

The geography of intergenerational mobility in Denmark: a source-faithful replication

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Abstract

This results-unfilled manuscript prepares a descriptive replication of Eriksen and Munk (2020). The fixed question concerns geographic variation in intergenerational income mobility across Danish childhood municipalities, its comparison with published international benchmarks, and its association with municipal characteristics. The source follows the 1973–1977 child cohorts, measures adult income during 2010–2015, and links parental income from 1980 through a specified child-age endpoint. Its main municipal analysis relates child-family income rank to parental rank; related individual-income, historical-geography, elasticity and quintile specifications belong to the same analysis. We preserve the source’s three contributions and result order. Several scientific details remain unresolved in the retrieved paper and appendix, including rank conventions, annual family-link timing and parts of the inference specification. Their outputs have explicit no-estimate dispositions. Replication findings are pending: *[pending]*. No published value has been inserted as a new result.

Keywords: Intergenerational mobility; income ranks; municipal geography; Denmark; replication.

PRE-DATA DRAFT: empirical placeholders are not findings.

Introduction

National intergenerational mobility statistics summarize the association between parental and child economic positions across a country. A spatial description asks whether that relationship differs between the places where children grew up. Eriksen and Munk (2020) place their Danish municipal estimates alongside the within-country analyses of Chetty et al. (2014, 2020) and Connolly, Corak and Haeck (2019). Their contribution is a descriptive account of Danish municipal variation, an international distributional comparison and a set of correlations with municipal characteristics. This replication preserves that question and sequence.

Income rank measures relative position rather than an income change in currency units. A fitted child rank at a given parental rank gives a different description from the slope connecting ranks across generations. The source therefore considers the municipal rank-regression slope alongside fitted child ranks at the 25th, 50th and 75th parental percentiles. Its maps show the slope and the 25th-percentile prediction; the other predictions remain part of the same analysis. We retain the paper’s online appendix specifications without treating them as a new robustness program.

The prior-work positioning here describes the original paper’s argument. It is not an independent review of every work in its references. The article distinguishes Swedish hierarchical-model estimates and Italian surname-based measures from its rank-regression comparisons, and cites lifecycle work to motivate its income windows. It also discusses possible future causal applications of descriptive estimates. This replication neither estimates those applications nor attributes municipal associations to place effects.

Published results were known before this registration. The objective is faithful reconstruction where the sources determine an analysis and explicit reporting where they do not. Agreement with a printed number has no registered pass/fail band. The source’s narrative is not a promised replication finding.

Data and measurement

2.1 Population and observation periods

The source analytical population consists of children born between 1973 and 1977 who can be linked to registered parent(s). Children must appear at least once during the adult income window, 2010–2015. Parent(s) must appear at least once from 1980 through the year in which the child turns 18 for the main analysis. The number meeting the faithfully reconstructed definition is *[pending]*. The paper’s youngest-age footnote is inconsistent with its stated cohort/year arithmetic; the cohort and calendar windows remain as printed, without an added age exclusion.

The appendix also labels parental windows ending at child ages 15 and 20. These are retained with the main analysis, together with its income and geography variants. They do not authorize trying other endpoints or replacing a blocked main specification. The source does not fully specify when parent identities are fixed, how changing parent links are handled, which annual snapshot defines observation, or how gaps around death, emigration or missing income are treated. Those decisions remain explicit boundaries rather than hidden cohort restrictions.

2.2 Income and family links

The original paper measures total pre-tax income and averages child-plus-registered-spouse annual sums during 2010–2015. It averages mother-plus-father annual sums from 1980 through the child-age endpoint. The retrieved appendix identifies Statistics Denmark’s PERINDKIALT for parents and PERINDKIALT_13 for children. These variables are documented in IND; the current official definitions differ, so they are not treated as interchangeable aliases. The source deflates annual income with the Danish CPI before time averaging and expresses descriptive income values in 2015 USD.

Exact CPI and currency series, annual spouse-link timing, treatment of a missing parent or spouse income component, and denominators under incomplete observation are not settled by the retrieved sources. A source-faithful reconstruction cannot silently average available values or turn missing values into zero. Individual child, mother and father measures in the appendix inherit the relevant unresolved construction decisions.

The planning boundary permits all 531 FSV tables. CPST and FAIN document candidates for early childhood parent/residence observations; BEF documents later demographic and spouse fields. The presence of a documented variable establishes neither the authors’ precise join nor runtime coverage. No confidential records or computed confidential summaries have been accessed for this manuscript. The historical income definitions and classifications have documented changes that are reported as measurement limitations, without adding a new harmonization analysis.

2.3 Childhood geography and ranks

The paper assigns children to the municipality in which they spent the most observed childhood years from 1980 through age 18 and presents the main estimates for 98 post-reform municipalities. Equal-year ties, within-year moves, the annual residence date and the person-specific mapping of split historical municipalities are unresolved. The original geometry and 2011 rural classification mapping have not been recovered. No adult-location, population-weighted crosswalk or invented rural score substitutes for these inputs.

The paper ranks incomes within birth cohorts. Its prediction formulas use fractional rank points, but the retrieved sources do not completely identify the ranking universe, tied-rank rule or endpoint normalization. These choices affect the scientific quantity and are therefore not filled by a software default. The mean proportion of observed childhood spent in the assigned municipality is *[pending]*; it is not assumed from the source’s printed percentage.

2.4 Descriptive sample statistics

Table 1 preserves every original row and the order of its six statistics. An unresolved cell is reported as not estimated with its reason, rather than filled from the original article. Counts and descriptive statistics are part of the consuming municipal analysis, not an additional empirical diagnostic test.

Table 1. Source-ordered descriptive statistics; the six source statistics occupy their own columns. Unfilled dashes are empirical cells, not zeros. Row-to-output bindings remain in results-map.md.

Source statistic	N	Mean	SD	p25	Median	p75
Observations in adulthood (count)	—	—	—	—	—	—
Female (indicator)	—	—	—	—	—	—
Married between 2010–2015 (indicator)	—	—	—	—	—	—

Source statistic	N	Mean	SD	p25	Median	p75
Child mean income (2015 USD)	—	—	—	—	—	—
Family mean income (2015 USD)	—	—	—	—	—	—
Parents' mean income (2015 USD)	—	—	—	—	—	—
Mother's mean income (2015 USD)	—	—	—	—	—	—
Father's mean income (2015 USD)	—	—	—	—	—	—
Mother's age in 1980 (years)	—	—	—	—	—	—
Father's age in 1980 (years)	—	—	—	—	—	—
Moves by age 18 (count)	—	—	—	—	—	—
In assigned municipality (share)	—	—	—	—	—	—
Living with both parents (share)	—	—	—	—	—	—
Living with mother (share)	—	—	—	—	—	—
Living with father (share)	—	—	—	—	—	—

Analysis methods and interpretation

3.1 Municipal income mobility

The source municipal regression is

$$R_i^{child} = \alpha_c + \beta_c R_i^{parent} + \epsilon_i,$$

where the observation is a linked child and c denotes childhood municipality. The main model uses child-family rank and combined parental rank. For a valid fit, the source-defined predictions are

$$r_{25,c} = \alpha_c + 0.25\beta_c, \quad r_{50,c} = \alpha_c + 0.50\beta_c, \quad r_{75,c} = \alpha_c + 0.75\beta_c.$$

Beta is described here as rank persistence. The paper uses inconsistent language about “relative mobility,” although its equation and legend identify the slope. We retain that inconsistency in the source audit and do not replace beta with its reciprocal or complement. Lower beta means less persistence in the stated equation; larger r_{25} means a higher fitted child rank at the 25th parental percentile. This distinction is necessary when reading signs across the four measures.

The retrieved municipal-model specification does not explicitly settle the fitting criterion/weights or covariance calculation. The Figure 2 caption's OLS-SE statement

is retained for that analysis and is not silently imposed on every municipal regression. Unsupported fit and uncertainty choices remain stopped. No new controls, estimator comparison, clustering choice, significance test, multiplicity correction or power calculation is added.

3.2 International comparison

The source compares Danish municipal mobility summaries with published US county and Canadian Census District benchmarks. We preserve its population-size context, beta averages, r25/r50/r75 mean-and-SD comparisons and the mean r75-minus-r25 span. A span expressed in percentile points is 100 times the difference of the fractional-rank means. Its inputs must be rebuilt means; published values cannot fill them.

The source's top-30 US and top-10 Canadian population exclusions are context for area size, not a clearly specified restriction on its mobility summaries. The weighting, missing-estimate treatment, SD convention, foreign extraction versions and tract/district terminology remain unresolved. Foreign values stay explicitly published reference context. No new US or Canadian empirical program, country-equality test or variance-ratio test is authorized by this FSV-bounded package.

3.3 Municipal characteristics

Figure 2 retains all 12 source characteristics against beta, r25, r50 and r75. The paper generally specifies working ages 18–65 and municipal time averages over 1980–1995. Income-decile shares use people aged 25 and older; students are excluded from labour-market numbers. Education shares use 1981–1995, the Gini coefficient 1987–1993, and criminal offences 1990–1997. Education is measured by levels, not years.

The four-series analysis includes bottom- and top-decile shares, Gini, outside-labour-market and employment shares, marriage, single parents, teen births, non-western immigrants including first and second generations, university and vocational education, and criminal offences per capita. The precise demographic code lists, annual denominators, decile universe, student exclusion codes, source Gini extraction and offence event definition are not supplied in full. These targets are all retained, with their unavailable inputs or missing decisions.

The Figure 2 caption specifies 95% confidence intervals based on OLS standard errors. It does not completely determine the fitted correlation procedure, weights/standardization, covariance implementation or critical-value distribution/degrees of freedom. We therefore do not manufacture intervals with a normal, t, Fisher-z, bootstrap or robust-SE default. The plotting template takes only completed plot-ready values and explicit boundary statuses; it fits no model and cannot supply absent science.

3.4 Supplementary targets

The retrieved appendix labels 72 specifications formed from the two municipal systems, three parental endpoints, six rank-income pairs and six corresponding log-income pairs. It retains regression intercepts/slopes and SEs, rank predictions, and extreme-quintile movements. Log beta is an elasticity target, not rank persistence.

The README specifies replacement of negative child/family income by 1000 DKK for logs but leaves zeros, parental nonpositive income, log base and operation timing unresolved. No extension of that replacement rule is assumed.

Several appendix descriptions conflict with their labels. The r75 description names the 25th percentile despite giving a .75 formula, and quintile destination descriptions are repeated inconsistently. The long file also carries percentile labels for log-income models without explaining the corresponding income input. Those targets remain explicitly not rebuilt where interpretation cannot be determined. Legacy joint-count columns in the earlier wide file are retained in the audit even though they are absent from the replacement schema. The original municipal $N < 25$ and quintile-group $N < 5$ publication restrictions are recorded, with the unresolved group scope; they are not scientific success criteria or sufficient current disclosure approval.

Results - unfilled

4.1 Municipal mobility

The main municipal fit and release scope is *[pending]*. The distribution of beta and the fitted r25/r50/r75 values is *[pending]*. Figure 1 presents the two original map panels only if their estimates and verified geographic inputs are available. Its rendering disposition is *[pending]*. The source's geographic narrative can be assessed within the completed scope as follows: *[pending]*. The available municipal uncertainty targets are *[pending]*.

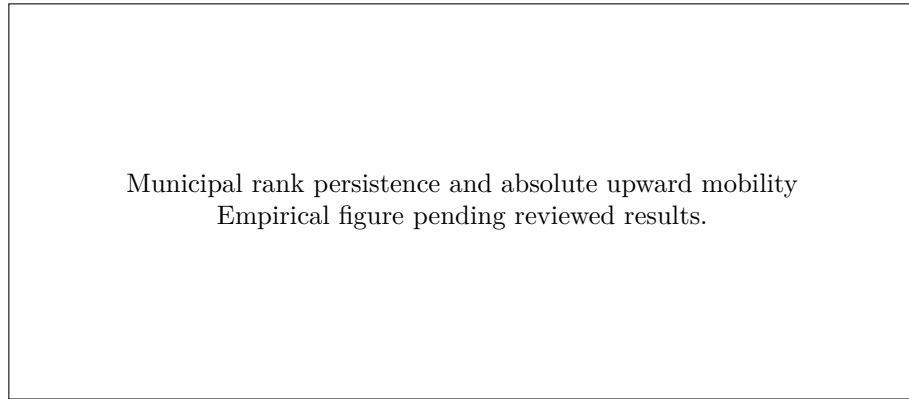


Fig. 1 Core source specification: post-reform childhood municipalities, parental endpoint age 18, family-on-parent ranks. Left: beta (rank persistence); right: r25 (fractional child rank). Darker shading means higher beta or lower r25. Four city labels and verified Bornholm relocation follow the source. No causal interpretation. Display availability: *[pending]*.

When the municipal module is complete or partial, this paragraph describes only the actually completed measures, with each remaining boundary named. When it has a source or input boundary, the paragraph states that the corresponding municipal estimates were not obtained and gives the reason. Pending work or operational failure is reported as unrun or failed execution, never as zero geographic variation.

4.2 International comparison

The population-size context is *[pending]*. The international benchmark disposition is *[pending]*. The average-beta comparison is *[pending]*. The source-ordered mean-and-SD summaries are r25: *[pending]*; r50: *[pending]*; and r75: *[pending]*. The r75-minus-r25 span and descriptive dispersion comparison are *[pending]*.

For a completed compatible Danish quantity, report its rebuilt value beside the explicitly published reference and their arithmetic difference at the source's printed precision. If its aggregation convention or input is unresolved, report no rebuilt summary. Foreign reference context remains distinct in either case; completion of Danish summaries is not independent reconstruction of foreign estimates.

International comparison: source-ordered reporting table

Quantity	Danish rebuilt summary	Foreign published context and comparability
Geographic population-size context	<i>[pending]</i>	<i>[pending]</i>
Mean rank slope beta	<i>[pending]</i>	US/Canada source versions and aggregation limits retained
Fitted rank at parental percentile 25, mean and SD	<i>[pending]</i>	Same named measure; no substituted weighting convention
Fitted rank at parental percentile 50, mean and SD	<i>[pending]</i>	Same named measure; reference remains published evidence
Fitted rank at parental percentile 75, mean and SD	<i>[pending]</i>	Same named measure; unavailable summaries remain explicit
Mean r75-minus-r25 span and descriptive dispersion	<i>[pending]</i>	Percentile-point versus fractional-rank units distinguished

Notes: result bundles keep the source order, rebuilt values, source-labelled comparison and any arithmetic difference whose inputs are actually available. They do not insert published Danish values into a reconstruction. The table is a presentation of the existing international module, not a new country-comparison test.

4.3 Municipal demographic correlations

Figure 2's overall input and uncertainty disposition is *[pending]*. The following table retains the original top-to-bottom order and all four measures per row; each measure cell contains its correlation, source-supported interval and available municipality count, or its explicit no-estimate reason. Each row retains its existing corr_* output binding in results-map.md.

Municipal characteristic	beta	r25	r50	r75
Share from bottom income decile; 1980–1995; ages 25	—	—	—	—
Share from top income decile; 1980–1995; ages 25	—	—	—	—
Gini coefficient; 1987–1993	—	—	—	—
Share outside labor market; 1980–1995; students excluded	—	—	—	—
Share employed; 1980–1995; students excluded	—	—	—	—
Share of married individuals; 1980–1995	—	—	—	—
Share of single parents; 1980–1995	—	—	—	—
Teen births per capita; 1980–1995	—	—	—	—
Share of non-western immigrants; 1980–1995; first and second generation	—	—	—	—
Share university educated; 1981–1995	—	—	—	—
Share vocationally educated; 1981–1995	—	—	—	—
Criminal offences per capita; 1990–1997	—	—	—	—

The ecological description supported by completed correlations is *[pending]*. Complete or partial output licenses a description only of those reported correlations. A source/input boundary leaves the corresponding pairs unestimated. No paragraph asserts the original directions from published values, treats a missing interval as zero uncertainty, or interprets these associations as causal effects.

Correlations of municipal characteristics with four mobility measures
Empirical figure pending reviewed results.

Fig. 2 Twelve original municipal characteristics against beta, r25, r50 and r75. Default 1980–1995, ages 18–65; income-decile shares ages 25+, students excluded from labour-market numbers, education 1981–1995, Gini 1987–1993, offences 1990–1997. Intervals are the source 95% OLS-SE targets only where the full specification is resolved. No estimates or CIs are filled by the renderer. Display availability: *[pending]*.

4.4 Online appendix targets

The appendix target coverage and unresolved scope are *[pending]*. Related rank specifications are *[pending]*, elasticity specifications are *[pending]*, and extreme-quintile targets are *[pending]*. Legacy-file and log-percentile-labelled targets have disposition *[pending]*. No supplementary result replaces an unavailable main result. Completed variants describe their own source definitions; blocked variants are not characterized as evidence of robustness or a failed robustness test.

Discussion

The four mobility measures should first be read jointly as features of the same fitted relationship. A municipality can have a lower rank slope without offering a higher fitted rank at every parental position; the intercept matters as well. Maps of persistence and the 25th-percentile prediction consequently answer related but nonidentical descriptive questions. The source’s r50 and r75 predictions help expose that distinction without adding a new model or a preferred municipal ranking.

The international comparison then changes the unit of comparison from families to distributions of area-level summaries. A difference in spread can reflect the scale of the geographic units, how estimates are aggregated and measurement choices, as well as the income processes of interest. The source’s population-size context belongs next to those summaries for this reason. The characteristic correlations finally describe which municipal features co-occur with the measured pattern; they do not explain it causally. This sequence preserves the original story without making the correlations an identification strategy.

The municipal description, if estimable, concerns an association between positions in the income distributions of two generations among the source-defined linked population. It does not identify a causal effect of childhood place. Geographic sorting, family

composition and other unmeasured differences are not removed by mapping conditional ranks. The completed evidence and restrictions support the following municipal interpretation: *[pending]*. If the main fit remains blocked, this sentence instead records the unresolved source definition and withholds a substantive municipal finding.

International comparisons depend on compatible quantities and geographic aggregation. The source’s foreign benchmarks retain their provenance and their unresolved comparability limits. The interpretation permitted by the completed Danish summaries is *[pending]*. A missing mean or SD does not imply equivalence across countries, and the source supplies no threshold for declaring replication success.

The characteristic correlations are aggregate descriptions. Their signs cannot identify an individual’s pathway or the consequence of changing employment, marriage, migration, education or crime. The interpretation within completed scope is *[pending]*. If construction or inference remains unresolved, the relevant associations and their uncertainty are left unreported as estimates, with the exact gap stated.

This replication’s remaining source limitations are substantive, not merely formatting omissions. The paper, complete retrieved README, preprint and public appendix labels were inspected; no empirical author program or correction resolving the gaps was located. The absence of a retrieved program is not proof that one never existed. Current schema documentation supplies plausible field meanings but cannot establish the authors’ exact runtime data vintage or successful linkage. The conversion adds no scientific defaults to bridge these limits.

Access, reporting and conclusion

No confidential data were accessed, and no empirical program was run for this registration. Any later computation and aggregate release require the governed data environment. The original aggregate appendix does not itself confer access to the administrative records or establish current disclosure approval. This is a later registration with known published findings, prepared by a source extractor without independent scientific review. The Transcriber may format/build these materials but cannot resolve the scientific gaps or change the registered modules.

The completed study will report the three source contributions in order, followed by the related appendix scope. The conclusion justified by the completed evidence and explicit boundaries is *[pending]*. If no target can be estimated faithfully, the conclusion will say that source or input limitations prevented estimation; it will not report a statistical null or a successful replication. The prepared displays and result bindings ensure that missing science remains visible through the final manuscript.

Supplementary reconstruction methods

Income construction precedes ranks

The sequence starts with annual person and family links and the source income variables, then deflates annual amounts, constructs the specified family sums and averages over the source windows. Only after those operations can the cohort ranks be formed. Ranking each annual value and averaging ranks would not reproduce a rank

of the prescribed multi-year income measure. Nor can a modern variable label establish equality between the parental and child historical concepts. The paper therefore reports income-unit and variable-vintage provenance with the corresponding result, not as an interchangeable implementation detail.

The annual spouse and parent identities determine whose resources enter a family sum. A missing component, an unobserved year and a genuinely recorded zero have different meanings. The exact source rule for each remains necessary before its downstream rank is reported. These gaps are listed with their affected targets; no available-case convention, household imputation or assumed zero is introduced in this expanded manuscript.

Residence and municipality assignment

Childhood municipality follows the longest observed childhood residence under the source's window. That choice precedes the municipal regressions. Annual residence timing, equal-duration ties and historical split-municipality mappings must be resolved at the required source level; a generic crosswalk can change which children populate each local regression. Historical and post-reform systems remain distinct appendix specifications. Unavailable map geometry affects display, whereas an unresolved municipality definition can affect the estimates themselves. The two failures should not be conflated.

Main and appendix analysis families

The municipal rank model produces an intercept, slope and the source predictions at parental ranks .25, .50 and .75. Their standard errors are retained only where source inference is specified. The appendix's income and geography variants remain part of this municipal scientific unit; their number does not create additional independent replication questions. Log-income coefficients are elasticities, and extreme-quintile movements are transition summaries rather than alternative names for the rank slope.

Source appendix component	Original scope	Complete vector or unresolved targets
Rank-income specifications	Source income pairs, parental endpoints and two geographies	<i>[pending]</i>
Log-income specifications	Source log-income pairs with their exact nonpositive-income rules	<i>[pending]</i>
Extreme-quintile movements	Source origin/destination categories and group counts	<i>[pending]</i>
Legacy and inconsistent log-percentile labels	Earlier-file targets and unresolved schema descriptions	<i>[pending]</i>

Source appendix component	Original scope	Complete vector or unresolved targets
Total specification coverage	All 72 source specification labels, with every unavailable cell	[pending]

Notes: this inventory summarizes existing result families. It neither removes a variant because it disagrees with the main result nor invents missing interpretations for a source label. Publication suppression is applied to the relevant units without being mistaken for the substantive absence of a municipal estimate.

Characteristic construction and correlation uncertainty

The twelve characteristics use their own age ranges, time windows and denominators. A working-age employment share and an income-decile share among people aged at least 25 cannot be formed from one interchangeable municipal denominator. Similarly, the education, Gini and crime windows remain as stated in the source rather than being harmonized into a convenient common calendar. Missing student-exclusion codes or offence definitions restrict the corresponding series, not every characteristic by default.

Each of the four mobility measures is paired with each original characteristic. The Figure 2 uncertainty statement refers to OLS-based 95% intervals, but source-silent weighting, standardization and distributional choices remain unresolved. The reporting table retains point-estimate and interval availability separately. A raw correlation calculated under an improvised default is not substituted for an unavailable source quantity.

Interpreting reconstruction outcomes

A difference from the publication must first be located in its sample, construction, geographic mapping, estimator or display unit. Without a source-defined tolerance, the manuscript reports the actual difference and its available uncertainty rather than declaring a numerical pass or fail. If the main definition cannot be resolved, an available appendix estimate is still an appendix estimate. If an interval is wide, that is uncertainty about an estimated relationship, not missing execution. If a needed input is absent, there is no estimate to characterize as small, unstable or inconsistent with the original.

References

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