Patience decreases with age for the poor but not for the rich: an international comparison

Giovanni Burro (Warwick University)
Rebecca McDonald (University of Birmingham)
Daniel Read (Warwick Business School)
Umar Taj (Warwick Business School)

17 June 2020
Project Doc Université Rennes 1

Plan

Patience throughout the world

- We participated in the Gallup End of Year survey (2015) and included this question on time preference (more than 50,000 respondents from 65 countries)

THE QUESTION

Again, think about your current household income: which of the following choices would you choose if offered?

1. Today you receive an extra payment which is equal to that of your normal monthly income (Smaller Sooner, SS)
2. In exactly one year from now you receive an extra payment equal to twice that of your normal monthly income (Large Later, LL)

Questions addressed

- How do age and personal income influence discounting? In particular, are the effects of age the same at all income levels, when controlling for nationality and individual characteristics?
- How does country level patience relate to country-level economic and socio-cultural characteristics?
- How does our country level measure of patience relate to previously reported country level measures?

Plan

Literature

- JDM research has been criticised for focusing on the WEIRD (Western Educated Industrialized Rich and Democratic: Heinrich, Heine & Norenzayen, 2010)

Literature

- JDM research has been criticised for focusing on the WEIRD (Western Educated Industrialized Rich and Democratic: Heinrich, Heine & Norenzayen, 2010)
- Wang, Rieger and Hens (2016) conducted a study where university students in 53 countries answered two time preference questions (amounts adjusted for PPP)

Literature

- JDM research has been criticised for focusing on the WEIRD (Western Educated Industrialized Rich and Democratic: Heinrich, Heine & Norenzayen, 2010)
- Wang, Rieger and Hens (2016) conducted a study where university students in 53 countries answered two time preference questions (amounts adjusted for PPP)
- Falk et al. (2018) conducted a larger scale study in which they measured Patience, Risk, positive and negative Reciprocity, Altruism and Trust

Literature

- JDM research has been criticised for focusing on the WEIRD (Western Educated Industrialized Rich and Democratic: Heinrich, Heine & Norenzayen, 2010)
- Wang, Rieger and Hens (2016) conducted a study where university students in 53 countries answered two time preference questions (amounts adjusted for PPP)
- Falk et al. (2018) conducted a larger scale study in which they measured Patience, Risk, positive and negative Reciprocity, Altruism and Trust
- Epper et al. (2020) investigate Patience in a sample of Danish individuals and find that patience is an important determinant of the position in the wealth distribution, over the entire lifespan

Literature: why are we different?

- Wang, Rieger and Hens (2016) only focus on undegraduate students

Literature: why are we different?

- Wang, Rieger and Hens (2016) only focus on undegraduate students
- Falk et al. (2018) focus a lot on cultural and national differences, not much on personal differences. They do not investigate the relationship that age and income have with Patience. We find a measure which is highly correlated with their measure but much easier to elicit

Literature: why are we different?

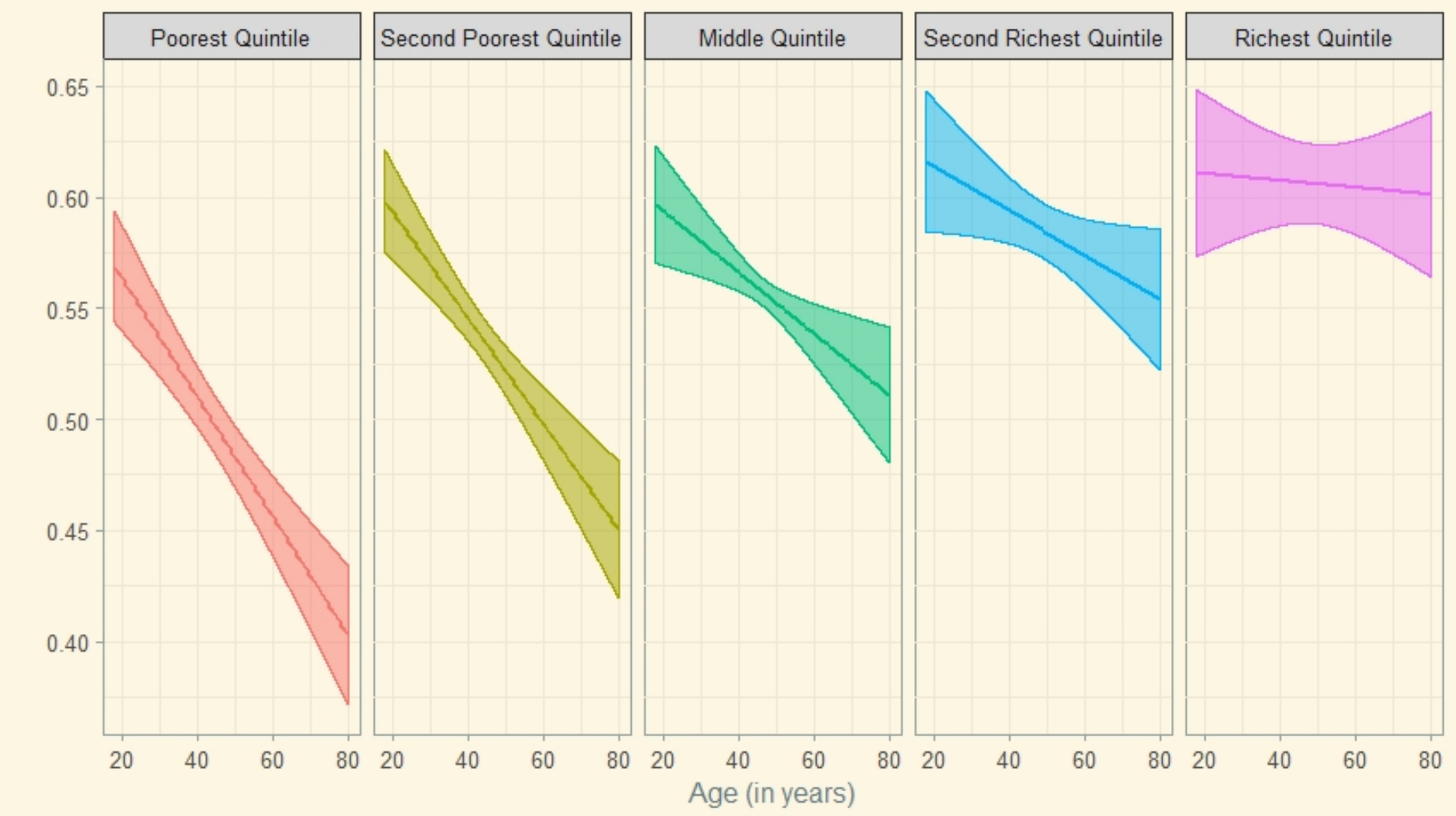
- Wang, Rieger and Hens (2016) only focus on undegraduate students
- Falk et al. (2018) focus a lot on cultural and national differences, not much on personal differences. They do not investigate the relationship that age and income have with Patience. We find a measure which is highly correlated with their measure but much easier to elicit
- Epper et al. (2020) measure Patience only for one cohort of individuals and suppose that measure is valid throughout their life. They focus on Denmark only

Literature: Income, Age and Discounting

- Becker and Mulligan (1997) suggested the poor should rationally be more impatient, and they are (Green et al., 1996; Meier & Sprenger, 2010; Tanaka, Camerer & Nguyen, 2010; Poulos & Whittington, 2000; Lawrance, 1991).
- Fisher (1930) and Sozou & Seymour (2003) proposed a "U shaped" time course of discounting, with greater discounting amongst the young and the old (similar ideas in Becker & Mulligan, 1998; Chu, Chien & Lee, 2010).
- Rogers (1998) claimed evolution will select younger people who discount at a high rate, predicting increasing patience with age.
- Trostel and Taylor (2001) argue that older people will discount more because of decreasing ability to enjoy life.
- All these patterns have been observed in several empirical studies.

Plan

Patience, age and income



Patience decreases with age for the poor

- Results are based on an OLS regression with FE at country level
- For young people, patience is relatively unaffected by income, but the difference grows dramatically with time
- With every additional ten years of age, patience declines at the following rates: 2.7% for the lowest and second-lowest income quintiles; 1.4% for the middle income quintile; 1.0% for the second richest quintile; and only 0.02% for the richest quintile

Tentative Explanation 1: poverty "causes" impatience

- Individuals with lower income are not born with lower patience but their condition leads them to decrease patience with age
- Poorer people might discount the future more extensively as they get older than would richer people, because they will be more strongly affected by the "pressure of pressing needs" (Fisher; 1930)
- Becker and Mulligan (1997) suggested that those who are well off will find it worthwhile to expend resources in thinking about the future while the poorer would not, and the "patience gap" between rich and poor will increase with age.

Tentative Explanation 2: impatience "causes" poverty

- If patience is randomly allocated to individuals by nature, those born with lower patience will move downwards in the income rank throughout their life
- Ramsey (1928) suggested that if discount rates differ among people, those who are more patient will become better off as they get older, while those who are less patient will become worse off
- Epper et al. (2020) found that patient individuals are wealthier and they causally attribute it to savings
- Green et al. (1999) found that older wealthier people discounted less than older poorer people. Plus, they found that older wealthy people discounted at the same rate as younger wealthy people, but did not have a group of young poor people

Possible concerns

- We model country heterogeneity with some alternative specifications Alternative models
- The effect is present for subsets of countries Macro Areas
- The effect is present if we treat age as categorical. No inverse-U shape relationship between patience and age Age bins
- The effect is not driven by a regular pattern in the refusal to answer the patience question Missing answers

Regression analysis

Dep Var: Larger Later	(1)	(2)	(3)	(4)	(5)	(6)
Age (decades)	−0.018***	−0.027***	−0.024***	−0.027***	−0.023***	−0.023***
	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)
Second Poorest Quintile	0.017	0.024	0.017	0.021	0.015	0.016
	(0.029)	(0.024)	(0.026)	(0.024)	(0.025)	(0.027)
Middle Quintile	−0.001	0.004	0.0004	−0.001	−0.007	−0.012
	(0.029)	(0.024)	(0.028)	(0.024)	(0.024)	(0.025)
Second Richest Quintile	0.028	0.017	0.025	0.009	0.0004	0.005
	(0.031)	(0.026)	(0.030)	(0.026)	(0.026)	(0.027)
Richest Quintile	0.007	−0.003	0.001	−0.016	−0.024	−0.015
	(0.038)	(0.031)	(0.035)	(0.030)	(0.030)	(0.031)
Age ∗Second Poorest Quintile	0.007	0.003	0.006	0.003	0.003	0.002
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Age ∗Middle Quintile	0.017***	0.013***	0.015***	0.013***	0.012**	0.011**
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Age ∗Second Richest Quintile	0.022***	0.017***	0.020***	0.016***	0.016***	0.014**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Age ∗Richest Quintile	0.032***	0.025***	0.030***	0.025***	0.024***	0.020***
	(0.007)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)
Gender	NO	NO	NO	YES	YES	YES
Education	NO	NO	NO	YES	YES	YES
Employment (ref: Full-time work)	NO	NO	NO	NO	YES	YES
Economic Optimism	NO	NO	NO	NO	NO	YES
Happiness	NO	NO	NO	NO	NO	YES
Risk Aversion	NO	NO	NO	NO	NO	YES
Observations	50,754	50,754	50,754	50,565	49,766	45,228
Adjusted R^2	0.010	0.054	0.018	0.055	0.056	0.063
Country FE	NO	YES	NO	YES	YES	YES
Macro Area FE	NO	NO	YES	NO	NO	NO

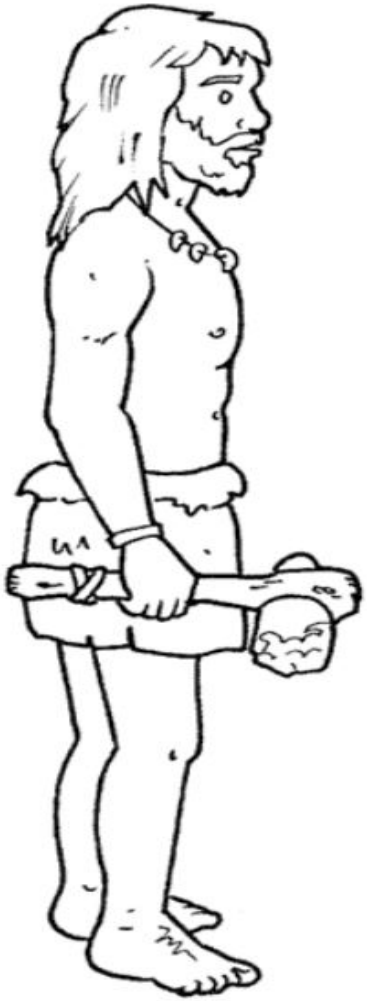
Note: *p<0.1; **p<0.05; ***p<0.01; Clustered Standard Errors at Country Level.

Regression analysis (cont.ed)

Dep Var: Larger Later	(1)	(2)	(3)	(4)
Age ∗Income	YES	YES	YES	YES
Female	−0.030***	−0.030***	−0.033***	−0.027***
	(0.006)	(0.006)	(0.006)	(0.006)
University Degree	0.028***	0.029***	0.026***	0.027***
	(0.007)	(0.007)	(0.007)	(0.007)
Unemployed (ref: Full-time work)		−0.048***	−0.043***	−0.042***
		(0.009)	(0.010)	(0.011)
Retired/Disabled (ref: Full-time work)		−0.033***	−0.024**	−0.019
		(0.012)	(0.012)	(0.012)
Next Yr Econ Neutral (ref: negative)			0.020**	0.013
			(0.008)	(0.009)
Next Yr Econ Positive (ref: negative)			0.026***	0.023**
			(0.009)	(0.010)
Happy			0.024***	0.020**
			(0.008)	(0.008)
Risk Averse			0.089***	0.092***
			(0.021)	(0.023)
Change Soon				−0.042***
				(0.009)
Strong disagree. Vaccine Effect. (ref: Strong agree.)				−0.071***
Atheist/Agnostic (ref: Catholic)				0.065***
				(0.010)
Protestant (ref: Catholic)				0.033***
				(0.010)
Observations	50,565	49,766	45,228	38,407
Adjusted R^2	0.055	0.056	0.063	0.067
Country FE	YES	YES	YES	YES
Countries number	65	65	65	60

Note: *p<0.1; **p<0.05; ***p<0.01; Clustered Standard Errors at Country Level.

Approximate sketch of Homo patiens

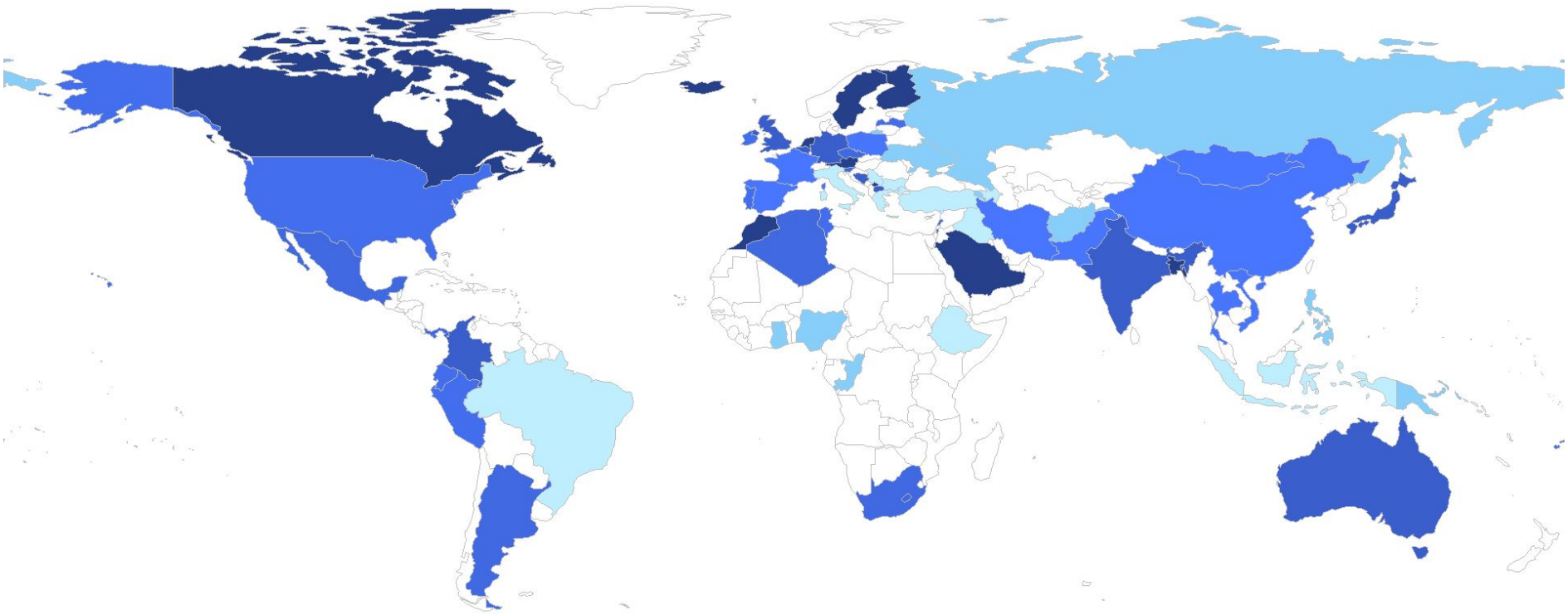


- An (old) high income, non believer male
- Satisfied with life and country
- Thinking next year is going to be economically prosperous
- Educated, not unemployed or retired and in favour of vaccines
- Risk Averse
- Better if Scandinavian

Plan

Patience in the world

- Patience index for each country is the percentage of LL answers in that country



Correlation with other patience indices

	Corr. Patience	p-value	Countries
Patience Falk et al. (2018)	0.605^{***}	0.000	44
Patience Wang et al. (2016)	0.439^{**}	0.020	28

- The correlation with other measures is very high
- Our measure is much easier to elicit
- Our measure is very easy to understand, it is individual specific and it poses no problems of converting the currency

Correlation with economic country variables

	Corr. Patience	p-value	Countries
GDP per capita 2014	0.528***	0.000	65
GDP per capita 2015	0.521***	0.000	65
Life Expectancy 2014	0.433***	0.000	65
Life Expectancy 2015	0.435***	0.000	65
Real Interest Rate 2014	−0.444***	0.003	44
Real Interest Rate 2015	−0.496***	0.001	43
Inflation 2014	−0.271**	0.030	64
Inflation 2015	−0.256**	0.041	64
Private Credit to GDP 2014	0.329***	0.009	63
Private Credit to GDP 2015	0.324**	0.010	63
Distance from Equator	0.320***	0.009	65

- Positive correlation with indices of economic development
- Negative correlation with interest rate and inflation
- No correlation with savings rate, growth rate and debt to GDP ratio

Correlation with cultural country variables

	Corr. Patience	p-value	Countries
Uncertainty Avoidance (Hofstede)	-0.376^{**}	0.013	43
Individualism (Hofstede)	0.361^{**}	0.017	43
Long Term Orientation (Hofstede)	-0.010	0.945	53
Future Time Reference Weak	0.270^{**}	0.035	61
Future Orientation Index	0.173	0.174	63

- Individualism and Future Time Reference were found to be correlated with patience by Falk et al. (2018)
- Uncertainty Avoidance was correlated to present bias in Wang et al. (2016)

Conclusion

- For the youngest group, patience does not differ between income levels. However, patience systematically diverges by income group as a function of age. **It decreases more with age, the lower the income**

Conclusion

- For the youngest group, patience does not differ between income levels. However, patience systematically diverges by income group as a function of age. **It decreases more with age, the lower the income**
- Individuals characteristics associated with patience: income; male; happiness; optimism; education; employment (worker, student, housewife); risk aversion; atheism

Conclusion

- For the youngest group, patience does not differ between income levels. However, patience systematically diverges by income group as a function of age. **It decreases more with age, the lower the income**
- Individuals characteristics associated with patience: income; male; happiness; optimism; education; employment (worker, student, housewife); risk aversion; atheism
- Country characteristics associated with patience: economic development; life expectancy; individualism

Conclusion

- For the youngest group, patience does not differ between income levels. However, patience systematically diverges by income group as a function of age. **It decreases more with age, the lower the income**
- Individuals characteristics associated with patience: income; male; happiness; optimism; education; employment (worker, student, housewife); risk aversion; atheism
- Country characteristics associated with patience: economic development; life expectancy; individualism
- We use an exceedingly simple measure of delay discounting for money that controls for relative value of reward without requiring we know individual income or country circumstances. **Despite the simplicity of the measure, it gives results consistent with more extravagant measures**

Alternative specifications for country heterogeneity

Dep Var: Larger Later	*LPM*	*LPM FE*	*Mixed Eff.*	*GLM Mixed Eff*	*Conditional Logit*	*Logit*
	(1)	(2)	(3)	(4)	(5)	(6)
Age (decades)	−0.018***	−0.027***	−0.026***	−0.114***	−0.086***	−0.075***
	(0.004)	(0.004)	(0.003)	(0.013)	(0.013)	(0.017)
Second Poorest Quintile	0.017	0.024	0.024	0.096	0.053	0.060
	(0.029)	(0.024)	(0.018)	(0.078)	(0.073)	(0.116)
Middle Quintile	−0.001	0.004	0.005	0.012	−0.004	−0.011
	(0.029)	(0.024)	(0.018)	(0.077)	(0.070)	(0.118)
Second Richest Quintile	0.028	0.017	0.017	0.062	0.019	0.104
	(0.031)	(0.026)	(0.020)	(0.086)	(0.072)	(0.123)
Richest Quintile	0.007	−0.003	−0.003	−0.027	−0.032	0.019
	(0.038)	(0.031)	(0.023)	(0.097)	(0.085)	(0.154)
Age (d.) ∗Second Poorest Q.	0.007	0.003	0.003	0.015	0.014	0.032
	(0.006)	(0.005)	(0.004)	(0.017)	(0.016)	(0.023)
Age (d.) ∗Middle Q.	0.017***	0.013***	0.013***	0.057***	0.044***	0.071***
	(0.006)	(0.005)	(0.004)	(0.017)	(0.015)	(0.023)
Age (d.) ∗Second Richest Q.	0.022***	0.017***	0.017***	0.074***	0.058***	0.091***
	(0.006)	(0.006)	(0.004)	(0.019)	(0.016)	(0.025)
Age (d.) ∗Richest Q.	0.032***	0.025***	0.025***	0.111***	0.079***	0.131***
	(0.007)	(0.006)	(0.005)	(0.022)	(0.017)	(0.030)
Observations	50,754	50,754	50,754	50,754	50,754	50,754
Adjusted R^2	0.010	0.054				

Note: *p<0.1; **p<0.05; ***p<0.01

Back

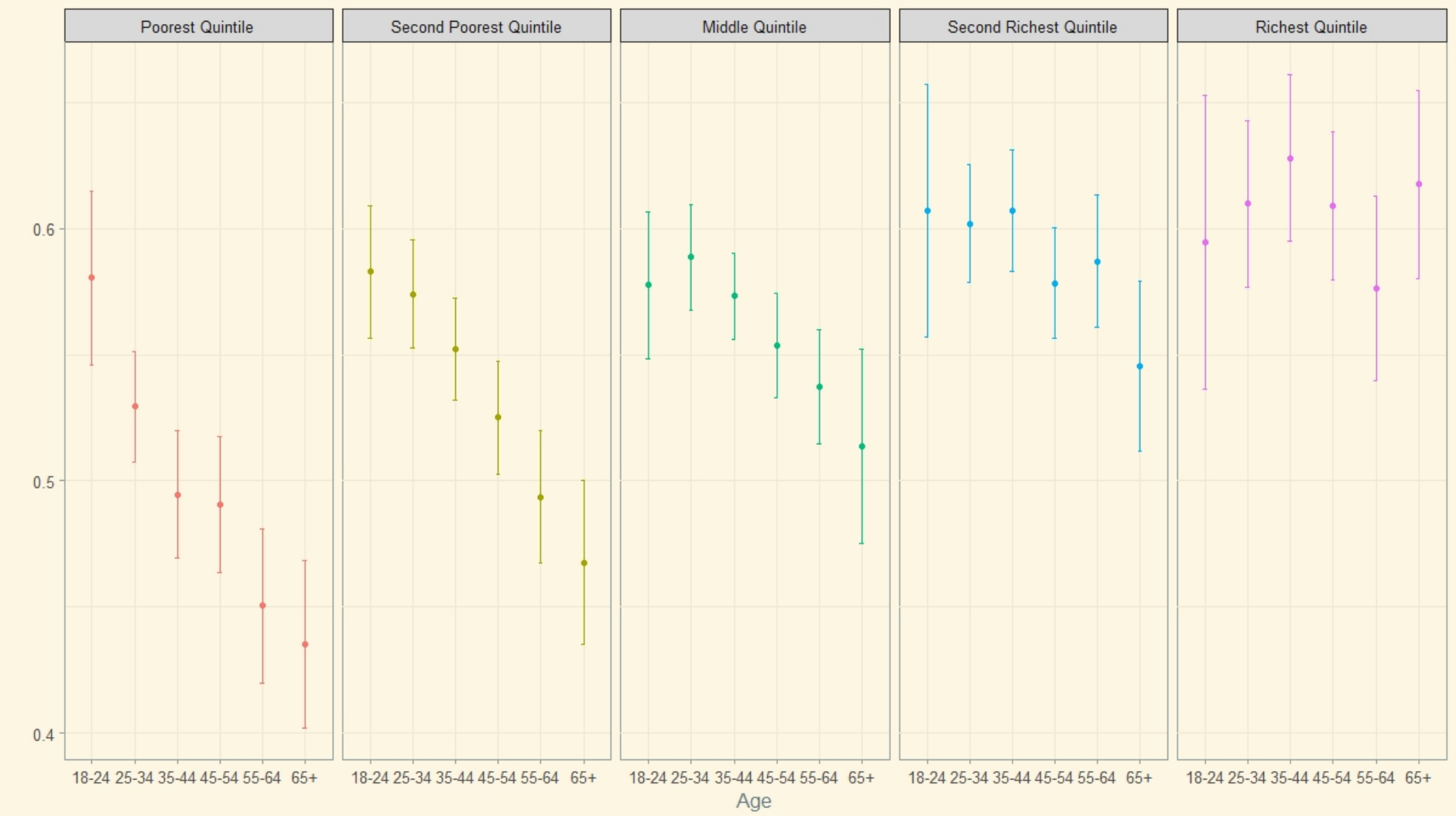
Macro Areas

Dep Var: Larger Later	Europe	Americas	Asia Oceania	MENA Africa
	(1)	(2)	(3)	(4)
Age (decades)	−0.035***	−0.016**	−0.007	−0.025***
	(0.004)	(0.007)	(0.007)	(0.006)
Second Poorest Quintile	0.048	0.048	0.085**	−0.067*
	(0.031)	(0.043)	(0.043)	(0.038)
Middle Quintile	0.048	0.027	0.020	−0.068*
	(0.030)	(0.044)	(0.041)	(0.039)
Second Richest Quintile	0.065**	0.037	−0.014	0.029
	(0.032)	(0.051)	(0.045)	(0.046)
Richest Quintile	0.054	−0.003	0.042	−0.120**
	(0.036)	(0.058)	(0.049)	(0.061)
Age (decades) ∗Second Poorest Q.	−0.002	−0.0002	−0.010	0.022**
	(0.006)	(0.009)	(0.010)	(0.009)
Age (decades) ∗Middle Q.	0.006	0.012	0.008	0.025***
	(0.006)	(0.010)	(0.010)	(0.010)
Age (decades) ∗Second Richest Q.	0.013*	0.011	0.017	0.009
	(0.007)	(0.011)	(0.011)	(0.011)
Age (decades) ∗Richest Q.	0.020***	0.026**	0.007	0.045***
	(0.007)	(0.013)	(0.011)	(0.015)
Observations	20,236	8,657	11,772	10,089
R^2	0.072	0.062	0.025	0.039
Adjusted R^2	0.071	0.060	0.023	0.037
Country FE	YES	YES	YES	YES

Note: *p<0.1; **p<0.05; ***p<0.01; . Robust standard errors.

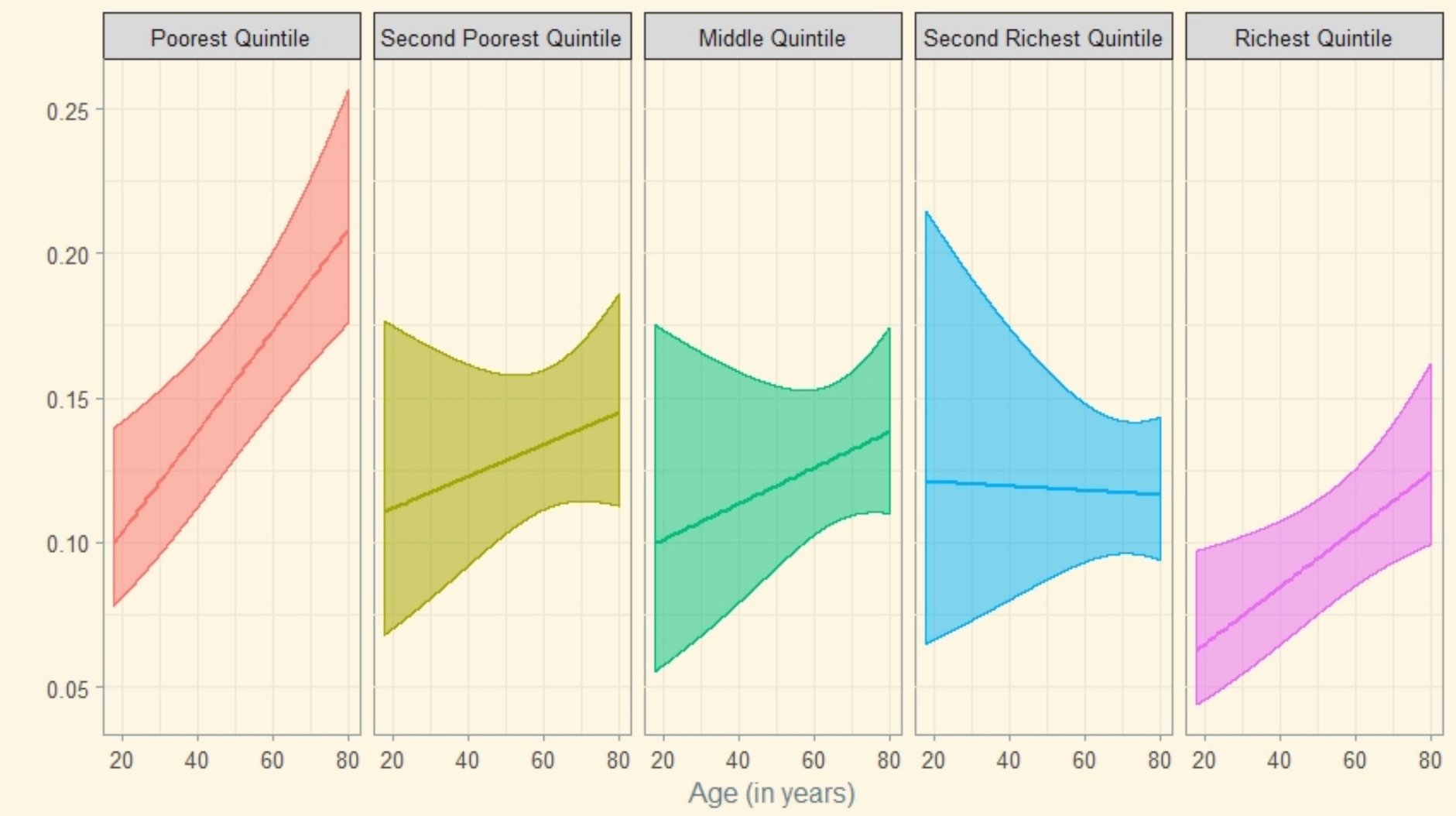
Back

Age as categorical



Back

Missing answers to the patience question



Back