversion towards gains							-1.53	*0.61*	(2.95)
Risk seeking towards losses							0.10	*0.97*	(2.69)
Probability bias							-4.59	*0.14*	(2.89)
Loss aversion							-0.68	*0.81*	(2.67)
Adjusted R^2		0.05			0.10			0.01	
N		33			30			30	

Table 3: Linear regression of the effect of time preferences on household debt maturity. The dependent variable is household debt maturity *DMAT*, measured by the ratio of long-term versus short-term loans. The independent variables are time preferences of households, represented by the present bias parameter β and the long-term discount factor δ, and a set of control variables. The table reports ordinary least squares estimates. *p*-values are denoted in *italics*, standard errors are denoted in parentheses. *** indicates the coefficient is different from 0 at the 1 % level, ** at the 5 % level, and * at the 10 % level.

Independent variables	*Dependent variable: Household debt maturity DMAT*								
Constant	6.43***	*0.00*	(1.00)	10.64**	*0.02*	(4.48)	7.13	*0.22*	(5.68)
Hofstede power distance index	-2.03	*0.40*	(2.38)	2.58	*0.12*	(1.61)	2.24	*0.26*	(1.92)
Hofstede individualism index	3.32*	*0.10*	(2.11)	4.42**	*0.02*	(1.83)	4.17*	*0.08*	(2.28)
Hofstede masculinity index	-1.17	*0.53*	(1.83)	-0.53	*0.61*	(1.04)	-0.17	*0.91*	(1.42)
Hofstede uncertainty avoidance index	5.07**	*0.03*	(2.19)	4.70***	*0.00*	(1.43)	5.25***	*0.00*	(1.63)
Median household income	1.17	*0.52*	(1.79)	3.84**	*0.02*	(1.62)	0.67	*0.81*	(2.69)
Tertiary education	-3.11	*0.11*	(1.86)	-2.51	*0.17*	(1.79)	-3.61	*0.13*	(2.31)
Dependency ratio	-3.70**	*0.04*	(1.71)	0.49	*0.71*	(1.34)	0.30	*0.85*	(1.59)
Protestant	0.52	*0.81*	(2.16)	-2.03	*0.66*	(4.59)	-1.33	*0.81*	(5.50)
Catholic	1.56	*0.46*	(2.05)	-0.77	*0.89*	(5.33)	0.10	*0.99*	(6.31)
Muslim	-1.44	*0.34*	(1.48)	-2.37	*0.68*	(5.74)	1.95	*0.79*	(7.22)
Hindu	3.58*	*0.06*	(1.77)	-3.41	*0.70*	(8.63)	2.17	*0.83*	(10.12)
Buddhist	-0.99	*0.56*	(1.66)	4.32	*0.41*	(5.13)	5.51	*0.37*	(6.06)
Orthodox	0.43	*0.82*	(1.90)	-4.63	*0.43*	(5.77)	-0.95	*0.89*	(6.70)
GDP per capita							2.48	*0.26*	(2.13)
Inflation rate							-1.79	*0.35*	(1.88)
Bank credit/bank deposits							1.55	*0.34*	(1.59)
Lending interest rate							-0.67	*0.73*	(1.91)
Adjusted R^2		0.14			0.29			0.26	
N		33			47			42	

Table 4: Linear regression of the effect of culture on household debt maturity. The dependent variable is debt maturity *DMAT*, measured by the ratio of long-term versus short-term loans. The independent variables are the cultural dimensions of the Hofstede model, power distance, Individualism and collectivism, masculinity and femininity, uncertainty avoidance, measured by the respective cultural dimension indexes. We include control variables as above. The table reports ordinary least squares estimates. *p*-values are denoted in *italics*, standard errors are denoted in parentheses. *** indicates the coefficient is different from 0 at the 1 % level, ** at the 5 % level, and * at the 10 % level.

Independent variables	*Dependent variable: Household debt maturity DMAT*					
Constant	15.49***	*0.00*	(5.29)	13.40**	*0.04*	(6.57)
Hofstede power distance index	5.22**	*0.02*	(2.15)	5.56**	*0.02*	(2.37)
Hofstede individualism index	12.67***	*0.00*	(4.19)	14.59***	*0.01*	(5.28)
Hofstede masculinity index	-1.67	*0.18*	(1.23)	-1.33	*0.38*	(1.51)
Hofstede uncertainty avoidance index	5.03***	*0.00*	(1.54)	5.63***	*0.00*	(1.63)
Median household income	1.37	*0.51*	(2.06)	-0.68	*0.80*	(2.70)
Tertiary education	-2.79	*0.15*	(1.95)	-4.43*	*0.06*	(2.37)
Dependency ratio	1.45	*0.36*	(1.58)	0.89	*0.58*	(1.61)
Protestant	-9.03	*0.12*	(5.84)	-12.26*	*0.10*	(7.37)
Catholic	-11.38	*0.13*	(7.45)	-13.54	*0.13*	(8.92)
Muslim	-6.91	*0.30*	(6.72)	-6.73	*0.40*	(7.98)
Hindu	-15.50	*0.15*	(10.76)	-4.61	*0.69*	(11.38)
Buddhist	7.34	*0.20*	(5.72)	7.90	*0.20*	(6.18)
Orthodox	-9.33	*0.16*	(6.60)	-4.82	*0.48*	(6.88)
GDP per capita				-0.09	*0.97*	(2.39)
Inflation rate				-8.08**	*0.02*	(3.49)
Bank credit/bank deposits				3.13*	*0.07*	(1.73)
Lending interest rate				2.71	*0.25*	(2.38)
Adjusted R^2		0.17			0.24	
N		46			41	

Table 5: Instrumental variables regression of the effect of culture on household debt maturity. The dependent variable is debt maturity *DMAT*, measured by the ratio of long-term versus short-term loans. The independent variables are the cultural dimensions of the Hofstede model, power distance, individualism and collectivism, masculinity and femininity, uncertainty avoidance, measured by the respective cultural dimension indexes. We include control variables as above. The table reports ordinary least squares estimates with pronoun drop as instrumental variable for individualism. *p*-values are denoted in *italics,* standard errors are denoted in parentheses. *** indicates the coefficient is different from 0 at the 1 % level, ** at the 5 % level, and * at the 10 % level.

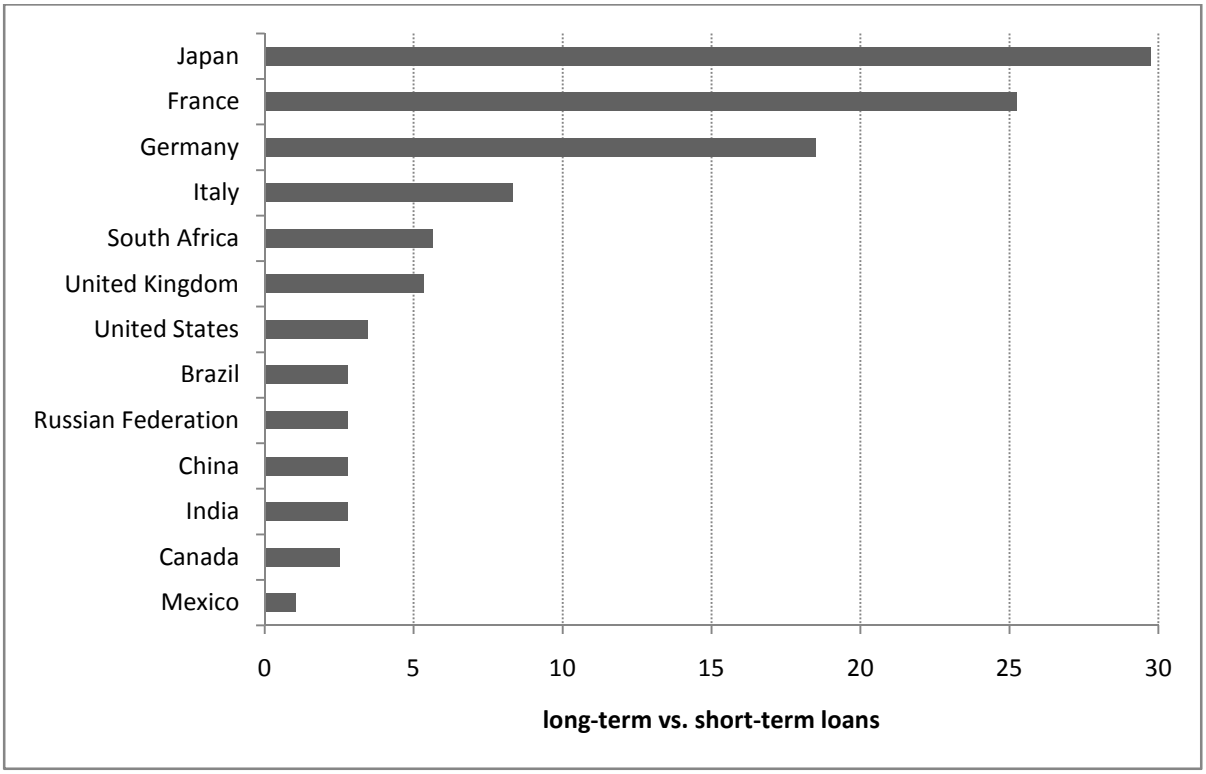

Figure 1: Ratio of long-term to short-term loans across countries. The figure shows the ratio of long-term loans to short-term loans for G8+5 countries. The data come from the Economist Intelligence Unit (EIU) World Data panel of 2009. Long-term loans are liabilities held by the household sector which consist of loans that have an original maturity of more than two years. Short-term loans are liabilities held by the household sector which consist of loans that have an original maturity of one or two years or less.

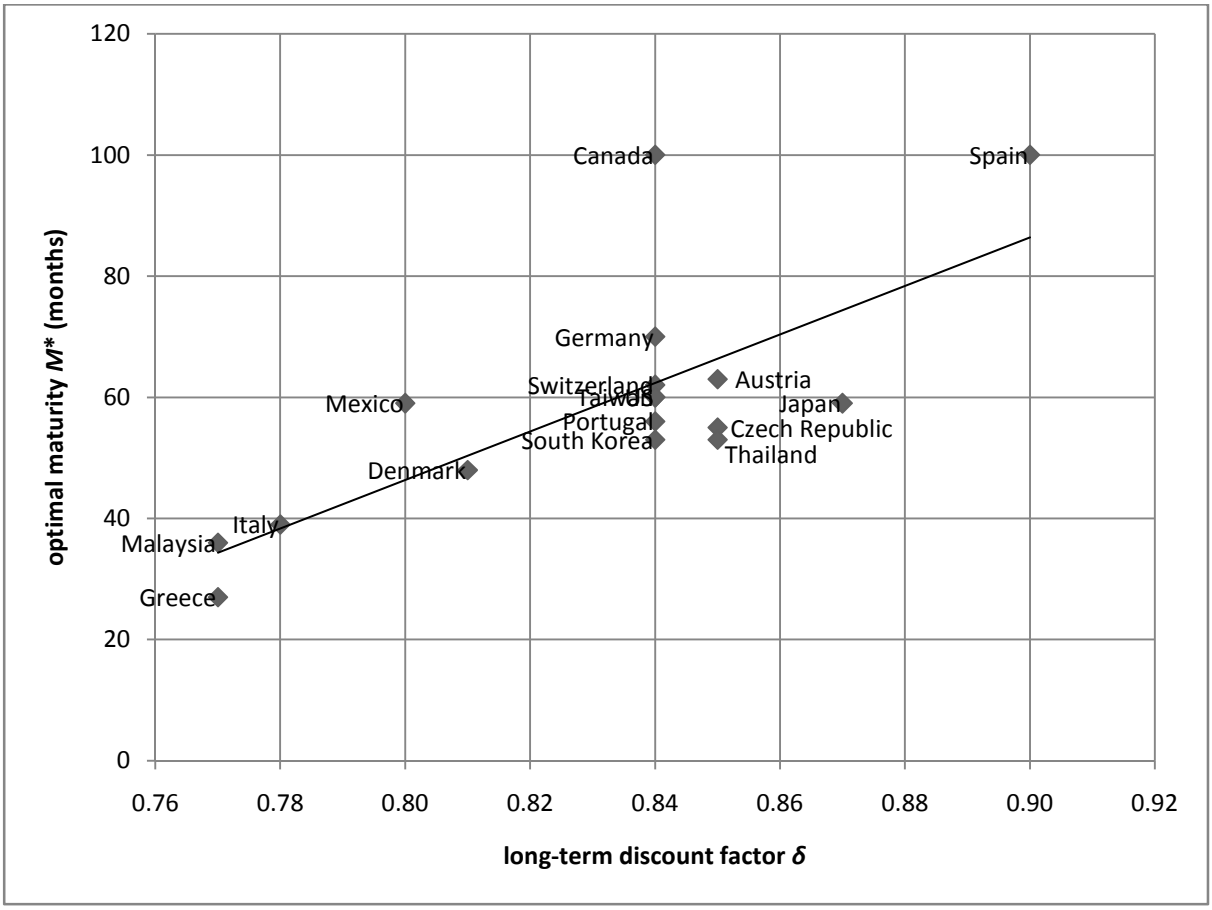

Figure 2: Time preferences and optimal maturity of loans. The figure plots the relationship between the optimal maturity of loans and the long-term discount factor derived from our theoretical model. Data for the long-term discount factor is from the INTRA survey.