The Nature and Predictive Power of Preferences: Global Evidence

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Motivation

- Theories of individual decision-making take as fundamental a set of preferences over risk, time, and social interactions
- Primitives of choice theories across disciplines
- Initial evidence on heterogeneity in preferences; preferences often correlate with economic and social behaviors in the way theory predicts
- However, empirical evidence generally scarce, scattered and restricted to a limited set of countries, typically based on non-representative samples

What We Do

- Measure and analyze global distribution of time and risk preferences, positive and negative reciprocity, altruism, and trust
- Tools: (i) preference module and (ii) novel, globally representative dataset (N=80,000) across 76 countries
- Identify strong heterogeneity across countries, which follows distinct geographic and cultural patterns
- Preferences systematically vary with individual characteristics: age, gender, and cognitive ability
- Around the world, preference measures predictive of a wide range of individual-level behaviors

Outline

Outline

Global Preference Survey

- Representative samples in 76 countries, N=80,000
- Global coverage, 90% of world population / global income
- Implemented through professional infrastructure of Gallup World Poll
- Survey measures regarding
  - Willingness to take risks
  - Patience
  - Positive reciprocity
  - Negative Reciprocity
  - Altruism
  - Trust

Global Preference Survey – Experimental Validation

- GPS items designed, tested, and selected through rigorous ex-ante experimental validation procedure (Falk et al., 2015)
- Ss participated in state-of-the-art financially incentivized experimental tasks designed to elicit preference parameters
- Two weeks later, Ss answered large batteries of survey questions designed to measure preferences
- Those survey items that jointly performed best in explaining observed behavior in experiments were selected
- (i) all items translated back and forth by professionals, (ii) monetary values adjusted along median household income across countries, and (iii) pretests in 22 countries of various cultural heritage

Preference Module, Falk et al. (2015)

- First comprehensive experimentally-validated preference survey module
- Leverages strengths of experimental and survey approaches
- Experiments, gold standard
  - Pro: payment-relevant choices in standardized conditions; help eliminate sources of unobserved heterogeneity that confound estimation of preferences from life choices
  - Con: high cost, in terms of money and time, limiting factor for using such measures on a large scale
- Survey measures
  - Pro: relatively low cost, and can be framed in abstract way, to elicit general trait that predicts behavior across many different contexts
  - Con: hypothetical, not involving incentivized choices
- Two experiments (measurement error); experiments and surveys conducted one week apart (limit spurious interdependencies)

Global Preference Survey – Survey Items

- Example: Risk preferences
- In experimental validation, Ss completed financially incentivized multiple price lists
- Two types of survey items were selected:
- Qualitative item: Asks for the respondent's self-assessment of his willingness to take risks on an eleven-point scale
- Quantitative items: Consist of series of five interdependent hypothetical binary choices between a fixed lottery and varying safe payments (staircase)
- Example: Receive 100 euros for sure or a 50-50 chance of receiving 160 euros or nothing $\rightarrow$ Procedure establishes progressively narrower bounds around point of indifference

Global Preference Survey: Further Methodological Details

- All items translated back and forth by professionals, into the major languages of each target country.
- Translation process involved three steps
  - Translator suggested an English, Spanish or French version of a German item, depending on the region.
  - A second translator, proficient both in the target language and in English, French, or Spanish then translated item into target language.
  - Finally, a third translator reviewed item in target language and translated it back into original language. If semantic differences between original item and back-translated item occurred, process was repeated until all translators agreed on a final version.
- Monetary values for quantitative items adjusted along median household income across countries
- Pretests were conducted in 21 countries of various cultural heritage

Global Preference Survey: Interview Modes and Sampling

- CATI and CAPI Interviews as part of Gallup World Poll 2012
- Interview mode
  - CATI if telephone coverage represents at least 80% of the population, random-digit-dial method or a nationally representative list of phone numbers
  - CAPI, face-to-face interviews, households are randomly selected
    - Identification of primary sampling units (PSUs), clusters of households. PSUs are stratified by population size and/or geography and clustering is achieved through one or more stages of sampling; if population information is available, sample selection based on probabilities proportional to population size; if not, simple random sampling
  - Data weighting to ensure nationally representative sample for each country
  - Six final preference measures, linearly combined using weights from Falk et al., 2015, and standardized at individual level

In the Field

A 30-year old housewife and the interviewer in rural Bangladesh

A 53-year old primary school teacher in rural Cambodia (Kandal province) during the interview

Global Preference Survey – Survey Items

For most of the six dimensions, underlying items comprise a combination of quantitative and qualitative questions, set of 12 items

Preference	**Item Description**	Weight
Patience	Intertemporal choice sequence using staircase method	0.71
	Self-assessment: Willingness to wait	0.29
Risk taking	Lottery choice sequence using staircase method	0.47
	Self-assessment: Willingness to take risks in general	0.53
Positive reciprocity	Self-assessment: Willingness to return a favor	0.48
	Gift in exchange for help	0.52
Negative reciprocity	Self-assessment: Willingness to take revenge	0.37
	Self-assessment: Willingness to punish unfair behavior towards self	0.265
	Self-assessment: Willingness to punish unfair behavior towards others	0.265
Altruism	Donation decision	0.54
	Self-assessment: Willingness to give to good causes	0.46
Trust	Self-assessment: People have only the best intentions	1

Table 1: Survey items of the GPS

Preference Module

Available in more than 100 languages, details in Falk et al. (2015) and on www.global-preferences.org (in progress)

Outline

World Map of Patience

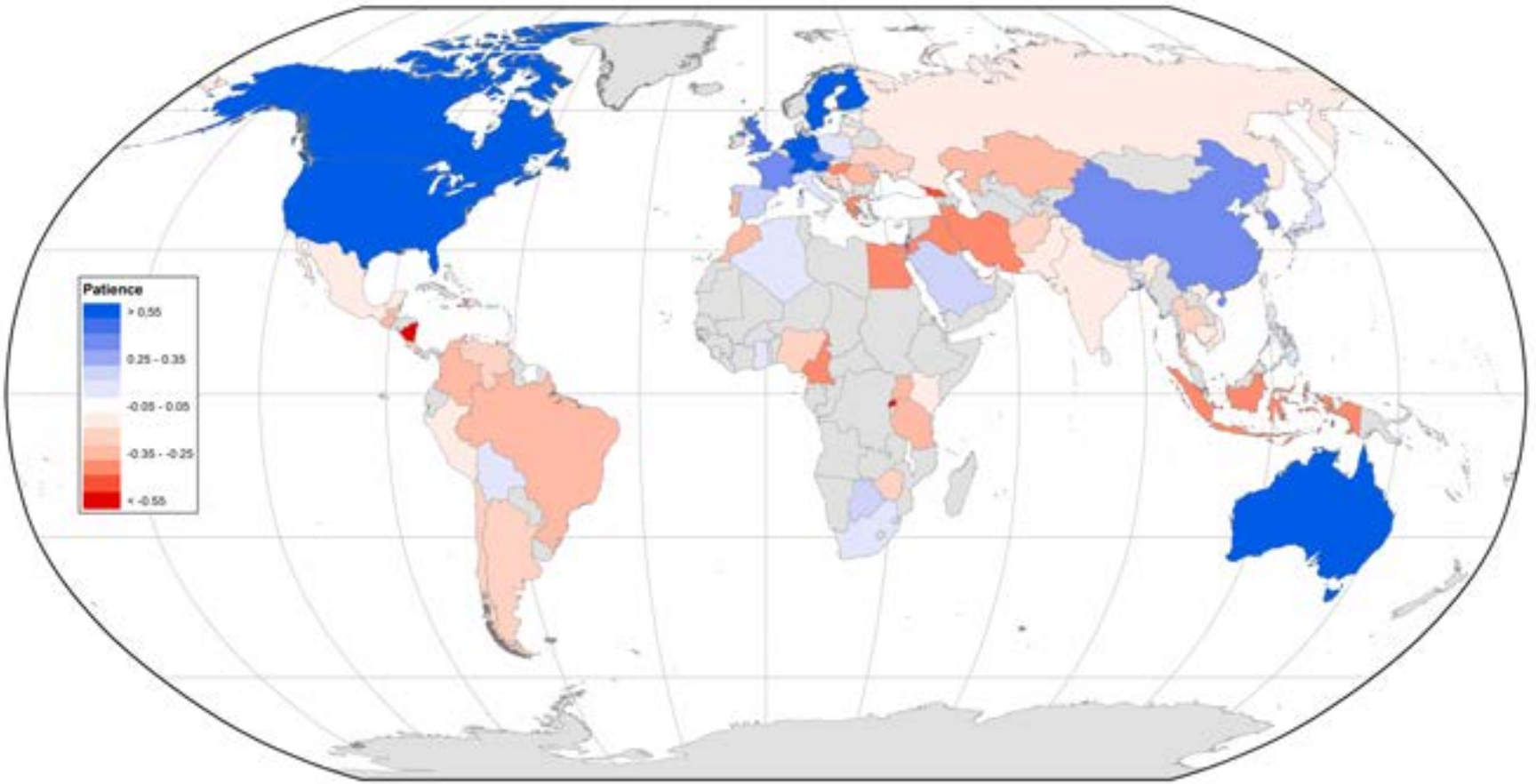

Figure 2: World map of patience

World Map of Risk Taking

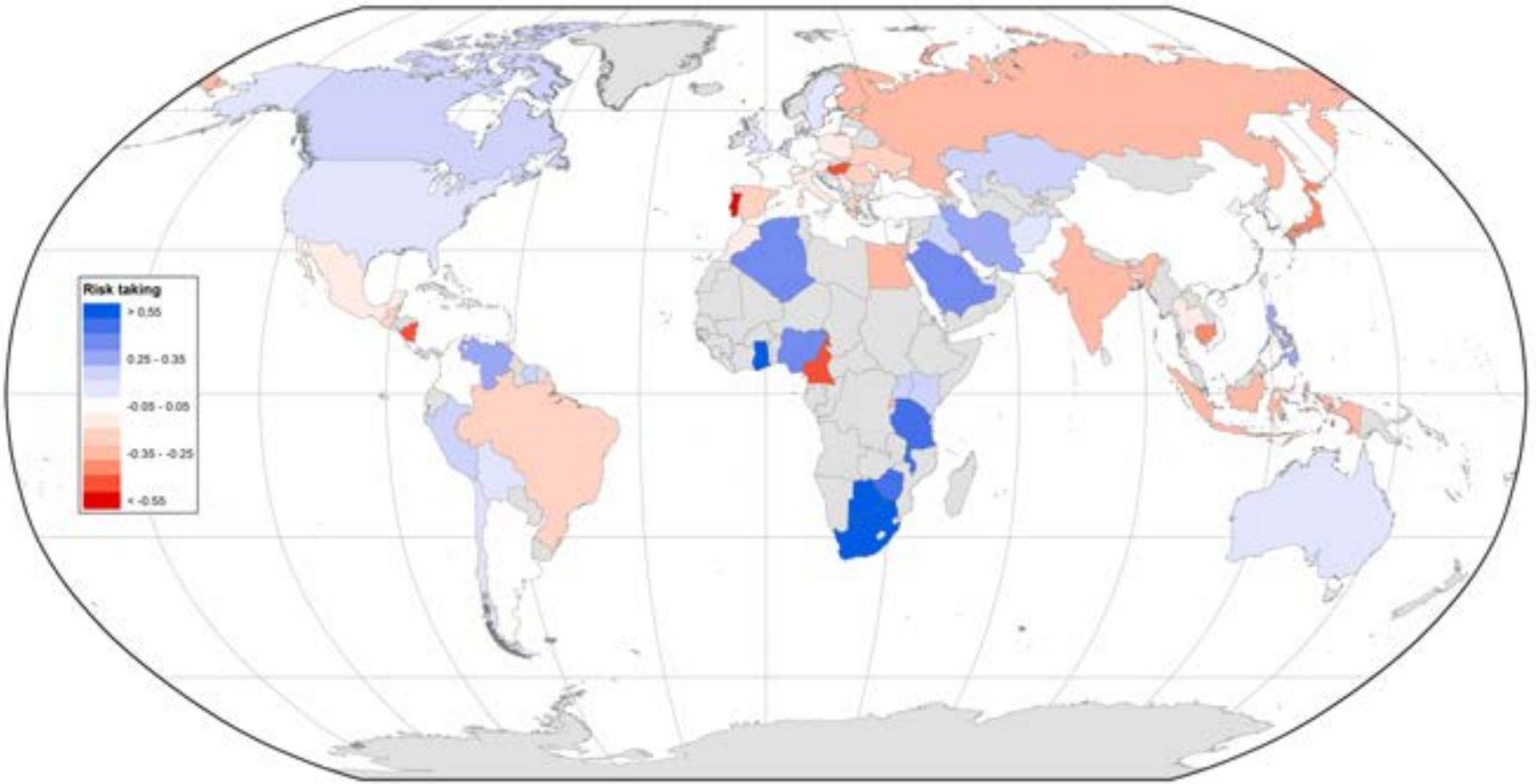

Figure 3: World map of risk taking

World Map of Positive Reciprocity

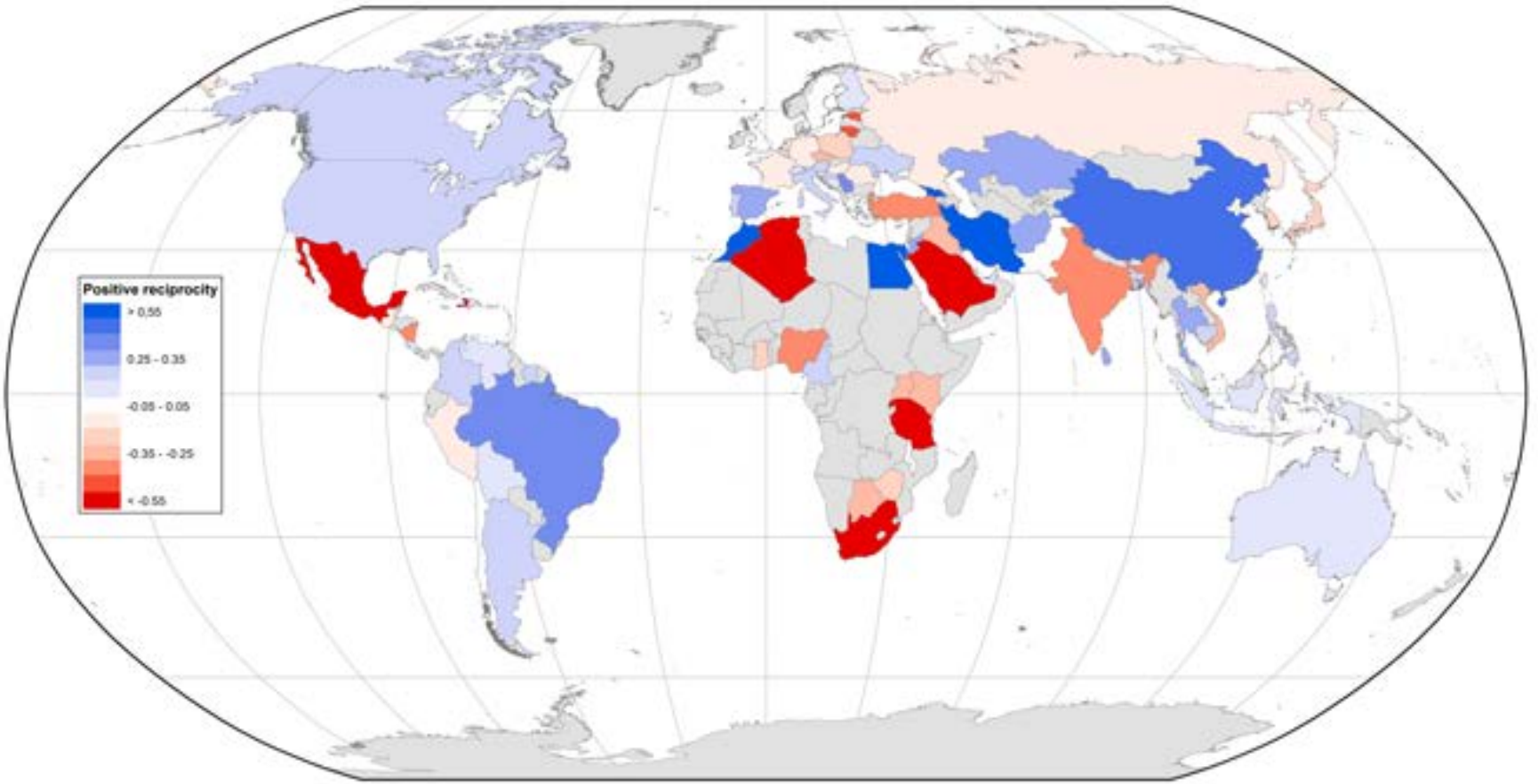

Figure 4: World map of positive reciprocity

World Map of Negative Reciprocity

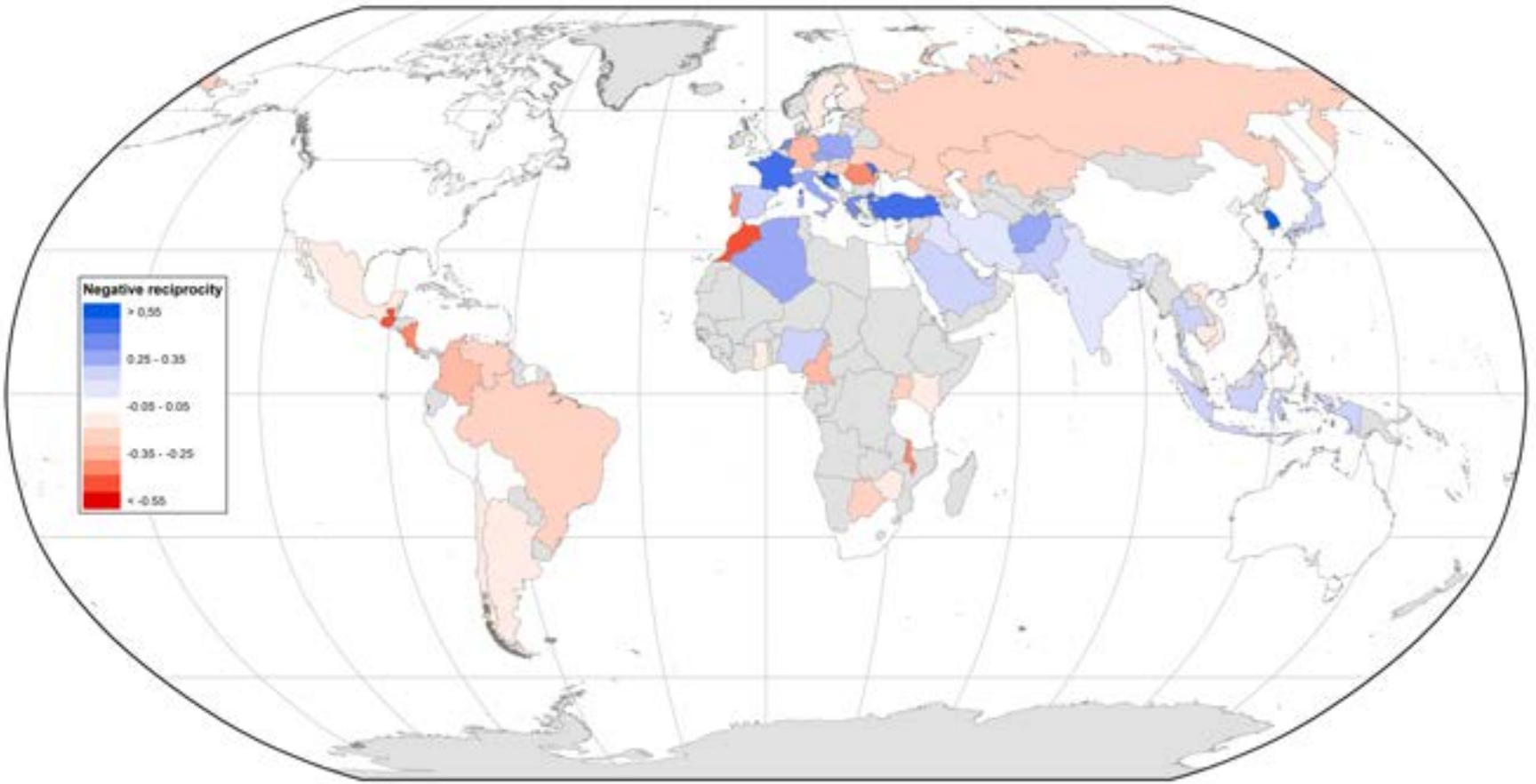

Figure 5: World map of negative reciprocity

World Map of Altruism

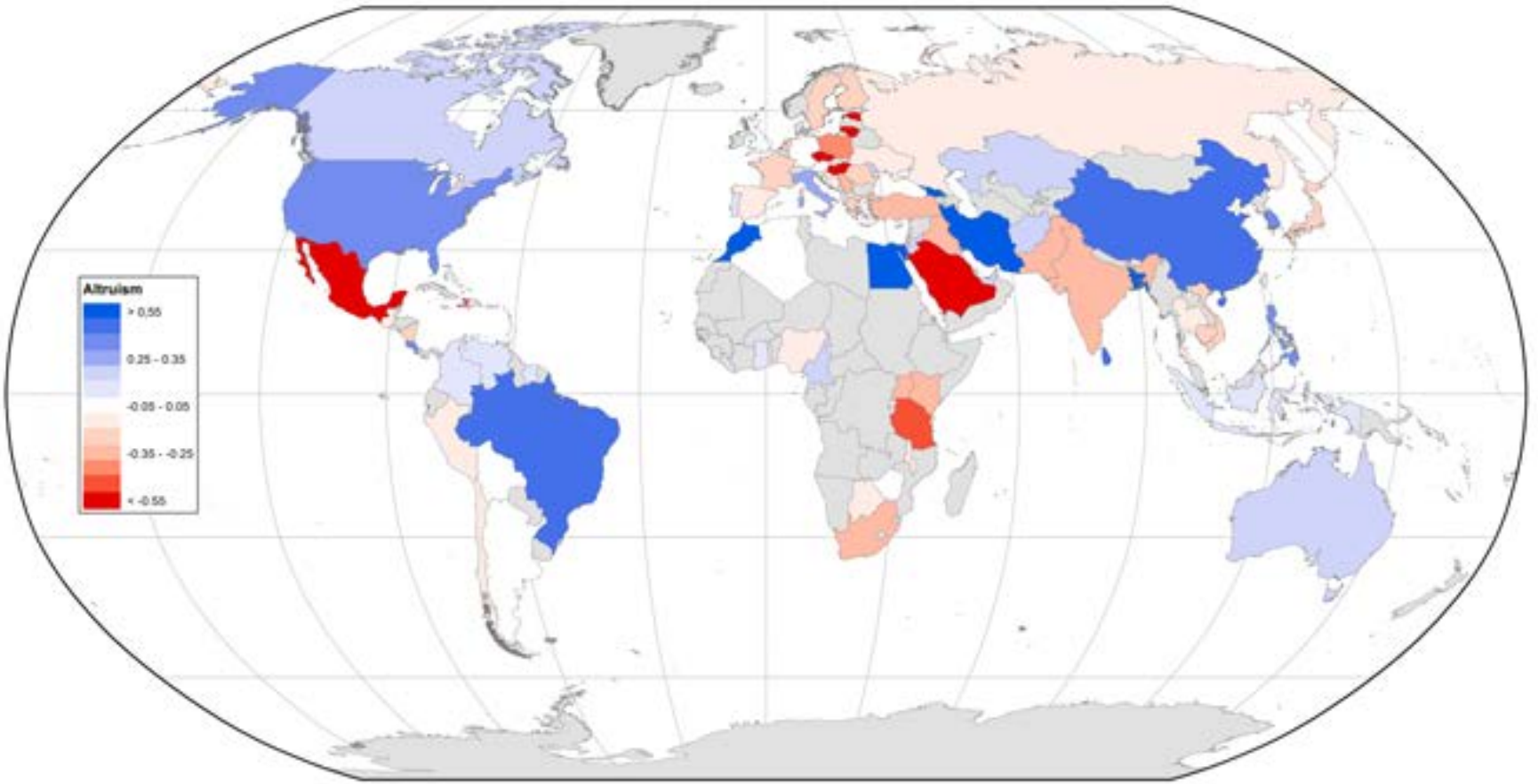

Figure 6: World map of altruism

World Map of Trust

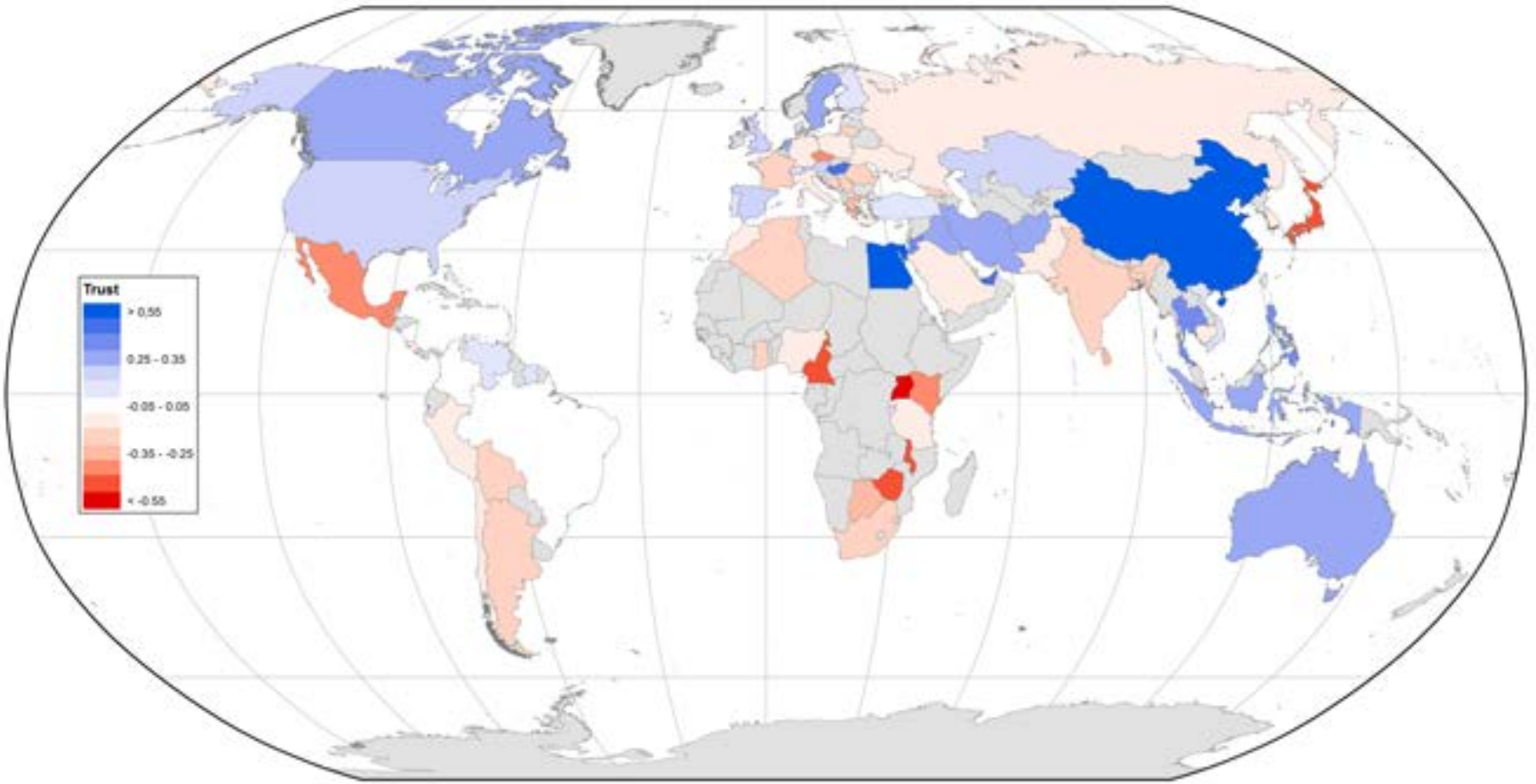

Figure 7: World map of trust

Country-Level Analysis

- Most cross-country differences in preferences are statistically significant
  - t-tests of all possible (2,850) pairwise comparisons for each preference, 1-percent level
  - 79% for risk, 82% for patience, 81% for altruism, 81% for positive reciprocity, 79% for negative reciprocity, and 77% for trust
- To which extent is this heterogeneity systematic?
- Identify geographic and cultural patterns
- Preferences correlated, giving rise to country-level preference bundles

Country-Level Analysis

- Western and "Neo" Europe: vast majority of populations relatively patient (10 most patient countries in sample all from this region); average levels of risk taking; strong negatively reciprocal inclinations
- Asia: Rather risk averse and impatient, except for the Confucian countries (China, Japan, South Korea)
- North Africa & Middle East: Relatively risk tolerant; low patience; diverse social attitudes
- Sub-Saharan countries: 10 most risk tolerant populations; all countries below average in prosocial dimensions altruism, positive reciprocity, and trust
- Southern Americas: Rather impatient; low negative reciprocity; intermediate risk taking

Country-Level Analysis

	Patience	Risk taking	Positive reciprocity	Negative reciprocity	Altruism	Trust
Patience	1					
Risk taking	0.231**	1				
Positive reciprocity	0.0202	-0.256**	1			
Negative reciprocity	0.262**	0.193*	-0.154	1		
Altruism	-0.00691	-0.0155	0.711***	-0.132	1	
Trust	0.186	-0.0613	0.363***	0.160	0.272**	1

Table 2: Pairwise correlations between preferences at country level

$\Rightarrow$ Patience and risk taking moderately correlated; high correlations among "prosocial" traits altruism, positive reciprocity, and trust

Between- vs. Within-Country Variation

Preference	Between-country variation (%)	Within-country variation (%)
Patience	14.3	85.7
Risk taking	9.9	90.1
Positive reciprocity	11.4	88.6
Negative reciprocity	7.6	92.4
Altruism	12.3	87.7
Trust	8.3	91.7

Table 3: Between- vs. within-country variation

Outline

Preferences and Individual Characteristics

- Investigate relationship of preferences to age, gender, and (self-reported) cognitive ability; arguably exogenous
- These characteristics are associated with important differences in economic outcomes – suggests that preferences are part of the explanation
- Representative nature of data across countries allows investigation of how general or culturally specific relationships are, e.g., between gender and risk aversion

Preferences and Individual Characteristics

	Dependent variable:					
	Patience	Risk taking	Pos. reciprocity	Neg. reciprocity	Altruism	Trust
	(1)	(2)	(3)	(4)	(5)	(6)
Age	0.72***	-0.083	1.02***	-0.36*	-0.0060	0.37*
	(0.17)	(0.20)	(0.17)	(0.19)	(0.14)	(0.21)
Age squared	-1.45***	-1.20***	-1.17***	-0.45**	0.015	0.032
	(0.20)	(0.21)	(0.18)	(0.18)	(0.15)	(0.20)
1 if female	-0.056***	-0.17***	0.049***	-0.13***	0.10***	0.066***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Subj. math skills	0.028***	0.046***	0.038***	0.040***	0.044***	0.056***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	-0.37***	0.21***	-0.079**	0.37***	-0.064**	-0.078**
	(0.04)	(0.04)	(0.04)	(0.05)	(0.03)	(0.04)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	78501	78445	78869	77521	78632	77814
R^2	0.165	0.167	0.128	0.112	0.135	0.111

Table 4: Correlates of preferences at individual level. Age is divided by 100.

Preferences and Age

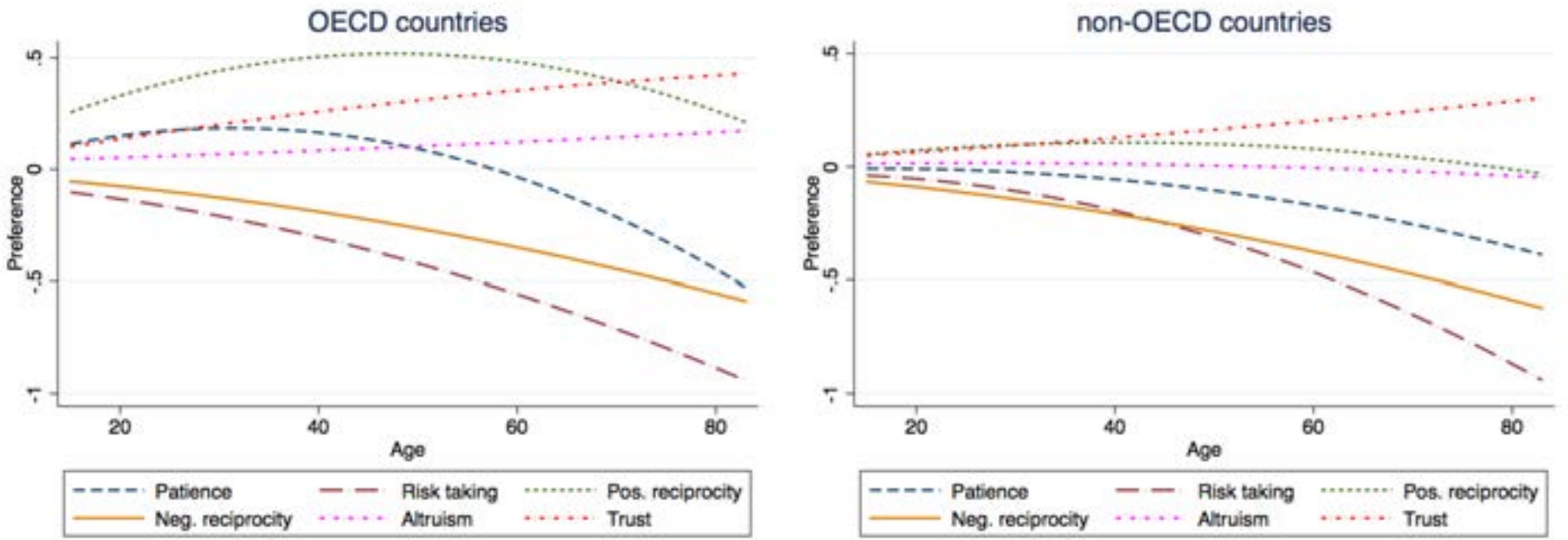

Figure 8: Age profiles by OECD membership. The figures depict the relationship between preferences and age conditional on country fixed effects, gender, and subjective math skills. Age is winsorized at 83 (99th percentile).

Universal and/or Country-Specificity: Gender effects across countries (1/3)

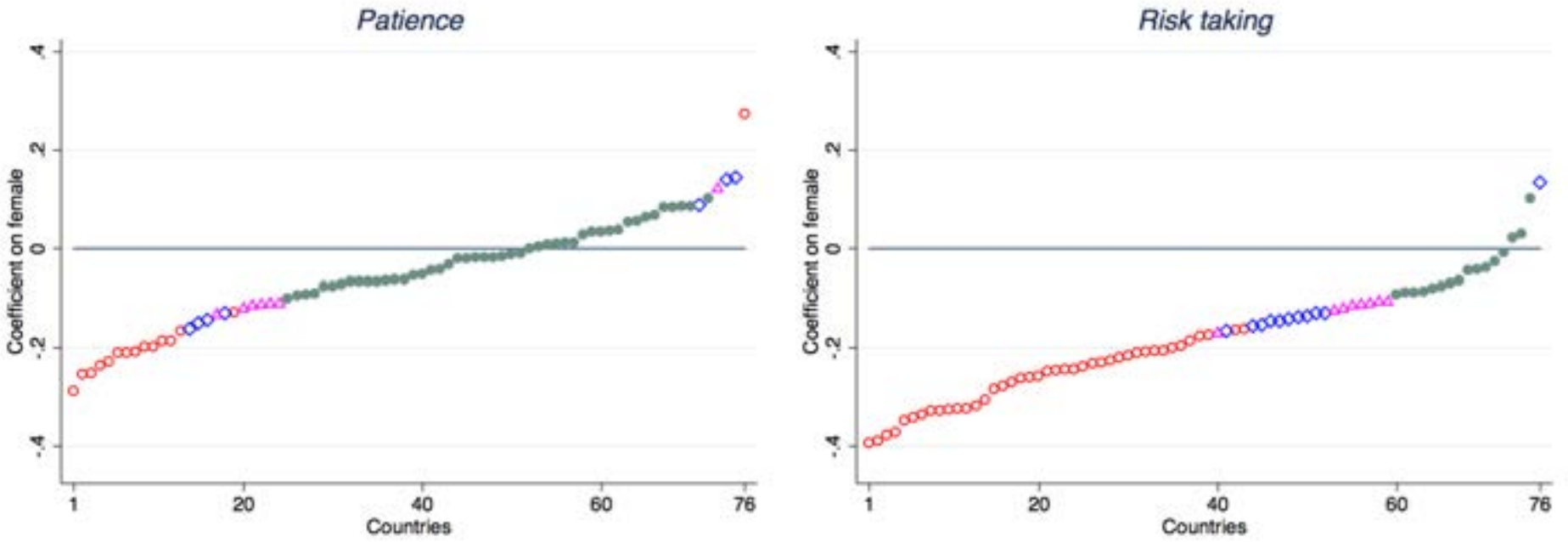

Figure 9: Gender correlations separately by country. Green dots: not statistically different from zero at the 10% level, while red / blue / pink dots denote countries in which the effect is significant at the 1% / 5% / 10% level, respectively. Positive coefficients imply that women have higher values in the respective preference.

Gender effects across countries (2/3)

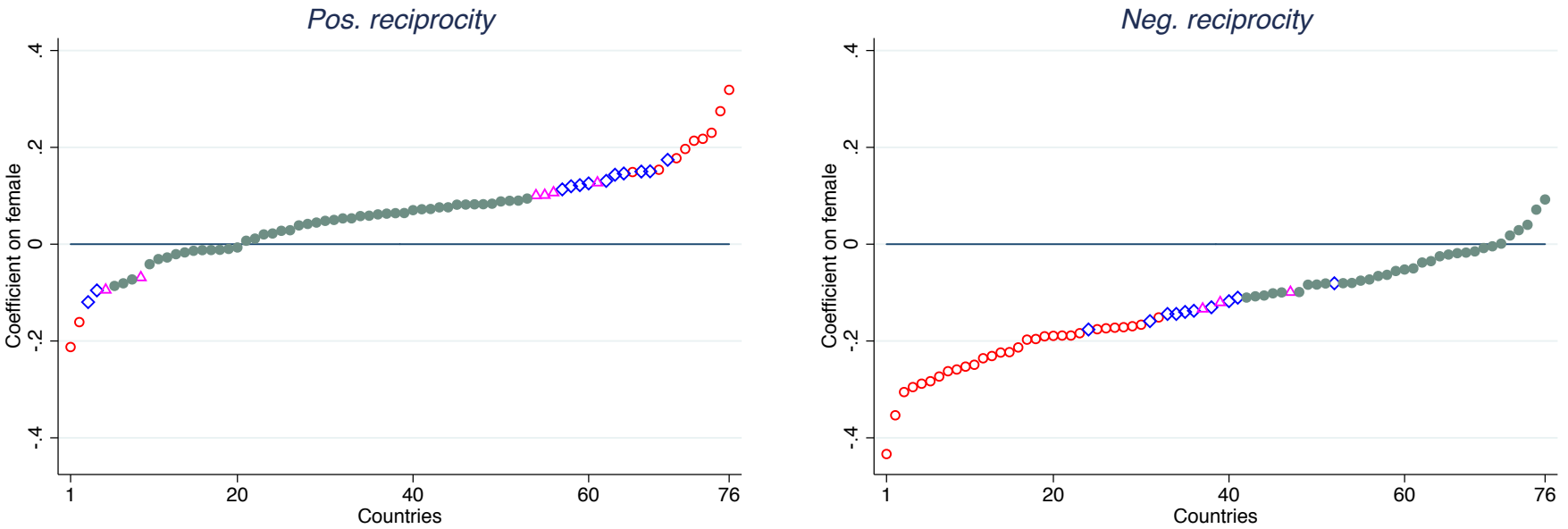

Figure 10: Gender effects separately by country.

Gender effects across countries (3/3)

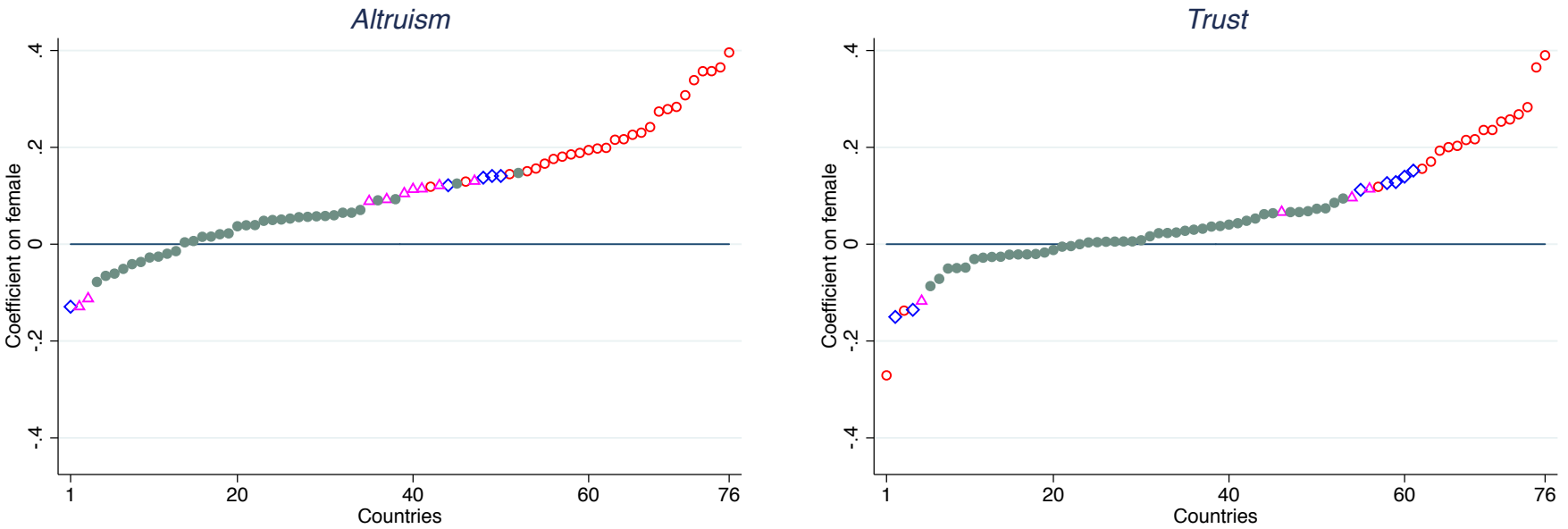

Figure 11: Gender effects separately by country.

IQ effects across countries (1/3)

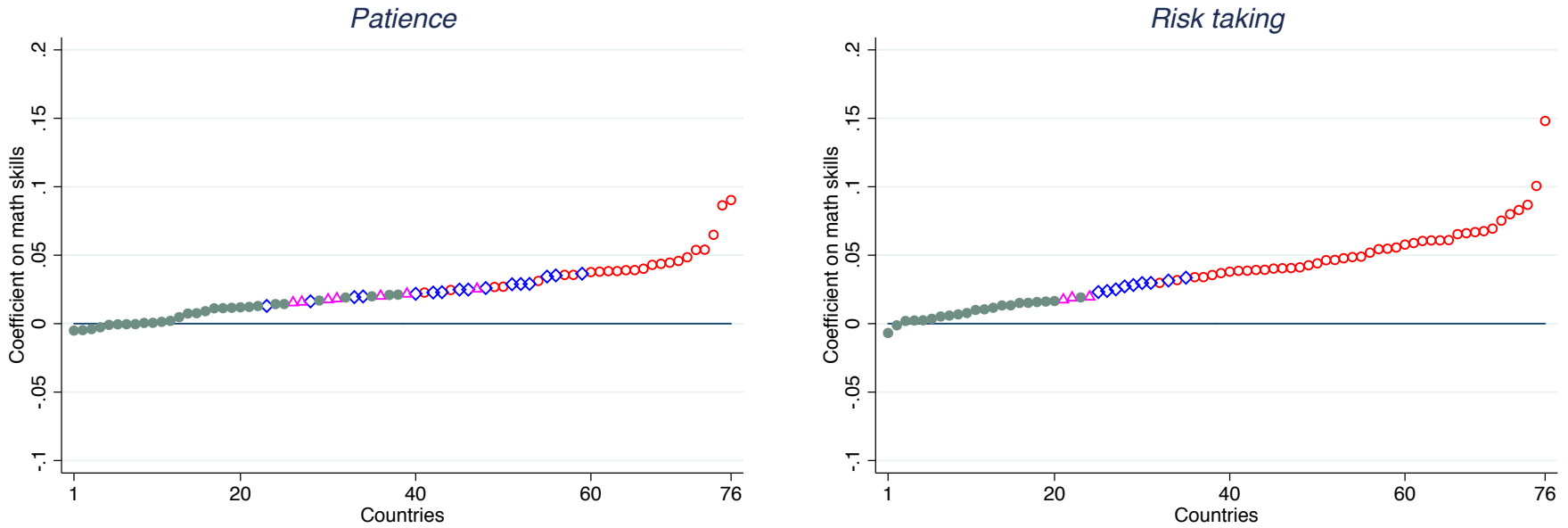

Figure 12: Cognitive ability effects separately by country

Positive coefficients imply that higher IQ individuals have higher values in the respective preference.

IQ effects across countries (3/3)

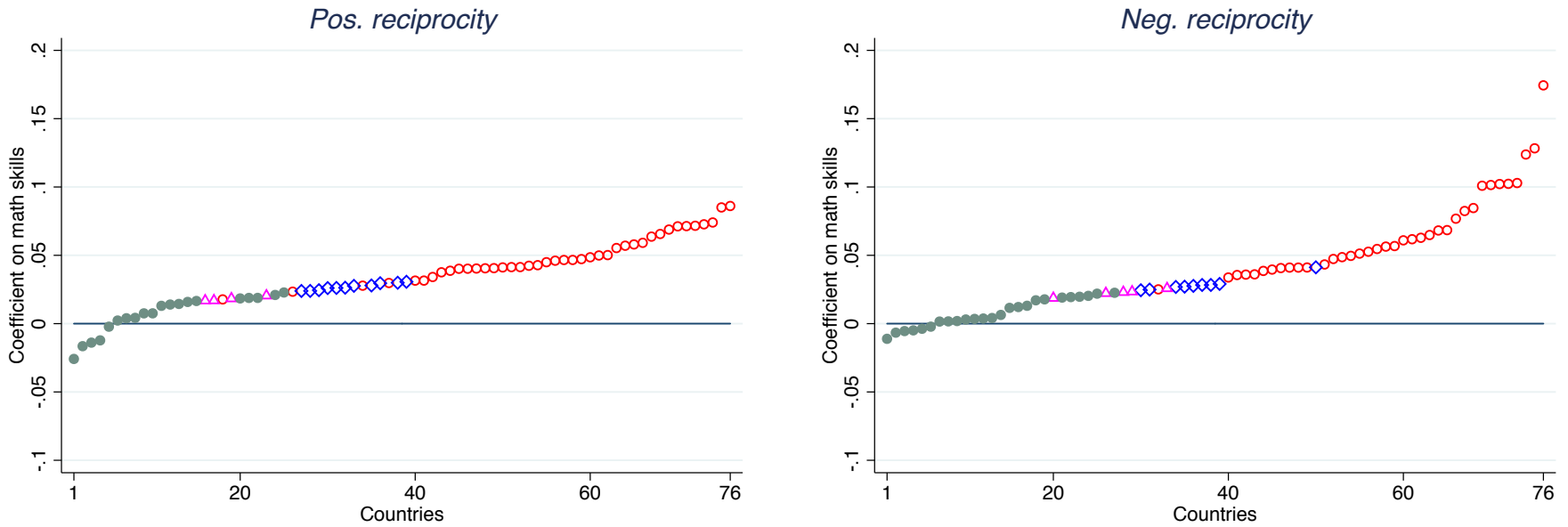

Figure 13: Cognitive ability effects separately by country

IQ effects across countries (3/3)

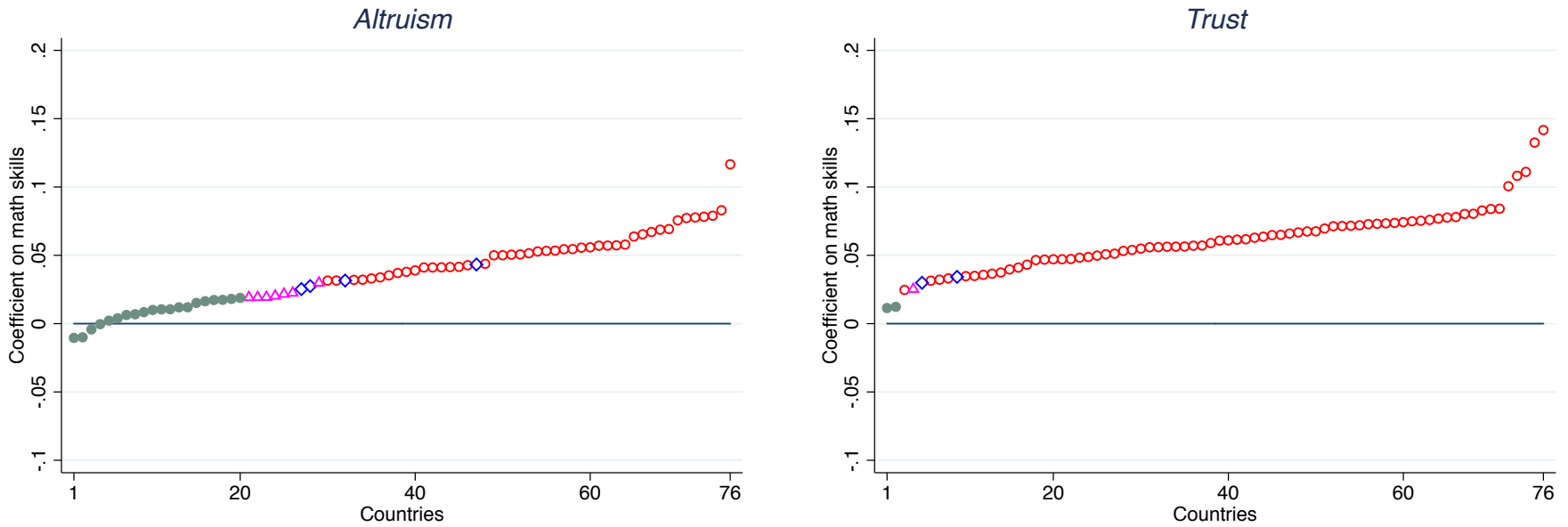

Figure 14: Cognitive ability effects separately by country

Income effects across countries (1/3)

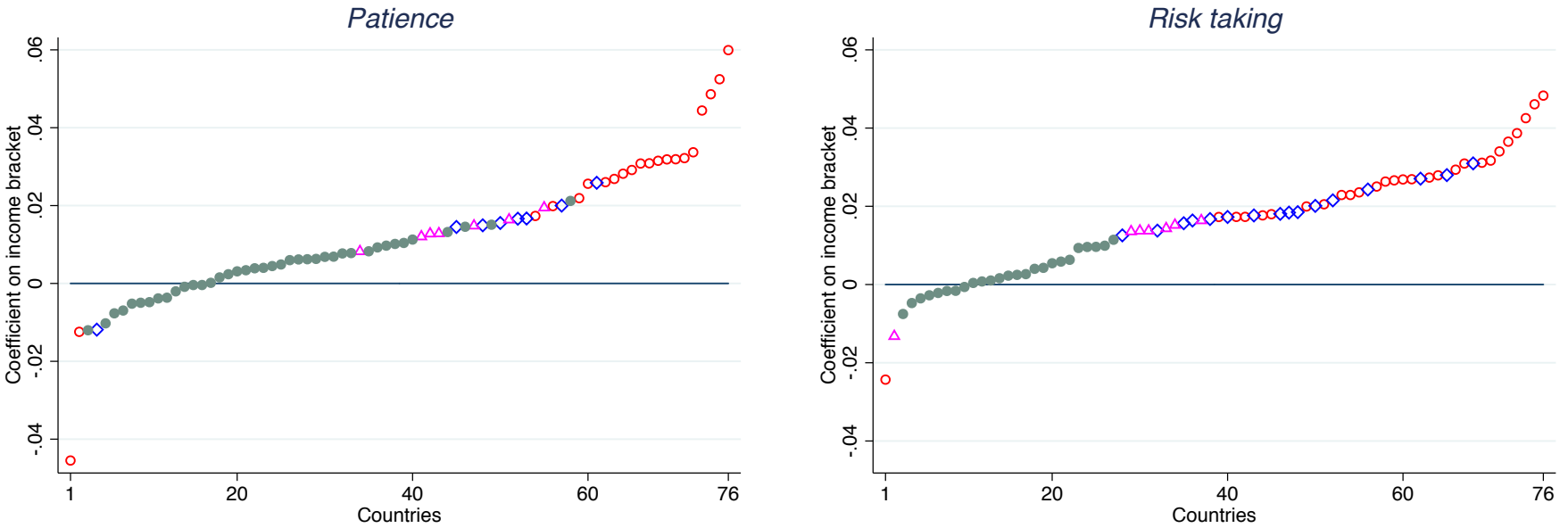

Figure 15: Income effects separately by country

Positive coefficients imply that rich people have higher values in the respective preference.

Income effects across countries (2/3)

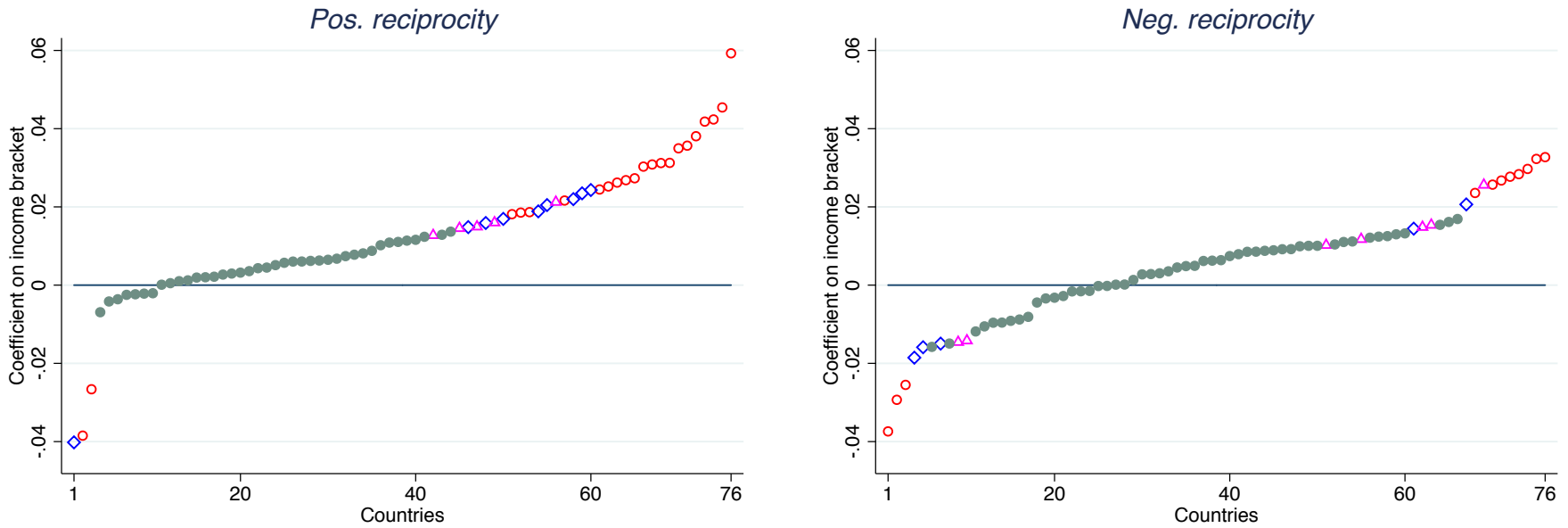

Figure 16: Income effects separately by country

Income effects across countries (3/3)

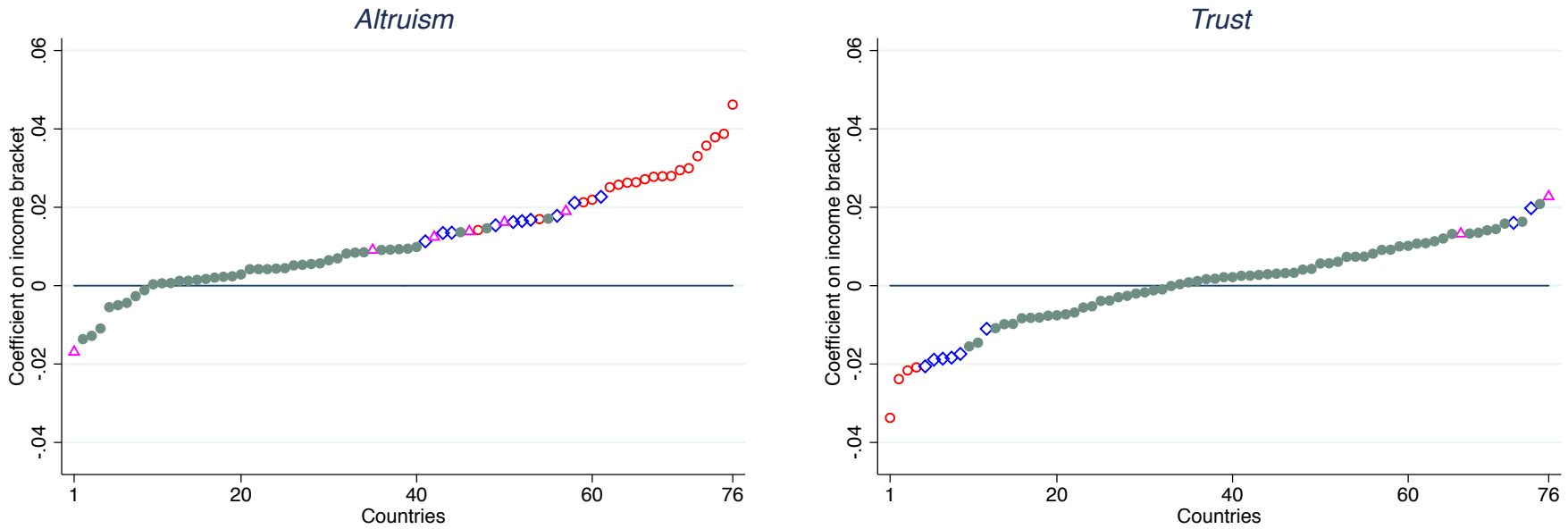

Figure 17: Income effects separately by country

Outline

Preferences and Individual Behaviors

- Investigate predictive power of preferences for economic and social behaviors, around the world
  - Patience and accumulation decisions
  - Risk taking and risky choices
  - Social preferences and social interactions
- Important to understand role of preferences in generating observed variation in choice behavior...
- ... but also to provide an out-of-sample validation check on the meaningfulness of the survey measures in culturally and economically heterogeneous samples

Patience, Risk Taking, and Behaviors

	Dependent variable:				
	Accumulation decisions		Risky choices		
	Saved last year	Education level	Own business	Plan to start business	Smoking intensity
	(1)	(2)	(3)	(4)	(5)
Patience	0.025***	0.033***			
	(0.01)	(0.00)			
Risk taking			0.022***	0.017***	0.023*
			(0.00)	(0.00)	(0.01)
Constant	-0.37***	0.24***	-0.38***	0.038	0.39***
	(0.09)	(0.07)	(0.05)	(0.03)	(0.07)
Country FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Observations	14459	69272	62985	51489	14490
R^2	0.132	0.329	0.104	0.120	0.198

Table 5: Patience and accumulation decisions, risk preferences and risky choices

Social Preferences and Social Interactions

	Dependent variable:				
	Donated money	Volunteered time	Helped stranger	Voiced opinion to official	Have friends / relatives I can count on
	(1)	(2)	(3)	(4)	(5)
Altruism	0.061***	0.038***	0.052***	0.025***	0.016***
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Positive reciprocity	-0.00037	0.0049	0.033***	-0.0025	0.017***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Negative reciprocity	-0.0042	-0.0035	-0.0032	0.016***	0.0037
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Constant	-0.022	0.15***	0.37***	-0.084**	0.48***
	(0.04)	(0.05)	(0.06)	(0.03)	(0.04)
Country FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Observations	53439	53430	53226	53174	59209
R^2	0.192	0.089	0.093	0.062	0.118

Table 6: Social preferences and social interactions

Outline

Outlook and Applications

- First assessment of distribution and nature of preferences on a globally representative basis using a novel dataset, which includes behaviorally validated survey measures of preferences
- Cross-cultural dimension of the data and the representative sampling design allow entirely new perspectives and level of analysis:
  - Study relationship of preferences to individual characteristics in more detail to understand biological or social mechanisms underlying, e.g., gender differences in preferences
  - Study sources of cross-country variation in preferences, or potential co-evolution of preferences
  - Detailed investigation of link between aggregate outcomes and preferences at the country level $\Rightarrow$ Given previous lack of representative preference data, new territory

Example Application: Patience and the Wealth of Nations

- Example: Dynamic theories in both micro- and macroeconomics highlight the crucial role of time preference for accumulation processes and hence ultimately income
- In neoclassical development framework, patience affects accumulation of physical capital (Ramsey-Cass-Koopmans), human capital (Becker, Ben-Porath) as well as ideas and knowledge (Romer, Aghion & Howitt)
- Investigate consistency of this large and influential body of theoretical work with empirical facts (Dohmen/Enke/Falk/Sunde, 2015)
- Exploit variation in patience, accumulation, and income across countries as well as across regions within countries

Patience and Contemporary Income

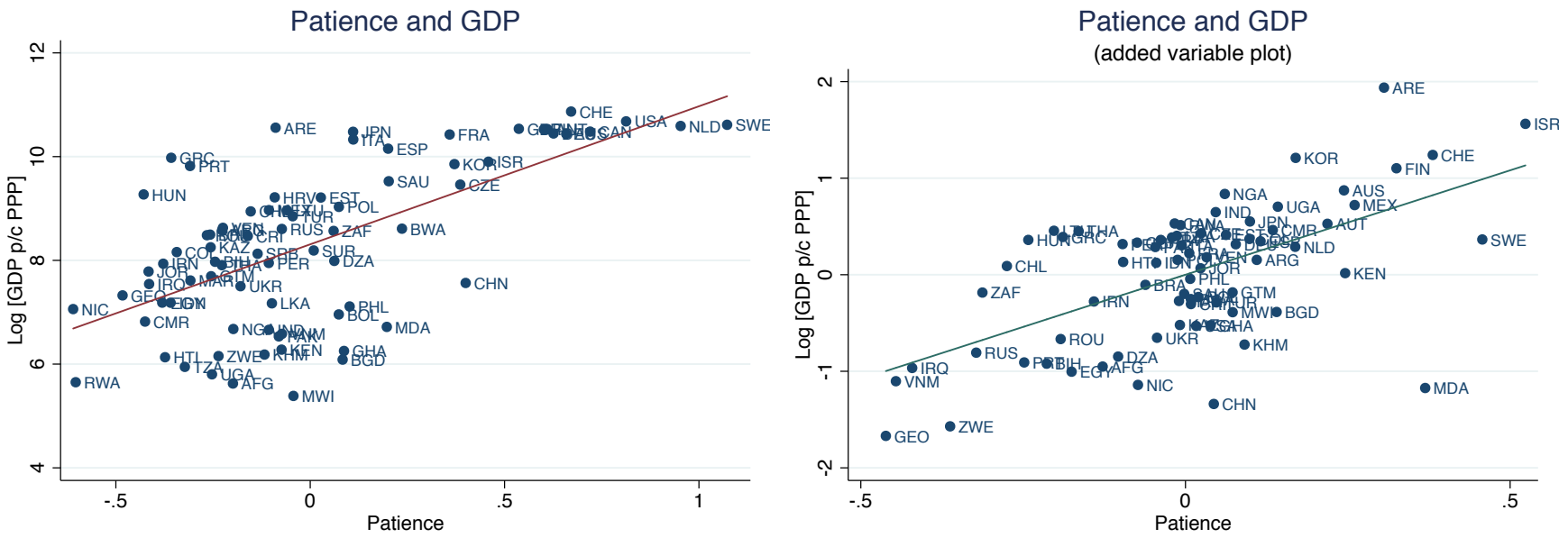

Figure 18: Patience and per capita income. Added variable plot conditional on geography, climate, continent FE, ethnic and gentic diversity, trust.

Similar results with short- and long-run growth rates since 1800, 1900, 1950

Patience and GDP

- Holds within various sub-samples:
  - Within each continent separately
  - (Non-) OECD
  - (Not) colonized
- Extends to other measures of development:
  - GDP per worker
  - Human development index (GDP, years of schooling, life expectancy)
  - Subjective life satisfaction

Patience and GDP)

Robust to:

- Controlling for inflation and interest rates
- Including proxies for borrowing constraints
- Restricting sample to top income quintiles

Patience and Accumulation

	Dependent variable:						
	Human capital		Physical capital		TFP and Institutions		
	Schooling	Educ. exp.	Log [capital stock]	Savings	Log [TFP]	R&D exp.	Property rights
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Patience	4.67***	1.45***	2.03***	7.70***	0.60***	2.09***	46.3***
	(0.53)	(0.31)	(0.28)	(2.23)	(0.10)	(0.23)	(4.39)
Constant	5.40***	4.28***	10.0***	10.2***	-0.57***	0.96***	48.3***
	(0.24)	(0.16)	(0.13)	(1.07)	(0.05)	(0.08)	(1.95)
Observations	71	71	71	68	60	64	74
R^2	0.429	0.138	0.327	0.102	0.265	0.574	0.515
Adjusted R^2	0.421	0.125	0.317	0.088	0.253	0.567	0.508

OLS estimates, robust standard errors in parentheses. Correlations hold conditional on full set of covariates. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Patience and Proximate Determinants

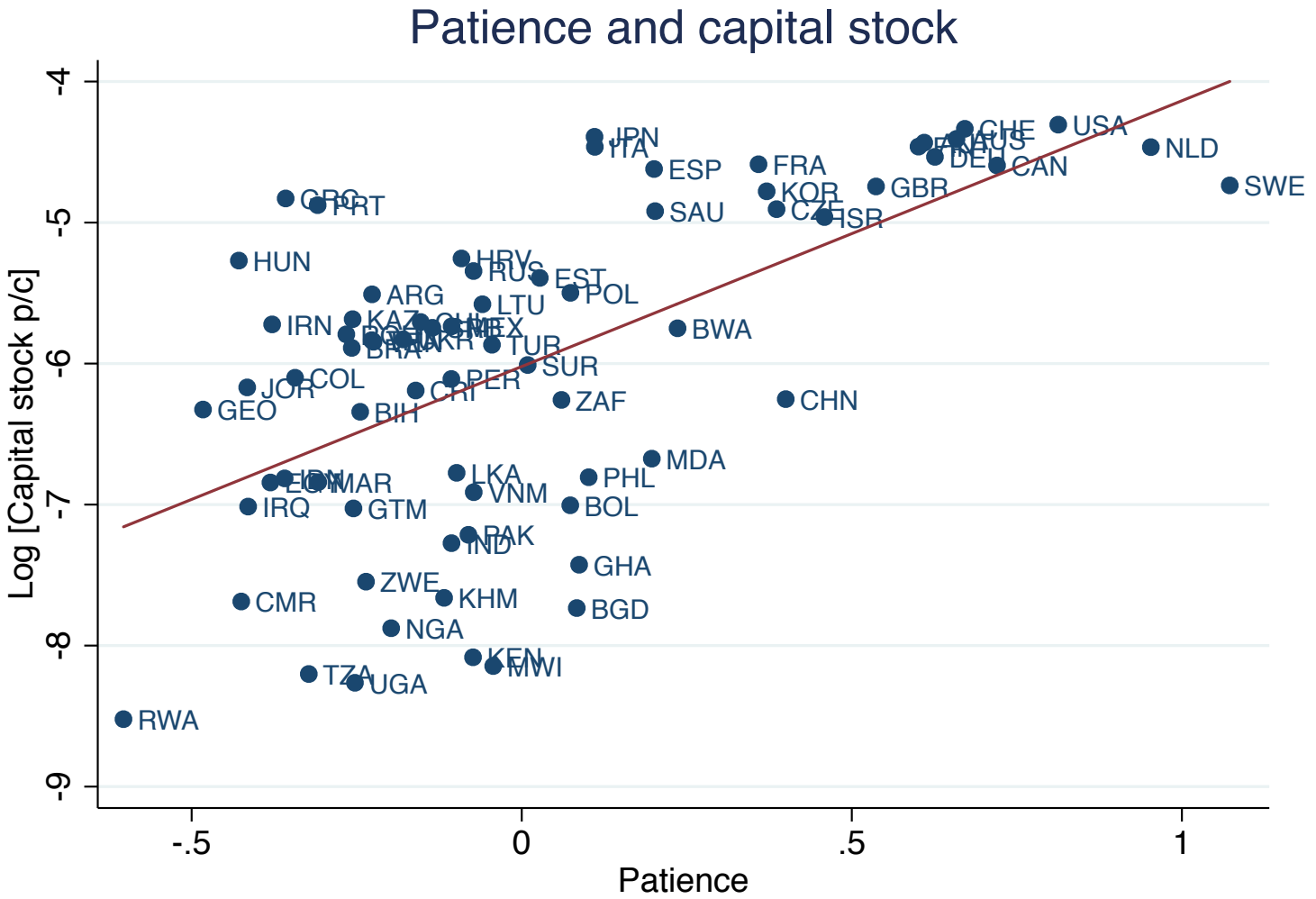

Figure 19:

Patience and Proximate Determinants

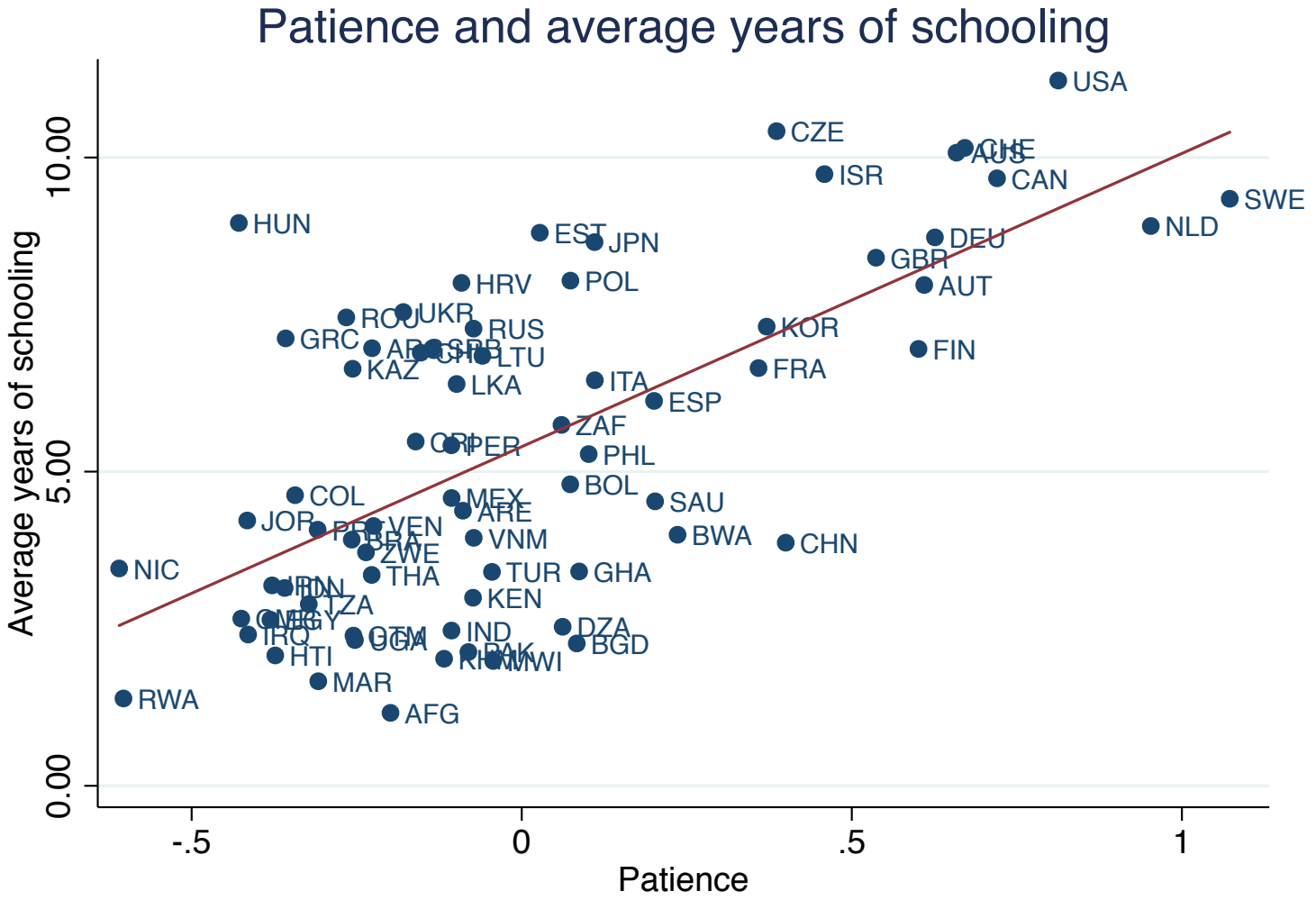

Figure 20:

Patience and Proximate Determinants

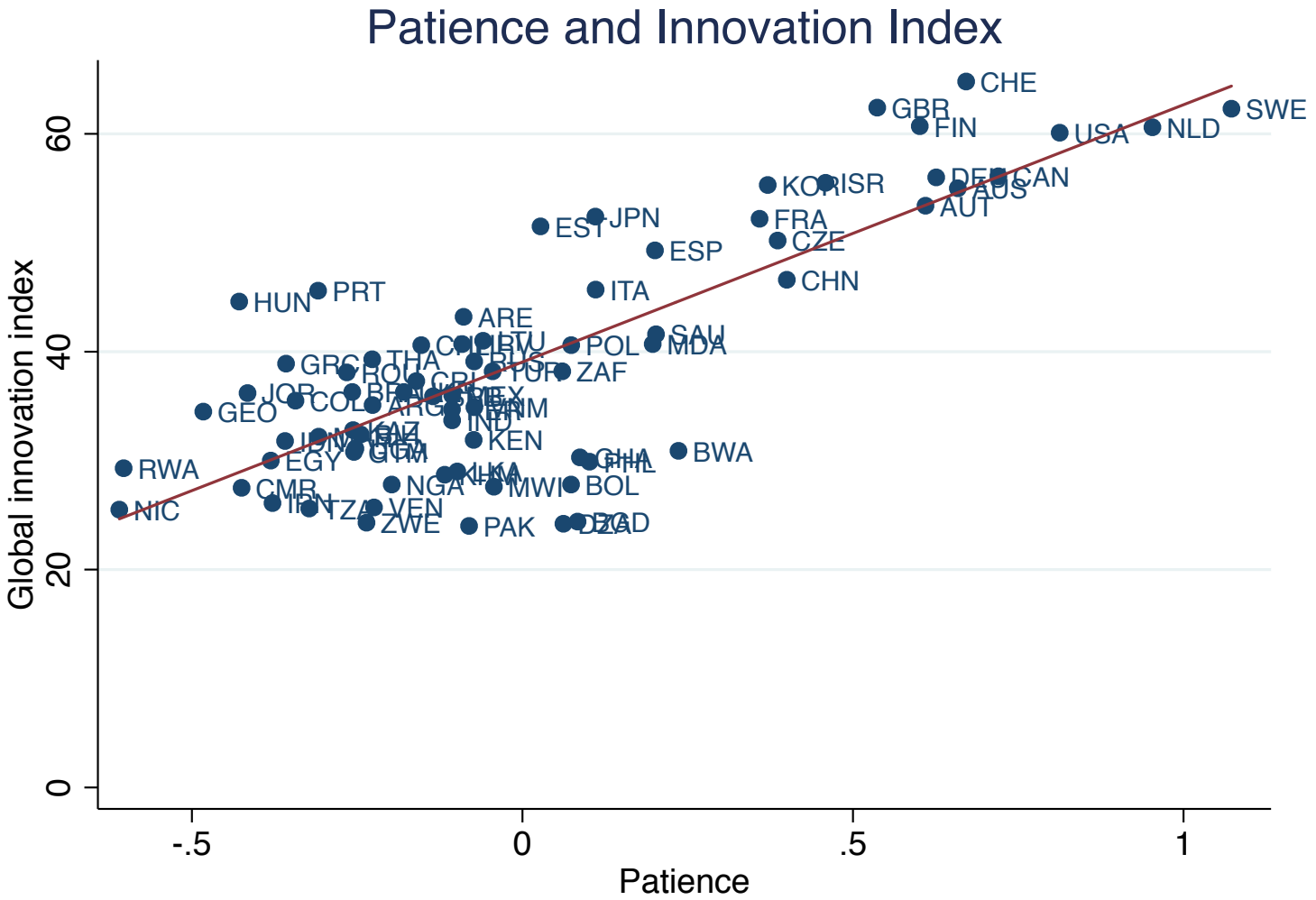

Figure 21:

Patience and Proximate Determinants

- Relationship b/w patience and proximate determinants extends to many other proxies for human and physical capital as well as factor productivity
- Holds for both stocks (years of schooling, capital stocks,...) and flows (savings, education expenditure as % of GDP,...)
- Correlations hold conditional on full set of covariates...
- ... and often even conditional on GDP

Patience, Accumulation, and Income Across Regions

	Dependent variable:					
	Log [Regional GDP p/c]			Avg. years of education		
	(1)	(2)	(3)	(4)	(5)	(6)
Patience	1.39***	0.21***	0.19**	3.34***	0.43**	0.40**
	(0.23)	(0.07)	(0.09)	(0.55)	(0.17)	(0.16)
Constant	8.74***	9.18***	8.81***	7.17***	7.37***	6.97***
	(0.18)	(0.02)	(0.32)	(0.36)	(0.04)	(0.55)
Country FE	No	Yes	Yes	No	Yes	Yes
Additional controls	No	No	Yes	No	No	Yes
Observations	704	704	687	693	693	676
R^2	0.184	0.937	0.949	0.252	0.936	0.954
Adjusted R^2	0.183	0.932	0.944	0.251	0.931	0.949

WLS estimates, observations weighted by number of observations in each region. Standard errors (clustered at country level) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Thank you!

Further Details

- Selected countries

Global Preference Survey: Selected Countries

- East Asia and Pacific: Australia, Cambodia, China, Indonesia, Japan, Philippines, South Korea, Thailand, Vietnam
- Europe and Central Asia: Austria, Croatia, Czech Republic, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Italy, Kazakhstan, Lithuania, Moldova, Netherlands, Portugal, Romania, Russia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom
- Latin America and Caribbean: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Guatemala, Haiti, Mexico, Nicaragua, Peru, Venezuela
- Middle East and North Africa: Algeria, Egypt, Iran, Iraq, Israel, Jordan, Morocco, Saudi Arabia, United Arab Emirates
- North America: United States, Canada
- South Asia: Afghanistan, Bangladesh, India, Pakistan, Sri Lanka
- Sub-Saharan Africa: Botswana, Cameroon, Ghana, Kenya, Malawi, Nigeria, Rwanda,
- South Africa, Tanzania, Uganda, Zimbabwe