Surnames and Social Mobility

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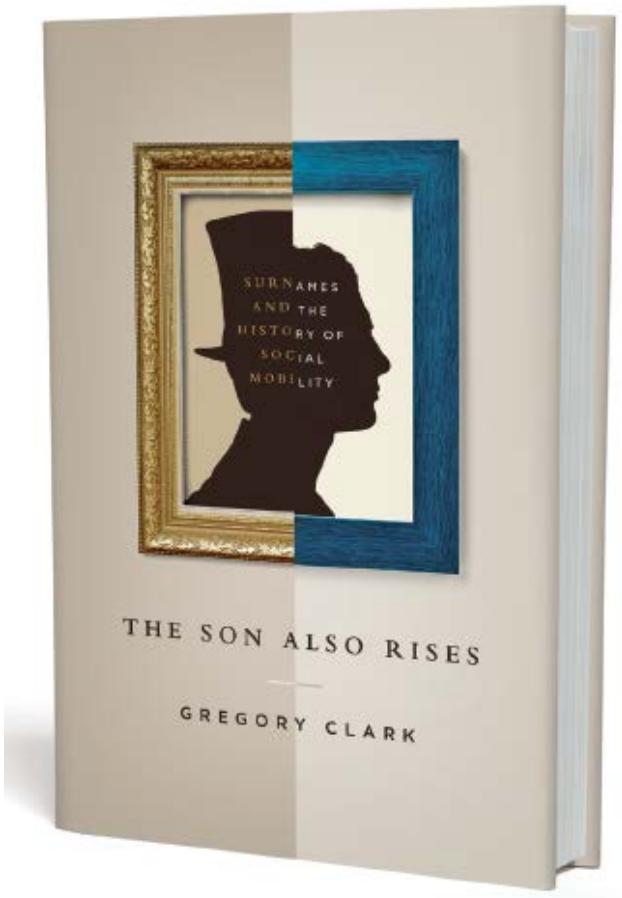
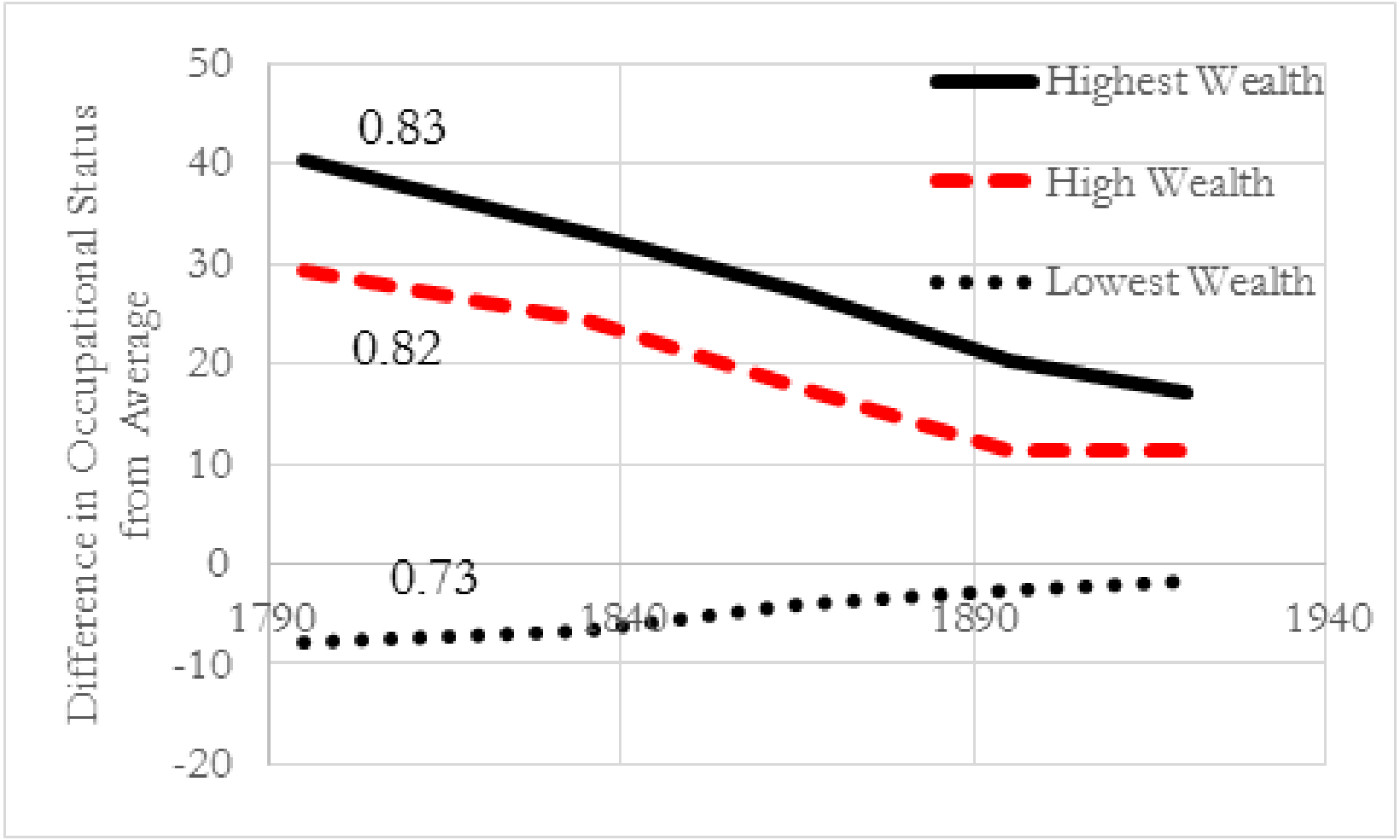
The Son Also Rises. Surnames and the History of Social Mobility (2014)



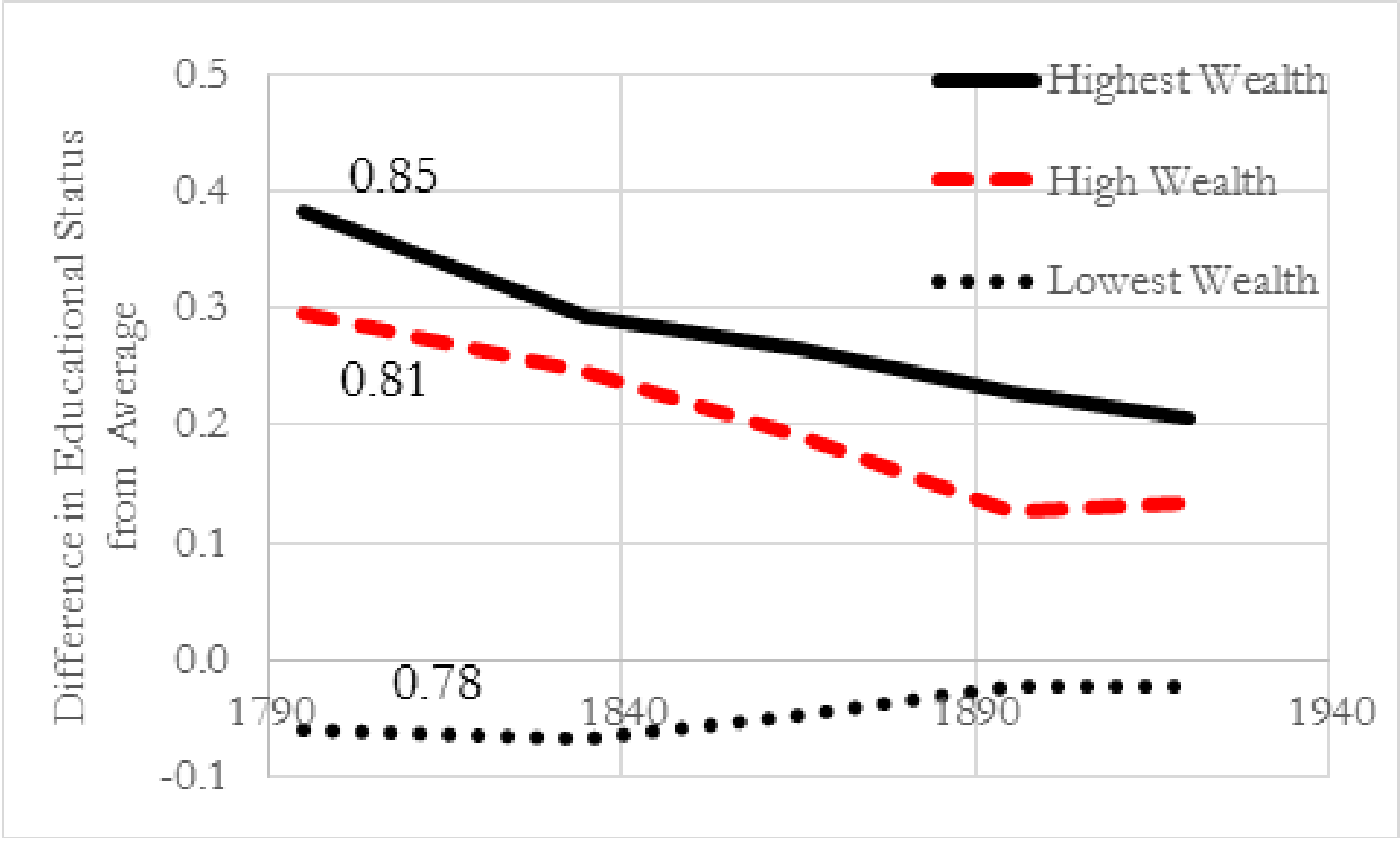
Key Findings of *The Son Also Rises* from surnames

- Long run social intergenerational correlation of status much higher than short run – 0.7-0.8
- This rate varies little across societies and time periods – whatever observed short-run rates. Little difference between medieval England and modern Sweden
- This is the rate that applies to social groups, such as the Jewish and French descended populations in the US, even in the short run

Some Examples – English Occupational Status by Surname Types, births 1790-1930



English Higher Educational Status by Surname Types, births 1790-1930



Notable features in England

- Complete convergence of initial groups to social mean will take 9-10 generations
- Low mobility found all across the status distribution
- Introduction of universal franchise and mass education has no effect on mobility rates

Information required to estimate social mobility from surnames very modest

- Overall frequency of surnames
- Frequency among social elites or underclasses
- % of top or bottom that the elite or underclass represents

Example for England, Oxford and Cambridge enrollment

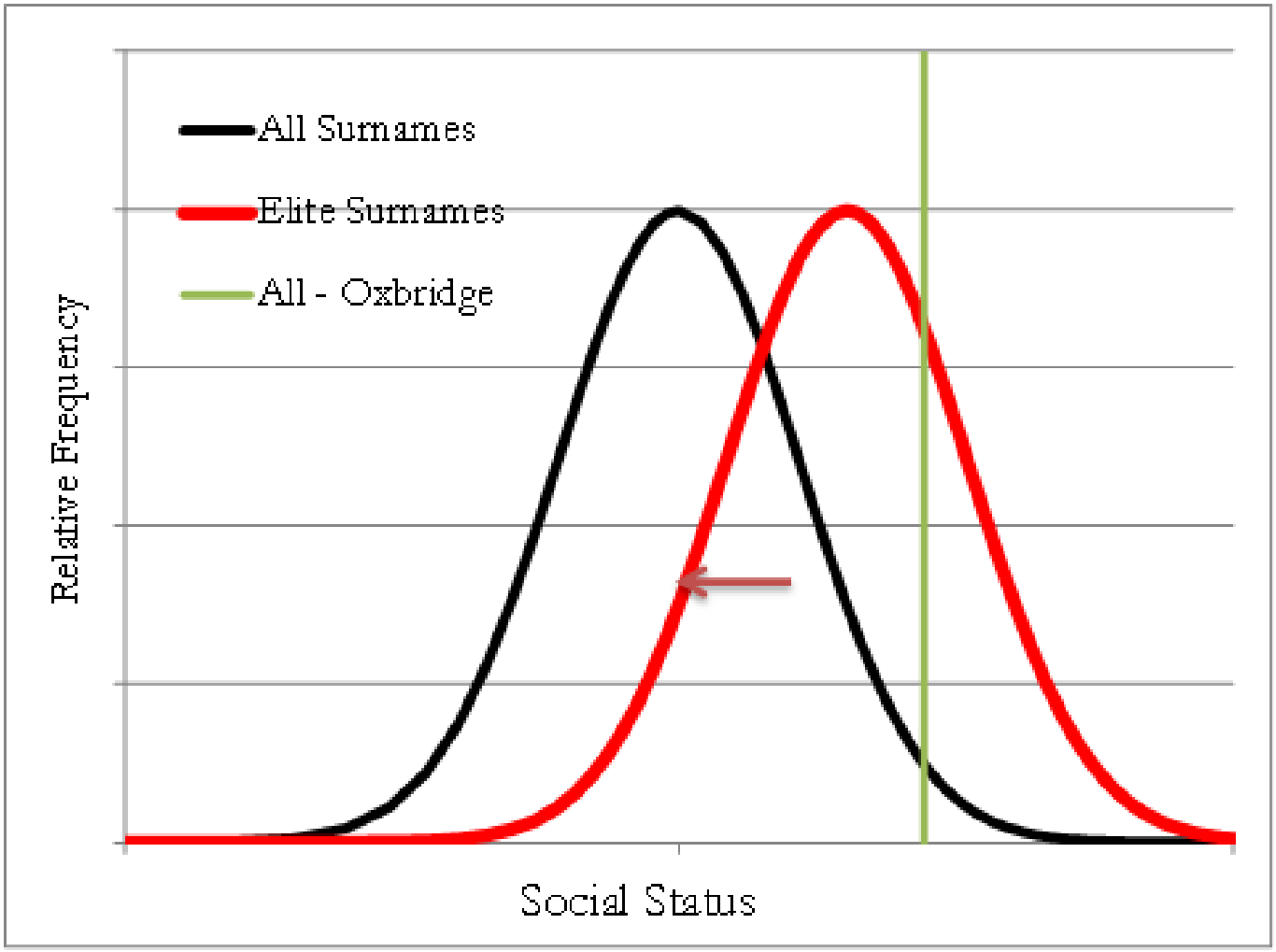


Table 4: Implied persistence rates for 1800-29 elite rare surnames

Generation	Relative Representation	Oxbridge elite share %	Implied Mean status (standard deviation units)	Implied b
1800-29	19.06	0.64	1.32	-
1830-59	10.57	0.62	0.99	0.75
1860-89	7.59	0.53	0.81	0.81
1890-1919	4.73	0.48	0.59	0.73
1920-49	2.89	0.70	0.41	0.70
1950-79	1.90	1.16	0.26	0.63
1980-2009	1.47	1.27	0.15	0.60
2010-3	1.47	1.24	0.15	0.99

Social Mobility in England 1300-2017

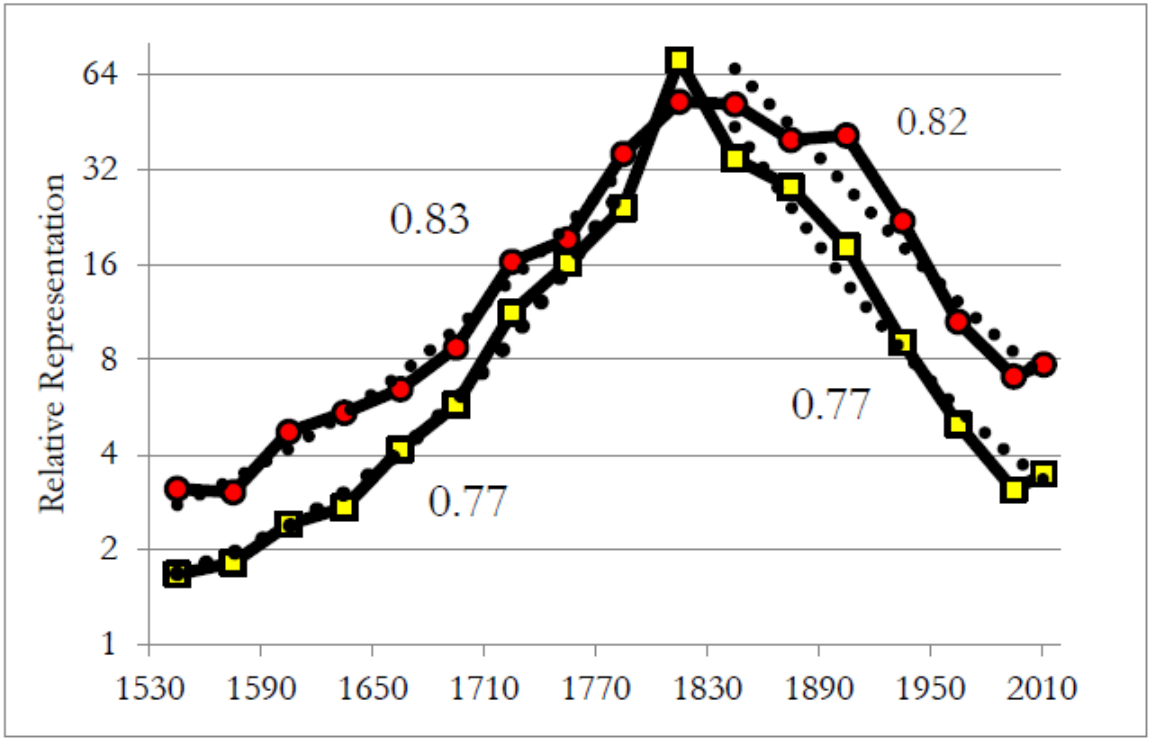
- Oxbridge attendance 1200-2017
- Will probated 1500-2017
- Member of Parliament 1270-2017
- Registered Doctors 1856-2017
- Criminal Convictions 1690-1913

General name frequency England

- 1538-2017 – births, deaths, marriages

Note – we can equivalently measure mobility by looking decline of elites, or rise of elites

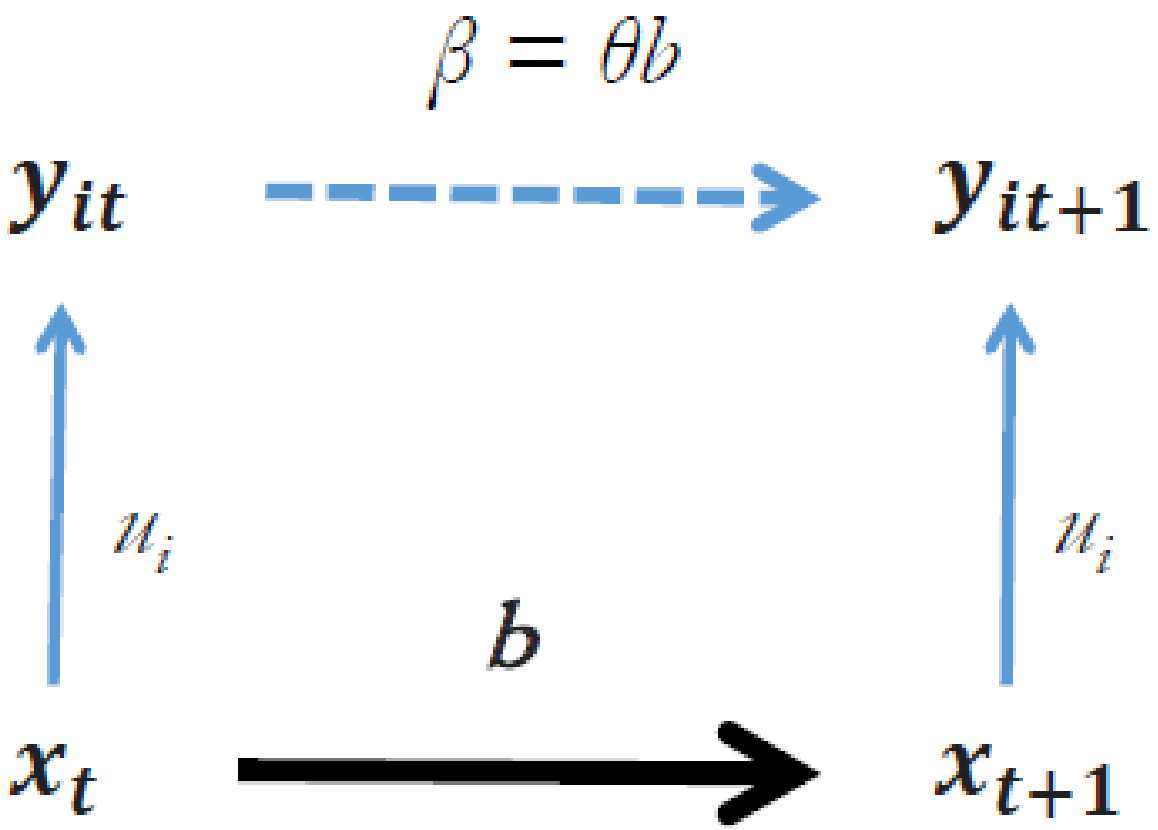
Oxbridge – Rare Surnames



Hypothesis of book

$$y_{it} = x_t + u_{it}$$
$$x_t = bx_{t-1} + e_t$$

- y_i status phenotypes (observed)
- x status genotype (latent)
- b ≈ 0.75


$\beta = \theta b$
y_{it}
y_{it+1}
u_i
u_i
b
x_t
x_{t+1}

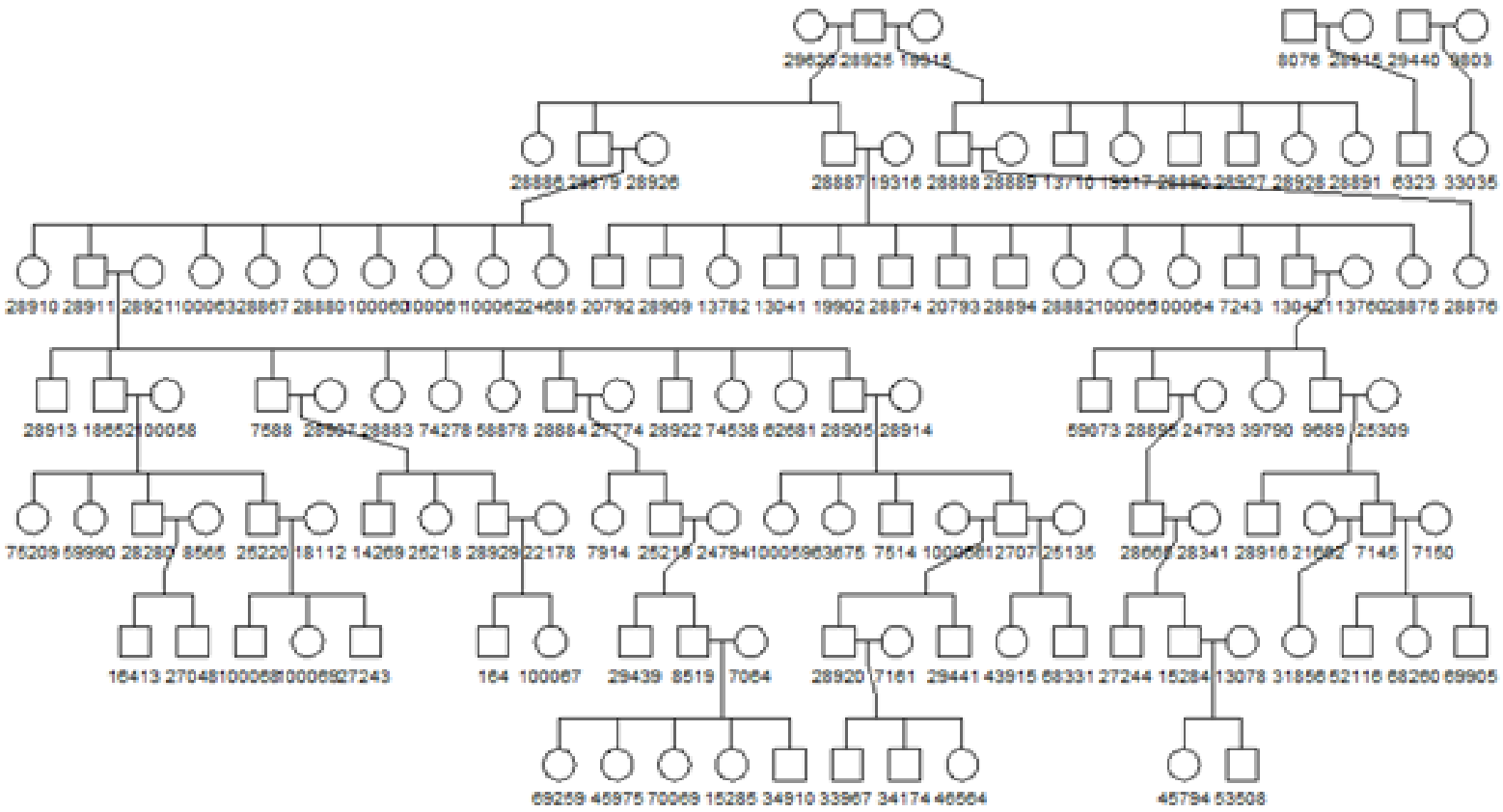
Questions

- What is transmitting status so strongly across generations? – How important is genetic transmission?
- Alternatives – social class, ethnic groups, social networks
- Can this transmission be significantly changed by social interventions

Dataset under construction to test this

- Lineage of 73,000 people with rare surnames England 1750-2017
- Using variety of sources we link parents-children across 7 generations
- Multiple social outcomes – wealth, occupation, educational status 11-20, educational attainment, life span, child mortality, child first names, house value 1999

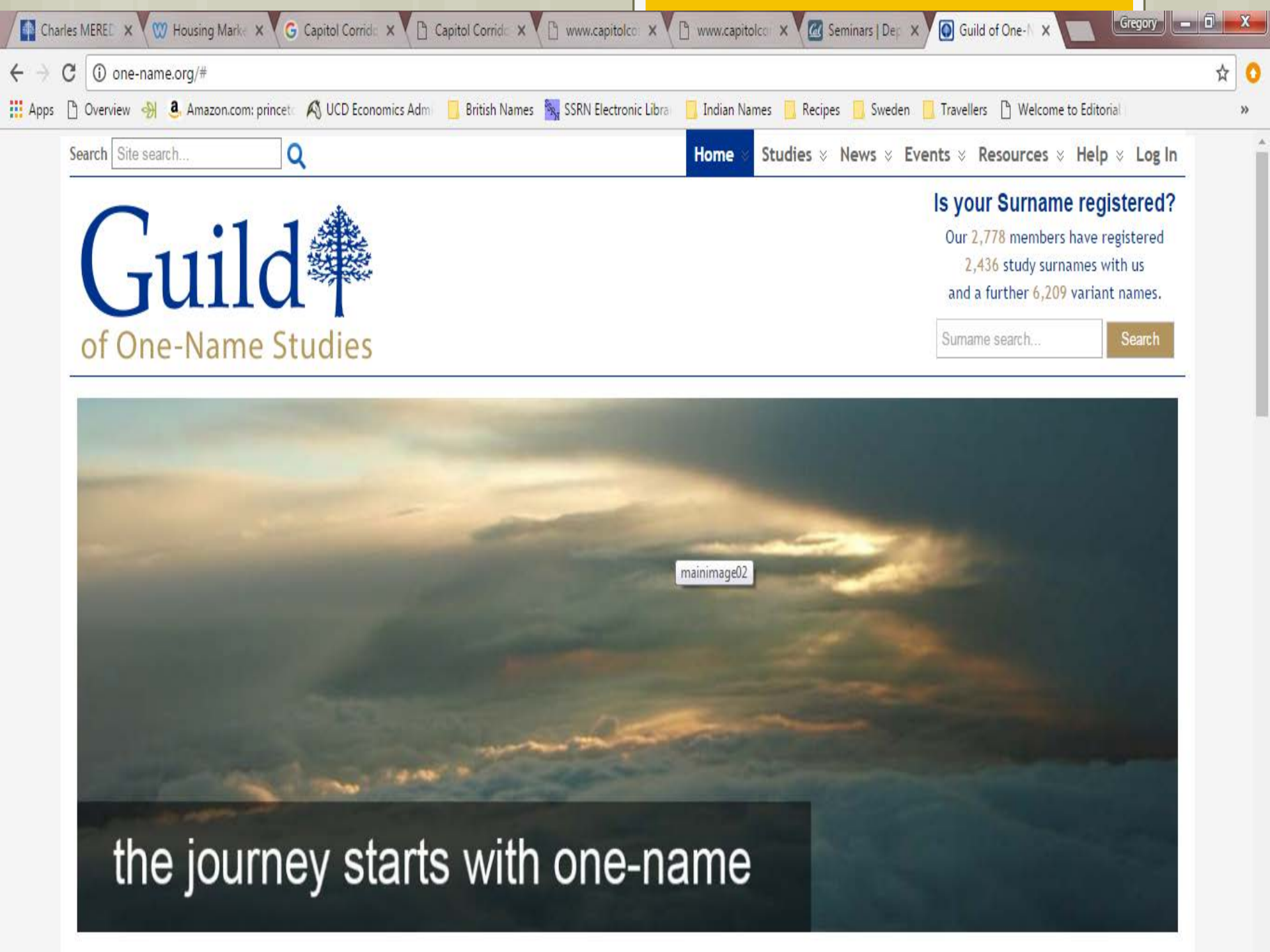
Sample of Database



Crowd Sourcing may offer ways to expand this database to 200,000-500,000

Guild of One-Name Studies

Gregory Clark
Member Number 7,565


Charles MERE
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UCD Economics Adm
British Names
SSRN Electronic Libra
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Travellers
Welcome to Editorial
Search
Site search...
Home
Studies
News
Events
Resources
Help
Log In
Guild
of One-Name Studies
Is your Surname registered?
Our 2,778 members have registered
2,436 study surnames with us
and a further 6,209 variant names.
Surname search...
Search
mainimage02
the journey starts with one-name

Guild of One-Name Studies

2,436 study surnames, and a further 6,209 variant names – linked genealogical information on as many as 2-3 m people

Working Papers

- **Clark, Gregory. 2017. "Estimating Social Mobility Rates from Surnames: Social Group versus Family Effects."**
- Clark, Gregory and Neil Cummins. 2017. "The People, not the Place. The Decline of the North of England 1918-2017: A Surname Investigation."
- Clark, Gregory and Neil Cummins. 2016. "Family Matters? Do Relatives other than Parents Matter to Social Outcomes, England 1780-2016?"
- **Clark, Gregory and Neil Cummins. 2016. "Nature Versus Nurture in Social Outcomes. A Lineage Study of 66,000 English Individuals, 1750-2016."**
- Clark, Gregory and Neil Cummins. 2016. "The Child Quality-Quantity Tradeoff, England, 1780-1880: A Fundamental Component of the Economic Theory of Growth is Missing."

Testing for the importance of Genetic Transmission

- Fisher, R. A. 1918. "The Correlation between Relatives on the Supposition of Mendelian Inheritance." *Transactions of the Royal Society of Edinburgh, 52:* 399-433.

- Nagylaki, Thomas. 1978. "The correlation between relatives with assortative mating." *Ann. Hum. Genet., Lond.*, 42: 131.

Is the pattern of correlations across relatives consistent with additive genetic inheritance?

Assumptions required

- The traits in question are controlled by many loci in the genome, each of which makes a small contribution.
- Genes and environment are uncorrelated, or the environment has little independent impact on outcomes.

Table 1: Phenotype Correlations for a Genetically Inherited Trait

Relative	Matching on Genotype
Parental	$h^2 m$
Mid-parent - child	h^2
Single parent – child	$h^2 \frac{1+m}{2}$
Siblings	$h^2 \frac{1+m}{2}$
Uncles/Aunts – child	$h^2 \left(\frac{1+m}{2}\right)^2$

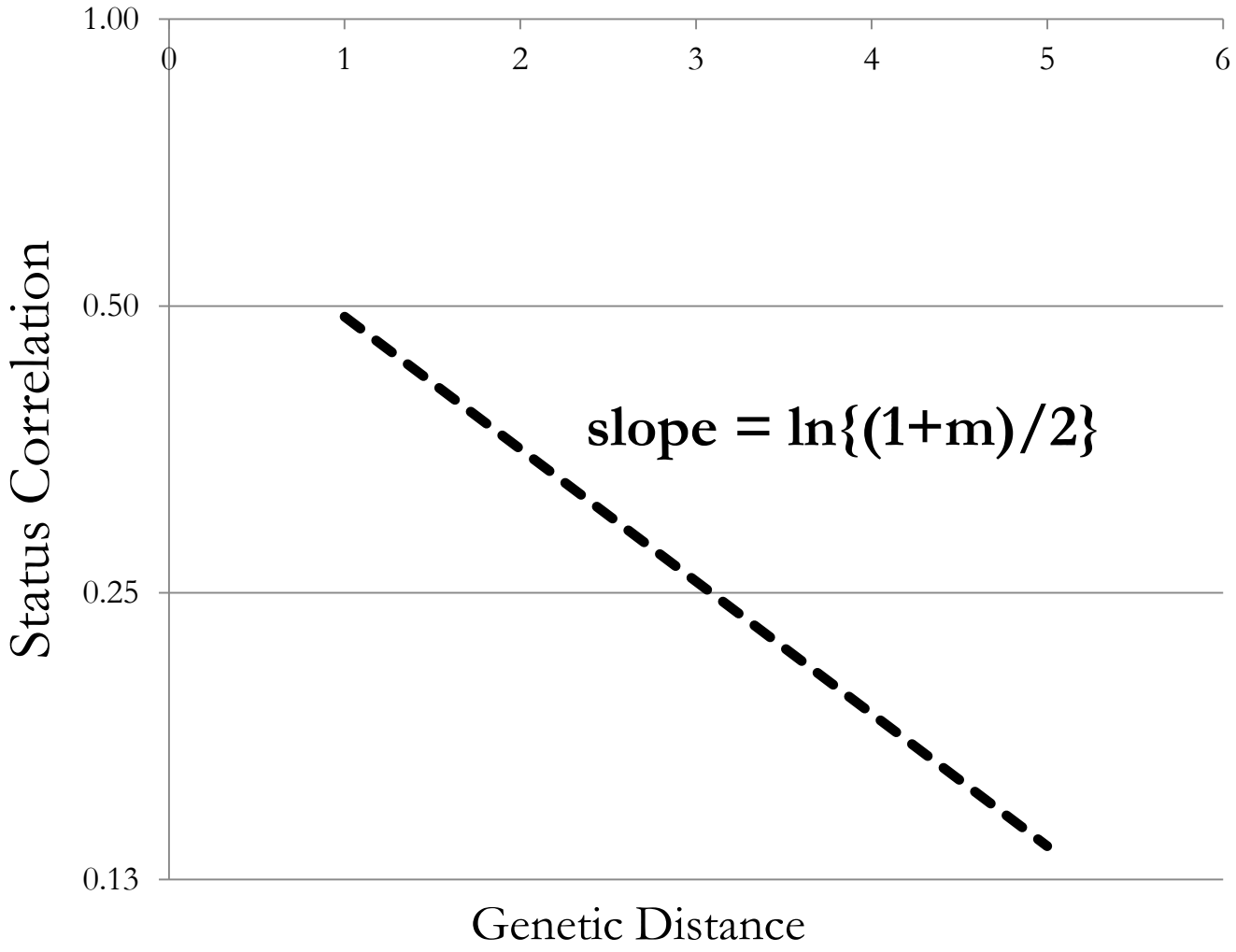
Note**:** *m* is the correlation of parents in genotype.

Table 1: Phenotype Correlations for a Genetically Inherited Trait

Relative	Matching on Genotype
Grandparent – child	$h^2\left(\frac{1+m}{2}\right)^2$
Cousins	$h^2\left(\frac{1+m}{2}\right)^3$
Great Grandparent – child	$h^2\left(\frac{1+m}{2}\right)^3$
Second Cousins	$h^2\left(\frac{1+m}{2}\right)^5$

Note**:** m is the correlation of parents in genotype.

Figure 5: Expected pattern of intergenerational status correlations with genetic distance



Note

- Additive genetic model has the same formal structure as the one derived in ***The Son also Rises***

- In particular social mobility is a first order Markov Process

Culture, Resources, Networks

- Sibling correlations should exceed those of parent-child.
- Children grow up in family with same culture, resources, networks
- Not true of parent versus child – given regression to the mean, if this is driven by social environment

Long Run Social Mobility

- Depends on $\left(\frac{1+m}{2}\right)$.
- With random matching, correlation long run is 0.5
- For a correlation of 0.75-0.8, correlation in genetics of spouses would have to be 0.5-0.6

Model of Such Processes – Height Inheritance in modern society

- Process known to be largely genetic
- At least 300 genes known to influence height
- Linearity in regression to the mean

Figure 1: Linearity of Regression to the Mean with Height

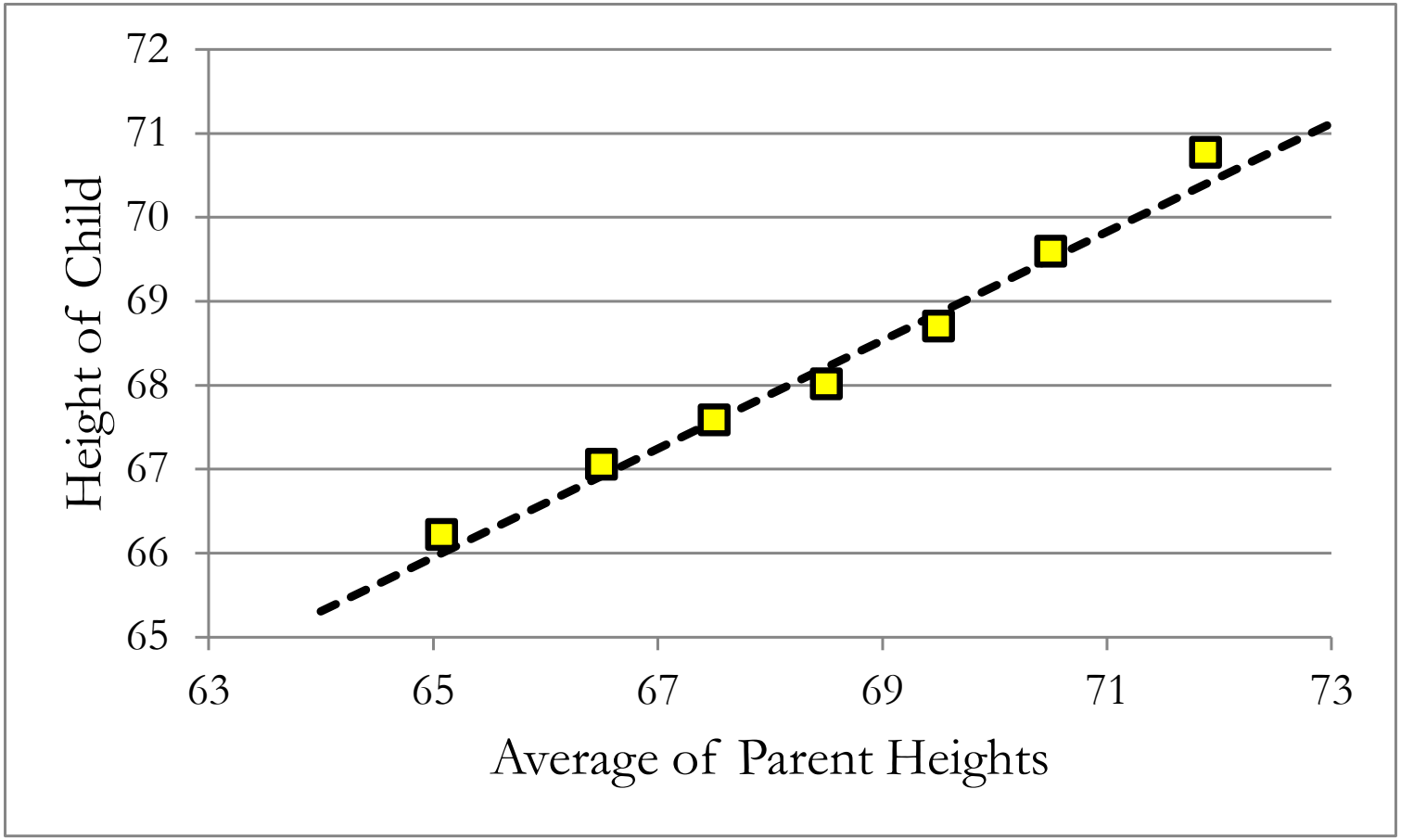


Table 3: Height Correlations in Norway, 1984-6

Relation	Number	Measured Correlation	Predicted Value	Fitted Value
Spouses	24,281	0.179	r	(0.179)
Parent-Child	43,613	0.430	$h^2 \frac{1+r}{2}$	(0.430)
Siblings	19,168	0.453	$h^2 \left(\frac{1+m}{2}\right)$	0.412
Grandparent-Child	1,318	0.250	$h^2 \left(\frac{1+m}{2}\right) \frac{1+r}{2}$	0.243
Avuncular	1,218	0.217	$h^2 \left(\frac{1+m}{2}\right) \frac{1+r}{2}$	0.243
Cousins	112	0.209	$h^2 \left(\frac{1+m}{2}\right)^2 \frac{1+r}{2}$	0.137

Correlation Pattern Heights

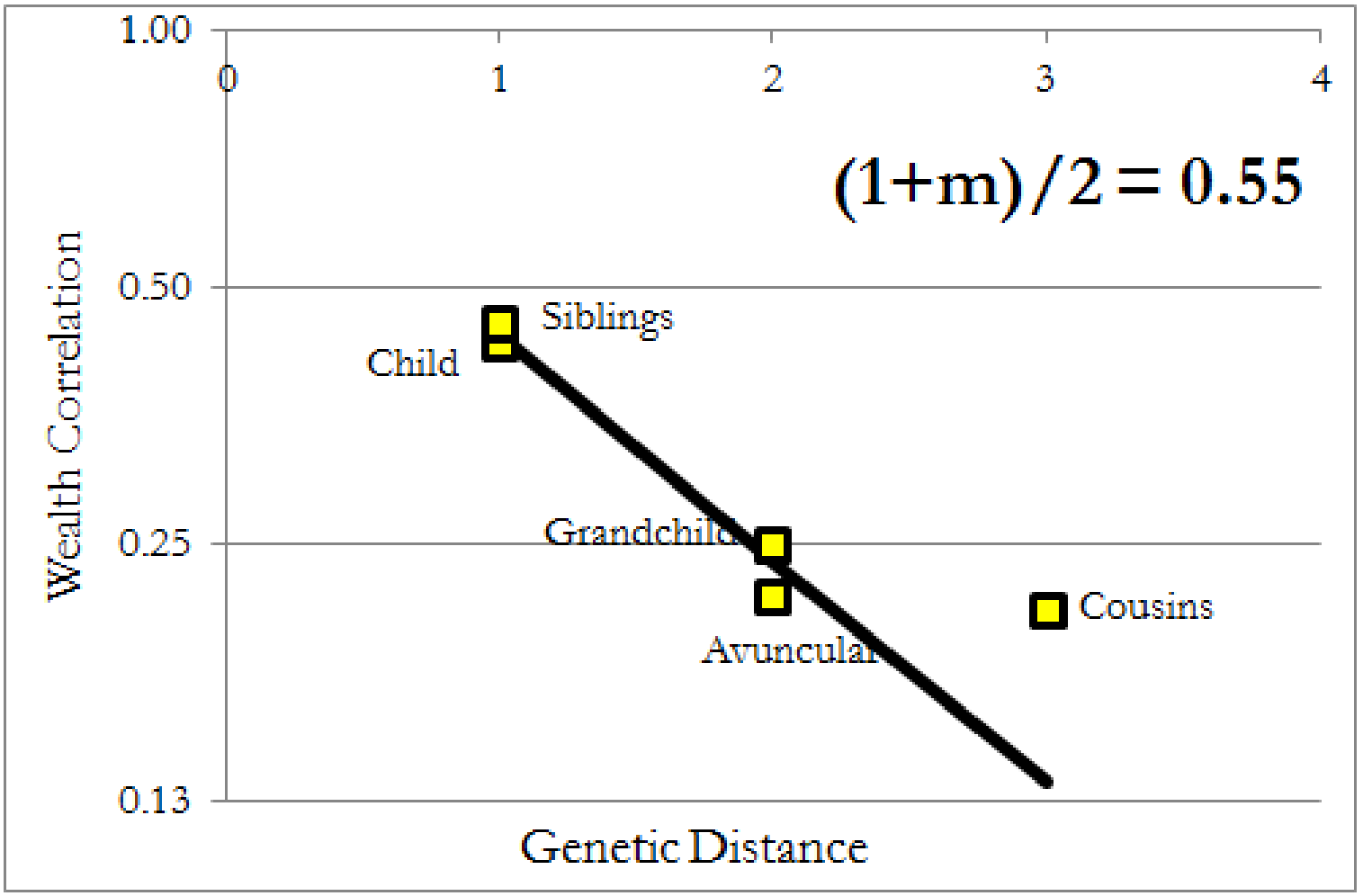


Table 4: Inheritance of Total Ridge Count

Relationship	Number of Pairs	Correlation (s.e.)	Predicted
Mother-Child	405	0.48 (.02)	$h^2\left(\frac{1+m}{2}\right)= 0.50$
Father-Child	405	0.49 (.02)	$h^2\left(\frac{1+m}{2}\right)= 0.50$
Husband-wife	200	0.05 (.03)	$m = 0.05$
Sibling-Sibling	642	0.50 (.02)	$h^2\left(\frac{1+m}{2}\right)= 0.50$
Monozygotic Twins	80	0.95 (.01)	$h^2 = 0.95$
Dizygotic Twins	92	0.49 (.04)	$h^2\left(\frac{1+m}{2}\right)= 0.50$

Table 5: Information Available on Relatives Characteristics, males

Relationship	All	Higher Education	Wealth at death	Occupation
Father-Son	17,557	10,101	8,315	5,003
Brothers	21,154	11,113	5,887	4,765
Grandson	12,996	7,021	5,655	3,203
Uncle-Nephew	34,532	17,182	12,857	6,821
Great-Grandson	8,673	4,154	2,983	1,481
Uncle-GNephew	14,171	6,268	3,882	3,440
Cousins	17,074	8,487	6,825	3,519
GG-Grandson	4,845	2,023	1,022	347
Uncle-GGNeph.	8,500	3,141	1,510	977
GGG-Grandson	2,309	1,029	217	34
2nd Cousins	12,307	5,220	4,319	1,835
3rd Cousins	5,145	1,710	1,167	433

Figure 3: Son Wealth relative to Father Wealth, by decile

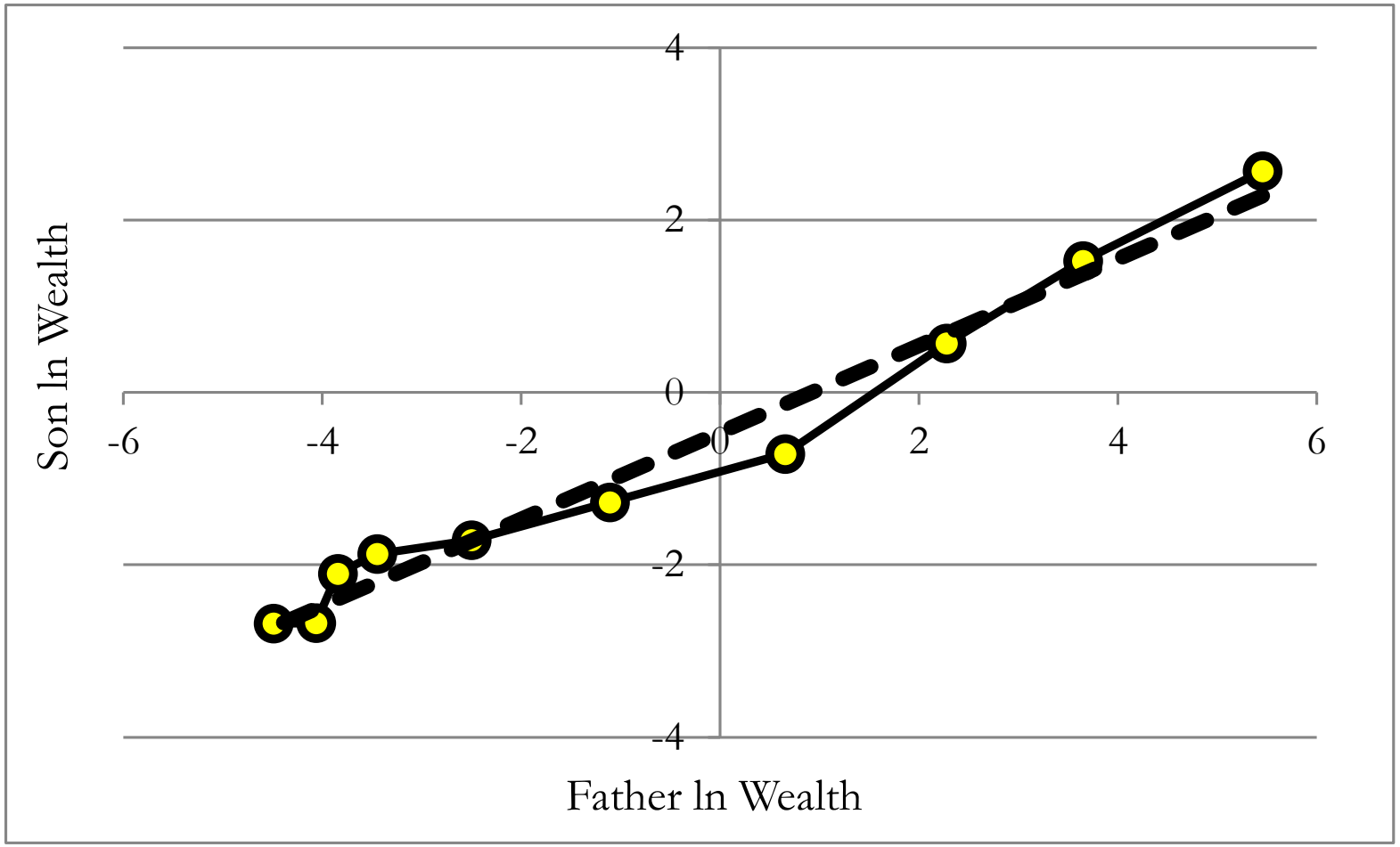


Figure 4: Son Occupational Status relative to Father's Status

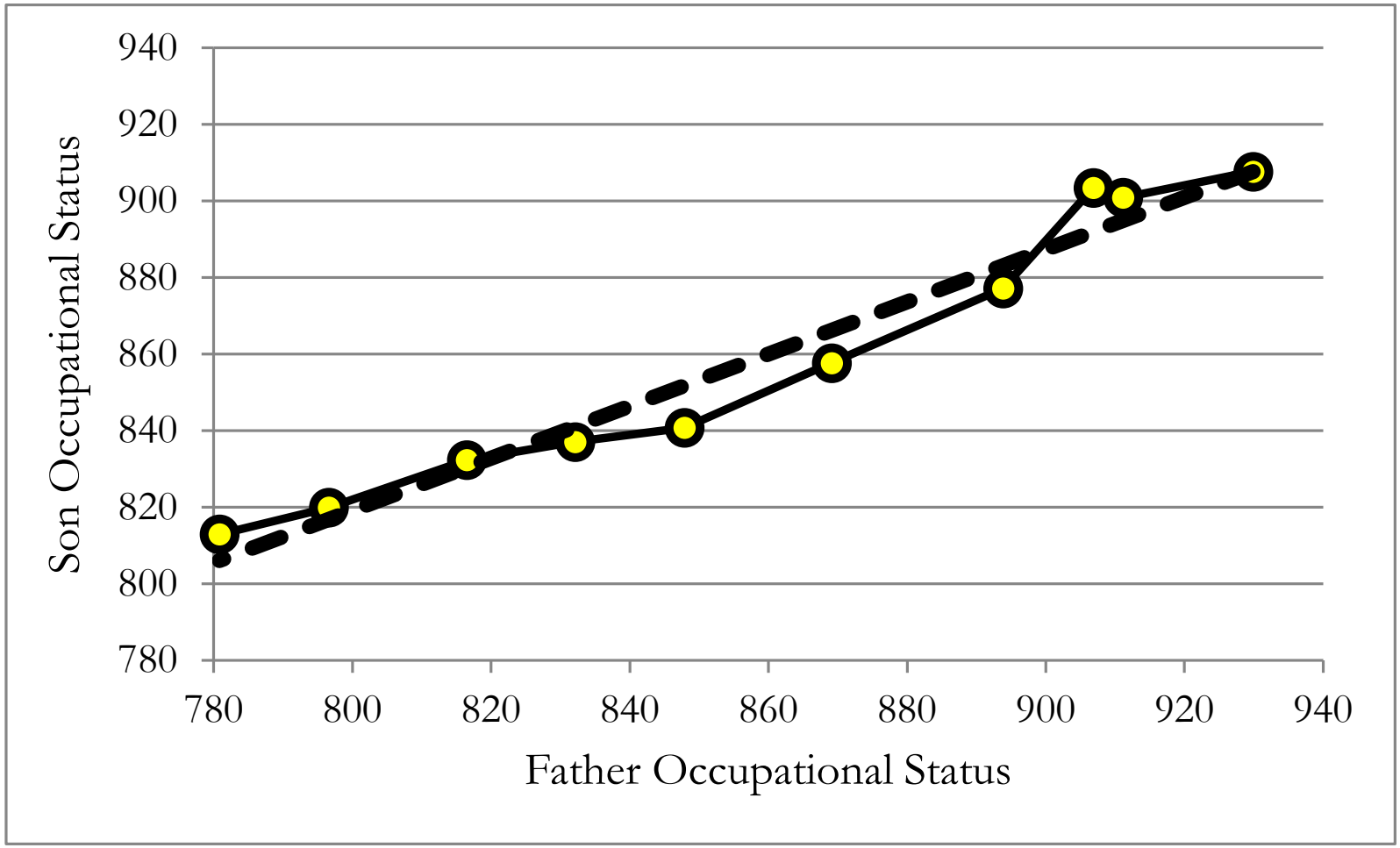


Table 6: Intergenerational Correlations, Males

Relationship	Genetic Distance	Wealth	Occupational Status	Higher Education
Father-Son	1	0.628 (.012)	0.703 (.012)	0.352 (.016)
Brothers	1	0.553 (.013)	0.697 (.016)	0.329 (.018)
Grandson	2	0.520 (.016)	0.639 (.019)	0.246 (.020)
Nephew	2	0.465 (.019)	0.642 (.019)	0.259 (.018)
Great-Grandson	3	0.434 (.022)	0.566 (.032)	0.163 (.029)
Great-Nephew	3	0.432 (.035)	0.598 (.028)	0.210 (.020)
Cousins	3	0.385 (.025)	0.638 (.026)	0.235 (.027)
GG-Grandson	4	0.325 (.035)	0.420 (.070)	0.078 (.059)
GG-Nephew	4	0.314 (.051)	0.602 (.052)	0.142 (.037)
GGG-Grandson	5	0.238 (.078)	0.239 (.216)	0.186 (.161)
Second Cousins	5	0.294 (.053)	0.524 (.056)	0.145 (.041)
GGG-Nephew	5	-	0.529 (.117)	0.047 (.055)
Third Cousins	7	0.170 (.053)	0.446 (.098)	0.119 (.060)

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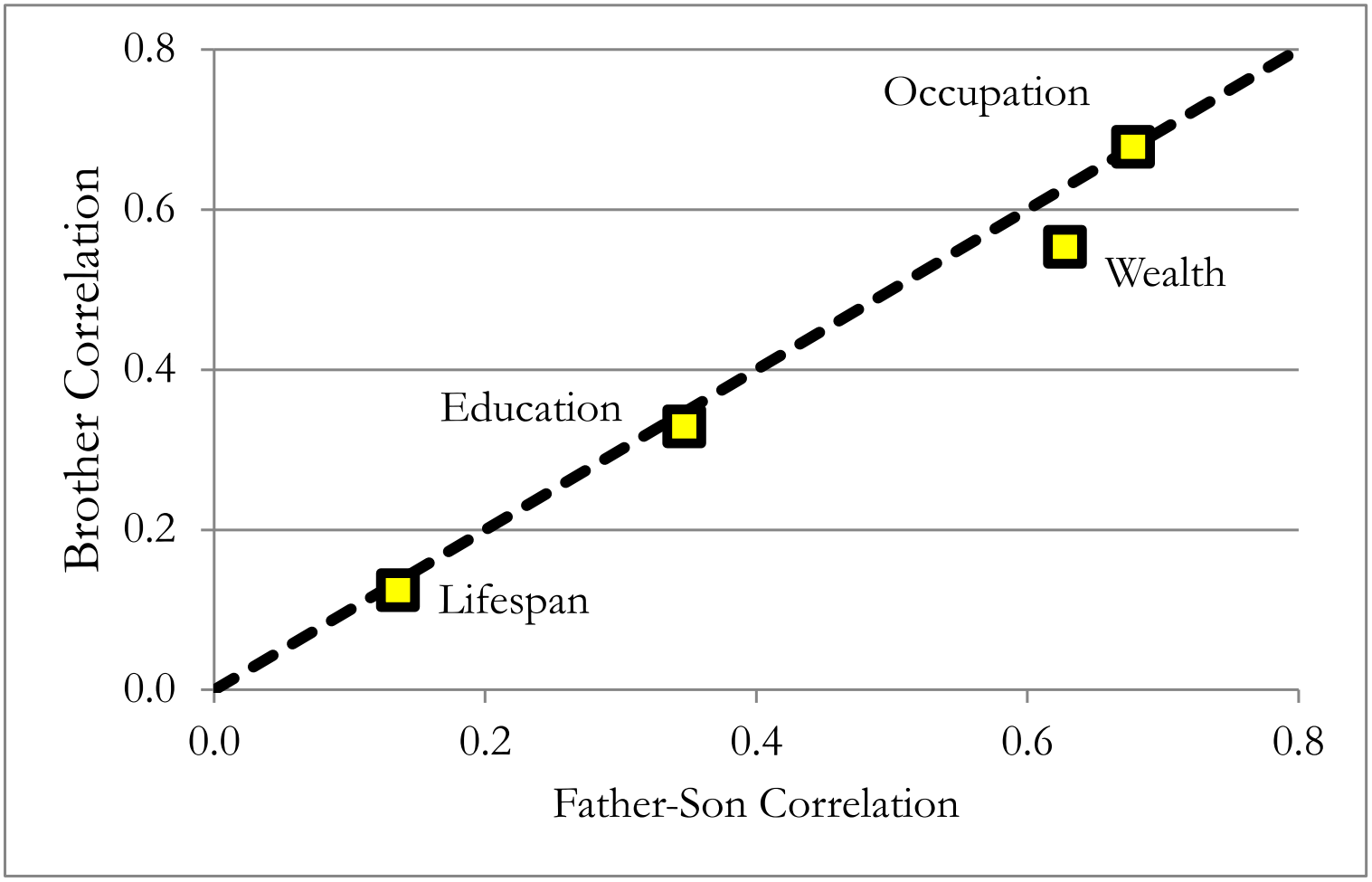
Father-Son vs Brothers



Wealth-all relatives

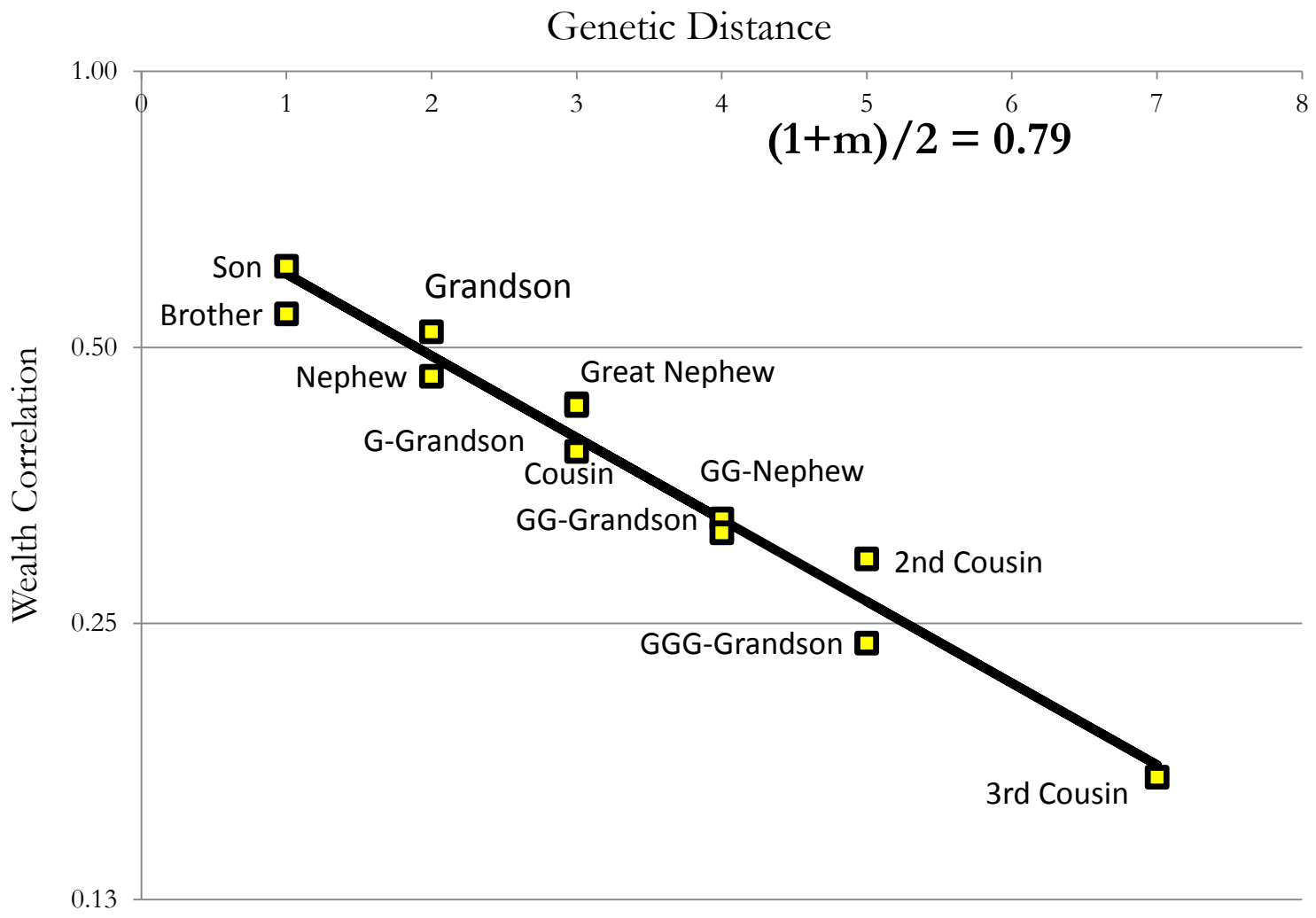


Figure 8: Occupational Status Correlations

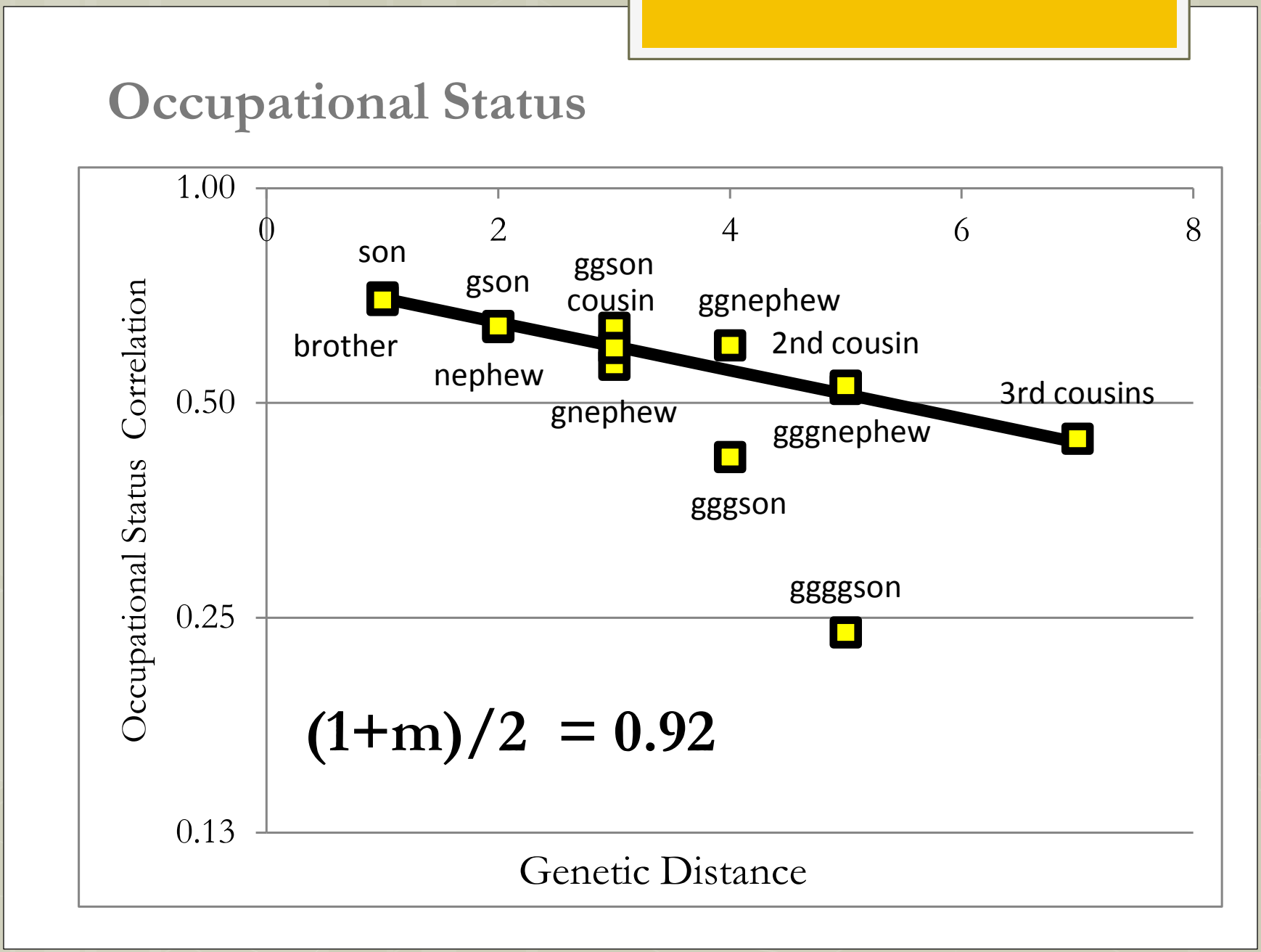
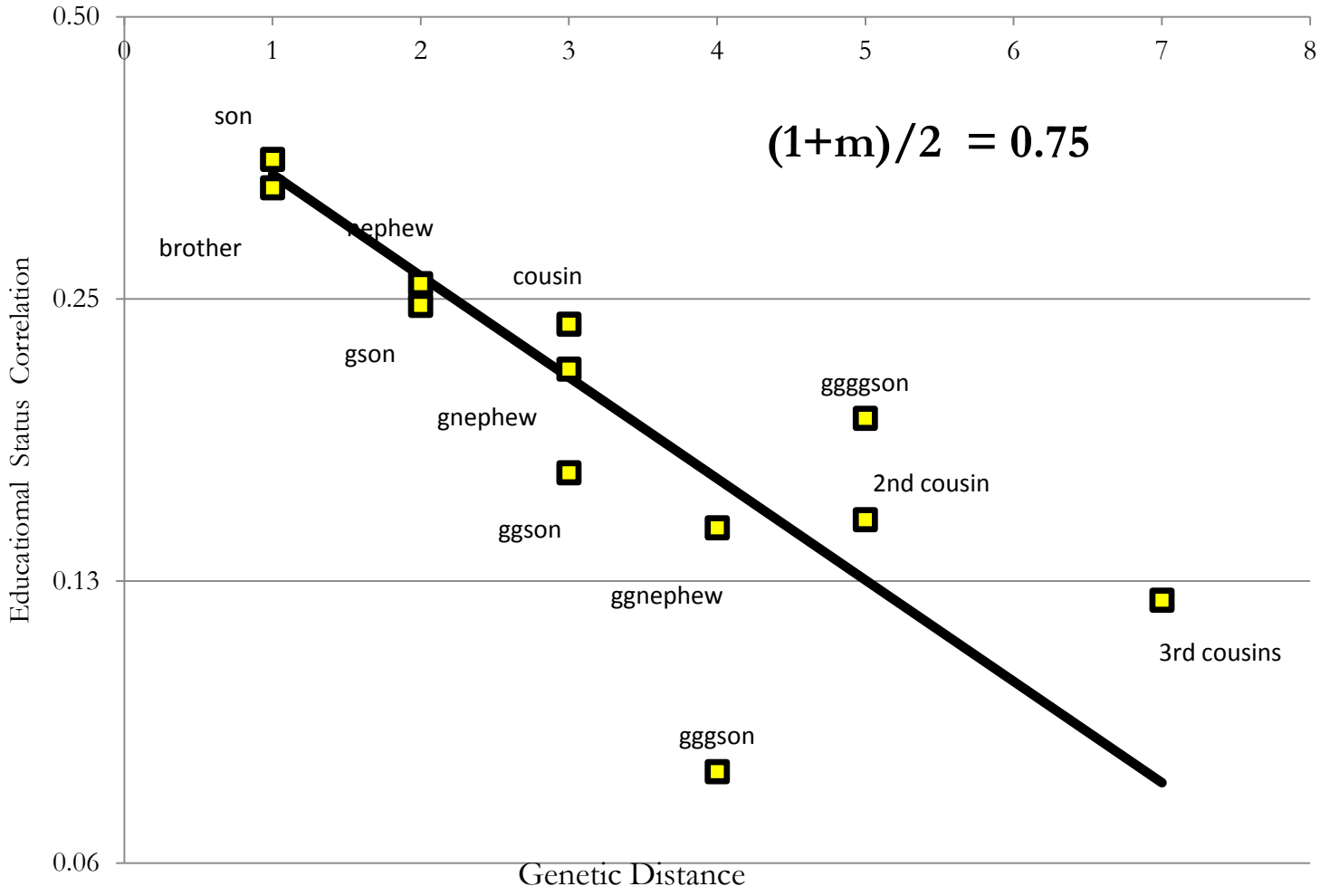
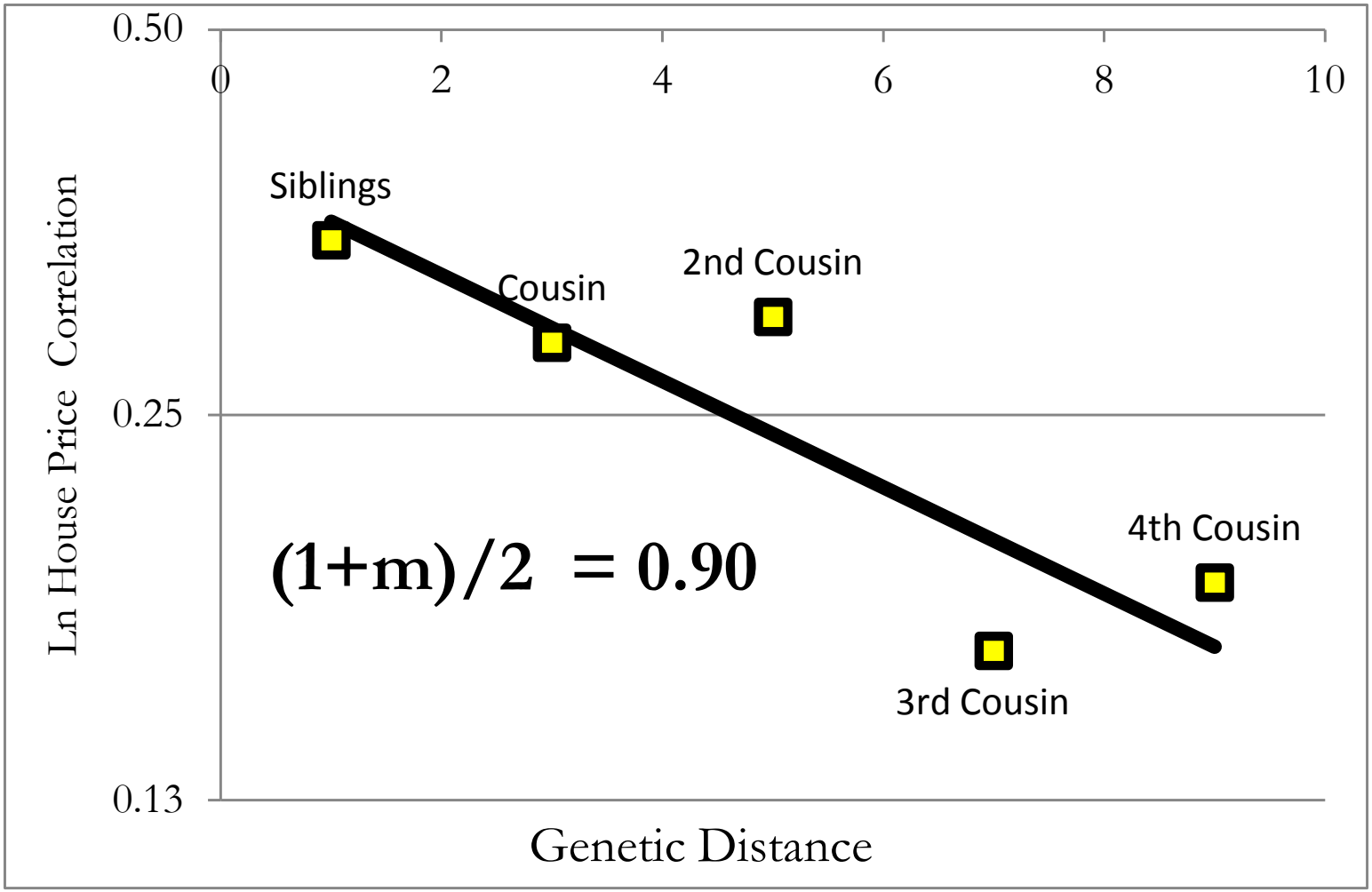


Figure 9: Educational Status Correlations



House Price, 1999



Is Mating Assortative to the correct degree?

- To get an intergenerational correlation of genotype of 0.8-0.9, then m = 0.6-0.8

- Measured assortment is less than this

Table 2: Phenotypic Correlations between Spouses

Characteristics	Correlation	Source
Height	0.29	McManus and Mascie-Taylor, 1984
Education	0.50	Watkins and Meredith, 1981
Income	0.34	Watkins and Meredith, 1981
Occupational Status	0.12	Watkins and Meredith, 1981
IQ	0.20-0.45	Mascie-Taylor, 1989
BMI	0.28	Abrevaya and Tang, 2011
Personality Traits	0.15	Mascie-Taylor, 1989

Table 9: Instrumental Variable estimates of brother-brother in law correlation

Outcome	OLS Brother-Brother in law	IV lwealth	IV Occupation	IV Education
Ln Wealth	0.413	-	0.905	0.785
	(.021)		(.040)	(.061)
Occupation Rank	0.627	0.927	-	0.838
	(.037)	(.049)		(.055)
Higher education	0.184	0.701	0.603	-
	(.020)	(.032)	(.046)	

Group versus Family Effects?

- Alternative model – regression to mean of social groups

$$y_t = b_i(y_{t-1} - x_{kt-1}) + x_{kt} + v_t$$

$$x_{kt} = b_g x_{kt-1} + e_{kt-1}$$

- b_i = within group persistence $\approx$ 0.35
- b_g = group level persistence $\approx$ 0.8

Torche, Florencia and Alejandro Corvalan. 2016. "Estimating Intergenerational Mobility With Grouped Data: A Critique of Clark's *the Son Also Rises*." *Sociological Methods & Research*.

Different Implications

- Pattern of correlation across n generations
- IV estimates
- Multigeneration controls

Correlation across n generations

- $Clark \quad E(\hat{\beta}_n) = \frac{\sigma_x^2}{\sigma_y^2} b^n$

- $Group \quad E(\hat{\beta}_n) = b_i^n \left(1 - \frac{\sigma_{x_k}^2}{\sigma_y^2}\right) + b_g^n \frac{\sigma_{x_k}^2}{\sigma_y^2}$

Individual versus Group

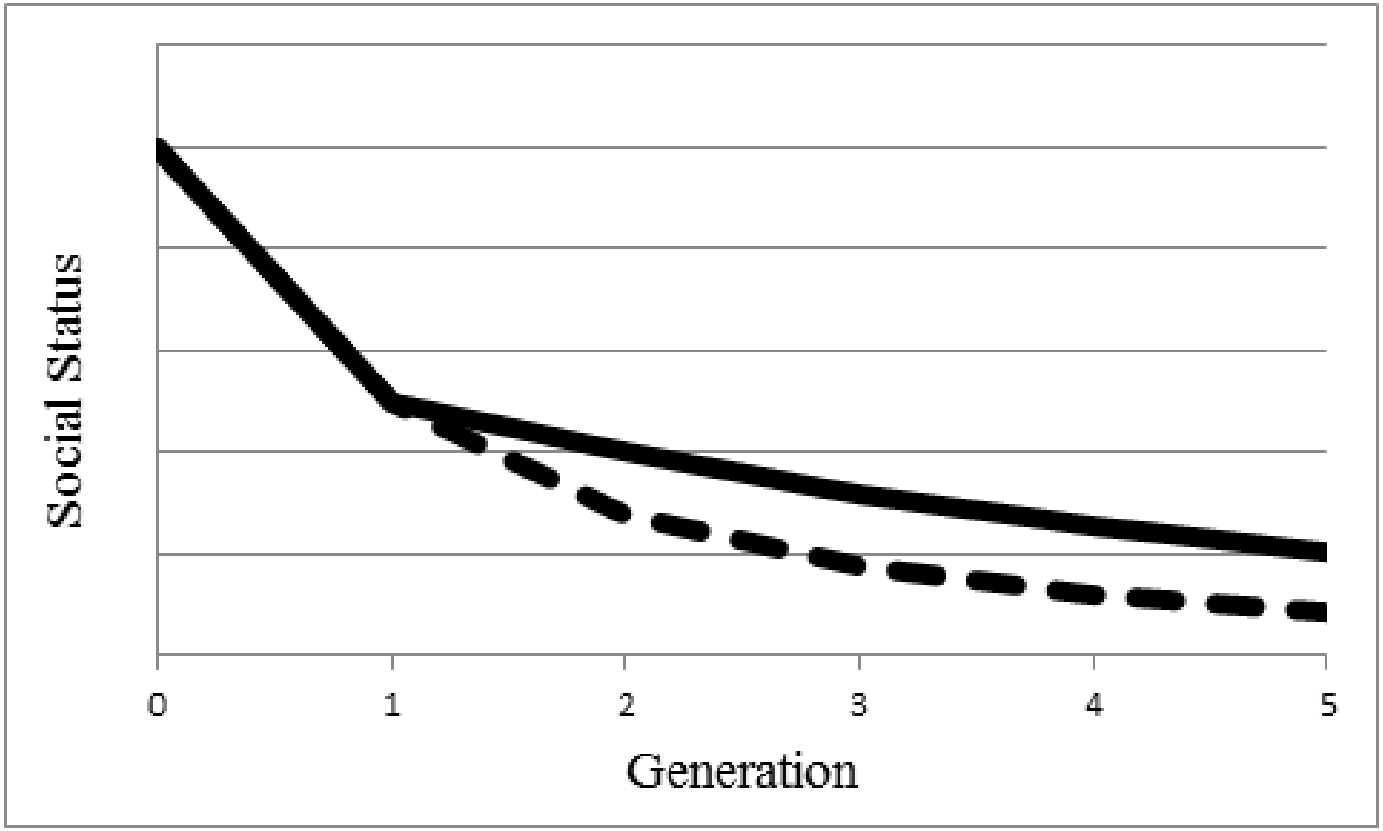


Figure 9: Occupational Status Correlations, Whole Sample

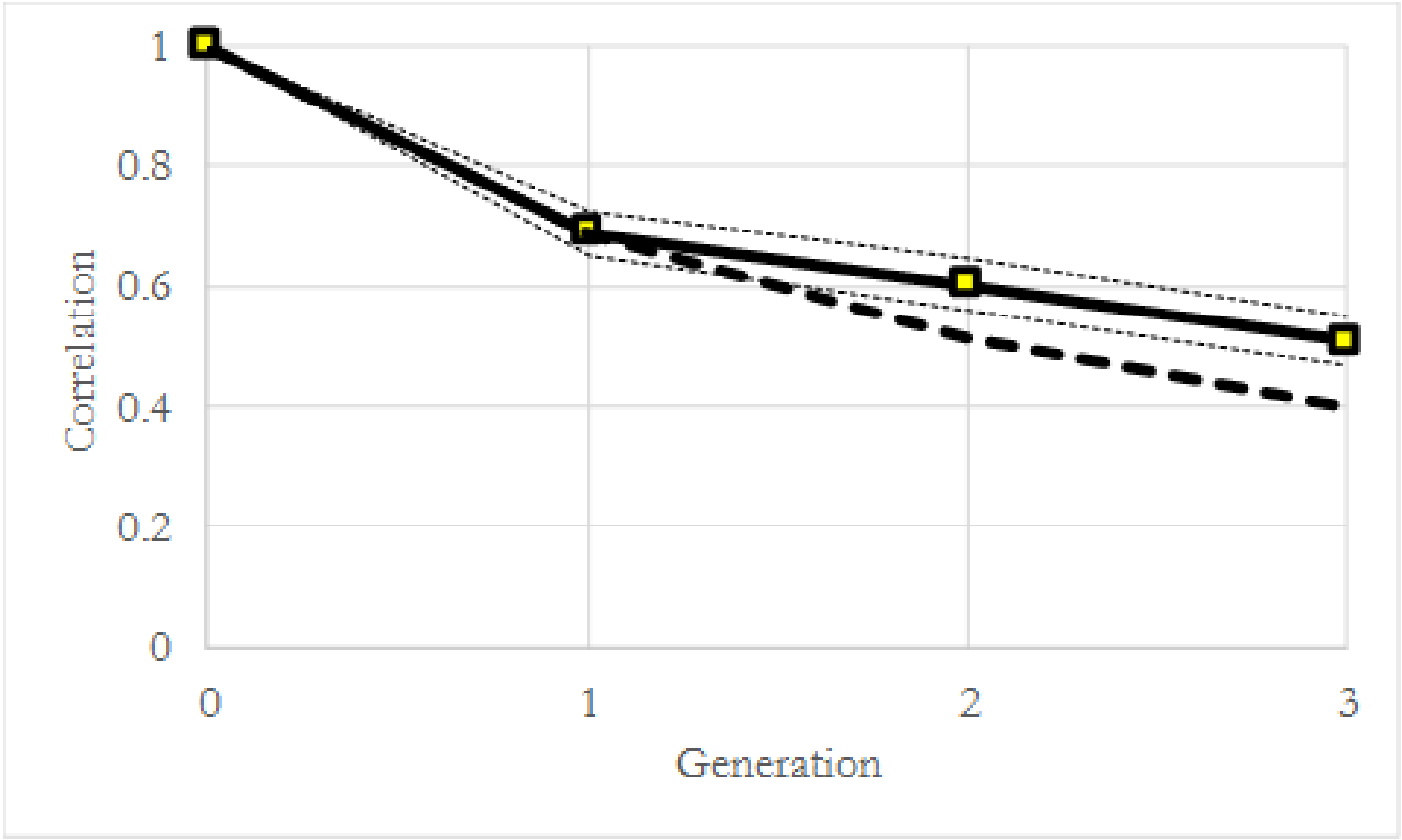
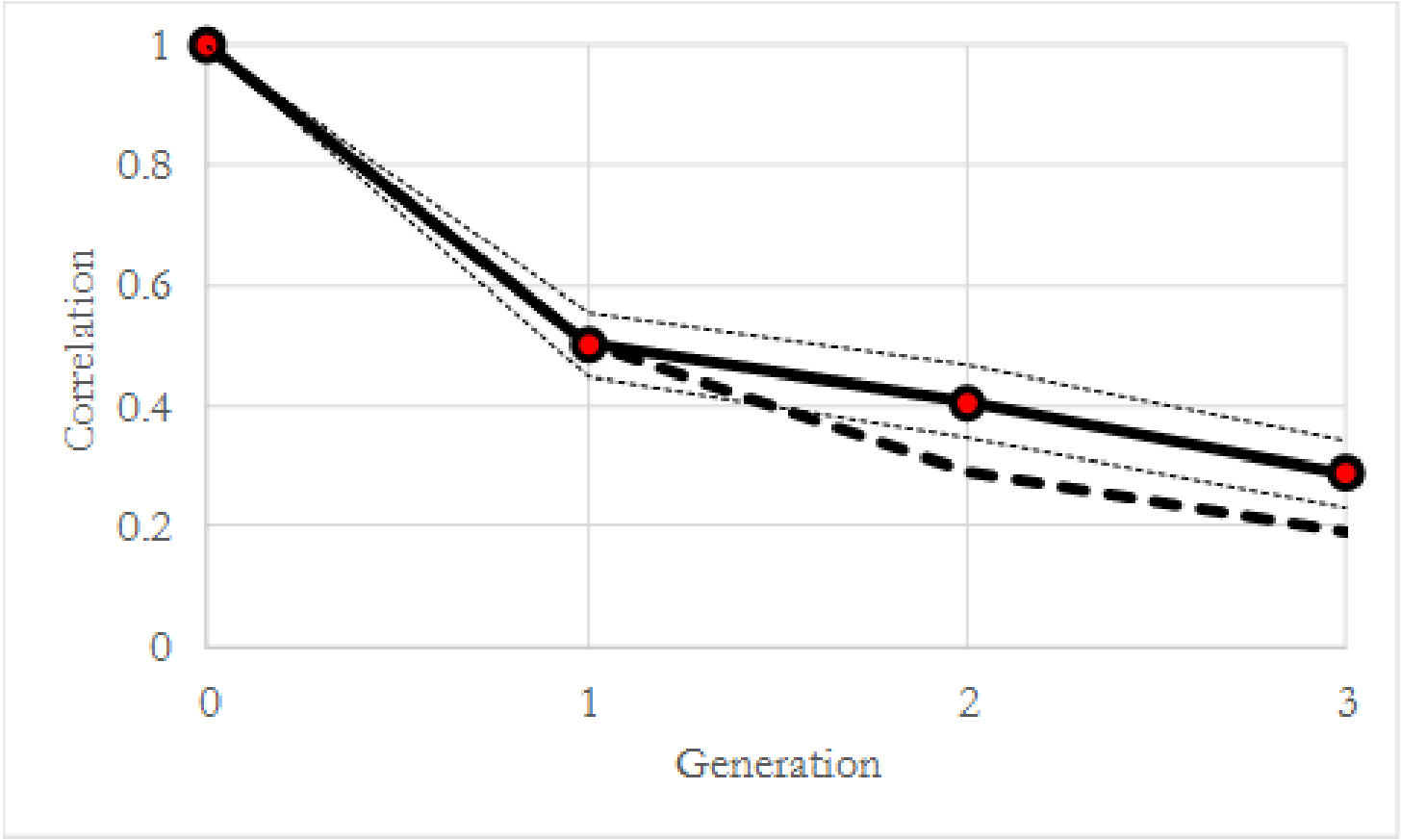


Figure 10: Occupational Status Correlations, Generation 0, 10-50



IV estimates

- Clark Model

$$E(\hat{\beta}_{1IV}) = b$$

Group Effects

$$E(\hat{\beta}_{1IV}) = E(\hat{\beta}_{1OLS})$$

Table 7: Correlation of measures of status for the same individual, England, men born 1790-1929

	Ln(wealth)	Occupational Status	Indicator -High Educational Status
Ln(wealth)	1.000	0.528	0.397
Occupational Status		1.000	0.680
Indicator -High Educational Status			1.000

Table 8: IV estimates of Intergenerational Correlations

y_{t+1}	y_t	IV (ln wealth$_t$)	IV (occupation status)	IV (higher education)
ln wealth$_{t+1}$	0.456	-	0.592	0.583
	(.011)		(.016)	(.021)
occupation status$_{t+1}$	0.549	0.751	-	0.596
	(.012)	(.012)		(.017)
higher education$_{t+1}$	0.498	0.893	0.700	-
	(.018)	(.034)	(.024)	

Robust standard errors in parentheses.

Adermon, Lindahl and Palme. 2016. "Dynastic Human Capital, Inequality and Intergenerational Mobility." Uppsala, IFAU Working Paper 2016:19.

Adermon, Lindahl and Palme. 2016

$$y_{jdt} = \alpha' + \beta' y_{jdt-1} + \delta \bar{y}_{dt-1} + \varepsilon'_{jdt}$$

$$\bar{y}_{dt} = \alpha' + \gamma \bar{y}_{dt-1} + \bar{\varepsilon}'_{dt}$$

To explain persistence $\gamma = 0.8$.

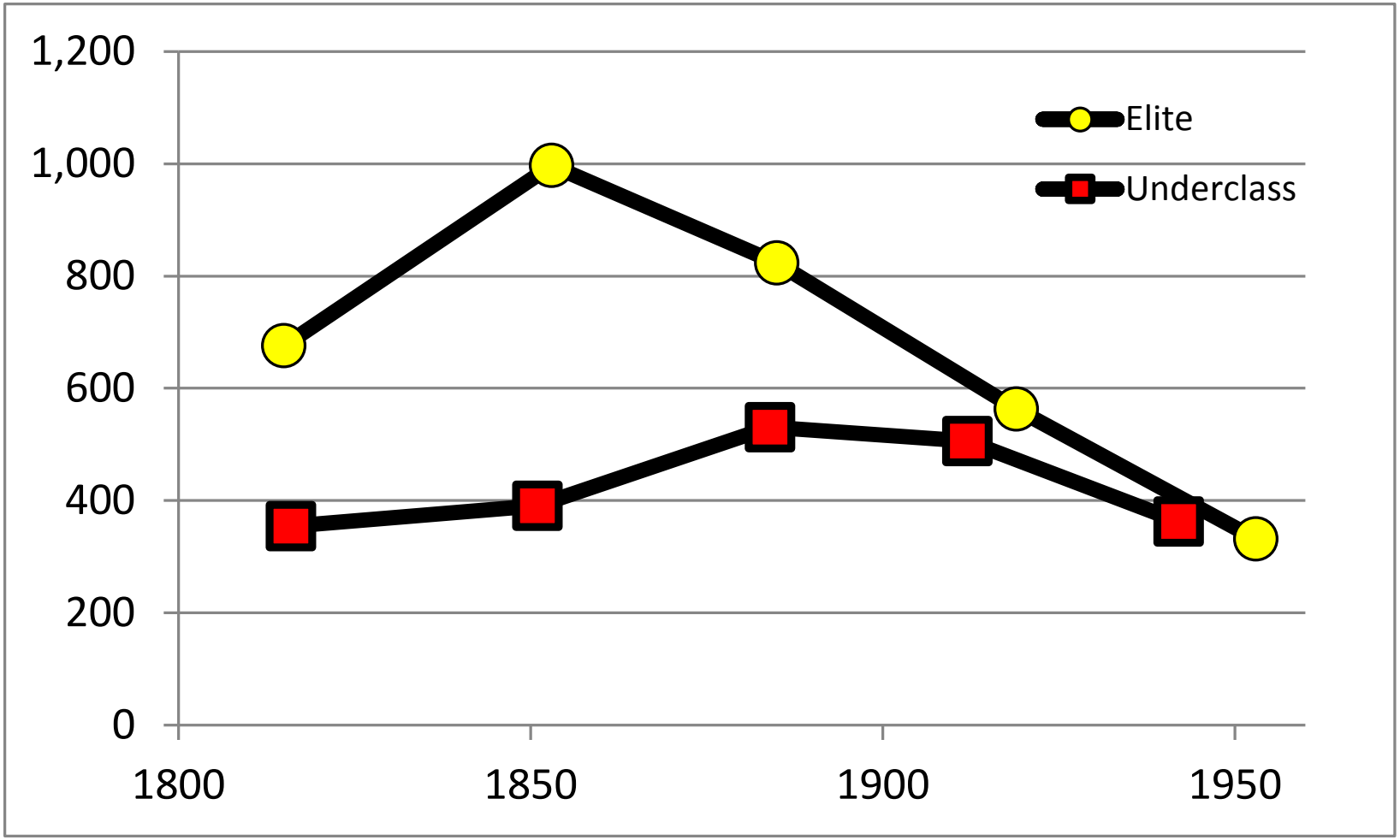
Also $\bar{y}_{dt+1} = \alpha'' + \gamma^2 \bar{y}_{dt-1} + \bar{\varepsilon}''_{dt}$

Other Tests

- Family Size, marriages 1780-1879
- Birth Order
- Extra information from alive v dead relatives, close v distant relatives
- Extent of family social network
- Location at birth – North versus South

Conclusion

- Differential Reproductive Success of Different Social Classes will change overall economic abilities of the population
- This favored England 1250-1800, in run up to IR
- For men born 1850-1929 there is a strong reversal of the effect, so that average British economic abilities must have declined substantially


1,200
1,000
800
600
400
200
0
1800
1850
1900
1950
Elite
Underclass

Reproductive Success by Birth Decade, Educated Men versus