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Supporting Online Material for

Intergenerational Wealth Transmission and the Dynamics of Inequality in Small-Scale Societies

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Supporting on line materials for

Intergenerational Wealth Transmission and the Dynamics of Inequality in Small-Scale Societies

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1. Statistical Methods

Basic Specification and Unit of Analysis

The objective is to calculate a dimensionless statistic that quantifies the resemblance between the wealth holdings of the parental generation (hereafter "F1") and their offspring ("F2"). Many such statistics are possible, but the one that allows for a clear algebraic link to the dynamics of inequality, as modeled in equations 1-3 in the text, is the elasticity of F2 wealth with respect to F1 wealth, which we call β. This statistic is applicable to any kind of wealth whose amount is a non-negative continuously measured quantity, regardless of its scale or the nature of its distribution, as required. It is important to stress that this statistic is descriptive, not structural: as required by our model, it is a measure of intergenerational association, and does not specify the causal pathways accounting for the association.

To estimate this statistic we drew upon the large literature that studies intergenerational associations in earnings or income, as summarized, for example, by Solon (1999). The standard econometric specification used in that body of research is to model the natural log of the F2 outcome (in our case, various forms of wealth) as a linear function of the natural log of the F1 outcome, with polynomial controls for age-at-measurement in both F1 and F2. We also control for gender in F2, yielding the following baseline specification, which was estimated using ordinary least squares regression (OLS):

$$\ln(W_{F2}) = \delta + \beta \ln(W_{F1}) + \lambda_{F2}(F2Age) + \lambda_{F1}(F1Age) + \tau(F2Male) + \pi(OtherControls) + e$$

Here W_{F2} and W_{F1} are wealth outcomes in the two generations, δ is the regression intercept, β is an intergenerational elasticity, λ_{F2} and λ_{F1} are vectors of coefficients that apply to their respective polynomial terms in F2 and F1 age, τ is the effect of F2 gender, π is a vector of parameters associated with situation-specific control variables described below, and e is the regression error term.

The unit of analysis for all such equations is the individual or the household in F2: in other words, the sample size is dictated by the number of children studied, not the number of parents. As a result, parents with multiple children appear multiple times on the right hand side of the equation. (The consequences of this for the estimation of standard errors are discussed below.)

In order that our estimates be as comparable as possible across wealth classes and populations, we sought to make as few modifications to this baseline specification as possible. Still, additions and modifications were necessary in some cases, for the reasons described next. The precise procedures used for each data set are detailed in Table S2. Our goal was to make the minimal deviation from the baseline specification that was needed to ensure that our estimates would be:

(a) *unbiased*: i.e. representative of the relation of the wealth of the average child to that of his or her parents

(b) *robust* to small changes in the sample or the specification

(c) reasonably *precise*, with consistently estimated standard errors.

Functional Form

The logarithmic functional form is preferred for use with data that are highly skewed, as is generally true of material wealth, because it is more robust to extreme values, and often yields more precise estimates than a model estimated in levels. It was used whenever practicable. The main obstacle to its use occurs when there are a non-trivial number of zeros in the F1 data, since one cannot take the logarithm of zero. A common solution to this problem is to add an arbitrary constant to all observations prior to taking logs, but this approach is often problematic (Duan, 1983). It was rejected in our case because in some datasets the estimated elasticity was extremely sensitive to the arbitrary constant. Moreover, the widely different scales of our many measures meant that no single value stood in the same relation to the non-zero data in all cases.

We chose instead to work in levels, as opposed to logarithms, for measures with large numbers of zeros in F1. In such cases, the reported elasticity is the elasticity at the mean of all independent variables. In a few cases this led to estimates that were heavily influenced by a small number of outliers; these cases are noted in Table S2. Our measurement-error-corrected results were also based on regressions in levels (see below).

Cases in which there were zeros in F2 but not F1 were handled either by working in levels, or by using a two-part model, in which the first part consists of a probit equation to separate the zero from the non-zero outcomes, and the second part is an OLS regression in logarithms. The parameters from these two models can then be combined into a single elasticity (Hertz, 2008).

Elasticities that are based on logarithms (such as the term β, in the equation above) are elasticities of the conditional *geometric* mean of the F2 outcome with respect to the F1 variable, while models in levels produce elasticities of the conditional *arithmetic* mean. For comparability across these two specifications, we transformed the log-derived elasticities (whether from the basic single-equation specification listed above, or from a two-part model) into elasticities of the arithmetic mean, following the methods described by Hertz (2008).

Whenever possible we compared linear and logarithmic estimates, and found that, in general, our final elasticities were robust to the choice of functional form. This was especially clear when the data were not skewed (for example, the anthropometric data).

Treatment of Gender in F1 and F2

In some societies, a particular wealth type may pertain only to men (for example, estate values in East Anglia in the 16^{th} – 19^{th} century). In these cases, the relevant elasticity is clearly that between fathers and sons, and F2 gender controls are not needed. In other cases, the form of wealth may be owned by both men and women, and, provided that both parents' wealth measures are separately ascertainable, one could calculate father-son, father-daughter, mother-son, and mother-daughter elasticities separately. Given the importance of gender in determining both wealth levels and inheritance practices, there is every reason to expect that these four elasticities might differ. On the other hand, this results in a proliferation of statistics for each society and wealth type (whereas our goal is to synthesis results for comparative purposes), and reduces the sample size for each estimate (which reduces the precision of the estimates). In such cases, we chose instead to pool sons and daughters, and to include an indicator variable for their gender. Since the gender of offspring is not, in general, strongly correlated to parents' wealth, this pooling should yield an elasticity that is an average of the son-specific and daughter-specific values. For F1, if both father's and mother's wealth were measured, we chose to use either their sum or their average, depending on which quantity best captured our concept of "household or parental status." For the anthropometric measures the “midparent” value, or average value, was used. Ownership of most forms of household material wealth was not differentiated by gender and so these are effectively sums, as are our measures of parental network partners in the case of the Ju/'’hoansi and the Lamelera.

A complication is that even if a given type of wealth may be owned by both mothers and fathers, not all households will contain both parents, either because of permanent separation, death, or temporary absence; moreover, in polygynous households children of the same man might be mapped to different mothers. We dealt with these cases by including indicator variables that flagged those households with only the father’s information, and those households with only the mother’s information. These variables were often quite important, and their inclusion serves to reduce an important source of omitted variables bias. For example, mother-only households will have lower-than-average F1 weight, and yet conditional of this lower weight value, the offspring should be expected to have higher-than-average weight, since their weight is in fact also causally determined by that of their missing father.

Age Controls

In most cases, we used quadratic polynomials in the age of the child, and in the average age of the parents. In some of the smaller samples, quadratic age controls led to counter-intuitive or extremely steep age profiles, and linear controls proved more plausible. In larger samples, on the other hand, we often augmented the quadratics to quartic polynomials, which can provide a better fit and higher precision. In other cases, F1 age controls were entirely immaterial and were dropped. In any event, in the great majority of cases, the final elasticity estimates did not depend strongly on the choice of age controls. Most analyses also specified a minimum age for F2, which was determined based on the nature of the wealth measure and the distribution of the data. Details appear in Table S2.

Other Controls

For data that were drawn from historical records, we were often able to include a time-trend term, to try to disentangle age effects from time effects; examples include the Ache and Gambian datasets. Finally, in two cases (Tsimane skills and hunting returns) we also included village indicators. The logic here was that if some villages are, say, located near rivers, so that everyone fishes, while others are not, then the association between fishing ability in F1 and F2 is overstated if the village controls are omitted, and if fishing skills are socially acquired, not inherited *per se*.

Data Cleaning and Robustness to Outliers

Prior to analysis all data were inspected for implausible values, such as children who were too close in age to their biological parents (or older), and implausible anthropometric outliers; such cases were corrected where possible or dropped. Outliers in material wealth measures were also investigated on a case by case basis: the anthropologist who collected the data was consulted and more often than not, could attest to the validity of these extreme values. In the final column of Table S2, we flag the few estimates that were substantially sensitive to outliers, and report the results obtained after dropping some of the most influential cases. These were identified by visual inspection and by checking their DFBETA test statistics (StataCorp, 2007), with special attention paid to those cases whose omission would alter the point estimate by more than 0.75 standard errors in either direction.

Standard Errors

In most cases we use heteroskedasticity-robust standard errors (White, 1980), under the presumption that the data were subject to heteroskedasticity of unknown form. These were also calculated to take account of clustering at the level of the parental household, in other words, to account for the likely correlation among unobservable factors for children of the same parents or households. This generally resulted in larger standard errors reflecting the loss of precision due to the intra-cluster correlation.

For the hunting returns data, we worked with averages over many hunting trips, generating heteroskedasticity of *known* form, which we handled using weighted least squares (i.e. by weighting the averages by the number of hunting trips they represent.) The exception was the Ache hunting data, for which a single observation representing an extremely high number of trips stood as an influential outlier. In that case, the efficiency gain of correcting for heteroskedasticity did not seem to justify introducing what appeared to be a significant source of bias, and weighted least squares was not used.

As noted, results based on logarithmic measures were transformed to apply to the arithmetic mean, for comparability with the levels-based elasticities. In these cases, and in the two-part model, standard errors are bootstrapped, sampling with replacement from among the parental clusters. Lastly, we used conventional standard errors for those estimates that we were able to adjust for the effects of measurement error.

Sample Selection Bias

Many of the datasets are village-based surveys, and are thus closer to a census than a random sample. However, they are often limited by who is present in the household, and so may be subject to biases related to non-random outmigration. We were not able to address this in a systematic way, due to the lack of instruments to predict migration. One way to view our results is to state that they pertain to the dynamics of wealth transmission among those who do not leave their parents' village. One particular form of sample selection bias that we could and did address related to the bequest data from East Anglia. There the sons of low-wealth parents were less likely to leave wills, but by truncating the sample at a minimum parental wealth threshold, we obtain a dataset of father-son *pairs* that has roughly the same wealth distribution as the full sample of fathers. Note that this amounts to selection on an independent variable, and not a dependent variable: it corrects for an unrepresentative sample and should not introduce any new source of bias if the intergenerational relationship is truly a linear one.

Measurement Error Bias

Classical (random) errors in the measurement of parental wealth will normally attenuate the estimated intergenerational elasticity (i.e. bias it towards zero). The best way to prevent this problem is to start with well-measured data in the first place. In this regard, our reliance on experts with extensive field experience and knowledge of their populations is important, as is the fact that in several cases (for example, the Gambian data, which are drawn from a long-running panel study) we were able to collapse multiple measurements into a long-run average. We are generally confident in the quality of our anthropometric data, and do not believe that correcting for residual measurement error would raise our estimate of the transmissibility of somatic wealth appreciably.

Perhaps the hardest forms of wealth to measure are the material outcomes, which sometimes involved aggregating different items using estimated prices, or were based on recall, not observation. Even in carefully executed studies such as the Panel Study of

Income Dynamics, the reliability of log annual earnings falls in the range of 0.70 to 0.85 (Bound*, et al.*, 1994; Duncan and Hill, 1985). If our material wealth data are of equivalent reliability, then we might expect that correcting for measurement error would raise our material wealth βs (which were, on average, already higher than for the other two wealth classes) by about 20 to 40 percent.

There were five cases in which we had repeated measures of the same quantity, and could thus make an explicit correction for measurement error. The first of these was the data on Ache hunting returns, where the presence of some hunters with many trips to their credit allows us to estimate the reliability of the data when fewer trips are recorded. We estimated that the average reliability of the data was 0.68, and corrected our elasticity to reflect this, using the standard algorithm for adjusting a regression coefficient under the assumption that a single regressor is mismeasured, with classical measurement error and known reliability (Greene, 2003). The second case was the Dominican land data, where measurement error estimates are based on comparing dual reports from community members. In the latter case, we found that male land holdings were estimated with a reliability of 0.70, and we corrected our estimates accordingly, while female land holdings were estimated with such a high degree of error as to be unusable.

The final three cases are the Datoga and Kipsigis cattle data, and the Kipsigis land data, for which multiple annual measurements were available. The correlation between such measurements is an estimate of reliability; it was 0.75 for cattle holdings in both populations, and 0.93 for Kipsigis land wealth.

Given that four of our five measurement-error-corrected results apply to material wealth, it is important to note that none of the qualitative findings reported in the paper was altered by the measurement-error correction.

Statistical Estimation of m (the α-Value for Material Wealth)

As noted in the main text, our estimate of the relative importance of each wealth class to the production of economic wellbeing (α) is based on expert assessments. However, for material wealth we were able to validate these estimates econometrically, using three data sets to estimate the relative importance of material wealth in agricultural production.

The first is an agropastoralist population (Nyaturu) in Tanzania observed half a century ago. (Our estimates are calculated from the Cobb-Douglas production functions estimated in (Massell 1963)). We estimated α for material wealth as the sum of the estimated exponents for cattle and land divided by the sum these two estimates plus the coefficient for labor, so that the resulting exponents summed to one (from equation 2, estimated on p. 37). This value is 0.76 implying that the sum of the αs for embodied and relational wealth is 0.24. We have no way to assess if these data are representative, but the economic system of the Nyaturu is very typical of East African agropastoral societies (Schneider 1979). Taken at face value, this statistical estimate suggests that our ethnographers' estimates for the αs in agricultural (0.59) and pastoral (0.61) societies could even be a bit on the low side. Correcting this underestimate (if that is what it is) would of course strengthen our results.

Our second α estimate is for 7 grain- and rice-growing areas in India during the 1950s and is derived from production function estimates in Bardhan (1973). Our estimate is the coefficient on acres tilled minus the coefficient on man-days of labor per acre, divided by the coefficient on acres (all in natural logarithms). There are a total of 8 estimates from grain-farming areas for material wealth (land) which average 0.68. Combining this estimate with the results from the Tanzanian grain-growers the average is 0.69, exactly the mean of the ethnographers' estimates for our 5 grain-growing agricultural populations. The ethnographic and Indian econometric estimates agree that the α for land is less in rice-growing areas, though here the correspondence is not exact. The econometrically-based estimates of α for the 4 Indian rice growing areas average 0.33 compared with our ethnographic estimates (from 3 rice areas also in India) of 0.41. Were we to use the econometrically-estimated αs, the average for all agricultural populations would be 0.57 rather than the 0.59 we obtained from our ethnographers.

Estimates of m for pastoral and for horticultural production come from third source, a single study (Berhanu et al, 2007) of the Borana people in Southern Ethiopia, who are semi-nomadic pastoralists engaging in some horticultural production. The estimated $m = 0.84$ for pastoral production is the estimated exponent of total livestock units (TLUs) in a Cobb-Douglas production function (the dependent variable is the total value of pastoral production). The estimated $m = 0.23$ for horticultural production is the sum of the exponents for land and oxen inputs in agricultural production adjusted to take account of decreasing returns to scale.

Aggregation of β and Gini Estimates by Wealth Class and Economic system

The estimates that appear in the first three columns of Table 2 of the paper are simple averages of the underlying βs for that wealth class and economic system (from Table 1). Their standard errors are estimated using a regression of the elasticities against a full set of 12 dummy variables, one for each cell. This amounts to assuming that the βs are homoskedastic, i.e. drawn from identical distributions. While this is a strong assumption, in this application it is also a conservative one in relation to several plausible alternative approaches. In particular, it yielded larger standard errors (meaning we are less likely to be overstating the precision and statistical significance of our findings) in most cells than did the simpler approach of basing the standard error for each cell mean on the standard deviation and number of data points in the cell; standard errors for most cells were also larger than those generated according to White's (1980) heteroskedasticity-robust estimator. In Table S11 we also report the results of using another method of dealing with heteroskedasticity, namely, weighting each β by the inverse of its estimated variance (weighted least squares). Note that this places less weight on the βs that were estimated with lower precision, and so alters the cell means, and their α-weighted averages, not just their standard errors. The results, however, are very similar to those reported in Table 2, and support the same conclusions. We follow Angrist and Pischke (2009) in reporting the unweighted results as our preferred estimates.

For the penultimate column of Table 2, the cell means were combined using the "importance weights" described in the text (and above), which are the α terms listed in the table. The full array of estimates of α, by population and wealth type, is found in Table S1. Note that we averaged these weights across populations in each economic system. Identical methods were used to produce averages of the Gini coefficients (Table S5, S12, and final column of text Table 2.)

Estimates of Inequality (Gini Coefficients)

Population- and wealth-type-specific Gini coefficients were calculated using the maximal sample of individuals, including all available F2s, F1 Mothers, and F1 Fathers, with no duplicates, for whom wealth and age data were available (with appropriate minimum age criteria). There was no requirement that wealth data be simultaneously available in two generations. Thus many more observations were used in the calculation of the Gini inequality estimates than were used for calculating the intergenerational elasticities.

The Ginis were age-adjusted by regressing the raw data against a quadratic in age, and saving the residuals from this regression. These were then added to the predicted value at age 50. In some cases, the age on which the data were centered was raised or lowered by at most ten years, to prevent zero values from being adjusted into negative numbers. (When negative numbers were unavoidable, they were recoded to zero.) Ginis were then calculated on these age-adjusted data, and their standard errors were bootstrapped using 100 replications. All results and sample sizes are reported in Table S4.

Whenever the intergenerational elasticities were calculated using village dummy variables (as described above) village dummies were also included in the age-adjustment regression, just described, that produced the inequality estimates. In these cases, both the intergenerational transmission measures and the inequality measures become within-village estimates.

Decomposition of Population Differences in α-Weighted βs

The decomposition in the text was calculated as follows. First, we averaged the three values of α reported in Table 2 for Hunter-Gatherers with the three values reported for Horticulturalists; and likewise for the βs. We then used the average αs to weight the average βs. Next, we did the same for the Pastoralist and Agricultural populations, thus reducing four economic systems to two. The difference between these two resulting α-weighted βs can then be decomposed as follows:

$$\alpha_1\beta_1 - \alpha_0\beta_0 \equiv \overline{\alpha}(\beta_1 - \beta_0) + \overline{\beta}(\alpha_1 - \alpha_0)$$

where the "1" subscript refers to the Pastoralist and Agricultural societies and the "0" to the other two economic systems. The term $\overline{\alpha}$ is just the grand mean of the αs for all four economic systems, and likewise for $\overline{\beta}$. Thus the first term captures the effects of differing βs across the paired economic systems, holding the αs at their means across economic systems, while the second holds the βs fixed at their means across economic systems, and captures the contribution of differences in the αs across economic systems. This is a variant of the Oaxaca-Blinder decomposition technique that is commonly used to study male-female wage differentials (Oaxaca, 1973; Blinder, 1973).

2. Heritability (h^2) of Economic and Social Behaviors (Embodied wealth) and its Contribution to the Intergenerational Transmission of Wealth

A series of recent papers (Cesarini et al, 2008; Cesarini et al, 2009a; Wallace et al, 2007; Cesarini et al, 2009b) has used data from the Swedish Twin Registry (and in one case U.S. data) to estimate the genetic heritability of economic behaviors, including risk taking (measured by actual choices among retirement options), risk aversion (the certainty equivalent of bets made in an experimental lottery), generosity (offers in a Dictator Game), reciprocity (rejections of low offers in an Ultimatum Game) and trusting and trustworthiness (in a Trust Game). We would like to use these data to estimate the value of β_G namely the extent of transmission across generations that would occur (for the traits in question) were genetic inheritance the only transmission process at work. To do this we use methods explained in Bowles and Gintis (2002) and Goldberger (1989) and derived from Falconer (1981).

Table S6 presents data from these studies and computations based on them. The columns MZ and DZ refer to the correlations between monozygotic twins and between dizygotic twins for the traits indicated. Estimation of the degree of heritability h^2 is based on the assumption that dominance is absent in which case the DZ correlation must be at least half of the MZ correlation, an assumption violated in 6 of the 8 cases below. To provide a minimum estimate of heritability consistent with the no dominance assumption we can replace the observed DZ correlation by the minimum value it could take consistent with the estimating model. If we then assume that there is no mating assortment on genes ($\mu = 0$) the heritability estimates in the penultimate column result ($h^2 = 2\Delta/(1+ \mu)$, where Δ is the difference between the MZ and DZ correlations). Finally the last column gives estimates of $\beta_G = h^2(1+ \mu)/2$. (The value of m does not affect the final column, as the term appears both in the calculation of h^2 and of β_G and cancels out). The mean of the final column is 0.126.

Parent-offspring similarity in standard personality measures such as “conscientiousness” or “extroversion” reflect both cultural and genetic transmission.

These correlations are also quite modest, the mean value in a meta analysis of 529 estimates implying a $\beta = 0.14$ (Loehlin 2005).

3. Relationship Between β Values and the Probability of Attaining High and Low Positions in the Wealth Distribution Conditional on Parents' Position

How much intergenerational inequality does a given value of β indicate? To answer this question we estimate the ratio of the probability that an offspring whose parent is in the top decile (or quintile) of the distribution of wealth will also end up in the top decile, to the probability that the offspring of a parent in the bottom decile will end up in the top decile. We call this the inequality of life chances ratio (denoting it as ρ), as it measures the degree to which one's parents wealth predicts one's own attainments as an adult. Assuming that wealth in the two generations is jointly normally distributed, and that these distributions have the same variance (as would be true at the stationary distribution so that the β is equal to the intergenerational correlation coefficient), we can create a 10x10 transition matrix (each entry of which, w_{ij}, gives the probability that the offspring of a parent in the i^{th} decile will end up in the j^{th} decile) from which we can calculate the second column of Table S7.

Thus if the average β is about what we find for horticultural and hunter gatherer populations (say 0.2), the son of the wealthy top decile is 3.6 times more likely to end up where his parents were (top decile) than the son of someone whose parents were in the bottom decile. From Table S7 we can see that a value of β 'close to zero' does not indicate an egalitarian system of intergenerational transmission, and that "small" βs are associated with quite substantial values of ρ; furthermore small differences in β are associated with huge differences in ρ. By either the decile or quintile measure, our hunter-gatherer and horticultural α-weighted βs demonstrate a substantial level of intergenerational inequality when measured by the comparison of the conditional probabilities of getting ahead for the offspring of top and bottom parents. But our pastoral and agricultural populations have much greater intergenerational inequality (4.5 times more by the decile ρ measure, twice by the quintile ρ measure). For $\beta = 0.95$ the probability that the son of the poorest decile will attain the top decile is so small that the ρ cannot be reliably calculated. And for $\beta = 0.90$ the (decile) number is eleven million, three hundred thousand. The numbers for these very high betas are subject to considerable error (especially for the decile case) because the denominator of the ratio is almost zero (no chance of getting to the top at all) so small differences in that number due to random sampling variation in the simulation of the income distribution make a large difference in the ratio.

4. Sensitivity of Weighted Averages of β to an Alternative Classification of Societies by Economic system

We investigated the sensitivity of our main findings to a possible reclassification of societies across economic systems (Table S8). Two possible alternatives were selected as being worthy of consideration, namely, reclassifying the Ache as horticulturalists and the Kipsigis as pastoralists. (We do not believe that either of these reclassifications is at all justified yet the question of the sensitivity of our results to these choices remains an important one.) In Table S8 we implement this reclassification, and replicate all components of Table S3, reporting the mean βs by economic system and wealth class, as well as the α-weighted means of the βs for each economic system. Note that reclassifying these two societies alters both the βs and the αs, since the αs for each cell are derived from averages across estimates for the societies in that cell.

As Table S8 shows, this reclassification has virtually no effect on our estimates – the cell means of β for each economic system and wealth class are not appreciably altered, and neither are the α-weighted averages.

5. Effects of Using Econometric Estimates of *m* for α-weighted βs and Ginis.

We also explored the effect of using the econometric estimates of m^* described in the text and in section 1 above. Because we lack separate estimates for the embodied versus the relational wealth classes, these were combined, and their sum ($e+r$) was set to $1-m^*$. Data limitations also required that we apply the estimate of m for horticulturalists to hunter-gatherers as well. The results are in tables S9 and S10. The effect is to increase somewhat the differences in α-weighted βs between the hunter-gatherer and horticultural populations on the one hand and the agricultural and pastoral populations on the other; the weighted average Ginis are virtually unaffected.

6. Statistical Determinants of Intergenerational Transmission and Inequality

We also conducted a more detailed econometric exercise, treating the estimated elasticities and Gini coefficients as dependent variables and the wealth classes and the population's economic system as independent variables. We estimated the following 4 equations with ordinary least squares:

$$\hat{\beta}_{wp} = c + \delta^{am} A_p M_w + \delta^h A_p + \delta^m M_w + \varepsilon_{wp}$$
$$\hat{\beta}_{wp} = c + \delta^{am} A_p M_w + \delta^m M_w + \phi_p + \varepsilon_{wp}$$
$$\hat{G}_{wp} = c + \delta^{am} A_p M_w + \delta^h A_p + \delta^m M_w + \varepsilon_{wp}$$
$$\hat{G}_{wp} = c + \delta^{am} A_p M_w + \delta^m M_w + \phi_p + \varepsilon_{wp}$$

where w denotes wealth class, p denotes population, M_w denotes an indicator for material wealth, A_p denotes a binary indicator for the population being agricultural or pastoral (as opposed to hunter-gatherer or horticultural), and ϕ_p denotes a population-specific average transmission coefficient, which we estimate with a set of dummy variables (fixed effects). The constant term is denoted c. The standard errors are heteroskedasticity-robust, but not clustered on population type (this is conservative; clustering the errors by population would led to more significant results, perhaps due to within population negative correlation in the error terms across wealth types.) Results are reported in Table S13 and discussed in the main text. Very similar results were obtained using weighted least squares as an alternative solution to the problem of heteroskedasticity.

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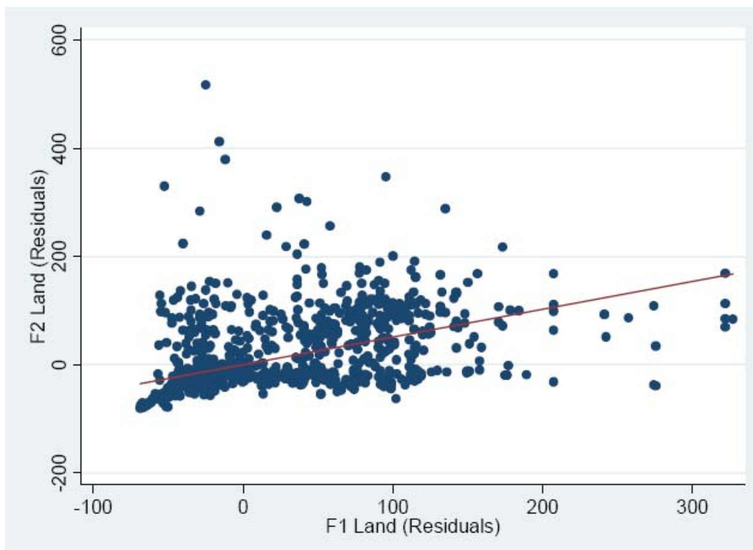
Figures

Figure S1. Two intergenerational wealth transmission scatter plots

The upper panel of the figure below shows the intergenerational relationship in land holdings in Krummhörn. The linear fit through the data is plotted, after removing the effects of age and gender. The slope is 0.51, and when converted to an elasticity at means this becomes 0.61, with a robust standard error of 0.04, as reported in Table 2. The lower panel shows the scatter plot for reproductive success (RS) for the Datoga. The elasticity at means is 0.07 with a robust standard error of 0.06.

Krummhörn:
Land



Datoga:
Reproductive
Success

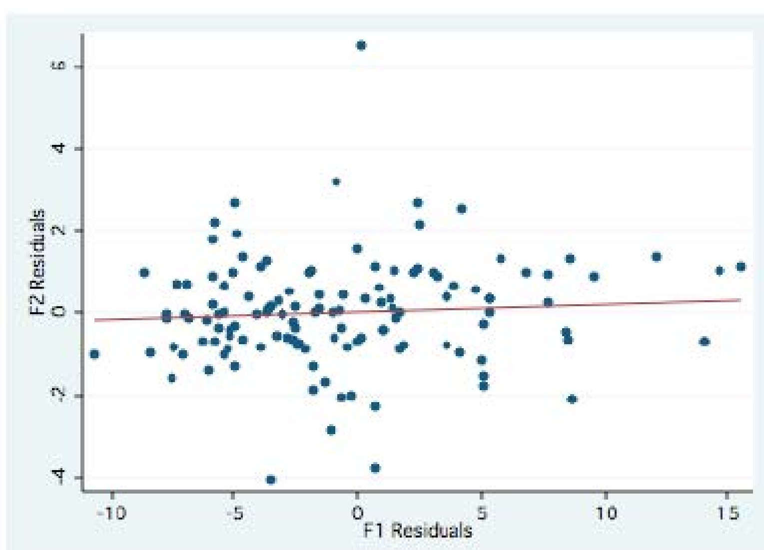
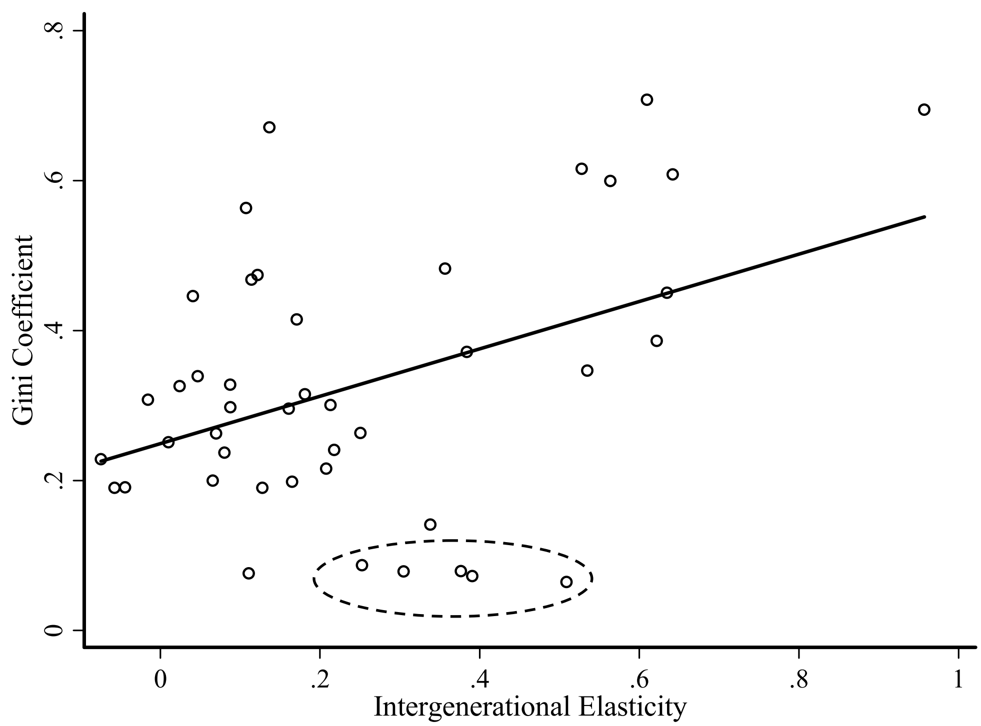


Figure S2. Gini coefficients and βs for 43 wealth types

The figure below documents the simple linear relationship between 43 estimates of inequality (Gini coefficients) and the corresponding estimates of β. The relationship is positive and significant, with a correlation coefficient of 0.41 ($p < 0.01$). The dotted circle contains those points that describe the intergenerational transmission and inequality in body weight which is atypically equally distributed for trait that is substantially transmitted across generations.



Tables

Table S1. Population and wealth-class specific estimates of α, and averages across economic systems

POPULATIONS	WEALTH CLASSES		
Hunter-Gatherer	**Embodied**	**Relational**	**Material**
Hadza	0.70	0.30	0.00
Meriam	0.40	0.40	0.20
Ju/''hoansi	0.35	0.40	0.25
Ache	0.50	0.45	0.05
Lamalera	0.35	0.40	0.25
	0.46	**0.39**	**0.15**
Horticultural			
Gambia	0.55	0.25	0.20
Tsimane	0.45	0.40	0.15
Pimbwe	0.60	0.10	0.30
Dominica	0.50	0.30	0.20
	0.53	**0.26**	**0.21**
Pastoralist			
Yomut Charwa	0.20	0.10	0.70
Datoga	0.25	0.25	0.50
Sangu (Ukwaheri)	0.30	0.10	0.60
Juhaina Arabs	0.28	0.10	0.62
	0.26	**0.14**	**0.61**
Agricultural			
Bengali	0.30	0.20	0.50
Khasi	0.40	0.25	0.35
Kipsigis	0.20	0.10	0.70
Yomut Chomur	0.20	0.10	0.70
England	0.50	0.00	0.50
Skellefteå	0.10	0.10	0.80
Krummhörn	0.15	0.10	0.75
Bengaluru	0.30	0.30	0.40
	0.27	**0.14**	**0.59**

Note: See text for source of individual estimates. The averages by economic system and wealth class (in boldface) were used in Table 2 in the text, and Tables S3, S5, S8, S11 and S12, below.

Table S2. Details of estimation of β: a. Hunter-gatherer populations

Population	Author	Wealth Type	Class	Elasticity	Std Err.	Error Type	P-value	N (F2)	Model	F1 Measure	F2 Measure	Controls	Outlier Effects
Ache	Hill	Hunting returns	Embodied	0.081	0.273	Conventional, not clustered.	0.768	49 (2915 trips).	Levels, with measurement error correction.	Age and year-corrected lifetime average kg. of meat per trip, father.	Age and year-corrected lifetime average kg. of meat per trip.	None: age and time corrections done in first stage.	Not influential.
Ache	Hill	Weight	Embodied	0.509	0.128	Robust, clustered on HHID.	0.000	137	Levels, elasticity at means.	Midparent weight.	F2 weight.	Quadratic in midparent and F2 age, sex, single parent controls.	Not influential.
Hadza	Marlowe	Weight	Embodied	0.305	0.076	Robust, clustered on HHID.	0.000	227	Levels, elasticity at means.	Midparent weight.	F2 weight.	Quartic in midparent age, quadratic in F2 age, sex, single parent controls.	Not influential.
Hadza	Marlowe	Hunting and gathering returns	Embodied	0.047	0.193	Robust, clustered on HHID.	0.808	33	Levels, elasticity at means.	Midparent total kilocalories per day from hunting and foraging, all food sources.	Total kilocalories per day from hunting and foraging, all food sources.	Quartic in midparent and F2 age, sex, single parent controls. Mother-daughter digging omitted because they dig together.	Not influential
Hadza	Marlowe	Grip strength	Embodied	-0.044	0.050	Robust, clustered on HHID.	0.386	196	Levels, elasticity at means.	Midparent right hand grip strength.	Right hand grip strength.	Quadratic in midparent and F2 age, sex, single parent controls.	Not influential.
Ju/'hoansi	Wiessner	Social networks	Relational	0.208	0.114	Bootstrapped, clustered on HHID.	0.067	26	Logs, with mean correction.	Log of sum of parents Hxaro partners.	Log of Hxaro partners.	Quadratic in midparent and F2 age, sex. (Single parent controls greatly reduced precision.)	Not influential.
Lamalera	Nolin	RS	Embodied	0.161	0.174	Robust, clustered on HHID.	0.355	121	Levels, elasticity at means.	Midparent RS.	RS.	Quadratic in midparent and F2 age, sex. (All two parent households.)	Not influential.
Lamalera	Nolin	Quality of housing	Material	0.218	0.099	Robust, clustered on HHID.	0.027	121	Levels, elasticity at means.	Mokken Scale of house construction.	Mokken Scale of house construction.	Quartic in midparent age and F2 age, sex. (All two parent households.)	Not influential.
Lamalera	Nolin	Boat shares	Material	0.122	0.093	Robust, clustered on HHID.	0.190	121	Levels, elasticity at means.	Household's shares in ownership of fishing boats.	Household's shares in ownership of fishing boats.	Quadratic in F2 age, sex. (All two parent households.)	Removal of single most influential observation raises β to 0.185.
Lamalera	Nolin	Food sharing partners	Relational	0.251	0.052	Bootstrapped, clustered on HHID.	0.000	119	Logs, with mean correction.	Sum of number of HHs the focal HH gives food to or receives food from.	Sum of number of HHs the focal HH gives food to or receives food from.	Quadratic in midparent and F2 age, sex. (All two parent households.)	Not influential.
Meriam	E. Smith	RS	Embodied	0.088	0.247	Robust, clustered on HHID.	0.722	91	Levels, elasticity at means.	Midparent RS	RS	Quadratic F2 age, sex, single parent controls.	Not influential.

Table S2, Continued. Details of estimation of β: b. Horticultural populations

Population	Author	Wealth Type	Class	Elasticity	Std Err.	Error Type	P-value	N (F2)	Model	F1 Measure	F2 Measure	Controls	Outlier Effects
Dominicans	Quinlan	Land	Material	0.137	0.140	Conventional, not clustered.	0.327	62	Levels, with measurement error correction based on reliability estimate of 0.7, from dual reports.	Land holdings (fathers).	Land holdings (sons and daughters).	F2 age and sex.	Positive elasticity driven by a single outlier, which is confirmed to be correct (a wealthy father-son pair). Without this point, estimate is negative (but insignificant).
Gambia	Sear	Weight	Embodied	0.391	0.041	Robust, clustered on HHID	0.000	1274	Levels, elasticity at means.	Midparent weight.	Weight.	Quartic in midparent and F2 age, sex, single parent controls.	Not influential.
Gambia	Sear	RS	Embodied	0.088	0.086	Robust, clustered on HHID	0.309	967	Levels, elasticity at means.	Midparent survival adjusted RS5	Survival adjusted RS5	Quadratic in midparent & F2 ages, sex, F1 & F2 birth years, single parent controls, village controls, controls for type of censoring.	Not influential.
Pimbwe	Borgerhoff Mulder	Farming skill	Embodied	-0.015	0.097	Robust, clustered on HHID	0.875	217	Levels, elasticity at means.	Number of months family is without maize.	Number of months family is without maize.	Quadratic in midparent and F2 age, sex, single parent controls, linear controls in hectares of land planted in both generations.	Not influential.
Pimbwe	Borgerhoff Mulder	Weight	Embodied	0.377	0.096	Robust, clustered on HHID	0.000	148	Levels, elasticity at means.	Midparent weight	Weight	Quartic in midparent and F2 age, sex, single parent controls.	Not influential.
Pimbwe	Borgerhoff Mulder	RS	Embodied	-0.057	0.107	Robust, clustered on HHID	0.592	599	Levels, elasticity at means.	Midparent RS5, survival adjusted.	RS5, survival adjusted.	Quadratic in midparent and F2 age, sex, single parent controls.	Not influential.
Pimbwe	Borgerhoff Mulder	Household and farm utensils	Material	0.107	0.318	Bootstrapped, clustered on HHID	0.735	283	Logs, with mean correction.	Log value of midparent wealth (household and farm utensils) averaged across multiple surveys.	Log value of household and farm utensils averaged across multiple surveys.	Quartic in midparent and F2 age, sex, single parent controls.	Not influential.
Tsimane	Gurven / Schniter	Knowledge of skills.	Embodied	0.111	0.094	Robust, clustered on HHID	0.240	181	Levels, elasticity at means.	Average of parents' percent of skills possessed (different skill sets for men and women).	Percent of skills possessed (different skill sets for men and women).	Quadratic in F2 age, sex, single parent controls, village controls.	Not influential.
Tsimane	Gurven	Grip strength	Embodied	0.070	0.042	Robust, clustered on HHID	0.094	490	Levels, elasticity at means.	Midparent grip strength.	Grip strength.	Quartic in midparent and F2 age, sex, single parent controls.	Not influential.
Tsimane	Gurven	Weight	Embodied	0.253	0.069	Robust, clustered on HHID	0.000	383	Levels, elasticity at means.	Midparent weight.	Own weight.	Quadratic in F2 age, sex, single parent controls (parental age controls had no effect).	Not influential.
Tsimane	Gurven	Hunting returns	Embodied	0.384	0.130	Weighted least squares.	0.003	26 (203 trips.)	Levels, weighted by son's number of trips (weighted least squares); elasticity at means.	Rate of return (father)	Rate of return (son)	Quadratic in fathers' and sons' ages, village dummies.	Result highly sensitive to outliers. Dropping the most positively influential point reduces elasticity to 0.004. Removing the most negatively influential point raises elasticity to 0.593.

Table S2, Continued. Details of estimation of β: Horticultural populations, continued

Population	Author	Wealth Type	Class	Elasticity	Std Err.	Error Type	P-value	N (F2)	Model	F1 Measure	F2 Measure	Controls	Outlier Effects
Tsimane	Gurven	RS	Embodied	0.128	0.073	Bootstrapped, clustered on HHID	0.079	849	Two-part model: RS in logs, adjusted to arithmetic mean.	Log midparent RS.	Log child RS.	Quartic in midparent and F2 age, sex, single parent controls.	Not influential.
Tsimane	Gurven	Household wealth	Material	0.024	0.071	Bootstrapped, clustered on HHID	0.731	110	Logs, with mean correction.	Log average of parents wealth = value of household objects.	Log wealth.	Quadratic in midparent and F2 age, sex.	Removal of most influential observation lowers elasticity to -0.002.
Tsimane	Hooper	Labour cooperation network ties	Network	0.181	0.106	Robust, clustered on father ID	0.086	67	Levels, elasticity at means.	Number of individuals from remote communities who helped father in field.	Number of individuals from remote communities who helped son in field.	Quadratic in fathers' and sons' ages.	Not influential.
Tsimane	Hooper	Allies in conflict.	Network	0.338	0.103	Robust, clustered on HHID	0.001	45	Levels, elasticity at means.	Peer-interviews: relative ranking of who would have more allies in a conflict (father).	Peer-interviews: relative ranking of who would have more allies in a conflict (son).	Quadratic in F2 age. (F1 age immaterial.)	Not influential.

Table S2, Continued. Details of estimation of β: c. Pastoral populations

Population	Author	Wealth Type	Class	Elasticity	Std Err.	Error Type	P-value	N (F2)	Model	F1 Measure	F2 Measure	Controls	Outlier Effects
Datoga	Borgerhoff Mulder	RS	Embodied	0.066	0.060	Robust, clustered on HHID	0.274	133	Levels, elasticity at means.	Father's RS5, survival adjusted	F2 RS5, survival adjusted	Quadratic in father's age and own age, sex.	Not influential.
Datoga	Borgerhoff Mulder	Livestock	Material	0.622	0.127	Conventional	0.000	135	Levels, with measurement error correction.	Father's livestock.	Own livestock.	Quadratic in father's and F2 age, sex.	Four high and four low outliers roughly offset each other; data are valid.
Juhaina Arabs	Fazzio	Camels (milk).	Material	0.535	0.226	Bootstrapped, clustered on FID.	0.018	21	Logs, with mean adjustment.	Camel milik collected by father.	Camel milik collected by child.	Quadratic in F2 age, sex.	Not influential.
Sangu (Ukwaheri)	McElreath	Cattle	Material	0.957	0.424	Bootstrapped, clustered on FID.	0.024	108	Levels, elasticity at means.	Father livestock holdings	Child livestock holdings	Quadratic in F2 age, sex.	Two wealthy fathers drive this result, but they are valid data; without them the elasticity is -0.04. We used bootstrapped standard errors to emphasize this lack of precision. These are 70% larger than conventionally estimated standard errors.
Yomut Charwa	Irons	Patrimony (livestock)	Material	0.564	0.167	Robust, not clustered.	0.001	22	Levels, elasticity at means.	Father's patrimony.	Sons patrimony.	None.	Not influential.

Table S2, Continued. Details of estimation of β: d. Agricultural populations

Population	Author	Wealth Type	Class	Elasticity	Std Err.	Error Type	P-value	N (F2)	Model	F1 Measure	F2 Measure	Controls	Outlier Effects
Bengali	Leonetti	RS	Embodied	-0.074	0.057	Bootstrapped, clustered on mother's ID.	0.191	382	Logs, with mean adjustment.	Mother RS	Son RS	Quadratics in F1 and F2 ages.	Not influential.
Bengaluru	Shenk	In-law networks	Relational	0.114	0.073	Bootstrapped, clustered on HHID.	0.117	249	Logs, with mean adjustment.	Parents' average in-law network size.	Sons' and daughters' in-law network size	Sex (age insignificant).	Not influential.
East Anglians	Clark	RS	Embodied	0.171	0.150	Robust, clustered on father's ID.	0.255	200	Levels, elasticity at means.	Fathers RS	RS	Quadratics in fathers' and sons' ages; linear in sons' decade of death.	Not influential.
East Anglians	Clark	Estate value (mostly land)	Material	0.642	0.073	Bootstrapped, clustered on father's ID.	0.000	210	Logs, with mean correction and selection correction.	Log father's estate value.	Log son's estate value.	None. Age-at-death and decade-of-birth corrections immaterial.	Not influential.
Khasi	Leonetti	RS	Embodied	0.165	0.045	Robust, clustered on mother's ID.	0.000	650	Levels, elasticity at means.	Mother RS	Daughter RS	Quadratics in mothers' and daughters' ages.	Not influential.
Kipsigis	Borgerhoff Mulder	RS	Embodied	0.213	0.106	Robust, clustered on father's ID.	0.044	270	Levels, elasticity at means.	Fathers survivial adjusted RS5	Survival adjusted RS5	Linear terms in F1 and F2 age, sex.	Not influential.
Kipsigis	Borgerhoff Mulder	Land	Material	0.357	0.041	Conventional	0.000	270	Levels, with measurement error correction.	Father's land holdings.	Own land holdings.	Quadratic in childrens' ages, sex.	Not influential.
Kipsigis	Borgerhoff Mulder	Livestock	Material	0.635	0.098	Conventional	0.000	270	Levels, with measurement error correction.	Fathers' livestock.	Own livestock.	Quadratic in childrens' ages, sex.	Not influential.
Kipsigis	Borgerhoff Mulder	Cattle partners	Relational	0.041	0.139	Robust, clustered on father's ID.	0.767	102	Levels, elasticity at means.	Father's cattle partners.	Child's cattle partners.	Quartic in fathers and childrens' ages, sex.	Not influential.
Krummhörn	Beise	Land	Material	0.610	0.043	Robust, clustered on father's ID.	0.000	1602	Levels, elasticity at means.	Father's land	Child's land	Quadratic in F2 year of birth, sex.	Not influential.
Skellefteå	Low	RS	Embodied	0.010	0.028	Robust, not clustered.	0.714	2515	Levels, elasticity at means.	Midparent RS.	Son's RS.	Quadratic in F2 age, single parent controls.	Not influential.
Yomut Chomur	Irons	Patrimony (land)	Material	0.528	0.147	Robust, not clustered.	0.000	58	Levels, elasticity at means.	Fathers' patrimony.	Sons' patrimony.	None.	Removal of three most influential observations (two positively, one negatively, affecting slope by more than one standard error) reduces elasticity to 0.266 (Std Err 0.117)

Table S3. Expanded version of text Table 2: Population and wealth-class specific weighted averages of β, and tests of differences

Economic System		Wealth Class: Embodied	Relational	Material	α-Weighted Average
Hunter-Gatherer	α	0.46	0.39	0.15	
	β	0.16	0.23	0.17	0.19
	SE(β)	(0.06)	(0.11)	(0.11)	(0.05)
	p-value	*0.01*	*0.04*	*0.12*	*0.00*
Horticultural	α	0.53	0.26	0.21	
	β	0.17	0.26	0.09	0.18
	SE(β)	(0.05)	(0.11)	(0.09)	(0.04)
	p-value	*0.00*	*0.02*	*0.31*	*0.00*
Pastoral	α	0.26	0.14	0.61	
	β	0.07	na	0.67	0.43 †
	SE(β)	(0.15)	na	(0.07)	(0.06)
	p-value	*0.66*	na	*0.00*	*0.00*
Agricultural	α	0.27	0.14	0.59	
	β	0.10	0.08	0.55	0.36
	SE(β)	(0.07)	(0.11)	(0.07)	(0.05)
	p-value	*0.16*	*0.47*	*0.00*	*0.00*
Average across all economic systems	α	0.38	0.23	0.39	
	β	0.12	0.19	0.37	0.29
	SE(β)	(0.05)	(0.06)	(0.04)	(0.03)
	p-value	*0.01*	*0.00*	*0.00*	*0.00*

Differences in Average βs: Embodied – Material, and Relational – Material

		Embodied – Material	Relational – Material
Differences by wealth class in averages across economic systems	Δβ	-0.25	-0.18
	SE(Δβ)	(0.06)	(0.07)
	p-value	*0.00*	*0.02*

Notes: Cell-means were estimated in a regression against a full set of dummy variables for each cell, with conventional standard errors. See section 1, above, and Table S11, below, for a discussion of alternative approaches to estimating these cell-means and their standard errors. Averages across wealth classes (rightmost column) are calculated after weighting each cell mean by the values of α shown. In the upper panel, the p-values test whether the true β is zero for that cell. In the lower panel, p-values relate to the difference between βs, as indicated.

† The elasticity for Kipsigis cattle partners (see Table S2) is used in the Pastoral / Relational cell for the calculation of the α-weighted average across wealth classes.

Table S3, Continued

Economic System Pairs		Embodied	Relational	Material	α-Weighted Average
Average of Hunter-Gatherer and Horticultural economic systems	α	0.49	0.33	0.18	
	β	0.17	0.24	0.13	0.19
	SE(β)	(0.04)	(0.07)	(0.00)	(0.03)
	p-value	*0.00*	*0.00*	*0.07*	*0.00*
Average of Pastoral and Agricultural economic systems	α	0.26	0.14	0.60	
	β	0.08	0.08	0.61	0.40
	SE(β)	(0.08)	(0.11)	(0.05)	(0.04)
	p-value	*0.33*	*0.47*	*0.00*	*0.00*
Difference between Hunt./Hort. and Past./Agric. systems	Δβ	0.09	0.17	-0.48	-0.21
	SE(Δβ)	(0.09)	(0.13)	(0.08)	(0.05)
	p-value	*0.34*	*0.21*	*0.00*	*0.00*

Differences in Average βs: Embodied – Material, and Relational – Material

Economic System Pairs		Embodied – Material	Relational – Material
Average of Hunter-Gatherer and Horticultural economic systems	Δβ	0.04	0.11
	SE(Δβ)	(0.08)	(0.10)
	p-value	*0.62*	*0.27*
Average of Pastoral and Agricultural economic systems	Δβ	-0.53	-0.53
	SE(Δβ)	(0.10)	(0.12)
	p-value	*0.00*	*0.00*

Notes: These are average results for Hunter-Gatherer & Horticultural economic systems, on the one hand, and Pastoral & Agricultural systems on the other. The upper panel compares the two paired systems, and reports the difference in their α-weighted average βs (-0.21), which is reported in the text. The lower panel compares Embodied to Material wealth for each paired system, and also compares Relational to Material wealth. The α-weighted averages for the paired economic systems are calculated by first averaging the αs and the βs, then using the former to weight the latter.

Table S4. Gini coefficients for 43 wealth types (and sample sizes for both generations)

Population	Wealth Type	Gini	SE(Gini)	N (F1+F2)
Ache	Hunting returns	0.237	0.014	147
Ache	Weight	0.064	0.003	297
Hadza	Weight	0.079	0.002	485
Hadza	Hunting and gathering returns	0.339	0.018	179
Hadza	Grip strength	0.191	0.006	451
Ju/''hoansi	Social networks	0.216	0.028	44
Lamalera	RS	0.296	0.012	560
Lamalera	Quality of housing	0.241	0.007	610
Lamalera	Boat shares	0.474	0.010	611
Lamalera	Food sharing partners	0.263	0.010	611
Meriam	RS	0.298	0.024	145
Dominicans	Land	0.671	0.024	315
Gambia	Weight	0.073	0.001	2355
Gambia	RS	0.328	0.010	1935
Pimbwe	Farming skill	0.308	0.011	507
Pimbwe	Weight	0.079	0.003	395
Pimbwe	RS	0.190	0.005	1041
Pimbwe	Household and farm utensils	0.563	0.012	614
Tsimane	Knowledge of skills	0.076	0.004	265
Tsimane	Grip strength	0.263	0.006	1249
Tsimane	Weight	0.087	0.002	1033
Tsimane	Hunting returns	0.371	0.037	40
Tsimane	RS	0.190	0.005	1288
Tsimane	Household wealth	0.326	0.020	361
Tsimane	Labour cooperation network ties	0.315	0.014	234
Tsimane	Allies in conflict	0.141	0.008	130
Datoga	RS	0.200	0.018	186
Datoga	Livestock	0.386	0.037	189
Juhaina Arabs	Camels (milk)	0.346	0.037	***33***
Sangu (Ukwaheri)	Cattle	0.694	0.052	130
Yomut Charwa	Patrimony (livestock)	0.599	0.042	44
Bengali	RS	0.228	0.006	729
Bengaluru	In-law networks	0.468	0.189	499
East Anglians	RS	0.415	0.016	381
East Anglians	Estate value (mostly land)	0.608	0.022	387
Khasi	RS	0.198	0.004	1138
Kipsigis	RS	0.301	0.015	425
Kipsigis	Land	0.482	0.036	426
Kipsigis	Livestock	0.450	0.019	425
Kipsigis	Cattle partners	0.446	0.021	181
Krummhörn	Land	0.708	0.008	1887
Skellefteå	RS	0.251	0.002	6238
Yomut Chomur	Patrimony (land)	0.615	0.028	113

Table S5. Population and wealth-class specific weighted averages of Gini coefficients, and tests of differences

		Wealth Classes			
Economic System		Embodied	Relational	Material	α-Weighted Average
Hunter-Gatherer	α	0.46	0.39	0.15	
	Gini	0.21	0.24	0.36	0.25
	SE(Gini)	(0.05)	(0.08)	(0.08)	(0.04)
	p-value	*0.00*	*0.01*	*0.00*	*0.00*
Horticultural	α	0.53	0.26	0.21	
	Gini	0.20	0.23	0.52	0.27
	SE(Gini)	(0.04)	(0.08)	(0.07)	(0.03)
	p-value	*0.00*	*0.01*	*0.00*	*0.00*
Pastoral	α	0.26	0.14	0.61	
	Gini	0.20	na	0.51	0.42 †
	SE(Gini)	(0.12)	na	(0.06)	(0.05)
	p-value	*0.10*	na	*0.00*	*0.00*
Agricultural	α	0.27	0.14	0.59	
	Gini	0.28	0.46	0.57	0.48
	SE(Gini)	(0.05)	(0.08)	(0.05)	(0.04)
	p-value	*0.00*	*0.00*	*0.00*	*0.00*
Average across all economic systems	α	0.38	0.23	0.39	
	Gini	0.22	0.31	0.49	0.35
	SE(Gini)	(0.04)	(0.05)	(0.03)	(0.02)
	p-value	*0.00*	*0.00*	*0.00*	*0.00*

Note: Cell-means were estimated in a regression against a full set of dummy variables for each cell, with conventional standard errors. See section 1, above, and Table S12, below, for a discussion of alternative approaches to estimating these cell-means and their standard errors. The final column appears as the final column in Table 2, in text.

† The Gini for Kipsigis cattle partners (see Table S4) is used in the Pastoral / Relational cell for the calculation of the α-weighted average across wealth classes.

Table S6. Heritability (h^2) of economic behavior and the intergenerational transmission of embodied wealth

	r MZ	**r(DZ**	**Min DZ**	**h² (μ = 0)**	**βG (μ = 0)**
Risk taking (Cesarini et al 2009b) (avg. of 3 measures)	0.26	0.15		0.22	0.11
Risk aversion (Cesarini et al, 2009a)	0.222	0.025	0.111	0.222	0.11
Trust (Sweden, fraction sent) (Cesarini et al, 2008)	0.25	-0.01	0.125	0.25	0.13
Trust (U.S. fraction sent) (Cesarini et al, 2008)	0.13	-0.07	0.065	0.13	0.07
Trustworthiness (Sweden, fraction returned) (Cesarini et al, 2008)	0.29	0.18		0.22	0.11
Trustworthiness (US, fraction returned) (Cesarini et al, 2008)	0.26	0.06	0.13	0.26	0.13
Generosity (allocation in DG) (Cesarini et al, 2009a)	0.32	0.11	0.16	0.32	0.16
Reciprocity (min acceptable UG offer) (Wallace et al, 2007)	0.39	-0.04	0.195	0.39	0.19

Notes: see text section 2. The column h^2 (μ = 0) gives the heritability estimate on the assumption that marital assortment on genes is absent, adjusted (by the current authors) to take account of the violation of the assumption that dominance is absent (see text). DG indicates Dictator Game; UG indicates Ultimatum Game.

Table S7. Conversion of β values to inequality of life chances (ρ)

β	ρ deciles	ρ quintiles
0.00	1.0	1.0
0.05	1.4	1.2
0.10	1.9	1.5
0.15	2.6	1.8
0.20	3.6	2.2
0.25	5.0	2.8
0.30	7.2	3.5
0.35	10.6	4.4
0.40	16.2	5.7
0.45	25.9	7.6
0.50	43.9	10.3
0.55	80.2	14.7
0.60	163.3	22.1
0.65	386.6	35.8
0.70	1,146	64.9
0.75	4,839	140.3
0.80	37,450	407.1
0.85	881,747	2083
0.90	11,300,000	41,434
0.95	*	*

Note. See text section 3. For the given values of β the entries ρ give the ratio of the probability that the offspring in the top decile or quintile of the wealth distribution will attain that same status relative to the probability that the offspring from the lowest decile or quintile will attain that status. * indicates: cannot be reliably calculated (the denominator of the ratio is too small).

Table S8: Sensitivity of α-weighted averages of β to an alternative classification of societies by economic system

Economic System		Embodied	Relational	Material	α-Weighted Average
		Wealth Class			
Hunter-Gatherer	α	0.45	0.38	0.18	
	β	0.11	0.23	0.17	0.17
	SE(β)	(0.07)	(0.11)	(0.11)	(0.05)
	p-value	*0.11*	*0.04*	*0.12*	*0.00*
Horticultural	α	0.52	0.30	0.18	
	β	0.19	0.26	0.09	0.19
	SE(β)	(0.04)	(0.11)	(0.09)	(0.04)
	p-value	*0.00*	*0.02*	*0.32*	*0.00*
Pastoral	α	0.25	0.13	0.62	
	β	0.14	0.04	0.61	0.42
	SE(β)	(0.11)	(0.15)	(0.06)	(0.05)
	p-value	*0.20*	*0.79*	*0.00*	*0.00*
Agricultural	α	0.28	0.15	0.57	
	β	0.07	0.11	0.59	0.38
	SE(β)	(0.08)	(0.15)	(0.09)	(0.06)
	p-value	*0.38*	*0.46*	*0.00*	*0.00*
Average across all economic systems	α	0.37	0.24	0.39	
	β	0.13	0.16	0.37	0.29
	SE(β)	(0.04)	(0.07)	(0.04)	(0.03)
	p-value	*0.00*	*0.02*	*0.00*	*0.00*

Differences in Average βs: Embodied – Material, and Relational – Material

		Embodied – Material	Relational – Material
Differences by wealth class in averages across economic systems	Δβ	-0.24	-0.20
	SE(Δβ)	(0.06)	(0.08)
	p-value	*0.00*	*0.01*

Note: This table replicates Table S3, after reclassifying the Ache as horticulturalists and the Kipsigis as pastoralists. See notes to Table S3 and discussion in section 4 above.

Table S8, continued

Economic System Pairs		Embodied	Relational	Material	α-Weighted Average
Average of Hunter-Gatherer	α	0.49	0.34	0.18	
and Horticultural economic	β	0.15	0.24	0.13	0.18
systems	SE(β)	(0.04)	(0.08)	(0.07)	(0.03)
	p-value	*0.00*	*0.00*	*0.07*	*0.00*
Average of Pastoral and	α	0.26	0.14	0.60	
Agricultural economic	β	0.10	0.08	0.60	0.40
systems	SE(β)	(0.07)	(0.11)	(0.05)	(0.04)
	p-value	*0.13*	*0.48*	*0.00*	*0.00*
Difference between	Δβ	0.05	0.17	-0.47	-0.22
Hunt./Hort. and Past./Agric.	SE(Δβ)	(0.08)	(0.13)	(0.09)	(0.05)
systems	*p-value*	*0.54*	*0.21*	*0.00*	*0.00*

Differences in Average βs: Embodied – Material, and Relational – Material

Economic System Pairs		Embodied – Material	Relational – Material
Average of Hunter-Gatherer	Δβ	0.02	0.11
and Horticultural economic	SE(Δβ)	(0.08)	(0.10)
systems	*p-value*	*0.78*	*0.27*
Average of Pastoral and	Δβ	-0.50	-0.52
Agricultural economic	SE(Δβ)	(0.08)	(0.12)
systems	*p-value*	*0.00*	*0.00*

Note: This table replicates Table S3, after reclassifying the Ache as horticulturalists and the Kipsigis as pastoralists. See notes to Table S3 and discussion in section 4 above.

Table S9. Sensitivity of α-weighted average β estimates to using econometric estimates of *m*.

		Wealth Class		
Economic system		Embodied & Relational	Material	α-Weighted Average
Hunter-Gatherer	α	0.77	0.23	
	β	0.18	0.17	0.18
	SE(β)	(0.05)	(0.10)	
	p-value	*0.00*	*0.11*	
Horticultural	α	0.77	0.23	
	β	0.19	0.09	0.16
	SE(β)	(0.04)	(0.08)	
	p-value	*0.00*	*0.29*	
Pastoral	α	0.16	0.84	
	β	0.07	0.67	0.57
	SE(β)	(0.15)	(0.07)	
	p-value	*0.65*	*0.00*	
Agricultural	α	0.43	0.57	
	β	0.09	0.55	0.36
	SE(β)	(0.05)	(0.07)	
	p-value	*0.10*	*0.00*	
Average across all economic systems	α	0.53	0.47	
	β	0.13	0.37	0.24
	SE(β)	(0.04)	(0.04)	
	p-value	*0.00*	*0.00*	

Notes: See discussion above (section 5). Estimation method is identical to Table S3, but the econometrically-derived estimates for α are used.

Table S10. Sensitivity of α-weighted average Gini estimates to using econometric estimates of *m*.

Economic system		Wealth Class: Embodied & Relational	Wealth Class: Material	α-Weighted Average
Hunter-Gatherer	α	0.77	0.23	
	Gini	0.22	0.36	0.25
	SE(Gini)	(0.04)	(0.08)	
	p-value	*0.00*	*0.00*	
Horticultural	α	0.77	0.23	
	Gini	0.20	0.52	0.27
	SE(Gini)	(0.03)	(0.07)	
	p-value	*0.00*	*0.00*	
Pastoral	α	0.16	0.84	
	Gini	0.20	0.51	0.46
	SE(Gini)	(0.12)	(0.06)	
	p-value	*0.10*	*0.00*	
Agricultural	α	0.43	0.57	
	Gini	0.33	0.57	0.47
	SE(Gini)	(0.05)	(0.05)	
	p-value	*0.00*	*0.00*	
Average across all economic systems	α	0.53	0.47	
	Gini	0.24	0.49	0.36
	SE(Gini)	(0.03)	(0.03)	
	p-value	*0.00*	*0.00*	

Notes: See discussion above (section 5). Estimation method is identical to Table S5, but the econometrically-derived estimates for α are used.

Table S11. Sensitivity of α-weighted average β estimates to using weighted least squares

		Wealth Class			
Economic System		Embodied	Relational	Material	α-Weighted Average
Hunter-Gatherer	α	0.46	0.39	0.15	
	β	0.10	0.24	0.17	0.17
	SE(β)	(0.07)	(0.09)	(0.13)	(0.05)
	p-value	*0.16*	*0.01*	*0.21*	*0.00*
Horticultural	α	0.53	0.26	0.21	
	β	0.20	0.26	0.05	0.18
	SE(β)	(0.04)	(0.14)	(0.12)	(0.05)
	p-value	*0.00*	*0.08*	*0.68*	*0.00*
Pastoral	α	0.26	0.14	0.61	
	β	0.07	na	0.61	0.39 †
	SE(β)	(0.12)	na	(0.18)	(0.12)
	p-value	*0.58*	na	*0.00*	*0.00*
Agricultural	α	0.27	0.14	0.59	
	β	0.04	0.10	0.51	0.33
	SE(β)	(0.04)	(0.13)	(0.05)	(0.04)
	p-value	*0.58*	*0.44*	*0.00*	*0.00*
Average across all economic systems	α	0.38	0.23	0.39	
	β	0.10	0.20	0.33	0.27
	SE(β)	(0.04)	(0.07)	(0.06)	(0.04)
	p-value	*0.01*	*0.01*	*0.00*	*0.00*

Differences in Average βs: Embodied – Material, and Relational – Material

		Embodied – Material	Relational – Material
Differences by wealth class in averages across economic systems	Δβ	-0.23	-0.13
	SE(Δβ)	(0.07)	(0.10)
	p-value	*0.00*	*0.18*

Notes: Comparable to Table S3, except that means across societies of βs by wealth class and economic system, and their standard errors, are calculated using weighted least squares, with the inverse of the squared standard errors of the βs (from text Table 1 or Table S2, above) as weights. See discussion in section 1, above.

† The elasticity for Kipsigis cattle partners (see Table S2) is used in the Pastoral / Relational cell for the calculation of the α-weighted average across wealth classes.

Table S11, Continued

Economic System Pairs		Embodied	Relational	Material	α-Weighted Average
Average of Hunter-Gatherer and Horticultural economic systems	α	0.49	0.33	0.18	
	β	0.15	0.25	0.11	0.18
	SE(β)	(0.04)	(0.09)	(0.09)	(0.04)
	p-value	*0.00*	*0.01*	*0.24*	*0.00*
Average of Pastoral and Agricultural economic systems	α	0.26	0.14	0.60	
	β	0.06	0.10	0.56	0.36
	SE(β)	(0.06)	(0.13)	(0.09)	(0.06)
	p-value	*0.38*	*0.44*	*0.00*	*0.00*
Difference between Hunt./Hort. and Past./Agric. systems	Δβ	0.10	0.15	-0.45	-0.19
	SE(Δβ)	(0.07)	(0.15)	(0.13)	(0.07)
	p-value	*0.21*	*0.32*	*0.00*	*0.01*

Differences in Average βs: Embodied – Material, and Relational – Material

Economic System Pairs		Embodied – Material	Relational – Material
Average of Hunter-Gatherer and Horticultural economic systems	Δβ	0.04	0.14
	SE(Δβ)	(0.10)	(0.12)
	p-value	*0.67*	*0.25*
Average of Pastoral and Agricultural economic systems	Δβ	-0.50	-0.46
	SE(Δβ)	(0.11)	(0.16)
	p-value	*0.00*	*0.01*

Notes: As in Table S3, these are average results for Hunter-Gatherer & Horticultural economic systems, on the one hand, and Pastoral & Agricultural systems on the other; the only change is the use of weighted least squares. The upper panel compares the two paired systems, and reports the difference in their α-weighted average βs, which is now -0.19, compared to the figure of -0.21 which is reported in the text. The decomposition of this figure into the share due to differences in αs (holding βs at their means) versus the share due to differences in βs (holding αs at their means) remains unchanged at 45 percent / 55 percent.

Table S12. Sensitivity of α-weighted average Gini estimates to using weighted least squares

		Wealth Classes			
Economic System		Embodied	Relational	Material	α-Weighted Average
Hunter-Gatherer	α	0.46	0.39	0.15	
	Gini	0.21	0.24	0.36	0.25
	SE(Gini)	(0.05)	(0.08)	(0.08)	(0.04)
	p-value	*0.00*	*0.01*	*0.00*	*0.00*
Horticultural	α	0.53	0.26	0.21	
	Gini	0.20	0.23	0.52	0.27
	SE(Gini)	(0.04)	(0.08)	(0.07)	(0.03)
	p-value	*0.00*	*0.01*	*0.00*	*0.00*
Pastoral	α	0.26	0.14	0.61	
	Gini	0.20	na	0.51	0.42 †
	SE(Gini)	(0.12)	na	(0.06)	(0.05)
	p-value	*0.10*	na	*0.00*	*0.00*
Agricultural	α	0.27	0.14	0.59	
	Gini	0.28	0.46	0.57	0.48
	SE(Gini)	(0.05)	(0.08)	(0.05)	(0.04)
	p-value	*0.00*	*0.00*	*0.00*	*0.00*
Average across all economic systems	α	0.38	0.23	0.39	
	Gini	0.22	0.31	0.49	0.35
	SE(Gini)	(0.04)	(0.05)	(0.03)	(0.02)
	p-value	*0.00*	*0.00*	*0.00*	*0.00*

Note: Comparable to Table S5, except that means across societies of Ginis by wealth class and economic system, and their standard errors, are calculated using weighted least sqaures, with the inverse of the squared standard errors of the Ginis (from Table S4, above) as weights. See discussion in section 1, above.

† The Gini for Kipsigis cattle partners (see Table S4) is used in the Pastoral / Relational cell for the calculation of the α-weighted average across wealth classes.

Table S13. Statistical determinants of wealth transmission and inequality.

Variable	(1) β	(2) β	(3) Gini	(4) Gini
Material	-0.062	-0.074	0.245	0.175
	(0.183)	(0.367)	(0.003)	(0.068)
Agricultural/Pastoralist	-0.095	na	0.104	na
	(0.056)		(0.028)	
Agricultural/Pastoralist X Material	0.579	0.515	-0.015	-0.034
	(0.000)	(0.000)	(0.876)	(0.743)
Constant	0.184	0.295	0.210	0.151
	(0.000)	(0.200)	(0.000)	(0.108)
Population Fixed Effects (Yes/No)	N	Y	N	Y
Observations	43	43	43	43
R-squared	0.66	0.78	0.59	0.80

Notes: Robust p-values in parentheses. Dependent variables are the estimated βs in the first 2 data columns and the estimated Gini coefficients in the last two. Agricultural/Pastoralist is a binary variable indicating that a population is agricultural or pastoralist (rather than hunter-gatherer or horticultural). Material is a binary variable indicating that a wealth type is material (rather than embodied or relational). The third row reports the coefficient on the interaction of Material and Agricultural/Pastoralist. Very similar results were obtained under weighted least squares, with the inverses of the estimated variances of the βs and Ginis as weights.