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Patience and subjective well-being

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Patience and subjective well-being

We show that patience is a key determinant of subjective well-being differences between countries. To address potential endogeneity bias, we apply an instrumental variable approach using the share of Protestants in the country, which prior literature has associated with patience and used as an instrument. While tentative, our findings are consistent with a sizeable causal effect of patience on subjective well-being. They are robust across several specifications and hold for three different measures of subjective well-being: life satisfaction, positive affect, and negative affect.

Keywords: subjective well-being; happiness; time preference; intertemporal choice; patience

JEL classification: D9; I3

I. Introduction

Why do average levels of happiness vary across countries? Country-level data recently made available (Falk et al. 2018) allows for a re-examination of this question in terms of economic preferences. In this paper, we focus on patience, a measure of time preference. Patience captures the ability to sacrifice the present for future rewards and represents an important determinant of country differences in economic development (Hübner and Vannoorenberghe 2015; Falk et al. 2018). However, its relationship with country-level subjective well-being (SWB) is not well known. Using representative data comprising 73 countries, we document a substantial effect of patience on three measures of SWB: life satisfaction, positive affect, and negative affect. To address potential endogeneity concerns due to patience itself depending on levels of SWB, we follow a previously employed strategy (Dohmen et al. 2015) and use the share of Protestants in the country (Barro and McCleary, 2003) as an instrument for patience. We study both cognitive life evaluation (i.e., judgments of overall life satisfaction) and emotional well-

being (i.e., quality of emotions, moods, and affective states) in line with the usual distinction in the SWB literature (Kahneman and Deaton 2010).

II. Materials and methods

Data

Our analysis is based on the Global Preferences Survey (GPS) (Falk et al. 2018), a globally representative dataset on economic preferences. The GPS was conducted in 2012 on 80,000 individuals from 76 countries. Measures were selected for their predictive power in incentivized laboratory experiments (Falk et al. 2016). We supplemented this dataset with country-level data from well-known databases (see Data availability statement).

Empirical strategy

For consistency and comparability, our empirical approach closely follows previous work on the effects of culture (Gorodnichenko and Roland 2011) and patience (Hübner and Vannoorenberghe 2015) on economic development. We use a two-stage least-squares instrumental variable (IV) strategy based on the shares of Protestants in the country as of 1900 ('Protestantism 1900') and 2000 ('Protestantism 2000'), which have previously been used as instruments for patience in regressions of various measures of economic development (Dohmen et al. 2015). The first-stage (1) and second-stage (2) regression equations are (cross-section of 73 countries, 3 countries excluded due to incomplete data):

$$Patience_i = \pi_0 + \pi_1 Protestantism_i + \pi_2 W_{1i} + \dots + \pi_{2+r} W_{ri} + v_i \quad (1)$$

$$SWB_i = \beta_0 + \beta_1 Patience_i + \beta_2 W_{1i} + \dots + \beta_{2+r} W_{ri} + v_i \quad (2)$$

SWB takes on three standard measures of country SWB (Clark, Layard, and Senik 2012): life satisfaction (as a measure of cognitive life evaluation) and positive and negative affect (as measures of emotional well-being). *Patience* is a measure of time preference composed of five hypothetical choices (e.g., ‘Would you rather receive amount x today or y in 12 months?’) and a self-report measure of willingness to wait (Falk et al. 2018), see Appendix A. *Protestantism* denotes the share of Protestants in the country as of 1900 or 2000. Variables W_l to W_r refer to a set of control variables carefully selected based on prior country-level studies of SWB (Clark 2018; Dolan, Peasgood, and White 2008; Clark, Layard, and Senik 2012; Diener, Diener and Diener 2009), see Appendix B.

Instrument validity

The main threat to the validity of our estimates is endogeneity. Given that we control for (essentially) all the main determinants of SWB discussed in the literature (see below), it is unlikely that a third variable could fully explain the correlations between patience and SWB observed in our OLS regressions (see Results and discussion). However, reverse causality may bias our estimates, as it could be that SWB affects (individual or aggregate) patience: indeed, previous research reports evidence that happiness (Lane 2017) and positive affect (Ifcher and Zarghamee 2011) influence time preference by reducing impatience.

One way to deal with this issue is to exploit information about population patterns determined long before our measures of SWB. Following previous research (Dohmen et al. 2015), we use the historical share of protestants in the country to instrument patience, thus solving the issue of patience being measured before SWB. This choice is grounded in the Weber-hypothesis (Weber 1930) which involves the claim that Protestantism attributes particular importance to patience and thriftiness, and

that the Protestant ethic contributed to making people more patient (Falk et al. 2018). In our dataset, the Weber-hypothesis finds strong empirical support: Patience strongly correlates with Protestantism 1900 ($r = .69$, $p < .001$, see Figure 1) and Protestantism 2000 ($r = .44$, $p < .001$), suggesting that Protestantism is not a weak instrument (see also Results and Discussion).

The central question for the validity of our instrument is thus whether the exclusion restriction assumption holds. The exclusion restriction stipulates that Protestantism does not affect SWB through channels other than patience, conditional on the full set of control variables. In fact, while Life satisfaction and Protestantism 1900 are correlated ($r = .51$), a simple regression that controls for Patience and GDP shows that adding Protestantism 1900 as a predictor does not provide any additional predictive power (regression coefficient = 0.004, p-value = .989, R-squared is unchanged, see Appendix C), suggesting that this might indeed be the case here. In addition, indirect effects of Protestantism on SWB through channels other than Patience appear very unlikely. Indeed, our models control for all the main determinants of SWB reported in the literature (henceforth ‘traditional controls’) — including economic measures (log GDP per capita, GDP growth, inflation, unemployment), proxies for health and education, and measures of pollution, corruption, freedom, and social support. We also control for a large number of variables that could potentially be related to both SWB and Protestantism or its historical diffusion (e.g., via spatial, cultural, or religious proximity). Thus, our models include the other economic preferences measured in the GPS (risk aversion, positive reciprocity, negative reciprocity, altruism, and trust) and — following Gorodnichenko and Roland (2011) and Hübner and Vannoorenberghe (2015) — we also control for the impact of religiosity, the share of each of the main religions in the country and a set of geographical variables.

As such, conditional on the set of control variables, it is dubious that Protestantism could affect SWB through channels other than Patience. Nevertheless, as is often the case with instrumental variable approaches, it is difficult to provide a definitive argument for the exclusion restriction. As a result, the reader should keep in mind that our IV regression results are only suggestive and must be interpreted with care.

III. Results and discussion

As expected, we find a strong positive correlation between Life satisfaction and Patience ($r = .70$), see Figure 2. Patience also correlates positively with Positive affect ($r = .42$) and negatively with Negative affect ($r = -.35$). These relationships are confirmed by the OLS regressions of SWB (see Table 1): the coefficient on Patience is positive for the Life satisfaction and Positive affect regressions, and negative for the Negative affect regressions. It is also significantly different from 0 in almost all models (except the second OLS regression of negative affect; also note that coefficients are only marginally significant in two cases). The main IV estimates (using share of non-religious as the only religious control) are consistent with the OLS results, with positive signs for regressions of the first two dependent variables and negative signs for regressions of Negative affect. Except in one case (marginally significant), all of them are statistically significant. The first-stage F-statistics (ranging from 9.79 to 34.26, see Appendix D) indicate that our instruments are not weak.

Figure 1. Correlation between Patience and Protestantism 1900 ($r = .69$). 73 countries.

Figure 2. Correlation between Life satisfaction and Patience ($r = .70$). 73 countries.

Our results remain robust after controlling for the shares of the main religions in each country: the coefficients on Patience remain large and significant for the Life satisfaction and Positive affect regressions, see Table 2. Adding these controls does not substantially improve the predictive power of our models and leads to lower first-stage F-statistics (lower than 10 for Protestantism 2000, therefore not presented here, see Appendix E), and higher threats of multicollinearity. As such, estimates are likely to be less precise than for our main models and should be interpreted with caution. Note that coefficients for Patience on the Negative affect regressions are no longer significant, which constitutes one limitation of our results.

Table 1. Main regression results for Patience (share of non-religious).

Table 2. Additional results for Patience (all religious controls).

The effect of patience on SWB is sizable. In the Life satisfaction regressions, the coefficients on Patience suggest that a one standard deviation increase in Patience (roughly equivalent to the difference between Sweden and Bangladesh) is expected to lead to a 0.700 to 0.856 increase in Life satisfaction on the 0 to 10 scale (roughly equivalent to the difference between Switzerland and the United States). The impact of patience on Positive affect and Negative affect is also substantial: a one standard deviation increase in Patience is expected to lead to a 0.091 to 0.152 increase in Positive affect (Min = 0.42, Max = 0.90) and a 0.074 to 0.151 decrease in Negative affect (Min = 0.13, Max = 0.53). Finally, dominance analysis on OLS regressions with traditional controls also reveals that Patience is the second-best contributor to the R-squared in the Life satisfaction (after GDP, dominance statistic = .14) and Positive affect (after freedom, dominance statistic = .09) regressions.

IV. Conclusion

In summary, our findings suggest that patience is a key determinant of SWB differences between countries. Despite being only suggestive, results of our instrumental variable regressions provide preliminary evidence consistent with a causal effect of patience on SWB beyond its effect on economic development.

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Data availability statement

Data, analysis script, and description of variables are available on an OSF repository:

<https://osf.io/5ay4j/>

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendices

Appendix A. Measures of patience.

Appendix B. Description of variables and summary statistics.

Appendix C. Regression of Life satisfaction on Patience, Log GDP per capita and Protestantism.

Appendix D. First-stage regression results for Table 1.

Appendix E. First-stage regression results for Table 2.

Figure 1. Correlation between Patience and Protestantism 1900 ($r = .69$). 73 countries.

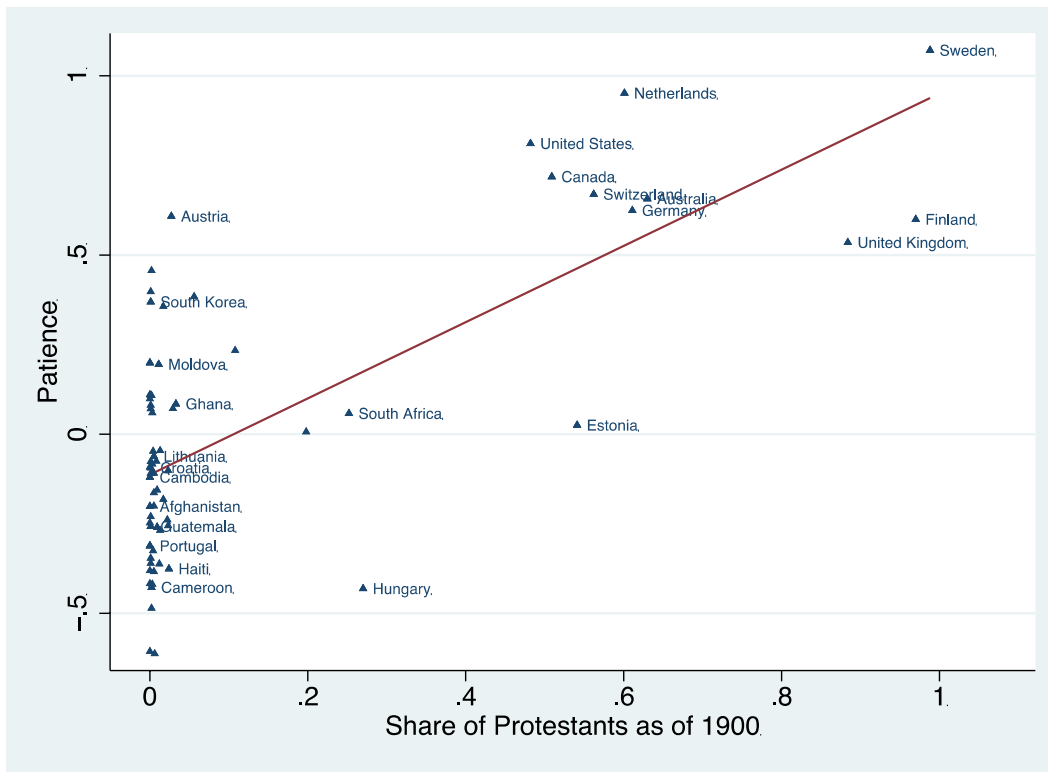


Figure 2. Correlation between Life satisfaction and Patience ($r = .70$). 73 countries.

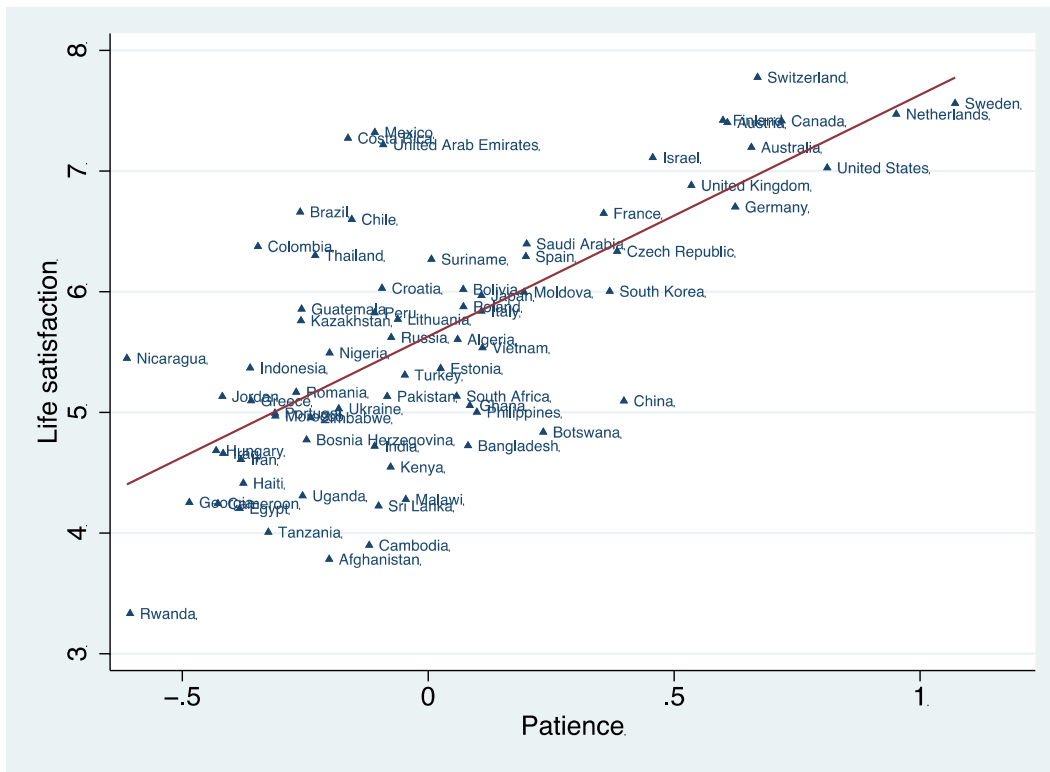


Table 1. Main regression results for Patience (share of non-religious).

	OLS		IV			
	(1)	(2)	Protestantism 1900 (3)	Protestantism 1900 (4)	Protestantism 2000 (5)	Protestantism 2000 (6)
Life satisfaction	0.856*** (0.201)	0.750*** (0.269)	0.702** (0.301)	0.735** (0.291)	0.700* (0.370)	0.790** (0.356)
R-squared	0.786	0.864	0.785	0.864	0.785	0.864
Positive affect	0.093*** (0.024)	0.091*** (0.030)	0.119*** (0.036)	0.143*** (0.038)	0.150*** (0.048)	0.152*** (0.046)
R-squared	0.697	0.737	0.693	0.727	0.677	0.723
Negative affect	-0.074*** (0.025)	-0.040 (0.029)	-0.082* (0.043)	-0.083** (0.037)	-0.151** (0.059)	-0.118** (0.046)
R-squared	0.442	0.591	0.441	0.579	0.377	0.552
Observations	73	73	73	73	73	73
F-test			18.55	34.26	9.79	29.39
Traditional controls	Yes	Yes	Yes	Yes	Yes	Yes
Economic preferences	No	Yes	No	Yes	No	Yes
Share of non-religious	No	Yes	No	Yes	No	Yes
Geographical controls	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

'F-test' is the F-test for excluded instruments in the first-stage IV regression. See S1 Table for the full list of control variables.

Table 2. Additional results for Patience (all religious controls).

	IV		
	Protestantism 1900		
	(1)	(2)	(3)
Life satisfaction	0.719** (0.305)	1.558*** (0.593)	1.333*** (0.514)
R-squared	0.803	0.833	0.877
Positive affect	0.133*** (0.034)	0.186** (0.083)	0.225** (0.101)
R-squared	0.694	0.714	0.700
Negative affect	-0.089** (0.037)	0.059 (0.079)	0.078 (0.081)
R-squared	0.492	0.579	0.639
Observations	73	73	73
First-stage F-test	36.84	13.40	11.28
Traditional controls	Yes	Yes	Yes
Economic preferences	Yes	Yes	Yes
Religious controls	No	Yes	Yes
Geographical controls	No	No	Yes

Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

'F-test' is the F-test for excluded instruments in the first-stage IV regression. See S1 Table for the full list of control variables.

Appendix A. Measures of patience.

Our measure of patience (or time preference) is a weighted combination of a quantitative measure (five interdependent hypothetical binary choices between immediate and delayed financial rewards, weight of 71.2%) and a qualitative measure (self-report measure of willingness to wait, weight of 28.8%), which are given below (Falk et al. 2018).

Quantitative measure:

Suppose you were given the choice between receiving a payment today or a payment in 12 months. We will now present to you five situations. The payment today is the same in each of these situations. The payment in 12 months is different in every situation. For each of these situations we would like to know which you would choose. Please assume there is no inflation, i.e, future prices are the same as today's prices. Please consider the following: Would you rather receive 100 Euro today or x Euro in 12 months? (Falk et al. 2018, 1654)

Qualitative measure:

How willing are you to give up something that is beneficial for you today in order to benefit more from that in the future? (Falk et al. 2018, 1654)

Appendix B. Description of variables and summary statistics.

Variable	Description	Unit	Mean	Std. dev.	Min	Max
patience	time preference/willingness-to-wait	std., country avg.*	0.00	0.37	-0.61	01.07
life satisfaction	cognitive life evaluation	0-10, country avg.	5.64	01.08	3.33	7.78
positive affect	emotional well-being (happiness, laugh, enjoyment)	0-1, country avg.	0.72	0.11	0.42	0.90
negative affect	emotional well-being (worry, sadness, anger)	0-1, country avg.	0.26	0.08	0.13	0.53
gdp	GDP per capita, PPP	international dollars	19681.44	16432.37	1034.02	69102.48
gdp growth	GDP per capita, growth	annual %	02.06	3.66	-8.55	14.70
inflation	inflation, consumer prices	annual %	05.01	4.57	-0.94	27.26
unemployment	rate of unemployment	% (of labour force)	8.00	5.85	0.51	28.01
pollution	PM2.5 air pollution, mean annual exposure	micrograms pcm	28.98	18.96	6.60	88.17
education	mean years of schooling	years	09.08	2.85	3.40	13.90
healthy life	years of healthy life expectancy at birth	years	63.99	7.19	41.42	74.16
corruption	average corruption of government and businesses	0-1, country avg.	0.73	0.26	0.00	0.96
freedom	freedom to choose what you do with your life	0-1, country avg.	0.72	0.16	0.32	0.96
social support	having someone to count on in times of trouble	0-1, country avg.	0.82	0.12	0.51	0.95
risk taking	risk preference	std., country avg.*	0.01	0.31	-0.79	0.97
positive reciprocity	propensity to act in a positively reciprocal way	std., country avg.*	-0.04	0.34	-1.04	0.57
negative reciprocity	willingness to take revenge/punish unfair behavior	std., country avg.*	0.02	0.28	-0.49	0.74
altruism	willingness to donate to good causes/charity	std., country avg.*	-0.04	0.35	-0.94	0.91
trust	propensity to assume that people only have the best intentions	std., country avg.*	-0.02	0.28	-0.71	0.61

religion shares	share of each of the main religions in the country**	% (of population)
latitude	latitude	coordinate
longitude	longitude	coordinate
landlocked	country is landlocked	dummy

*Standardized at the individual level, weighted country average.

**Include the share of Catholics, Orthodox Christians, Jews, Muslims, Hindus, Buddhists, Eastern religions, and non-religious.

See Data availability statement for data repository.

Appendix C. Regression of Life satisfaction on Patience, Log GDP per capita and Protestantism.

	Life satisfaction					
	(1)	(2)	(3)	(4)	(5)	(6)
Patience	2.002***	1.871***	2.092***	1.107***	1.105***	1.024***
	(0.185)	(0.281)	(0.221)	(0.222)	(0.297)	(0.271)
<i>p-value</i>	0.000	0.000	0.000	0.000	0.000	0.000
Log GDP per capita				0.566***	0.566***	0.579***
				(0.071)	(0.070)	(0.076)
<i>p-value</i>				0.000	0.000	0.000
Protestantism 1900		0.295			0.004	
		(0.353)			(0.331)	
<i>p-value</i>		0.406			0.989	
Protestantism 2000			-0.463			0.324
			(0.591)			(0.359)
<i>p-value</i>			0.426			0.371
R-squared	0.483	0.486	0.487	0.682	0.682	0.684
Observations	73	73	73	73	73	73

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Appendix D. First-stage regression results for Table 1.

	IV			
	Protestantism 1900		Protestantism 2000	
	(3)	(4)	(5)	(6)
Patience	0.763*** (0.177)	0.820*** (0.140)	0.824*** (0.263)	0.922*** (0.170)
R-squared	0.620	0.833	0.566	0.787
Observations	73	73	73	73
F-test	18.55	34.26	9.79	29.39
Traditional controls	Yes	Yes	Yes	Yes
Economic preferences	No	Yes	No	Yes
Share of non-religious	No	Yes	No	Yes
Geographical controls	No	Yes	No	Yes

Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

'F-test' is the F-test for excluded instruments in the first stage IV. See Table A1 for the full list of control variables.

Appendix E. First-stage regression results for Table 2.

	IV		
	Protestantism 1900		
	(1)	(2)	(3)
Patience	0.844*** (0.139)	0.747*** (0.204)	0.674*** (0.201)
R-squared	0.799	0.844	0.863
Observations	73	73	73
First-stage F-test	36.84	13.40	11.28
Traditional controls	Yes	Yes	Yes
Economic preferences	Yes	Yes	Yes
Religious controls	No	Yes	Yes
Geographical controls	No	No	Yes

Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

'F-test' is the F-test for excluded instruments in the first stage IV. See Table A1 for the full list of control variables.