Human Migration and Individual Leaning

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Brown U

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- We have an ability to engage in cultural evolution:
  - Explore unfamiliar environments through Individual Learning
  - Learn from each other through Social Learning
  - Pass on the knowledge to future generation
- This allowed humanity to spread across the Globe

  (from tropical forests to polar tundras)

Research Objective

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  - The fundamental factors that contributed to the evolution of propensity towards individual learning in the course of human history
  - The origins of variation in the propensity towards individual learning across regions and nations
  - The implications of the deep determinants of individual learning for observed human behavior

Main Hypothesis

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- The evolution of propensity towards individual learning reflects an adaptation to an ancestral history of environmental change
  - Changes in the environment call for changes in culture
  - Changes in culture are achieved through individual learning
  - Those who engage in individual learning get a comparative advantage while culture adapts to a new environment

Related Literature

Testable Predictions

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Are characterized by a **higher** propensity towards individual learning

Theoretical Model

- An overlapping-generation Malthusian economy

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- Income is the hump-shaped function attaining the potential maximum of $\bar{y}_t$ when $x_{it} = x(e)$

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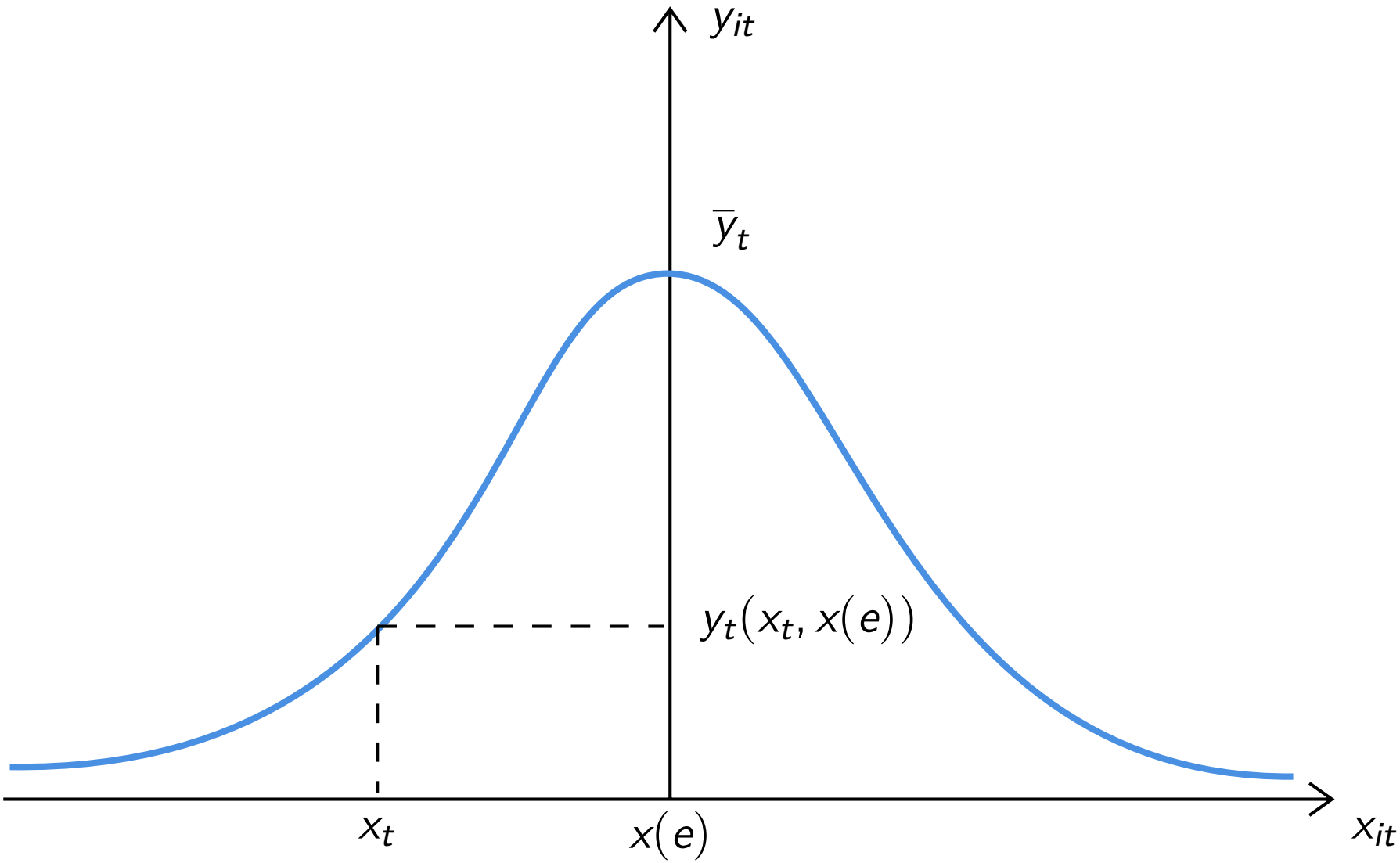
$$x_{it} = \begin{cases} x(e), & \text{with probability } p \\ x_t, & \text{with probability } 1-p, \end{cases}$$

Output and Behaviour



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- Relative reproductive success

$$n_{it} = \begin{cases} \gamma/\tau\bar{y}_t & w/p \quad p \quad if \quad IL_{it} = 1 \\ \gamma/\tau\bar{y}_t \exp\{-\delta(x_t - x(e))^2\} & w/p \quad 1-p \quad if \quad IL_{it} = 1 \\ \gamma/\tau\bar{y}_t \exp\{-\delta(x_t - x(e))^2\} & if \quad IL_{it} = 0. \end{cases}$$

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- The share evolves according to the difference equation

$$\mu_t = \frac{p\mu_{t-1}\exp\{\delta(x_t - x(e))^2\} + (1-p)\mu_{t-1}}{p\mu_{t-1}\exp\{\delta(x_t - x(e))^2\} + (1-p)\mu_{t-1} + 1 - \mu_{t-1}}$$

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$$x_t = (1 - \mu_{t-1}p)x_{t-1} + \mu_{t-1}px(e)$$

Co-Evolution of Culture and Individual Learning

- Co-evolution of culture and predisposition towards individual learning for a given (x_0, μ_0) is governed by a system of difference equations

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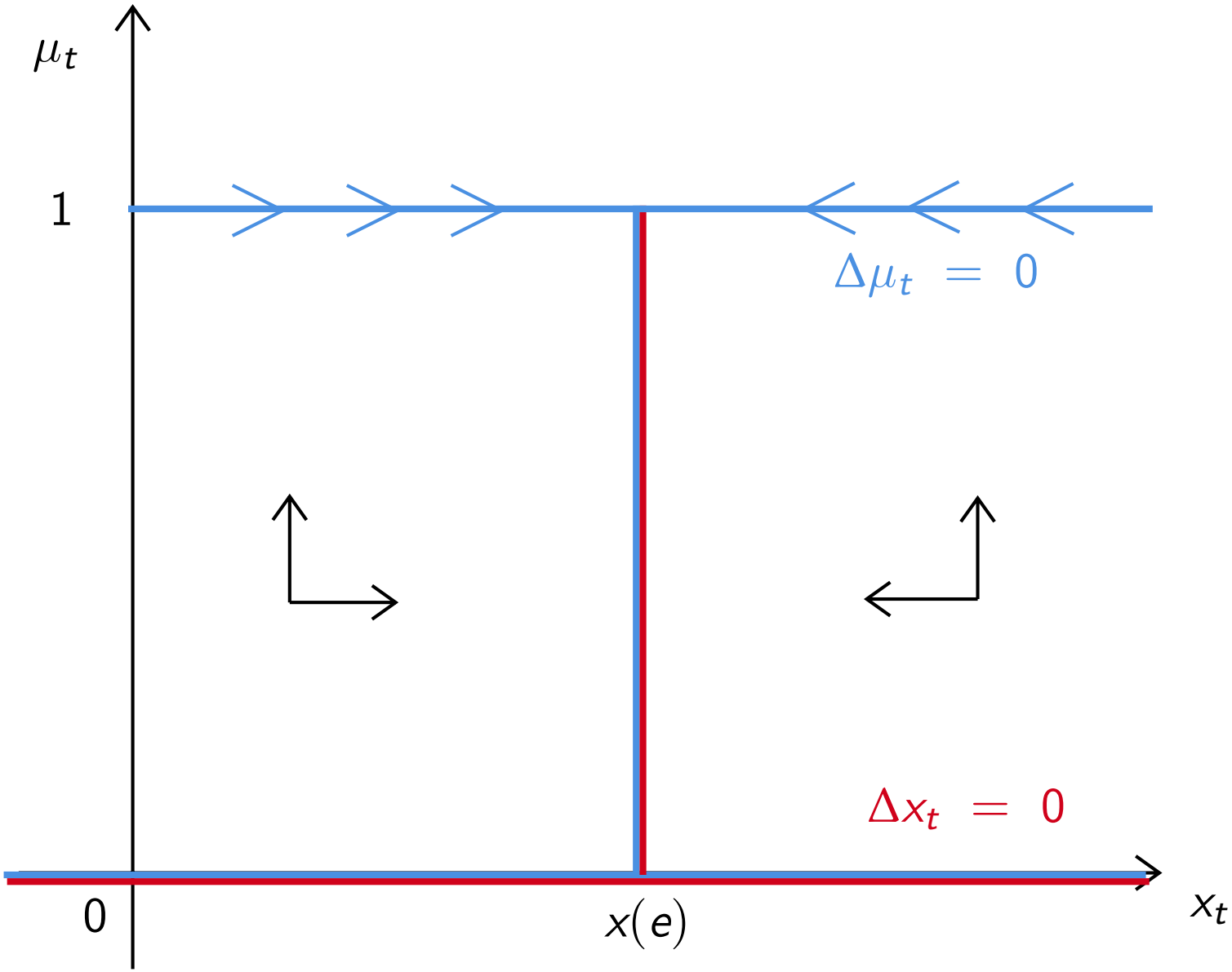
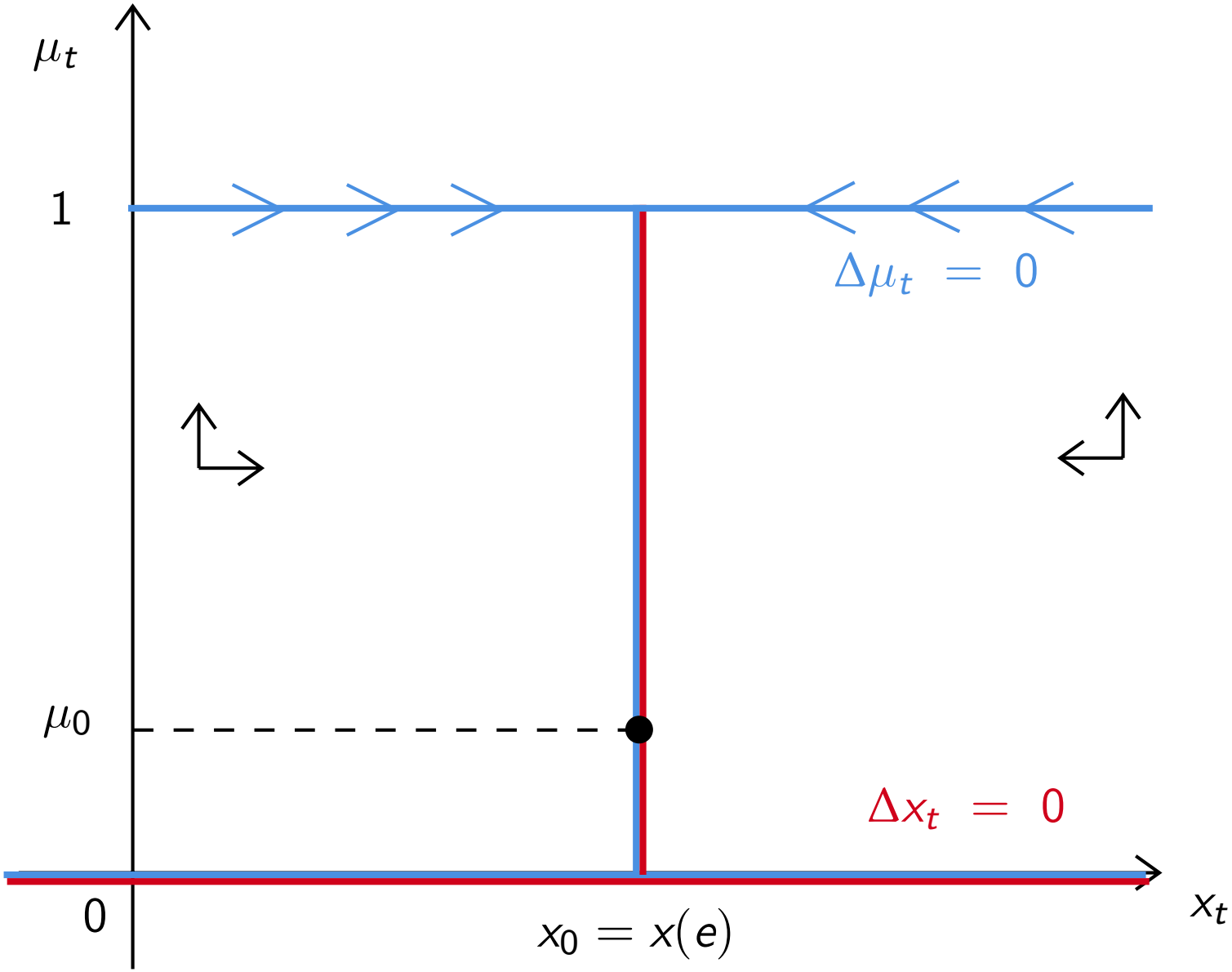
- Most importantly, the system reaches a steady state whenever $x_t = x(e)$

Phase Diagram



Changes in the Environment



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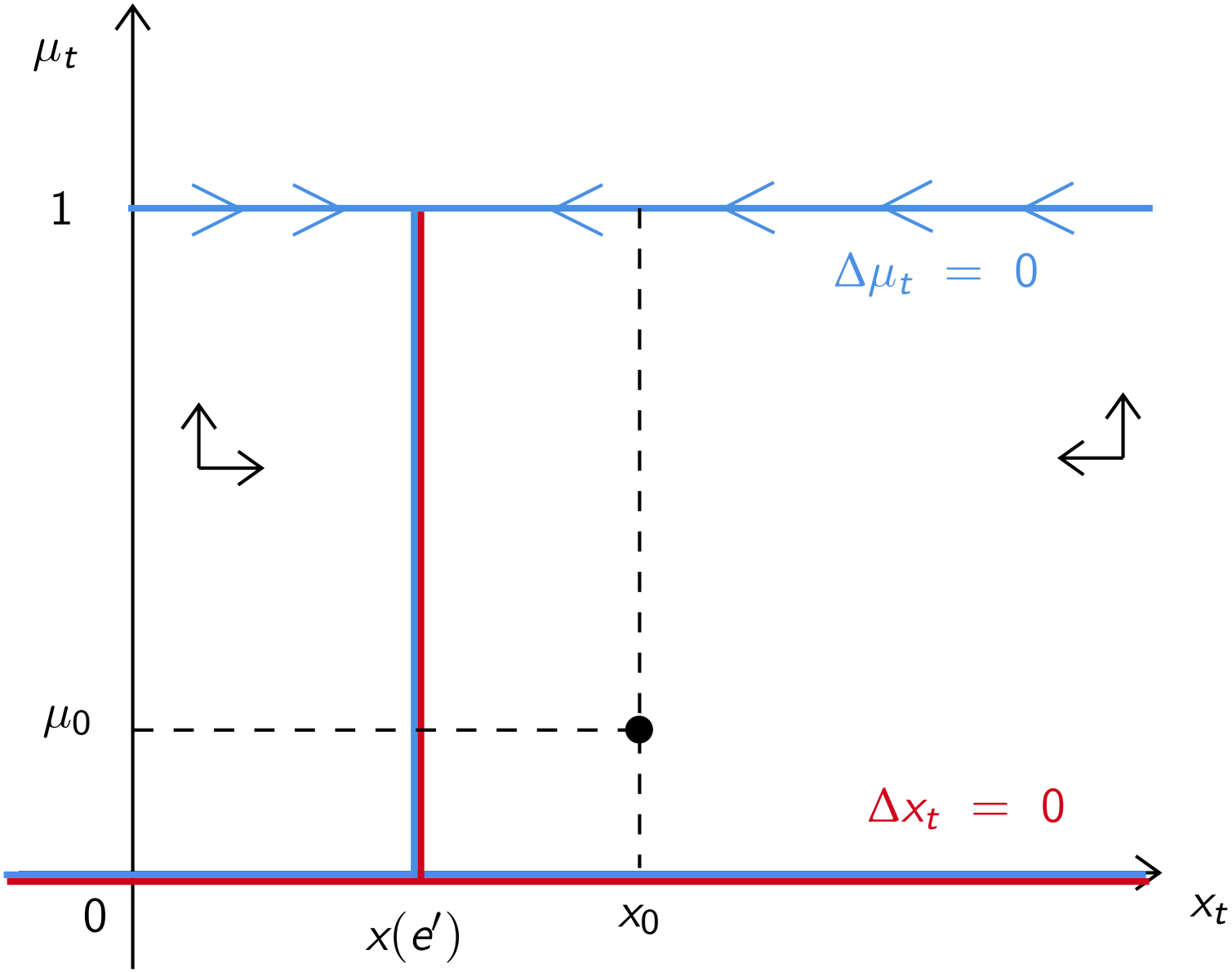

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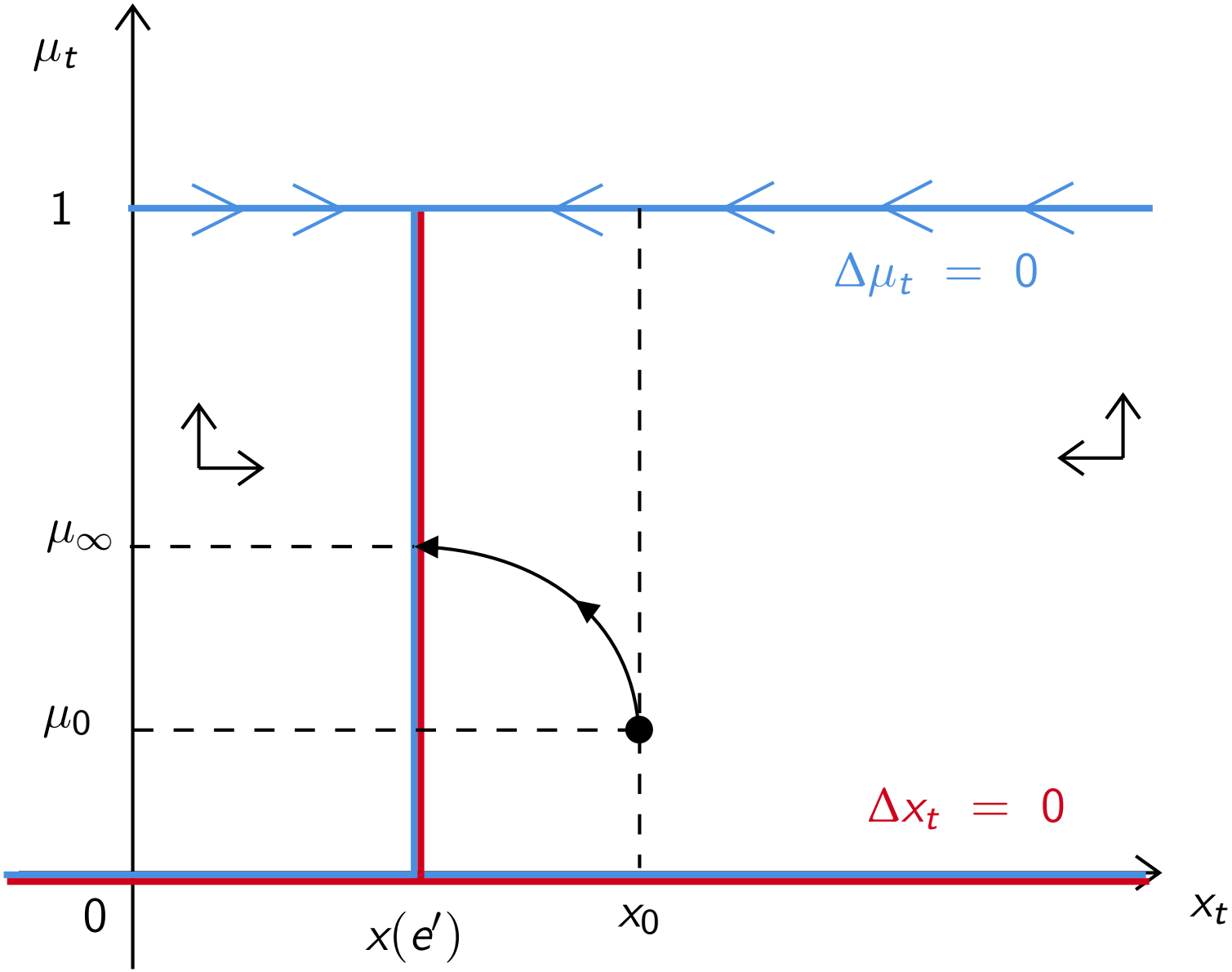
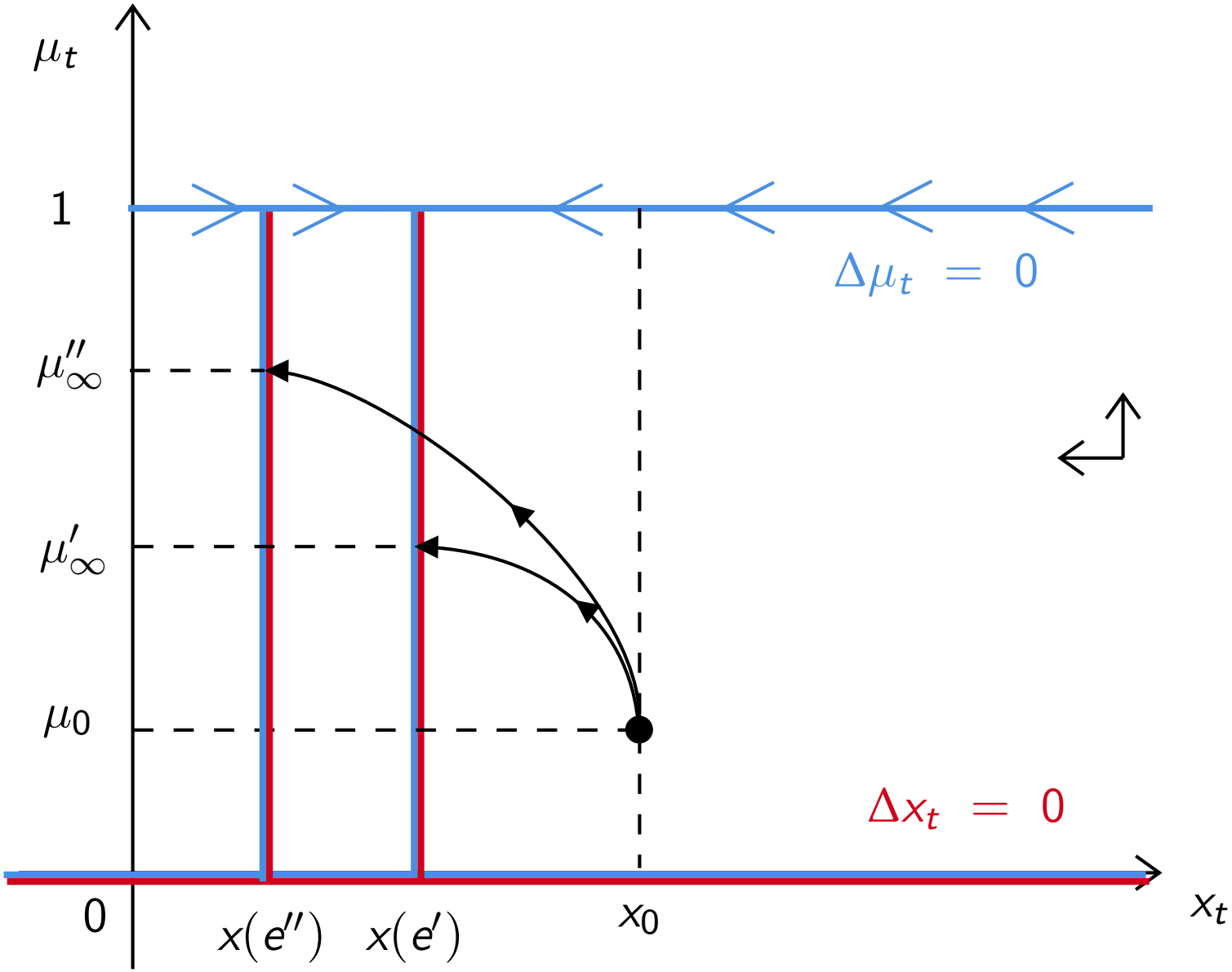
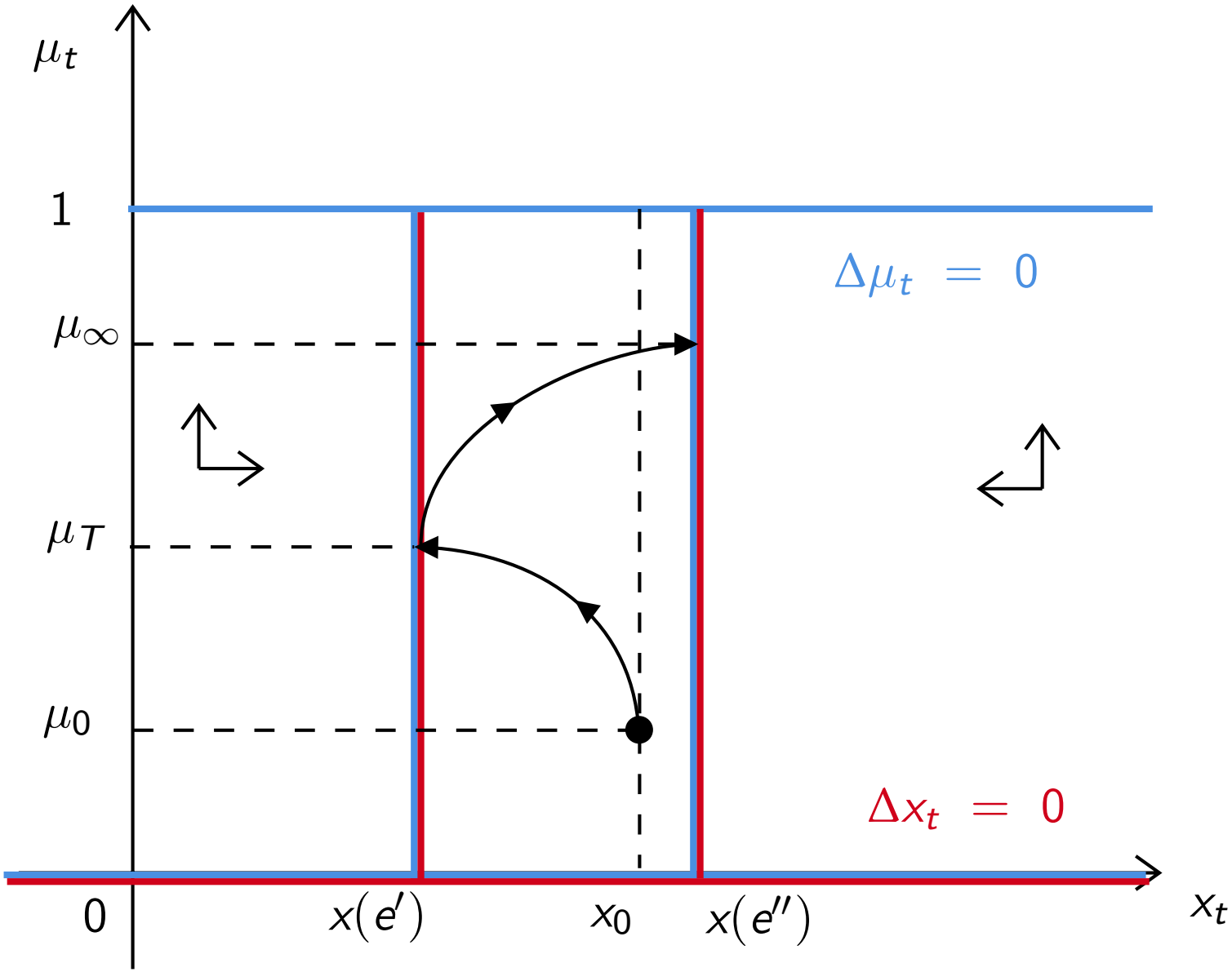


Changes in the Environment: Comparative Dynamics



Changes in the Environment: Cumulative Effect



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- The effect is cumulative, i.e. the whole history matters

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- Comparative advantage of individual learners disappears but their share in the population is greater than before

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- Migrants' ability to adapt to local culture

Empirical Analysis

Variation in preferences and cultural adaptation across Indo-European speakers and their association with ancestral environmental changes

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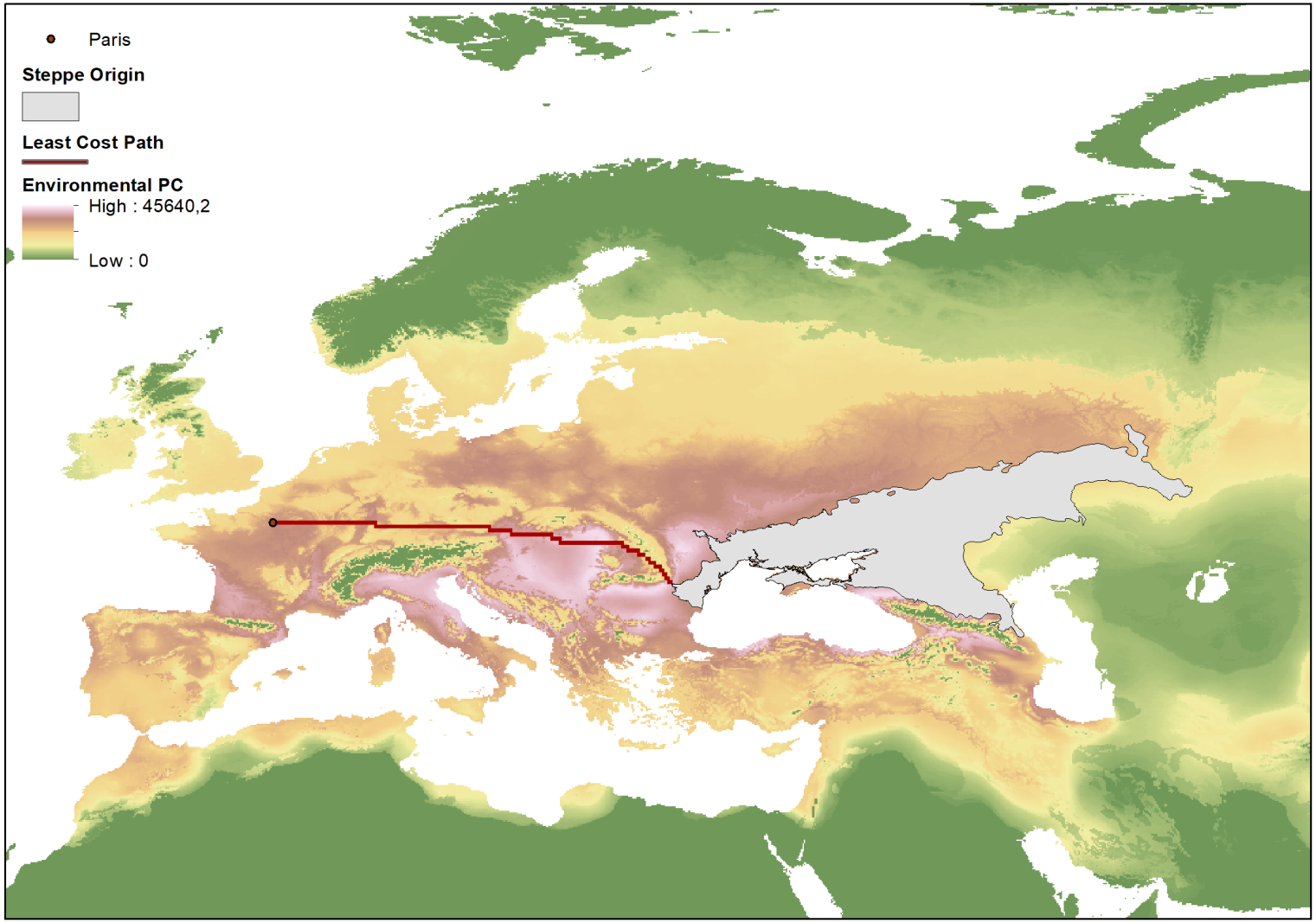
  - Environment is captured by the first principal component of climatic, agricultural and geographical dimensions

Indo-European Origin and Expansion



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- Where $P_i = \{p_i^0, \ldots, p_i^K\}$ is the path from the Indo-European origin to location i composed of a series of adjacent $5' \times 5'$ cells

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  - productivity of main food crops (FAO GAEZ)
  - 19 climatic dimension (WorldClim)
  - Elevation and ruggedness

Data: Predisposition towards Individual Learning

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  - Importance of thinking up new ideas, being creative and doing things in her/his own original way
- Among individuals in the US (GSS)
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  - The inverse of importance of being obedient

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  - Reflect preference and norms
  - Widely available throughout the survey

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Empirical Model

Individual Learning: Individuals in Europe (ESS)

	Importance of Creativity and New Ideas					
	(1)	(2)	(3)	(4)	(5)	(6)
Accumulated Env. Change	0.143***	0.115***	0.116***	0.093***	0.079***	0.081***
	(0.048)	(0.017)	(0.018)	(0.013)	(0.011)	(0.010)
Country of Residence FE	No	Yes	Yes	Yes	Yes	Yes
Round FE	No	No	Yes	Yes	Yes	Yes
Individual Controls	No	No	No	Yes	Yes	Yes
Geographic Controls	No	No	No	No	Yes	Yes
Country of Origin FE	No	No	No	No	No	Yes
Adjusted-R^2	0.01	0.05	0.05	0.08	0.08	0.08
Observations	168097	168097	168097	168097	168097	168097

1st-G Migrants | 2nd-G Migrants | Selection on Unobservables | Alternative Outcomes

Cultural Adaptation: 1st-Generation Migrants in Europe

	Level of Cultural Adaptation				
	(1)	(2)	(3)	(4)	(5)
Accumulated Env. Change	0.045***	0.043***	0.043***	0.043***	0.041***
	(0.014)	(0.009)	(0.009)	(0.009)	(0.012)
Country of Residence FE	No	Yes	Yes	Yes	Yes
Round FE	No	No	Yes	Yes	Yes
Individual Controls	No	No	No	Yes	Yes
Geographic Controls	No	No	No	No	Yes
Adjusted-R^2	0.03	0.22	0.22	0.22	0.24
Observations	18907	18907	18907	18907	18907

Selection on Unobservables

Cultural Adaptation: 2nd-Generation Migrants in Europe

	Level of Cultural Adaptation				
	(1)	(2)	(3)	(4)	(5)
Accumulated Env. Change	0.028***	0.019**	0.019**	0.020**	0.034***
	(0.007)	(0.008)	(0.008)	(0.008)	(0.011)
Country of Residence FE	No	Yes	Yes	Yes	Yes
Round FE	No	No	Yes	Yes	Yes
Individual Controls	No	No	No	Yes	Yes
Geographic Controls	No	No	No	No	Yes
Adjusted-R^2	0.01	0.20	0.20	0.20	0.21
Observations	11736	11736	11736	11736	11736

Selection on Unobservables

Natural Experiment: Random Change of the Environment

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Natural Experiment: Random Change of the Environment

- Potential concern:
  - Selective migration of individuals with greater propensity towards individual learning
- Remedy:
  - "Random assignment" of change in the environment
  - Exogenous variation in the potential productivity of the crops introduced in the course of the Columbian Exchange

Natural Experiment: Random Change of the Environment

	Importance of Creativity and New Ideas					
	All Individuals			Migrants		
	(1)	(2)	(3)	(4)	(5)	(6)
Crop Yield (Change)	0.038***	0.039***	0.049***	0.029**	0.034**	0.034***
	(0.012)	(0.013)	(0.012)	(0.011)	(0.014)	(0.013)
Crop Yield (Pre-1500)		0.091	0.126*		0.095	0.099
		(0.078)	(0.065)		(0.088)	(0.074)
Accumulated Env. Change			0.075***			0.059***
			(0.016)			(0.021)
Country of Residence FE	Yes	Yes	Yes	Yes	Yes	Yes
Round FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.10	0.10	0.10	0.12	0.12	0.12
Observations	168097	168097	168097	27424	27424	27424

Natural Experiment: Random Change of the Environment

	Level of Cultural Adaptation					
	First Generation Migrants			Second Generation Migrants		
	(1)	(2)	(3)	(4)	(5)	(6)
Crop Yield (Change)	0.015***	0.033***	0.028***	0.019***	0.018***	0.018***
	(0.002)	(0.009)	(0.008)	(0.003)	(0.006)	(0.005)
Crop Yield (Pre-1500)		0.048	0.071		-0.007	-0.011
		(0.041)	(0.045)		(0.025)	(0.022)
Accumulated Env. Change			0.036**			0.035***
			(0.015)			(0.010)
Country of Residence FE	Yes	Yes	Yes	Yes	Yes	Yes
Round FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.24	0.25	0.25	0.21	0.21	0.21
Observations	18907	18907	18907	11736	11736	11736

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- Effect of migratory distance rather than accumulated environmental change
- Effect of accumulated environmental change on placebo cultural traits

Placebo Origins: Individual Learning (ESS)

	Importance of Creativity and New Ideas								
	All Individuals			First G Migrants			Second G Migrants		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Accumulated Env. Change (Berlin)	0.030			-0.011			0.038		
	(0.018)			(0.027)			(0.025)		
Accumulated Env. Change (London)		-0.010			-0.057			-0.007	
		(0.023)			(0.039)			(0.031)	
Accumulated Env. Change (Lisbon)			0.029			-0.007			0.010
			(0.020)			(0.038)			(0.039)
Country of Residence FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Round FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.08	0.08	0.08	0.13	0.13	0.13	0.09	0.09	0.09
Observations	168097	168097	168097	15873	15873	15873	11536	11536	11536

Alternative Origin Hypotheses

Placebo Origins: Cultural Adaptation (ESS)

	Level of Cultural Adaptation					
	First G Migrants			Second G Migrants		
	(1)	(2)	(3)	(4)	(5)	(6)
Accumulated Env. Change (Berlin)	0.021			0.001		
	(0.015)			(0.008)		
Accumulated Env. Change (London)		0.004			-0.019**	
		(0.008)			(0.008)	
Accumulated Env. Change (Lisbon)			0.010			0.022
			(0.009)			(0.015)
Country of Residence FE	Yes	Yes	Yes	Yes	Yes	Yes
Round FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.25	0.25	0.25	0.21	0.21	0.21
Observations	18907	18907	18907	11736	11736	11736

Placebo Language Groups: Individual Learning (ESS)

	Importance of Creativity and New Ideas								
	All Individuals			First G Migrants			Second G Migrants		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Accumulated Env. Change	0.035	0.035	0.020	0.005	0.006	-0.012	0.056	0.052	0.012
	(0.024)	(0.024)	(0.026)	(0.025)	(0.025)	(0.026)	(0.046)	(0.050)	(0.051)
Country of Residence FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Round FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Individual Controls	No	No	Yes	No	No	Yes	No	No	Yes
Geographic Controls	No	No	Yes	No	No	Yes	No	No	Yes
Adjusted-R^2	0.04	0.04	0.07	0.02	0.02	0.06	0.03	0.03	0.05
Observations	45556	45556	45556	3592	3592	3592	5369	5369	5369

Placebo Language Groups: Cultural Adaptation (ESS)

	Level of Cultural Adaptation					
	First G Migrants			Second G Migrants		
	(1)	(2)	(3)	(4)	(5)	(6)
Accumulated Env. Change	0.006	0.004	0.005	0.009	0.007	0.005
	(0.045)	(0.044)	(0.044)	(0.008)	(0.010)	(0.009)
Country of Residence FE	Yes	Yes	Yes	Yes	Yes	Yes
Round FE	No	Yes	Yes	No	Yes	Yes
Individual Controls	No	No	Yes	No	No	Yes
Geographic Controls	No	No	Yes	No	No	Yes
Adjusted-R^2	0.11	0.12	0.13	0.05	0.05	0.05
Observations	1491	1491	1491	2760	2760	2760

Placebo Cultural Traits (ESS)

	Attitude towards					
	(1) Immigrants	(2) Leisure	(3) Strong Gov	(4) Prosperity	(5) Job Security	(6) Democracy
Accumulated Env. Change	0.023	0.015	-0.006	0.006	-0.004	-0.028
	(0.015)	(0.018)	(0.018)	(0.019)	(0.016)	(0.072)
Country of Residence FE	Yes	Yes	Yes	Yes	Yes	Yes
Round FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.12	0.11	0.11	0.10	0.07	0.15
Observations	165734	168046	167761	168728	41487	28416

Migratory Distance vs Accumulated Environmental Change

	Importance of Creativity and New Ideas					
	All Individuals		First G Migrants		Second G Migrants	
	(1)	(2)	(3)	(4)	(5)	(6)
Accumulated Env. Change		0.084***		0.044**		0.072***
		(0.012)		(0.018)		(0.026)
Migratory Distance to the Origin	0.008	-0.010	-0.002	-0.013	0.021	0.015
	(0.012)	(0.009)	(0.027)	(0.028)	(0.021)	(0.018)
Country of Residence FE	Yes	Yes	Yes	Yes	Yes	Yes
Round FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.08	0.08	0.13	0.13	0.09	0.09
Observations	168097	168097	15873	15873	11536	11536

Individual Learning: Individuals in the US (GSS)

	Preference for Individual Learning						
	Think for Oneself vs Obey					Think	Obey
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Accumulated Env. Change	0.073*	0.096**	0.096**	0.074***	0.137***	0.054***	-0.083***
	(0.041)	(0.039)	(0.039)	(0.019)	(0.039)	(0.017)	(0.028)
Region FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	No	No	Yes	Yes	Yes	Yes
Geographic Controls	No	No	No	No	Yes	Yes	Yes
Adjusted-R^2	0.00	0.01	0.01	0.15	0.15	0.11	0.14
Observations	9574	9574	9574	9574	9574	9574	9574

Migrants

Cultural Adaptation: Individuals in the US (GSS)

	Level of Cultural Adaptation						
	First G Migrants					2nd G	3rd G
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Accumulated Env. Change	-1.142***	-1.071***	-1.018***	-1.046***	-0.659***	-0.434**	-0.167*
	(0.216)	(0.207)	(0.217)	(0.208)	(0.213)	(0.162)	(0.091)
Region FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes	Yes	Yes
Geographic Controls	No	No	No	Yes	Yes	Yes	Yes
Individual Controls	No	No	No	No	Yes	Yes	Yes
Adjusted-R^2	0.05	0.06	0.11	0.12	0.17	0.23	0.23
Observations	1031	1031	1031	1031	1031	984	2628

Placebo Origin: Individual Learning (GSS)

	Preference for Thinking for Oneself vs Obedience								
	First G Migrants			Second G Migrants			Third G Migrants		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Accumulated Env. Change (Berlin)	-0.116			0.192			0.053		
	(0.194)			(0.143)			(0.067)		
Accumulated Env. Change (London)		0.167			0.107			-0.083	
		(0.163)			(0.129)			(0.075)	
Accumulated Env. Change (Lisbon)			0.096			0.073			0.034
			(0.062)			(0.070)			(0.085)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.15	0.15	0.15	0.14	0.13	0.13	0.12	0.12	0.12
Observations	1136	1136	1136	1029	1029	1029	2322	2322	2322

Placebo Origin: Cultural Adaptation (GSS)

	Level of Cultural Adaptation								
	First G Migrants			Second G Migrants			Third G Migrants		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Accumulated Env. Change (Berlin)	0.373			0.203			0.139		
	(0.226)			(0.150)			(0.088)		
Accumulated Env. Change (London)		-0.277			-0.174			0.014	
		(0.341)			(0.313)			(0.139)	
Accumulated Env. Change (Lisbon)			-0.157			-0.187*			-0.049
			(0.137)			(0.103)			(0.083)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.17	0.16	0.17	0.23	0.23	0.23	0.23	0.23	0.23
Observations	1016	1016	1016	984	984	984	2628	2628	2628

Placebo Cultural Traits (GSS)

	Attitudes towards					
	(1) Trust	(2) LTO	(3) Gender	(4) Work	(5) Succes	(6) Altrusim
Accumulated Env. Change	0.010	-0.008	0.010	-0.009	-0.014	-0.003
	(0.010)	(0.013)	(0.010)	(0.012)	(0.011)	(0.014)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.08	0.08	0.07	0.05	0.05	0.02
Observations	11219	2590	5817	9098	9098	9109

Migratory Distance vs Accumulated Environmental Change

	Preference for Thinking for Oneself vs Obedience				
	All	Migrants			
	(1)	(2) 1st-G	(3) 2nd-G	(4) 3rd-G	(5) Higher-G
Migratory Distance to the Origin	0.058	0.098	0.070	0.069	0.042
	(0.057)	(0.140)	(0.153)	(0.045)	(0.029)
Region FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.15	0.15	0.13	0.13	0.10
Observations	9574	1473	1029	2751	6708

Concluding Remarks

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  - Due to introduction of new crops in the course of Columbian exchange
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Concluding Remarks

- The evolution of propensity towards individual learning reflects an adaptation to an ancestral history of environmental change
- Environmental changes that occurred:
  - Due to migrations of ancestral population
  - Due to introduction of new crops in the course of Columbian exchange
- Have a **positive** effect on the contemporary:
  - Propensity towards individual learning
  - Migrants' ability to adapt to local culture

Related Literature

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  - Norms and preferences (Buggle and Durante 2020; Galor and Ozak 2016; Galor and Savitskiy 2020)
- Cultural adaptation and change (Giavazzi, Petkov and Schiantarelli 2019; Galor and Michalopoulos 2012, Giuliano and Nunn 2020)

Back

Individual Learning: 1st-Generation Migrants in Europe

	Importance of Creativity and New Ideas					
	(1)	(2)	(3)	(4)	(5)	(6)
Accumulated Env. Change	0.215***	0.088***	0.088***	0.069***	0.073***	0.047***
	(0.067)	(0.012)	(0.012)	(0.012)	(0.015)	(0.018)
Country of Residence FE	No	Yes	Yes	Yes	Yes	Yes
Round FE	No	No	Yes	Yes	Yes	Yes
Individual Controls	No	No	No	Yes	Yes	Yes
Geographic Controls	No	No	No	No	Yes	Yes
Country of Origin FE	No	No	No	No	No	Yes
Adjusted-R^2	0.03	0.09	0.09	0.12	0.12	0.12
Observations	18591	18591	18591	18591	18591	18591

Back

Individual Learning: 2nd-Generation Migrants in Europe

	Importance of Creativity and New Ideas					
	(1)	(2)	(3)	(4)	(5)	(6)
Accumulated Env. Change	0.187**	0.098***	0.099***	0.078***	0.063**	0.077***
	(0.074)	(0.022)	(0.021)	(0.018)	(0.027)	(0.024)
Country of Residence FE	No	Yes	Yes	Yes	Yes	Yes
Round FE	No	No	Yes	Yes	Yes	Yes
Individual Controls	No	No	No	Yes	Yes	Yes
Geographic Controls	No	No	No	No	Yes	Yes
Country of Origin FE	No	No	No	No	No	Yes
Adjusted-R^2	0.02	0.07	0.07	0.09	0.09	0.09
Observations	11536	11536	11536	11536	11536	11536

Back

Selection on Unobservables: AEC and Individual Learning

	Importance of Creativity and New Ideas					
	All		Migrants			
	(1)	(2)	(3)	(4)	(5)	(6)
			1st-G	1st-G	2nd-G	2nd-G
Accumulated Env. Change	0.14***	0.08***	0.22***	0.05***	0.19**	0.08***
	(0.05)	(0.01)	(0.07)	(0.02)	(0.07)	(0.02)
Country of Residence FE	No	Yes	No	Yes	No	Yes
Round FE	No	Yes	No	Yes	No	Yes
Individual Controls	No	Yes	No	Yes	No	Yes
Geographic Controls	No	Yes	No	Yes	No	Yes
Country of Origin FE	No	No	No	No	No	Yes
AET		2.18		1.14		3.80
δ		2.55		1.11		3.61
β^*		0.05		0.00		0.06
R^2	0.01	0.08	0.03	0.13	0.02	0.11
Adjusted-R^2	0.01	0.08	0.03	0.12	0.02	0.09
Observations	168097	168097	18591	18591	11536	11536

Back

Selection on Unobservables: AEC and Cultural Adaptation

	Level of Cultural Adaptation							
	ESS				GSS			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1st-G	1st-G	2nd-G	2nd-G	1st-G	1st-G	2nd-G	2nd-G
Accumulated Env. Change	0.04***	0.04***	0.03***	0.03***	1.14***	0.68**	0.42***	0.23***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.22)	(0.27)	(0.11)	(0.08)
Country/Region FE	No	Yes	No	Yes	No	No	No	No
Round/Year FE	No	Yes	No	Yes	No	No	No	No
Individual Controls	No	Yes	No	Yes	No	No	No	No
Geographic Controls	No	Yes	No	Yes	No	No	No	No
AET		20.00		-6.05		1.46		1.20
δ		4.47		-10.45		2.52		3.25
β^*		0.03		0.04		0.47		0.16
R^2	0.03	0.25	0.01	0.21	0.06	0.21	0.02	0.25
Adjusted-R^2	0.03	0.24	0.01	0.21	0.05	0.16	0.02	0.23
Observations	18907	18907	11736	11736	1031	1031	3612	3612

Back

Alternative Origin Hypotheses

	Importance of Creativity and New Ideas					
	(1)	(2)	(3)	(4)	(5)	(6)
Accumulated Env. Change	0.075***		0.068**		0.047**	0.056**
	(0.011)		(0.029)		(0.021)	(0.028)
Accumulated Env. Change (Anatolia)		0.079***	0.010			-0.028
		(0.019)	(0.038)			(0.052)
Accumulated Env. Change (Armenia)				0.078***	0.037	0.051
				(0.014)	(0.024)	(0.034)
Country of Residence FE	Yes	Yes	Yes	Yes	Yes	Yes
Round FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.08	0.08	0.08	0.08	0.08	0.08
Observations	168097	168097	168097	168097	168097	168097

Back

Alternative Proxies for Individual Learning

	Important to:					
	Try Different Things		Make Own Decisions		Follow Rules	
	(1) All	(2) Migrants	(3) All	(4) Migrants	(5) All	(6) Migrants
Accumulated Env. Change	0.059***	0.042**	0.050***	0.048***	-0.073***	-0.055***
	(0.015)	(0.019)	(0.009)	(0.010)	(0.018)	(0.016)
Country of Residence FE	Yes	Yes	Yes	Yes	Yes	Yes
Round FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.06	0.06	0.06	0.05	0.07	0.06
Observations	168383	30109	168611	30138	167583	29978

Back

Individual Learning: Migrants in the US

	Preference for Thinking for Oneself vs Obedience				
	All	Migrants			
	(1)	(2) 1st-G	(3) 2nd-G	(4) 3rd-G	(5) Higher-G
Accumulated Env. Change	0.137***	0.289*	0.259**	0.171**	0.046*
	(0.039)	(0.154)	(0.116)	(0.067)	(0.024)
Region FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.15	0.14	0.14	0.13	0.11
Observations	9574	1473	1029	2751	4658

Back

Empirical Strategy

- Exploit a random assignment of potential change in the environment in the post 1500 era (based on the potential changes in the crop-specific productivity)

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Empirical Strategy

- Exploit a random assignment of potential change in the environment in the post 1500 era (based on the potential changes in the crop-specific productivity)
  - Mitigating concerns about the selective migration of individual with higher predisposition towards individual learning
  - Mitigating concerns about the confounding effects of unobservables geographical factors in the parental county of origin
  - Disentangling the importance of changes in the agricultural productivity in the post-1500 period

Empirical Model: Individuals

The linear effect of accumulated environmental change on predisposition towards individual learning across individuals

$$\begin{aligned} IL_{ilct} = & \beta_0 + \beta_1 AEC_l + \sum_c \gamma_c \delta_{ic} \\ & + \sum_j \gamma_{0j} X_{lj} + \sum_j \gamma_{2j} Z_{ij} + \sum_t \gamma_t \delta''_{it} + \epsilon_i \end{aligned} \tag{1}$$

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Empirical Model: Migrants

The linear effect of accumulated environmental change on predisposition towards individual learning across migrants

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- $\delta_{ic} \equiv$ host country fixed effects for individual i in country c
- $\delta_{ip} \equiv$ country of origin fixed effects for migrant i from country p

Back