



Explaining the drift in socio-economic classifications

What might and might not matter for pension schemes?

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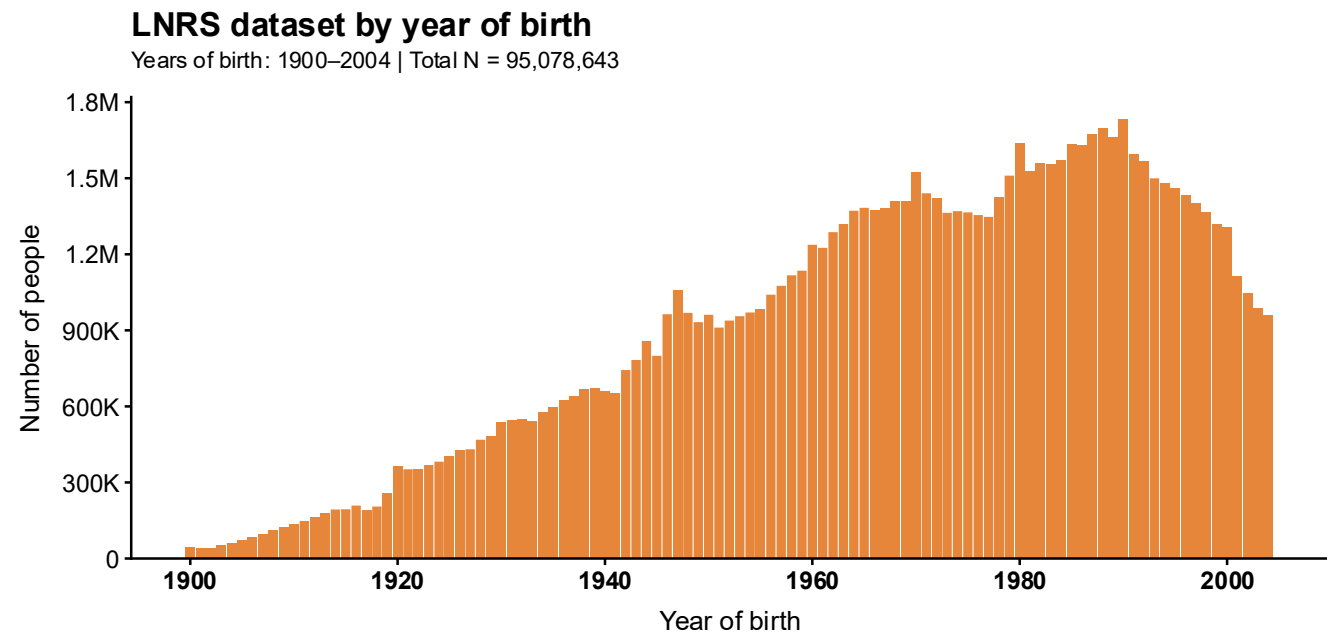
LNRS dataset and L-Distribution

Harnessing individual population-level data for longevity purposes

LNRS dataset tracks entire UK population

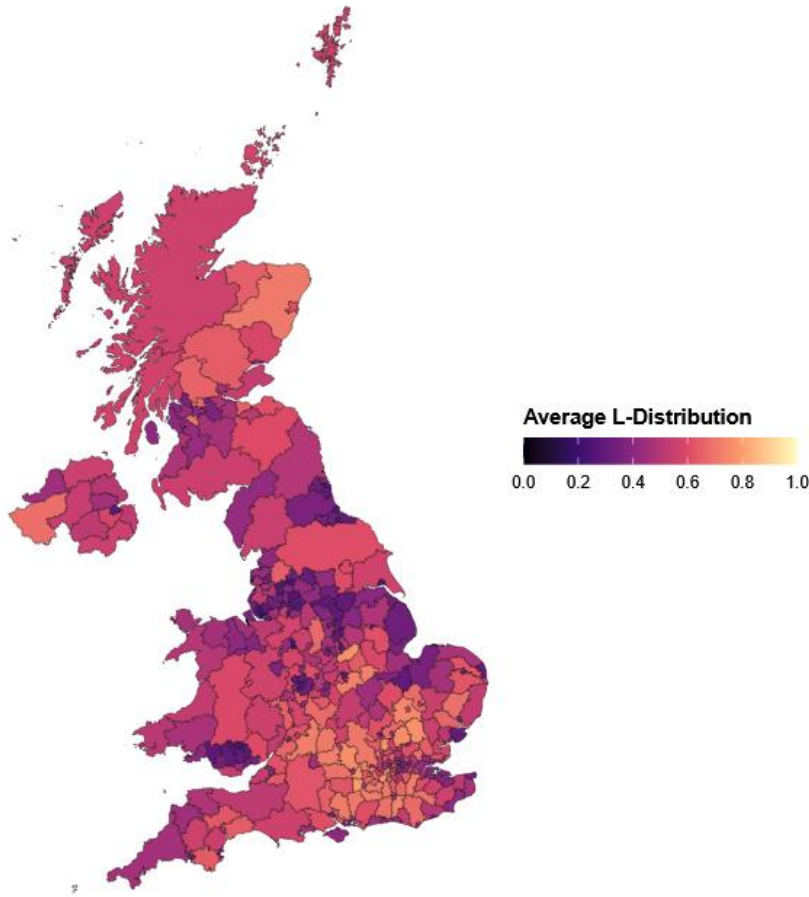
Datasets maintained by LexisNexis Risk Solutions (LNRS) track virtually the **entire population** of UK adults

- Used for tracing, existence testing, fraud detection, etc.
- Includes **address history** as far back as 1990s
- Captures **~95 million individuals**, though incomplete/biased at older ages



Source: LexisNexis® Risk Solutions longevity dataset, after minimal filtering

L-Distribution: a profiler tuned to mortality



Sources for L-Distribution:

Mortality and address data from LexisNexis® Risk Solutions; additional demographic data from Office of National Statistics; own calculations

- From ~2010 onwards, LNRS dataset tracks **individual-level mortality experience** for the population
- Collaboration for longevity modelling : Ad Res & LNRS
- The “**L-Distribution**” is a postcode-level geo-demographic profiler derived from the LNRS experience data, plus public and proprietary sources

Applying the L-Distribution to mortality

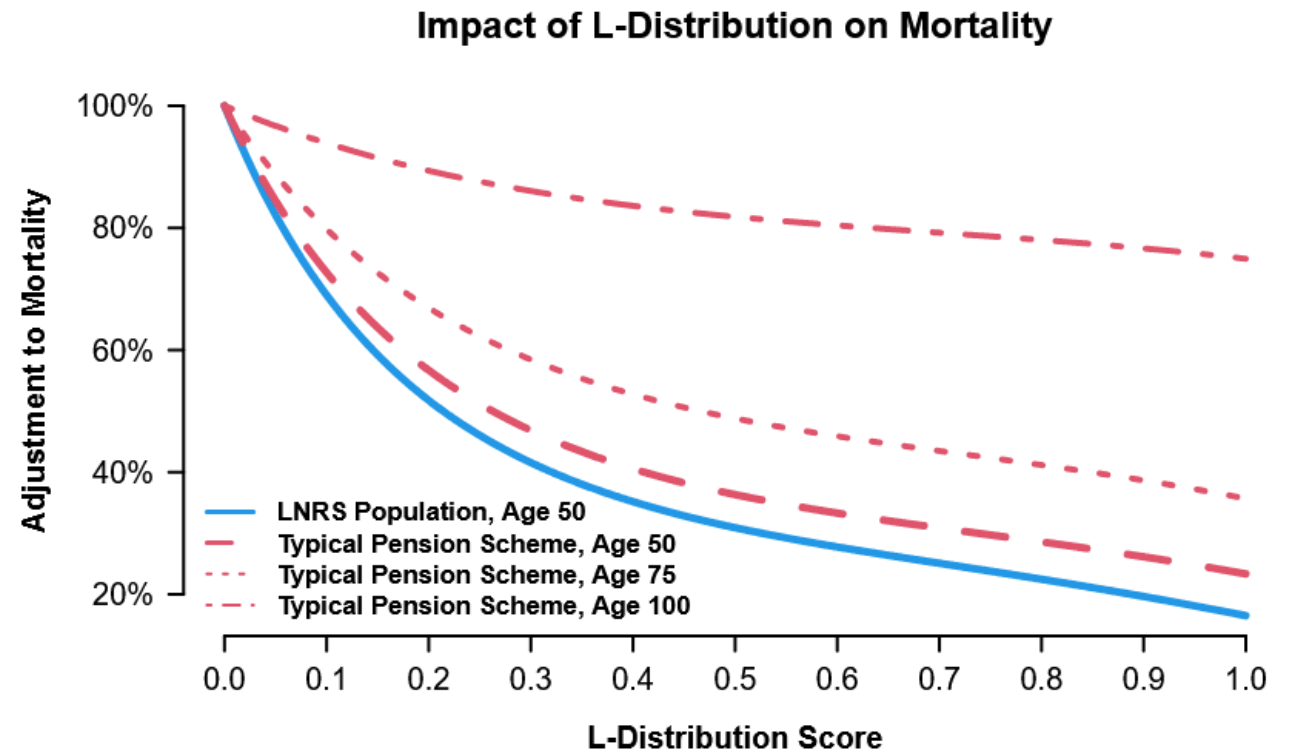
L-Distribution is **continuous** in [0,1]

- Higher values suggest greater affluence and thus lower mortality

Current version derived using experience in 2015 to 2019 over ages 66 – 71

- 80% population sample used: 5.85 million lives and 170K deaths
- Ordering of postcodes consistent across other age bands and periods

Applicable as continuous variable or bucketed (like pension amount)



Source: LexisNexis® Risk Solutions L-Distribution; mortality experience for certain large UK pension schemes; own calculations



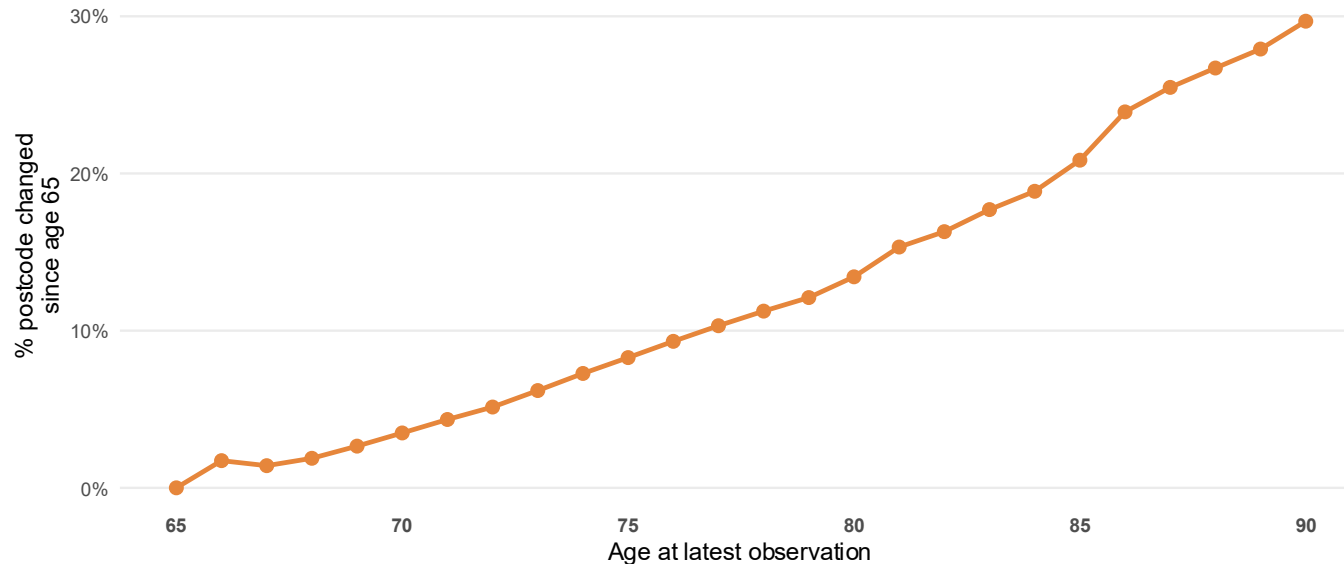
Impact of moving

How do shifts in postcode affect socio-economic profile?

LNRS datasets tracks address changes

Postcode change since age 65

Eligible post-65 population: N = 19,038,300



Source: LexisNexis® Risk Solutions longevity dataset and L-Distribution;
“Age last seen” represents age when individual is last observed in LNRS dataset

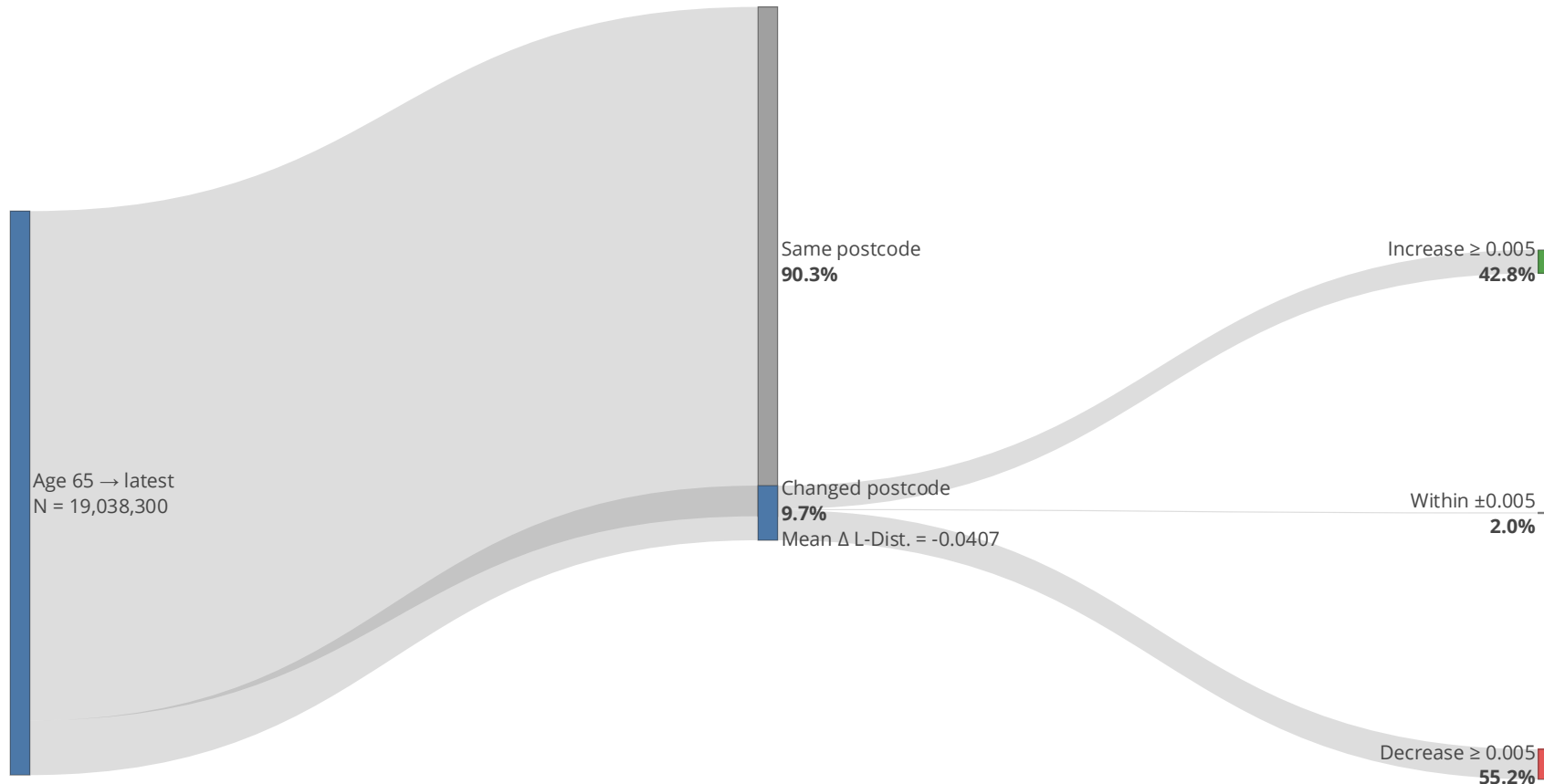
19 million individuals older than 65 with known postcode at age 65

- Likelihood to have moved postcode steadily rises by Age Last Seen, subject to death
- Changes in postcode occur at pre-retirement ages, too:

Age from – to	Population Count	% changed Postcode
35 – 45	14.5 million	39.2%
45 – 55	15.0 million	22.1%
55 – 65	12.7 million	16.3%

Shifts in postcode and L-Distribution after 65

Postcode and L-Distribution change, age 65 to latest



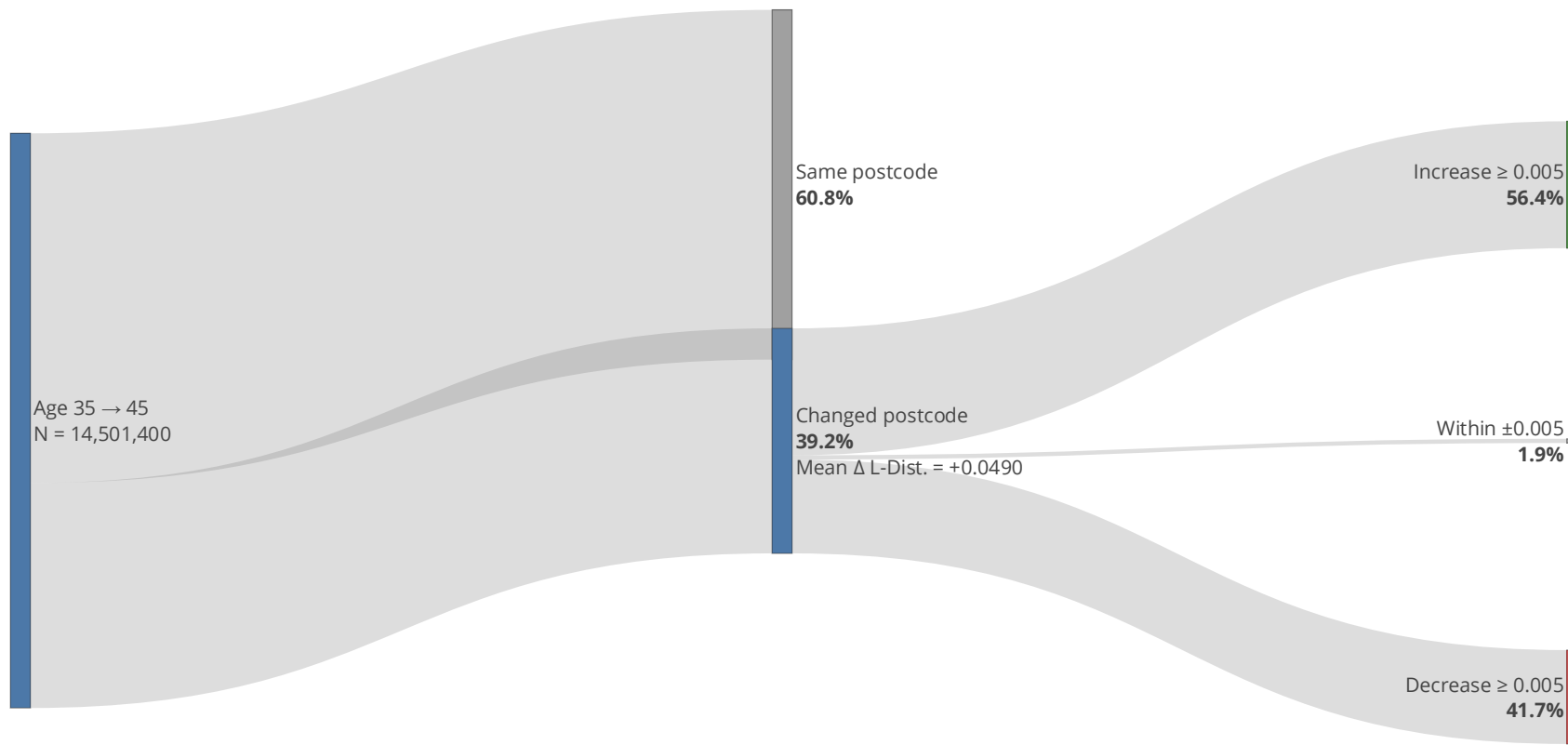
For ~19 million over age 65, we know address at age 65

Over full dataset to age 90, 10% change postcodes, with a 4-point mean drop in L-Distribution score

However, movements have a distribution, with ~43% increasing by more than 0.5 points

Shifts in postcode and L-Distribution, 35 – 45

Postcode and L-Distribution change, age 35 to 45



~39% of those people with postcode known at 35 and 45 change postcode

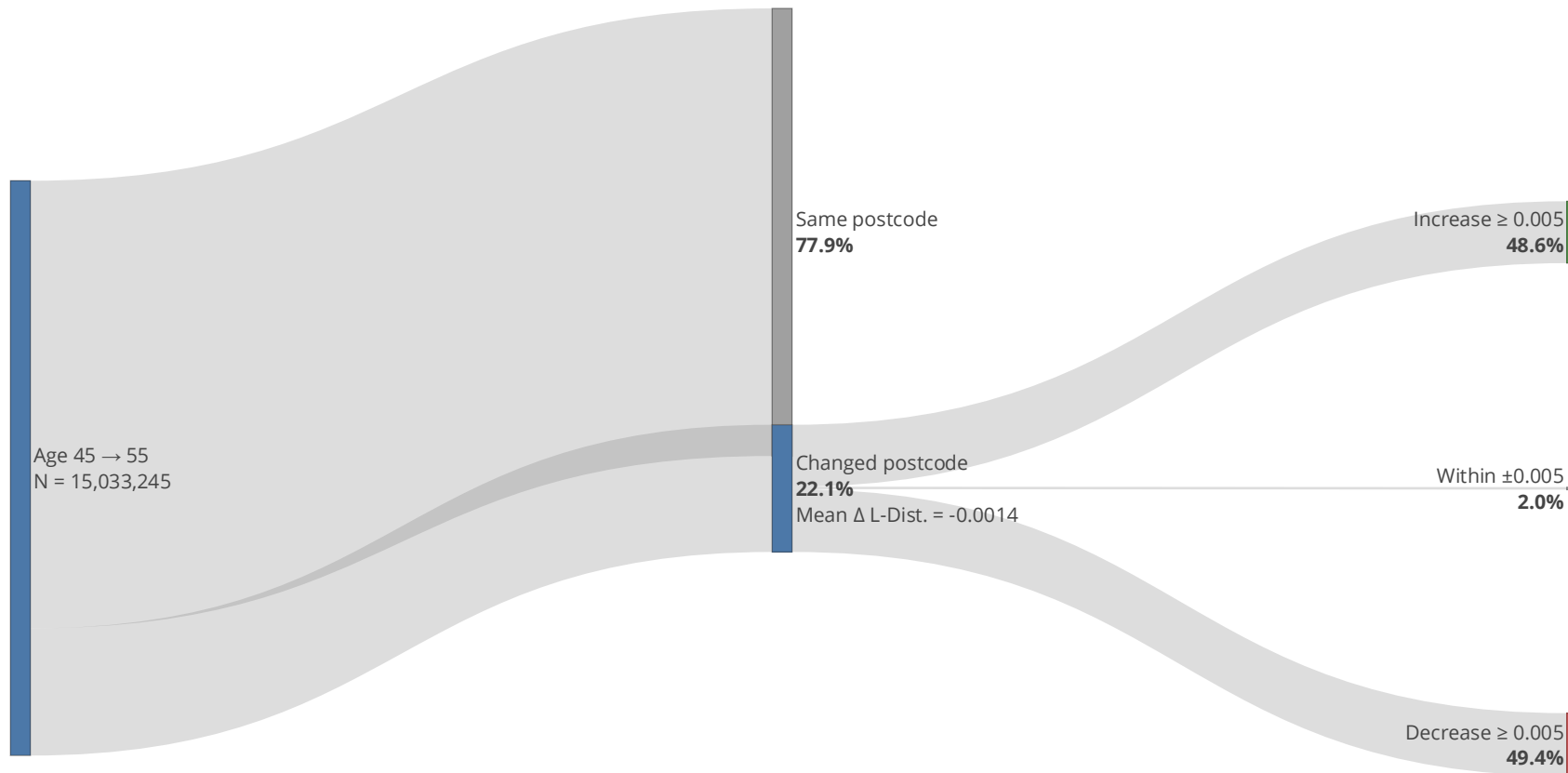
For those who change, 4.9-point increase in L-Distribution

Asymmetric distribution:

- 42% experience *decrease* in L-Distribution by more than 0.5 points

Shifts in postcode and L-Distribution, 45 – 55

Postcode and L-Distribution change, age 45 to 55

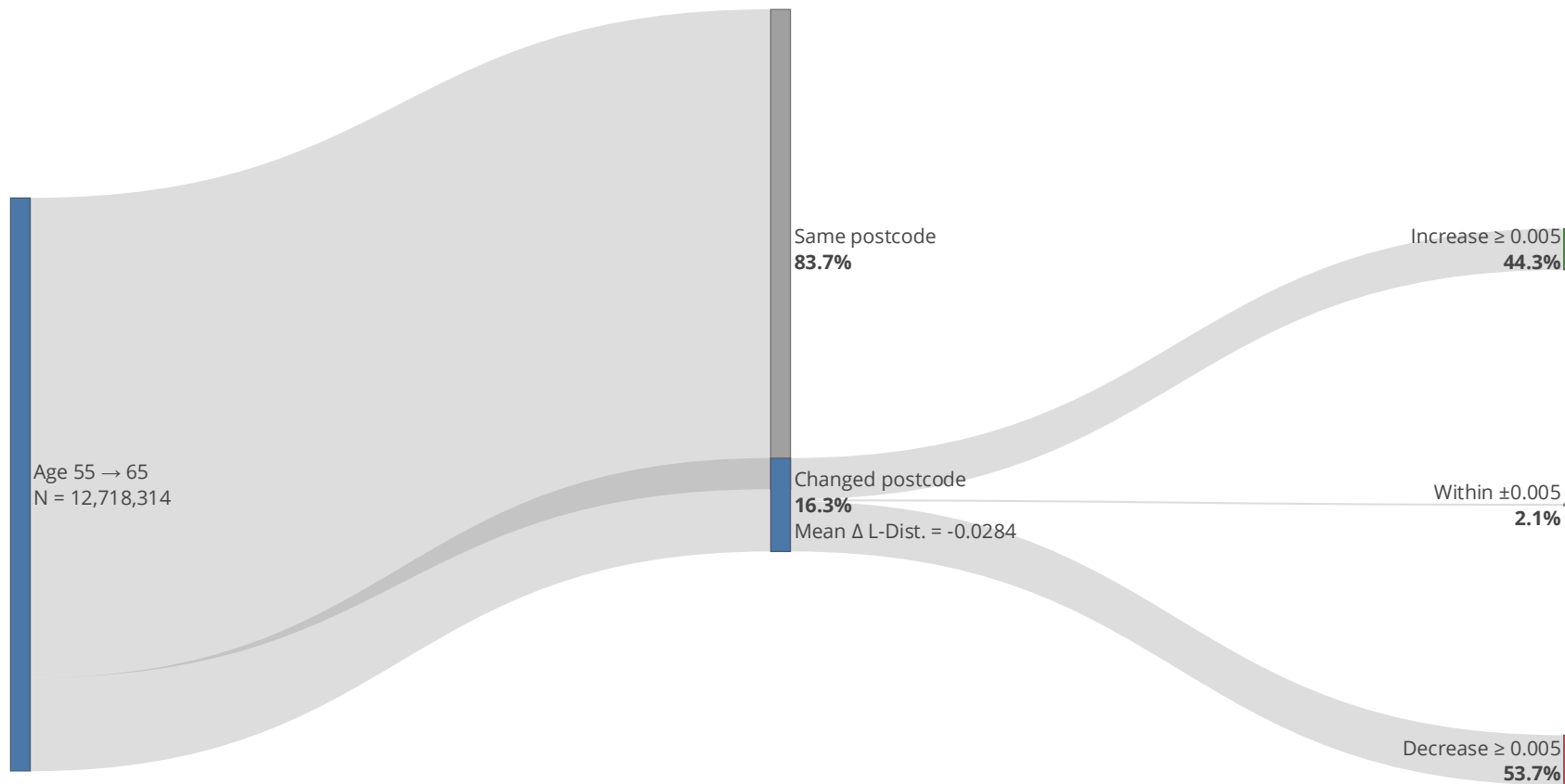


~22% in the dataset with postcode known at 45 and 55 change their postcode

Only slight decrease in mean L-Distribution

Shifts in postcode and L-Distribution, 55 – 65

Postcode and L-Distribution change, age 55 to 65



~16% in the dataset
dataset with postcode
known at 45 and 55
change postcode

For those who change,
decrease of 2.8 points in
L-Distribution

Pre-retirement: Best estimate hardly affected

Intuitive transitions:

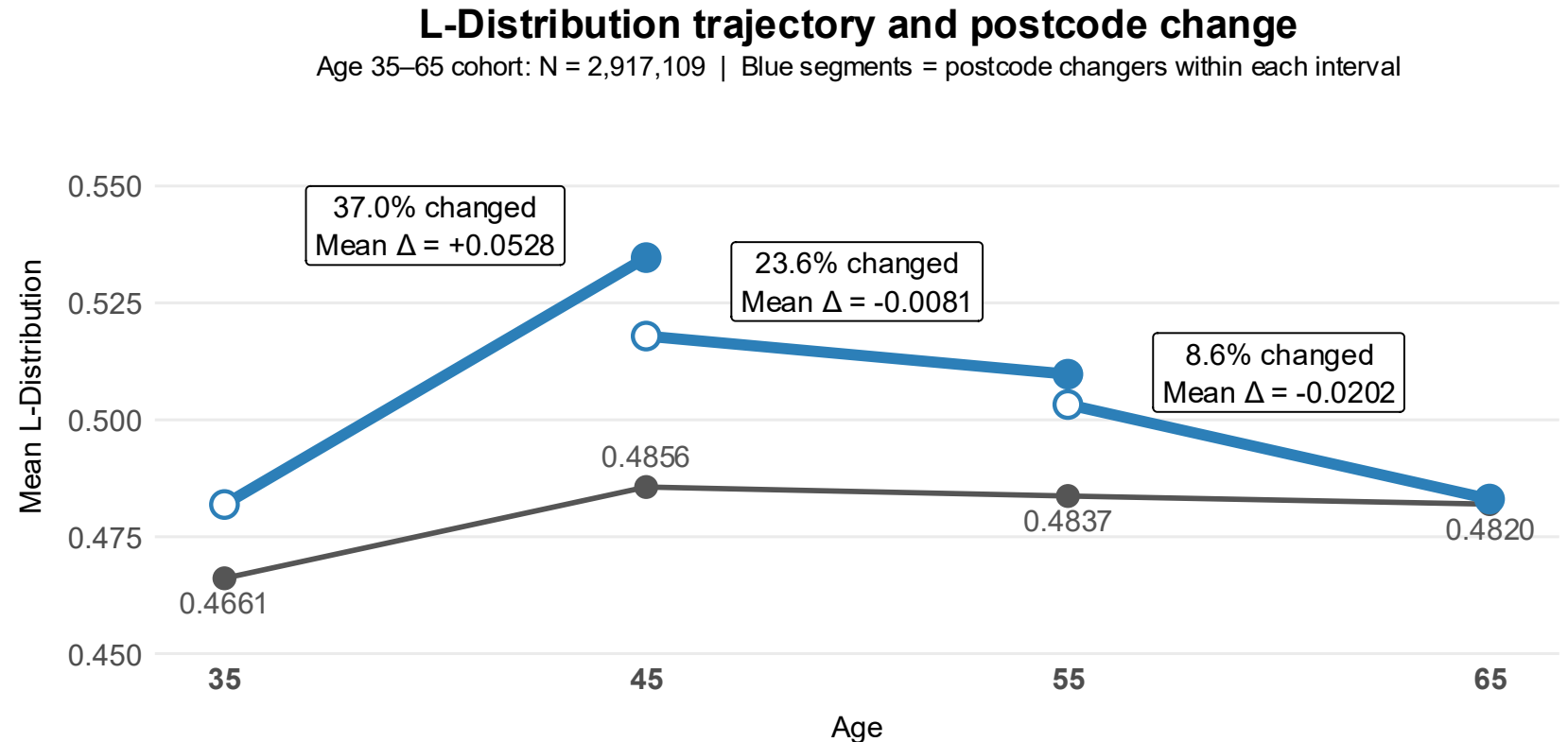
Strong increase

35 to 45 (+5.3 pts)

Modest decreases

45 to 55 (−0.8 pts) and 55 to 65 (−2.0 pts)

Subset with known address at all of 35, 45, 55, and 65 experiences less change in L-Distribution



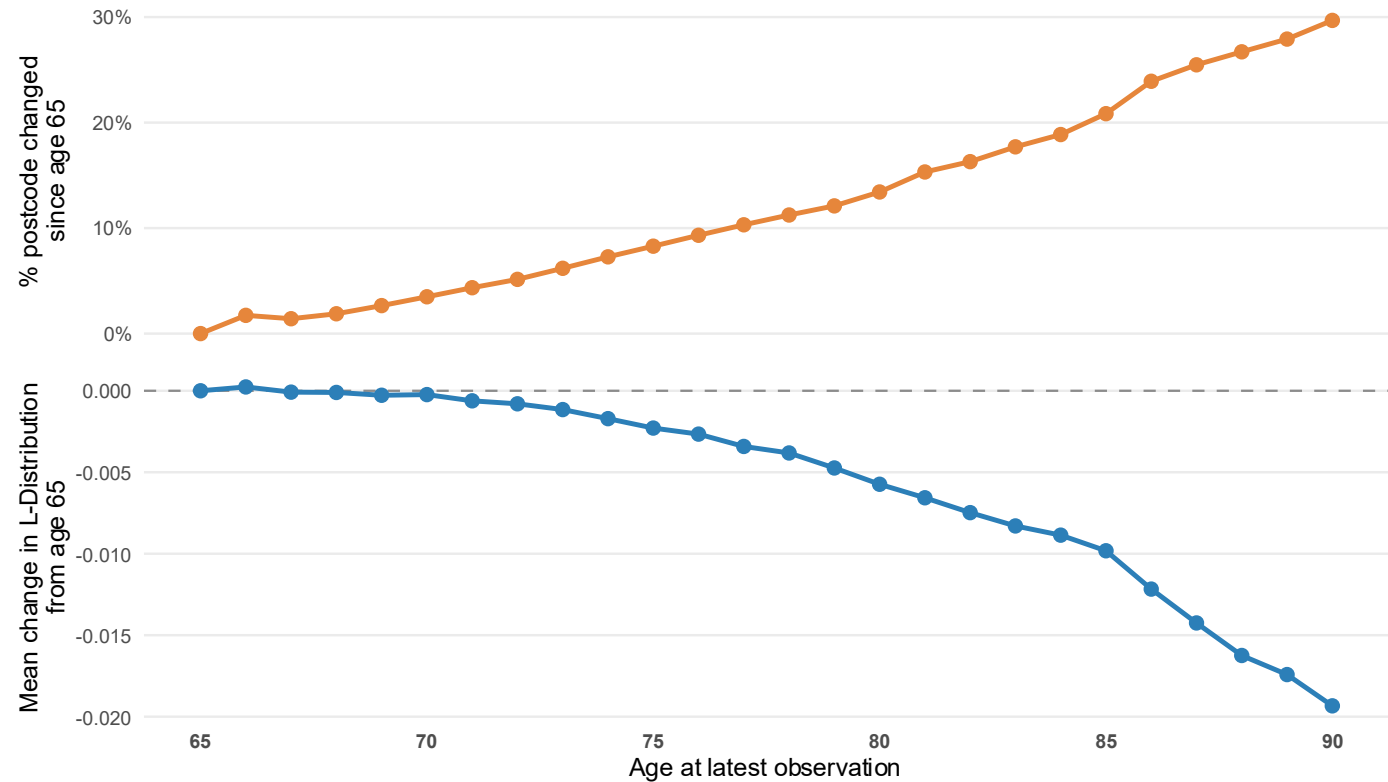
Source: LexisNexis® Risk Solutions longevity dataset and L-Distribution

Post-retirement means also gradually drift

- L-Distribution by latest known postcode drifts from the value at age 65 starting in the 70s
- Although **mean** drift is modest, assessing the socio-economic profile at the latest known ages subject to distortions:
 - Some move to care homes / near family
 - Relatively random whether they move up or down within L-Distribution
 - Movements and type of movement tied to age

Postcode and L-Distribution change since age 65

Eligible post-65 population: N = 19,038,300



Source: LexisNexis® Risk Solutions longevity dataset and L-Distribution



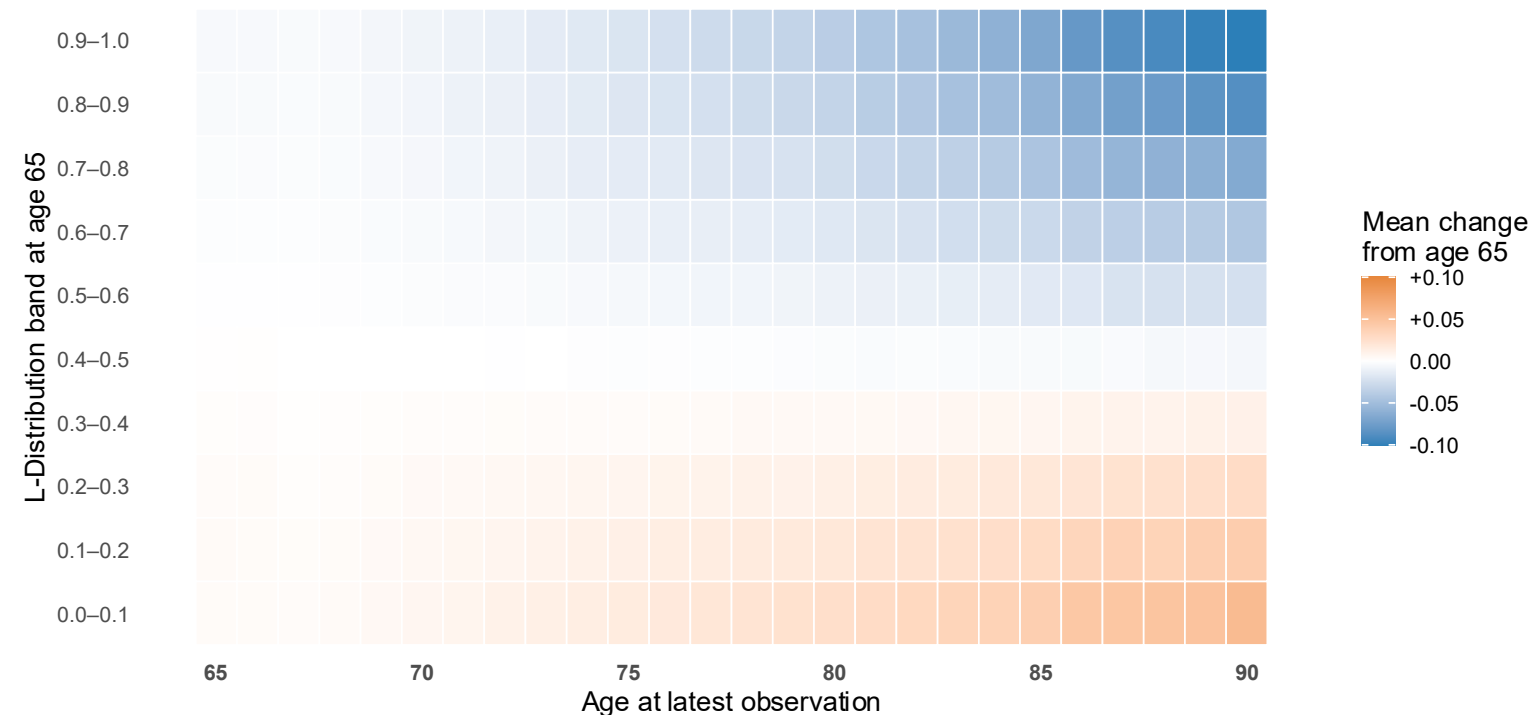
Moving past the mean

Could the distribution of the shifts be more meaningful than the mean suggests?

Individuals move more than the mean

Change in L-Distribution position after age 65

Mean change from age 65 to latest observed age, by age-65 L-Distribution band



Source: LexisNexis® Risk Solutions longevity dataset and L-Distribution

We can track where each L-Distribution “decile” at age 65 ends up at the latest observed age

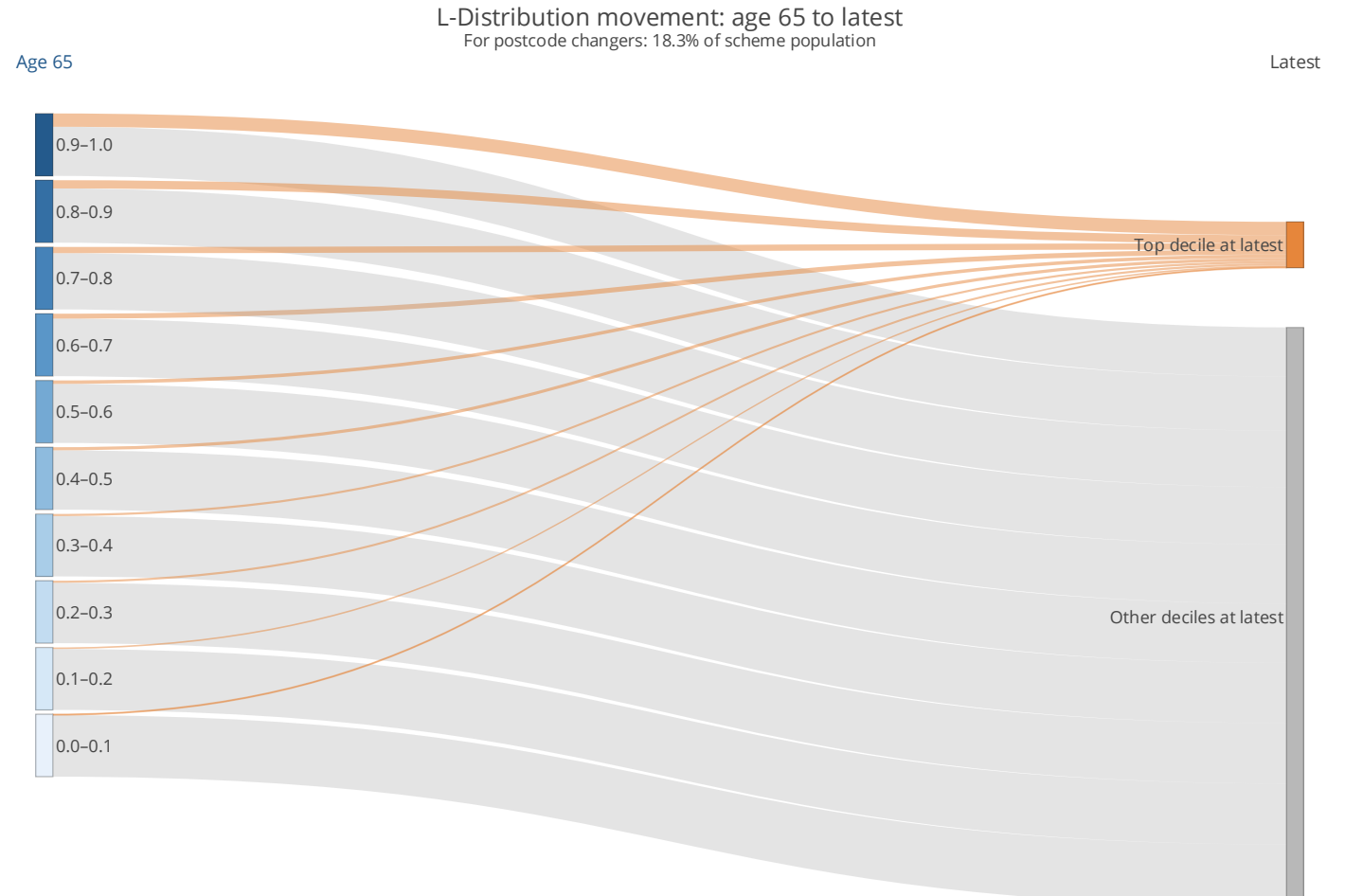
At older ages with greatest chance of postcode change, first and last deciles of L-Distribution at 65 see largest systematic shift

- For example, by age 90 the mean L-Distribution for those in the top decile at age 65 falls by 10 points

Movements “cancel out” across dataset, complicating analysis and interpretation

Potential impact on pension schemes

- Consider UK pension schemes with addresses known at 65 and at latest age
- ~18% of pensioners changed postcode
- For those that changed postcode only ~21% with L-Distribution ≥ 0.9 at age 65 remain within decile
- Establishing socio-economic profile at “benchmark age” allows most consistent comparison
- Materiality depends on how reference and target populations compare in terms of age



Source: LexisNexis® Risk Solutions L-Distribution; membership data for certain large UK pension schemes with fields appended via LNRS datasets

Discussion

Summary

- LNRS dataset allows us to answer questions on how shifts in address do and do not affect assigned socio-economic levels
- Between many ages, mean shift in L-Distribution relatively modest, but can still be measured and potentially included in pricing
- Differences appear more significant when consider distribution for shift, though will cancel out to some extent

Ongoing Research

1. Developing a model to capture the distribution in socio-economic movements
2. To what degree does the distribution of socio-economic movements impact pricing uncertainty?
3. Using L-Distribution to measure socio-economic trends over time
4. You tell us ...

Looking forward to discuss!

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