

# **Economic History**

*(Master PPD & APE, Paris School of Economics)*

Thomas Piketty

Academic year 2016-2017

## **Lecture 6: Historical demography, family structures and the population transition**

*(check [on line](#) for updated versions)*

# Roadmap of lecture 6

- [Basic facts about demographic transition](#)
- [The race between fertility and mortality](#)
- [The early French demographic transition](#)
- [Explaining the demographic transition](#)
- [Malthusianism vs anti-Malthusianism](#)
- [Living standards and population growth](#)
- [Family structures and development](#)
- [Family vs gouvernement](#)
- [Gender inequality in historical perspective](#)

# Basic facts about demographic transition

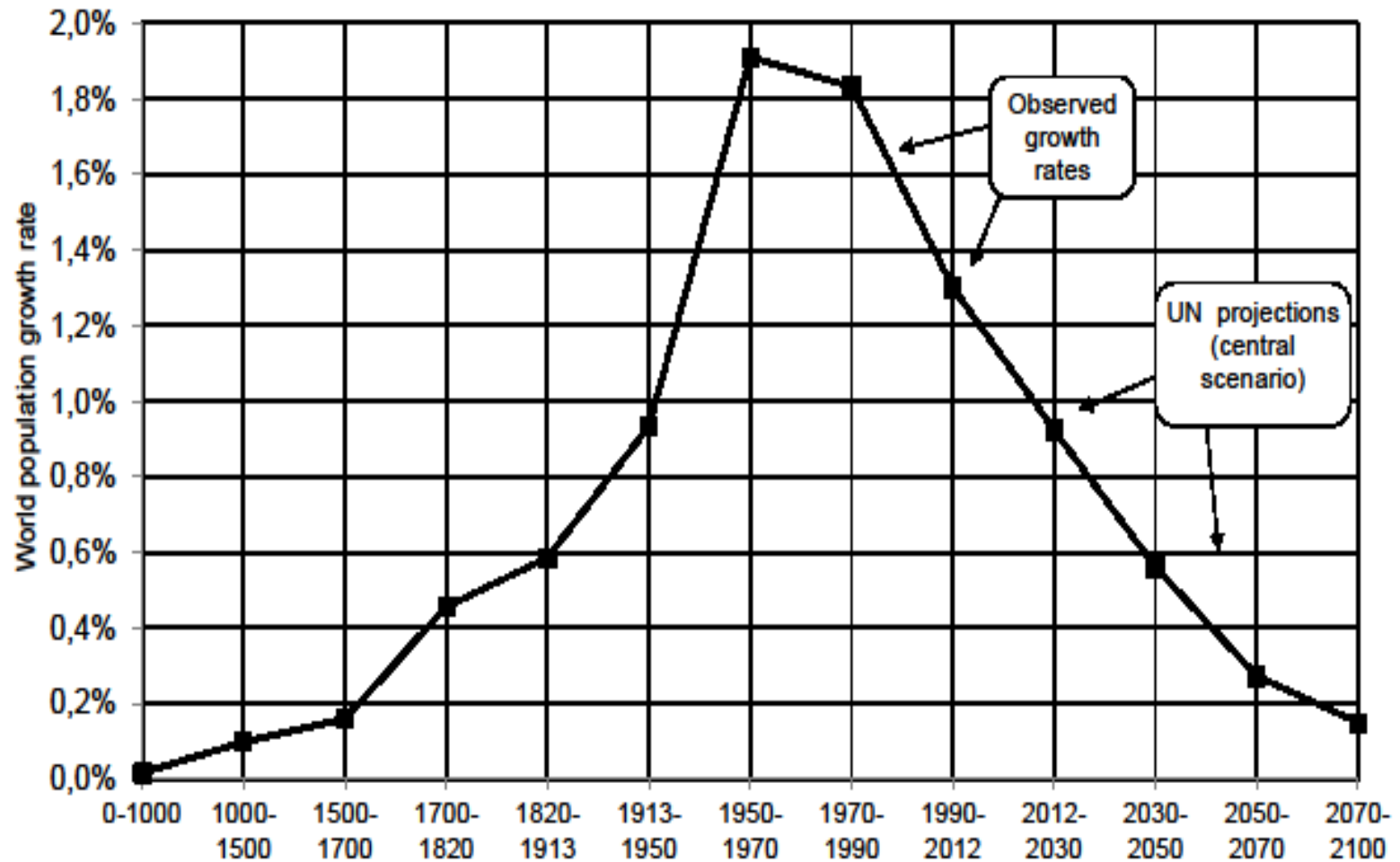
- Demographic transition: moving from a low-growth regime to a high-growth regime and finally back to a low-growth regime
- Stage 1: high fertility, high mortality  $\rightarrow n=f-m\approx 0$
- Stage 2: high fertility, low mortality  $\rightarrow n=f-m$  high
- Stage 3: low fertility, low mortality  $\rightarrow n=f-m\approx 0$
- **At the world level,  $n\approx 0.1\%$  over 0-1700,  $n\approx 0.8\%$  over 1700-2050, back to  $n\approx 0.1-0.2\%$  by 2050-2100** (according to UN projections)

**( $n$  = population growth rate = fertility rate  $f$  - mortality rate  $m$ )**

(GDP growth  $g$  = population growth  $n$  + productivity growth  $h$ )

- Income elasticity of fertility used to be  $>0$  ; now  $\approx 0$  or  $<0$   
(true in time-series, between-country & within-country)
- What are the causes & consequences of the demographic transition, & how does it vary across countries?
- **Peak population growth occurred in 20<sup>c</sup> for the world, 19<sup>c</sup> for Europe & America, 20<sup>c</sup> for Asia, and 20<sup>c</sup>-21<sup>c</sup> for Africa**

**Figure 2.2. The growth rate of world population from Antiquity to 2100**



The growth rate of world population was above 1% per year from 1950 to 2012 and should return toward 0% by the end of the 21st century. Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

**Table 2.3: Demographic growth since the industrial revolution**

Average annual growth rate	World population	Europe	America	Africa	Asia
0-1700	0,1%	0,1%	0,0%	0,1%	0,1%
1700-2012	0,8%	0,6%	1,4%	0,9%	0,8%
incl: 1700-1820	0,4%	0,5%	0,7%	0,2%	0,5%
1820-1913	0,6%	0,8%	1,9%	0,6%	0,4%
1913-2012	1,4%	0,4%	1,7%	2,2%	1,5%
<i>Projections 2012-2050</i>	<b>0,7%</b>	-0,1%	0,6%	1,9%	0,5%
<i>Projections 2050-2100</i>	<b>0,2%</b>	-0,1%	0,0%	1,0%	-0,2%

Between 1913 and 2012, the growth rate of world population was 1.4% per year, including 0.4% for Europe, 1.7% for America, etc.

Sources: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c). Projections for 2012-2100 correspond to the UN central scenario.

- **Stage 1 (0-1700).** Small & chaotic pop growth, but positive.  $n=0.1\%$ , so that world population rose from  $\approx 210$  millions in year 0 to  $\approx 250$ m in 1000,  $\approx 450$ m in 1500,  $\approx 600$ m in 1700.
- Not a Malthusian stagnation: world population tripled between 0 and 1700 = huge expansion of arable land, deforestation, etc.
- But without much improvement in living standards:  $h=0\%$  over 0-1700 period
- More precisely:  $n=0.06\%$  vs  $h=0.02\%$  over 0-1700 (Maddison)
- $1.0006^{1700} = 2.8$  vs  $1.0002^{1700} = 1.3$
- I.e. population was multiplied by 2.8 (from 210m to 600m), while average living standards only increased by 30% = almost the same average living standards at the time of the Roman Empire and at the beginning of the 18<sup>th</sup> century
- **Small differences in growth rates matter a lot when they persist over centuries**

**Table 2.1: World growth since the industrial revolution**

Average annual growth rate	World output	World population	Per capita output
0-1700	<b>0,1%</b>	0,1%	0,0%
1700-2012	<b>1,6%</b>	0,8%	0,8%
<i>incl.: 1700-1820</i>	<b>0,5%</b>	0,4%	0,1%
<i>1820-1913</i>	<b>1,5%</b>	0,6%	0,9%
<i>1913-2012</i>	<b>3,0%</b>	1,4%	1,6%

Between 1913 and 2012, the growth rate of world GDP was 3,0% per year on average. This growth rate can be broken down between 1,4% for world population and 1,6% for per capita GDP.

Sources: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

**Table S2.1: World growth from the Antiquity (growth rate per period)**

Average annual growth rate	World output	World population	Per capita output
0-1700	0.07%	0.06%	0.02%
<i>dont: 0-1000</i>	0.01%	0.02%	0.00%
1000-1500	0.14%	0.10%	0.04%
1500-1700	0.20%	0.16%	0.04%
1700-2012	1.60%	0.79%	0.81%
<i>incl.: 1700-1820</i>	0.53%	0.46%	0.07%
1820-1913	1.46%	0.56%	0.90%
1913-2012	3.04%	1.39%	1.62%
Projections 2012-2050	X	0.73%	X
Projections 2050-2100	X	0.17%	X

Between 1913 and 2012, the growth rate of world GDP was 3.0% per year on average. This growth rate can be broken down between 1.4% for world population and 1.6% for per capita GDP.

Sources: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c). Projections for 2012-2100 correspond to the UN central scenario.



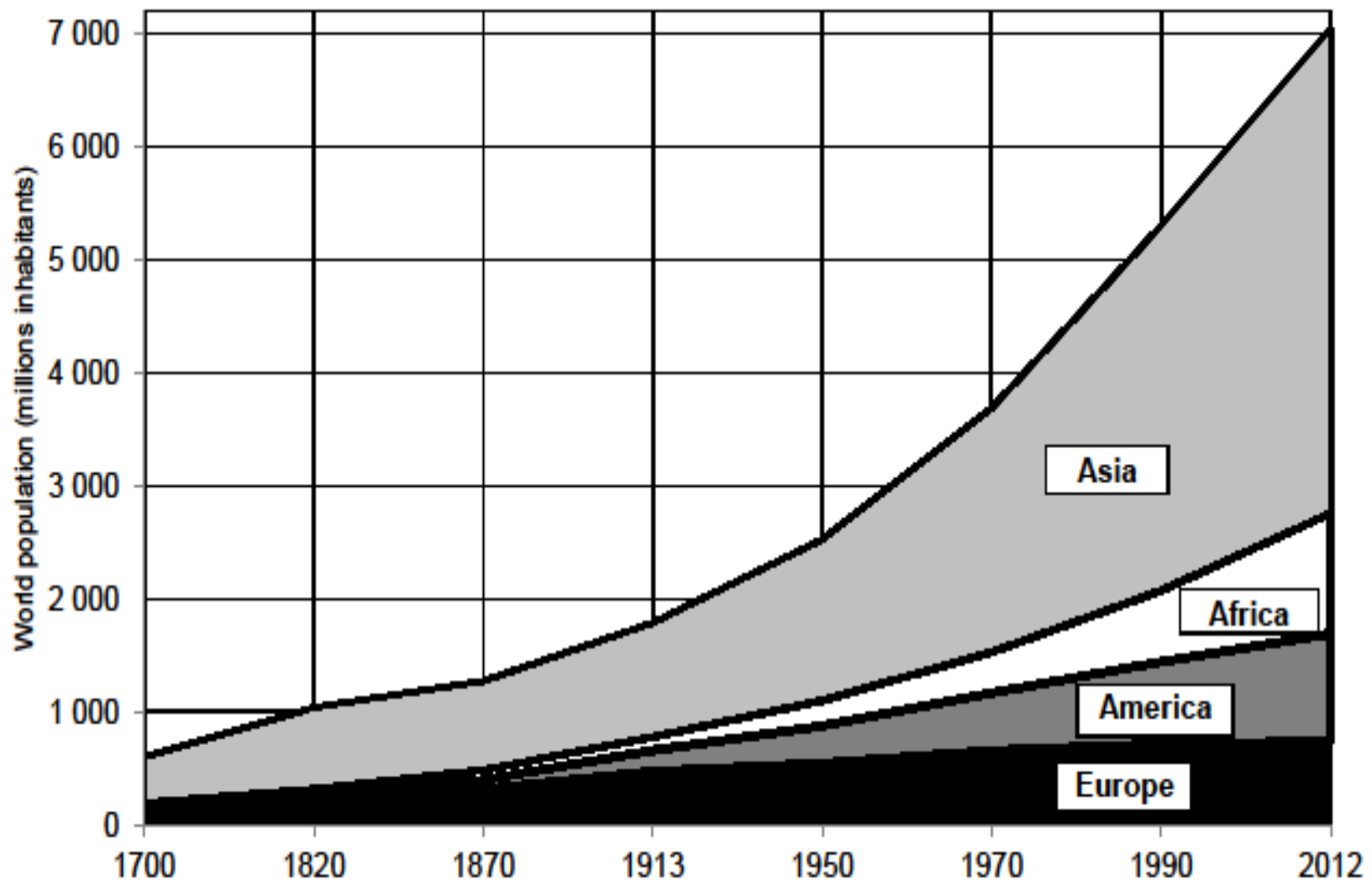
- **Stage 2 (1700-2050).  $n=0.8\%$**  = very large population growth. World population rose from 600m in 1700 to 7b in 2012 & nearly 10b by 2050 (UN projections).
- The simple (but important) arithmetics of cumulative population growth:
- **$n=0.5\%$** : pop multiplied by 1.16 every 30 years ( $1.005^{30}=1.16$ ) (i.e. **fertility = 2,32** children/woman) (assuming generation length = 30y & stable life expectancy), & multiplied by 4.5 every 300 years
- **$n=1\%$** : pop multiplied by 1.35 every 30 years (**fertility=2,70**), & by 20 every 300 years
- **$n=2\%$** : pop multiplied by 1.81 every 30 years (**fertility=3,62**), & by 380 every 300 years
- **Small differences in (surviving) fertility rates have an enormous impact on long run size of countries**

**Table 2.2. The law of cumulated growth**

<b>An annual growth rate equal to...</b>	<b>.. is equivalent to a generational growth rate (30 years) of...</b>	<b>...i.e. a multiplication by a coefficient equal to...</b>	<b>...and a multiplication after 100 years by a coefficient equal to...</b>	<b>...and a multiplication after 1000 years by a coefficient equal to...</b>
0,1%	3%	1,03	1,11	2,72
0,2%	6%	1,06	1,22	7,37
0,5%	16%	1,16	1,65	147
1,0%	35%	1,35	2,70	20 959
1,5%	56%	1,56	4,43	2 924 437
2,0%	81%	1,81	7,24	398 264 652
2,5%	110%	2,10	11,8	52 949 930 179
3,5%	181%	2,81	31,2	...
5,0%	332%	4,32	131,5	...

An annual growth rate of 1% is equivalent to an annual growth rate of 35% per generation (30 years), a multiplication by 2,7 every 100 years, and by over 20 000 every 1000 years.

**Figure 2.1. The growth of world population 1700-2012**



World population rose from 600 millions inhabitants in 1700 to 7 billions in 2012.

Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

- **Stage 3 (2050-2100).  $n=0.2\%$ .** But with large variations:  $<0$  in Europe-Asia,  $>>0$  in Africa
- With a population growth rate around 1,5%, Africa will multiply its size by about 4 during 21<sup>c</sup>, from 1b to 4b; rest of the world will growth at 0% (or  $<0$ ), so that world pop will go from 7b to 11b, almost entirely due to Africa (UN projections)
- Concrete country exemples: France & Germany will remain approximately stable around 60-80m between 2015 and 2100, while Egypt will go from 90m to 200m, & Niger from 20m to 200m ( $n>2\%$ )

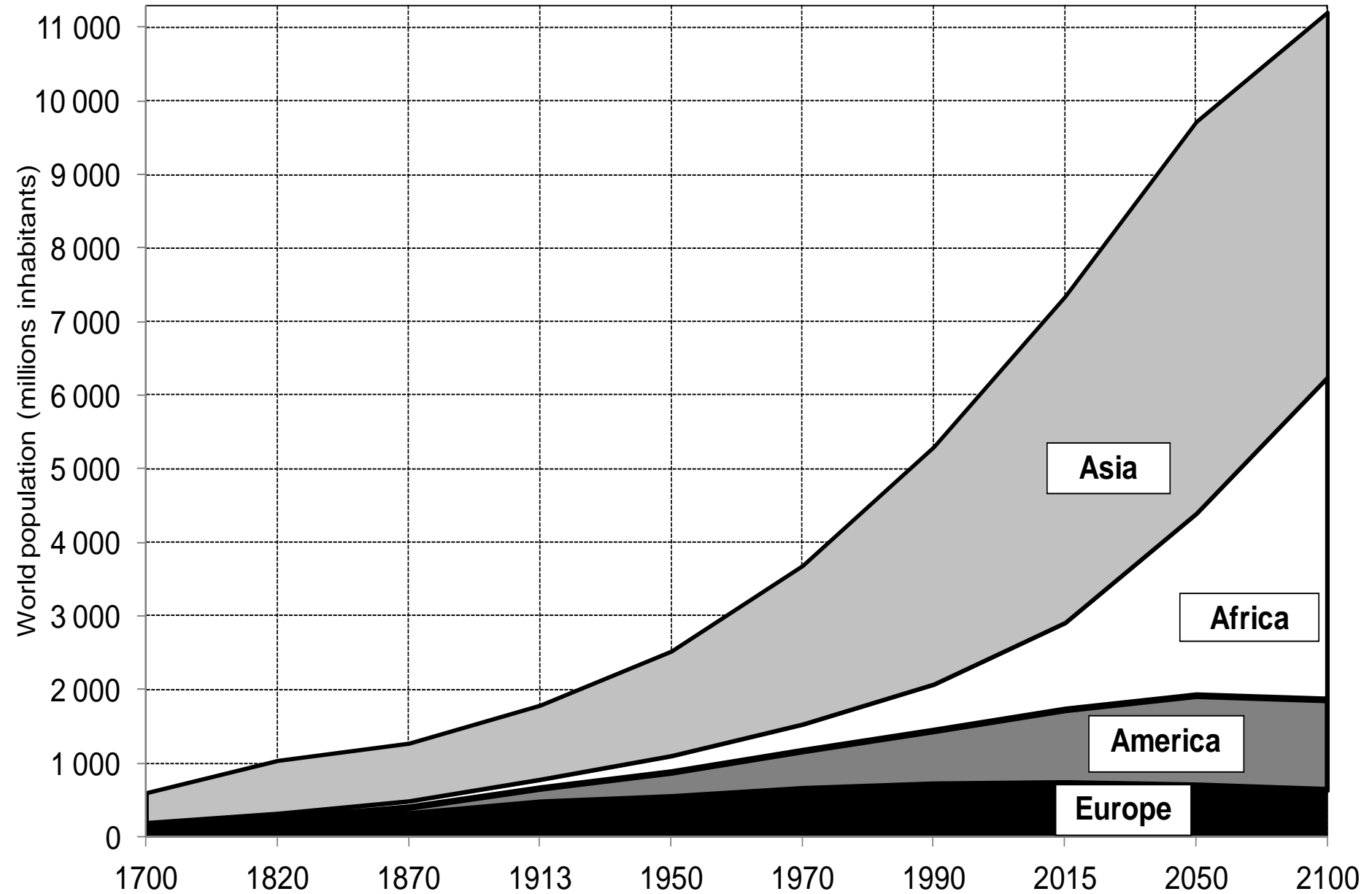
**Table 2.3: Demographic growth since the industrial revolution**

Average annual growth rate	World population	Europe	America	Africa	Asia
0-1700	0,1%	0,1%	0,0%	0,1%	0,1%
1700-2012	0,8%	0,6%	1,4%	0,9%	0,8%
incl: 1700-1820	0,4%	0,5%	0,7%	0,2%	0,5%
1820-1913	0,6%	0,8%	1,9%	0,6%	0,4%
1913-2012	1,4%	0,4%	1,7%	2,2%	1,5%
<i>Projections 2012-2050</i>	<b>0,7%</b>	-0,1%	0,6%	1,9%	0,5%
<i>Projections 2050-2100</i>	<b>0,2%</b>	-0,1%	0,0%	1,0%	-0,2%

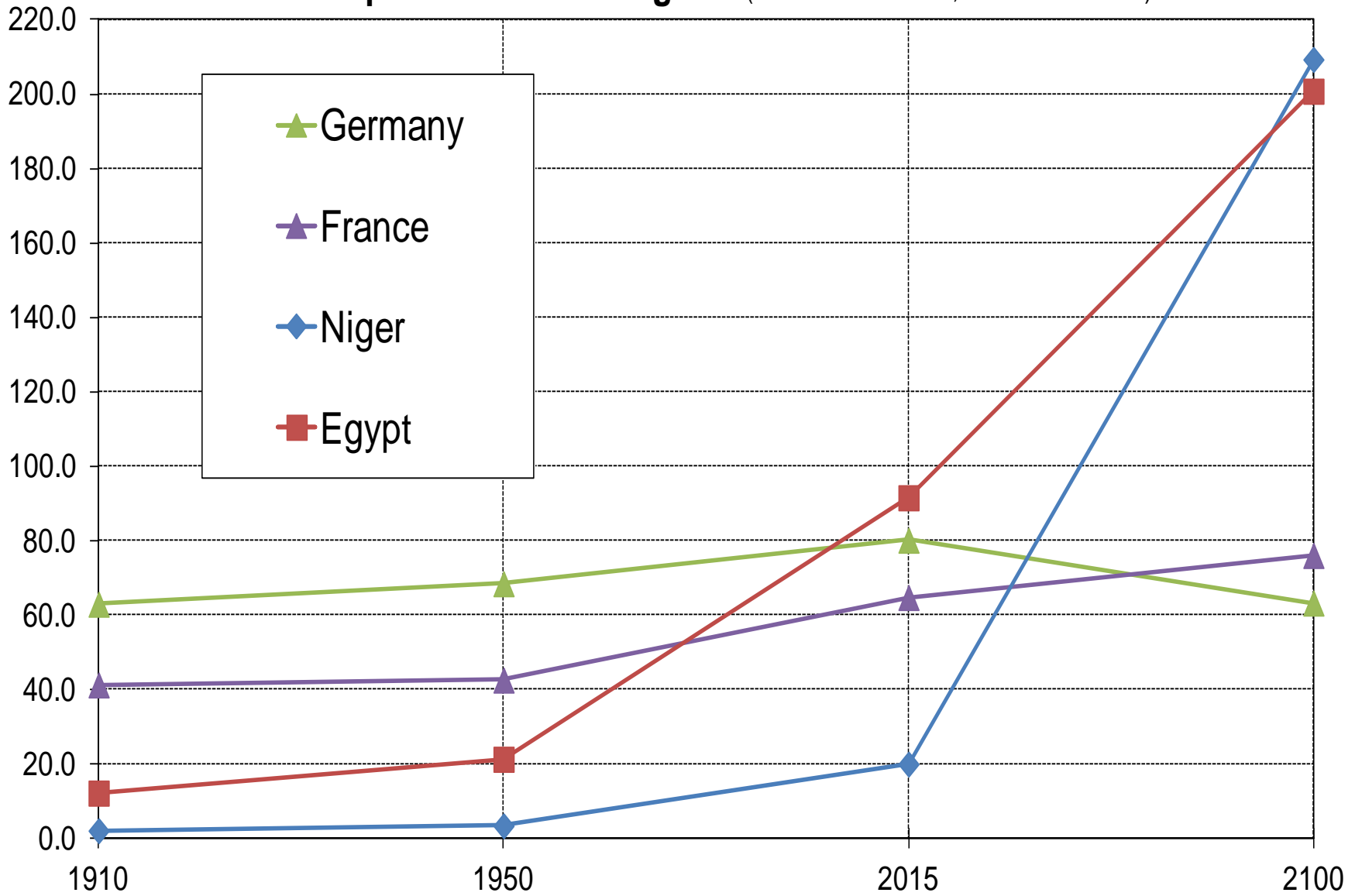
Between 1913 and 2012, the growth rate of world population was 1.4% per year, including 0.4% for Europe, 1.7% for America, etc.

Sources: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c). Projections for 2012-2100 correspond to the UN central scenario.

# The growth of world population 1700-2100



**Population in the long run** (millions inhabitants, current territories)



# The race between fertility & mortality

- Basic demographic equation:  $N_{t+1} = N_t + B_t - D_t + NM_t$

With  $N_{t+1}$  = population at time t+1

$N_t$  = population at time t

$B_t$  = number of births between time t and t+1

$D_t$  = number of deaths between time t and t+1

$NM_t$  = net migrant inflow between time t and t+1

$$\rightarrow \quad \mathbf{n_t = f_t - m_t + x_t}$$

With  $n_t = (N_{t+1} - N_t) / N_t$  = population growth rate  
between time t and t+1

$f_t = B_t / N_t$  = fertility rate

$m_t = D_t / N_t$  = mortality rate

$x_t = NM_t / N_t$  = net migration rate



- **France 2000-2015.** Population  $N_t$  rises from 60 million to 65m, i.e. 5m rise in 15y,  $\approx 0.35\text{m/y} \rightarrow n \approx \mathbf{0.55\%}$  (0.35/60)
- Births  $\approx 0.8\text{m/y} \rightarrow f \approx \mathbf{1.3\%}$  (0.8/60m)
- Deaths  $\approx 0.55\text{m/y} \rightarrow m \approx \mathbf{0.9\%}$  (0.55/60m)
- Net migrants  $\approx 0.1\text{m/y} \rightarrow m \approx \mathbf{0.15\%}$  (0.55/60m)
  
- **Germany 2000-2015.** Population  $N_t$  drops from 82 million to 81m, i.e. 1m drop in 15y,  $\approx 0.05\text{m/y} \rightarrow n \approx \mathbf{-0.1\%}$  (0.05/82m)
- Births  $\approx 0.65\text{m/y} \rightarrow f \approx \mathbf{0.8\%}$  (0.65/82m)
- Deaths  $\approx 0.9\text{m/y} \rightarrow m \approx \mathbf{1.1\%}$  (0.9/82m)
- Net migrants  $\approx 0.2\text{m/y} \rightarrow m \approx \mathbf{0.2\%}$  (0.2/82m)
  
- For 1950-2015 series (& 2015-2100 projections) for all world countries on population, fertility, mortality and migrations, see [UN World Population Projections 2015](#)

- Prior to 1950: we do not have complete fertility and mortality series by age group for all countries = research in historical demography largely consists of collecting such data (archived in Etat-Civil, parishes, etc.) and explaining observed trends; we still know very little in this area
- [Maddison historical series](#): total pop. for each country since year 0, but no fertility/mortality/age decomposition
- See Guinnane, "The Historical Fertility Transition", [JEL 2011](#), for long-run series on fertility and mortality for Europe & the US and analysis of the different explanations
- **Basic orders of magnitude: fertility & mortality rates used to be very high until 18<sup>c</sup>-19<sup>c</sup> (as high as 4%-5%, i.e. 40-50 per thousand) and are now much smaller (as low as 1%-1.5%, 10-15 per thousand)**

(Note: with stationary population & everybody dying at age 100, mortality = fertility = 1% per year; if everybody dies at age 50,  $m=f=2\%$ ; with growing population & cohort size,  $m < 1/H < f$ , with  $H$ =life expectancy)

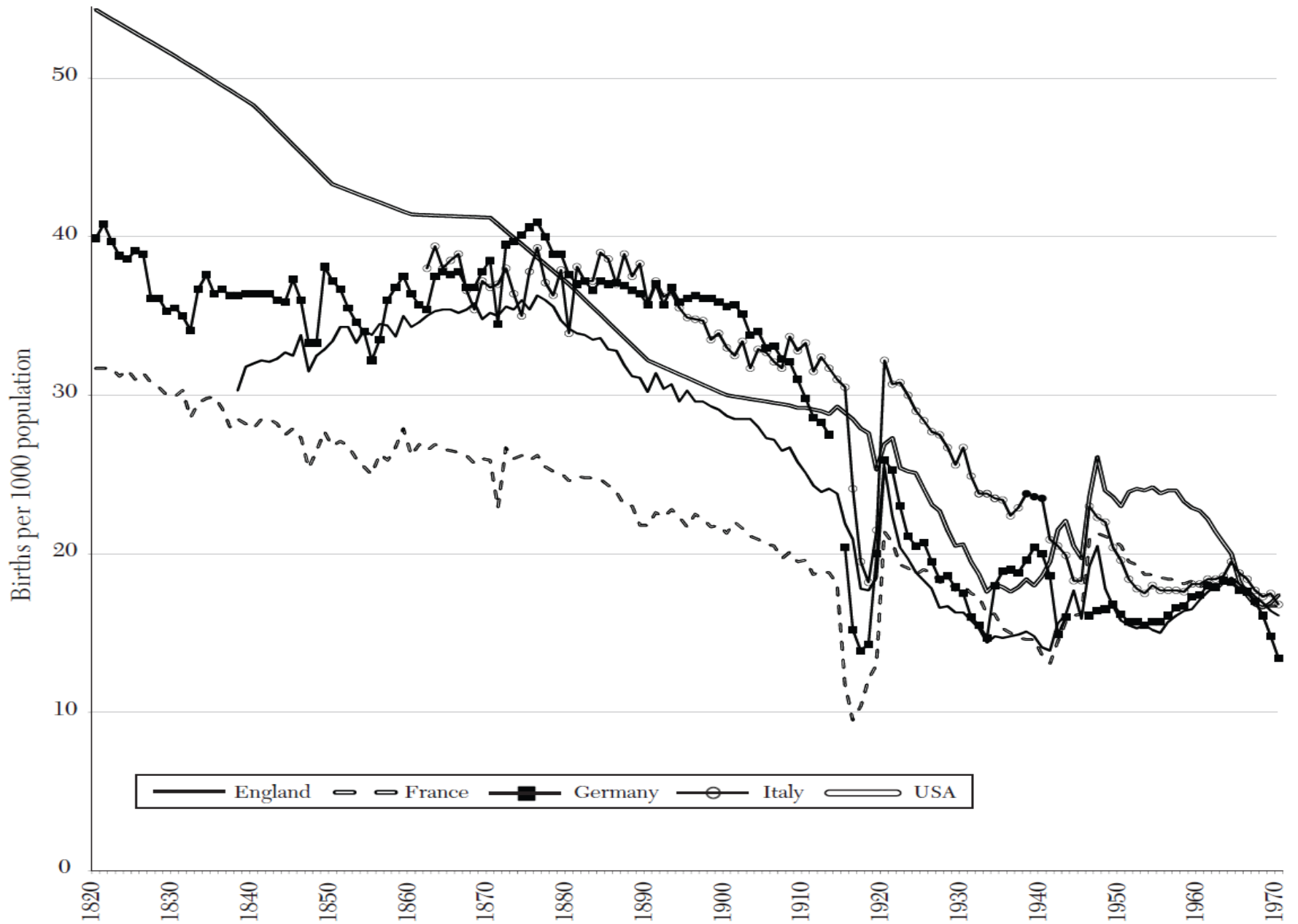


Figure 1. Crude Birth Rates, Selected Countries, 1820–1970

- Basic fact: general decline of crude fertility rate from 4%-5% to 1%-1.5% over the course of 19c-20c in every developed country
- But there are important differences and reversals:
- France: much lower fertility during late 18<sup>c</sup>-19<sup>c</sup>-early 20<sup>c</sup> than every other country in Europe and North America; rebound of French fertility after mid-20<sup>c</sup> (today one of the highest in Europe)
- US: very high fertility in 1800-1850, then sharp decline, so that f below most of Europe in 1900; rebound after mid-20c

- Crude fertility rate (or crude birth rate) ( $=B_t/N_t$ )  
(=number of births/total pop)
- $\neq$  Cohort fertility rate (CFR) (=average number of births for all women belonging to given cohort)
- Cohort fertility rate is more data demanding (one needs to know to follow entire cohorts, or to observe mother age for all births), but it is also more informative
- Cohort fertility rate declined from 4-5 in 19<sup>c</sup> to 2-2.5 after mid-20<sup>c</sup> (or below 2 today: 1-1.5 in Germany-Italy-Japan etc.; see [here](#))
- Cohort fertility rate in 19c France fell to about 2.5-3 in 19<sup>c</sup>, much below all other countries

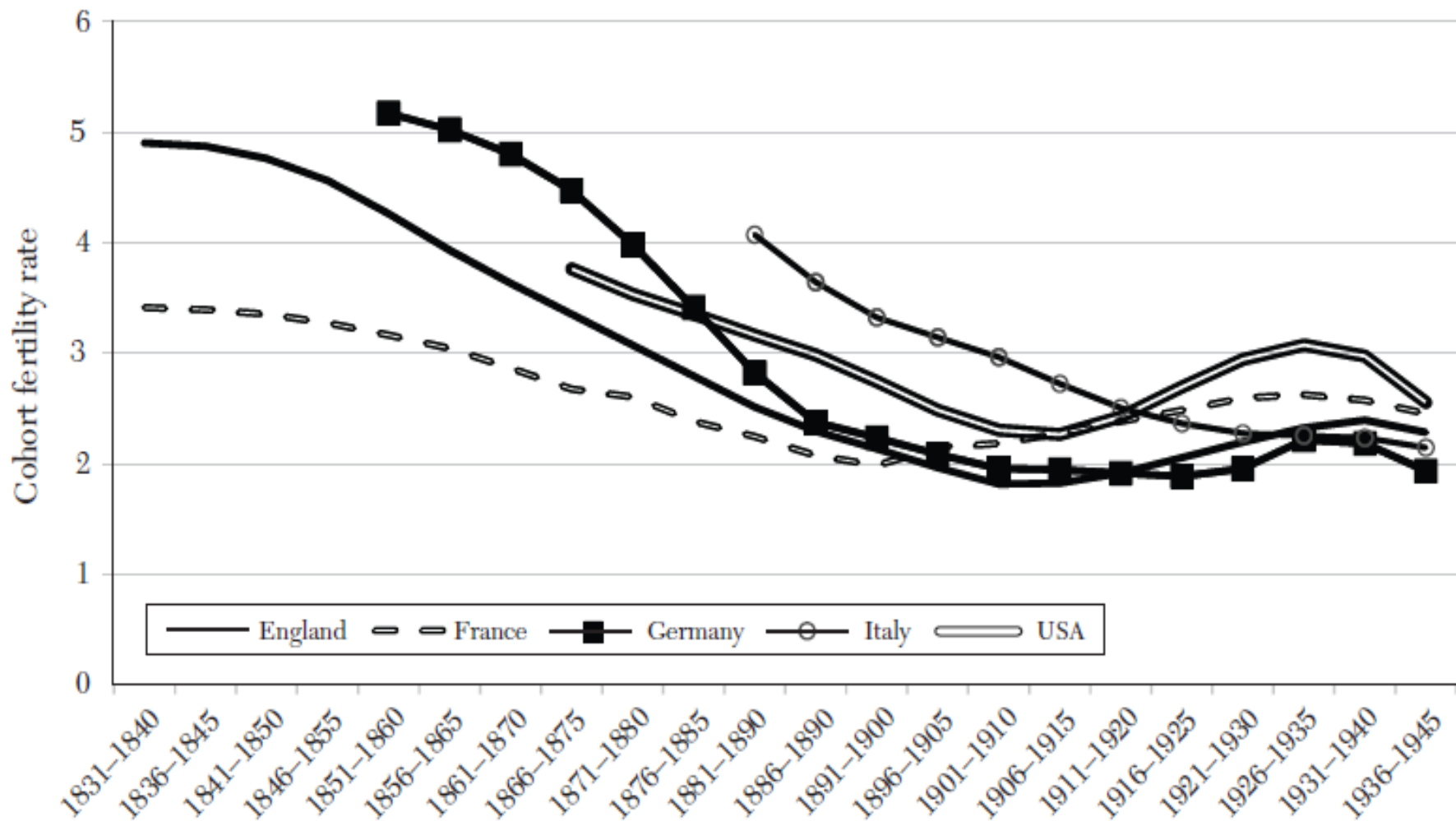


Figure 3. Cohort Fertility Rates, 1831–1945

Notes: The cohort fertility rate is the mean number of children born to women belonging to the birth cohorts on the horizontal axis. The overlapping years are in the source. The precise birth cohorts vary slightly across countries.

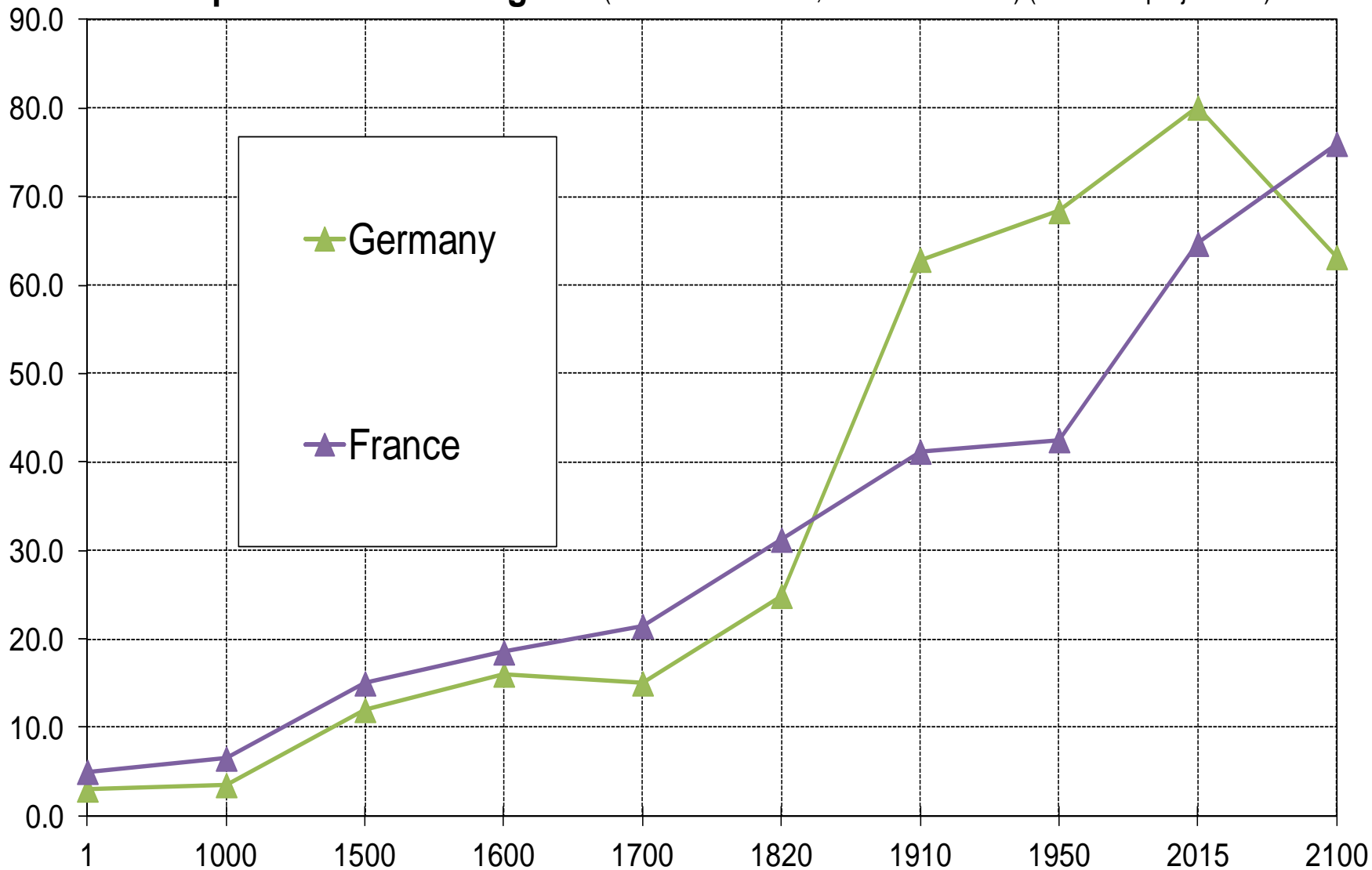
- The concrete consequences of the race between fertility and mortality: small differences in adjustment speed make a very large difference
- Germany 19c-early 20c: fertility around 3.5%-4%, mortality around 2.5% → population growth rate around 1-1.5%, pop multiplied by almost 3 in less than a century: 25m in 1820, 63m in 1910  
(vs France: 31m in 1820, 41m in 1910, 42m in 1950)  
→ complete reversal in balance of power in Europe during 19<sup>c</sup>-early 20<sup>c</sup>, with dramatic consequences



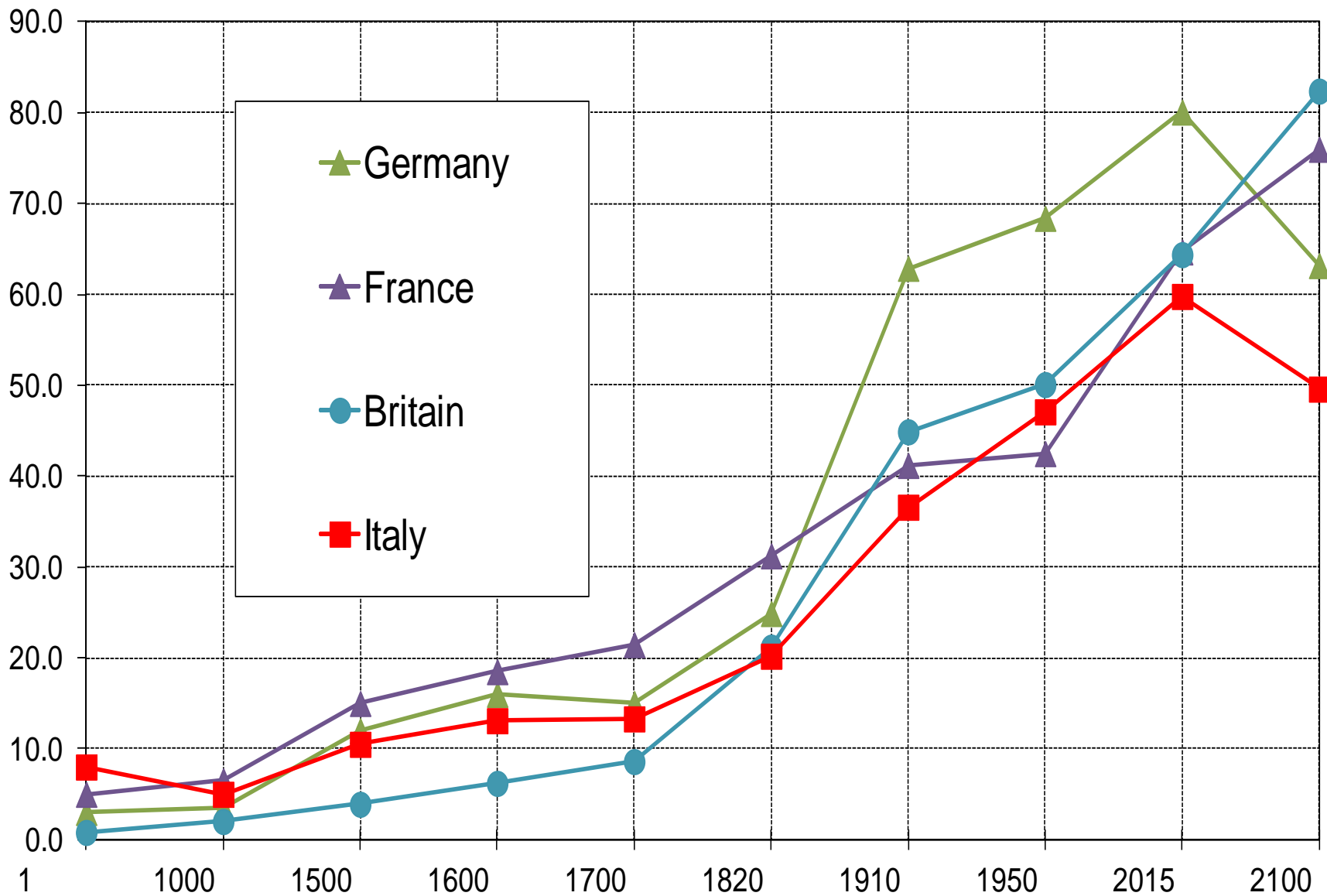
*Figure 2. Fertility and Mortality in Germany  
(Number of events per thousand population)*



**Population in the long run** (millions inhabitants, current territories) (2100: UN projections)



**Population in the long run** (millions inhabitants, current territories)



# The early French demographic transition

- During 18<sup>c</sup>, France was by far the most populous country in Europe; it inspired Malthus' dark predictions about population growth and poverty (via Young' s travel diaries & fear of French Revolution)
- Starting in the late 18<sup>c</sup> and during the entire 19<sup>c</sup>, France then became the **first birth-controlled country in the world, with declining fertility as early as 1750-1780**
- See Goubert, “Historical Demography and the Reinterpretation of Early Modern French History: A Research Review”, [JIH 1970](#)
- One possible explanation: France also seems to be the first country with **decline of religious beliefs and practice**  
→ **rise of natural contraception and birth control**
- On the impact of secularization at the level of départements (decline in fertility vs proportion of priests swearing oath of allegiance to the Revolution in 1791 ), see Murphy « Old Habits Die Hard (Sometimes): What Can Department Heterogeneity Tell Us About the French Fertility Decline? », [JEG 2015](#)

- **Other explanations.** French revolution & Civil Code 1802 instituted equal sharing of inheritance among siblings (*quotité disponible* =  $1/n+1$ : 50% if one kid, 33% if two kids, 25% if three kids or more) → reduction in fertility in order to avoid fragmentation of land and property (major theme in 19c historical demography: Le Play, declining fertility & paternal authority, etc.)
  - Post revolution Malthusian trauma: the French experienced the negative consequences of excessive population on wages and revolutionary chaos & reacted by reducing fertility during 19<sup>c</sup>
  - OK, except that declining fertility started in 1750-1780
  - After WW1-WW2 military shocks, new national trauma: family policies (child benefits, kindergarden, tax incentives & penalties,..) in order to become more populated than Germany once again: according to UN, this should be done by 2060
- **Demographic history is always a mixture of intimate psychological decisions & national histories and identities** (Japan/Germany after WW2, ex-communist countries today: much lower fertility than France/US/UK/Sweden; differentials are very large and difficult to explain just on the basis of different economic incentives and family policies)

# Explaining the demographic transition

One can think of different possible factors:

- 1. Exogenous decline in mortality
- 2. Innovations in contraceptive technology
- 3. Rising direct costs of childbearing
- 4. Rising opportunity costs of childbearing
- 5. Rising returns to child quality (quantity-quality trade-off)
- 6. Rise of other forms of old-age support (state, finance)

See Guinnane, "The Historical Fertility Transition", [JEL 2011](#)

→ **General conclusion: one needs to combine many social & cultural factors (all of these six factors, and others) to explain the diversity of national trajectories with respect to the evolution of fertility behavior**

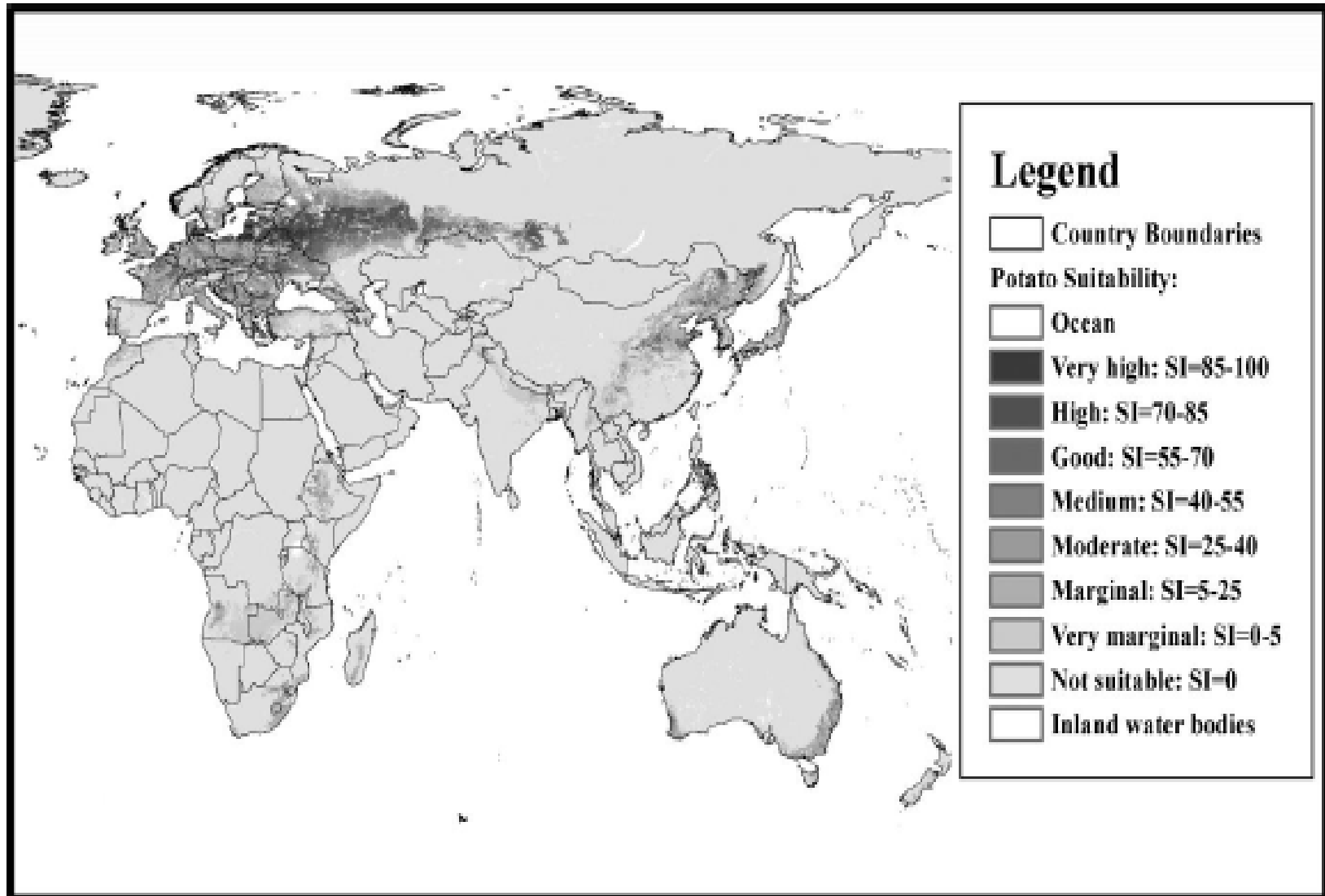
- 18<sup>c</sup>-19<sup>c</sup>: early fertility decline France & US ≠ other countries
- late 20<sup>c</sup>-early 21<sup>c</sup>: falling fertility below replacement levels in Germany, Japan, Italy, etc., ≠ US, UK, France, Sweden, etc.

- **1. Exogenous decline in mortality**

- I.e. mortality gradually declined due to better living conditions, hygiene, etc., & it took time for parents to adapt their fertility
- Huge decline in infant & child mortality during 18<sup>c</sup>-19<sup>c</sup> (& then in old-age mortality during 20<sup>c</sup>)
  - Exogenous decline in mortality not only involved better hygiene & medical care, but also new technologies which allowed to feed and sustain a larger population on given land
  - Braudel: rice agriculture + lower taste for meat → much higher population density in China than Europe for centuries
  - Nunn-Qian « The Potato's Contribution to Population and Urbanization », [QJE 2011](#)
  - Potatoes: much higher yield in joules/acre than wheat and other crops; but depends a lot on soil and climate → one can exploit local variations to identify impact on pop growth
  - Conclusion: « discovery » of potatoe in America & transfer to Europe can explain at least 25% of Europe's population growth and urbanization between 1700 and 1900

TABLE I  
 AVERAGE CROP YIELDS OF ENGLISH FARMS IN THE EIGHTEENTH CENTURY

	Average yield per acre		Energy value of crop	Acres of land needed to provide 42 megajoules per day for one year
	Bushels	Kilograms	Megajoules	
Wheat	23	650	8,900	1.70
Barley	32	820	11,400	1.40
Oats	38	690	9,300	1.60
Potatoes	427	10,900	31,900	0.50



**FIGURE II**  
Average Potato Suitability in the Old World



- Exogenous decline in mortality is certainly a very important part of the explanation for demographic transition
- But: (i) One still needs a theory of fertility behavior: what is the desired number of children?
- (ii) Decline in fertility sometime played leading role. E.g. in the US, strong decline in fertility in early 19<sup>c</sup>, in spite of the fact that declining child mortality occurred mostly after 1850 (Guinnane):  
 US women born 1850: life expectancy = 39.8y at birth, vs 55.8y if they survive at age 5, & 59.8y if they survive at age 20  
 US women born 1910: life expectancy = 54.7y at birth, vs 57.4y if they survive at age 5, & 60.7y if they survive at age 20
- In the long run, however, declining mortality started before major changes in fertility behavior & seems to play key role
- **Global demographic history 0-2000 involves a joint mortality-fertility adjustment process, together with complex cultural and country-specific factors. Small differences in adjustment speed for either mortality or fertility matter a lot.**

- **2. Innovations in contraceptive technology**

- There was no modern contraceptive technology before late 19<sup>c</sup>-early 20<sup>c</sup>, and fertility decline started much before: late 18<sup>c</sup> for France, early 19<sup>c</sup> for US → traditional withdrawal techniques (or abstinence) are sufficient to adjust fertility behavior; modern techniques do not play a central role before mid 20<sup>c</sup>
- Without such traditional techniques, historical fertility should have been much higher for centuries: 9 births per couple if 5 sexual intercourse every 24-day-cycle & no withdrawal (>5-6 births per couple in traditional societies)
- Some demographers today recommend to expand access to contraceptive methods in order to reduce fertility in Africa
- But this does not seem to be the way the historical fertility transition took place. It took place when parents decided to have fewer children. Contraception is very useful, but mostly for other reasons (welfare, HIV); maybe not to reduce fertility.

- **3. Rising direct costs of childbearing.** I.e. rising relative price of child-related goods and services. Main possibility: rising relative price of land & housing due to urbanization → more costly to have many children. This was used to explain fertility decline in US 1800-1850 (rising land prices). See [Guinnane 2011](#). Could also contribute to explain higher US fertility today (housing prices are higher in Europe). But this can only be part of the story (Germany etc.).
- **4. Rising indirect costs of childbearing.** I.e. rising wages & outside options, so that parents (particularly women) choose to « consume » fewer children & devote their time to other uses
- See Voigtlander-Voth « How the West 'Invented' Fertility Restriction », [AER 2013](#) : Black Death 14<sup>c</sup> → land abundance, shift from grain to livestock agriculture → more employment prospects for women (pastoral work) → later marriage, lower fertility

(identification exploiting local variations in share of pastoral land in 14<sup>c</sup> England and their impact on celibacy)

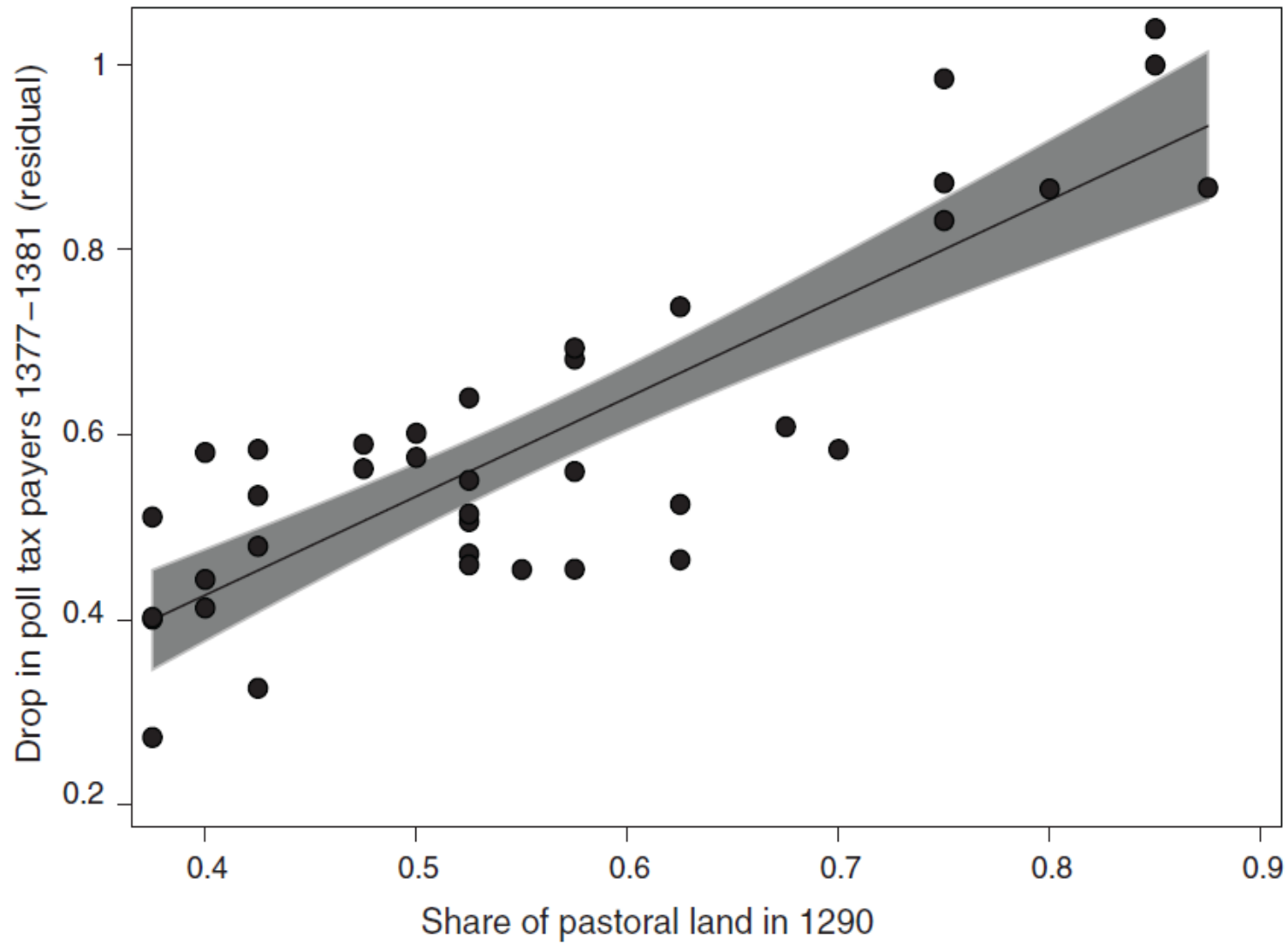
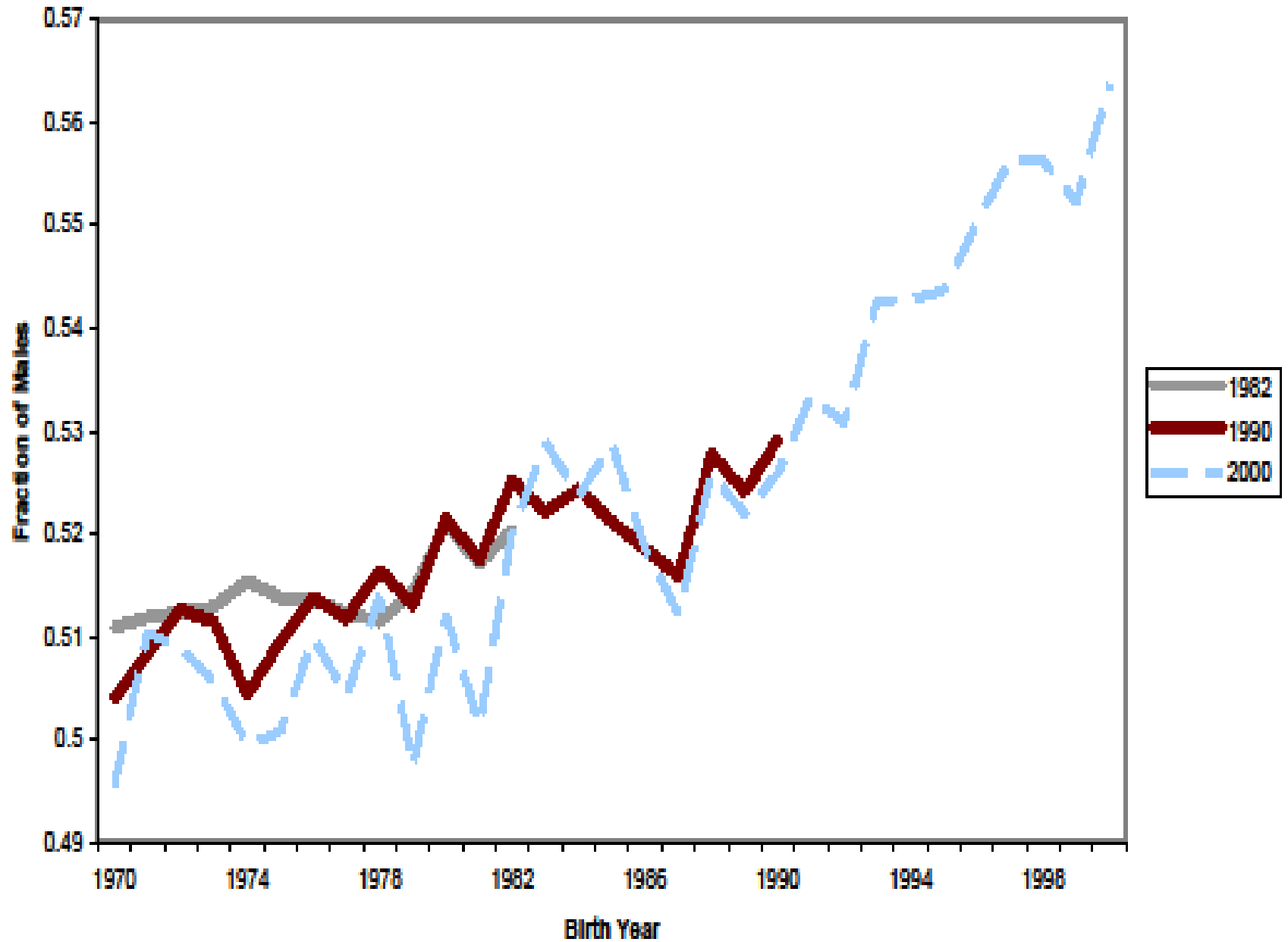


FIGURE 6. CELIBACY AND PASTORAL PRODUCTION: EVIDENCE FROM THE 1381 POLL TAX (*Partial Scatterplot*)

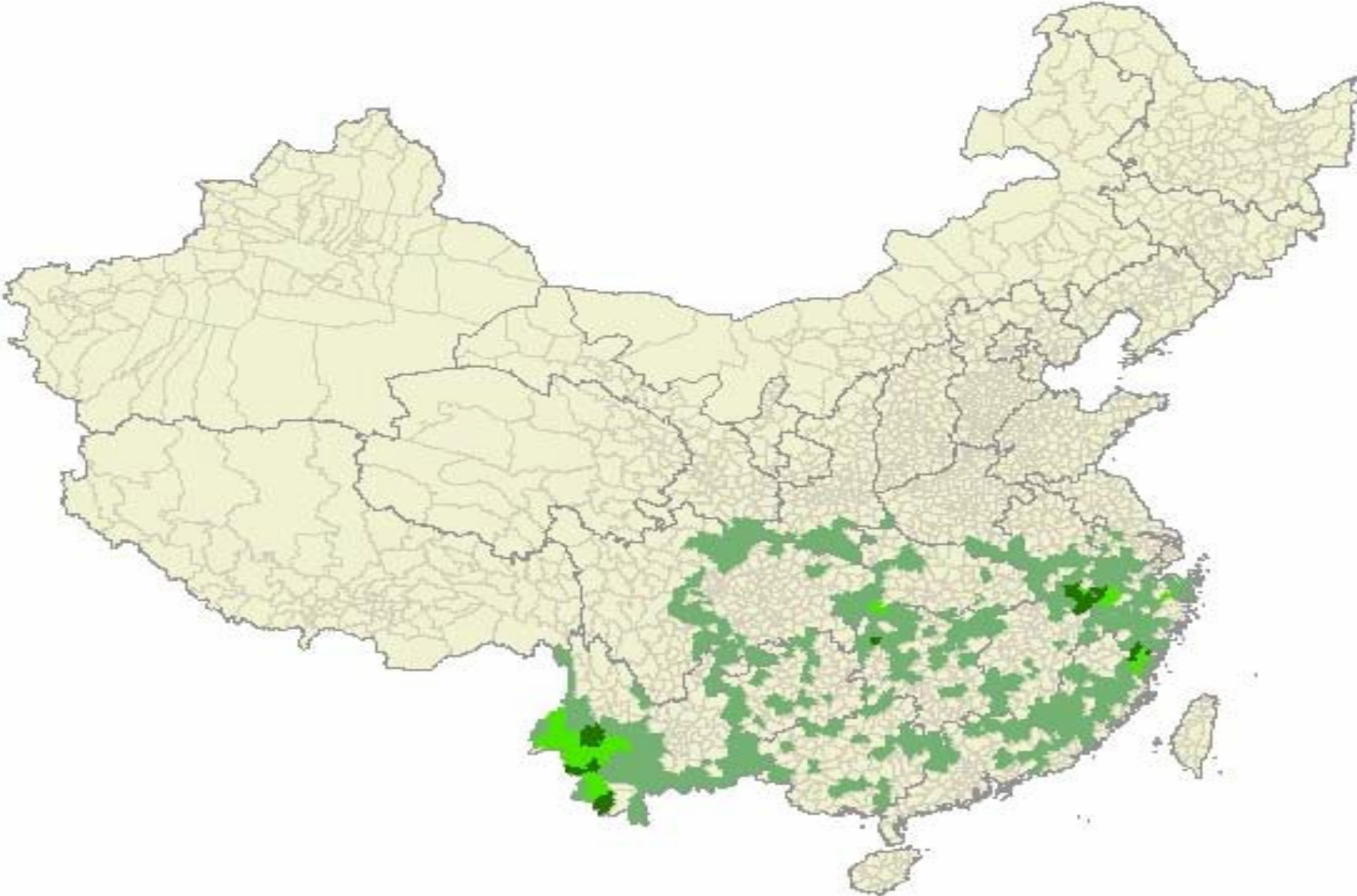
- See N. Qian, « Missing Women and the Price of Tea in China: the Effect of Sex-Specific Earnings on Sex Imbalance », [QJE 2008](#)
- One child policy in China 1978 (CPC stronger than Malthus!)  
→ huge rise in sex ratio =  $(\text{number of surviving boys}) / (\text{number of surviving girls})$
- In tea-growing areas, girl survival rate higher when price of tea is higher (tea growing = mostly female activity)
- One can observe important historical variations in sex ratios in all countries (for instance higher boy/girl ratios after wars; see e.g. research by Halbwegs 1936 and Jaisson-Brian 2005), but usually not as extreme as for China

Figure 1 – Sex Ratios by Birth Year in Rural China



**Figure IVa - Tea Planting Counties in China**

Darker shades correspond to more tea planted per household.



- **5. Rising returns to child quality.** I.e. with rising role of education & human k, parents choose to have fewer children & invest more in them (quality-quantity trade-off) (Becker)
- **6. Rise of alternative forms of old-age support (state, finance)** → declining fertility

→ All these mechanisms are certainly relevant, but:

(i) They are not sufficient to explain all cross-country variations

(ii) Changing gender roles, education, family links, etc. involve country-specific cultural, social & political processes, and need to be studied as such



# Malthusianism vs anti-Malthusianism

- Is population growth good or bad for growth?
- Malthus 1798: population growth leads to poverty and chaos → one needs to restrict fertility of the poor
- Modern Malthusianism: see e.g. [Leridon 2015](#) on demographic explosion in Africa
- When population is multiplied by 5 or more in two or three generations (Egypt: 1910 12m, 2015 91m, 2100 201m), it is very difficult to finance and organize adequate investment in public infrastructures, education, health, etc. ( $\beta=s/g...$ )
- But negative population growth also creates other difficulties: aging population, rise of inheritance, etc.
- Maybe the ideal is to have moderate but positive population growth

- One strong anti-Malthusian view: see Kremer, “Population Growth and Technological Change: One million BC to the present”, [QJE 1993](#)
- If one takes a very long term view, then one observes an acceleration of population growth throughout history (until demographic transition)
- I.e. the higher the absolute level of the population, the higher the growth rate
- Kremer’s explanation: growth is about producing new ideas (=non-rival good); the higher the population, the more ideas are produced, and the more everybody can benefit from them → acceleration of population growth over time  
→ the demographic transition and associated population decline or stagnation might have a negative impact on growth in the very long run

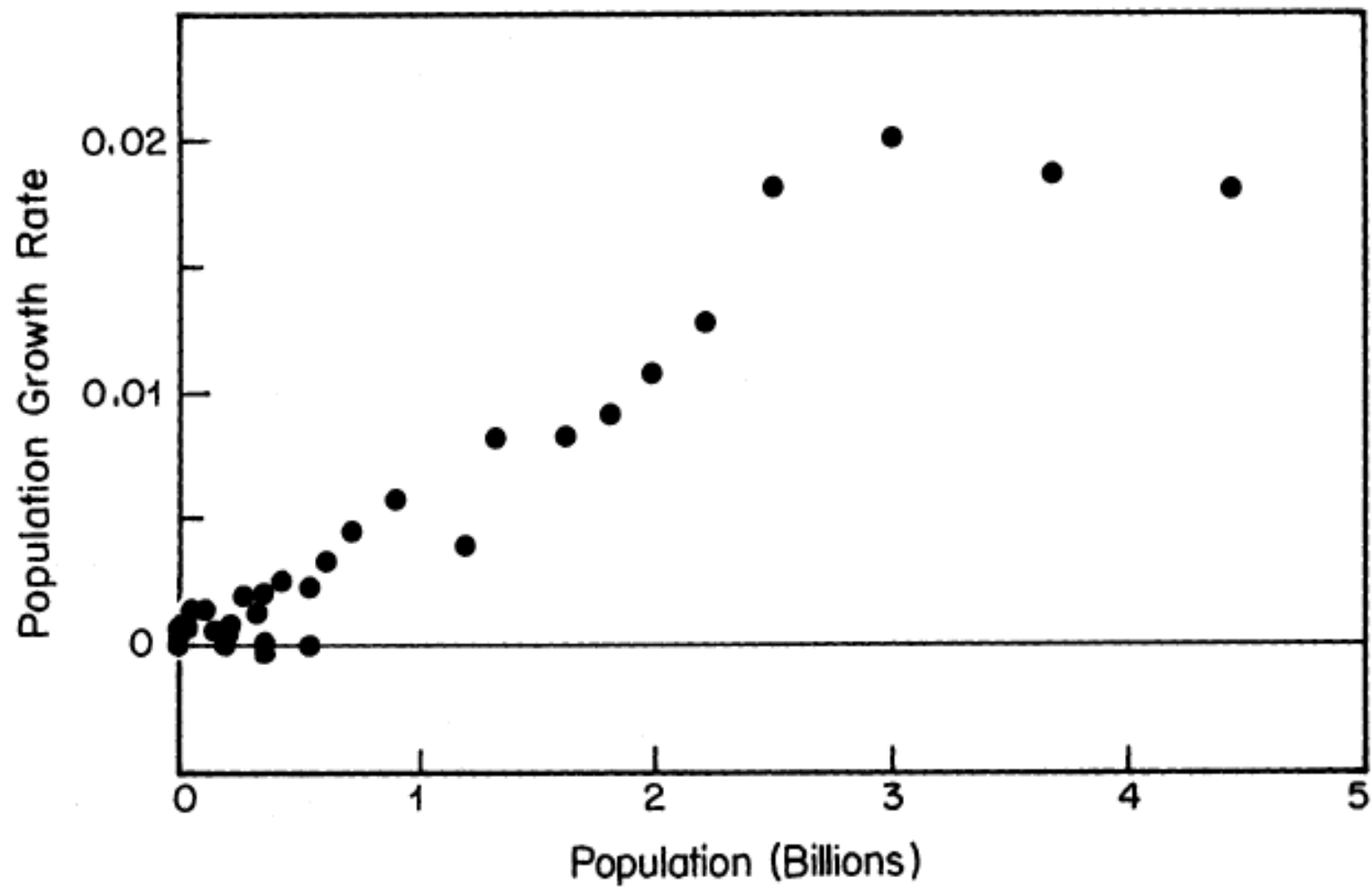


FIGURE I  
Population Growth Versus Population

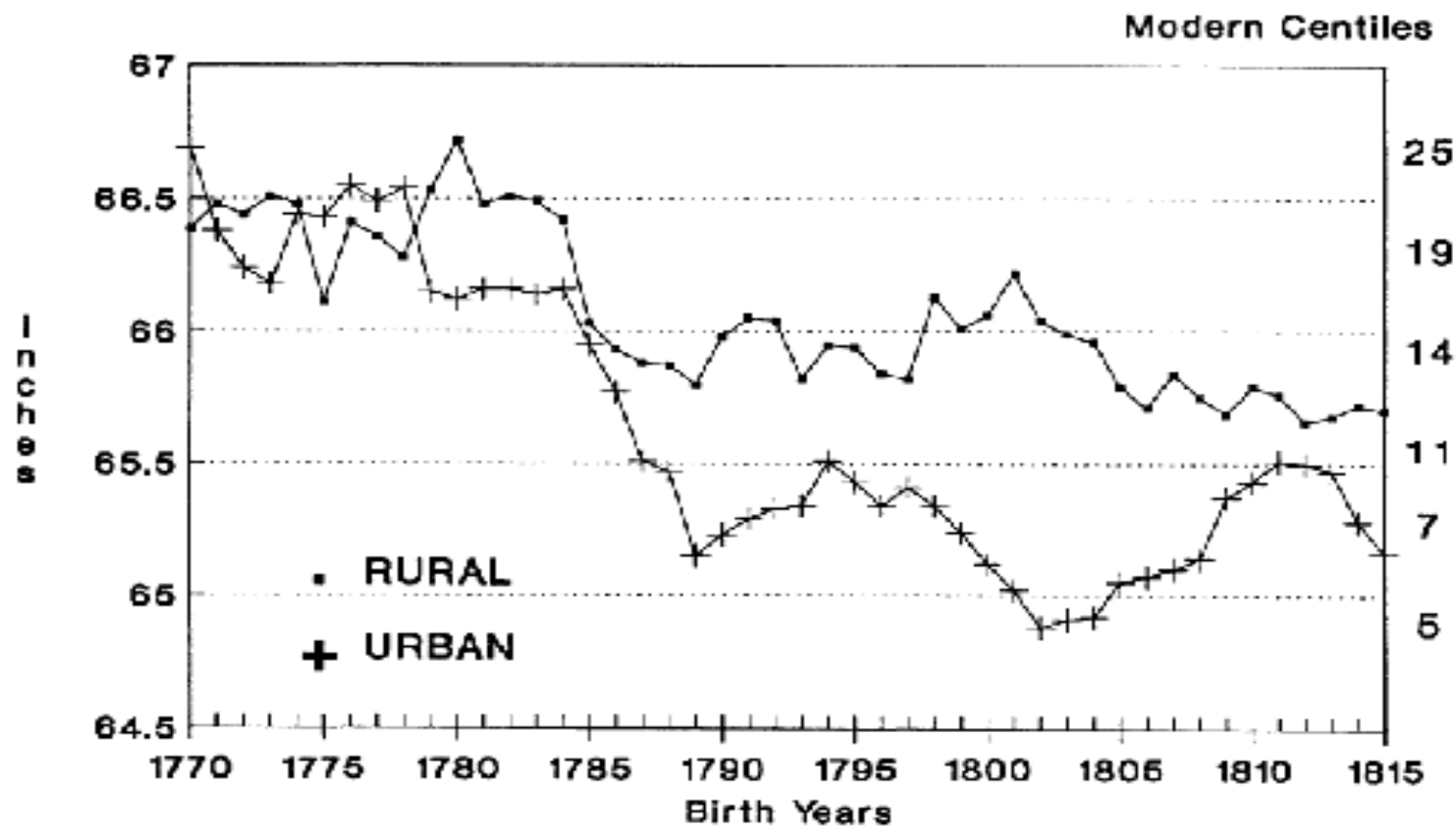
# Living standards and population growth

- Was there any escape from Malthusian poverty trap prior to 1800? I.e. was output growth entirely absorbed by population growth until 1800?
- The best evidence indeed suggests that living standards did not rise much until 19<sup>c</sup>
- See e.g. Feinstein, “Pessimism Perpetuated: Real Wages and the Standard of Living During and After the Industrial Revolution”, [JEH 1998](#); Allen, « Engel’ s Pause: Technical Change, Capital Accumulation and Inequality During the British Industrial Revolution », [EEH 2009](#) = no significant rise in real wages until 1860-1870, rising profit share

- Wage and price series are imperfect, but they are confirmed by other sources, e.g. evolution of height or labor time
- See Nicholas-Steckel, “Heights and Living Standards of English Workers during the Early Years of Industrialization, 1770–1815,” [JEH 1991](#): decline in average height of British urban men from 66.5inches to 65inches (1.65m) in late 18<sup>c</sup>-early 19<sup>c</sup>
- For very long run series on the evolution of height using osteological data, see Boix-Rosentbluth, « Bones of Contention: The Political Economy of Height Inequality », [APSR 2014](#)

FIGURE 3

HEIGHT PROFILE OF ENGLISH WORKERS 23 TO 49: 5-YEAR MOVING AVERAGE



From: Nicholas and Steckel, "Heights and Living Standards"

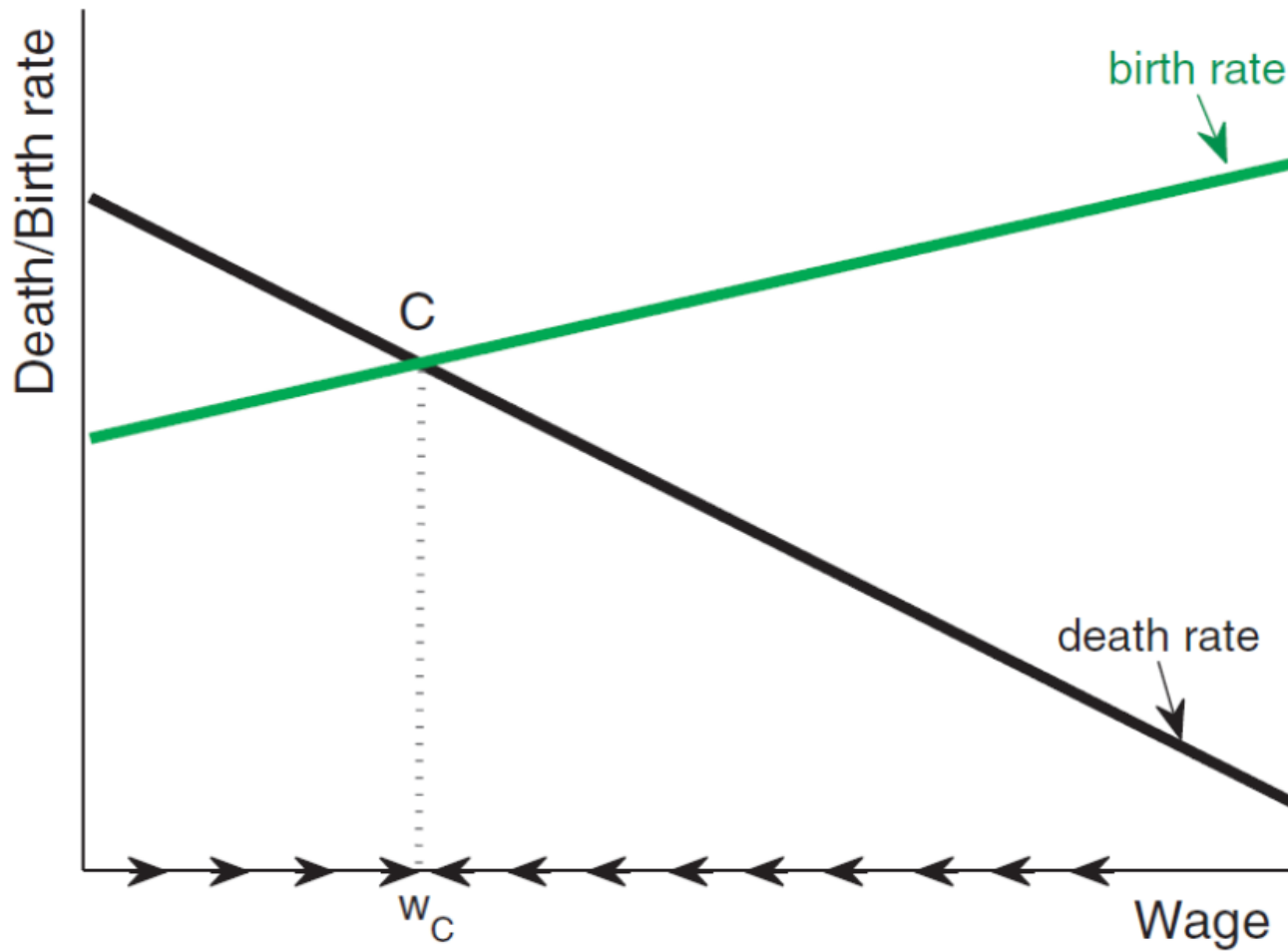
- Rise of working time & child labor to compensate declining hourly wages during late 18<sup>c</sup>-early 19<sup>c</sup>: see Voth, «Time and Work in Eighteenth-Century London», [JEH 1998](#) (use of witness judicial accounts to measure effective working time); De Vries, “The Industrial Revolution and the Industrious Revolution”, [JEH 1994](#)

- Long run evolution of the relation between income and working time: see Costa, “The Unequal Work Day: A Long-Term View“, [JLE 2000](#); until late 19<sup>c</sup>-early 20<sup>c</sup>, effective working time was much higher for low-skill workers and poorer socio-economic groups than for high-skill workers and more privileged groups; today the relation tends to go in the opposite direction, especially given unemployment among low-skill groups (same reversal as the income-fertility relation); why?
- Decline of wealth inequality/rise of meritocratic ideology/political realism given universal suffrage: the rich now need to work and to show that they are productive (see Boutmy 1872)
- More demanding standards for decent work → rising unemployment
- Income effect: with rising living standards it makes sense to work less; the rich work more because they have nicer & more rewarding jobs



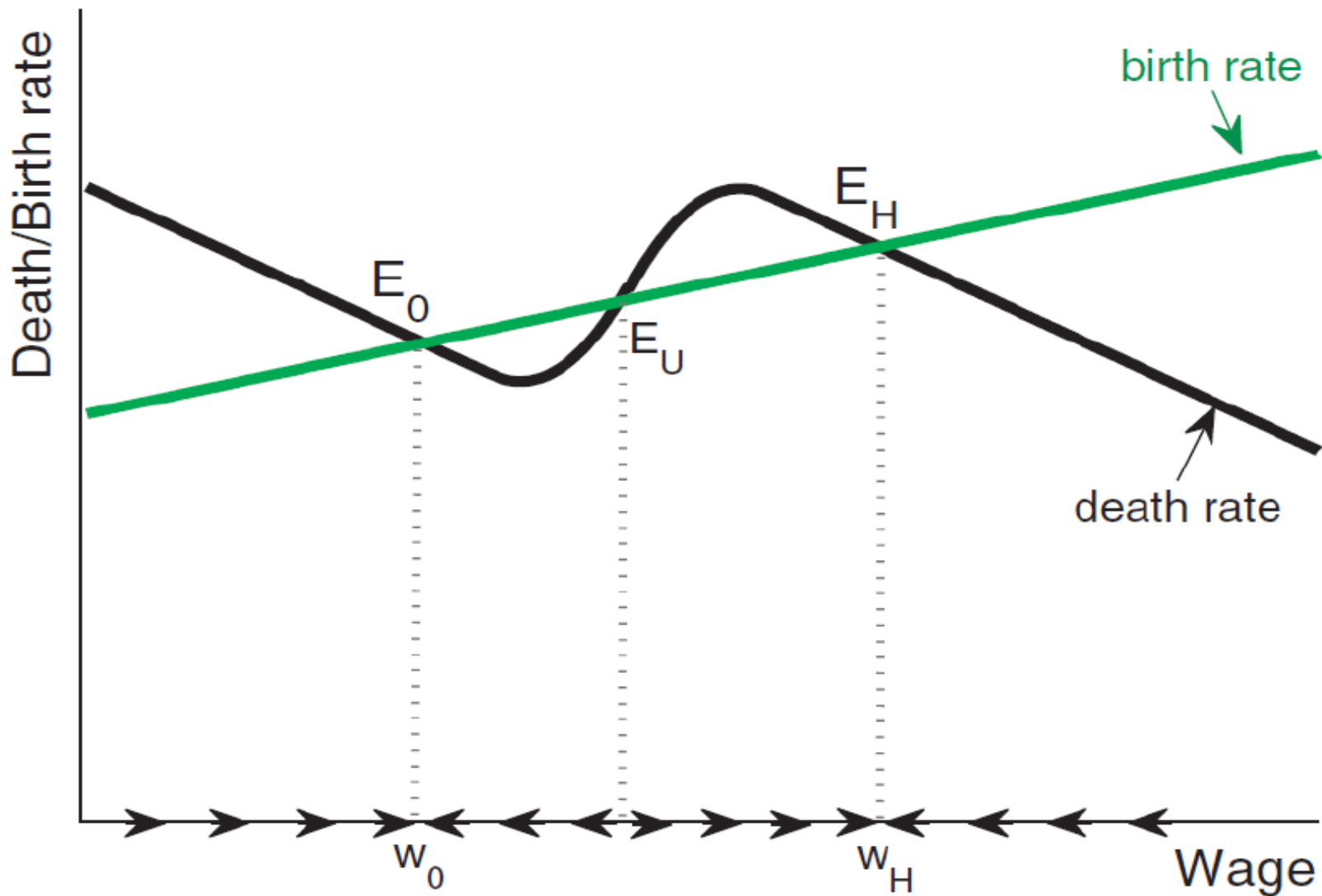
- Living standards did not increase much between 1500 & 1800, but maybe they increased a little bit (20-30%); how to reconcile this with standard Malthusian logic?
- See N. Voigtlander, J. Voth, « The Three Horsemen of Growth: Plague, War and Urbanization in Early Modern Europe », [RES 2013](#);
- Standard Malthusian model: fertility rises with income, mortality declines with income, & population growth leads to declining income (decreasing returns to land)  
→ unique equilibrium
- Possibility of multiple equilibrium: Black Death 14<sup>c</sup>  
→ declining population, rising wages, but also urbanization and rising mortality over some range  
→ new equilibrium with higher population & wages  
→ plague, war, and urbanization led to the first demographic transition

## Steady state in the standard Malthusian model



From Voigtländer and Voth, "The Three Horsemen of Riches"

# Steady states with "Horsemen effect"



From Voigtländer and Voth, "The Three Horsemen of Riches"

- There is consensus about the fact that living standards did not increase much until 19<sup>c</sup>, but some disagreement about exact timing
- E.g. Clark believes that rising wages started in early 19<sup>c</sup> rather than mid-to-late 19<sup>c</sup>, and that the post-Black Death rise in wages was smaller than what was considered earlier (so that the 19<sup>c</sup> rise looks more substantial from a long-run standpoint)
- See Clark ‘The Long March of History: Farm Wages, Population, and Economic Growth, 1250 – 1869,’ [EHR 2007](#); “The Condition of the Working Class in England, 1209–2004.” [JPE 2005](#).

# Clark's New Real Wage Series

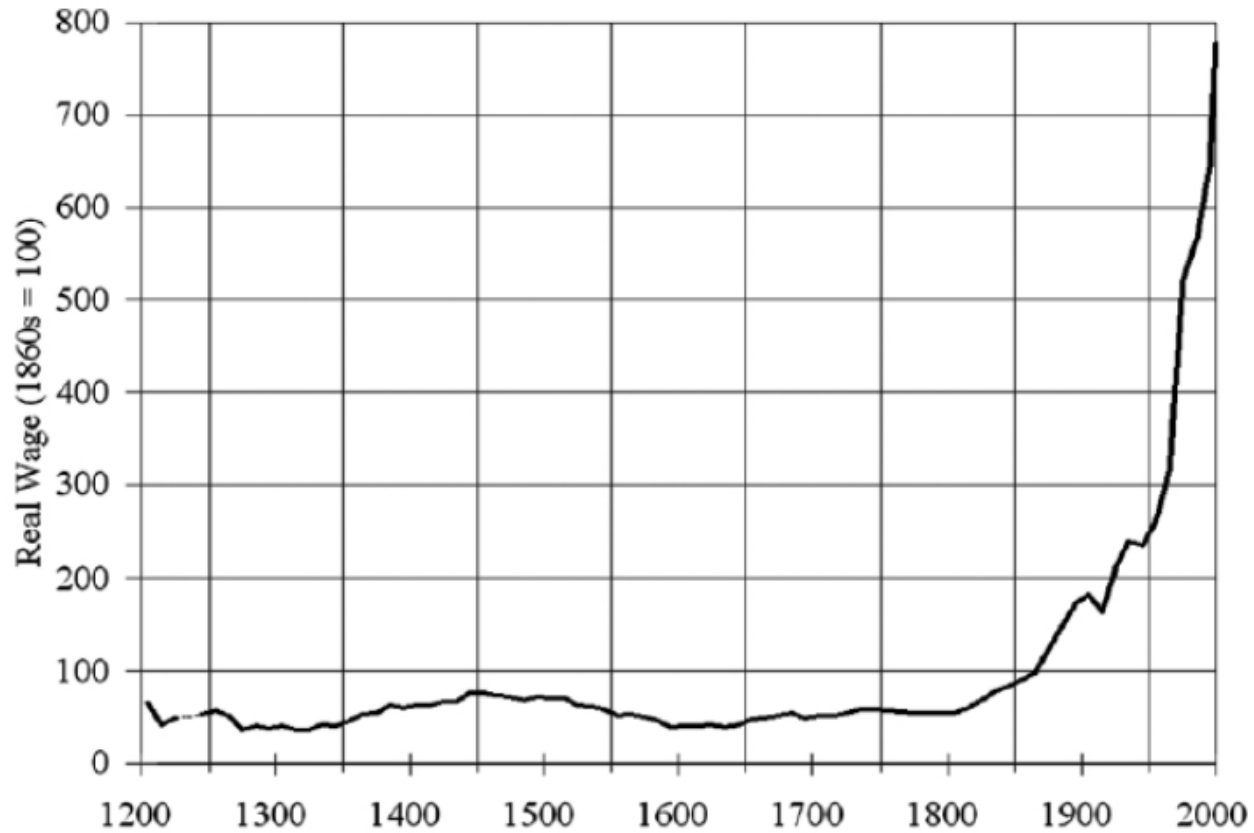


FIG. 1.—Builders' real day wages, 1209–2004 (source: table A2)

From: Clark, "The Condition of the Working Class in England, 1209-2004"

# Comparison to Alternative Real Wage Series

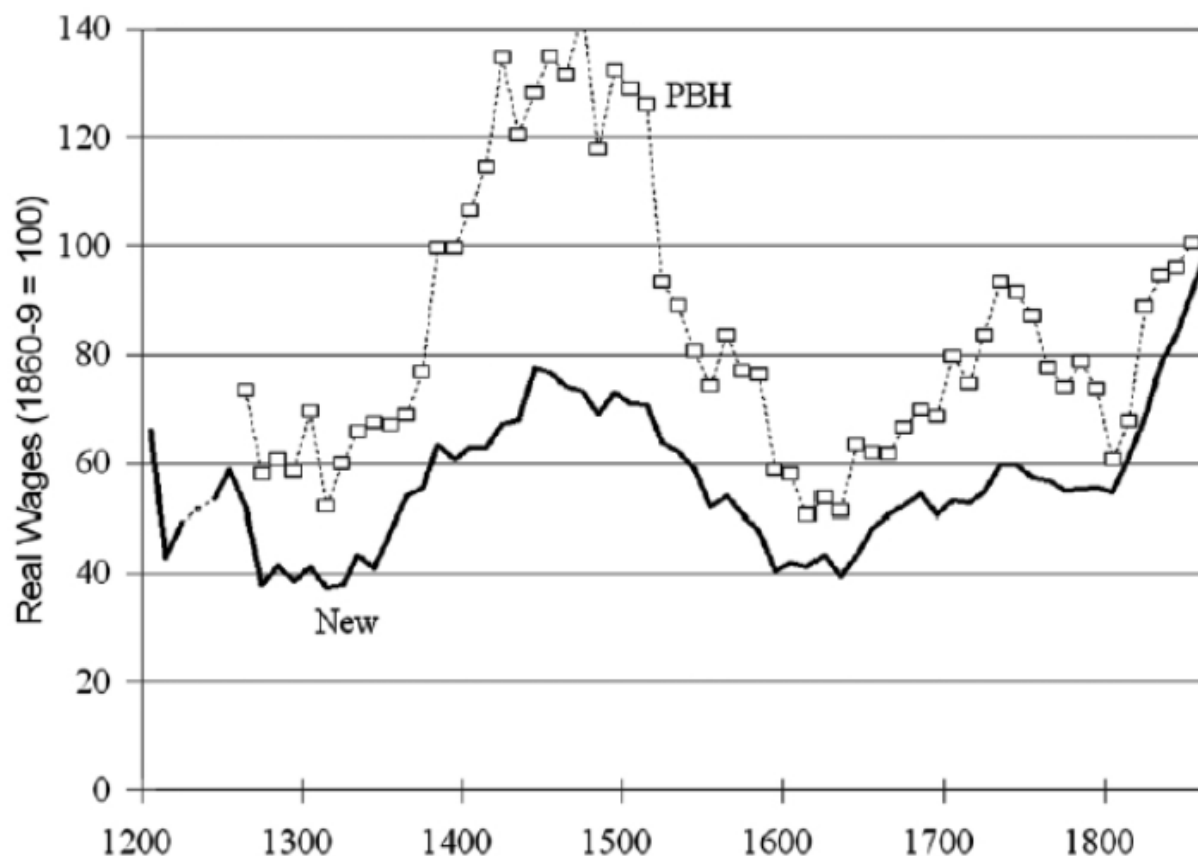


FIG. 4.—Real wages, 1200–1869, Phelps Brown and Hopkins vs. new series. In both series, 1860–69 has been set to 100. Sources: Phelps Brown and Hopkins (1981, 28–31), table A2.

From: Clark, "The Condition of the Working Class in England, 1209-2004"

# Scatter Plot of Real Wages and Population using Clark's Data

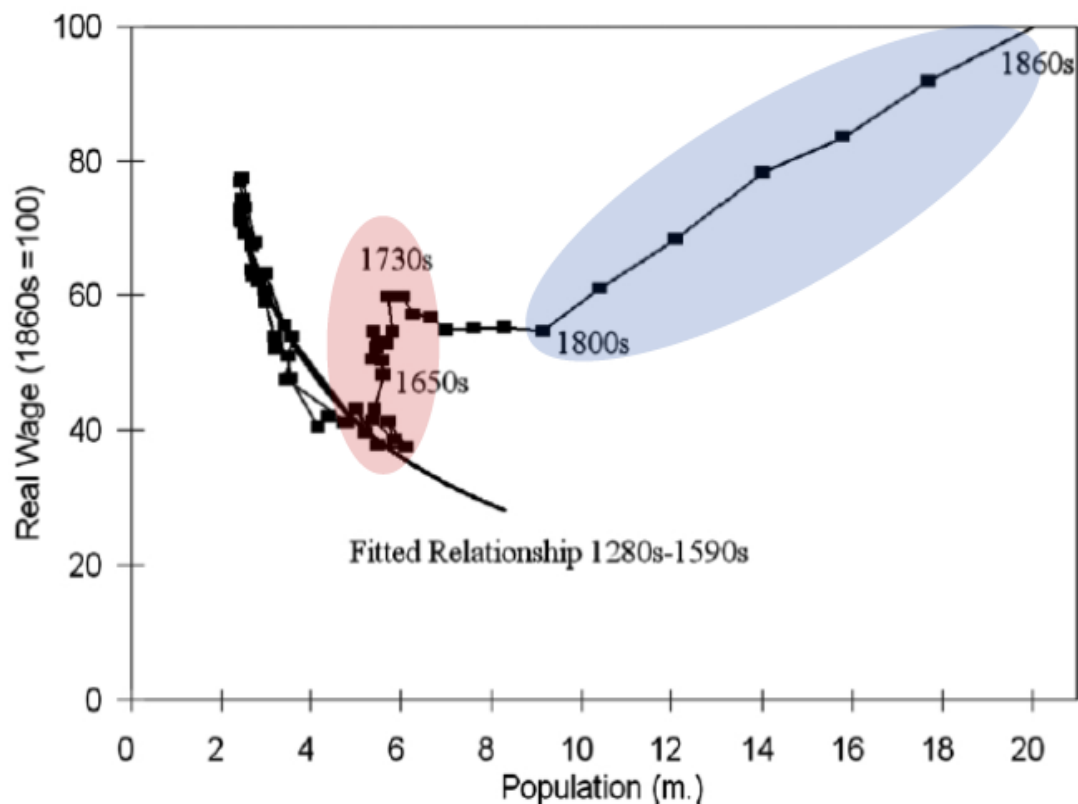


FIG. 5.—Real wages vs. population on the new series, 1280s–1860s. The line summarizing the trade-off between population and real wages for the preindustrial era is fitted using the data from 1260–69 to 1590–99. Sources: population, same as for fig. 3; real wage, table A2.

From: Clark, “The Condition of the Working Class in England, 1209-2004”

# Family structures & development

- Family is not only about number of children. Most basic dimension of family structure: who is allowed to marry & have children with whom?
  - Prohibition of incest = almost universal
  - C. Levi-Strauss, *Les structures élémentaires de la parenté*, 1947 (*The Elementary Structures of Kinship*): « Incest prohibition has nothing to do with biological risk. It is largely due to a subsistence imperative & the need for social and political rules: culture vs nature »
  - « In societies with fragile subsistence and strong gender specialization, men and women must circulate between families; otherwise a family with no boy or with no girl is stuck »
  - « The need for the « circulation of women » (and men) is what leads to the rise of different marriage systems between first cousins, etc., in different primitive societies in Amazonia, Oceania, etc. »
- Incest prohibition & kinship structures as insurance mechanisms against demographic & economic shocks



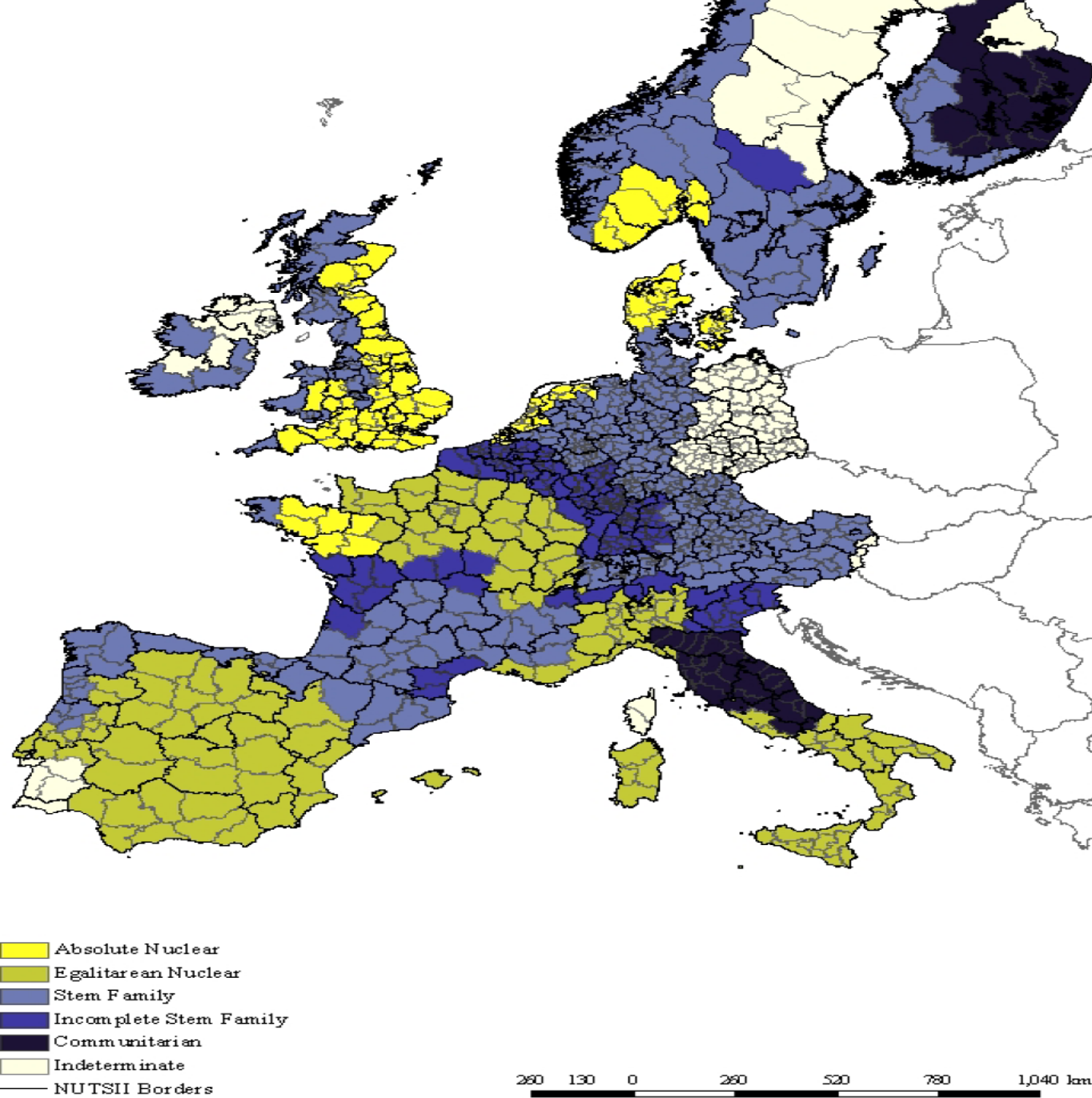
- J. Goody, *The European Family*, 2000; *The Theft of History*, 2006
- « In all post-Bronze-age, plough-agriculture Eurasian societies, one observes rising surplus and accumulation, and the rise of property transmission and dowries to maintain the status of daughters (and not only of sons) » (Africa: hoe agriculture, less accumulation, less social stratification, lower female status)  
(plough (charrue) vs hoe (houe) agriculture: less productive)
- « The idea of a European specificity with high female status and nuclear families is wrong & Euro-centric; you see variants of this same pattern throughout Eurasia »
- « The only European specificity might be the prohibition of adoption, remarriage, first-cousins marriage, etc. by the Christian church in order to maximize property transmission to the Church and limit the ability of families to organize property transmission & the power of kin groups »; « by limiting family power, Church was able to appropriate 20-30% of land in W.Europe 500-800 »
- « Close marriages (e.g.cousins) are a very natural way to protect family wealth and avoid misalliance: very common in ancient Greece, Rome, Islam, Judaism, & not only in primitive societies »
- « Return of divorce, adoption, remarriage, etc. in late 20<sup>c</sup> »

- Todd: « there are large variations in family structures within Europe & all parts of the world, and they have long lasting consequences on politics, economics & society »
- See E. Todd, *La troisième planète*, 1983 (*Explanation of Ideology: Family Structure and Social System*, 1985); *La nouvelle France*, 1988 (*The Making of Modern France: Politics, Ideology and Culture*, 1991); *L'invention de l'Europe*, 1990; *L'origine des systèmes familiaux*, 2011
- Two basic dimensions (+ a third dimension: gender):
- **Equality**: equality vs inequality between siblings (equal sharing of inheritance vs primogeniture)
- **Authority**: nuclear families (adult children live separately from parents = more liberal model)  
vs multi-generation families (some of the adult children stay in the same home as parents = more authoritarian model)  
(paternal authority may also depend on inheritance rules)

→ Four basic family types:

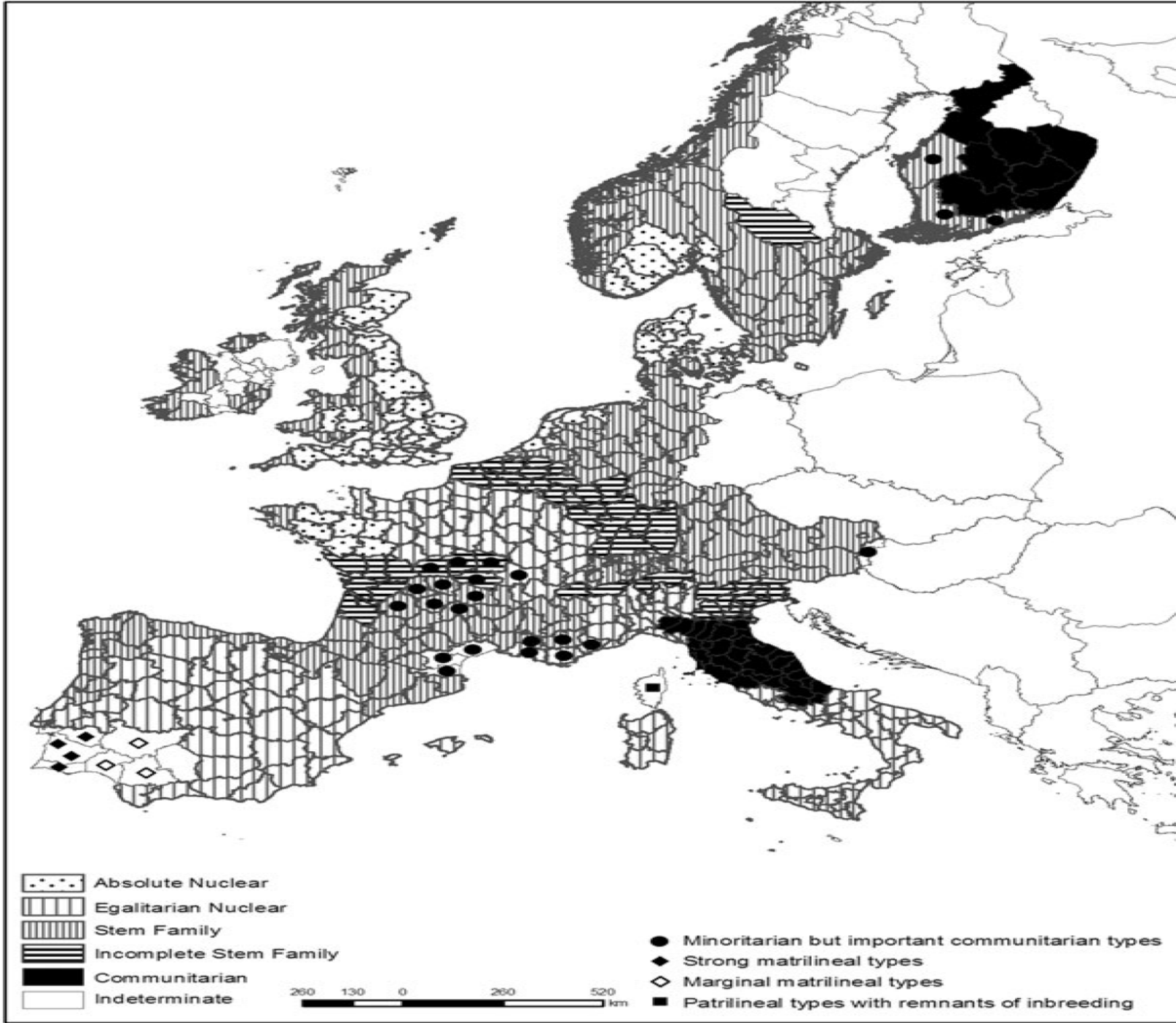
- **Unequal & liberal: absolut nuclear family** (Britain)  
(→ inegalitarian political liberalism)
- **Equal & liberal: egalitarian nuclear family** (France)  
(→ egalitarian political liberalism)
- **Unequal & authoritarian: stem family** (*famille souche*): multi-generation family with unequal sharing; typically, first-born boy stays with parents & brings his spouse; younger offspring move out & have no or limited inheritance (Germany, Japan)  
(→ authoritarian & inegalitarian regimes: fascism)
- **Equal & authoritarian: communitarian family** (*famille communautaire*) (Russia, China, parts of central Italy & central France)  
(→ authoritarian & egalitarian regimes: communism)

- Todd uses historical records on inheritance rules and 19c-early 20c census data on proportion of multigeneration households in order to draw maps of the dominant family structures in the various regions of France, Europe and the world
- General conclusion: « even if they have largely disappeared (i.e. multi-generation households are now very rare, & equal sharing is the default rule almost everywhere), historical family structures still have a long lasting impact on deep anthropological beliefs systems & on political attitudes »
- E.g. there is no region in the world with no strong communist support without communitarian family background
- « No family structure is better or worst than others; they simply happen to have different consequences at different stages of political and socio-economic development »
- E.g. nuclear families may have contributed to first industrial revolution (Britain); but authoritarian families better for diffusion of education and for second industrial revolution (Sweden, Germany: much higher literacy than Britain in 19<sup>c</sup>)



**Figure 1. Family types in Europe.**

Absolute nuclear	Total emancipation of children in adulthood to form independent families made simply of a couple and their children. Division of inheritance among children by testament or will, usually to a single individual, often the son. Brothers and sisters are treated as independent individuals (Todd 1990a, 37).
Egalitarian nuclear	Total emancipation of children in adulthood to form independent families made simply of a couple and their children. Equal division of inheritance among children. This system encourages the persistence of slightly stronger relations between parents and children until the inheritance is completely divided after the parents' death (Todd 1990a, 37–38).
Stem family	An extended family with several generations living under one roof. One child—generally, but not always, the eldest—marries and has children who remain in the household to preserve the lineage. The rest have the choice of remaining unmarried within the household or of marrying and leaving the home or becoming soldiers or priests. The house and the land are inherited by the son who stays at home. Others may receive some financial compensation. The inheriting son, who stays at home, remains under the formal authority of the father (Todd 1990a, 38).
Incomplete stem family	The same as the stem family, but with more egalitarian inheritance rules (in principle, but rarely in practice).
Communitarian family	An extended family in which all the sons can get married and bring their wives to the family home. Equality among children in inheritance, with family wealth and estates divided after the death of the parent (although a period of cohabitation between married brothers after the death of the parents is possible) (Todd 1990a, 39–40).



- Duranton et al 2009, “Family Types and the Persistence of Regional Disparities in Europe”, [EG 2009](#) : use of Todd’s classification at the European regional level
- Le Bris, “Family Characteristics and Economic Development”, [WP 2016](#) : use of Todd’s classification at the world level
- Family score (0-3) = authority (0-1) + high female status (0-1) + inequality (0-1)
- Higher family score has positive
- Interesting, but what about looking at each dimension separately? Regional data rather than country data?
- Maybe it would be necessary to return to census data & other raw sources in order to construct more extended and consistent series on family structures





**Figure 1. Countries where the family type shows strong parental authority over children**



Figure 2. Countries where family type shows relatively high female status

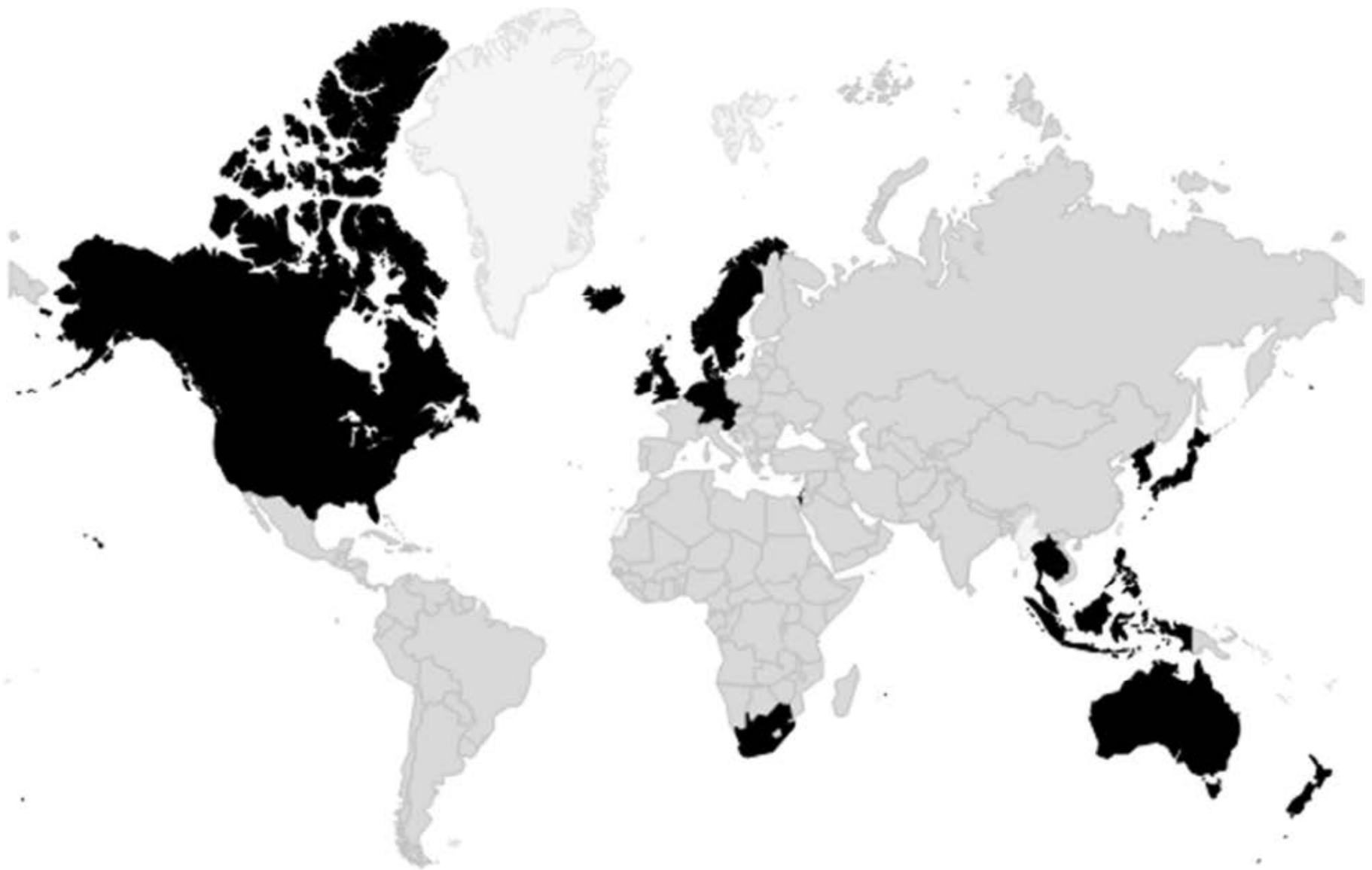
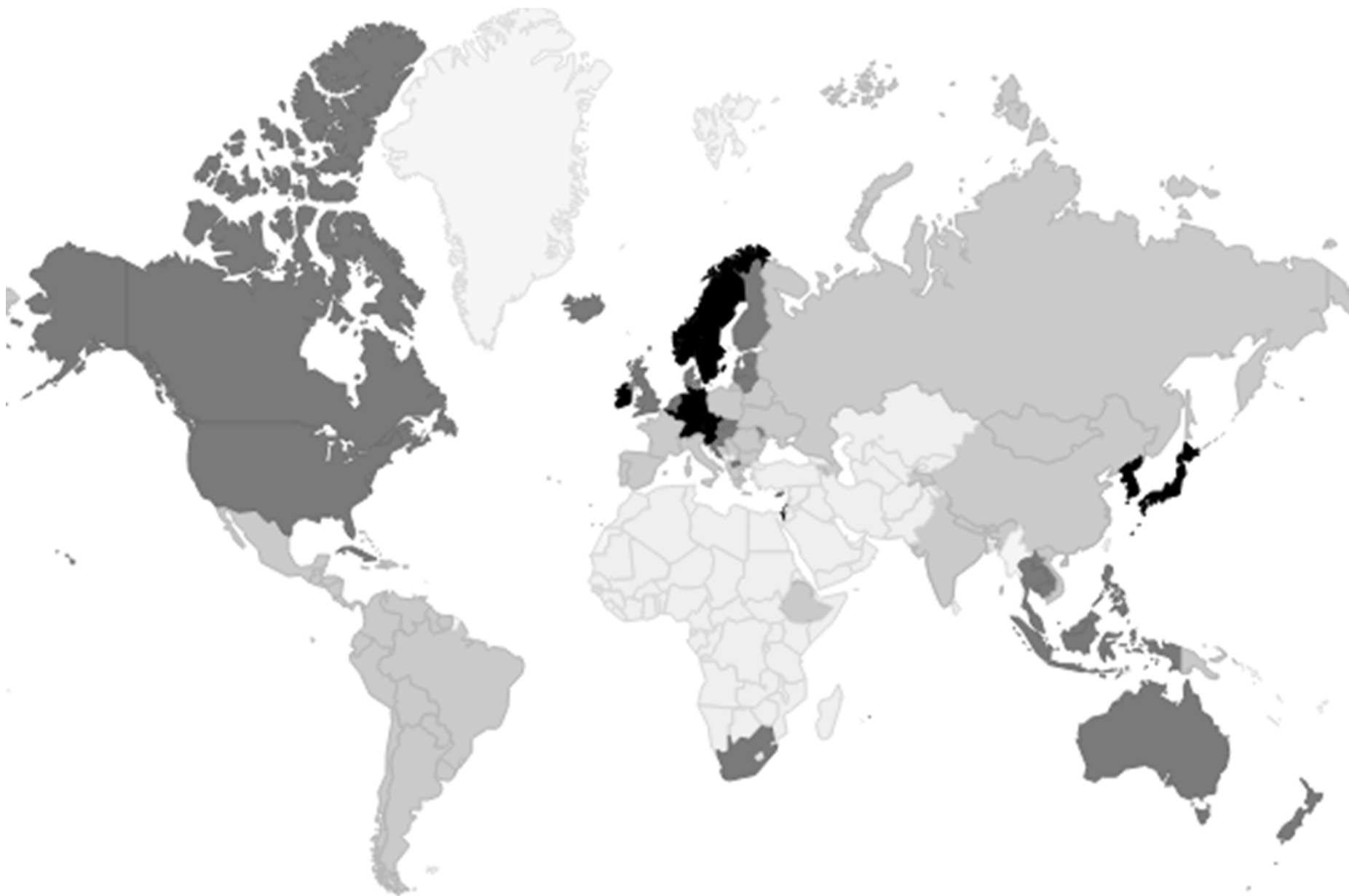


Figure 3. Countries where family type shows potential inequality among siblings



**Figure 4. Family score according to propensity to invest  
(from 0 in pale grey to 3 in black)**

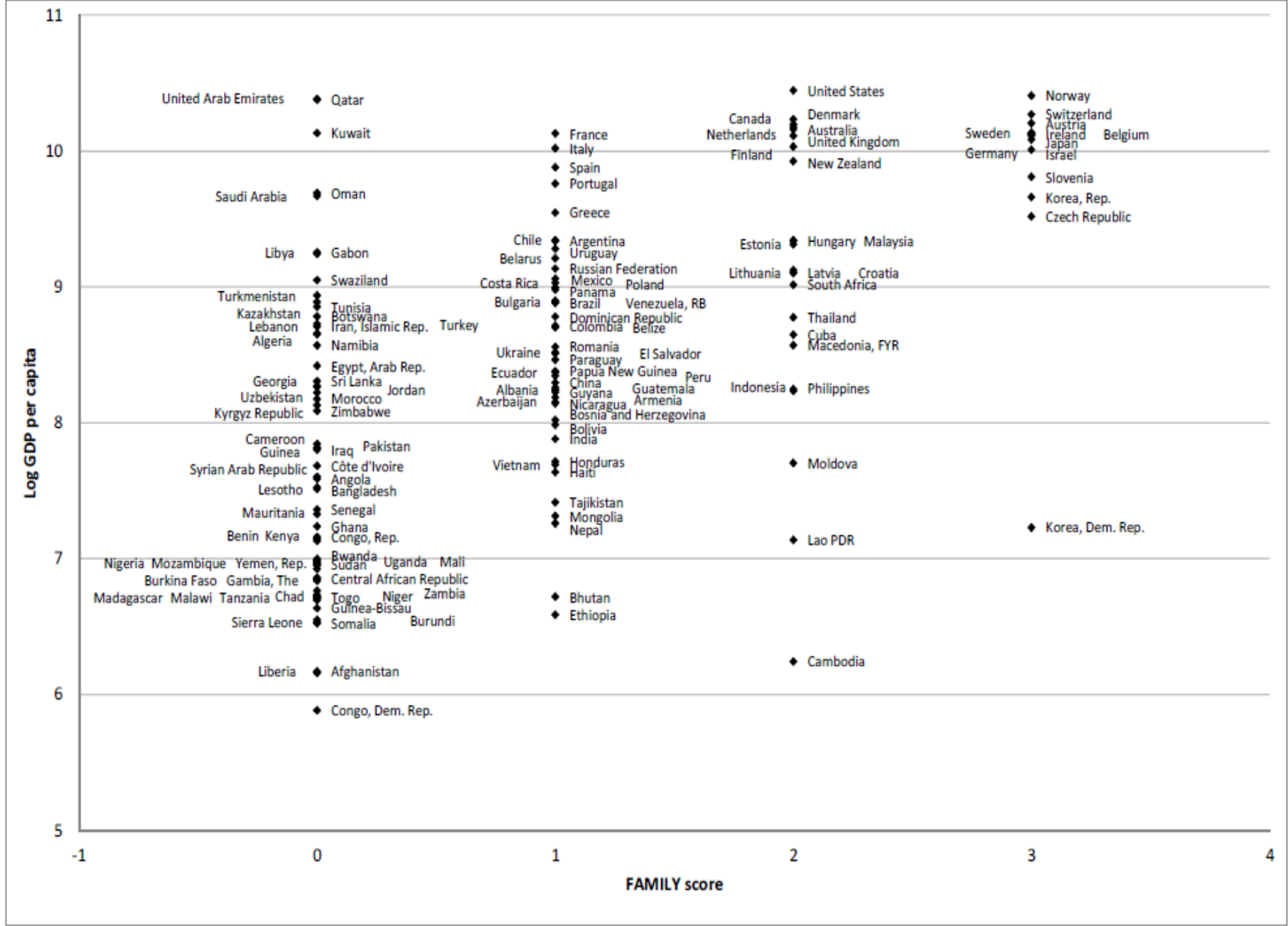


Figure 5. Family score and economic development

**Table 1. Family characteristics and economic development**

	log income per capita in 2000			
	(1)	(2)	(3)	(4)
WOMEN	1,264*** (0,0000)			
VERTICALITY		0,697*** (0,0009)		
INEQUALITY			1,281*** (0,0000)	
Family score				0,732*** (0,0000)
Observations	177	177	177	177
R <sup>2</sup>	0,28	0,06	0,32	0,32

**Table 2. Family characteristics and economic development controlling for geography**

	log income per capita in 2000	
	(1)	(2)
Family score	0,413*** (0,0000)	0,314*** (0,0007)
% of pop at risk of contracting malaria	-1,475*** (0,0000)	-1,366*** (0,0000)
% of pop. Living in tropical zones	-0,052 (0,8332)	0,095 (0,7199)
Mean distance to nearest waterway	-0,390** (0,0065)	-0,284** (0,0426)
log Neolithic transition (ancestry adjusted)	0,000 (0,5861)	0,000 (0,7586)
log percentage of arable land	-0,096 (0,2006)	-0,111 (0,1629)
log absolute latitude	0,076 (0,5118)	0,063 (0,5825)
log land suitability for agriculture	-0,134** (0,0731)	-0,153*** (0,0397)
OPEC member	0,429* (0,0645)	0,499** (0,0267)
Continent fixed effect	No	Yes
Observations	145	145
R <sup>2</sup>	0,65	0,67

# Is it possible to collect better data on family structures?

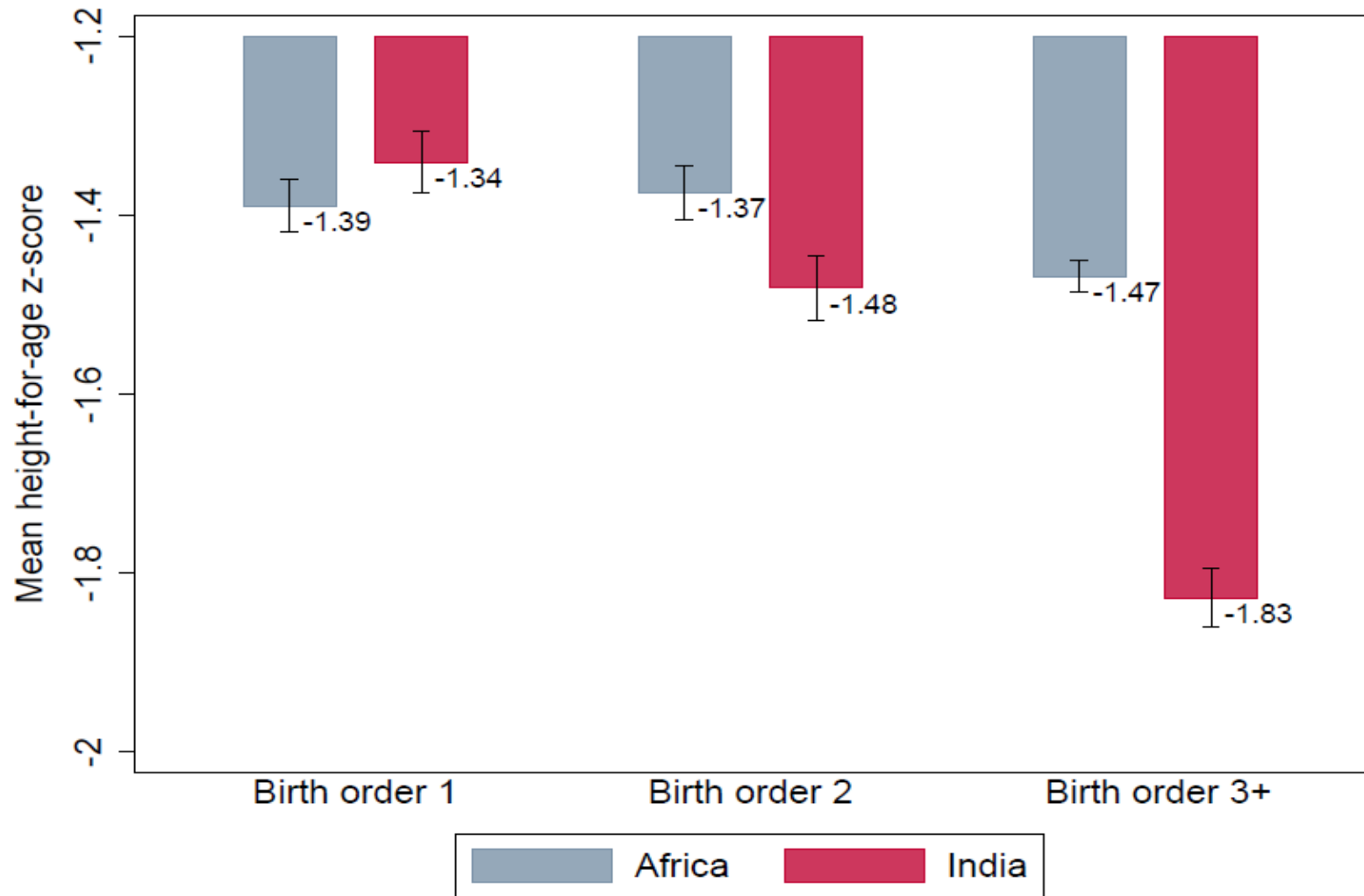
- In order to make progress on these issues, one would need to collect more systematic and reliable data on the evolution of family structures
- One probably needs to return to censuses (cohabitation, fertility etc.) and other micro level data, e.g. to measure inequality between siblings
- One could also use surveys on family norms and beliefs systems (world value surveys etc.), but they do not offer a long run perspective



# Inequality between siblings

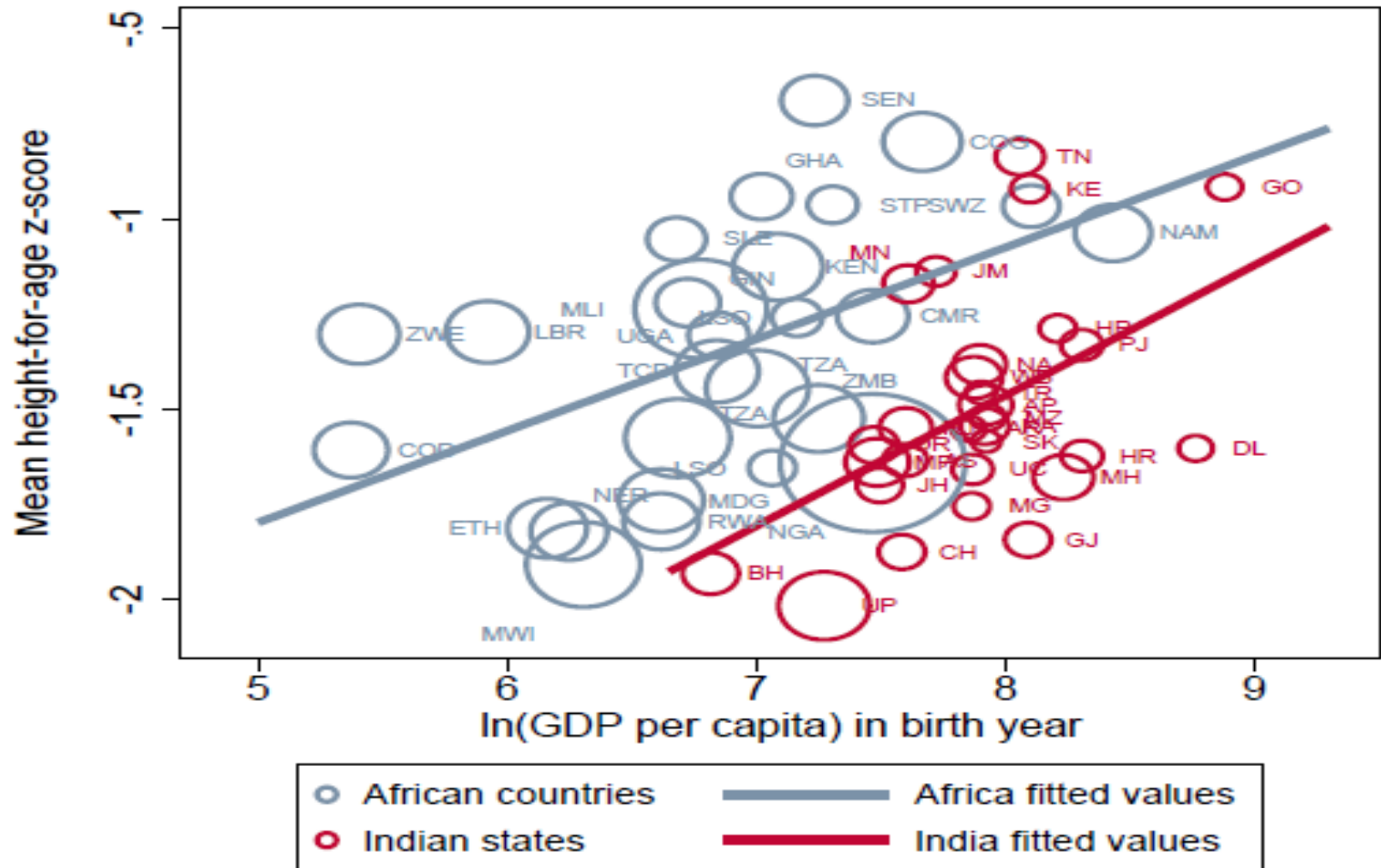
- **Indians are on average less tall than Africans (for comparable GDP). But firstborns Indians are taller than African firstborns, while Indian secondborns, thirdborns and more are much shorter.**
- See Jayachandran-Pande, « Why Are Indian Children So Short? The Role of Birth Order and Son Preference », [WP 2015](#)
- Sen: “The country of first boys”
- This kind of measure could potentially be used to construct measures of inequality between siblings across countries
- See also Salvanes, [QJE 2005](#); Andeweg- Van Den Berg, “ Linking Birth Order to Political Leadership: The Impact of Parents or Sibling Interaction?”, [PS 2003](#); Kristensen-Bjerkedal, “Explaining the Relation between Birth Order and Intelligence”, [Science 2007](#)

Figure 2: Child height in India and Africa, by child's birth order

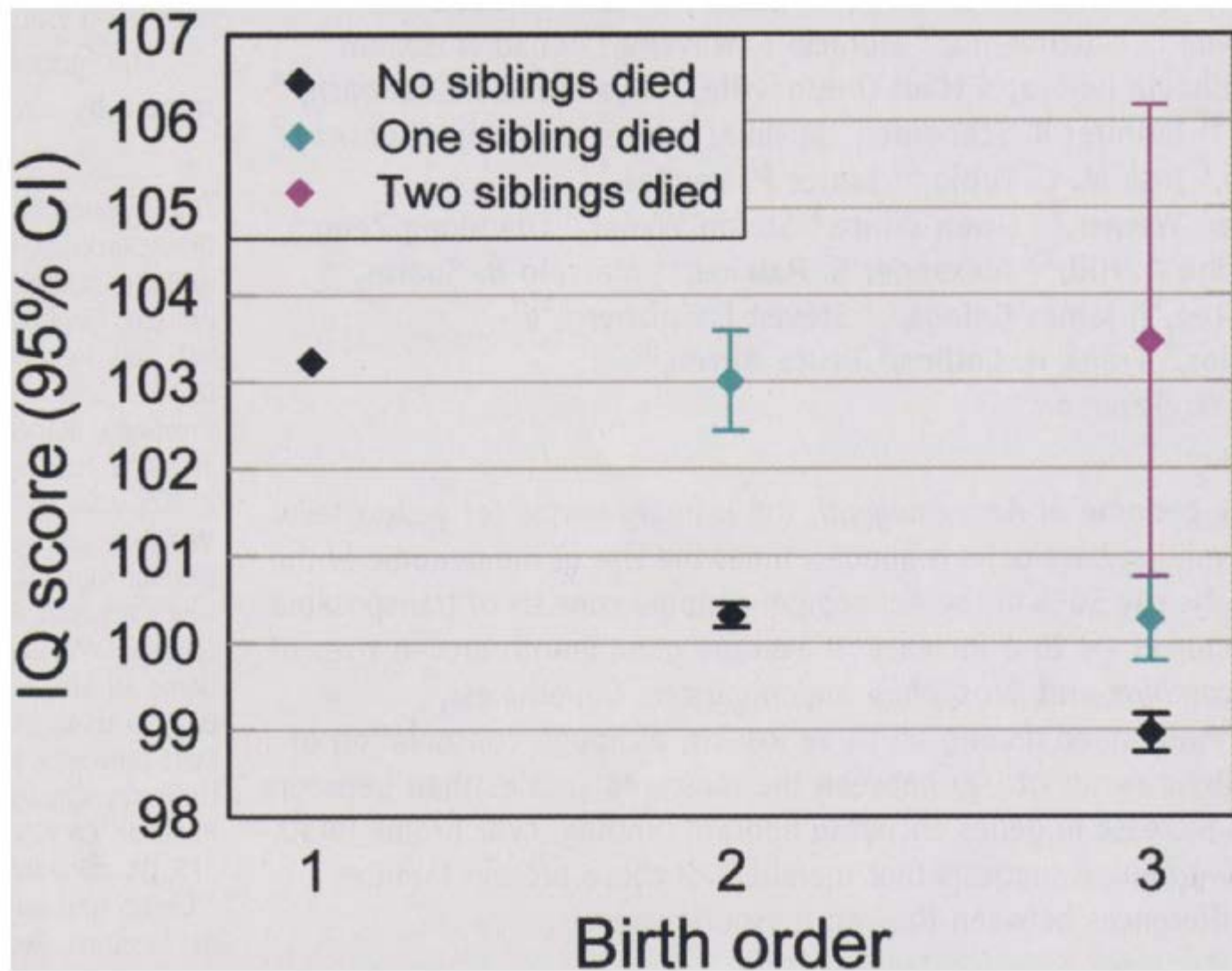


Notes: The figure depicts the mean child height-for-age z-scores for Sub-Saharan Africa and India, by the birth order of the child. The mean is calculated over all children less than 60 months old with anthropometric data.

Figure 1: Child height versus national GDP



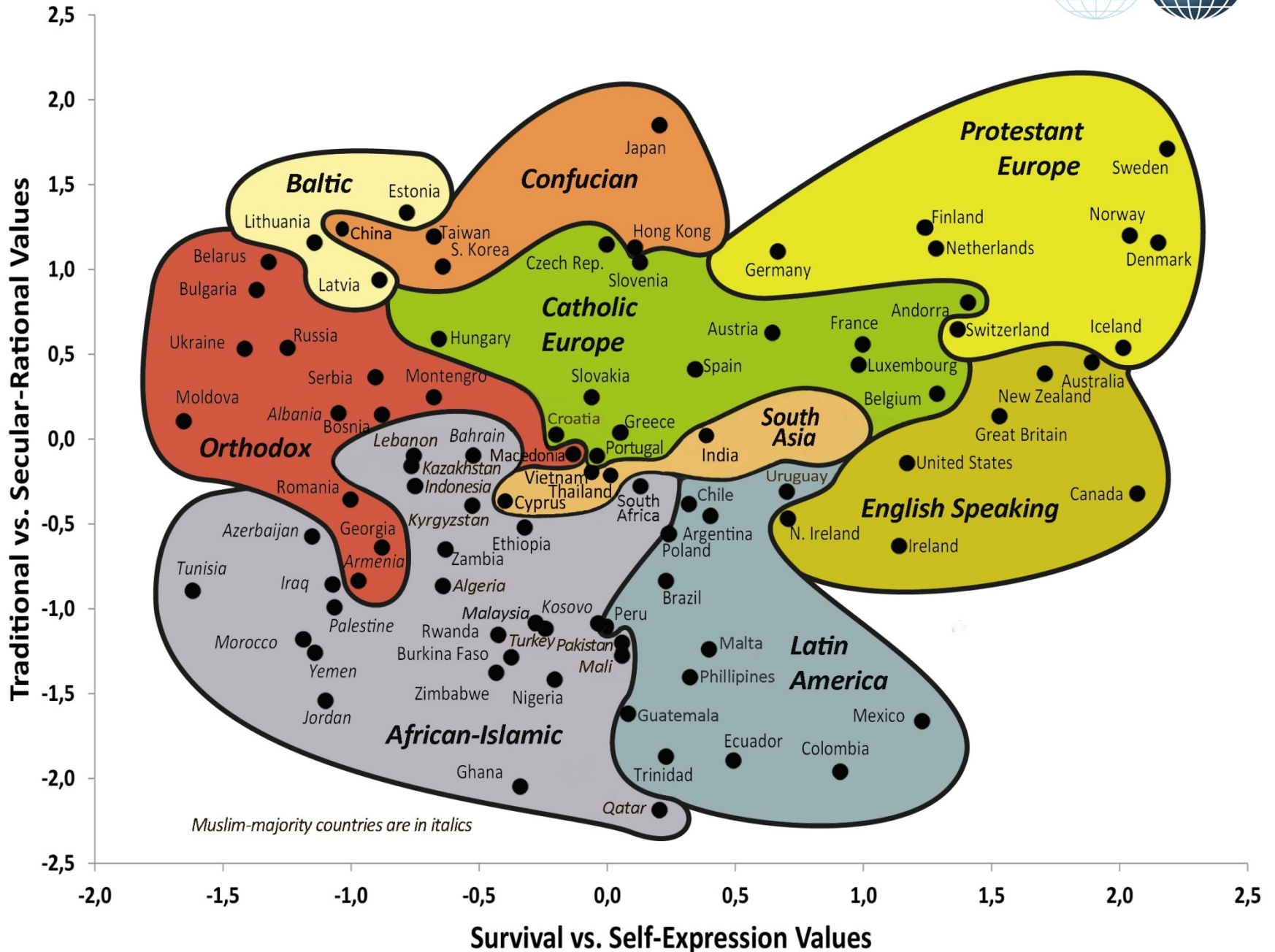
Notes: The light blue and dark red circles represent Sub-Saharan Africa countries and Indian states, respectively. The averages are calculated over all children less than 60 months old. The lines represent the best linear fit for each sample.



**Fig. 1.** Relation between birth order and IQ score. Mean IQ scores for male conscripts, first-, second-, and thirdborn in Norway to mothers with single births only and first birth from 1967 through 1976, according to birth order and number of elder siblings who died in infancy (age < 1 year). Scores are adjusted for parental education level, maternal age at birth, sibship size, birth weight, and year of conscription. Error bars show 95% confidence intervals (CIs). Reference: birth order one.

# Political culture & World value maps

- [Inglehart-Welzel 2011](#), « The World-Values-Surveys Cultural Map of the World »; [IW 2006](#), « Modernization, cultural change and democracy: the human development sequence »
- **Religious-Traditional vs Secular-Rational Values:** deference to authority, importance of parent-child relation, nationalism, vs the opposite
- **Survival vs Self-Expression Values:** emphasis on economic security vs concern for subjective well-being, diversity, environment, participation
- Interesting but somewhat Western-centered, and restricted to contemporary period (see [on-line changing world map values 1981-2015](#): little change)



# Family role vs Government role

- One of the main dimension of political conflict in history: role of family vs. role of government
- E.g. about education: should families be able to make their own choices about their child schooling (religion, discipline, curriculum, etc.), or should the government provide equal educational opportunities to all?
- Weak vs strong family ties. See Alesina-Giuliano “The Power of the Family”, [JEG 2010](#); “Family Ties and Political Participation”, [JEEA 2011](#). They use World Value Surveys to estimate new measures of strength of family ties in world regions. Strong family ties appear to be not so good for state formation & development.

- Chicago school view: families make far-reaching strategic choices for their members; there is not much government can do to counteract family choices (e.g. to reduce inequality between families), and this can be highly counterproductive
- See Becker, *A Treatise on the Family*, HUP 1981; Mulligan, *Parental Priorities and Economic Inequality*, UCP 1997
- Interesting, but largely theoretical
  
- Clark's neo-Darwinist view: it is the positive income-fertility relation that made development possible; i.e. high-skill families had more children and replaced the low-skill groups; work on rare surnames shows that mobility has always been limited and there is not much one can do about it
- See G. Clark *The Son Also Rises: Surnames and the History of Social Mobility*, PUP 2014



# Gender inequality in historical perspective

- One observes high gender inequality and stereotypes in nearly every human society
- Standard anthropological account of the origins of gender inequality: men use their physical force to dominate women, & to protect themselves against what they perceive to be a threat to their domination, i.e. women's power to give birth and men's inability to be certain about father's identity
- See Godelier, *La production des grands hommes. Pouvoir et domination masculine chez les Baruyas de Nouvelle-Guinée*, 1982 (The Making of Great Men. Male domination and Power among the New Guinea Baruya, CUP 1986) for an extreme example of a primitive society based upon male domination.
- Other accounts: plough vs hoe agriculture (charrue vs houe), Eurasia vs Africa. See Alesina, P. Giuliano, N. Nunn, "On the Origins of Gender Roles: Women and the Plough," [QJE 2013](#)

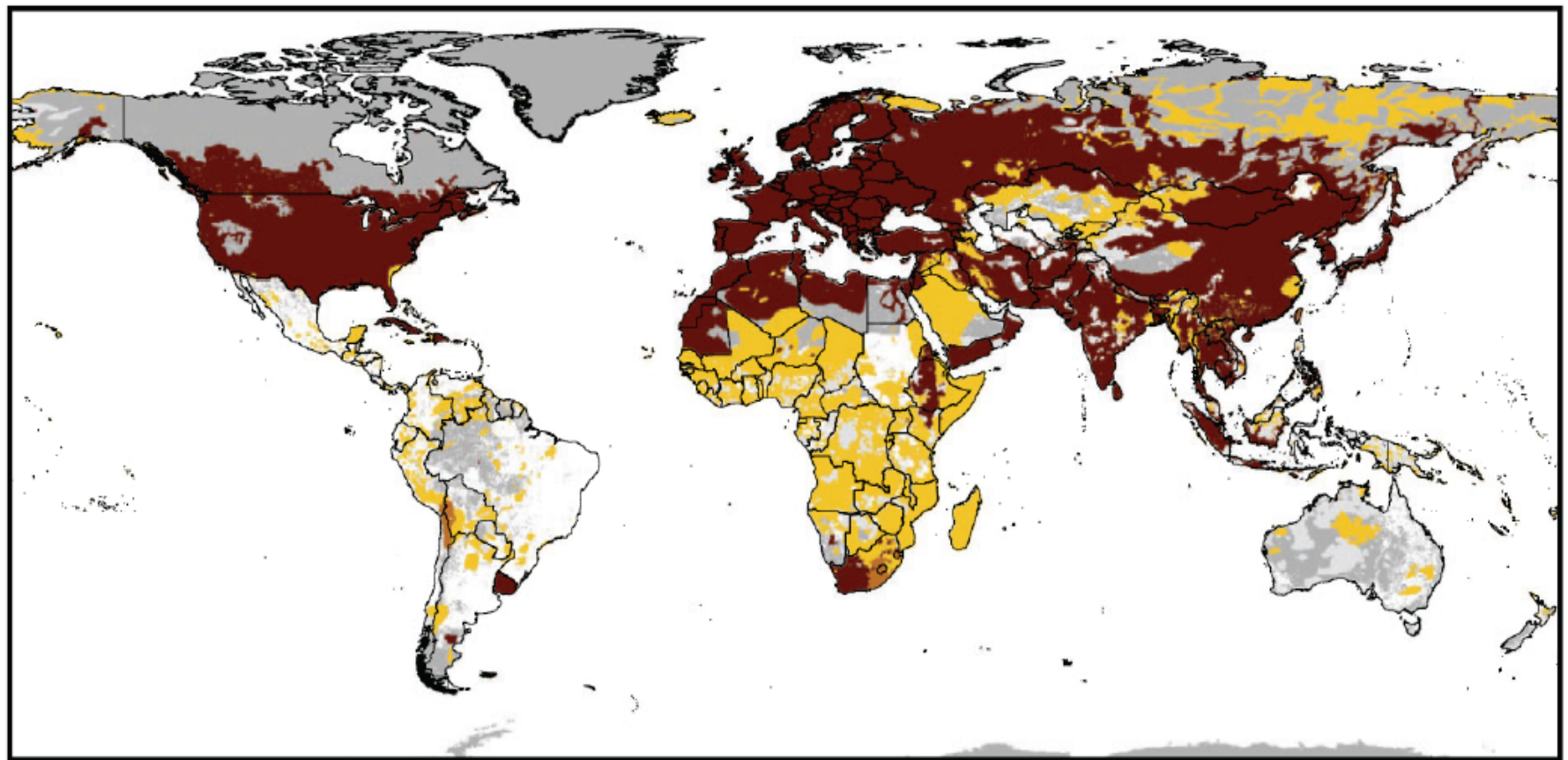


FIGURE II  
 Traditional Plough Use among the Ethnic/Language Groups Globally

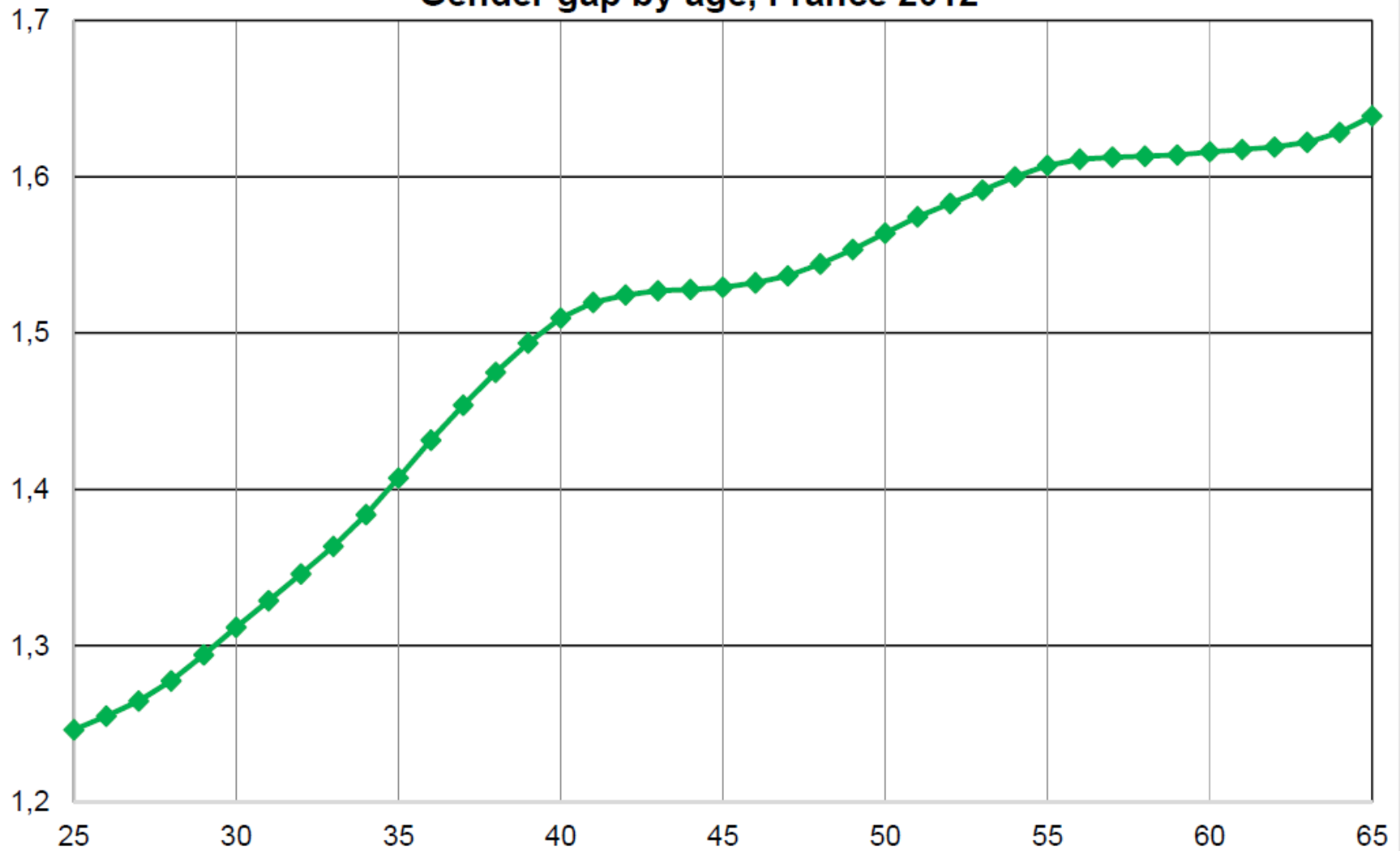


From Alesina, Giuliano, and Nunn, "On the Origins of Gender Roles"

- The rise toward gender equality is certainly not linear: the « breadwinner model » (men work, women stay at home) became particularly strong during 20<sup>c</sup>, but less so before, and probably less so after
- Today's conflicts about mothers role = probably part of the explanation for low fertility in Germany or Japan (strong pressure on mothers to stay at home → women react by not having children → gender equality may have become the best policy to promote fertility)
- Goody 2000, 2006: « Strong normative discourses against working mothers extended from aristocratie to bourgeoisie in 18<sup>c</sup>, and then to upper working class during late 19c and early 20<sup>c</sup>; reversal in late 20<sup>c</sup>, so that the breadwinner model has now largely disappeared »
- « This again illustrates the fact that changes in family norms and structures have little to do with one-directional modernization: they always reflect changing power relations and ideology » (e.g. about moral value of work)

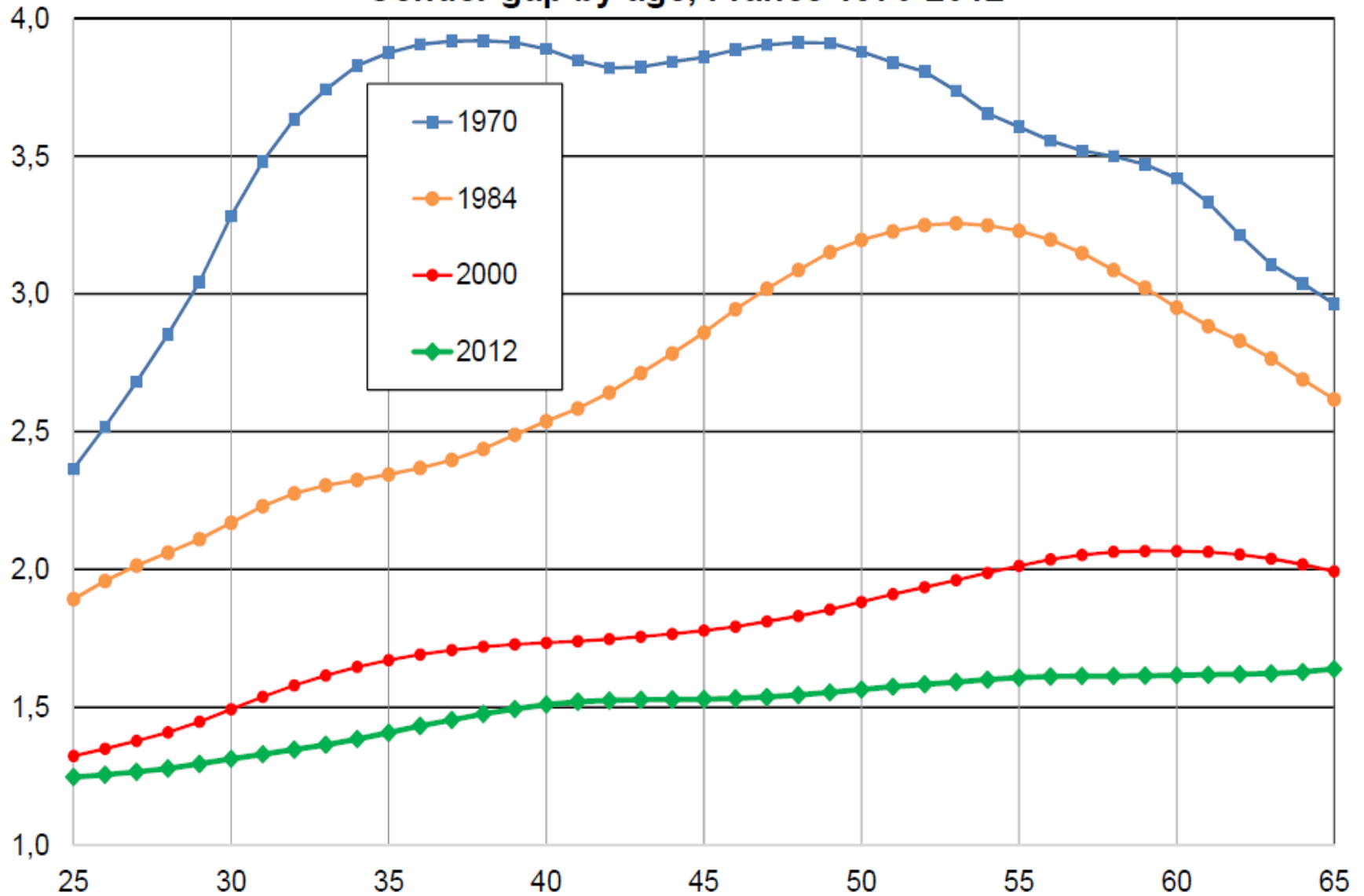
- **How large is gender inequality today? Very large**
- For similar jobs, degrees & experience, gender gap may seem to be « moderate »: say 10-20% higher wages for men
- Sometime even lower in « family-friendly » professions: see e.g. [Goldin-Katz 2012](#) on pharmacists
- But the point is that women do not take the same jobs: different participation rates & work hours, & most importantly different career paths and promotions
- France 2010s: ratio between average labor income of men & women is 1.2 at age 25, 1.5 at age 40, & 1.8 at age 65
- Good news: this used to be much worst (in 1970-1990, men/women wage ratio as large as 3-4 at age 50-60)
- See e.g. [Garbinti-Goupille-Piketty 2016](#)
- **We are just starting to get out of the age of patriarchy**

## Gender gap by age, France 2012



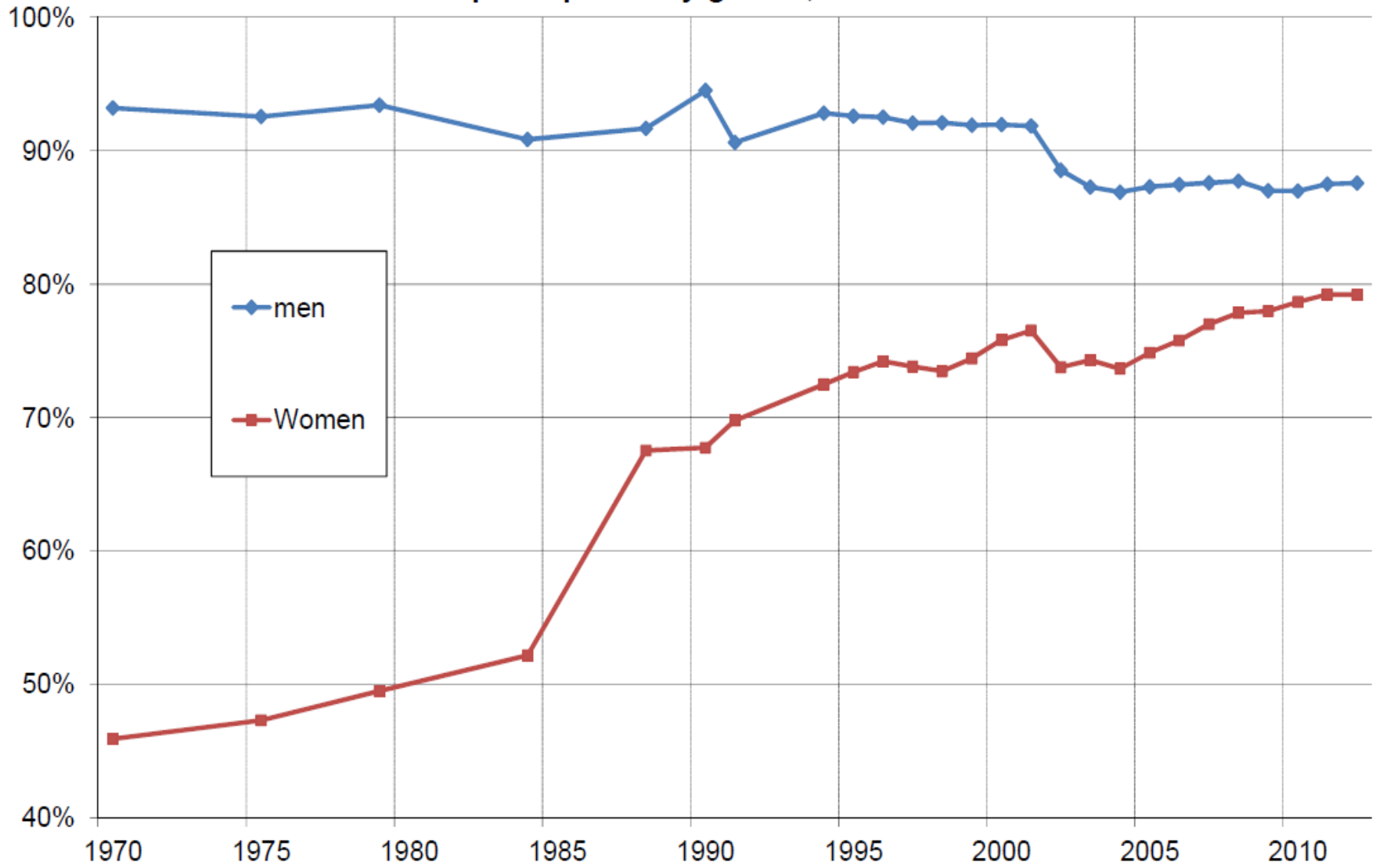
Ratio between average labor income of men and women by age (incl. non participants).  
Labor income includes wages, pensions, unemploy. insurance and 70% of mixed income.

## Gender gap by age, France 1970-2012



Ratio between average labor income of men and women by age (incl. non participants).  
Labor income includes wages, pensions, unemploy. insurance and 70% of mixed income.

## Labor market participation by gender, France 1970-2012



Fraction of men and women 25-to-65-year-old with positive labor income.

Labor income includes wages, pensions, unemployment insurance and 70% of mixed income.

# Share of women in fractiles of top labor incomes in France, 1970-2012

