To what extent GDP per capita is linked to the level of happiness?

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Outline

Introduction

Question

To what extent GDP per capita is linked to the level of happiness?

Introduction

Motivation

- Countries are focused on GDP;
- GDP and happiness seem to be correlated;
- But uncorrelated after a certain level of GDP.

Introduction

Literature

- **R. Easterlin**: link no longuer exists when the GDP is high;
- **B. Stevenson & J. Wolfers**: link stronger for rich people;
- **P. Frijters & A. Ferrer-i-Carbonell**: having a children decreases the happiness.

Data

Variable	Description	Source
RLadder	Average level of happiness[1]	World Happiness Report
logGDP	Log of GDP per capita	World Bank
GINI	The GINI Index	United Nations University
CO2	CO_2 emissions per capita	C.D.I.A.C.[2]
CPW	Fertility rate[3]	World Bank
WestEurope	= 1 if loc. in West. Europe[4]	
EastEurope	= 1 if loc. in Eastern Europe[4]	
Africa	= 1 if loc. in Africa[4]	
MiddleEast	= 1 if loc. in Mid. East[4]	
AsiaOceania	= 1 if loc. in Asia/Oceania[4]	
America	= 1 if loc. in America[4]	

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[1] An integer between 4 and 7

[2] Carbon Dioxide Information Analysis Center

[3] Number of children per woman

[4] 0 otherwise

Data

A brief summary statistics table

	logGDP	GINI	CO_2	CPW
Min.	6.485	0.154	0.037	1.227
1st Qu.	8.986	0.308	1.725	1.498
Median	9.690	0.355	4.441	1.893
Mean	9.562	0.373	5.254	2.191
3rd Qu.	10.261	0.433	7.468	2.570
Max.	11.423	0.700	21.616	7.566

Data

The means of the following variables, grouped by continent

	WestEur.	EastEur.	Africa	Mid.East	Asia/O.	America
RLadder	6.01	5.29	4.32	5.63	6.14	6.59
logGDP	10.17	9.66	7.90	9.43	9.77	9.83
GINI	0.32	0.32	0.42	0.37	0.34	0.45
CO_2	6.83	5.78	1.58	4.79	8.25	7.85
CPW	1.63	1.50	4.80	2.99	2.32	2.41

Econometric models & estimation method

Model 1

$$RLadder_{c,t} = \beta_0 + \beta_1 \times logGDP_{c,t} + \epsilon_{c,t}$$

- Multinomial Logistic Regression

Econometric models & estimation method

Model 2

$RLadder_{c,t} = \beta_0 + \beta_1 \times logGDP_{c,t} + \beta_2 \times GINI_{c,t} + \beta_3 \times CO2_{c,t} + \beta_4 \times CPW_{c,t} + \beta_5 \times WestEurope_{c,t} + \beta_6 \times EastEurope_{c,t} + \beta_7 \times Africa_{c,t} + \beta_8 \times MiddleEast_{c,t} + \beta_9 \times AsiaOceania_{c,t} + \beta_{10} \times America_{c,t} + \epsilon_{c,t}$

- Multinomial Logistic Regression

Econometric models & estimation method

Model 3

$RLadder_{c,t} = \beta_0 + \beta_{poor} \times \mathbb{1}(logGDP_{c,t} < k) \times (logGDP_{c,t} - log(k)) + \beta_{rich} \times \mathbb{1}(logGDP_{c,t} \geq k) \times (logGDP_{c,t} - log(k)) + \epsilon_{c,t}$

- OLS Regression
- **Test the Easterlin hypothesis**:
  very rich people are not happier than the others
- with k the threshold

Table: Coefficients on Model 1

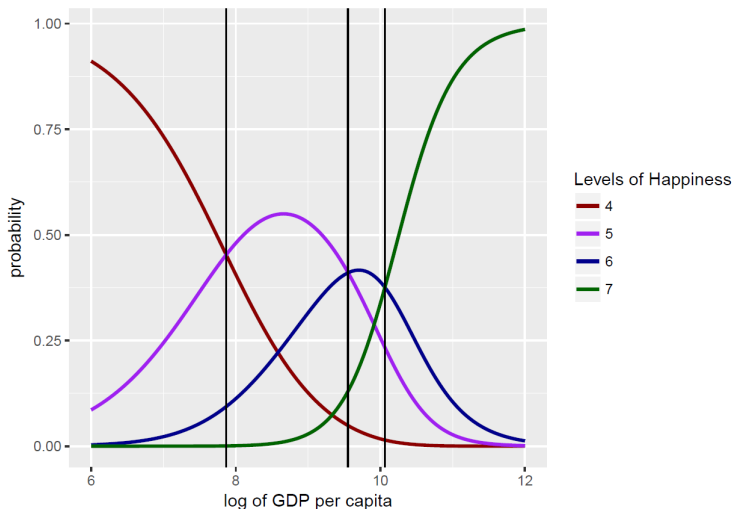|	*Dependent variable:*		
	5	6	7
logGDP	1.265***	2.199***	4.451***
	(0.202)	(0.244)	(0.340)
Constant	−9.948***	−18.876***	−41.540***
	(1.745)	(2.177)	(3.259)

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

Resuls on Model 1: multinom. with only logGDP

The marginal effects

$$\pi_p = \frac{exp(\beta_{p,0} + \beta_{p,1} \times logGDP)}{1 + \sum\limits_{i=4}^{n=7} exp(\beta_{p,0} + \beta_{p,1} \times logGDP)} \forall p \in (4, 7)$$

Figure: The probability to reach each level of happiness according to GDP
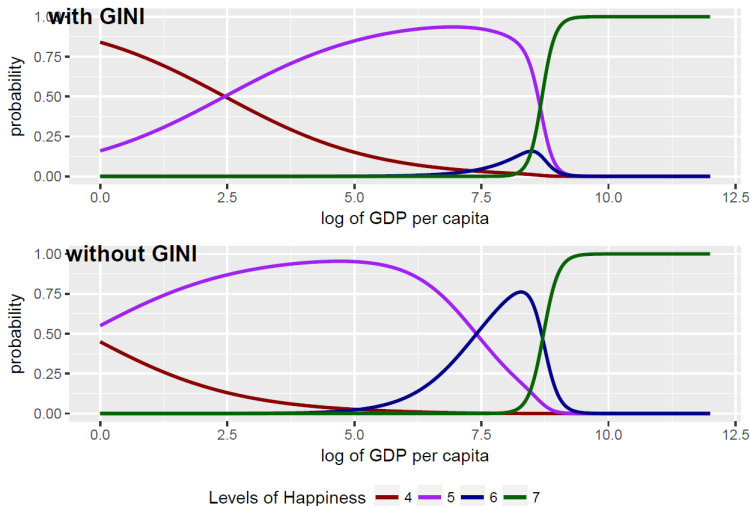
Results on Model 2: multinom. with all the variables

Table: Coefficients on Model 2

	Dependent variable:		
	5	6	7
logGDP	0.677*	2.243***	8.896***
	(0.409)	(0.524)	(1.018)
GINI	−4.998*	−13.433***	−9.432**
	(2.693)	(3.525)	(4.791)
CO2	0.347***	0.338**	0.372**
	(0.134)	(0.140)	(0.161)
CPW	−0.227	−0.483	0.753
	(0.315)	(0.484)	(0.706)

WestEurope	4.912**	3.790	−7.605***
	(2.245)	(3.558)	(2.394)
EastEurope	−3.579***	−4.922	−17.532***
	(0.848)	(6.015)	(2.044)
Africa	−1.798*	−10.834	−18.478***
	(1.087)	(33.213)	(0.092)
MiddleEast	−0.384	−1.437	−11.500***
	(1.311)	(6.122)	(2.528)
AsiaOceania	−1.766**	−2.538	−14.421***
	(0.742)	(5.999)	(2.105)
America	1.488	3.836	−3.376
	(1.256)	(6.100)	(2.175)
Constant	−1.126	−12.106*	−72.912***
	(3.277)	(7.355)	(8.719)

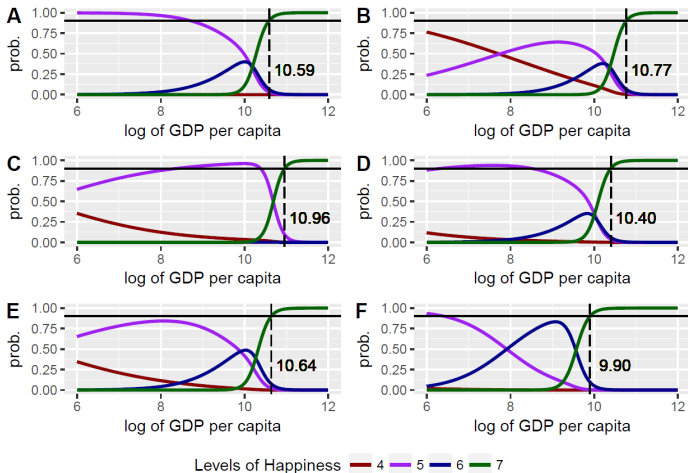# Resuls on Model 2: multinom. with all the variables

Figure: The prob. to reach each level according to GDP, incl. or not GINI Index

Figure: The prob. to reach each level according to GDP, by continent

with **A**: Western Europe; **B**: Eastern Europe; **C**: Africa; **D**: Middle East; **E**: Asia/Oceania & **F**: America.

Results on Model 3: OLS with a threshold

Table: Coefficients on Model 3

	Dependent variable:			
	RLadder			
	Frey $10k	Layard $15k	Layard $20k	Deaton $75k
Rich	0.914***	1.016***	1.260***	0.357
	(0.060)	(0.079)	(0.104)	(1.678)
Poor	0.469***	0.528***	0.524***	0.711***
	(0.068)	(0.054)	(0.046)	(0.033)
Constant	5.612***	5.777***	5.323***	6.935***
	(0.052)	(0.050)	(0.055)	(0.064)

Note:	$^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Conclusion

Main points

- Positive correlation
- Differences by continent: importance of the geographical factor
- Non-correlation with a huge level of GDP

Limits

- Lack of qualitative variable
- A regression for each continent

Aknoledgements

Thank you to have listened our presentation.