Money Illusion and Household Finance

Online Appendix

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A Correlates of Money Illusion

Our empirical analysis focuses on the relationship between money illusion, as measured by the MI index, and the RA share. To minimize the risk of confounds, we control for theoretically relevant characteristics. In this section, we discuss the observed correlations between the MI index and other characteristics, using Spearman rank correlations, and OLS and Tobit regressions.

Table A.1: Correlations of Money Illusion Index, Education, and Finances

	MI Index	Student	Education	STEM	Exper. Infl.	Income	Assets
Student	−0.160***						
	[0.000]						
Education	−0.091**	−0.132***					
	[0.014]	[0.000]					
STEM	−0.026	−0.056	0.169***				
	[0.479]	[0.133]	[0.000]				
Exper. Infl.	0.015	−0.357***	0.100***	0.059			
	[0.686]	[0.000]	[0.007]	[0.113]			
Income	−0.106***	−0.302***	0.392***	0.124***	0.345***		
	[0.004]	[0.000]	[0.000]	[0.001]	[0.000]		
Assets	−0.052	−0.277***	0.235***	0.200***	0.168***	0.276***	
	[0.158]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	
Liabilities	0.005	−0.231***	0.178***	0.091**	0.291***	0.358***	0.528***
	[0.885]	[0.000]	[0.000]	[0.014]	[0.000]	[0.000]	[0.000]

Notes: The table shows Spearman rank correlations for all 733 validated participants, with *p*-values in square brackets. *MI Index* is our survey measure of money illusion. *Student* is a dummy set to 1 for current students. *Education* is the standard number of years required to complete an individual's education. *STEM* is a dummy set to 1 if the participant completed an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications. *Exper. Infl.* is the average inflation rate over the participant's life. *Income* includes gross wages, pensions, and benefits. *Assets* is gross assets, excluding pension wealth. *Liabilities* is total liabilities. Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table A.1 shows Spearman rank correlations among the MI index and education, experienced inflation, and finances. The first three rows show that students and participants with more education tend to be less prone to money illusion than others. Surprisingly, there is no correlation between the MI index and STEM education, suggesting that money illusion is not related to numeracy. The fourth row shows that the correlation between the MI index and experienced inflation is close to zero and insignificant, suggesting that experience with low to moderate inflation does not necessarily reduce money illusion. The fifth through seventh rows show that participants with higher incomes tend to be less prone to money illusion, that education, income and wealth are highly correlated, and that individuals with higher incomes, more assets, and

more liabilities have experienced higher inflation. This last result suggests a confound with age, which we include in regressions, given that older people tend to have higher incomes and more assets, and that inflation in Denmark has been considerably lower since the mid-1980s than it was in prior decades.

Table A.2: Correlations of Money Illusion Index, Education, and Finances (no students)

	MI Index	Education	STEM	Exper. Infl.	Income	Assets
Education	−0.115***					
	[0.003]					
STEM	−0.029	0.151***				
	[0.450]	[0.000]				
Exper. Infl.	−0.050	0.024	0.049			
	[0.199]	[0.546]	[0.212]			
Income	−0.176***	0.386***	0.131***	0.240***		
	[0.000]	[0.000]	[0.001]	[0.000]		
Assets	−0.098**	0.186***	0.201***	0.032	0.193***	
	[0.012]	[0.000]	[0.000]	[0.409]	[0.000]	
Liabilities	−0.036	0.143***	0.086**	0.209***	0.296***	0.494***
	[0.350]	[0.000]	[0.027]	[0.000]	[0.000]	[0.000]

Notes: The table shows Spearman rank correlations for the 663 validated non-student participants, with *p*-values in square brackets. *MI Index* is our survey measure of money illusion. *Education* is the standard number of years required to complete an individual's education. *STEM* is a dummy set to 1 if the participant completed an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications. *Exper. Infl.* is the average inflation rate over the participant's life. *Income* includes gross wages, pensions, and benefits. *Assets* is gross assets, excluding pension wealth. *Liabilities* is total liabilities. Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table A.2 shows the same correlations as Table A.1, with students, who tend to be highly able but have low incomes and wealth, excluded. The first column shows that education and income are even more strongly correlated with the MI index when students are excluded, and that a higher index is associated with significantly lower gross assets, but not significantly lower gross liabilities. The significant correlations between the MI index, length of education, income and wealth are all consistent with expectations. More educated people are likely to have higher incomes, higher wealth, and a better understanding of how to deflate. As before, the MI index is not correlated with STEM education or experienced inflation. Experienced inflation remains significantly correlated with income and liabilities, but the correlation with assets ceases to be significant.

Table A.3: Correlations of Money Illusion Index, Cognition and Risk/Loss Aversion

	MI Index	IST-M Score	CRT Score	Risk Consistent	Risk Safe	Loss Consistent
IST-M Score	−0.136***					
	[0.000]					
CR Score	−0.283***	0.300***				
	[0.000]	[0.000]				
Risk Consistent	−0.121***	0.177***	0.181***			
	[0.001]	[0.000]	[0.000]			
Risk Safe	0.066*	−0.070*	−0.033	−0.273***		
	[0.074]	[0.059]	[0.366]	[0.000]		
Loss Consistent	−0.098***	0.108***	0.105***	0.367***	−0.167***	
	[0.008]	[0.004]	[0.005]	[0.000]	[0.000]	
Loss Safe	−0.014	0.041	0.056	−0.126***	0.298***	−0.177***
	[0.704]	[0.268]	[0.131]	[0.000]	[0.000]	[0.000]

Notes: The table shows Spearman rank correlations for all 733 validated participants, with *p*-values in square brackets. *MI Index* is our survey measure of money illusion. *IST-M Score* is a measure of fluid intelligence between 0 and 20 (Liepmann et al. 2001). *CR Score* is a cognitive reflection test score between 0 and 3 (Frederick 2005). *Risk Consistent* and *Loss Consistent* are dummies set to 1 if a participant had a single switching point in incentivized lottery tasks measuring risk and loss aversion (Tanaka, Camerer, and Nguyen 2010). *Risk Safe* and *Loss Safe* are the number of safe choices in the risk and loss lottery tasks, with higher values indicating greater risk and loss aversion, respectively. Safe choices are used in lieu of switching points so that inconsistent participants can be included. Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table A.3 shows Spearman rank correlations among the MI index and elicited measures of cognitive ability, cognitive reflection, risk aversion, and loss aversion. The first column shows that the MI index is highly significantly negatively correlated with cognitive ability (IST-M), cognitive reflection (CR), and a single switching point in lottery tasks intended to measure risk and loss aversion. It is also marginally significantly correlated with more safe choices in the risk aversion lottery task, but not with the number of safe choices in the loss aversion lottery task. The second and third columns show that cognitive ability and cognitive reflection are strongly correlated, and that a single switching point in both lottery tasks is strongly correlated with cognitive ability and reflection. The positive relationship between the cognitive measures and a single switching point in the lottery tasks is not surprising, inasmuch as understanding the lottery tasks well enough to answer consistently requires a certain level of cognitive ability. The number of safe risk choices is marginally negatively correlated with cognitive ability, but not with cognitive reflection, and the number of safe loss choices is not correlated with either. The last three columns show that there is a strong positive correlation between safe choices in the risk and loss lottery tasks, as well as a strong negative correlation between a single switching point and the number of safe choices in both cases.

Taken together, the results in Tables A.1 to A.3 show that there is a strong negative relationship between cognitive ability/reflection, education, and income on one side, and money illusion on the other. There is also a significant negative correlation between money illusion and assets. These simple correlations point to the need for controls in regressions of the RA share on the MI index. However, we are also interested in the degree to which demographic and psychometric measures explain money illusion. To explore this issue, we regress the MI index on the other relevant variables, using OLS (with Tobit as a robustness check).

Table A.4: Money Illusion, Education, and Finances (OLS)

Dep. Var.: Money Illusion Index	(1)	(2)	(3)	(4)	(5)
Student	−0.144***	−0.168***	−0.174***	−0.165***	−0.141***
	(0.029)	(0.037)	(0.036)	(0.037)	(0.038)
Education	−0.014***	−0.014***	−0.009*	−0.008*	−0.004
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
STEM Education	−0.001	−0.001	0.013	0.045*	0.037
	(0.025)	(0.025)	(0.025)	(0.026)	(0.025)
Experienced Inflation		−0.015	−0.002	−0.039	−0.045
		(0.016)	(0.018)	(0.032)	(0.032)
Income Quintile (kr.)					
Second (127k to 196k)			−0.019	−0.021	−0.012
			(0.039)	(0.042)	(0.042)
Third (196k to 286k)			0.027	0.033	0.033
			(0.040)	(0.043)	(0.042)
Fourth (286k to 375k)			0.013	0.046	0.056
			(0.037)	(0.044)	(0.043)
Fifth (375k+)			−0.076**	−0.004	0.011
			(0.035)	(0.045)	(0.045)
Net Worth Quintile (kr.)					
Second (−114k to 8k)			0.005	0.006	0.010
			(0.037)	(0.038)	(0.037)
Third (8k to 165k)			0.020	0.017	0.025
			(0.035)	(0.035)	(0.035)
Fourth (165k to 709k)			−0.024	−0.023	−0.027
			(0.029)	(0.029)	(0.029)
Fifth (709k+)			−0.043	−0.030	−0.019
			(0.030)	(0.031)	(0.031)
Demographics	No	No	No	Yes	Yes
Psychometrics	No	No	No	No	Yes
Constant	0.446***	0.516***	0.414***	0.457***	0.631***
	(0.056)	(0.091)	(0.105)	(0.127)	(0.198)
R^2	0.035	0.036	0.064	0.106	0.163
AIC	167.4	168.5	163.4	153.8	127.3
N	733	733	733	733	733

Notes: The table shows coefficients from OLS regressions of the *Money Illusion Index* on relevant characteristics for all validated participants, with robust standard errors in parentheses. *Student* is a dummy set to 1 for students. *Education* is the standard number of years required to complete an individual's education. *STEM Education* is a dummy set to 1 if the participant completed an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications. *Experienced Inflation* is the average inflation rate over the participant's life. *Income Quintile* includes dummies for gross non-capital income (from wages, pensions, and benefits), with a base of the bottom quintile. *Net Worth Quintile* includes dummies for net worth (gross assets excluding pension wealth less liabilities), with a base of the bottom quintile. *Demographics* include age, number of children, and dummies for self-employed, retired, medium- and high-skilled employment, public sector employment, partnered and married. *Psychometrics* include an IST-M fluid intelligence test score (Liepmann et al. 2001), a dummy for correctly answering two or more questions on a cognitive reflection test (Frederick 2005), incentivized risk and loss aversion measures (Tanaka, Camerer, and Nguyen 2010) and the Big 5 personality test (Costa and McCrae 1992). Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table A.5: Money Illusion, Education, and Finances (Tobit)

Dep. Var.: Money Illusion Index	(1)	(2)	(3)	(4)	(5)
Student	−0.144***	−0.168***	−0.173***	−0.164***	−0.141***
	(0.034)	(0.044)	(0.044)	(0.046)	(0.044)
Education	−0.014***	−0.014***	−0.009*	−0.008	−0.004
	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
STEM Education	−0.001	−0.001	0.014	0.045*	0.037
	(0.025)	(0.025)	(0.025)	(0.027)	(0.026)
Expr. Inflation		−0.016	−0.001	−0.039	−0.045
		(0.017)	(0.018)	(0.033)	(0.032)
Income Quintile (kr.)					
Second (127k to 196k)			−0.019	−0.022	−0.012
			(0.040)	(0.042)	(0.041)
Third (196k to 286k)			0.029	0.035	0.035
			(0.038)	(0.042)	(0.041)
Fourth (286k to 375k)			0.012	0.045	0.055
			(0.036)	(0.044)	(0.043)
Fifth (375k+)			−0.078**	−0.005	0.010
			(0.035)	(0.045)	(0.044)
Net Worth Quintile (kr.)					
Second (−114k to 8k)			0.005	0.005	0.009
			(0.037)	(0.037)	(0.036)
Third (8k to 165k)			0.023	0.019	0.028
			(0.034)	(0.034)	(0.033)
Fourth (165k to 709k)			−0.023	−0.022	−0.026
			(0.031)	(0.031)	(0.030)
Fifth (709k+)			−0.042	−0.030	−0.019
			(0.032)	(0.033)	(0.032)
Demographics	No	No	No	Yes	Yes
Psychometrics	No	No	No	No	Yes
Constant	0.447***	0.518***	0.412***	0.455***	0.639***
	(0.060)	(0.099)	(0.108)	(0.134)	(0.178)
Pseudo R^2	0.115	0.119	0.214	0.361	0.578
AIC	208.3	209.5	204.1	195.2	168.7
N	733	733	733	733	733

Notes: The table shows coefficients from Tobit regressions of the *Money Illusion Index* on relevant characteristics for all validated participants, with robust standard errors in parentheses. *Student* is a dummy set to 1 for students. *Education* is the standard number of years required to complete an individual's education. *STEM Education* is a dummy set to 1 if the participant completed an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications. *Experienced Inflation* is the average inflation rate over the participant's life. *Income Quintile* includes dummies for gross non-capital income (from wages, pensions, and benefits), with a base of the bottom quintile. *Net Worth Quintile* includes dummies for net worth (gross assets excluding pension wealth less liabilities), with a base of the bottom quintile. *Demographics* include age, number of children, and dummies for self-employed, retired, medium- and high-skilled employment, public sector employment, partnered and married. *Psychometrics* include an IST-M fluid intelligence test score (Liepmann et al. 2001), a dummy for correctly answering two or more questions on a cognitive reflection test (Frederick 2005), incentivized risk and loss aversion measures (Tanaka, Camerer, and Nguyen 2010) and the Big 5 personality test (Costa and McCrae 1992). Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table A.4 shows OLS (Table A.5 Tobit) regressions of the MI index (which lies in the interval $[-1, 1]$) on educational and financial variables and experienced inflation, with and without demographic and psychometric controls. In columns (1) and (2), student status and education are highly significantly correlated with the MI index. Students have, on average, an MI index 0.144 points (60 percent) lower than the average of 0.241, and this result is robust across all columns, ranging from 0.141 (59 percent) in column (5) to 0.174 (72 percent) in column (3). In terms of education, each additional year is associated with a reduction in the index of about 0.014 points (6 percent) in columns (1) and (2), but this falls to an insignificant 0.004 points (less than 2 percent) with all controls in column (5). As with the simple correlations, STEM education and experienced inflation are not related to the MI index.

When income and wealth quintile dummies are added in column (3), using the bottom quintiles as the baseline, education becomes only marginally significant. The top income quintile dummy is significant, but the others are not, and none of the net worth quintile dummies are significant. With the inclusion of demographics in column (4), income ceases to be significant, while education remains marginally significant (under OLS but not Tobit), and STEM education becomes marginally significant. When psychometrics including cognitive ability/reflection are added in column (5), however, both educational variables cease to be significant.

Table A.6: Money Illusion, Risk/Loss Aversion and Psychometrics (OLS)

Dep. Var.: Money Illusion Index	(1)	(2)	(3)	(4)
IST-M Score	−0.004	−0.004	−0.005	−0.006*
	(0.003)	(0.003)	(0.003)	(0.004)
High CR Score	−0.125***	−0.124***	−0.115***	−0.102***
	(0.021)	(0.021)	(0.022)	(0.022)
Risk Consistent	−0.050	−0.049	−0.037	−0.023
	(0.036)	(0.036)	(0.037)	(0.036)
Risk Switch Point	0.003	0.003	0.002	0.001
	(0.004)	(0.004)	(0.004)	(0.004)
Loss Consistent	−0.036	−0.035	−0.036	−0.033
	(0.047)	(0.047)	(0.047)	(0.049)
Loss Switch Point	−0.001	−0.001	−0.001	0.000
	(0.006)	(0.006)	(0.006)	(0.006)
Student	−0.115***	−0.132***	−0.135***	−0.141***
	(0.031)	(0.038)	(0.037)	(0.038)
Education	−0.008**	−0.008**	−0.005	−0.004
	(0.004)	(0.004)	(0.004)	(0.005)
STEM Education	0.006	0.006	0.017	0.037
	(0.024)	(0.024)	(0.024)	(0.025)
Experienced Inflation		−0.011	−0.002	−0.045
		(0.016)	(0.017)	(0.032)
Income and Net Worth	No	No	Yes	Yes
Demographics	No	No	No	Yes
Personality	No	No	No	Yes
Constant	0.529***	0.581***	0.507***	0.631***
	(0.066)	(0.096)	(0.112)	(0.198)
R^2	0.103	0.104	0.123	0.163
AIC	125.9	127.4	127.6	127.3
N	733	733	733	733

Notes: The table shows coefficients from OLS regressions of the *Money Illusion Index* on psychometric characteristics for all validated participants, with robust standard errors in parentheses. *IST-M Score* is an IST-M fluid intelligence test score between 0 and 20 (Liepmann et al. 2001), while *High CR Score* a dummy for correctly answering two or more (out of three) questions on a cognitive reflection test (Frederick 2005). *Risk Consistent* and *Loss Consistent* are dummies set to 1 if a participant had a single switching point in incentivized lottery tasks measuring risk and loss aversion (Tanaka, Camerer, and Nguyen 2010). *Risk Switch Point* and *Loss Switch Point* refer to the choice where individuals switched from risky to safe, with higher values indicating greater risk and loss aversion, respectively. *Student* is a dummy set to 1 for students *Education* is the standard number of years required to complete an individual's education. *STEM Education* is a dummy set to 1 if the participant completed an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications. *Experienced Inflation* is the average inflation rate over the participant's life. *Income and Net Worth* refers to quintile dummies. *Demographics* include age, number of children and dummies for self-employed, retired, medium- and high-skilled employment, public sector employment, partnered and married. *Personality* is the Big 5 personality test (Costa and McCrae 1992). Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table A.7: Money Illusion, Risk/Loss Aversion and Psychometrics (Tobit)

Dep. Var.: Money Illusion Index	(1)	(2)	(3)	(4)
IST-M Score	−0.004	−0.004	−0.005	−0.006
	(0.003)	(0.003)	(0.003)	(0.004)
High CR Score	−0.127***	−0.126***	−0.117***	−0.104***
	(0.021)	(0.021)	(0.021)	(0.021)
Risk Consistent	−0.050	−0.049	−0.036	−0.022
	(0.035)	(0.035)	(0.035)	(0.034)
Risk Switch Point	0.003	0.003	0.002	0.001
	(0.004)	(0.004)	(0.004)	(0.004)
Loss Consistent	−0.037	−0.036	−0.037	−0.034
	(0.045)	(0.045)	(0.044)	(0.044)
Loss Switch Point	−0.001	−0.001	−0.001	0.000
	(0.006)	(0.006)	(0.006)	(0.006)
Student	−0.115***	−0.132***	−0.134***	−0.141***
	(0.034)	(0.043)	(0.043)	(0.044)
Education	−0.008*	−0.008*	−0.005	−0.004
	(0.004)	(0.004)	(0.005)	(0.005)
STEM Education	0.006	0.006	0.017	0.037
	(0.024)	(0.024)	(0.024)	(0.026)
Experienced Inflation		−0.011	−0.002	−0.045
		(0.017)	(0.018)	(0.032)
Income and Net Worth	No	No	Yes	Yes
Demographics	No	No	No	Yes
Personality	No	No	No	Yes
Constant	0.530***	0.581***	0.503***	0.639***
	(0.069)	(0.104)	(0.113)	(0.178)
Pseudo R^2	0.353	0.355	0.427	0.578
AIC	166.9	168.5	168.4	168.7
N	733	733	733	733

Notes: The table shows coefficients from Tobit regressions of the *Money Illusion Index* on psychometric characteristics for all validated participants, with robust standard errors in parentheses. *IST-M Score* is an IST-M fluid intelligence test score between 0 and 20 (Liepmann et al. 2001), while *High CR Score* a dummy for correctly answering two or more (out of three) questions on a cognitive reflection test (Frederick 2005). *Risk Consistent* and *Loss Consistent* are dummies set to 1 if a participant had a single switching point in incentivized lottery tasks measuring risk and loss aversion (Tanaka, Camerer, and Nguyen 2010). *Risk Switch Point* and *Loss Switch Point* refer to the choice where individuals switched from risky to safe, with higher values indicating greater risk and loss aversion, respectively. *Student* is a dummy set to 1 for students *Education* is the standard number of years required to complete an individual's education. *STEM Education* is a dummy set to 1 if the participant completed an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications. *Experienced Inflation* is the average inflation rate over the participant's life. *Income and Net Worth* refers to quintile dummies. *Demographics* include age, number of children and dummies for self-employed, retired, medium- and high-skilled employment, public sector employment, partnered and married. *Personality* is the Big 5 personality test (Costa and McCrae 1992). Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table A.6 shows psychometric coefficients for OLS regressions (Table A.7 for Tobit). Column (1) includes only psychometric and education variables, with experienced inflation added in column (2). Column (3) adds income and net worth quintile dummies, while column (4) adds controls for demographics and personality. The top panel shows that the IST-M measure of cognitive ability is generally not correlated with the MI index, though the sign is in the expected direction and the coefficient in column (4) is marginally significant under OLS (but not Tobit). In contrast, the dummy for a high CR score (at least two of three questions answered correctly) is large and highly significant across all four columns. The effect of a high CR score under OLS ranges from a reduction in the MI index of 0.102 points (42 percent of the average) in column (5), with all controls, to a reduction of 0.125 points (52 percent) in column (1), a model that includes only education and psychometrics. (Tobit estimates are slightly larger in all specifications.) The risk and loss measures in the second panel are not significant in any specifications, so there is no evidence that the MI index measures general risk or loss aversion. The third panel shows that the effect of education is reduced in models that include psychometrics (and only marginally significant with Tobit estimates), and becomes insignificant when income and net worth are included. Experienced inflation is not significant in any specification.

Table A.8: Money Illusion and Demographics

Dep. Var.: Money Illusion Index	(1)	(2)	(3)	(4)
Age				
35–49	0.068	0.068	0.084	0.085
	(0.064)	(0.065)	(0.064)	(0.063)
50–74	0.047	0.048	0.043	0.045
	(0.057)	(0.059)	(0.057)	(0.057)
75–	−0.039	−0.039	−0.047	−0.046
	(0.070)	(0.070)	(0.071)	(0.069)
Self-employed	0.078	0.079	0.078	0.085
	(0.059)	(0.056)	(0.059)	(0.055)
Retired	0.093**	0.093**	0.093**	0.083**
	(0.046)	(0.043)	(0.046)	(0.042)
Medium Skill	−0.014	−0.013	−0.014	−0.006
	(0.028)	(0.027)	(0.028)	(0.026)
High Skill	−0.067**	−0.068**	−0.067**	−0.006
	(0.030)	(0.030)	(0.030)	−0.051*
Public Sector	0.031	0.030	0.031	(0.029)
	(0.024)	(0.024)	(0.024)	(0.024)
Female	0.086***	0.086***	0.063***	0.063***
	(0.022)	(0.022)	(0.023)	(0.023)
Partnered	0.035	0.034	0.025	0.024
	(0.036)	(0.036)	(0.035)	(0.035)
Married	−0.036	−0.036	−0.034	−0.033
	(0.035)	(0.034)	(0.034)	(0.033)
Children (number)	−0.010	−0.010	−0.009	−0.009
	(0.012)	(0.012)	(0.011)	(0.012)
Controls	Yes	Yes	Yes	Yes
Psychometrics	No	No	Yes	Yes
Model	OLS	Tobit	OLS	Tobit
Constant	0.457***	0.455***	0.631***	0.639***
	(0.127)	(0.134)	(0.198)	(0.178)
R^2 (Pseudo for Tobit)	0.106	0.361	0.163	0.578
AIC	153.8	195.2	127.3	168.7
N	733	733	733	733

Notes: The table shows coefficients from OLS and Tobit regressions of the *Money Illusion Index* on relevant characteristics for all validated participants, with robust standard errors in parentheses. *Age* includes category dummies, with a base category of 19–34. *Self-employed*, *Retired*, and *Public Sector* are social status dummies. *Medium Skill* and *High Skill* are category dummies, with a default of *Low Skill*. *Female*, *Partnered*, and *Married* are dummies, while *Children* is the number of children. *Controls* include a dummy set to 1 for students, years of education, a dummy for STEM (science, technology, engineering, mathematics) education, the average rate of inflation over a participant's life, and dummies for income and wealth quintiles, with the bottom quintile as the baseline in each case. *Psychometrics* include an IST-M fluid intelligence test score (Liepmann et al. 2001), a dummy for correctly answering two or more questions on a cognitive reflection test (Frederick 2005), incentivized risk and loss aversion measures (Tanaka, Camerer, and Nguyen 2010) and the Big 5 personality test (Costa and McCrae 1992). Significance at 10% is denoted by *, at 5% by **, and at 1% by ***, using robust standard errors.

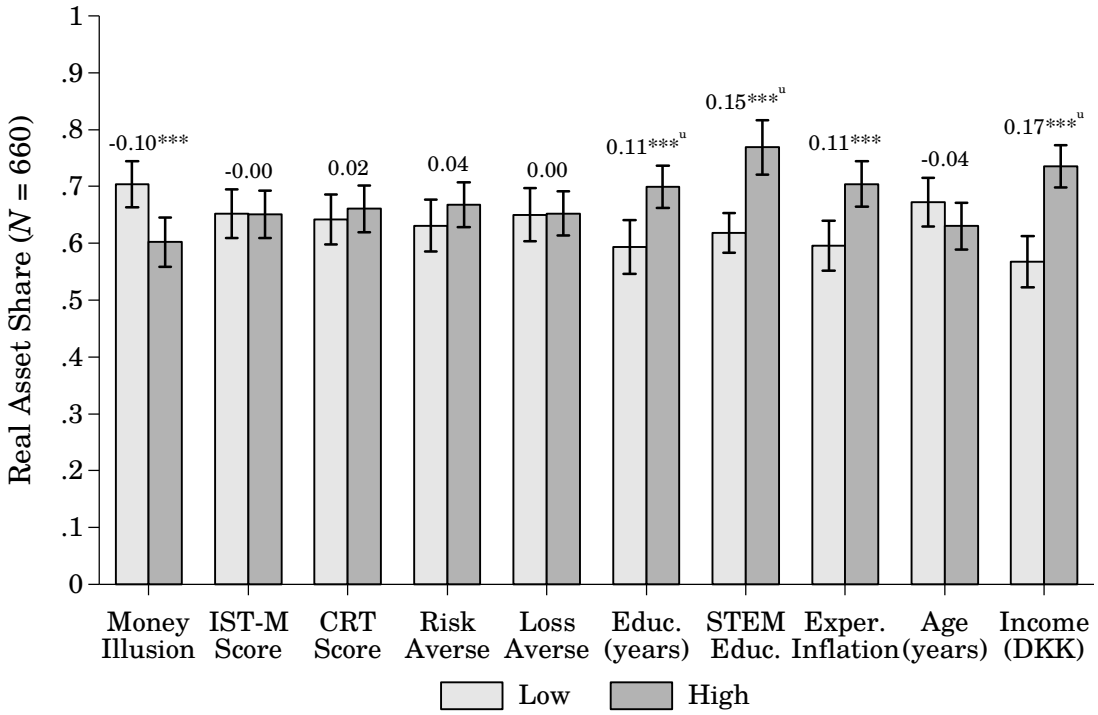
Table A.8 shows demographic coefficients from the regressions in Tables A.4 to A.7. Columns (1) and (2) show coefficients for OLS and Tobit regressions without psychometrics, while columns (3) and (4) show the same for regressions that include psychometrics. Columns (3) and (4) correspond to column (4) in Tables A.4 and A.5, and column (5) in Tables A6 and A.7). The upper panel includes age category dummies, and again there is no evidence that money illusion declines with age and experience. If anything, it may increase, given the robust and positive coefficient on the *Retired* dummy in the second panel. Other robust demographic correlations include the *High Skill* dummy in the second panel, which is associated with a lower MI index, and *Female* in the third panel, which is associated with a higher MI index.

In terms of model fit, the Akaike Information Criterion (AIC) is minimized by the model in column (1) of Table A.6 (Table A.7 for Tobit), which includes only psychometrics and education. It outperforms the models with additional correlates in columns (2) to (4), and substantially outperforms any of the models without psychometrics in columns (1) to (4) of Table A.4 (Table A.5 for Tobit). Nevertheless, with an R^2 of 0.103 (or a pseudo R^2 of 0.353 for Tobit), much of the variation in the MI index remains unexplained. Overall, the evidence points to money illusion as a cognitive phenomenon that is related to, but distinct from, general cognitive ability and cognitive reflection. It is thus essential to include cognitive and educational controls when regressing the RA share on the MI index, as well as demographics, such as income, that are related to cognitive ability, in addition to controls we expect to be related to the RA share itself.

B Real Asset Share Correlates and Regressions

This section contains additional details on the correlations between the Money Illusion index and the Real Asset share, including simple correlations beyond those shown in Figure 6, as well as additional details from ZOIB regressions, and OLS regressions for robustness.

Figure B.1: Real Asset Share (RA) by Key Characteristics (Expanded)



Notes: The bars show simple correlations between the Real Asset Share (RA) and key characteristics for all verified non-student participants with assets. *Money Illusion* is our survey measure of money illusion. *IST-M Score* is a measure of fluid intelligence between 0 and 20 (Liepmann et al. 2001). *CRT Score* is a cognitive reflection test score between 0 and 3 (Frederick 2005). *Risk Averse* and *Loss Averse* are the number of safe choices in the risk and loss lottery tasks, with higher values indicating greater risk and loss aversion, respectively. *Educ. (years)* is the standard number of years required to complete an individual's education. *STEM Educ.* is a dummy set to 1 if a participant completed an education in a STEM (science, technology, engineering, and mathematics) field and zero otherwise. *Exper. Inflation (years)* is the average inflation rate over the participant's life. *Age* is a participant's age in years. *Income* includes gross wages, pensions, and benefits. All variables other than *STEM Educ.* are split at the medians, with Low vs. High referring to the lower vs. upper halves of the distributions. For *STEM Educ.* High indicates that the participant completed a STEM education. Whiskers show 95% confidence intervals for the means. The numbers above the bars are the differences between the High and Low groups. Significance at 10% is denoted by *, at 5% by **, and at 1% by ***, based on a two-sided t-tests. A superscript "u" indicates that the test was run without the assumption of equal variance, because a test for equality of variance was rejected.

Figure B.1 shows variation in the RA share based on median splits of potentially relevant explanatory variables. It includes the variables shown in Figure 6 in the paper, all of which are significant, as well as insignificant correlations between the RA share and the IST-M fluid intelligence score, the cognitive reflection test score, the number of safe choices in lottery tasks measuring risk and loss aversion, and age.

In our main analysis, we regress the real asset share on the money illusion index and other relevant socioeconomic and psychometric variables using the zero/one inflated beta model developed by Cook, Kieschnick, and McCullough (2008). The assumptions of the ZOIB model are appropriate for the RA share, which can be viewed as three decisions. With bank deposits as the default asset (wages, benefits, etc. are paid into bank accounts), the default RA share is zero. The first decision is therefore a Boolean choice to enter a real asset market (housing,

stocks) or not. If an individual chooses to enter a real asset market, the second decisions is the proportion of total gross wealth to invest in real assets, with an RA share in the interval $(0, 1)$. Finally, there is a rare case in which all wealth is held in real assets, so the RA share is one, and current consumption is financed by borrowing.

From Cook, Kieschnick, and McCullough (2008), the ZOIB probability density is

$$g(y \mid p, q) = \begin{cases} \delta, & y = 0 \\ (1-\delta)\eta, & y = 1 \\ (1-\delta)(1-\eta) f(y \mid p, q), & y \in (0, 1) \end{cases},$$

where y is the real asset share, δ is the probability of holding only nominal assets (so $1 - \delta$ is the probability of selecting into one or more real asset markets), η is the probability of exhausting all nominal assets, conditional on having entered a real asset market, and

$$f(y \mid p, q) = \left[\frac{\Gamma(p+q)}{\Gamma(p)\Gamma(q)} y^{p-1}(1-y)^{q-1} \right], \qquad y \in (0, 1),$$

is a two-parameter beta function for the proportion of gross assets to invest in real assets, with p and q as parameters.

The remainder of this section is structured as follows. First, we provide additional details relating to the combined marginal effects discussed in the paper. Second, we discuss individual marginal effects for selection (RA share > 0) and proportion (RA share | RA share $\in (0, 1)$). Third, we present OLS estimates of the RA share.

B.1 Demographic and Psychometric Correlates

Table B.1 shows average marginal effects for demographic controls in columns (4) and (5) of Table 3. The top panel shows the money illusion index. The panel directly below it shows coefficients on dummies for *Couple* and *Married*, which are not significantly different from zero. The third panel shows occupation dummies for *High Skill* and *Medium Skill* levels, with a base line of low skill or other, and for *Public Sector* employment.[1] The coefficient on the *High Skill* dummy is marginally negative in column (4) and significantly negative in column (5), but there is no obvious reason for this effect. It may be spurious, given that the simple Spearman rank correlation between the RA share and the *High Skill* dummy of 0.013 is not significantly different from zero ($p = 0.738$), and the simple Pearson correlation coefficient of 0.089 significantly

[1] The public sector employment variable refers to the year before the study was conducted.

positive ($p = 0.001$). The fourth panel shows coefficients on risk and loss aversion measures elicited using incentivized lottery tasks based on Tanaka, Camerer, and Nguyen (2010). Each of the risk/loss lottery tasks involves a list of lotteries, with an optimal switching point for a given CRRA coefficient, with a higher optimum for people who are more risk/loss averse. In the *Risk* case, all lotteries involve gains, while the *Loss* case includes losses. Participants were not forced to choose a single switching point, so *Consistent* is a dummy set to one if a participant had a single switching point. *Switch Point* is the point at which a consistent subject switched (1–11 for *Risk* and 1–8 for *Loss*), or zero for inconsistent participants. About 84% of participants were consistent in the *Risk* task and 92% in the *Loss* task, but the coefficients on switching points are all close to zero and not significantly different from it. Surprisingly, there is thus no evidence that the RA share is correlated with lottery measures of risk and loss aversion.

Table B.1: Real Asset Share, Demographics and Psychometrics (RA Share ∈ [0, 1])

Dep. Var.: RA Share	(4)	(5)
Money Illusion Index	−0.097**	−0.083**
	(0.047)	(0.036)
Couple	−0.190	−0.199
	(2.106)	(1.482)
Married	0.146	0.116
	(1.054)	(0.941)
High Skill	−0.073*	−0.065**
	(0.040)	(0.028)
Medium Skill	0.019	−0.010
	(0.032)	(0.025)
Public Sector	0.006	0.017
	(0.030)	(0.022)
Risk Consistent	−0.035	−0.023
	(0.040)	(0.033)
Risk Switch Point	0.003	0.000
	(0.005)	(0.003)
Loss Consistent	0.003	−0.018
	(0.053)	(0.043)
Loss Switch Point	0.009	0.003
	(0.008)	(0.006)
Controls	Yes	Yes
Assets and Liabilities	No	Yes
Wald χ^2	41.34	111.33
AIC	16.48	−323.40
N	660	660

Notes: The table shows average marginal effects for ZOIB regressions of the share of gross wealth held in real assets (RA), with standard errors in parentheses. Students and participants without any assets are excluded. *Money Illusion Index* is a measure of money illusion between −1 and 1. *Couple* and *Married* are dummies for partnered (married or not) and married, respectively. *High Skill* and *Medium Skill* are occupational dummies, with a baseline of *Low Skill* or other. *Public Sector* is a dummy for public sector employment. *Risk Consistent* and *Loss Consistent* are dummies set to 1 if a participant had a single switching point in incentivized lottery tasks measuring risk and loss aversion (Tanaka, Camerer, and Nguyen 2010). *Risk Switch Point* and *Loss Switch Point* refer to the choice where individuals switched from risky to safe, with higher values indicating greater risk and loss aversion, respectively. *Controls* include an IST-M fluid intelligence test score (Liepmann et al. 2001), a dummy for correctly answering two or more questions on a cognitive reflection test (Frederick 2005), years of education, a dummy for STEM (science, technology, engineering, and mathematics) education, age, the average rate of inflation over a participant's life, gross non-capital income with linear and quadratic terms, dummies for retired, self-employed, and female, as well as the number of children. *Assets and Liabilities* is gross assets and liabilities, with linear and quadratic terms. Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

B.2 Real Asset Share Selection and Proportion

Tables B.2 to B.7 show average marginal effects of the explanatory variables on the RA share, decomposed into selection into real asset markets, and the proportion given entry, provided it is

less than one. Given the small number of cases, we do not report detailed results for the probability that the RA share is one. For the most part, none of the explanatory variables are significant predictors of an RA share of one. The exceptions are the IST-M score and liabilities, which in some specifications are significantly different from zero, in the plausible directions (negative for the IST-M score and positive for liabilities).

Tables B.2 and B.3 cover the variables included in Table 3, focusing on selection and proportion, respectively. Starting with the MI index, its overall effect is driven by selection into real asset markets (dominated by housing). The effect is significant in columns (1) to (3) of Table B.2, but only marginally significant in column (4), where demographics beyond education, age, and income are included, and insignificant in column (5), where wealth is included. At the same time, as shown in Table B.3, when controlling for wealth, the MI index has a significant effect on the proportion of total wealth invested in real assets. This result is consistent with our proposition that money illusion directly affects the RA share, and indirectly affects wealth, because real assets offer higher rates of return.

In terms of the other major correlates, the sources of the overall effects vary. Education and STEM are significant in most of the selection results in Table B.2, but not in any of the proportion results in Table B.3. Cognitive ability is significantly positively correlated with the RA share in column (2) of Table B.3, and marginally significant in column (2) of Table B.2, but is insignificant in all other specifications. Age is significant for selection in column (4) of Table B.2, in the expected direction, but marginally significant in the opposite direction in column (3) of Table B.3. Experienced inflation is marginally significant for selection in column (3) of Table B.2, but insignificant in other cases. Income is significant for both selection and proportion in column (4), and for selection in column (3), but is not robust to the inclusion of wealth in column (5). In column (4), the self-employed are more likely to enter, and invest more in real assets given entry, but the effect disappears when wealth is included. The effect of the number of children is visible in both selection and proportion, and is robust to the inclusion of wealth. The gender effect, in contrast, is significant only in selection, and only when wealth is not controlled for. Finally, the effect of gross assets is driven by selection (though still significant for proportion), while the effect of liabilities is driven by proportion (or, more probably the reverse, with entry into the housing market increasing gross assets, and greater investment in housing leading to more leverage). In terms of other demographics and psychometrics, Tables B.4 to B.7 show little difference from the overall effects.

Table B.2: Real Asset Share and Money Illusion (Pr(RA Share > 0))

Dep. Var.: RA Share	(1)	(2)	(3)	(4)	(5)
Money Illusion Index	−0.131**	−0.134**	−0.108**	−0.085*	−0.035
	(0.053)	(0.054)	(0.053)	(0.051)	(0.037)
IST-M Score		−0.009*	−0.003	−0.000	0.003
		(0.005)	(0.005)	(0.005)	(0.003)
High CR Score		−0.024	−0.048	−0.041	−0.039*
		(0.033)	(0.032)	(0.030)	(0.022)
Education (years)		0.018***	0.012*	0.014**	0.010**
		(0.006)	(0.006)	(0.007)	(0.005)
STEM Education		0.121***	0.114***	0.089***	0.010
		(0.031)	(0.031)	(0.034)	(0.033)
Age			0.002	0.005**	−0.000
			(0.001)	(0.002)	(0.001)
Experienced Inflation			0.092*	0.010	0.010
			(0.048)	(0.048)	(0.029)
Income (million kr.)			0.261**	0.469***	−0.007
			(0.113)	(0.154)	(0.103)
Retired				0.063	0.034
				(0.049)	(0.039)
Self-employed				0.167***	−0.019
				(0.031)	(0.062)
Children (number)				0.068***	0.026**
				(0.019)	(0.013)
Female				−0.062**	−0.024
				(0.031)	(0.023)
Assets (million kr.)					0.410***
					(0.030)
Liabilities (million kr.)					0.019
					(0.028)
Controls	No	No	No	Yes	Yes
Wald χ^2	2.91	9.89	19.76	41.34	111.33
AIC	67.83	52.52	39.83	16.48	−323.40
N	660	660	660	660	660

Notes: The table shows average marginal effects for ZOIB regressions of the probability of holding any real assets (Pr(RAS > 0)) , with standard errors in parentheses. Students and people without any assets are excluded. *Money Illusion Index* is a measure of money illusion between −1 and 1. *IST-M Score* is a measure of fluid intelligence between 0 and 20 (Liepmann et al. 2001). *High CRT Score* is a dummy set to 1 for participants who correctly answered at least 2 of 3 cognitive reflection test questions (Frederick 2005). *Age* is in years at the time of the study. *Education* is the standard number of years required to complete an individual's education. *STEM Education* is a dummy set to 1 if the participant completed an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications. *Experienced Inflation* is the average inflation rate over the participant's life. *Income* includes gross wages, pensions, and benefits. *Assets* is gross assets, excluding pension wealth. *Liabilities* is total liabilities. Financial variables are in millions of Danish crowns (kr.), with linear and quadratic terms. *Retired*, *Self-Employed*, and *Female* are dummies, while *Children* is the number of children. *Controls* include dummies for partnered, married, occupational skill level, and public sector employment, together with incentivized measures to control for risk and loss aversion (Tanaka, Camerer, and Nguyen 2010) and the Big 5 personality test (Costa and McCrae 1992). Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table B.3: Real Asset Share and Money Illusion (RAS | RAS ∈ (0, 1))

Dep. Var.: RA Share	(1)	(2)	(3)	(4)	(5)
Money Illusion Index	−0.056*	−0.047	−0.046	−0.036	−0.074**
	(0.033)	(0.034)	(0.034)	(0.036)	(0.034)
IST-M Score		0.007**	0.004	0.004	0.003
		(0.003)	(0.003)	(0.003)	(0.003)
High CR Score		0.007	0.007	−0.010	−0.001
		(0.019)	(0.020)	(0.020)	(0.020)
Education (years)		−0.001	−0.003	−0.006	−0.007
		(0.004)	(0.004)	(0.005)	(0.005)
STEM Education		0.023	0.019	0.014	0.026
		(0.020)	(0.020)	(0.023)	(0.022)
Age			−0.002*	0.000	−0.002
			(0.001)	(0.001)	(0.001)
Experienced Inflation			0.017	−0.013	0.003
			(0.033)	(0.036)	(0.034)
Income (million kr.)			0.094	0.235**	0.080
			(0.064)	(0.092)	(0.091)
Retired				0.012	0.028
				(0.039)	(0.037)
Self-employed				0.093**	−0.014
				(0.038)	(0.055)
Children (number)				0.026**	0.024**
				(0.012)	(0.011)
Female				−0.021	−0.016
				(0.023)	(0.021)
Assets (million kr.)					0.024**
					(0.010)
Liabilities (million kr.)					0.115***
					(0.017)
Controls	No	No	No	Yes	Yes
Wald χ^2	2.91	9.89	19.76	41.34	111.33
AIC	67.83	52.52	39.83	16.48	−323.40
N	660	660	660	660	660

Notes: The table shows average marginal effects for ZOIB regressions of the share of gross wealth held in real assets (RA), given that the share is in $(0, 1)$, with standard errors in parentheses. Students and participants without any assets are excluded. *Money Illusion Index* is a measure of money illusion between -1 and 1. *IST-M Score* is a measure of fluid intelligence between 0 and 20 (Liepmann et al. 2001). *High CRT Score* is a dummy set to 1 for participants who correctly answered at least 2 of 3 cognitive reflection test questions (Frederick 2005). *Age* is in years at the time of the study. *Education* is the standard number of years required to complete an individual's education. *STEM Education* is a dummy set to 1 if the participant completed an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications. *Experienced Inflation* is the average inflation rate over the participant's life. *Income* includes gross wages, pensions, and benefits. *Assets* is gross assets, excluding pension wealth. *Liabilities* is total liabilities. Financial variables are in millions of Danish crowns (kr.), with linear and quadratic terms. *Retired*, *Self-Employed*, and *Female* are dummies, while *Children* is the number of children. *Controls* include dummies for partnered, married, occupational skill level, and public sector employment, together with incentivized measures to control for risk and loss aversion (Tanaka, Camerer, and Nguyen 2010) and the Big 5 personality test (Costa and McCrae 1992). Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table B.4: Real Asset Share and Demographics (Pr(RA Share > 0))

Dep. Var.: RA Share	(4)	(5)
Money Illusion Index	−0.085*	−0.035
	(0.051)	(0.037)
Female	−0.062**	−0.024
	(0.031)	(0.023)
Couple	0.099*	0.052
	(0.056)	(0.034)
Married	0.071	−0.001
	(0.048)	(0.032)
Children (number)	0.068***	0.026**
	(0.019)	(0.013)
Self-employed	0.167***	−0.019
	(0.031)	(0.062)
Retired	0.063	0.034
	(0.049)	(0.039)
High Skill	−0.039	−0.032
	(0.047)	(0.030)
Medium Skill	0.035	0.017
	(0.035)	(0.026)
Public sector	−0.001	−0.002
	(0.033)	(0.022)
Controls	Yes	Yes
Assets and Liabilities	No	Yes
Wald χ^2	41.34	111.33
AIC	16.48	−323.40
N	660	660

Notes: The table shows average marginal effects for ZOIB regressions of the probability of holding any real assets (Pr(RAS > 0)), with standard errors in parentheses. Students and participants without any assets are excluded. *Money Illusion Index* is a measure of money illusion between −1 and 1. *Female* is a dummy. *Couple* and *Married* are dummies for partnered (married or not) and married, respectively. *Children (number)* is the number of children. *Self-employed* and *Retired* are dummies. *High Skill* and *Medium Skill* are occupational dummies, with a baseline of *Low Skill* or other. *Public Sector* is a dummy for public sector employment. *Controls* include age, years of education, a dummy for completion of an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications, the average rate of inflation over a participant's life, an IST-M fluid intelligence test score (Liepmann et al. 2001), a dummy for correctly answering two or more questions on a cognitive reflection test (Frederick 2005), incentivized risk and loss aversion measures (Tanaka, Camerer, and Nguyen 2010) and the Big 5 personality test (Costa and McCrae 1992).. *Assets and Liabilities* is gross assets and liabilities, with linear and quadratic terms. Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table B.5: Real Asset Share and Demographics (RAS | RAS ∈ (0, 1))

Dep. Var.: RA Share	(4)	(5)
Money Illusion Index	−0.036	−0.074**
	(0.036)	(0.034)
Female	−0.021	−0.016
	(0.023)	(0.021)
Couple	0.022	0.023
	(0.040)	(0.037)
Married	−0.008	0.003
	(0.032)	(0.031)
Children (number)	0.026**	0.024**
	(0.012)	(0.011)
Self-employed	0.093**	−0.014
	(0.038)	(0.055)
Retired	0.012	0.028
	(0.039)	(0.037)
High Skill	−0.046	−0.054*
	(0.029)	(0.028)
Medium Skill	−0.005	−0.026
	(0.024)	(0.023)
Public sector	0.012	0.027
	(0.023)	(0.021)
Controls	Yes	Yes
Assets and Liabilities	No	Yes
Wald χ^2	41.34	111.33
AIC	16.48	−323.40
N	660	660

Notes: The table shows average marginal effects for ZOIB regressions of the share of gross wealth held in real assets (RA), given that the share is in $(0, 1)$, with standard errors in parentheses. Students and participants without any assets are excluded. *Money Illusion Index* is a measure of money illusion between -1 and 1. *Female* is a dummy. *Couple* and *Married* are dummies for partnered (married or not) and married, respectively. *Children (number)* is the number of children. *Self-employed* and *Retired* are dummies. *High Skill* and *Medium Skill* are occupational dummies, with a baseline of *Low Skill* or other. *Public Sector* is a dummy for public sector employment. *Controls* include age, years of education, a dummy for completion of an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications, the average rate of inflation over a participant's life, an IST-M fluid intelligence test score (Liepmann et al. 2001), a dummy for correctly answering two or more questions on a cognitive reflection test (Frederick 2005), incentivized risk and loss aversion measures (Tanaka, Camerer, and Nguyen 2010) and the Big 5 personality test (Costa and McCrae 1992).. *Assets and Liabilities* is gross assets and liabilities, with linear and quadratic terms. Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table B.6: Real Asset Share and Psychometrics (Pr(RA Share > 0))

Dep. Var.: RA Share	(1)	(2)	(3)	(4)	(5)
Money Illusion Index	−0.131**	−0.134**	−0.108**	−0.085*	−0.035
	(0.053)	(0.054)	(0.053)	(0.051)	(0.037)
IST-M Score		−0.009*	−0.003	−0.000	0.003
		(0.005)	(0.005)	(0.005)	(0.003)
High CR Score		−0.024	−0.048	−0.041	−0.039*
		(0.033)	(0.032)	(0.030)	(0.022)
Education (years)		0.018***	0.012*	0.014**	0.010**
		(0.006)	(0.006)	(0.007)	(0.005)
STEM Education		0.121***	0.114***	0.089***	0.010
		(0.031)	(0.031)	(0.034)	(0.033)
Risk Consistent				−0.077*	−0.035
				(0.040)	(0.033)
Risk Switch Point				0.007	0.001
				(0.005)	(0.003)
Loss Consistent				−0.041	−0.064
				(0.055)	(0.041)
Loss Switch Point				0.011	0.001
				(0.009)	(0.006)
Age, Experienced. Inflation, Income	No	No	Yes	Yes	Yes
Other Controls	No	No	No	Yes	Yes
Assets and Liabilities	No	No	No	No	Yes
Wald χ^2	2.91	9.89	19.76	41.34	111.33
AIC	67.83	52.52	39.83	16.48	−323.40
N	660	660	660	660	660

Notes: The table shows average marginal effects for ZOIB regressions of the probability of holding any real assets (Pr(RAS > 0)), with standard errors in parentheses.. Students and people without any assets are excluded. *Money Illusion Index* is a measure of money illusion between 0 and 1. *IST-M Score* is a measure of fluid intelligence between 0 and 20 (Liepmann et al. 2001). *High CRT Score* is a dummy set to 1 for subjects who correctly answered at least 2 of 3 cognitive reflection test questions (Frederick 2005). *Education* is the standard number of years required to complete a participant's level of education. *STEM Education* is a dummy set to 1 if the participant completed an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications (OECD, Eurostat, and UNESCO Institute for Statistics 2015). *Risk Consistent* and *Loss Consistent* are dummies set to 1 if a participant had a single switching point in incentivized lottery tasks measuring risk and loss aversion (Tanaka, Camerer, and Nguyen 2010). *Risk Switch Point* and *Loss Switch Point* refer to the choice where individuals switched from risky to safe, with higher values indicating greater risk and loss aversion, respectively. *Age, Experienced Inflation, Income* includes age with linear and quadratic terms, the average rate of inflation over a participant's life, and gross non-capital income with linear and quadratic terms. *Other Controls* include dummies for retired, self-employed, female, partnered, married, occupational skill level, and public sector employment, together with the number of children and the Big 5 personality test (Costa and McCrae 1992). *Assets and Liabilities* is gross assets and liabilities, with linear and quadratic terms. Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table B.7: Real Asset Share and Psychometrics (RAS | RAS ∈ (0, 1))

Dep. Var.: RA Share	(1)	(2)	(3)	(4)	(5)
Money Illusion Index	−0.056*	−0.047	−0.046	−0.036	−0.074**
	(0.033)	(0.034)	(0.034)	(0.036)	(0.034)
IST-M Score		0.007**	0.004	0.004	0.003
		(0.003)	(0.003)	(0.003)	(0.003)
High CR Score		0.007	0.007	−0.010	−0.001
		(0.019)	(0.020)	(0.020)	(0.020)
Education (years)		−0.001	−0.003	−0.006	−0.007
		(0.004)	(0.004)	(0.005)	(0.005)
STEM Education		0.023	0.019	0.014	0.026
		(0.020)	(0.020)	(0.023)	(0.022)
Risk Consistent				0.024	0.001
				(0.034)	(0.031)
Risk Switch Point				−0.002	0.000
				(0.003)	(0.003)
Loss Consistent				0.037	0.025
				(0.045)	(0.041)
Loss Switch Point				0.004	0.005
				(0.006)	(0.006)
Age	No	No	Yes	Yes	Yes
Experienced Inflation	No	No	Yes	Yes	Yes
Income	No	No	Yes	Yes	Yes
Assets and Liabilities	No	No	No	No	Yes
Occupation	No	No	No	Yes	Yes
Family Status	No	No	No	Yes	Yes
Personality (Big 5)	No	No	No	Yes	Yes
Wald χ^2	2.91	9.89	19.76	41.34	111.33
AIC	67.83	52.52	39.83	16.48	−323.40
N	660	660	660	660	660

Notes: The table shows average marginal effects for ZOIB regressions of the share of gross wealth held in real assets (RA), given that the share is in $(0, 1)$, with standard errors in parentheses.. Students and people without any assets are excluded. *Money Illusion Index* is a measure of money illusion between 0 and 1. *IST-M Score* is a measure of fluid intelligence between 0 and 20 (Liepmann et al. 2001). *High CRT Score* is a dummy set to 1 for subjects who correctly answered at least 2 of 3 cognitive reflection test questions (Frederick 2005). *Education* is the standard number of years required to complete a participant's level of education. *STEM Education* is a dummy set to 1 if the participant completed an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications (OECD, Eurostat, and UNESCO Institute for Statistics 2015). *Risk Consistent* and *Loss Consistent* are dummies set to 1 if a participant had a single switching point in incentivized lottery tasks measuring risk and loss aversion (Tanaka, Camerer, and Nguyen 2010). *Risk Switch Point* and *Loss Switch Point* refer to the choice where individuals switched from risky to safe, with higher values indicating greater risk and loss aversion, respectively. *Age, Experienced Inflation, Income* includes age with linear and quadratic terms, the average rate of inflation over a participant's life, and gross non-capital income with linear and quadratic terms. *Other Control*s include dummies for retired, self-employed, female, partnered, married, occupational skill level, and public sector employment, together with the number of children and the Big 5 personality test (Costa and McCrae 1992). *Assets and Liabilities* is gross assets and liabilities, with linear and quadratic terms. Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

B.3 OLS Estimates of Real Asset Share

Tables B.8 to B.10 show OLS estimates of the RA share, using the same explanatory variables as in the ZOIB regressions. The OLS estimates are qualitatively similar to the ZOIB estimates of the overall average marginal effects. In line with Cook, Kieschnick, and McCullough (2008), however, the effect sizes tend to be overstated, because OLS estimates are biased and inconsistent when the dependent variable is a proportion.

Table B.8: Real Asset Share, Cognition, Education, Experience, and Finances (OLS)

Dep. Var.: RA Share	(1)	(2)	(3)	(4)	(5)
Money Illusion Index	−0.163***	−0.158***	−0.137**	−0.117**	−0.120**
	(0.055)	(0.057)	(0.057)	(0.056)	(0.047)
IST-M Score		0.000	0.000	0.002	0.003
		(0.005)	(0.005)	(0.005)	(0.004)
High CR Score		−0.025	−0.046	−0.054*	−0.060**
		(0.032)	(0.032)	(0.031)	(0.027)
Education (years)		0.015**	0.006	0.007	0.004
		(0.007)	(0.007)	(0.007)	(0.007)
STEM Education		0.136***	0.122***	0.085**	0.059*
		(0.030)	(0.031)	(0.034)	(0.031)
Age			−0.004	0.015	0.016
			(0.013)	(0.014)	(0.013)
Age^2			0.000	0.000	0.000
			(0.000)	(0.000)	(0.000)
Experienced Inflation			0.135***	0.038	0.021
			(0.051)	(0.054)	(0.047)
Income (million kr.)			0.540***	1.136***	0.830***
			(0.204)	(0.272)	(0.286)
$Income^2$			−0.263	−0.773***	−0.754***
			(0.183)	(0.228)	(0.261)
Assets (million kr.)					0.136***
					(0.022)
$Assets^2$					−0.008***
					(0.002)
Liabilities (million kr.)					0.136***
					(0.028)
$Liabilities^2$					−0.007***
					(0.002)
Constant	0.693***	0.465***	−0.100	−0.173	−0.148
	(0.020)	(0.104)	(0.224)	(0.303)	(0.273)
Controls	No	No	No	Yes	Yes
R^2	0.013	0.047	0.100	0.221	0.413
AIC	624.40	609.51	581.71	522.55	343.54
N	660	660	660	660	660

Notes: The table shows coefficients for OLS regressions of the share of gross wealth held in real assets (RA), with robust standard errors in parentheses. Students and participants without any assets are excluded. *Money Illusion Index* is a measure of money illusion between −1 and 1. *IST-M Score* is a measure of fluid intelligence between 0 and 20 (Liepmann et al. 2001). *High CR Score* is a dummy for correctly answering at least 2 of 3 cognitive reflection test questions (Frederick 2005). *Education* is the standard number of years required to complete an individual's education. *STEM Education* is a dummy set to 1 for an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications. *Age* is in years at the time of the study. *Experienced Inflation* is the average inflation rate over the participant's life. *Income* includes gross wages, pensions, and benefits. *Assets* is gross assets, excluding pension wealth. *Liabilities* is total liabilities. Controls include dummies for retired, self-employed, female, partnered, married, occupational skill level, and public sector employment, plus the number of children, incentivized measures to control for risk and loss aversion (Tanaka, Camerer, and Nguyen 2010), and the Big 5 personality test (Costa and McCrae 1992). Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table B.9: Real Asset Share and Demographics (OLS)

Dep. Var.: RA Share	(4)	(5)
Money Illusion Index	−0.117**	−0.120**
	(0.056)	(0.047)
Female	−0.071**	−0.041
	(0.033)	(0.028)
Couple	0.097	0.106**
	(0.060)	(0.048)
Married	0.081	0.055
	(0.052)	(0.042)
Children (number)	0.064***	0.059***
	(0.017)	(0.015)
Self-employed	0.261***	0.045
	(0.077)	(0.089)
Retired	0.090	0.102*
	(0.063)	(0.056)
High Skill	−0.077*	−0.066*
	(0.044)	(0.036)
Medium Skill	0.025	0.009
	(0.037)	(0.032)
Public sector	0.001	0.007
	(0.036)	(0.029)
Constant	−0.173	−0.148
	(0.303)	(0.273)
Controls	Yes	Yes
Assets and Liabilities	No	Yes
R^2	0.221	0.413
AIC	522.55	343.54
N	660	660

Notes: The table shows coefficients for OLS regressions of the share of gross wealth held in real assets (RA), with robust standard errors in parentheses. Students and participants without any assets are excluded. *Money Illusion Index* is a measure of money illusion between −1 and 1. *Female* is a dummy. *Couple* and *Married* are dummies for partnered (married or not) and married, respectively. *Children (number)* is the number of children. *Self-employed* and *Retired* are dummies. *High Skill* and *Medium Skill* are occupational dummies, with a baseline of *Low Skill* or other. *Public Sector* is a dummy for public sector employment. *Controls* include age, years of education, a dummy for completion of an education in science, technology, engineering, or mathematics, based on ISCED-2011 classifications, the average rate of inflation over a participant's life, an IST-M fluid intelligence test score (Liepmann et al. 2001), a dummy for correctly answering two or more questions on a cognitive reflection test (Frederick 2005), incentivized risk and loss aversion measures (Tanaka, Camerer, and Nguyen 2010) and the Big 5 personality test (Costa and McCrae 1992).. *Assets and Liabilities* is gross assets and liabilities, with linear and quadratic terms. Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

Table B.10: Real Asset Share and Risk/Loss Aversion Measures (OLS)

Dep. Var.: RA Share	(4)	(5)
Money Illusion Index	−0.097**	−0.120**
	(0.047)	(0.047)
Risk Consistent	−0.061	−0.086*
	(0.053)	(0.044)
Risk Switch Point	0.008	0.010**
	(0.005)	(0.004)
Loss Consistent	−0.018	−0.019
	(0.066)	(0.057)
Loss Switch Point	0.011	0.009
	(0.009)	(0.008)
Constant	−0.173	−0.148
	(0.303)	(0.273)
Controls	Yes	Yes
Assets and Liabilities	No	Yes
R^2	0.221	0.413
AIC	522.55	343.54
N	660	660

Notes: The table shows coefficients for OLS regressions of the share of gross wealth held in real assets (RA), with robust standard errors in parentheses. Students and participants without any assets are excluded. *Money Illusion Index* is a measure of money illusion between −1 and 1. *Risk Consistent* and *Loss Consistent* are dummies set to 1 if a participant had a single switching point in incentivized lottery tasks measuring risk and loss aversion (Tanaka, Camerer, and Nguyen 2010). *Risk Switch Point* and *Loss Switch Point* refer to the choice where individuals switched from risky to safe, with higher values indicating greater risk and loss aversion, respectively. *Controls* include an IST-M fluid intelligence test score (Liepmann et al. 2001), a dummy for correctly answering two or more questions on a cognitive reflection test (Frederick 2005), years of education, a dummy for STEM (science, technology, engineering, and mathematics) education, age, the average rate of inflation over a participant's life, gross non-capital income with linear and quadratic terms, dummies for retired, self-employed, female, partnered, married, occupational skill level, and public sector employment, together with the number of children and the Big 5 personality test (Costa and McCrae 1992). *Assets and Liabilities* is gross assets and liabilities, with linear and quadratic terms. Significance at 10% is denoted by *, at 5% by **, and at 1% by ***.

C Money Illusion and Prospect Theory

Money illusion is largely absent from standard economic models, so in this section we define the term and explain how it interacts with valuations under prospect theory (Kahneman and Tversky 1979; Tversky and Kahneman 1992). Our definition builds on the work of Shafir, Diamond, and Tversky (1997), who define money illusion as a *bias* towards nominal representations of economic transactions. The extent of the bias may vary across individuals, but an individual who gives *any* weight at all to nominal representations will be biased towards them, thereby exhibiting money illusion. This definition is sharply different from a naive view of

money illusion as thinking in purely nominal terms, but does not preclude the possibility that *some* people may do so.

We define money illusion as an individual-level parameter $\psi_i \in [0, 1]$.[2] If $\psi_i = 0$, then individual i is completely free of money illusion, or *non-illuded*. Any other value, $\psi_i \in (0, 1]$, indicates that i is prone to money illusion, or *illuded*. Illuded individuals are further divided into *partly illuded*, where $\psi_i \in (0, 1)$, and *fully illuded*, where $\psi_i = 1$. While the extreme cases are not excluded, we expect most people to be partly illuded.

To incorporate money illusion of the form described above into prospect theory, we start with a standard value function of the form

$$v(x) = \begin{cases} x^{\alpha}, & x \geq 0 \\ -\lambda(-x)^{\beta}, & x < 0 \end{cases}, \qquad \alpha \in (0, 1), \quad \beta \in (0, 1), \quad \lambda > 1, \tag{C.1}$$

where x is a gain or loss, $\alpha \in (0, 1)$ indicates risk aversion in the gain domain, $\beta \in (0, 1)$ indicates risk seeking in the loss domain, and $\lambda > 1$ indicates loss aversion. All three assumptions are supported by Tversky and Kahneman's (1992) empirical estimates.[3] In the context of household finance, a real gain or loss x_{itm} for investor i during period t in mental account m is

$$x_{itm} \equiv r_{itm} w_{i(t-1)m}, \tag{C.2}$$

where r_{itm} is the real rate of return (for assets) or the borrowing rate (for liabilities) during period t and $w_{i(t-1)m}$ is the initial balance in the mental account, in purchasing power terms. A mental account containing only assets has a positive balance, $w_{i(t-1)m} > 0$, while a mental account containing only liabilities has a negative balance, $w_{i(t-1)m} < 0$. A mixed account contains both assets and liabilities, but is either a net asset or net liability account, unless the two exactly cancel each other out and $w_{i(t-1)m} = 0$.[4] With a zero balance, r_{itm} is undefined.

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[2] For simplicity, we assume that ψ_i is constant. In reality, it may be a function of the rate of inflation, $\psi_i = \psi(\pi_t; \mathbf{x}_i)$, where $\psi' < 0$ and $\mathbf{x}_{it}$ is a vector of individual characteristics. This latter form would be consistent with Yellen and Akerlof (2006), who argue that inflation is more likely to be ignored with it is low.

[3] Tversky and Kahneman estimate that $\alpha = \beta = 0.88$ and $\lambda = 2.25$.

[4] An example would be a mental account containing real estate (an asset) and an associated mortgage (a liability), assuming both are evaluated jointly rather than separately. The maximum loan to value ratio allowed under Danish law is 80 percent, so mortgaged real estate would typically be viewed as an asset, with a net positive balance. In the face of sufficiently large price declines, however, the value of the real estate could fall below the value of the mortgage, reversing the sign of the balance in the mental account.

To consider both real and nominal returns, we begin by defining inflation as

$$\pi_t \equiv \frac{P_t}{P_{t-1}} - 1, \qquad \forall t\colon P_t > 0, \tag{C.3}$$

where P_t is the price level at the end of period t and π_t is the change in the price level during the period. Nominal changes, rates, and initial wealth are therefore

$$\tilde{x}_{itm} \equiv \tilde{r}_{itm}\widetilde{w}_{i(t-1)m}, \qquad \tilde{r}_{itm} \equiv \big((1 + r_{itm})(1 + \pi_t) - 1\big), \qquad \widetilde{w}_{i(t-1)m} \equiv P_{t-1}w_{i(-1)tm}, \tag{C.4}$$

respectively. To incorporate money illusion into valuations, real and nominal rates of return are jointly evaluated as

$$(1 - \psi_i)v(x_{itm}) + \psi_i v(\tilde{x}_{itm}), \tag{C.5}$$

which combines standard prospect theory values for real and nominal gains and losses, with the weight assigned to each indicated by ψ_i. Inserting (C.4) into (C.5), normalizing the initial price level to $P_{t-1} = 1$, and omitting subscripts for simplicity gives a value function

$$\begin{aligned} &\overline{v}^{itm}(r, w) = (1 - \psi)v(rw) + \psi v(\tilde{r}w), \qquad \tilde{r} \equiv \big((1 + r)(1 + \pi) - 1\big), \\ &\frac{\partial \tilde{r}}{\partial r} = (1 + \pi) > 0, \qquad \frac{\partial \tilde{r}}{\partial \pi} = (1 + r)\begin{cases} > 0, & r > -1 \\ \leq 0, & r \leq -1 \end{cases}, \end{aligned} \tag{C.6}$$

which from (C.1) to (C.4) expands to

$$\overline{v}^{itm}(r, w) = \begin{cases} (1 - \psi)(rw)^\alpha + \psi(\tilde{r}w)^\alpha > 0, & rw \geq 0 \wedge \tilde{r}w \geq 0 \\ -(1 - \psi)\lambda(-rw)^\beta + \psi(\tilde{r}w)^\alpha \gtreqless 0, & rw < 0 \wedge \tilde{r}w \geq 0 \\ (1 - \psi)(rw)^\alpha - \psi\lambda(-\tilde{r}w)^\beta \gtreqless 0, & rw \geq 0 \wedge \tilde{r}w < 0 \\ -(1 - \psi)\lambda(-rw)^\beta - \psi\lambda(-\tilde{r}w)^\beta < 0, & rw < 0 \wedge \tilde{r}w < 0 \end{cases}. \tag{C.7}$$

From (C.7), it is clear that real gains that are also nominal gains are always evaluated positively, while real losses that are also nominal losses are always evaluated negatively. A real loss that is a nominal gain will be evaluated positively if

$$\psi > \frac{\lambda(-rw)^\beta}{\lambda(-rw)^\beta + (\tilde{r}w)^\alpha}, \tag{C.8}$$

while a real gain that is a nominal loss will be evaluated negatively if

$$\psi > \frac{(rw)^\alpha}{(rw)^\alpha + \lambda(-\tilde{r}w)^\beta}. \tag{C.9}$$

In modern economies where inflation is the norm and deflation is rare, the case in (C.8) is the more interesting of the two.

In a weakly inflationary environment where $\pi_t \geq 0$, the value $\overline{v}^{itm}(r, w)$ is weakly increasing in money illusion ψ_i and the rate of inflation π_t, for a positive balance $w > 0$, and decreasing in both for a negative balance $w < 0$. More specifically, the partial effect of money illusion on the value is

$$\frac{\partial \overline{v}^{itm}(r,w)}{\partial \psi} = \begin{cases} -(rw)^{\alpha} + (\tilde{r}w)^{\alpha} \begin{Bmatrix} > 0, & \pi w > 0 \\ = 0, & \pi w = 0 \\ < 0, & \pi w < 0 \end{Bmatrix}, & rw \geq 0 \wedge \tilde{r}w \geq 0 \\ \lambda(-rw)^{\beta} + (\tilde{r}w)^{\alpha} > 0, & rw < 0 \wedge \tilde{r}w \geq 0 \\ -(rw)^{\alpha} - \lambda(-\tilde{r}w)^{\beta} < 0, & rw \geq 0 \wedge \tilde{r}w < 0 \\ \lambda(-rw)^{\beta} - \lambda(-\tilde{r}w)^{\beta} \begin{Bmatrix} > 0, & \pi w > 0 \\ = 0, & \pi w = 0 \\ < 0, & \pi w < 0 \end{Bmatrix}, & rw < 0 \wedge \tilde{r}w < 0 \end{cases}, \tag{C.10}$$

which under inflation is positive for $w > 0$ and negative for $w < 0$, and vice-versa under deflation. In an inflationary environment, money illusion makes both asset returns and borrowing costs look higher. However, the size of the effect varies with the real rate r. Considering asset ($w > 0$) returns in a non-deflationary ($\pi \geq 0$) environment, (C.10) simplifies to

$$\frac{\partial \overline{v}^{itm}(r,w)}{\partial \psi} \Big| (w > 0 \wedge \pi \geq 0) = \begin{cases} -(rw)^{\alpha} + (\tilde{r}w)^{\alpha} \geq 0, & r \geq 0 \\ \lambda(-rw)^{\beta} + (\tilde{r}w)^{\alpha} > 0, & r \in \left(-\frac{\pi}{1+\pi}, 0\right) \\ \lambda(-rw)^{\beta} - \lambda(-\tilde{r}w)^{\beta} \geq 0, & r \leq -\frac{\pi}{1+\pi} \end{cases}. \tag{C.11}$$

Although the effect of money illusion on the value of asset returns is always weakly positive, the magnitude varies non-monotonically with the real rate of return r, as shown by

$$\frac{\partial^2 \overline{v}^{itm}(r,w)}{\partial \psi \partial r} \Big| (w > 0 \wedge \pi \geq 0) = \begin{cases} \left(-\frac{1}{r^{1-\alpha}} + \frac{1+\pi}{\tilde{r}^{1-\alpha}}\right) \alpha w^{\alpha}, & r > 0 \\ -\frac{1}{(-r)^{1-\beta}} \lambda \beta w^{\beta} + \frac{1+\pi}{\tilde{r}^{1-\alpha}} \alpha w^{\alpha}, & r \in \left(-\frac{\pi}{1+\pi}, 0\right) \\ \left(-\frac{1}{(-r)^{1-\beta}} + \frac{1+\pi}{(-\tilde{r})^{1-\beta}}\right) \lambda \beta w^{\beta}, & r < -\frac{\pi}{1+\pi} \end{cases}, \tag{C.12}$$

which is defined if $r \neq 0$ and $\tilde{r} \neq 0$ (i.e. if $r \notin \{0, -\pi/(1+\pi)\}$). The sign of (C.12) is characterized by

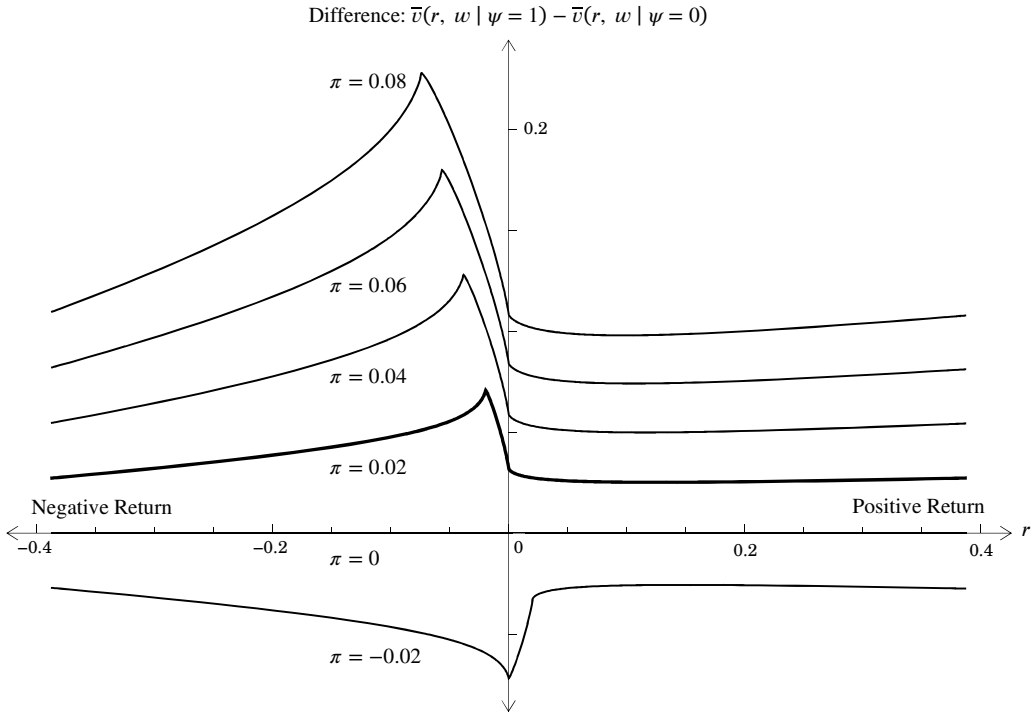
$$\frac{\partial^2 \overline{v}^{itm}(r,w)}{\partial\psi\partial r} \Big| (w>0 \wedge \pi) \geq 0 \begin{cases} > 0, & r > \dfrac{\pi}{(1+\pi)^{\frac{1}{1-\alpha}} - (1+\pi)} \\ = 0, & r = \dfrac{\pi}{(1+\pi)^{\frac{1}{1-\alpha}} - (1+\pi)} \\ < 0, & r \in \left(0, \dfrac{\pi}{(1+\pi)^{\frac{1}{1-\alpha}} - (1+\pi)}\right) \\ < 0, & r \in \left(-\dfrac{\pi}{1+\pi}, 0\right) \wedge \dfrac{(-r)^{1-\beta}}{(\tilde{r})^{1-\alpha}} < \dfrac{\lambda\beta}{\alpha(1+\pi)w^{\alpha-\beta}} \\ = 0, & r \in \left(-\dfrac{\pi}{1+\pi}, 0\right) \wedge \dfrac{(-r)^{1-\beta}}{(\tilde{r})^{1-\alpha}} = \dfrac{\lambda\beta}{\alpha(1+\pi)w^{\alpha-\beta}} \\ > 0, & r \in \left(-\dfrac{\pi}{1+\pi}, 0\right) \wedge \dfrac{(-r)^{1-\beta}}{(\tilde{r})^{1-\alpha}} > \dfrac{\lambda\beta}{\alpha(1+\pi)w^{\alpha-\beta}} \\ > 0, & r < -\dfrac{\pi}{1+\pi} \end{cases}, \quad \text{(C.13)}$$

which is positive outside of an area around zero. Under the assumption that $\beta = \alpha$, as Tversky and Kahneman's (1992) empirical estimates suggest, (C.13) simplifies to

$$\frac{\partial^2 \overline{v}^{itm}(r,w)}{\partial\psi\partial r} \Big| (w>0 \wedge \pi) \geq 0 \begin{cases} > 0, & r > \dfrac{\pi}{(1+\pi)^{\frac{1}{1-\alpha}} - (1+\pi)} \\ = 0, & r = \dfrac{\pi}{(1+\pi)^{\frac{1}{1-\alpha}} - (1+\pi)} \\ < 0, & r \in \left(0, \dfrac{\pi}{(1+\pi)^{\frac{1}{1-\alpha}} - (1+\pi)}\right) \\ < 0, & r \in \left(-\dfrac{\pi}{\left(\frac{1+\pi}{\lambda}\right)^{\frac{1}{1-\alpha}} + (1+\pi)}, 0\right) \\ = 0, & r = -\dfrac{\pi}{\left(\frac{1+\pi}{\lambda}\right)^{\frac{1}{1-\alpha}} + (1+\pi)} \\ > 0, & r \in \left(-\dfrac{\pi}{1+\pi}, -\dfrac{\pi}{\left(\frac{1+\pi}{\lambda}\right)^{\frac{1}{1-\alpha}} + (1+\pi)}\right) \\ > 0, & r < -\dfrac{\pi}{1+\pi} \end{cases}. \quad \text{(C.14)}$$

Assuming Tversky and Kahneman's parameter estimates and an inflation target of 2 percent, (C.14) is steeply negative for real rates of return between about -1.96 and 0 percent, and remains negative until the real rate of return reaches about 12.55 percent.

Figure C.1: Effect of Money illusion on Value by Rate of Return and Inflation ($w > 0$)



Notes: The figure shows the difference in valuations of a rate of return r, given wealth $w > 0$ in a mental account, using parameter estimates from Tversky and Kahneman (1992), with the addition of money illusion parameter $\psi \in [0, 1]$, where 0 indicates non-illuded (thinking in real terms) and 1 indicates fully illuded (thinking in nominal terms). The horizontal axis shows the rate of return and the vertical axis the difference in valuations between a fully illuded and a non-illuded investor. The thick line shows an inflation rate of 2 percent, with the thin lines showing rates between −2 (deflation, bottom) and 8 percent, with intervals of 2 percentage points. In the absence of inflation, the line is flat at zero. In the presence of inflation, money illusion always makes returns look better, and the effect is increasing in the rate except for the area near zero. Under inflation, the effect of money illusion peaks when the rate r is close to $-\pi/(1+\pi)$, where π is the rate of inflation.

Figure C.1 shows the effect of money illusion on valuations of rates of return for different levels of inflation, using Tversky and Kahneman's (1992) parameter estimates of $\alpha = \beta = 0.88$ and $\lambda = 2.25$. Each line shows the difference in valuations between a fully illuded ($\psi_i = 1$) and a non-illuded ($\psi_i = 0$) individual, at a given rate of inflation. The thick line shows a baseline case of 2 percent inflation, with the others ranging from −2 (deflation of 2 percent) to 8 percent, in increments of 2 percentage points. Money illusion increases valuations of all rates of return, but for rates within typical ranges, it has a markedly larger impact in the loss domain than in the gain domain. For plausible rates of return, the effect of money illusion is most pronounced when the nominal rate of return $\tilde{r}$ is close to zero, meaning the real rate of return r is close to $-\pi/(1+\pi)$. However, the effect falls much more rapidly to the right of the peak, in the direction of nominal gains, than to the left, in the direction of nominal losses.

Turning to borrowing costs on debts ($w < 0$), again in a non-deflationary ($\pi \geq 0$) environment, (C.10) simplifies to

$$\frac{\partial \overline{v}^{itm}(r,w)}{\partial \psi} \Big| (w<0 \wedge \pi \geq 0) = \begin{cases} \lambda(-rw)^{\beta} - \lambda(-\tilde{r}w)^{\beta} \leq 0, & r \geq 0 \\ -(rw)^{\alpha} - \lambda(-\tilde{r}w)^{\beta} < 0, & r \in \left(-\frac{\pi}{1+\pi}, 0\right), \\ -(rw)^{\alpha} + (\tilde{r}w)^{\alpha} \leq 0, & r \leq -\frac{\pi}{1+\pi} \end{cases} \quad \text{(C.15)}$$

which also varies non-monotonically with r, as shown by

$$\frac{\partial^2 \overline{v}^{itm}(r,w)}{\partial \psi \partial r} \Big| (w<0 \wedge \pi \geq 0) = \begin{cases} \left(\frac{1}{r^{1-\beta}} - \frac{1+\pi}{\tilde{r}^{1-\beta}}\right) \lambda\beta(-w)^{\beta}, & r > 0 \\ \frac{1}{(-r)^{1-\alpha}} \alpha(-w)^{\alpha} - \frac{1+\pi}{\tilde{r}^{1-\beta}} \lambda\beta(-w)^{\beta}, & r \in \left(-\frac{\pi}{1+\pi}, 0\right). \\ \left(\frac{1}{(-r)^{1-\alpha}} - \frac{1+\pi}{(-\tilde{r})^{1-\alpha}}\right) \alpha(-w)^{\alpha}, & r < -\frac{\pi}{1+\pi} \end{cases} \quad \text{(C.16)}$$

As with assets, (C.16) is defined if $r \neq 0$ and $\tilde{r} \neq 0$ (i.e. if $r \notin \{0, -\pi/(1+\pi)\}$), and the sign characterized by

$$\frac{\partial^2 \overline{v}^{itm}(r,w)}{\partial \psi \partial r} \Big| (w<0 \wedge \pi \geq 0) \begin{cases} < 0, & r > \dfrac{\pi}{(1+\pi)^{\frac{1}{1-\beta}} - (1+\pi)} \\ = 0, & r = \dfrac{\pi}{(1+\pi)^{\frac{1}{1-\beta}} - (1+\pi)} \\ > 0, & r \in \left(0, \dfrac{\pi}{(1+\pi)^{\frac{1}{1-\beta}} - (1+\pi)}\right) \\ > 0, & r \in \left(-\frac{\pi}{1+\pi}, 0\right) \wedge \frac{\tilde{r}^{1-\beta}}{(-r)^{1-\alpha}} > \frac{\lambda\beta(1+\pi)(-w)^{\beta}}{\alpha(-w)^{\alpha}} \\ = 0, & r \in \left(-\frac{\pi}{1+\pi}, 0\right) \wedge \frac{\tilde{r}^{1-\beta}}{(-r)^{1-\alpha}} = \frac{\lambda\beta(1+\pi)(-w)^{\beta}}{\alpha(-w)^{\alpha}} \\ < 0, & r \in \left(-\frac{\pi}{1+\pi}, 0\right) \wedge \frac{\tilde{r}^{1-\beta}}{(-r)^{1-\alpha}} < \frac{\lambda\beta(1+\pi)(-w)^{\beta}}{\alpha(-w)^{\alpha}} \\ < 0, & r < -\frac{\pi}{1+\pi} \end{cases} \quad \text{(C.17)}$$

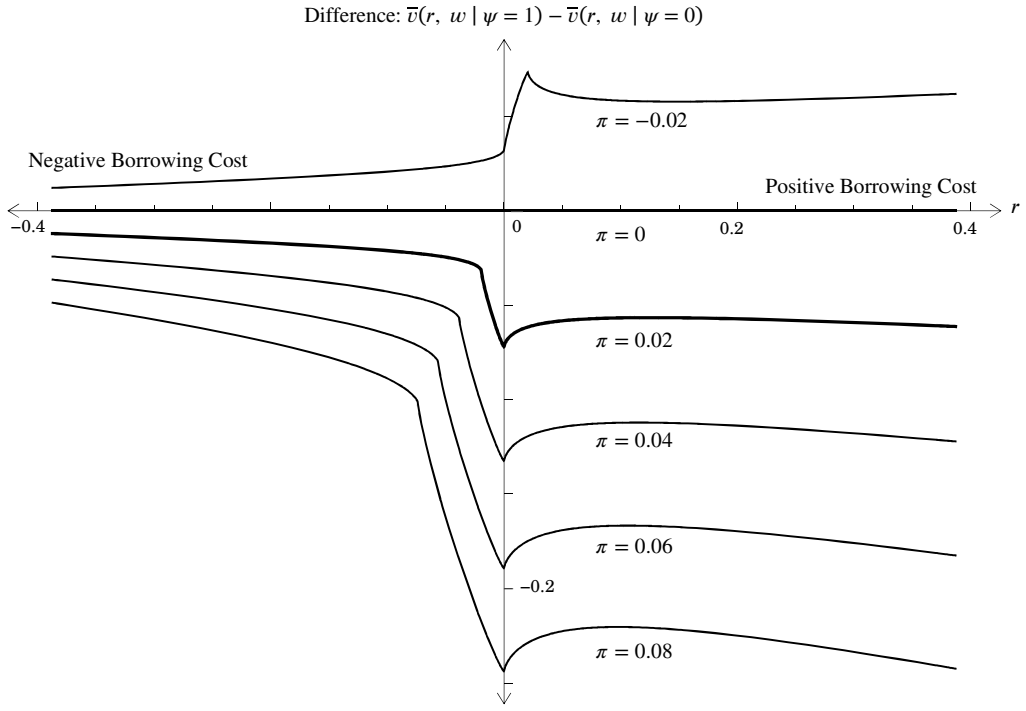
which simplifies to

$$\frac{\partial^2 \overline{v}^{itm}(r,w)}{\partial\psi\partial r} \Big| (w<0 \wedge \pi \geq 0) \begin{cases} <0, & r > \dfrac{\pi}{(1+\pi)^{\frac{1}{1-\alpha}} - (1+\pi)} \\ =0, & r = \dfrac{\pi}{(1+\pi)^{\frac{1}{1-\alpha}} - (1+\pi)} \\ >0, & r \in \left(0, \dfrac{\pi}{(1+\pi)^{\frac{1}{1-\alpha}} - (1+\pi)}\right) \\ >0, & r \in \left(-\dfrac{\pi}{\left(\lambda(1+\pi)\right)^{\frac{1}{1-\alpha}} + (1+\pi)}, 0\right) \\ =0, & r = -\dfrac{\pi}{\left(\lambda(1+\pi)\right)^{\frac{1}{1-\alpha}} + (1+\pi)} \\ <0, & r \in \left(-\dfrac{\pi}{1+\pi}, -\dfrac{\pi}{\left(\lambda(1+\pi)\right)^{\frac{1}{1-\alpha}} + (1+\pi)}\right) \\ <0, & r < -\dfrac{\pi}{1+\pi} \end{cases} , \quad \text{(C.18)}$$

if $\beta = \alpha$. Assuming Tversky and Kahneman's parameter estimates and an inflation target of 2 percent, (C.18) is steeply negative for real rates of return between about -1.96 and 0 percent, and the positive from about 0 to 12.55 percent.

Figure C.2 shows the effect of money illusion on valuations of borrowing rates, for different levels of inflation, as before using Tversky and Kahneman's (1992) parameter estimates of $\alpha = \beta = 0.88$, and $\lambda = 2.25$. Each line shows the difference in valuations between a fully illuded ($\psi_i = 1$) and a non-illuded ($\psi_i = 0$) investor, at a given rate of inflation. The thick line shows a baseline case of 2 percent inflation, with the others ranging from -2 (deflation of 2 percent) to 8 percent, in increments of 2 percentage points. Money illusion decreases valuations of all borrowing rates, but especially those to the right of $-\pi/(1+\pi)$, which is the nominal zero. An important difference between asset returns and borrowing costs is that *nominal* borrowing rates are virtually always positive. As a result, feasible borrowing rates are to the right of $-\pi/(1+\pi)$, in the region where money illusion has a strong negative effect on valuations. For plausible borrowing rates, the effect of money illusion is most pronounced when the real rate r is close to zero, with only a marginal reduction in the effect to the right of zero. The effect of money illusion on valuations of borrowing rates is thus strongly negative for plausible rates.

Figure C.2: Effect of Money illusion on Value by Borrowing Rate and Inflation ($w < 0$)



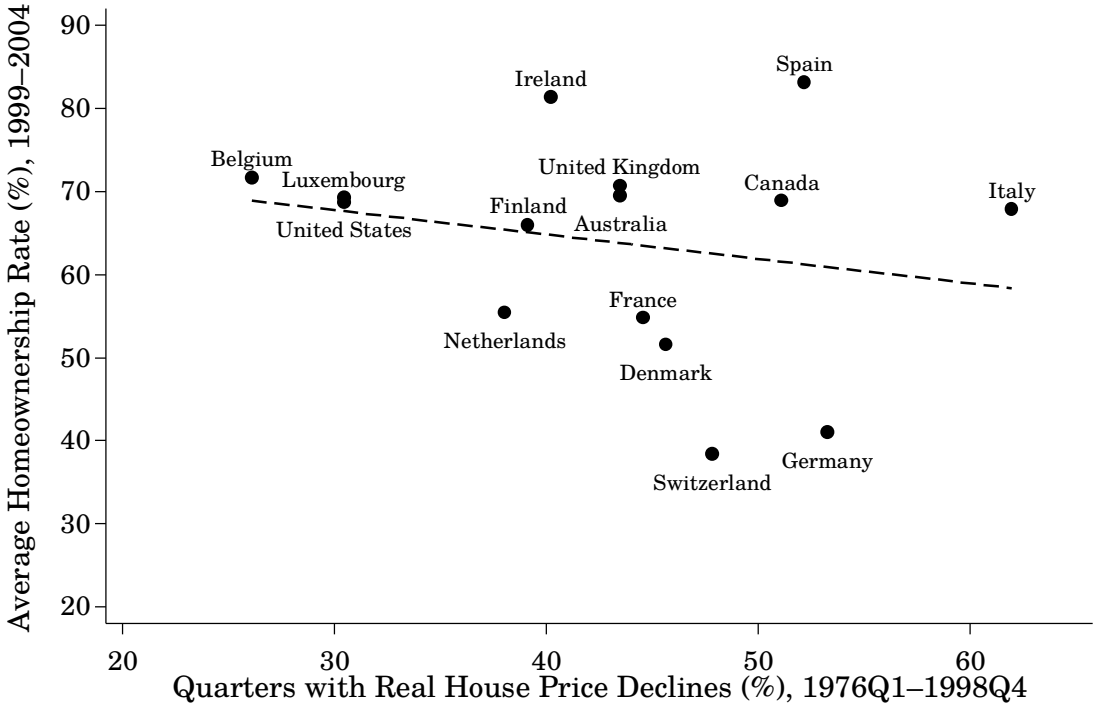
Notes: The figure shows the difference in valuations of a borrowing rate r, given debt $w < 0$ in a mental account, using parameter estimates from Tversky and Kahneman (1992), with the addition of money illusion parameter $\psi \in [0, 1]$, where 0 indicates non-illuded (thinking in real terms) and 1 indicates fully illuded (thinking in nominal terms). The horizontal axis shows the borrowing rate and the vertical axis the difference in valuations between a fully illuded and a non-illuded investor. The thick line shows an inflation rate of 2 percent, with the thin lines showing rates between −2 (deflation, top) and 8 percent, with intervals of 2 percentage points. In the absence of inflation, the line is flat at zero. In the presence of inflation, money illusion always makes returns look better, and the effect is increasing in the rate except for the area near zero. Under inflation, the effect of money illusion peaks when the rate r is close to $-\pi/(1+\pi)$, where π is the rate of inflation.

The above analysis covers the addition of money illusion to a prospect theory value function, and the way in which the combination of money illusion and inflation influences valuations of each potential outcome. The other aspects of prospect theory, such as probability weighting, continue to apply in the usual way.

D Loss Aversion and Housing Markets

Figure 4 in the paper shows that nominal price declines in the last quarter of the 20th century are significantly correlated with homeownership rates at the end of the century. Given that nominal and real losses may coincide, it is informative to consider the same relationship in real terms.

Figure D.1: Real Losses and Homeownership in Selected OECD Countries



Notes: Homeownership rates are from Andrews and Caldera Sánchez (2011), and are for 2004, with the exception of Belgium, France, and Ireland, where they are for 2000, and the Netherlands, where they are for 1999. Quarters with year-on-year real price declines are computed from the house price data set described in Mack and Martínez-García (2011). The line is an OLS estimate, using robust standard errors, with $\hat{\alpha} = 76.57$ ($p = 0.000$), $\hat{\beta} = -0.29$ ($p = 0.354$), and $R^2 = 0.05$. The figure includes the 15 OECD countries that are available in both data sets.

Figure D.1 plots average homeownership rates in a selection of OECD countries at the end of the 20th century, and the percentage of quarters during the preceding quarter century in which real house prices fell year-on-year. Although there is some visual support for a negative correlation between real house price declines and subsequent homeownership rates, the OLS coefficient on real house price declines, $\hat{\beta}_{\mathrm{R}} = -0.29$, is not significantly different from zero (using robust standard errors, $p = 0.354$). This result contrasts sharply with the OLS coefficient on nominal price declines (see Figure 4) of $\hat{\beta}_{\mathrm{N}} = -0.84$, which is much larger in absolute terms and highly significantly different from zero ($p = 0.002$, again with robust standard errors).

Figures 4 and D.1 only show simple correlations, without controls for differences between countries. Nevertheless, they are consistent with the proposition that money illusion and aversion to nominal losses plays a role in the decision to enter the housing market.

E Asset Returns in Denmark

This section contains details of Danish asset returns by asset class.

Table E.1: Nominal and Real Total Rates of Return by Asset Class (1992–2016)

		Annual Rate of Return (%)			
		Nominal		Real	
	Share (%)	Average	Std. Dev.	Average	Std. Dev.
Certificates of deposit		3.18	2.54	1.25	2.45
Government bonds		7.79	8.35	5.78	8.28
Housing returns		10.49	8.01	8.43	7.91
Single-family houses	78.2	10.24	7.85	8.19	7.75
Owner-occupied flats	11.3	11.70	9.90	9.62	9.78
Holiday cottages	10.5	10.50	8.94	8.43	8.74
House price returns		5.36	7.66	3.40	7.57
Single-family houses	78.2	5.12	7.48	3.16	7.39
Owner-occupied flats	11.3	6.57	9.59	4.59	9.48
Holiday cottages	10.5	5.37	8.70	3.41	8.52
Equities		16.16	24.63	14.05	24.36

Notes: The table shows annual nominal and real arithmetic average returns and standard deviations, based on total returns, using quarterly observations from 1992Q1 to 2016Q1, and assuming reinvestment of interest, dividend, and imputed rental income. *Certificates of Deposit* are total returns on Danish central bank CDs, which approximate interest rates earned on bank deposits in savings accounts. *Government bonds* are total returns on Danish 10-year government bonds. *Housing returns* are aggregated returns for *Single-family houses*, *Owner-occupied flats*, and *Holiday cottages*, using prices per m² and weighted by the estimated total market value of each of the three subcategories, and including the value of imputed rents- *Share* is the total market value of a given category of housing, divided by the combined market value of all three categories. *House price returns* are average annual capital gains on housing. *Equities* are total returns (dividends and capital gains) from the OMX Copenhagen stock market index. Real values are deflated using the Danish consumer price index.

Table E.1 shows average annual rates of return for the asset classes used to estimate the individual cost of money illusion (see Section 3.5). The data set includes quarterly observations from 1992Q1 to 2016Q4, with returns computed as year-on-year changes, including capital gains or losses, as well as interest, dividend, imputed rents, in all cases assuming reinvestment. For housing, capital gains and losses are based on changes in the price per square meter for each of the three housing categories. The overall estimates for housing is computed by multiplying the individual returns by the *Share* for a given category, which is the market value of all housing in that category at the time of the study, divided by the sum of the value of all housing categories. The four rightmost columns show nominal and real returns, respectively. The *Average* is the arithmetic average annual return, while *Std. Dev.* is the standard deviation.

The *Nomina/Average* column shows that, as expected, CDs have provided the lowest nominal returns, with bonds providing the second-lowest, housing the second-highest and equities

the highest. Roughly half of the return on housing has been in the form of imputed rents, with the rest coming from capital gains. In nominal terms, bonds, housing, and equities have provided rates of return more than two, three, and five times as high, respectively, as CDs. In real terms, the differences are even more dramatic, with respective returns on bonds, housing and equities more than four, six, and eleven times as high as returns on CDs.

The portfolio returns in Table 4 are computed by multiplying the returns in Table E.1 by each participant's individual asset shares in bank deposits, bonds, housing, and equities, to compute an individual rate of return for. On an aggregate level, using a median split based on the money illusion index, we find that those in the lower half of the distribution (meaning less money illusion) have 26.2 percent of their wealth in bank deposits, 3.4 percent in bonds, 64.8 percent in housing, and 5.4 percent in stocks. For those in the upper half (meaning more money illusion), the shares are 36.4 percent in bank deposits, 3.4 percent in bonds, 54.8 percent in housing, and 5.2 percent in stocks. Assuming average returns on each asset class, the arithmetic average rates of return over the 1992–2016 period are therefore 6.6 percent for the low-MI group and 5.8 percent for the high-MI group, with respective standard deviations of 6.1 and 5.3 percentage points.

As discussed in Appendix C, the effect of money illusion on relative valuations of asset returns by prospect theory investors can be positive or negative, depending on the characteristics of both returns and inflation. In the 93 quarterly observations included in the data described in Table E.1, money illusion increased the attractiveness of bank deposits relative to housing in 79 cases (85 percent), decreased it in 13 cases (14 percent) and had no effect in 1 case (1 percent). In general, it is therefore safe to say that money illusion has made housing in Denmark appear *less* attractive, relative to bank deposits.

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