The Alignment of Household Preferences and Financial Decisions Leading up to Retirement

Leandro Carvalho, Arna Olafsson, and Dan Silverman

The Alignment of Household Preferences and Financial Decisions Leading up to Retirement

Leandro Carvalho
University of Southern California

Arna Olafsson
Copenhagen Business School

Dan Silverman
Arizona State University

October 2022

Acknowledgements

The Alignment of Household Preferences and Financial Decisions Leading up to Retirement

Abstract

We report on research that links survey and administrative data to investigate how within-couple differences in preferences and financial decision-making abilities affect household finances. We study whether within-household differences in preferences or financial decision-making abilities influence household choices and, thus, retirement readiness. Initial results indicate that, while individual variation in saving and portfolio preferences and decision-making ability is significantly related to individual variation in financial outcomes, there is only modest evidence that within-household variation in these measures is associated with between-household differences in expenditure, liquidity, and outcomes.

Citation

Introduction

In the years leading up to retirement, a household will make countless decisions concerning work, spending, saving, debt, and financial portfolio. These decision are made by household members with potentially different preferences and different abilities at financial decision making. Some household members may be more risk averse than others. Some may be more willing to trade smaller rewards now for larger ones in the future. Some may have more experience or training in making financial choices and mapping their options into their objectives. In theory, such differences could have important consequences for household financial outcomes. Depending on the mechanisms by which household decisions get made, and how well information is shared within the household, misaligned preferences or abilities could limit how well a household's members adhere to a budget, make and execute plans for retirement savings, avoid costly debt, and other important outcomes. There is, however, little empirical evidence about the relationships between within-household variation in preferences and financial decision-making abilities and household financial outcomes.

Our research addresses this gap in empirical evidence by collecting experimental measures of both the preferences and the decision-making abilities of individuals within households. It then links these measures with individual-level, detailed transaction and balance, administrative panel data that contains information on, e.g., income, expenditure, bank and investment account balances, and credit lines. By linking these two sources of data, we can study the relationship between within household variation in preferences and decision-making ability, and important financial outcomes.

The survey and linked administrative data come from Iceland, where the banking system has features that make it especially well-suited to studying household finances. In particular, Iceland has no joint bank accounts. Thus, while the two members of a couple might pool their resources through informal arrangements, they cannot formally share an account. The two members of a couple can, however, be linked accurately in administrative data. This allows us to conduct analysis both at the level of the individual and individual account, and at the level of the couple and pooled accounts.

Summary of data sources

Our analysis combines data from two sources. The first is an administrative data panel of all customers of the second largest commercial bank in Iceland. These data cover the period January 2017 to March 2022. They contain the transaction and balance records of the checking, savings, credit card, and investment accounts of bank customers. There are no "joint" accounts in Iceland, but the accounts of spouses can be linked using unique but deidentified codes.[1]

The second data source is a survey, conducted from October 2021 to January 2022, of 1,336 of individual customers whose administrative records are included in the first administrative data source. These 1,336 individuals were screened to ensure they also had a spouse with records in the administrative data, resulting in 668 couples. There are two main elements of this survey.[2] The first element is a set of incentivized

---

[1] We use the term spouse to identify a member of a couple who may, or may not, be legally married but are officially recognized.

[2] The survey also includes standard questions about sociodemographic characteristics and a question (to each spouse) about who makes financial decisions.

experiments involving choice under risk, and the allocation of resources between spouses.[3] The risk experiments included both a standard task of allocating an endowment across risky assets and a novel task that asked one spouse to perform the same risk task as if they were the other spouse. In this second task, that is, we asked one spouse to predict what the other spouse would choose in decisions under risk and incentives. The task of allocating resources between spouses was standard. It involved dividing an endowment between self and spouse at rates of exchange that were manipulated by the experiment.

The second element of the survey was composed of two qualitative assessments of time preferences and financial decision-making ability. Again, the distinctive aspect of this element is to ask each spouse both about themselves and about their spouse. The time preferences assessment asked participants to evaluate their own and their spouse's willingness to postpone a benefit in order to receive a larger benefit in the future. The decision-making ability assessment asked participants to evaluate their own and their spouse's skills at avoiding financial mistakes.

Methods

Administrative data measures of financial outcomes.

We used the administrative bank records to calculate several financial choice and outcome measures. We define *cash-on-hand* as the sum of the balances of checking and savings accounts. *Liquidity*, is cash-on-hand plus the remaining credit

---

[3] In these and all other incentivized experiments, the incentive payments were made directly into the bank accounts of the participants.

available through checking account overdraft and through credit card. This measure of liquidity reflects the importance of checking (aka "current") account overdrafts as a source of consumer credit in Iceland. In Iceland, overdrafts on checking accounts are the most common form of revolving consumer debt. Virtually all checking accounts in Iceland offer an overdraft facility, the size of which is based on credit history, income, and assets. Overdrafts can be made at any time without consulting the bank and overdraft status can be maintained indefinitely. Overdrafts charge average annual percentage rates (APRs) of around 12%.[4]

Expenditures sums all debits from all accounts, adding back transfers between accounts and credit card payments. *Income* measures all credits to all accounts, subtracting out transfers between accounts and credit card payments. *Debt*, is the amount of overdraft and credit card debt. *Portfolio* gives the total value of investments held with this commercial bank, and the fraction of that portfolio invested in stocks.

Survey tasks and questions

Survey participants were administered three different experimental tasks. Summing across the three tasks, participants faced a total of 25 problems (not counting practice problems). At the end of the survey, one of the participant's 25 problems was randomly selected to be implemented.

---

[4] Statistics, Central Bank of Iceland
www.sedlabanki.is/library/Fylgiskjol/Hagtolur/Fjarmalafyrirtaeki/2019/1013\20INN_Utlan_0520 19.xlsx

Choices under risk for self

In the first task, participants allocated an experimental budget between two assets (Arrow securities), each of which pays off in only one of two, equally-likely, states of the world as in Choi et al. (2014). So the participant's decision is, in effect, to "bet" some part of the budget on one state and the rest on the other. Participants faced 15 such problems where, most importantly, the prices of the underlying Arrow securities vary across problems. That means the rate of exchange between the two assets varies across problems, making it more or less attractive to bet more of the budget on one state of the world or the other. If one of these 15 problems was the one selected to be implemented, the computer randomly selected the state of the world and the participant was paid her contingent choice in the randomly selected problem. Otherwise, the participant received no feedback on the outcomes of her choices.

Risk choices on behalf of spouse

The second task was analogous to the first with one important difference. In this second task, participants were asked to predict how their spouses would have allocated the experimental budget if they were facing the problem. Participants encountered five such problems, again with prices of the underlying Arrow securities varying across problems. If one of these five problems was the one selected to be implemented, then the computer randomly selected the state of the world and, the participant was informed, the *participant's spouse* was paid the participant's contingent choice in the randomly selected problem.

<u>Social choices task</u>

In the third task, participants decided how to allocate an endowment between themselves and their spouse. As is now standard, there was a conversion rate at which the participant could redistribute from self to spouse, making it more or less expensive for a participant to share the endowment with her spouse. Participants undertook five problems, where we varied this conversion rate. If one of these five problems was the one selected to be implemented, the participant was paid the amount she had allocated to herself in the selected problem while the amount allocated to her spouse in the same problem was paid to the spouse.

<u>Time preferences</u>

To evaluate time preferences while economizing on survey time, we asked participants the following question: "How willing are you to give up something that is beneficial for you today in order to benefit more from that in the future?" They were asked to provide an answer in the range from 0 to 10 where 0 was "Completely unwilling to do so" and 10 was "Completely willing to do so." In addition, we asked participants to make the same assessment of their spouses: "How willing is your spouse to give up something that is beneficial for him/her today in order [for him/her] to benefit more from that in the future?"

<u>Subjective assessment of decision-making abilities</u>

To complement measures of decision-making abilities (described below) based on the choice under risk task we asked participants: "On a scale of 1 to 10 how good are you at making financial decisions, where 1 means you almost always makes financial mistakes, and 10 means you never make financial mistakes?" We also asked

participants to make the same assessment of their spouse: "On a scale of 1 to 10 how good is your spouse at making financial decisions, where 1 means your spouse almost always makes financial mistakes, and 10 means he/she never makes financial mistakes?"

Measuring individual risk preferences

For a given problem in the individual choice under risk task, we measure risk preferences in two steps. First, we calculate the ratio of the payout in the more expensive state of the world to the sum of the payouts in the two states. This is a simple measure of aversion to risk. When the share of the total allocation going to the more expensive asset is higher, that means the participant is willing to pay more, in terms of payoff in the other state, to ensure a higher payoff in the state in which the more expensive asset pays off (the "expensive state"). They thus reveal greater aversion to accepting risk in exchange for reward. If, instead, that fraction is low, then the participant is more willing to accept the risk of a lower payoff in the expensive state in exchange for a higher reward if the other state is realized. In the second step, we calculated the minimum between this ratio and 0.5 and averaged this metric across the 15 problems of the risk task.

Individual decision-making ability

Our measure of financial decision-making ability (DMA) is designed to capture the consistency of choices in the individual choice under risk task with normative axioms of choice. In particular, we study the extent to which choices in that task are consistent the Generalized Axiom of Revealed Preference (GARP) and monotonicity first-order stochastic dominance (FOSD)

Choi et al. (2014), Kariv and Silverman (2013), and Carvalho, Olafsson, and Silverman (2021) all argue that consistency with GARP is a necessary condition for high quality decision-making. This view is founded on a result from Afriat (1967), which shows that if an individual's choices satisfy GARP in a setting like the one we study, then those choices can be rationalized by a utility function that is weakly monotonic and concave. Consistency with GARP thus implies that the choices can be reconciled with a single, stable, and at least moderately reasonable objective.

Consistency with GARP may be too low a standard of DMA because it treats, in effect, all stable objectives of choice as equally high-quality. For example, choices to always allocate all the endowment in the risk task to the asset displayed farthest to the right of the screen would be consistent with GARP. It is therefore reasonable to require a stronger notion a monotonicity. Specifically, violations of monotonicity with respect to first-order stochastic dominance — choices that yield payoff distributions with unambiguously lower payoffs than available options — may naturally be seen as imperfect choices and thus provide a criterion for decision-making quality. A simple way for a participant to violate monotonicity with respect FOSD in the risk task is if their choice implies that, when we sum across payments in both states, more than half of those payments are realized in the more expensive state. That choice violates monotonicity with respect to FOSD because there is another choice that would deliver at least as much in the more expensive state, but more in the cheaper state.

We follow Polisson et al. (2019) and calculate a unified measure of violations of GARP and of monotonicity with respect to FOSD. This measure lies between 0 and 1

where 1 represents perfect consistency with both GARP and monotonicity with respect to FOSD.

Individual social preferences

For a given problem in the social task, we calculated the ratio of the amount allocated to the participant's spouse to the sum of the amounts allocated to each spouse. We then averaged this ratio across the five problems of the social choices task. While the rate of exchange between self and spouse varies across problems, that average measure reflects a central tendency to trade own payoff for spouse's.

Measures for couples

Given a concept — risk preferences, decision-making abilities, time preferences, or social preferences, we constructed two measures for each couple: (1) the average of the two spouses' individual measures and (2) the absolute difference between the spouses' individual measures. In addition, as a measure of the intra-couple heterogeneity in risk preferences, we calculated the Euclidean distance between two vectors, one vector containing the choices of the participant in each of the 15 problems of the risk task and another containing the choices of the participant's spouse.[5]

Percentile ranks

All measures, including the financial outcomes, the risk preferences, and decision-making abilities, were converted into percentile ranks with just three exceptions: (1) the measures of time preferences; (2) income — log income is the

---

[5] Because the budget line is convex, a participant's choice in a given problem can be represented by a scalar.

measure used; and (3) the fraction of the portfolio invested in stocks. For individual-level measures, the percentile ranks were calculated with respect to the distribution of all 1,336 study participants. For couple-level measures, the percentile ranks were calculated with respect to the distribution of all 668 couples.

Summary statistics

Table 1 presents summary statics of the administrative records for participants in the survey, only. The level statistics are in Icelandic Krona, each of which is worth about $0.007. Cash on hand is the balance in the equivalent of current (checking) and saving accounts and is measured on a daily basis. Liquidity is cash on hand plus unused credit available through overdrafts or credit cards, also measured daily. Income represents all inflows into current and saving accounts, subtracting transfers between accounts, and is aggregated to a monthly measure. Debt is the average daily level of current account overdraft balance. The total value of the financial portfolio is any financial assets other than cash-on-hand, measured at the end of each month.

As is typical, average expenditure is approximately equal to average income. Average debt levels in this sample are modest relative to average income. At the end of the month, on average, couples carry approximately 20% of monthly income in overdraft debt. We drop from the individual-level sample 20 study participants who had zero income. Those 20 individuals were added back to the couple-level sample.

Table 1: Summary statistics of survey and administrative data

for survey participants

	Individuals	Couples
Cash on hand	2,496,631	4,918,512
	(6,193,658)	(9,669,636)
Liquidity	2,984,489	5,879,623
	(6,340,050)	(9,954,076)
Total expenditure	909,089	1,777,050
	(648,553)	(908,416)
Income	878,102	1,711,783
	(829,401)	(1,169,041)
Debt	185,011	364,483
	(358,647)	(567,770)
Financial portfolio	84,329	154,856
	(384,627)	(5,382,056)
% portfolio invested in stocks	0.18	0.29
	(0.38)	(0.45)
N	1,316	668

Note: Means and standard deviations (in parentheses) for participants in the couples survey. Excludes those using different bank for income and expenses.

Findings

In what follows, we present initial estimates of the relationship between financial outcomes and the more "own" measures of preferences and decision-making ability. We focus, that is, on the decision tasks where respondents made decisions on their own behalf. The analysis includes individual-level estimates and estimates that aggregate individual-level responses up to the level of the household, including measures of within-household variation in preferences and abilities.

Individual-level analysis

Table 2 presents OLS estimates, at the individual level, of the relationship between survey measures of preferences or decision-making ability, and the administrative data measure of expenditures. Recall that the risk preference, decision-

making ability, and expenditures measures have been converted into percentile ranks. Time preference is, however, measured on a scale of 1 to 10, and income is converted to a natural log scale.

The results show that those with higher levels of risk aversion have lower levels of expenditure, even conditional on income. An increase of one decile in the risk aversion distribution is associated with a decrease of between 0.068 and 0.047 deciles in the expenditure distribution. We would expect this negative relationship if, as is predicted by models of precautionary saving, those with higher risk aversion have higher saving rates. Less intuitively, the results show a positive relationship between patience and expenditures. Conditional on income and risk preferences, one would expect more patient people to spend less. It may be that this question is capturing something other than just the traditional notion of the time discount rate.

Table 2: Individual-level estimates of the relationships between preferences, decision-making ability, and expenditures

	Expenditures							
	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6	Regression 7	Regression 8
Risk	-0.0682**			-0.0628**	-0.0675**		-0.0622**	-0.0469*
	(0.0274)			(0.0274)	(0.0274)		(0.0275)	(0.0260)
Time		0.116***		0.112***		0.116***	0.111***	0.0931***
		(0.0324)		(0.0325)		(0.0324)	(0.0325)	(0.0316)
DMA			0.0191		0.0162	0.0171	0.0145	0.00197
			(0.0274)		(0.0273)	(0.0272)	(0.0272)	(0.0260)
Log Income								0.656***
								(0.0746)
Constant	5.336***	4.267***	4.903***	4.608***	5.253***	4.186***	4.536***	-3.320***
	(0.158)	(0.213)	(0.156)	(0.265)	(0.212)	(0.246)	(0.296)	(0.958)
Observations	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316
R-squared	0.005	0.009	0.000	0.013	0.005	0.009	0.013	0.105

Note: Standard errors are reported in the parentheses.

We find no evidence of an important relationship between the measure of decision-making ability (DMA) and expenditures. The coefficient on the measure of DMA is close to zero and we can reject null hypotheses of economically significant relationships (either positive or negative).

Table 3 presents parallel estimates for the individual-level of measure of liquidity.[6] These results show we cannot reject a null hypothesis of no relationship between liquidity and risk preferences. There is, however, evidence of a relatively strong negative relationships between time preference, decision-making ability, and liquidity. Again the relationship between time preference and liquidity is less intuitive. Individuals who say they are more patient have less liquidity. The relationship between decision-making ability (DMA) and liquidity is more of what one would expect. Those with higher levels of DMA have more liquidity, even conditional on income.

---

[6] Results are qualitatively similar if we study only cash on hand, instead of liquidity (cash on hand plus unused credit).

Table 3: Individual-level estimates of the relationships between preferences, decision-making ability, and liquidity

	Liquidity							
	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6	Regression 7	Regression 8
Risk	0.0210			0.0132	0.0238		0.0161	0.0279
	(0.0277)			(0.0276)	(0.0277)		(0.0276)	(0.0267)
Time		-0.161***		-0.160***		-0.163***	-0.162***	-0.176***
		(0.0328)		(0.0330)		(0.0326)	(0.0327)	(0.0325)
DMA			0.0655**		0.0666**	0.0683**	0.0690**	0.0594**
			(0.0274)		(0.0274)	(0.0271)	(0.0271)	(0.0263)
Log Income								0.502***
								(0.0544)
Constant	4.892***	6.009***	4.675***	5.937***	4.552***	5.685***	5.595***	-0.416
	(0.155)	(0.224)	(0.156)	(0.274)	(0.212)	(0.256)	(0.305)	(0.725)
Observations	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316
R-squared	0.000	0.018	0.004	0.018	0.005	0.022	0.023	0.076

Note: Standard errors are reported in the parentheses.

Couple-level analysis

The individual-level analysis provides some evidence that measures of preferences or DMA are associated with important economic outcomes like levels of expenditure and liquidity. We turn now to couple-level analysis and study the relationship between preferences, DMA, and financial outcomes across couples.

Table 4 displays couple-level results for expenditures. They show some evidence of an economically substantial relationship between within-couple variation in risk attitudes and the expenditures of the couple. The greater the degree of difference between the two spouses, the higher their level of expenditure. While it is estimated somewhat imprecisely, the coefficient on the within-couple difference in revealed risk attitudes is positive and sizeable. This result is consistent with the hypothesis that conflicting risk preferences, *per se,* make it more difficult to restrain expenditure.

The within-couple average of the time preference measure is, as in the individual-level analysis, positively correlated with expenditure. The point estimate on the difference in time preferences between spouses is small and imprecisely estimated. There is no evidence of an

important relationship between measures of decision-making ability and the expenditure of the couple. The estimated relationship between the (log) income of the couple and expenditure is, as expected, positive and strong.

Table 4: Couple-level estimates of the relationships between preferences, decision-making ability, and expenditures

	Expenditures							
	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6	Regression 7	Regression 8
Mean Risk	-0.0110			-0.00305	0.00541		0.0128	0.00636
	(0.0461)			(0.0459)	(0.0478)		(0.0476)	(0.0451)
Diff. in Risk	0.0823*			0.0793*	0.104**		0.100**	0.0895*
	(0.0460)			(0.0455)	(0.0512)		(0.0509)	(0.0490)
Mean Time		0.145***		0.135**		0.143***	0.134**	0.124**
		(0.0544)		(0.0545)		(0.0541)	(0.0545)	(0.0530)
Diff. in Time		0.0113		0.00151		0.0143	0.00756	0.0268
		(0.0667)		(0.0662)		(0.0664)	(0.0659)	(0.0613)
Mean DMA			0.0323		0.0628	0.0309	0.0606	0.0279
			(0.0409)		(0.0434)	(0.0407)	(0.0432)	(0.0417)
Diff. in DMA			0.0519		0.0336	0.0500	0.0330	0.0353
			(0.0414)		(0.0420)	(0.0410)	(0.0418)	(0.0405)
Log Income								1.626***
								(0.208)
% Income by Highest Earner								0.0582
								(0.451)
Constant	4.637***	4.065***	4.573***	3.762***	3.965***	3.665***	3.111***	-17.65***
	(0.414)	(0.383)	(0.354)	(0.561)	(0.592)	(0.504)	(0.697)	(2.754)
Observations	668	668	668	668	668	668	668	668
R-squared	0.008	0.010	0.003	0.017	0.011	0.013	0.020	0.159

Note: Standard errors are reported in the parentheses.

Estimates of the relationships between couple-level measures of preferences, decision-making ability, and liquidity reveal some modest evidence of the importance of within-household differences in time preferences and stronger evidence of the importance of average decision-making ability.

The point estimate on the mean level of time preference has a large negative coefficient, and the within-couple difference in time preferences suggests that conflict on this dimensions leads is associated with still lower levels of liquidity. The coefficients on this conflict effect are, however,

imprecisely estimated. Different from the estimates for expenditure, we find that the average decision-making ability of the couple is positively, and significantly associated with liquidity, even conditional on income.

Table 5: Couple-level estimates of the relationships between preferences, decision-making ability, and liquidity

	Liquidity							
	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6	Regression 7	Regression 8
Mean Risk	0.0518			0.0305	0.0885*		0.0678	0.0635
	(0.0453)			(0.0450)	(0.0469)		(0.0464)	(0.0452)
Diff. in Risk	-0.00720			0.00137	0.0504		0.0595	0.0525
	(0.0458)			(0.0452)	(0.0513)		(0.0506)	(0.0495)
Mean Time		-0.307***		-0.302***		-0.308***	-0.305***	-0.312***
		(0.0517)		(0.0520)		(0.0510)	(0.0511)	(0.0514)
Diff. in Time		-0.116*		-0.112*		-0.106*	-0.102	-0.0893
		(0.0636)		(0.0642)		(0.0631)	(0.0630)	(0.0626)
Mean DMA			0.0881**		0.109**	0.0880**	0.110**	0.0872**
			(0.0414)		(0.0441)	(0.0404)	(0.0432)	(0.0432)
Diff. in DMA			0.00701		0.00445	0.0101	0.00443	0.00496
			(0.0419)		(0.0431)	(0.0407)	(0.0420)	(0.0418)
Log Income								1.143***
								(0.179)
% Income by Highest Earner								-0.349
								(0.438)
Constant	4.770***	7.117***	4.518***	6.923***	3.735***	6.618***	5.873***	-8.472***
	(0.398)	(0.374)	(0.360)	(0.536)	(0.582)	(0.504)	(0.680)	(2.385)
Observations	668	668	668	668	668	668	668	668
R-squared	0.003	0.049	0.007	0.050	0.012	0.057	0.060	0.126

Note: Standard errors are reported in the parentheses.

Interim conclusions and plans for future work

The initial results reported here suggest that, for purposes of explaining important household financial outcomes, differences in average measures of preferences and abilities are more important than within-household differences in the preferences and abilities. There is some evidence that within-household conflicts in risk preferences are associated with higher levels of household expenditure. The average levels of time preference or decision-making ability are, however, more strongly associated with between-household differences in spending and liquidity.

Moving forward, we will study these relationships in greater depth and try to understand better the counter-intuitive findings about time preference and spending and liquidity. We will also study other aspects of the data, especially those surrounding one spouse's perceptions of the other's preferences, abilities, and spending patterns. It may be that misaligned perceptions about these factors are more important for household decision-making than the preferences, abilities, and spending patterns themselves.

We study whether within-household differences in preferences or financial decision-making abilities influence household choices and thus retirement readiness. Initial results indicate that, while individual variation in preferences and decision-making ability is significantly related to individual variation in financial outcomes, there is only modest evidence that within-household variation in these measures is associated with between-household differences in expenditure, liquidity, and other measures of household finances.

Citations

Afriat, Sydney. "The Construction of a Utility Function from Expenditure Data." *Econometrica*, 6 (1967), 67-77.

Carvalho, Leandro, Arna Olafsson, and Dan Silverman "Misfortune and Mistake: The Financial Conditions and Decision-making Ability of High-Cost Loan Borrowers." Working Paper, (2021).

Choi, Syngjoo, Shachar Kariv, Wieland Müller, and Dan Silverman. "Who Is (More) Rational?". *American Economic Review* 104.6 (2014): 1518-1550.

Kariv, Shachar, and Dan Silverman, "An Old Measure of Decision-Making Quality Sheds New Light on Paternalism," *Journal of Institutional and Theoretical Economics*, 169 (1) (2013), 29-44.

Polisson, Matthew, John K-H. Quah, and Ludovic Renou. "Revealed Preferences Over Risk and Uncertainty." Working Paper, (2019).