Mortality, Health, Diseases and the Economy

Lionel Kesztenbaum (INED and PSE)

lionel.kesztenbaum@ined.fr

Advanced Economic History

Session 3

08/10/2025

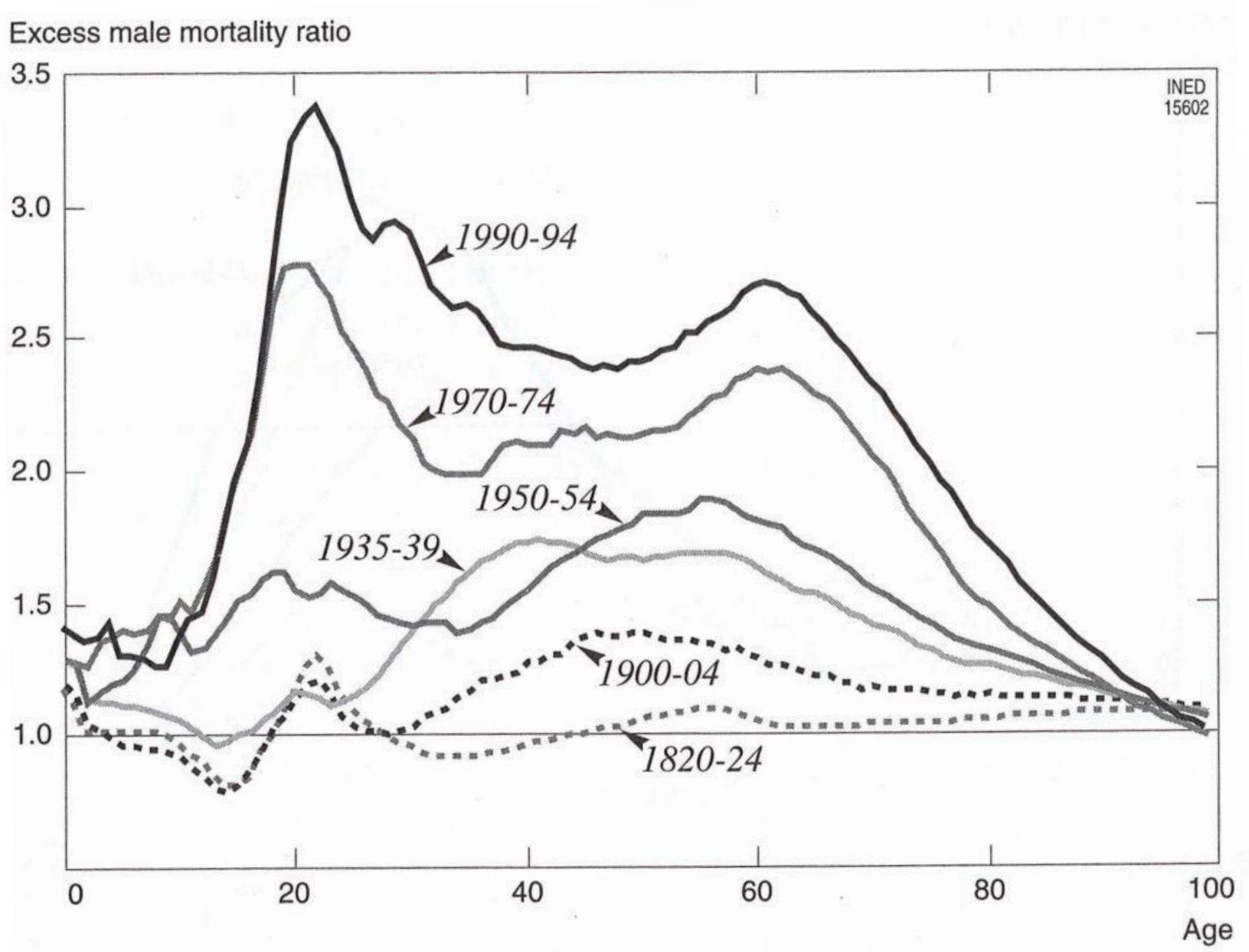
Inequalities during the mortality transition:

Space, gender, and income

The gender gap

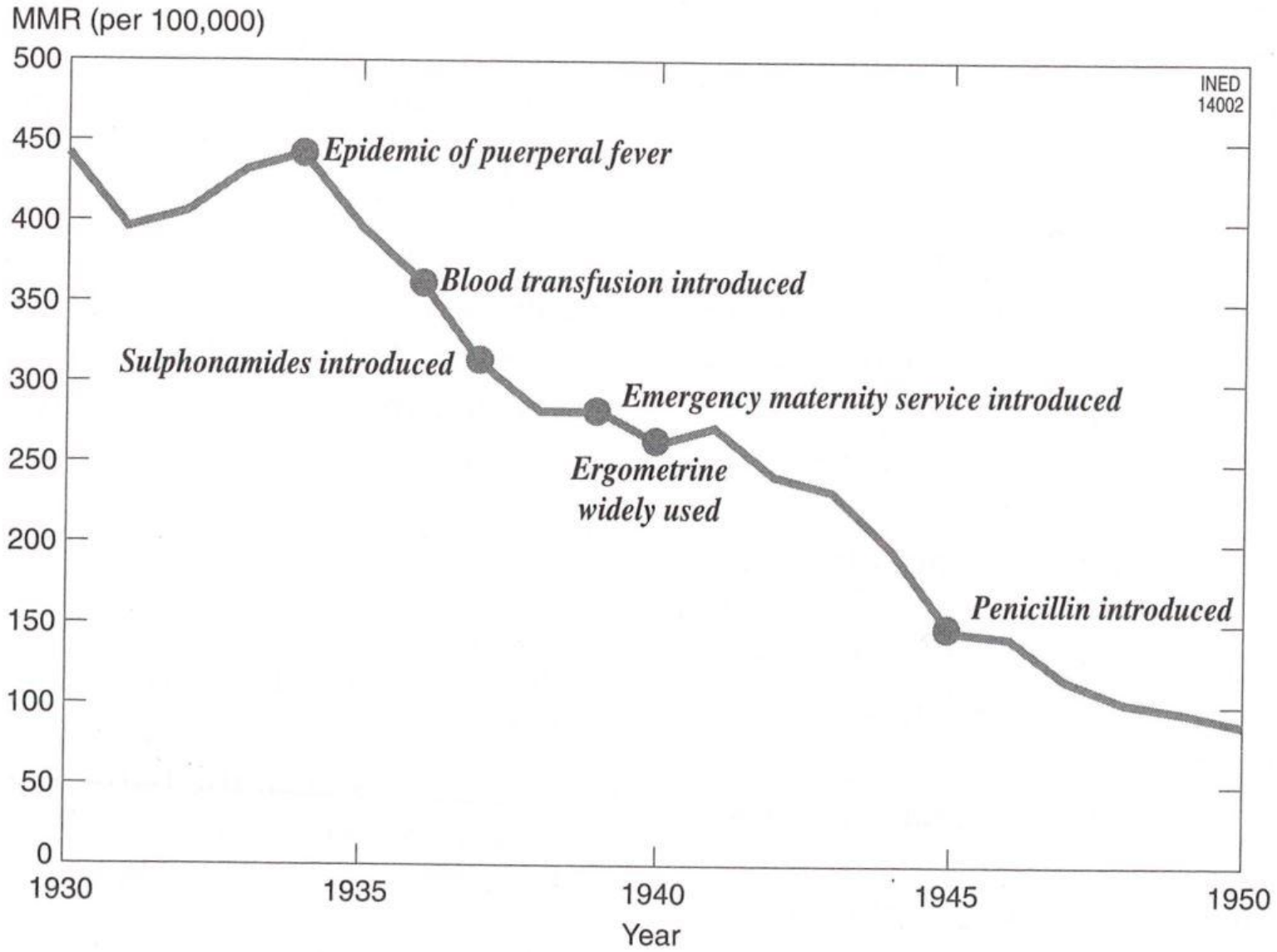
- Natural advantage for women...
- ...Often compensate and reversed by social practices.
  - A reversal during the health transition.
  - A spectacular increase in male mortality.
  - A disadvantage turned to an advantage?
- Finally social practices and genetics goes hand in hand.
- Still huge variations.

Masculine over-mortality, France, 1820-1990



Jacques Vallin. 2006. "Mortality, sex, and gender" in Caselli, Graziella, Jacques Vallin, et Guillaume J. Wunsch. *Demography: Analysis and Synthesis. Volume 2*. Amsterdam ; Boston: Elsevier, 177-194

Maternal mortality ratio, England and Wales, 1930-1950



Judith Fortney. 2006. "Measurement and levels of maternal mortality" in Caselli, Graziella, Jacques Vallin, et Guillaume J. Wunsch. *Demography: Analysis and Synthesis. Volume 2.* Amsterdam ; Boston: Elsevier, 61-70

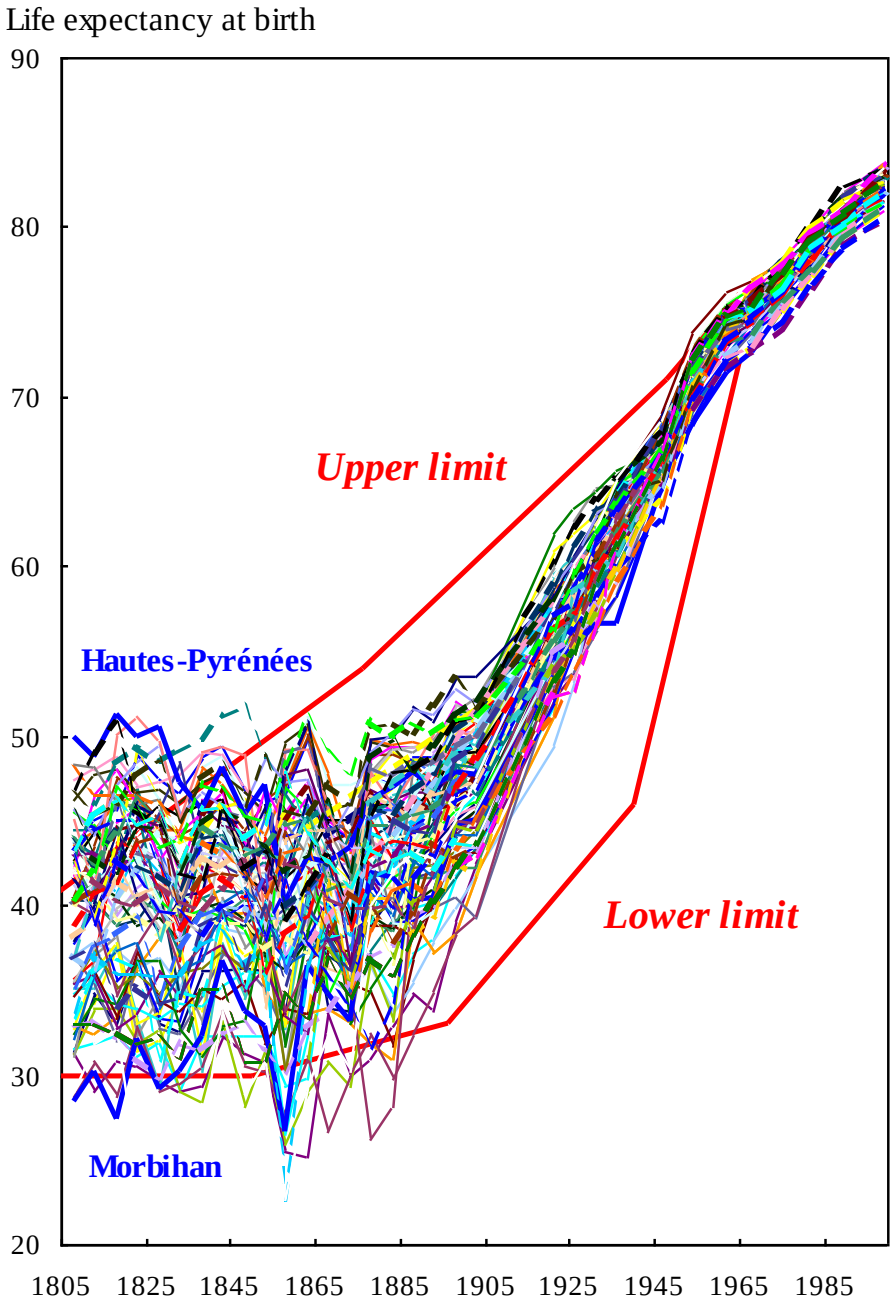
The gender gap

- Natural advantage for women...
- ...Often compensate and reversed by social practices.
  - A reversal during the health transition.
  - A spectacular increase in male mortality.
  - A disadvantage turned to an advantage?
- Finally social practices and genetics goes hand in hand.
- Still huge variations.

Variations in space

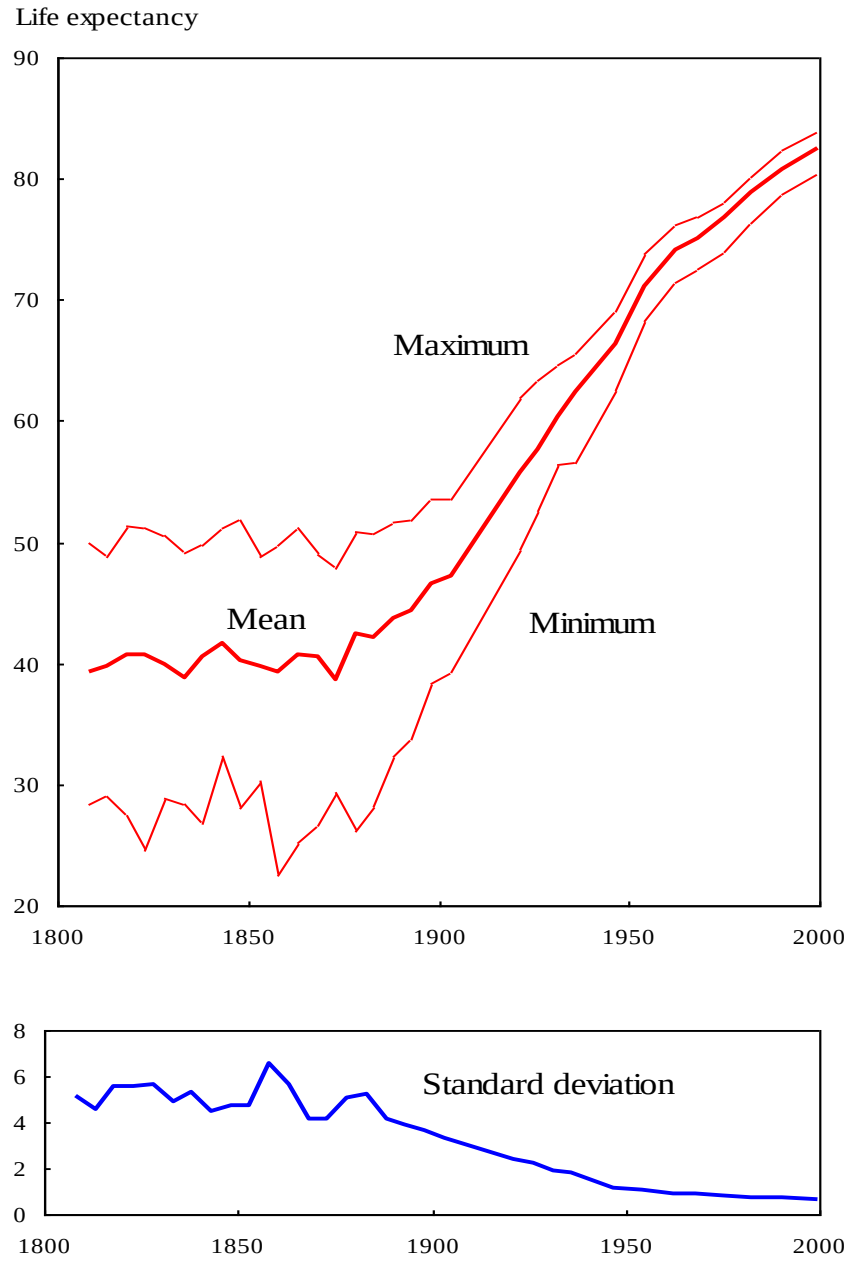
- Convergence between areas over time
  - Sub-national evolutions.
  - Homogenization (of practices, behaviours, knowledge, etc.).
- The “urban penalty”
  - Linked to bad living conditions...
  - ...or population concentration?
  - Stay high until the 20th century.

Female life expectancy by French département



Caselli, Graziella and Jacques Vallin. 2006. "Geographic variations of mortality" in Caselli, Graziella, Jacques Vallin, and Guillaume J. Wunsch. *Demography: Analysis and Synthesis. Volume 2*. Amsterdam ; Boston: Elsevier, 207-234

Female life expectancy by French département



Caselli, Graziella and Jacques Vallin. 2006. "Geographic variations of mortality" in Caselli, Graziella, Jacques Vallin, and Guillaume J. Wunsch. *Demography: Analysis and Synthesis. Volume 2*. Amsterdam ; Boston: Elsevier, 207-234

Variations in space

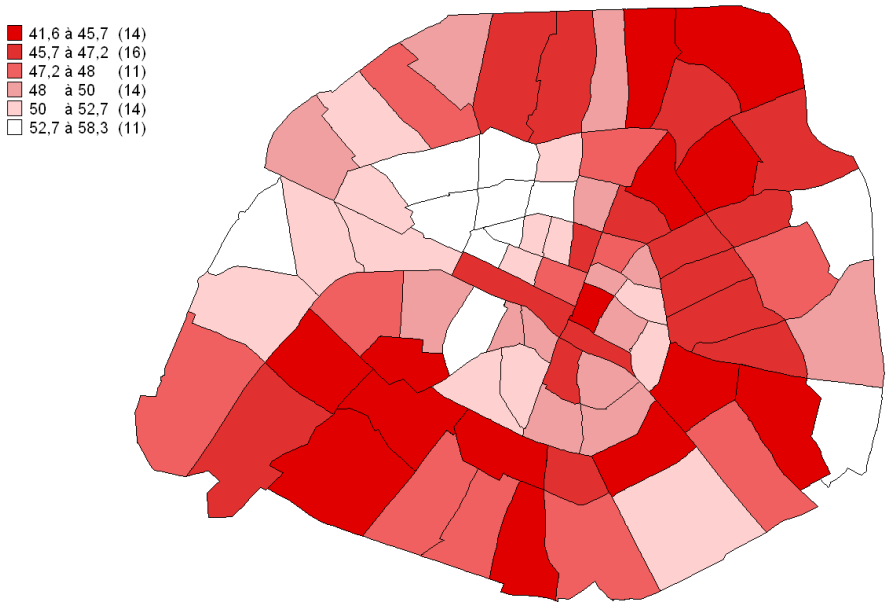
- Convergence between areas over time
  - Sub-national evolutions.
  - Homogenization (of practices, behaviours, knowledge, etc.).
- The “urban penalty”
  - Linked to bad living conditions...
  - ...or population concentration?
  - Stay high until the 20th century.

Within cities mortality in the US

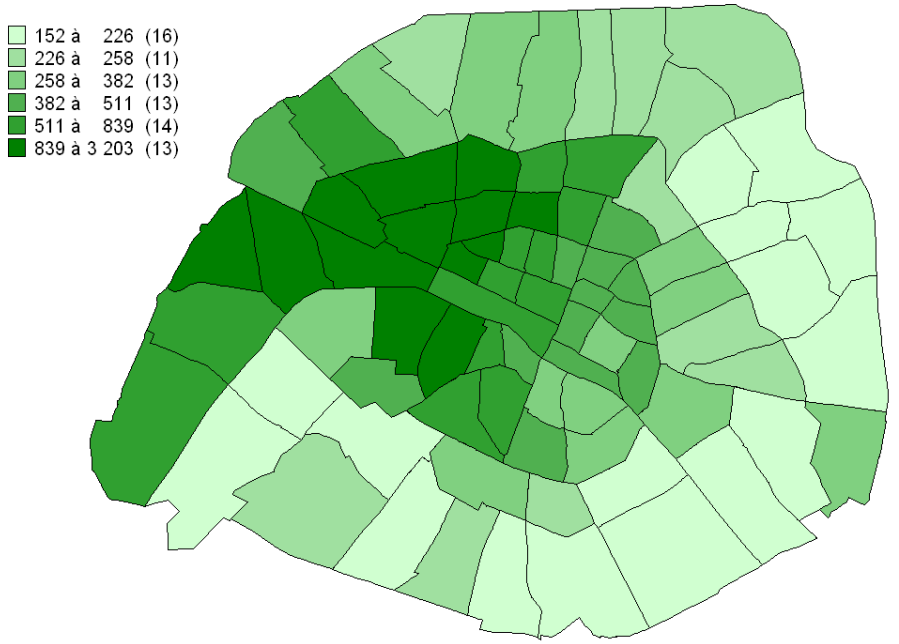
Costa, Dora L. 2015. "Health and the Economy in the United States from 1750 to the Present." Journal of Economic Literature 53 (3): 503–70.

Spatial variations in mortality are also social variations: Paris

Life expectancy, Paris 1881



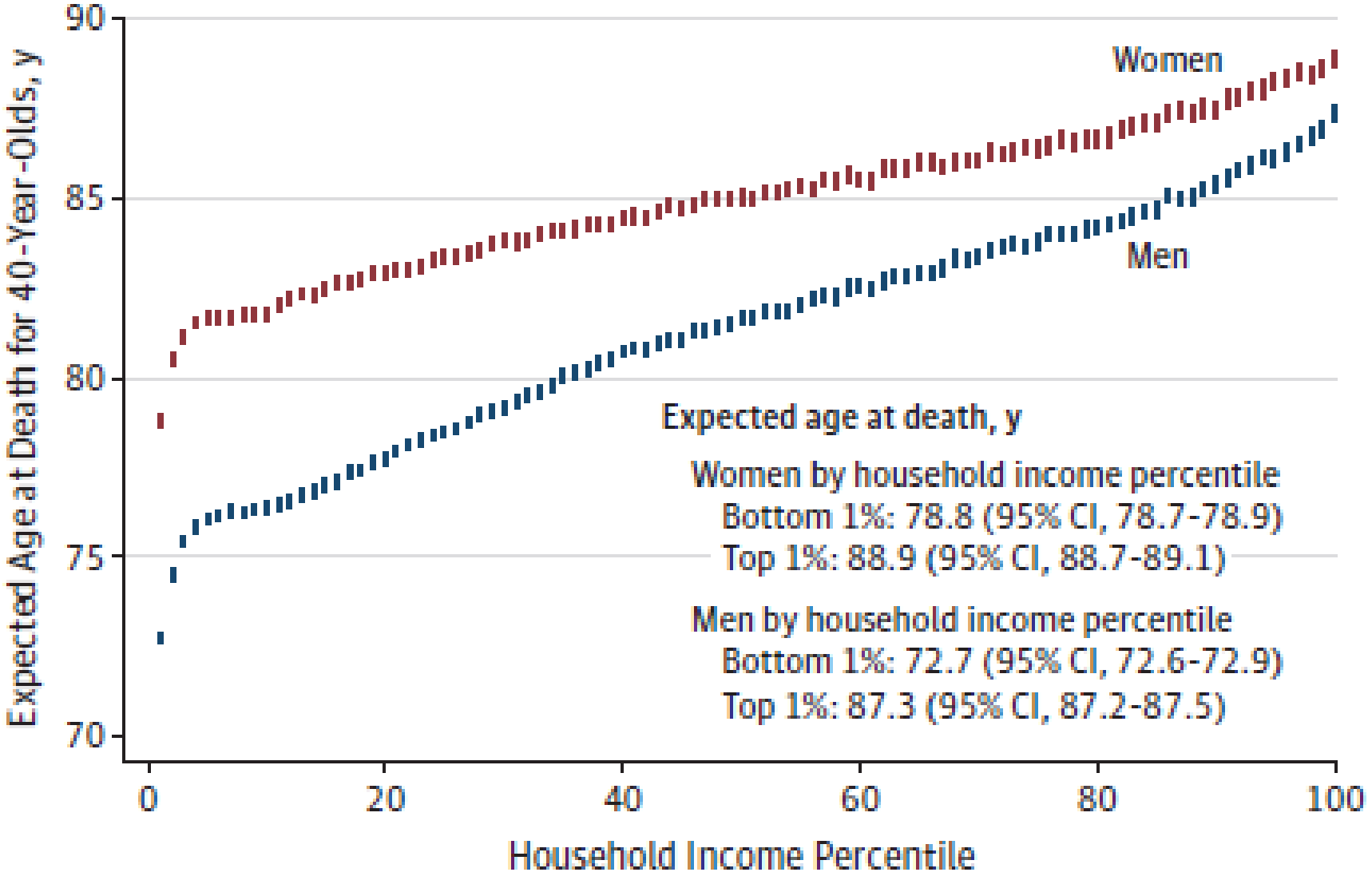
Rents, Paris 1878



The health-wealth relationship

- How much does wealth influence life chances?
  - Various indicators: wealth, income, education, etc.
  - Most studies use occupation as a proxy for affluence.
- Does this relationship change with time?
  - The gradient is invariant with time.
  - The gradient appears with the industrial revolution and diminishes during the 20th century.
  - Role of cities/urbanisation.
  - Role of different medical technology.

The health-wealth relationship: today



Chetty R, Stepner M, Abraham S, et al. 2016 The Association Between Income and Life Expectancy in the United States, 2001-2014. *JAMA*.;315(16):1750–1766.

The health-wealth relationship

- How much does wealth influence life chances?
  - Various indicators: wealth, income, education, etc.
  - Most studies use occupation as a proxy for affluence.
- Does this relationship change with time?
  - The gradient is invariant with time.
  - The gradient appears with the industrial revolution and diminishes during the 20th century.
  - Role of cities/urbanisation.
  - Role of different medical technology.

Wealth does not protect from mortality before IR

- Very limited medical knowledge
  - No use to give all your money to a doctor.
  - It can even be detrimental (e.g., bleeding, lack of hygiene).
- Exposure is key
  - Lot of social mixing and interactions (e.g. servants).
  - Exposure to bad quality food and water is not uncommon, among all social groups.
- Anecdotal evidences
  - From Ramses V to Nathan Rothschild, going by Louis XVth.

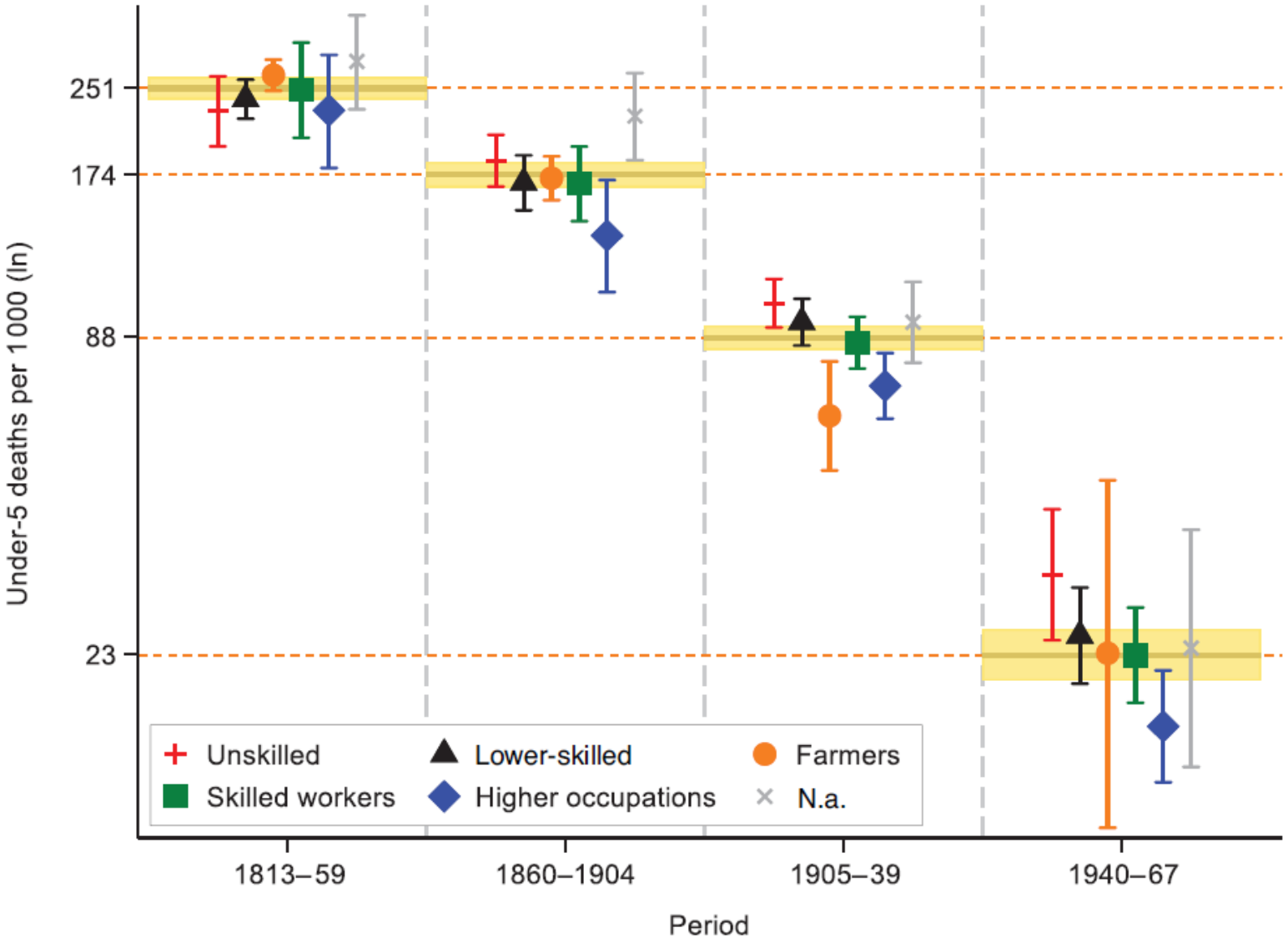
Wealth does protect from mortality before IR

- Standard of living matters
  - More (and better quality) food protects against diseases.
  - General physical conditions is better.
  - Type of work done matters as well.
- Exposure is key
  - The wealthiest are increasingly separated from the population.
  - Less potentially dangerous social interactions.
  - For instance: capacity to flee in times of plague.
- Theory of fundamental cause (Link & Phelan, 1995…).
  - SES-related resources (money, prestige, power…) promote health under different circumstances..
  - The precise links and mechanisms depend on context: Lifestyle; access to health care; environment; psychosocial.
  - Exceptions? In time of crisis or when knowledge is lacking and so power/money might not do anything.

Mixed empirical evidence

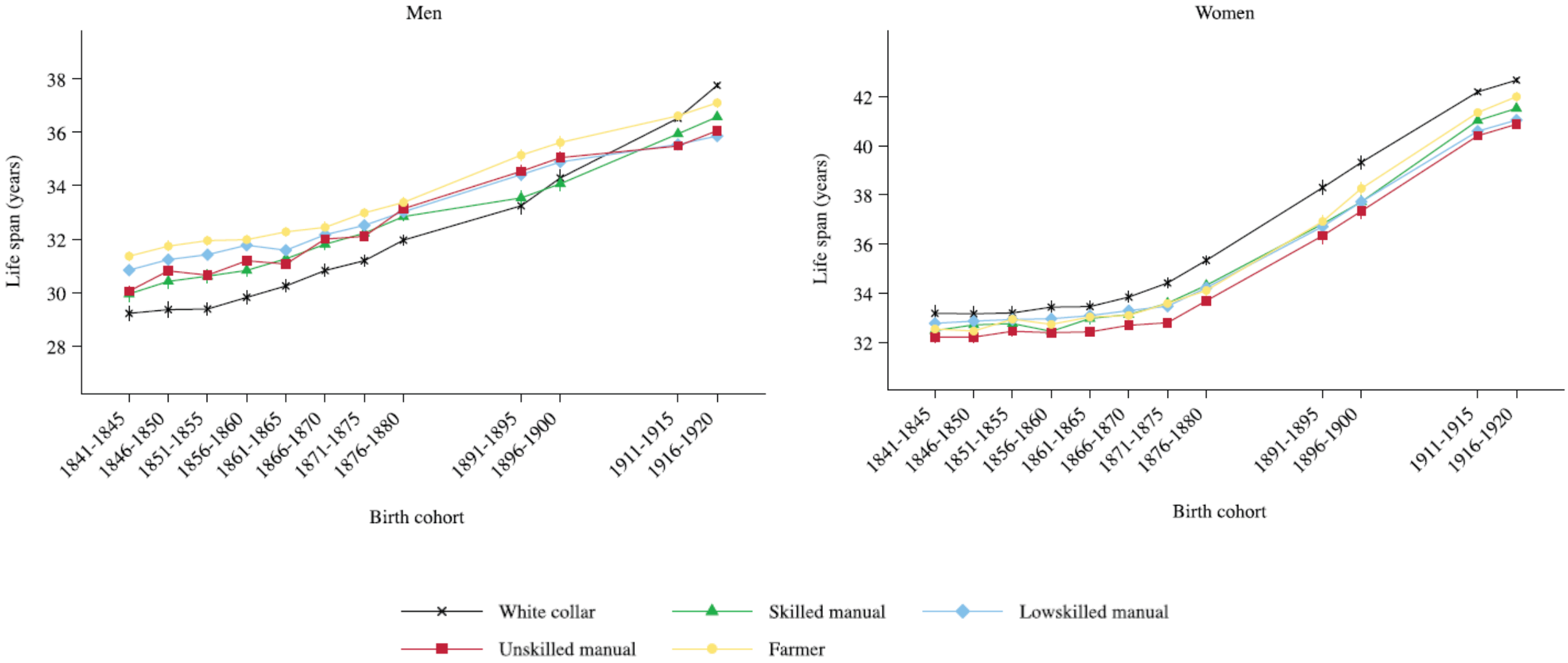
- Very little empirical evidence in the past
  - Plague epidemics: little variation by SES (Alfani & Bonetti 2019: Italy), better adaptation from the wealthy (Cummins, Kelly and O'Grada, 2016: London).
  - Sweden: for men, inversion of the SES gradient over time; much stable for women.
  - Variations by age: child mortality gradient emerge much earlier than for adults.
- Explanations?
  - Chronology of the rise of the gradient points to lifestyle (smoking), work related condition, unequal access.
  - Low nutrition, poor water and sanitation seem to have mattered less.
- Role of context is decisive
  - Not exactly the same in large metropolises and small urban area.
  - Not the same for all age groups, strong differences by gender.

Children mortality by SES, Sweden



Dribe, M. and Karlsson, O. 2022. 'Inequality in early life: Social class differences in childhood mortality in southern Sweden, 1815–1967', *Economic History Review*, 75: pp. 475–502.

SES gradient in the past: Sweden (e40)



Dribe, M. and Eriksson, B. 2025. The Long-Term Development of the Mortality Gradient: Socioeconomic Differences in Adult Life Span of Swedish Cohorts 1841–1920. Population and Development Review, 51: 1170-1204.

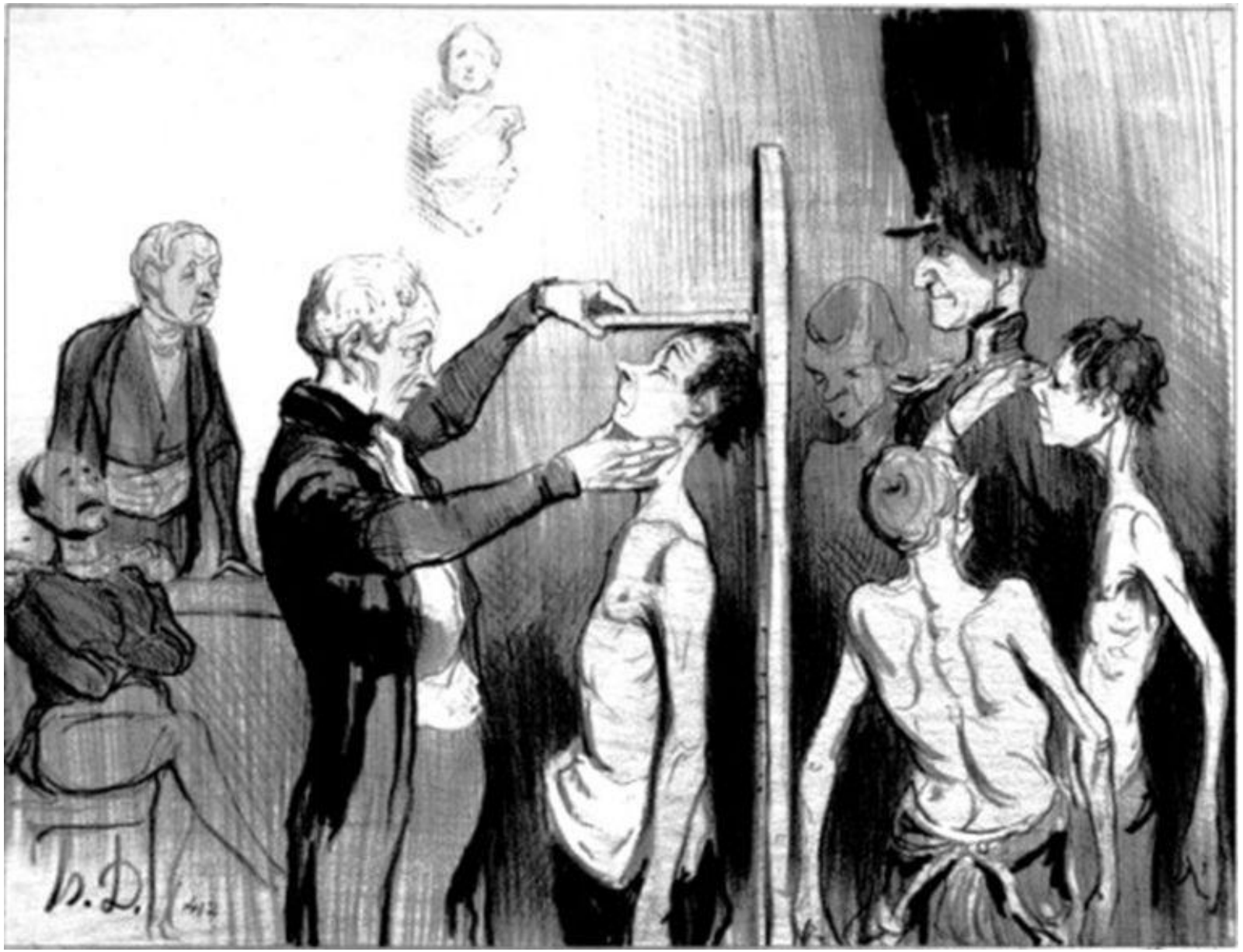
Mixed empirical evidence

- Very little empirical evidence in the past
  - Plague epidemics: little variation by SES (Alfani & Bonetti 2019: Italy), better adaptation from the wealthy (Cummins, Kelly and O'Grada, 2016: London).
  - Sweden: for men, inversion of the SES gradient over time; much stable for women.
  - Variations by age: child mortality gradient emerge much earlier than for adults.
- Explanations?
  - Chronology of the rise of the gradient points to lifestyle (smoking), work related condition, unequal access.
  - Low nutrition, poor water and sanitation seem to have mattered less.
- Role of context is decisive
  - Not exactly the same in large metropolises and small urban area.
  - Not the same for all age groups, strong differences by gender.

Who beneficiated from the health transition?

- Changes in health technology
  - Costs and returns may vary between social groups.
- Changes in the economic structure matters
  - Link with income inequalities.
  - Wage returns to different kind of work.
- Contradictory findings
  - Lack of empirical evidences.
  - Non-linear evolutions over time.
  - Education gradient

Height and physical capital



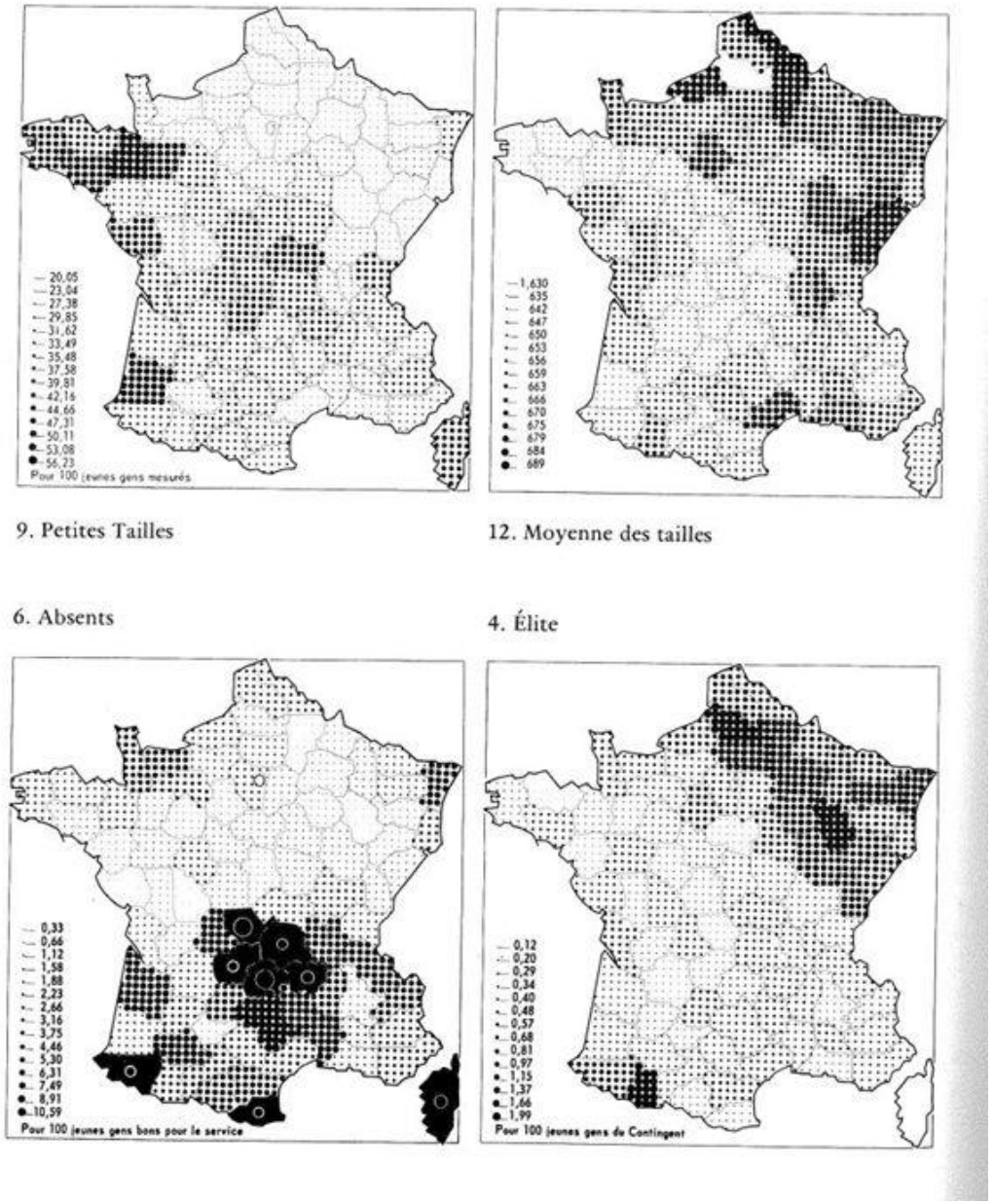
Stature as a measure of standard of living

- The body as a firm
  - Inputs: food (calories).
  - Outputs: basic metabolism, diseases, physical activities.
- Results: physical growth
  - Height is the visible result of the growth process.
- An indicator of standards of living?

Stature as a measure of standard of living

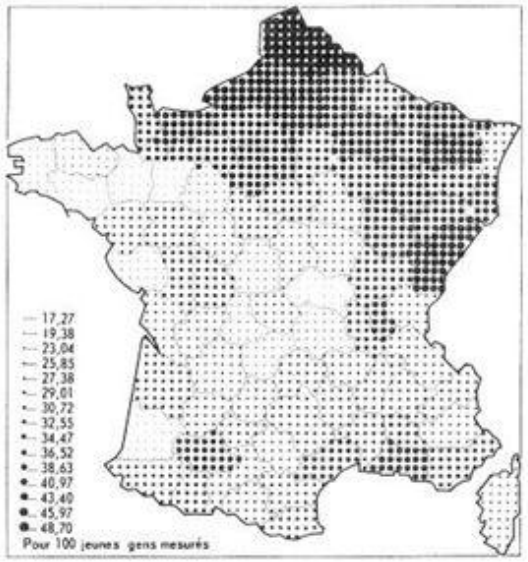
- The base for an anthropological history
  - Indicators of physical conditions.
  - Le Roy Ladurie et al. (*Anthropologie du conscrit français*).
- Robert Fogel
  - Compensating the lack of indicators of living standards for black slaves.
  - Showing that height is not correlated with income.
  - Looking at the relationships between height and mortality.
  - Getting a broader perspective on height.

Height and living conditions in France

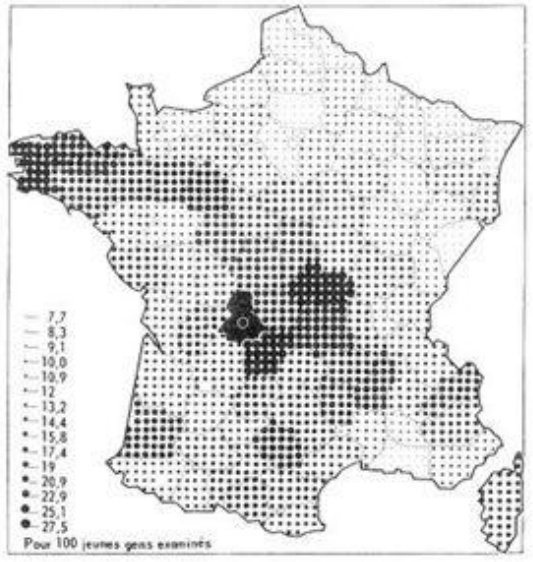


Aron, Jean-Paul, Paul Dumont, et Emmanuel Le Roy Ladurie. 1972. *Anthropologie du conscrit français d'après les comptes numériques et sommaires du recrutement de l'armée (1819-1826), présentation cartographique*. Civilisations et sociétés. Paris, La Haye: Mouton.

Height and education in France

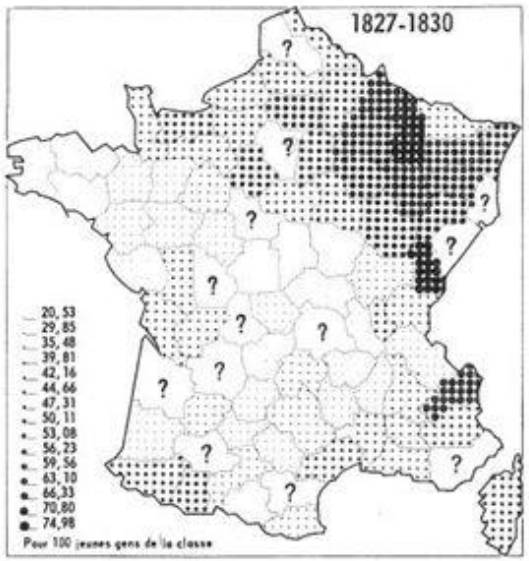


11. Grandes tailles

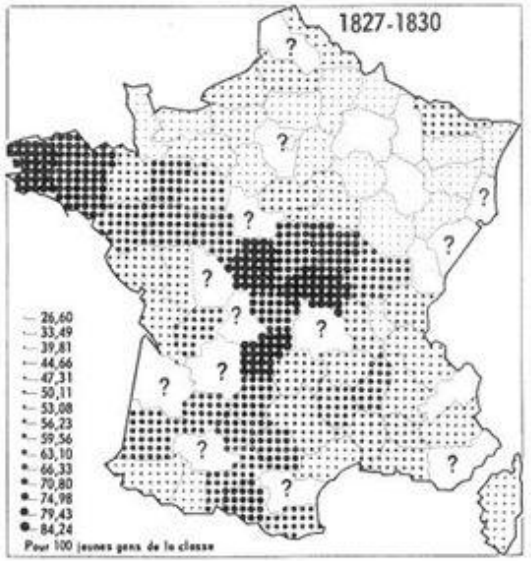


50. Défaut de taille

53. Lire et écrire



54. Ni lire, ni écrire



Aron, Jean-Paul, Paul Dumont, et Emmanuel Le Roy Ladurie. 1972. *Anthropologie du conscrit français d'après les comptes numériques et sommaires du recrutement de l'armée (1819-1826), présentation cartographique*. Civilisations et sociétés. Paris, La Haye: Mouton.

Stature as a measure of standard of living

- The base for an anthropological history
  - Indicators of physical conditions.
  - Le Roy Ladurie et al. (*Anthropologie du conscrit français*).
- Robert Fogel
  - Compensating the lack of indicators of living standards for black slaves.
  - Showing that height is not correlated with income.
  - Looking at the relationships between height and mortality.
  - Getting a broader perspective on height.

The case *for* anthropometrics

- Easy to compute and frequently available
  - Often the only indicator available.
  - Allows for study of evolution in the long run.
  - And between countries.
- Reflect more directly standards of living or welfare (?).
- Have consequences on future life.

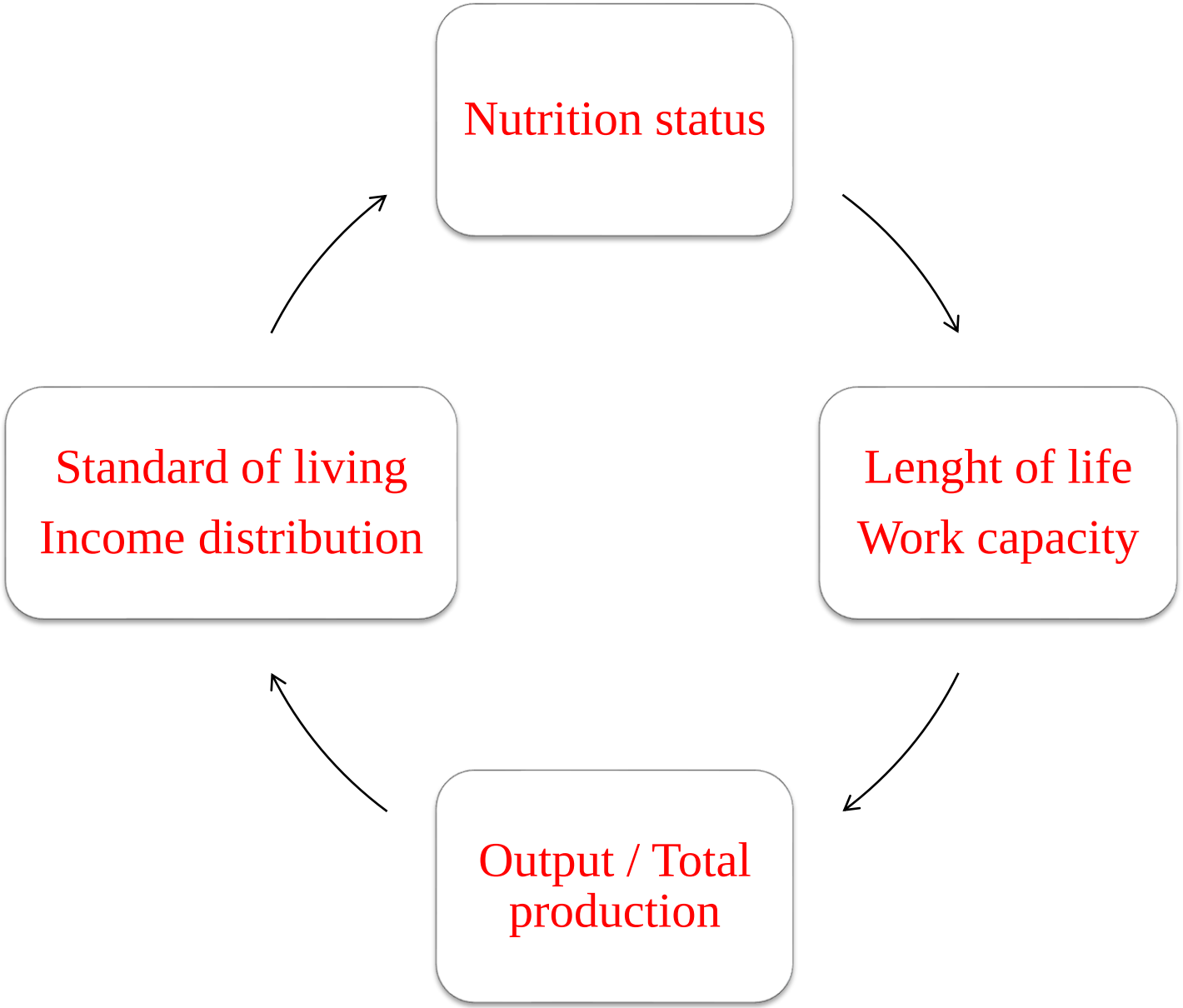
The case *against* anthropometrics

- What it measures is still unclear
  - Many different determinants.
  - The period of body growth is large and its limits unclear.
- Many sources of bias
  - Measurement issues: truncation, heaping.
  - Population are often selected.
- A shortcut too often made from heights
  - to standards of living,
  - to well-being.

Stature as a physical capital

- The size of the body matters
  - For physical (and cognitive?) ability.
  - For length and intensity of work.
- Consequences on later life?
  - Resistance to disease? Longer life?
- A virtuous circle (Fogel).

The technophysio evolution



The historical heights literature

- Military personnel
  - Contributing to the standard of living debate.
  - The most easily available source.
  - But little account for self selection.
- Slaves, prisoners and criminals
  - Slave trade and human growth.
  - Prison data.
- Bias and selections
  - Too strong emphasize on left-side selection.
  - Changes in selection over time (so in the composition of the sample).

Early life effects

- Early life conditions
  - Persistence of the effect, association with certain diseases.
  - Possibility to compensate later? Catching-up….
- The foetal origin hypothesis
  - Heavily debated: not easy to observe or measure.
  - Even among nutritionists and co.
- In utero vs later
  - Timing of the effects.
  - Variations among age but also gender effects.

Early life effects: early examples

- Season of Birth
  - Linked to longevity, but also to specific risks.
  - Cystic fibrosis, multiple sclerosis, diabetes, high blood pressure, etc.
  - And non-medical conditions: occupational attainment, various measurement of education.
- Age of mother at conception
  - Linked to longevity.
- Cohort-specific insults, especially in utero
  - David Barker and the Fetal Origins Hypothesis
  - Example: 1918-19 influenza pandemic (Almond, *Journal of Political Economy* 2006).

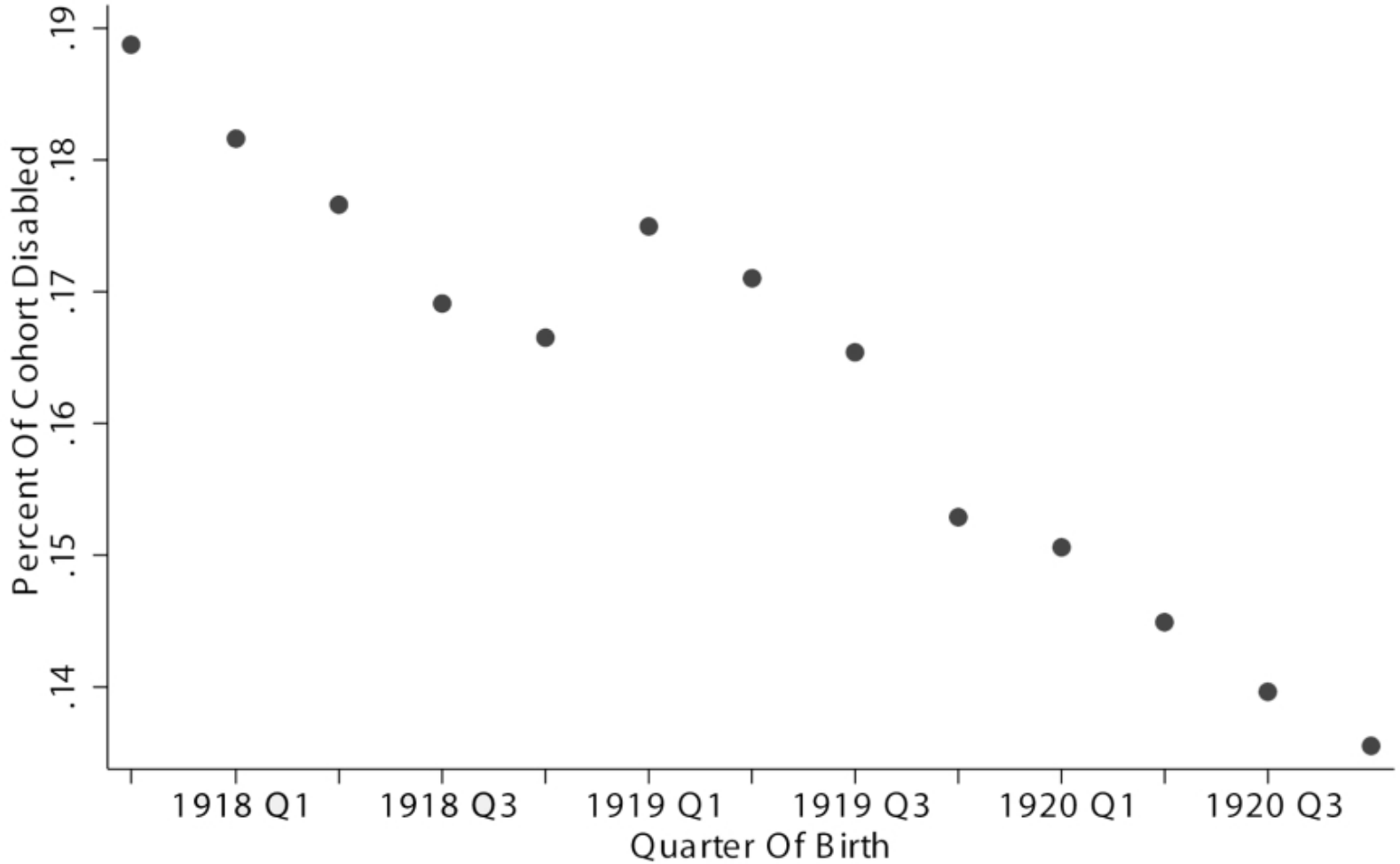


FIG. 2.—1980 male disability rates by quarter of birth: prevented from work by a physical disability.

Almond, *JPE* (2006)

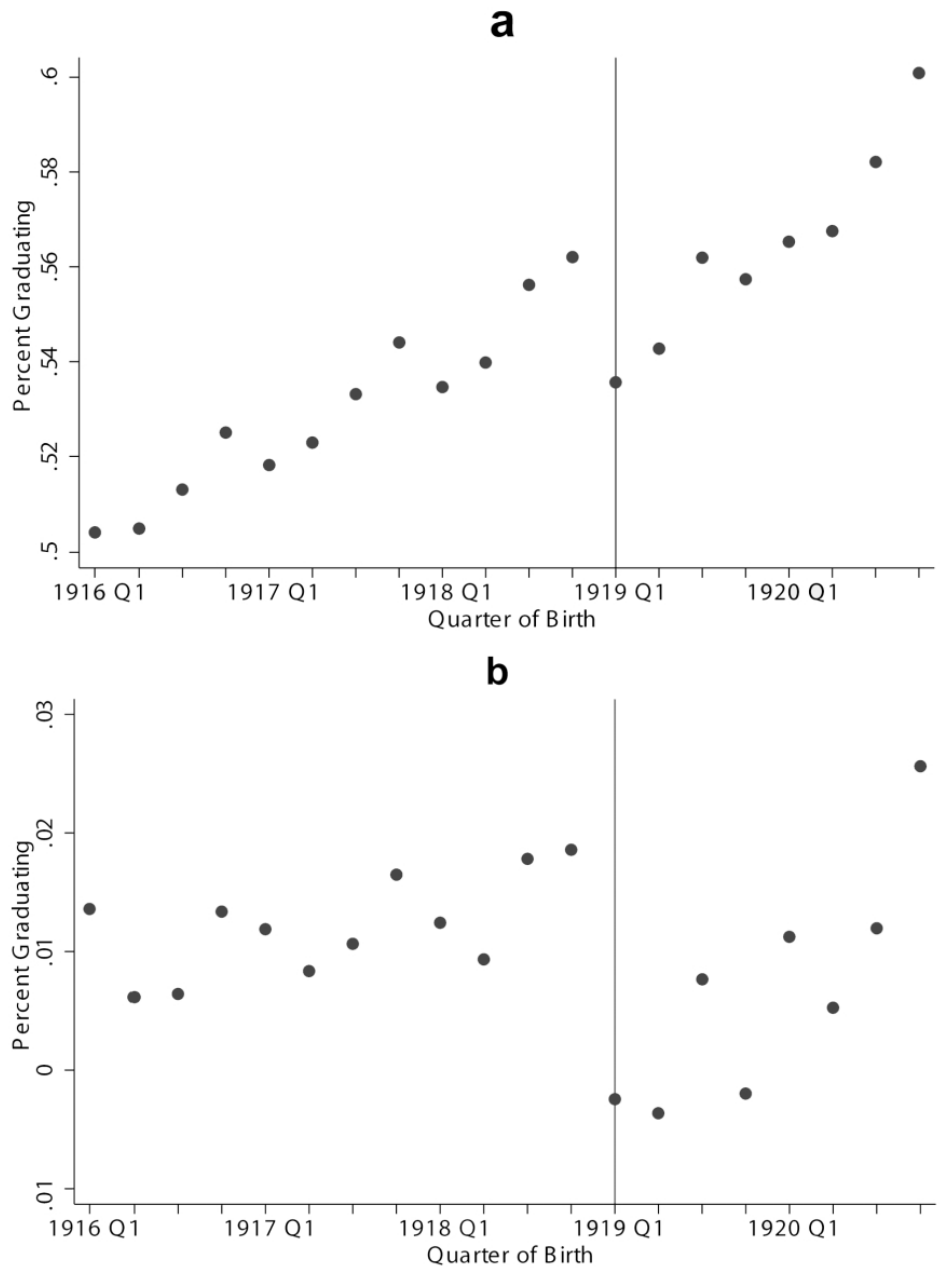


FIG. 5.—*a*, 1980 high school graduation rate by quarter of birth. *b*, Regression-adjusted 1980 high school graduation rate by quarter of birth.

Almond, *JPE* (2006)

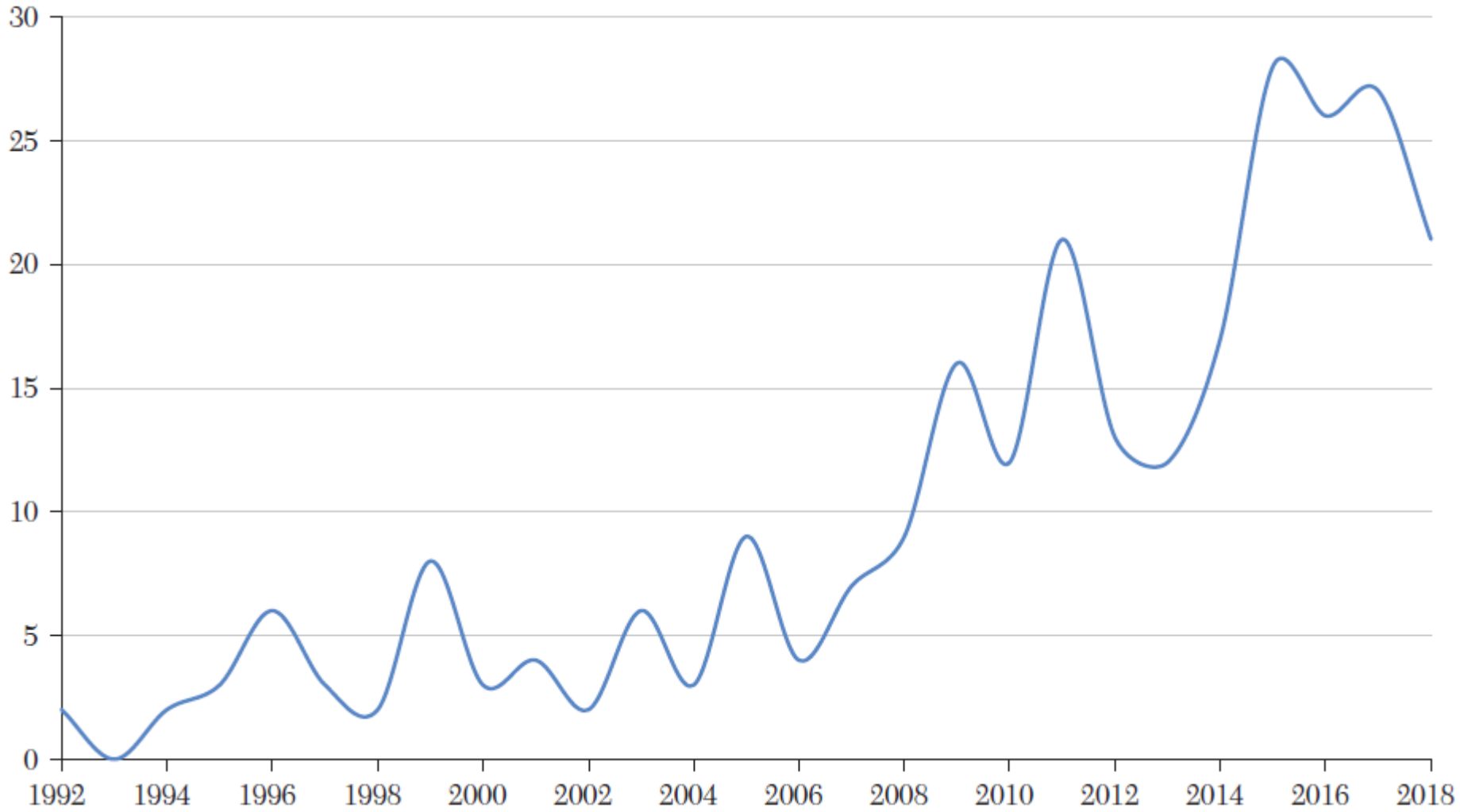
Investigating early life effects

- Specific shocks: wartime and long lasting deprivation
  - Civil warfare in present-day developing countries.
  - Papers on long term consequences of Vietnam war. Explore longevity, but also specific risks.
  - Korean war, Biafra, Ethiopia, etc.
- Famines
  - The Dutch Hunger Winter, the Great leap forward, the siege of Leningrad…
  - Most obvious exogenous shocks...
  - ... but selection issues and limitations of the data.
  - Problem with the timing, the precise chronology.
- Overviews
  - Almond, Douglas, and Janet Currie. 2011. "Killing Me Softly: The Fetal Origins Hypothesis." *Journal of Economic Perspectives*, 25 (3): 153-72.
  - Almond, Douglas, Janet Currie and Valentina Duque. 2018. "Childhood Circumstances and Adult Outcomes: Act II." *Journal of Economic Literature*, 56 (4): 1360-1446.

Early life effects on economic outcomes

- "Thus, the fetal origins hypothesis has not only survived contact with economics, but has flourished."
- "Clearly, a full acceptance of the fetal origins hypothesis idea would have radical implications for individual decisions and policy alike, suggesting for example, that the optimum time to intervene to improve children's life chances is before they are born, and perhaps before mothers even realize that they are pregnant." Almond and Currie, *JEP* (2011).
- Direct or indirect effects
  - Measure of fetal health (birth weight) vs latent effects.
  - Nutrional vs non-nutrional effects: maternal stress.
- The challenge of measure
  - Easy to observe (just need a date/place of birth), but control group is much trickier to obtain.
  - The advantage of history: people are seen after the end of their life and these life can be replaced in a broader context.
  - But very a-historical analyses in the end.

Publication on FOH in top economic journals



From Almond, Currie and Duque *JEL* (2018). Number of annual publications from January 1993 to October 2015 in the *Quarterly Journal of Economics, American Economic Review, Journal of Political Economy, Econometrica, Review of Economic Studies, Journal of Labor Economics, Journal of Econometrics, Journal of the European Economic Association, Review of Economics and Statistics, Journal of Human Resources, Journal of Public Economics, American Economic Journal: Applied Economics, Journal of Development Economics, American Economic Journal: Economic Policy, and Journal of Health Economics*

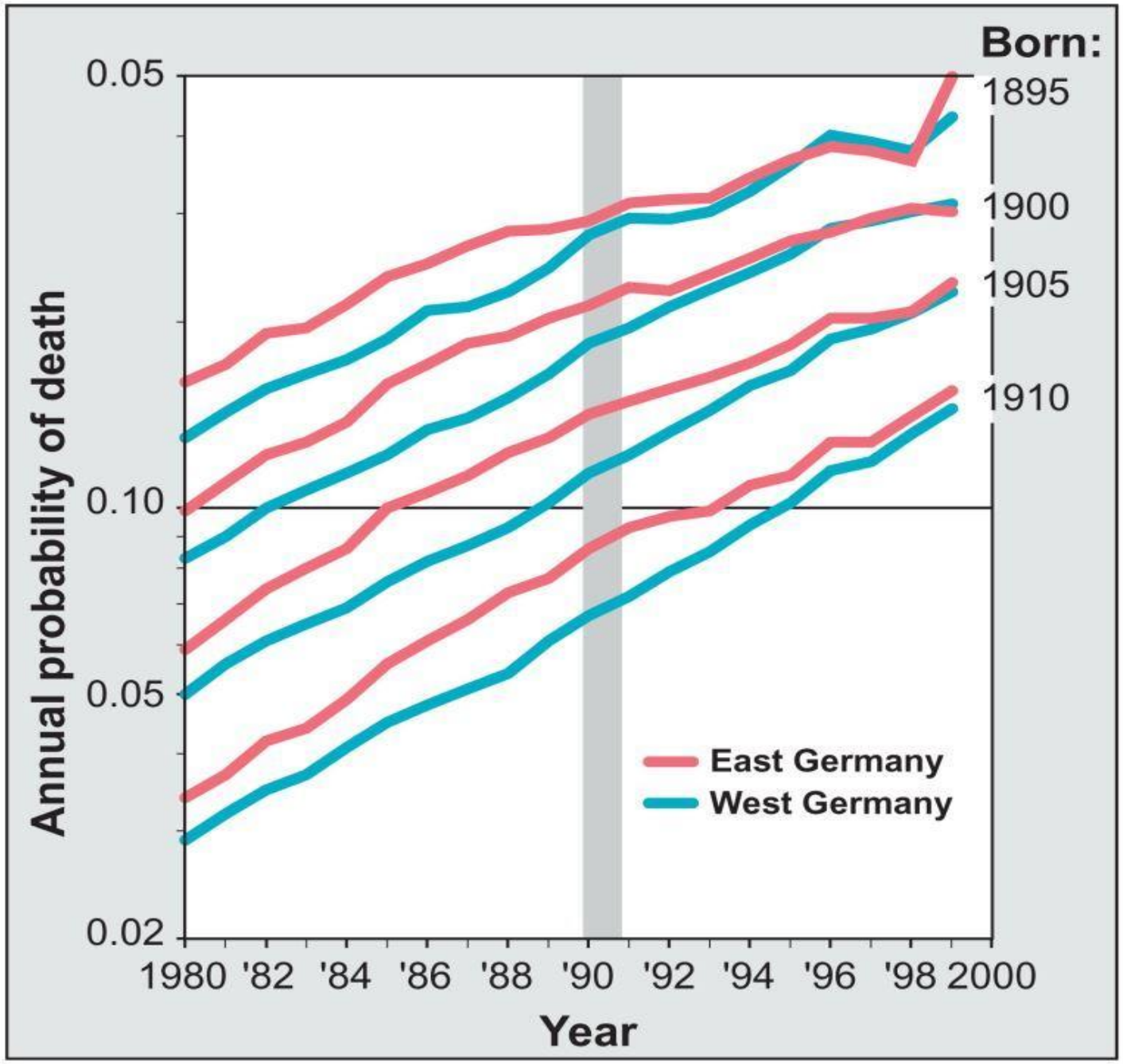
Early life effects on economic outcomes

- "Thus, the fetal origins hypothesis has not only survived contact with economics, but has flourished."
- "Clearly, a full acceptance of the fetal origins hypothesis idea would have radical implications for individual decisions and policy alike, suggesting for example, that the optimum time to intervene to improve children's life chances is before they are born, and perhaps before mothers even realize that they are pregnant." Almond and Currie, *JEP* (2011).
- Direct or indirect effects
  - Measure of fetal health (birth weight) vs latent effects.
  - Nutrional vs non-nutrional effects: maternal stress.
- The challenge of measure
  - Easy to observe (just need a date/place of birth), but control group is much trickier to obtain.
  - The advantage of history: people are seen after the end of their life and these life can be replaced in a broader context.
  - But very a-historical analyses in the end.

Contra early life hypothesis

- Germany as a quasi natural experiment
  - Gjonça, Brockmann and Maier (2000); Vaupel et al. (2003); Myrskylä and Scholz (2013), etc.
- Vaupel, Carey, and Christensen:
  - "Although conditions early in life do significantly influence human health and survival late in life, the German example—and other demographic data—provide strong evidence that such effects are of less importance (at least in more recent decades) than changes in current conditions."
  - "Epidemiological and clinical research provide further evidence of the malleability of old age. For example, the risk of death for elderly smokers who quit falls, within 1 or 2 years, to a lower level than that suffered by recalcitrant smokers. There is a growing appreciation that even octogenarians and nonagenarians can substantially benefit from medical interventions such as cataract surgery and hip replacement."

Death rates in Germany before and after reunification



Vaupel, James W., James R. Carey, and Kaare Christensen. 2003. "It's Never Too Late." *Science* 301 (5640): 1679–81.

Contra early life hypothesis

- Germany as a quasi natural experiment
  - Gjonça, Brockmann and Maier (2000); Vaupel et al. (2003); Myrskylä and Scholz (2013), etc.
- Vaupel, Carey, and Christensen:
  - "Although conditions early in life do significantly influence human health and survival late in life, the German example—and other demographic data—provide strong evidence that such effects are of less importance (at least in more recent decades) than changes in current conditions."
  - "Epidemiological and clinical research provide further evidence of the malleability of old age. For example, the risk of death for elderly smokers who quit falls, within 1 or 2 years, to a lower level than that suffered by recalcitrant smokers. There is a growing appreciation that even octogenarians and nonagenarians can substantially benefit from medical interventions such as cataract surgery and hip replacement."

Revisiting the 1918 influenza pandemic

- Brown & Thomas (2018): a refutation of Almond (2006)
  - "The non-random selection of the draft and the hypothesized non-arbitrary family planning of those experiencing a war, create legitimate concerns over the assumption of random experimental assignment."
- Beach, Ferrie & Saavedra (2018): refuting the refutation?
  - "These data allow us to construct an individual level panel dataset by linking World War II enlistment records back to the census. This means that we can observe each individual twice: first as a child with their parents and again as an adult when they enlist."
- The synthesis: Beach, Brown, Ferrie, Saavedra, and Thomas (2022)
  - "We find that exposure to greater pandemic intensity lowered educational attainment among the male enlistees that were successfully linked to the 1920 census when comparisons are drawn either between the 1912-1919 birth cohorts or among brothers in a household fixed effects model. On the other hand, when we restrict attention to the 1918-1919 birth cohorts, to help rule out unobserved differences across cohorts, none of the estimates is statistically significant.."

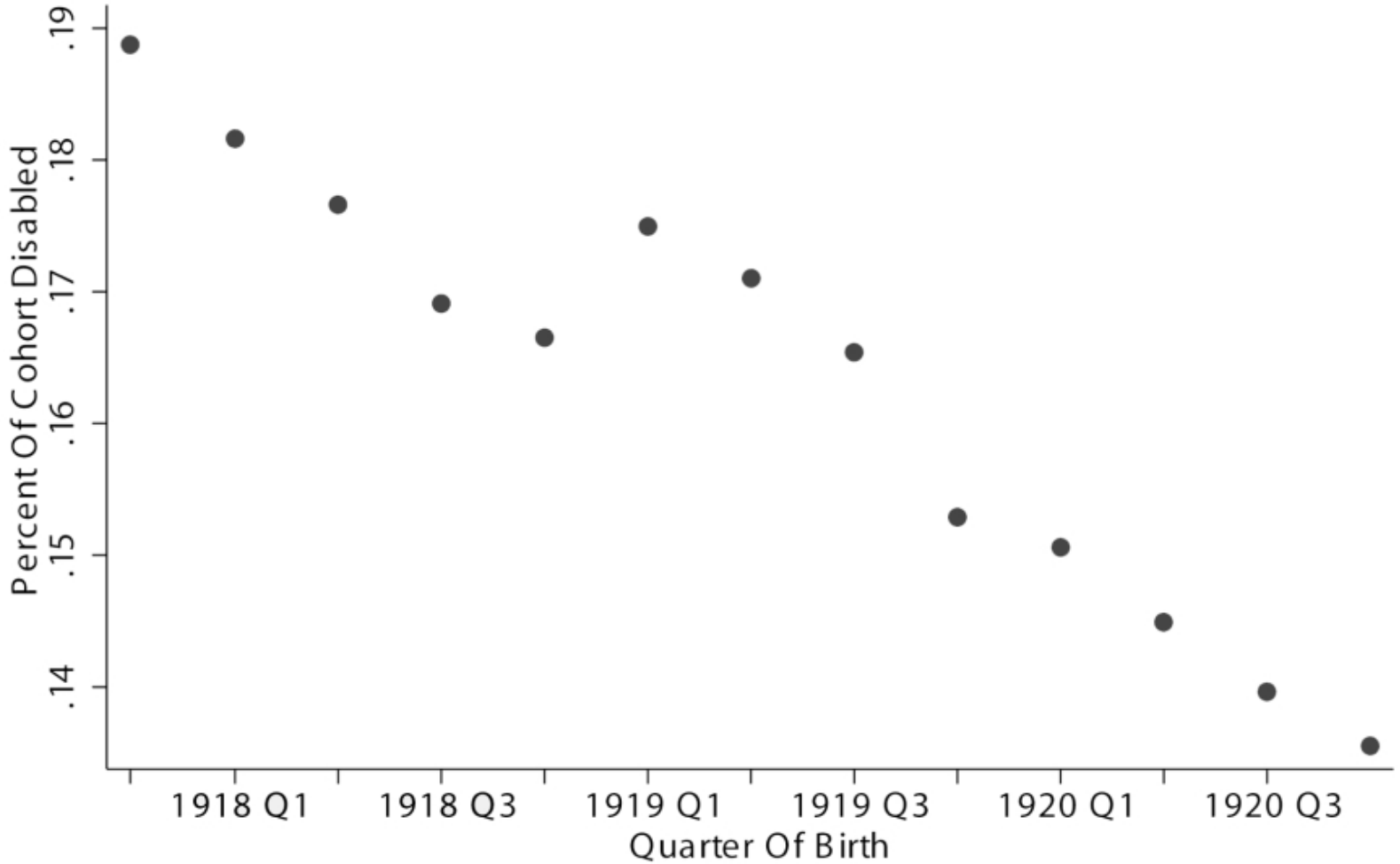
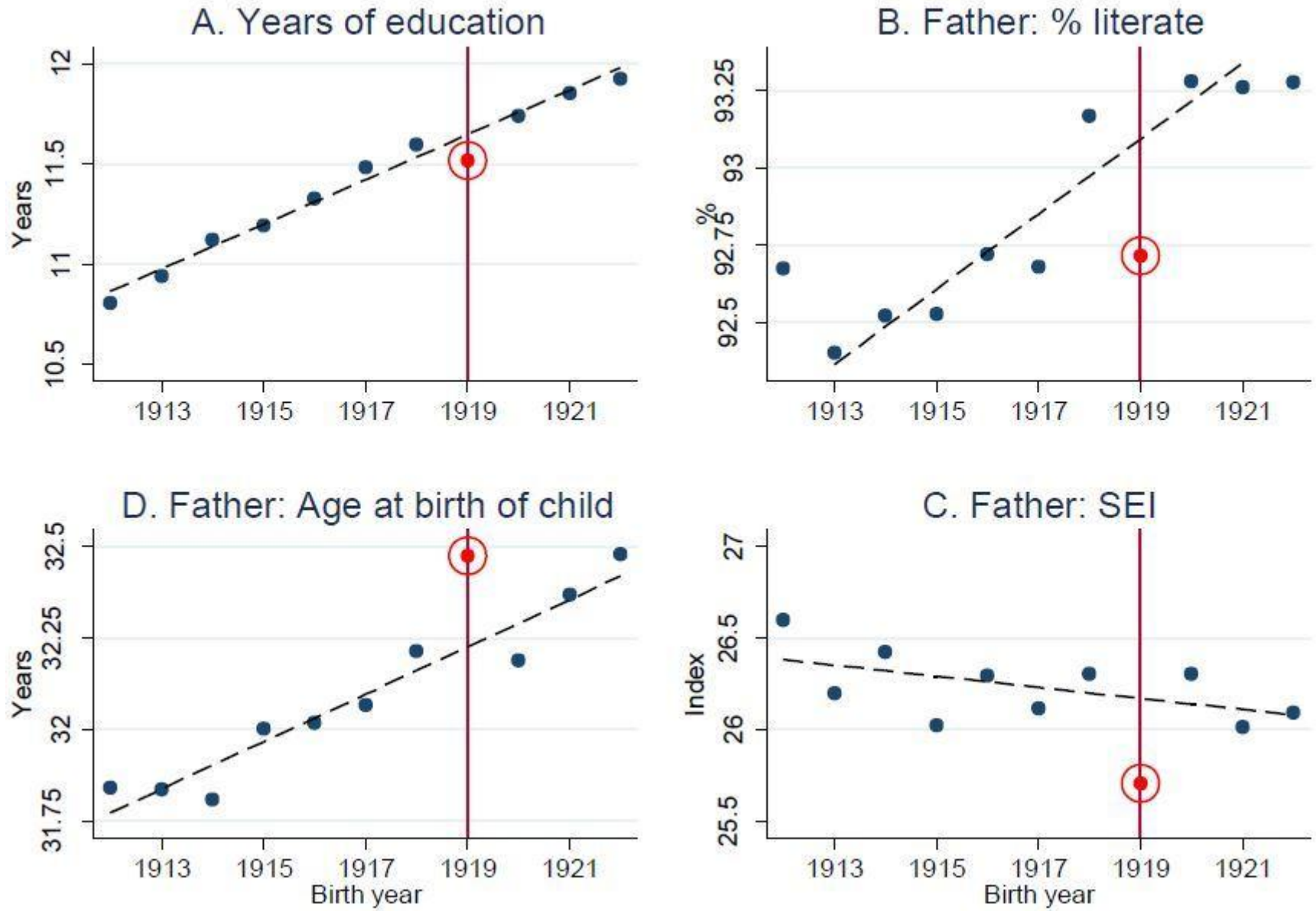


FIG. 2.—1980 male disability rates by quarter of birth: prevented from work by a physical disability.

Almond, *JPE* (2006)

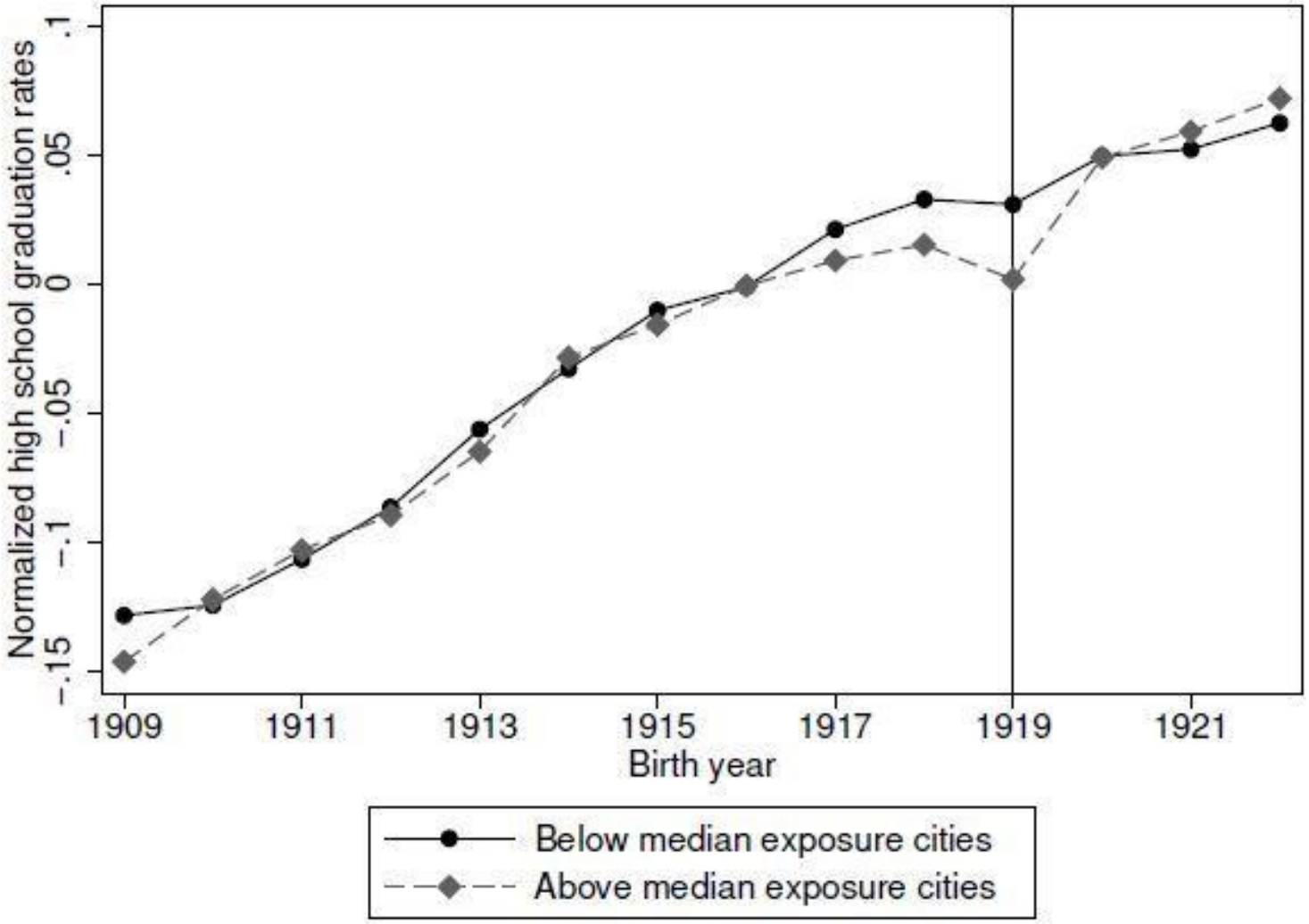
The influenza generation (from BT)



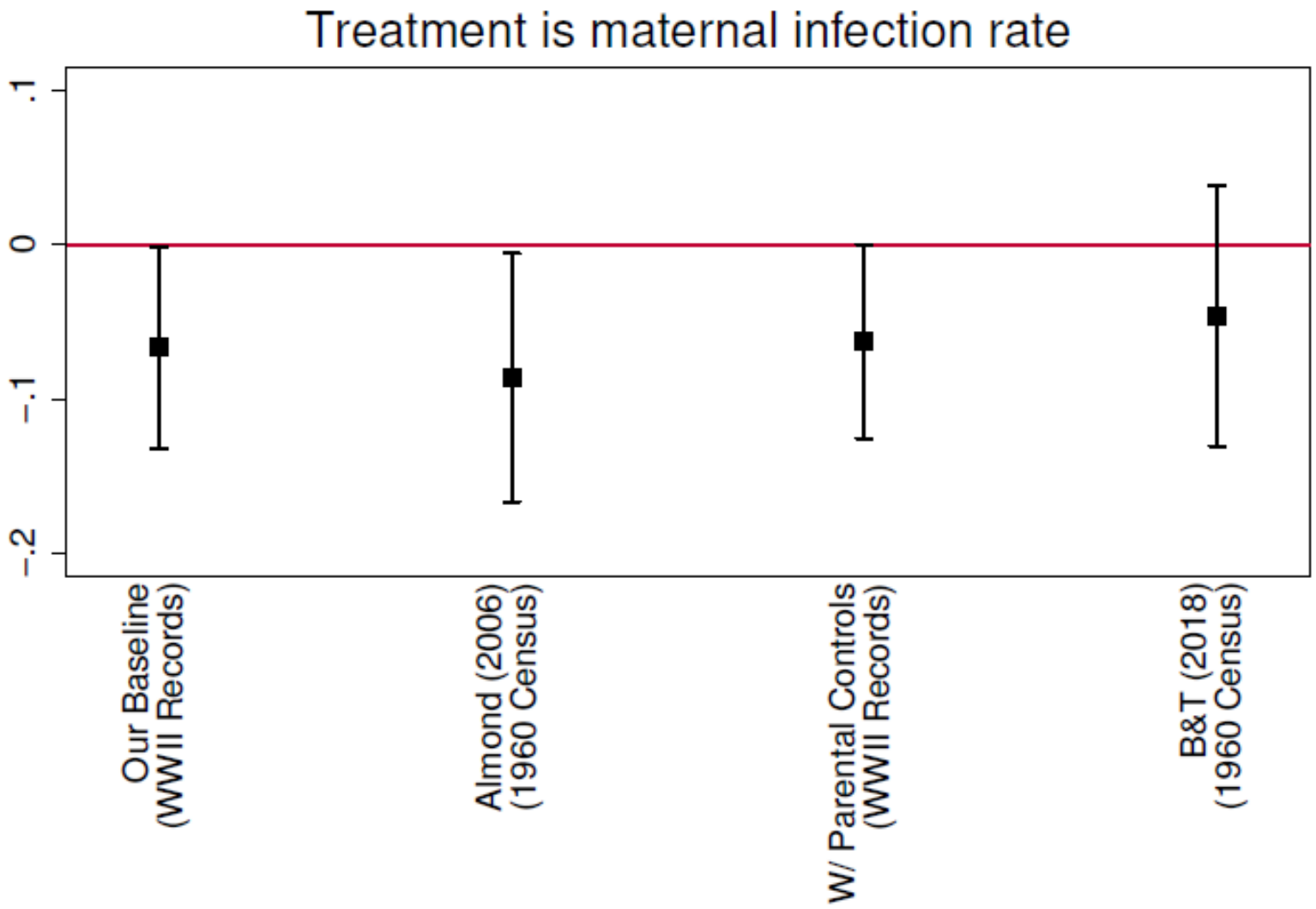
Revisiting the 1918 influenza pandemic

- Brown & Thomas (2018): a refutation of Almond (2006)
  - "The non-random selection of the draft and the hypothesized non-arbitrary family planning of those experiencing a war, create legitimate concerns over the assumption of random experimental assignment."
- Beach, Ferrie & Saavedra (2018): refuting the refutation?
  - "These data allow us to construct an individual level panel dataset by linking World War II enlistment records back to the census. This means that we can observe each individual twice: first as a child with their parents and again as an adult when they enlist."
- The synthesis: Beach, Brown, Ferrie, Saavedra, and Thomas (2022)
  - "We find that exposure to greater pandemic intensity lowered educational attainment among the male enlistees that were successfully linked to the 1920 census when comparisons are drawn either between the 1912-1919 birth cohorts or among brothers in a household fixed effects model. On the other hand, when we restrict attention to the 1918-1919 birth cohorts, to help rule out unobserved differences across cohorts, none of the estimates is statistically significant.."

Spatial variation in pandemic exposure (from BFS)



Comparison of results (from BFS)



Linked sample with influenza deaths (from Beach et al.)

	1912-1919 Birth Cohorts		1918-1919 Birth Cohorts		Brothers Sample 1912-1919 Birth Cohorts	
	Unadj.	Adj.	Unadj.	Adj.	Unadj.	Adj.
	(1)	(2)	(3)	(4)	(5)	(6)
Estimated effect of Std. Excess Flu X Born in 1919						
Dependent variables						
Years of schooling	-0.065*	-0.045*	-0.036	-0.023	-0.072	-0.104*
	(0.020)	(0.017)	(0.020)	(0.019)	(0.049)	(0.050)
Graduated high school	-0.017*	-0.013*	-0.011*	-0.009	-0.023*	-0.039*
	(0.004)	(0.004)	(0.005)	(0.005)	(0.012)	(0.012)
Observations	148,550	148,550	56,756	56,756	12,864	12,864
Height	0.036	0.047*	-0.013	-0.014	0.106	-0.050
	(0.021)	(0.020)	(0.032)	(0.038)	(0.062)	(0.073)
Observations	113,609	113,609	45,831	45,831	7,991	7,991

Revisiting the 1918 influenza pandemic

- Almond (2006): individual data US census 1960-80, no linking, effect is related to year of birth (and, less importantly, place of birth).
- Brown & Thomas (2018): individual data US census 1920-30, comparison between cohorts, no linking.
- Beach, Ferrie & Saavedra (2018): individual data, linking World War II enlistment records to the census: more precise, but selected.
- The synthesis: Beach, Brown, Ferrie, Saavedra, and Thomas (2022):
  - Observing selection of father for 1919 birth cohort.
  - Limited results on individual dataset.

General conclusion: on history and economics

- History allows to pose specific problems differently...
  - Looking at historical dynamics.
  - Testing variations in behaviours.
- ... but is more and more often used as a pretext
  - Using time to get exogeneity and only as such.
- History is especially important to study change in population
  - Lots of inertia in demographic phenomenon.
  - Being able to see long-term effects.

REFERENCES

Part 4. Inequalities and their evolution

- Caselli, Graziella and Jacques Vallin. 2006. "Geographic variations of mortality" in Caselli, Graziella, Jacques Vallin, and Guillaume J. Wunsch. *Demography: Analysis and Synthesis. Volume 2*. Amsterdam ; Boston: Elsevier, 207-234
- Jacques Vallin. 2006. "Mortality, sex, and gender" in Caselli, Graziella, Jacques Vallin, and Guillaume J. Wunsch. *Demography: Analysis and Synthesis. Volume 2*. Amsterdam ; Boston: Elsevier, 177-194
- Judith Fortney. 2006. "Measurement and levels of maternal mortality" in Caselli, Graziella, Jacques Vallin, and Guillaume J. Wunsch.. Amsterdam ; Boston: Elsevier, 61-70.
- Kesztenbaum, Lionel, and Jean-Laurent Rosenthal. 2017. « Sewers' Diffusion and the Decline of Mortality: The Case of Paris, 1880–1914 ». *Journal of Urban Economics* 98 (mars): 174-86.

Part 5. Height and anthropometric indicators

- Aron, Jean-Paul, Paul Dumont, and Emmanuel Le Roy Ladurie. 1972. *Anthropologie du conscrit français d'après les comptes numériques et sommaires du recrutement de l'armée (1819-1826), présentation cartographique*. Civilisations et sociétés. Paris, La Haye: Mouton.
- Fogel, Robert W. 1994. « Economic Growth, Population Theory, and Physiology: The Bearing of Long-Term Processes on the Making of Economic Policy ». *The American Economic Review* 84 (3): 369-95.
- Fogel, R. W., and D. L. Costa. 1997. « A Theory of Technophysio Evolution, with Some Implications for Forecasting Population, Health Care Costs, and Pension Costs ». *Demography* 34 (1): 49-66.
- Steckel, Richard H., and Roderick Floud. 1997. *Health and Welfare during Industrialization*. Chicago: University of Chicago Press.
- Bodenhorn, Howard, Timothy W. Guinnane, et Thomas A. Mroz. 2017. « Sample-Selection Biases and the Industrialization Puzzle ». *The Journal of Economic History* 77 (01): 171-207.
- Bodenhorn, Howard, Moehling, Carolyn, and Price, Gregory N. "Short Criminals: Stature and Crime in Early America." Journal of Law and Economics 55, no. 2 (2012): 393–419
- Johnson, Paul, and Nicholas, Stephen. "Male and Female Living Standards in England and Wales, 1812-1857: Evidence from Criminal Height Records." Economic History Review 48, no. 3 (1995): 470–81
- Komlos, John. "The Nutritional Status of French Students." Journal of Interdisciplinary History 24, no. 3 (1994): 493–508.
- Komlos, John. "Anomalies in Economic History: Toward a Resolution of the 'Antebellum Puzzle'." Journal of Economic History 56, no. 1 (1996): 202–14.
- Komlos, John. "Shrinking in a Growing Economy? The Mystery of Physical Stature during the Industrial Revolution." Journal of Economic History 58, no. 3 (1998): 779–802.
- Mokyr, Joel, and Ó Gráda, Cormac. "Height and Health in the United Kingdom 1815-1860: Evidence from the East India Company Army." Explorations in Economic History 33, no. 2 (1996): 141–68.

Part 6. Early life effects

- Almond, Douglas. 2006. Is the 1918 influenza pandemic over? Long-term effects of in utero influenza exposure in the post-1940 US population. *Journal of Political Economy*, 114(4), 672-712.
- Almond, Douglas, & Mazumder, Bhashkar. 2005. The 1918 influenza pandemic and subsequent health outcomes: an analysis of SIPP data. American Economic Review, 95(2), 258-262.
- Almond, Douglas, and Janet Currie. 2011. "Killing Me Softly: The Fetal Origins Hypothesis." *Journal of Economic Perspectives*, 25 (3): 153-72.
- Almond, Douglas, Janet Currie and Valentina Duque. 2018. "Childhood Circumstances and Adult Outcomes: Act II." *Journal of Economic Literature*, 56 (4): 1360-1446.
- Barker, David J. 1990. « The Fetal and Infant Origins of Adult Disease ». *British Medical Journal* 301 (6761): 1111.
- Barker, David J. 1995. Fetal origins of coronary heart disease. *BMJ: British Medical Journal*, 311(6998), 171.
- Brown, Ryan, & Thomas, Duncan (2018). « On the long term effects of the 1918 US influenza pandemic ». Unpublished Manuscript.
- Brian Beach, Joseph P. Ferrie, and Martin H. Saavedra (2018) « Fetal shock or selection? The 1918 influenza pandemic and human capital development ». NBER Working Paper No, 24725.
- Vaupel, James W., James R. Carey, and Kaare Christensen. 2003. "It's Never Too Late." *Science* 301 (5640): 1679–81.
- Doblhammer, Gabriele, Gerard J. van den Berg, et L. H. Lumey. 2013. « A re-analysis of the long-term effects on life expectancy of the Great Finnish Famine of 1866–68 ». *Population Studies* 67 (3): 309-22.
- Gørgens, Tue, Xin Meng, et Rhema Vaithianathan. 2012. « Stunting and selection effects of famine: A case study of the Great Chinese Famine ». *Journal of Development Economics* 97 (1): 99-111.
- Kannisto, V., K. Christensen, et J. W. Vaupel. 1997. « No Increased Mortality in Later Life for Cohorts Born during Famine ». *American Journal of Epidemiology* 145 (11): 987-94.
- Sparen, P., Denny Vågerö, Dimitri Shestov, Svetlana Plavinskaja, et Nina Parfenova. 2004. « Long Term Mortality after Severe Starvation during the Siege of Leningrad: Prospective Cohort Study ». *BMJ* 328 (7430): 11-0.
- Van den Berg, Gerard.J., Maarten Lindeboom, et France Portrait. 2006. « Economic conditions early in life and individual mortality ». *American Economic Review* 96 (1): 290-302.