Electoral Systems and Geographic Representation

Leonardo Carella (University of Oxford)

Andrew Eggers (University of Chicago)

March 12, 2023

The Paper

- The descriptive representation of places in parliaments: how well do legislators reflect the geographic diversity of voters?
- Theoretical expectations: electoral system effects.
- Measurement: the Spatial Un-Representativeness of Legislatures Index (SURLI).
- Cross-country analysis: evidence from 62 legislatures.
- Within-country analysis: local representation in German and UK single-member districts.

Parliaments and Places: How well do Representatives Reflect the Geographic Diversity of Voters?

- Voters value *localness* as a descriptive trait in candidates, and candidates often cue local credentials to reap an electoral bonus ('friends and neighbours' voting).
- Yet, it is often claimed that places are unequally represented in legislatures, and that this contributes to spatial inequalities.
- How can we *measure* geographic 'representativeness' of legislatures? How should we *expect* it to vary across countries?

DENNISTOUN BORN DAVID EXPLAINS...

Why I'm Standing

A strong *local* voice...

Recognise the face? Well, until a few weeks ago 36 year old David was a television presenter and reporter with BBC Reporting Scotland.

So why did David give up the world of TV to stand for the SNP in the North East of Glasgow?

"Well, I'm originally from the area and my famly have lived and worked here for generations so naturally I still hold it very dear.

"We lived in Duke Street and many of my family worked at the Cattle Market. As with many local families, they were moved out to Cumbernauld.

"I was constantly back though, visiting my grandparents and seeing the family. These are my roots and I'm proud to stand up for Glasgow and the North East in particular".

What does David make of the area today? "Having worked at the BBC I saw first hand the manner in which Labour has taken this area for granted, they have completely forgotten this part of the City. Basically they're letting down the community and worse, keeping quiet about it!

"When elected I'll fight for Glasgow North East against the gangs and against the council cuts to build a safer community.

"Glasgow North East has great potential and our community should be at the heart of this city. That's why I want to be your full time active MP. I know the SNP are on our side. The SNP track record is there for all to see, we won Glasgow East and we can win Glasgow North East, with your backing we can create real change for the better".

David, working for Reporting Scotland in Duke Street... and preparing to campaign for Scotland in his early Dennistoun years!

DUKE STREET

David ...

- Started life at 290 Duke Street
- Was until recently a reporter on BBC's Reporting Scotland
- Career highlight, interviewing Henry Winkler (the Fonz!)
- A keen runner, he completed the Glasgow half marathon last year
- Five Godchildren - Christopher, Katie, Max, Anna and Andrew
- Grandmother, grandfather and uncle all worked in the Glasgow Cattle Market at Dennistoun.

intouch

with Oldham East and Saddleworth

FREEPOST RSAK-CUGS-YKYR
OES Conservatives, Dolphin's Barn, Moorby Street, Oldham, OL1 3QU
office@oes-conservatives.com
07719 237423
www.oes-conservatives.com
Or find us on facebook.

Conservatives

KASHIF ALI
OLDHAM BORN & BRED

Kashif hasn't just arrived. He's a true Oldhamer, born, educated and still living here in Oldham.

Kashif's key priority is the economic regeneration of the constituency. *"Jobs, businesses, and better public transport are the key to prosperity*

Victor - the LOCAL Choice!

"I'm proud of Chorlton" says the ONLY local candidate Victor Chamberlain, "...after all I've lived here most of my life." Victor said, "I got involved with the Liberal Democrats in 2003 because of the Iraq war, then I helped get John Leech elected to Parliament 2005. Since then I have been heavily involved in numerous local campaigns including being involved in the campaign to save Chorlton Meadows FROM THE START, the campaign AGAINST the 'Mega' Tesco at Old Trafford, fought AGAINST Labour CLOSING Ewing School and dealt with hundreds of local cases.

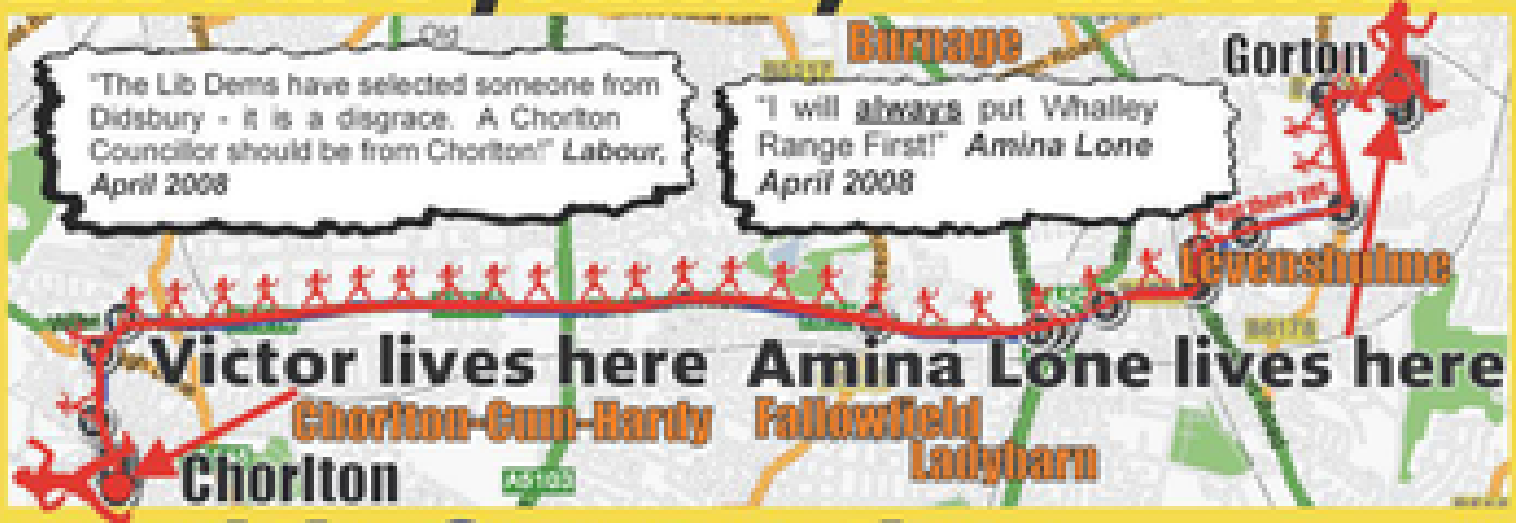
CARPET-BAGGER!

Meanwhile, the Labour Campaign is in tatters after Labour selected **Amina Lone** who lives in Gorton. Lone has already unsuccessfully stood in Whalley Range.

Councillor Paul Ankers said, "The selection of the Labour Candidate shows how much they take YOU for granted! Victor is standing because just like me he cares about you - the people of Chorlton." A close look at our map reveals that Amina Lone lives in Gorton.

John Leech said, "In a previous election, Labour have made a huge thing that our candidate came from neighbouring Didsbury. Now they select someone from miles away. They are hypocrites of the first order. Don't be fooled by their false promises! Select a Chorlton man - who can continue work alongside our Lib Dem Team!"

Labour's journey to Chorlton



Parliaments and Places: How well do Representatives Reflect the Geographic Diversity of Voters?

- Voters value *localness* as a descriptive trait in candidates, and candidates often cue local credentials to reap an electoral bonus ('friends and neighbours' voting).
- Yet, it is often claimed that places are unequally represented in legislatures, and that this contributes to spatial inequalities.
- How can we *measure* geographic 'representativeness' of legislatures? How should we *expect* it to vary across countries?

News › UK News › Politics

If you're born here then you're more likely to become an MP than anywhere else

Some areas of the UK are over-represented in parliament, with more MPs than you would expect

London and the South East feature disproportionately in parliamentary CVs

POLITICS DEVOLUTION *July 4, 2018*

Under-represented and under-funded: London politicians can't keep ignoring the south-west

By Sam Alvis

POLITICS 11/12/2017 13:17 GMT

John McDonnell: London-Centric Decision-Making May Have Caused Brexit Vote

Parliaments and Places: How well do Representatives Reflect the Geographic Diversity of Voters?

- Voters value *localness* as a descriptive trait in candidates, and candidates often cue local credentials to reap an electoral bonus ('friends and neighbours' voting).
- Yet, it is often claimed that places are unequally represented in legislatures, and that this contributes to spatial inequalities.
- How can we *measure* geographic 'representativeness' of legislatures? How should we *expect* it to vary across electoral systems?

Assumptions

Electoral rules resolve a tension between parties' and voters' different preferences over candidates' extraction:

- Voters prefer (*ceteris paribus*) local legislators.
  - To the extent that these preferences are enabled, legislatures tend to be spatially representative.
  - However, localness is a second-order consideration for voters relative to partisanship.
  - Most voters are *partisans*, who will consider localness only between candidates of the same party; only a subset ℓ of voters are *localists*, who will break across parties in proportion to the number of local candidates they present.

Assumptions

- Parties are biased towards certain parts of the country due to the unequal spatial distribution of resources and credentials that drive political ambition:
  - *At least in some territorial units*, parties would prefer to 'parachute' non-locals.
  - If candidate choice were left entirely to parties, legislatures would reproduce spatial inequalities in supply of aspirants to political office.

Assumptions

Electoral rules yield variation on two criteria associated with likelihood of local representation in a district:

1. *Party Incentives*: incentives for (viable) parties to select local candidates instead of 'parachuting' non-locals.

2. *Voter Leverage*: ability of voters to choose a local over a non-local, net of their partisan preferences.

How do these criteria vary across constituency/ballot structures?

Single-Member (SM) systems

Seat safety creates different *party incentives* and *voter leverage*.

In competitive seats (where ℓ can be decisive):

- High *party incentives*:
  - High visibility of candidate $\rightarrow$ more localist voters
  - High payoff of local choice $\rightarrow$ choosing a local can make a difference between winning 100% of seats or 0% (unlike PR).
- High *voter leverage*:
  - Voters always elect a local candidate, provided that at least one viable party fields one (which they have high incentives to do anyway).

Single-Member (SM) systems

In safe seats (where ℓ is unlikely to be decisive):

- Low *party incentives*:
  - For the only viable party, fielding a local or parachuting makes no difference to election outcome.
- Low *voter leverage*:
  - Voters can never overrule the party's candidate choice.

Therefore, SM systems present a combination of the 'best' conditions for local representation in competitive seats and the 'worst' conditions in safe seats.

Single-Member (SM) systems

In safe seats (where ℓ is unlikely to be decisive):

- Low *party incentives*:
  - For the only viable party, fielding a local or parachuting makes no difference to election outcome.
- Low *voter leverage*:
  - Voters can never overrule the party's candidate choice.

Therefore, SM systems present a combination of the 'best' conditions for local representation in competitive seats and the 'worst' conditions in safe seats.

Multi-Member (MTM) systems

- Modest *party incentives* to field a representative party list:
  - Lower visibility of candidates vis-à-vis party brand.
  - Linear returns to each additional local candidate fielded: additional fractions of localist vote ℓ increase the expected number of seats proportionally.
  - Payoff of fielding an additional local is thus lower than in competitive SM districts but *never null*, as in safe SM districts.

Multi-Member (MTM) systems

- *Voter leverage* depends on ballot structure:
  - Leverage is *high* under preferential voting (PV) rules, as voters can overrule parties' preference, by changing the list order or determine within-party allocation of seats.
  - Leverage is *low* without PV (i.e. closed lists): parties can secure seats for 'parachuted' candidates by placing them higher up in the list.

Mixed-Member (MXM) systems

Naive view: convex combination SM and MTM systems.

However, the presence of a MTM tier increases *party incentives* to field locals in the SM tier (*contamination effects*):

- More parties compete in SM districts under MXM rules, as – even if the seat is hopeless – putting up a 'face' increases party share in the MTM tier (Herron and Nishikawa, 2001) $\rightarrow$ more competitive districts in the SM tier.
- Even in safe SM districts, there is an incentive to field locals, as these increase party share in the MTM tier.

In short, the SM tier of a MXM system approximates the conditions of *competitive* SM districts.

Mixed-Member (MXM) systems

Naive view: convex combination SM and MTM systems.

However, the presence of a MTM tier increases *party incentives* to field locals in the SM tier (*contamination effects*):

- More parties compete in SM districts under MXM rules, as – even if the seat is hopeless – putting up a 'face' increases party share in the MTM tier (Herron and Nishikawa, 2001) $\rightarrow$ more competitive districts in the SM tier.
- Even in safe SM districts, there is an incentive to field locals, as these increase party share in the MTM tier.

In short, the SM tier of a MXM system approximates the conditions of *competitive* SM districts.

Summing Up

Probability of electing a local by constituency and ballot structure.

Voter Leverage	Party incentives to select local candidates: **Low**	**Moderate**	**High**
High		MTM seats with PV (in both MTM and MXM systems)	competitive seats in SM systems SM tier in MXM systems
Low	safe seats in SM systems	MTM seats without PV (in both MTM and MXM systems)	

Measuring Spatial Representativeness of Legislatures

Simple intuition: discrepancy between where MPs are from and where voters are.

But multiple challenges:

1. What does it mean for a legislator to be 'from' somewhere?
2. Different geographical units *within* and *between* countries.
3. Making distance matter.
4. Comparing countries of widely different population, land area, geographic shape, legislature size etc.
5. Accounting for internal migration.

Measuring Spatial Representativeness of Legislatures

Simple intuition: discrepancy between where MPs are from and where voters are.

But multiple challenges:

1. What does it mean for a legislator to be 'from' somewhere?
2. Different geographical units *within* and *between* countries.
3. Making distance matter.
4. Comparing countries of widely different population, land area, geographic shape, legislature size etc.
5. Accounting for internal migration.

Our Solution: The Spatial Un-Representativeness of Legislatures Index (SURLI)

1. **What does it mean to be 'from' somewhere?**

- MPs' municipality of birth is the most widely available proxy: 13,808 entries for 62 legislatures, building on Global Leadership Project (GLP) dataset.

2. **Different geographical units within and between countries.**

- We use the gridded population data: MPs' birthplaces are geocoded and sorted into 15 $\times$ 15 arcmin cells, for which we have population estimates (data from HYDE3.2).

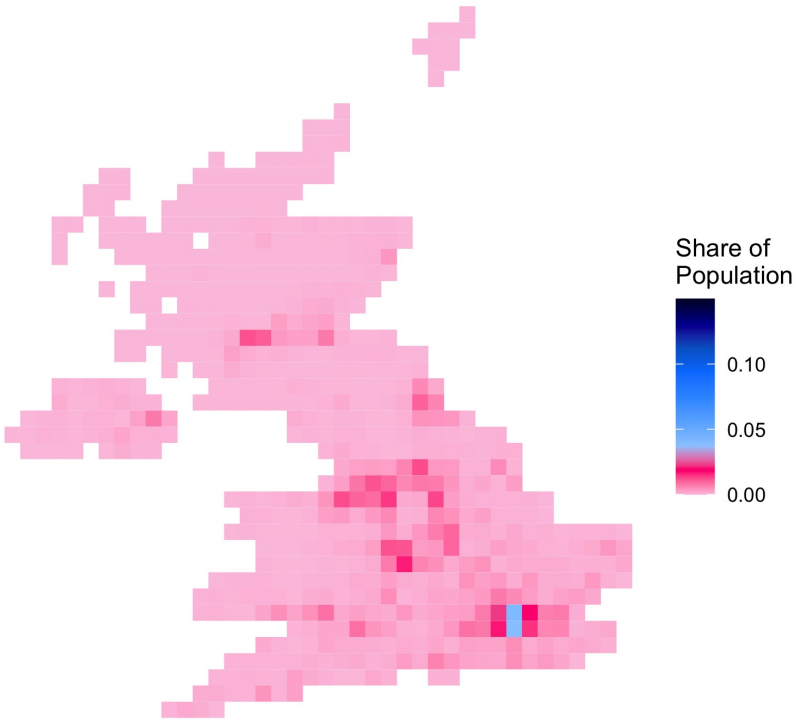
Our Solution: The Spatial Un-Representativeness of Legislatures Index (SURLI)

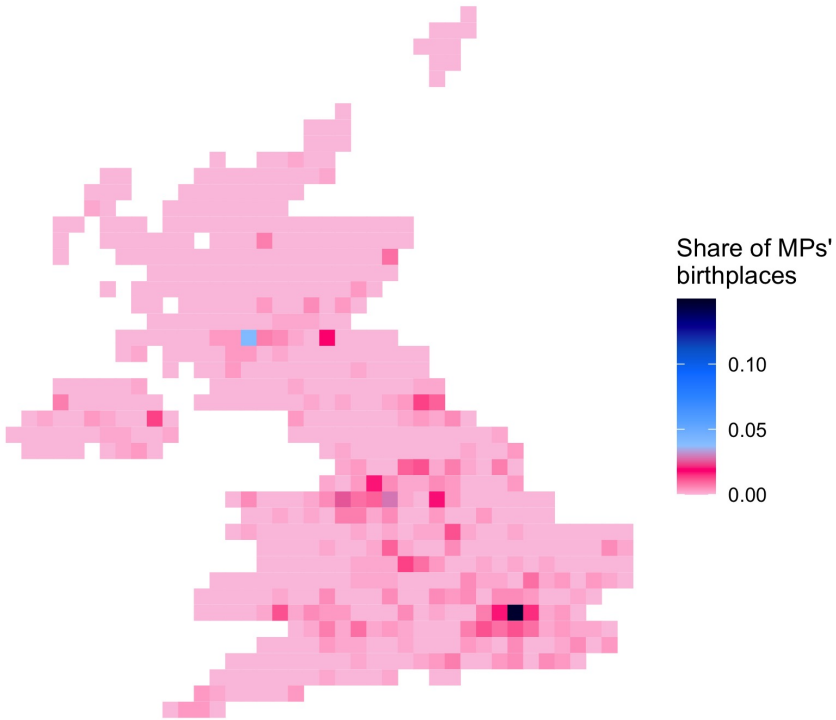
1. **What does it mean to be 'from' somewhere?**

- MPs' municipality of birth is the most widely available proxy: 13,808 entries for 62 legislatures, building on Global Leadership Project (GLP) dataset.

2. **Different geographical units within and between countries.**

- We use the gridded population data: MPs' birthplaces are geocoded and sorted into 15 $\times$ 15 arcmin cells, for which we have population estimates (data from HYDE3.2).


Share of
Population
0.10
0.05
0.00


Share of MPs'
birthplaces
0.10
0.05
0.00

Our Solution: SURLI

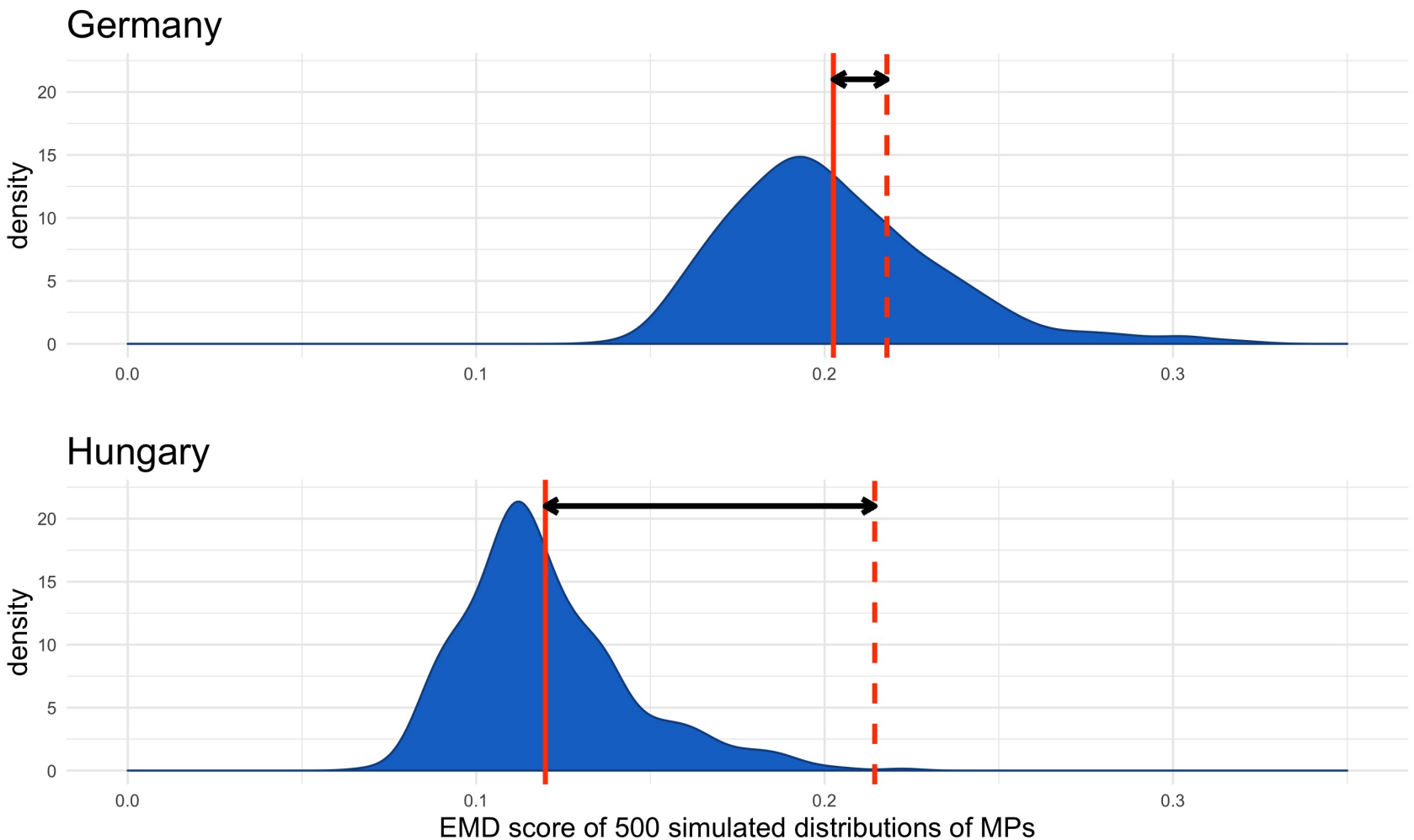
3. **Making distance matter.**

- Initial approach: Earth Mover's Distance (EMD), an algorithm that computes minimum amount of *work* (Mass $\times$ Distance) required to convert one distribution into the other.
- We show that for an orthogonal grid, the EMD is approximated extremely precisely by the discrepancy between the two probability distributions' CDFs, averaged across a sufficient number of rotations.
- The proxy reduces substantially computational time.

Our Solution: SURLI

4. **Comparing countries of widely different population, land area, geographic shape, legislature size etc.**

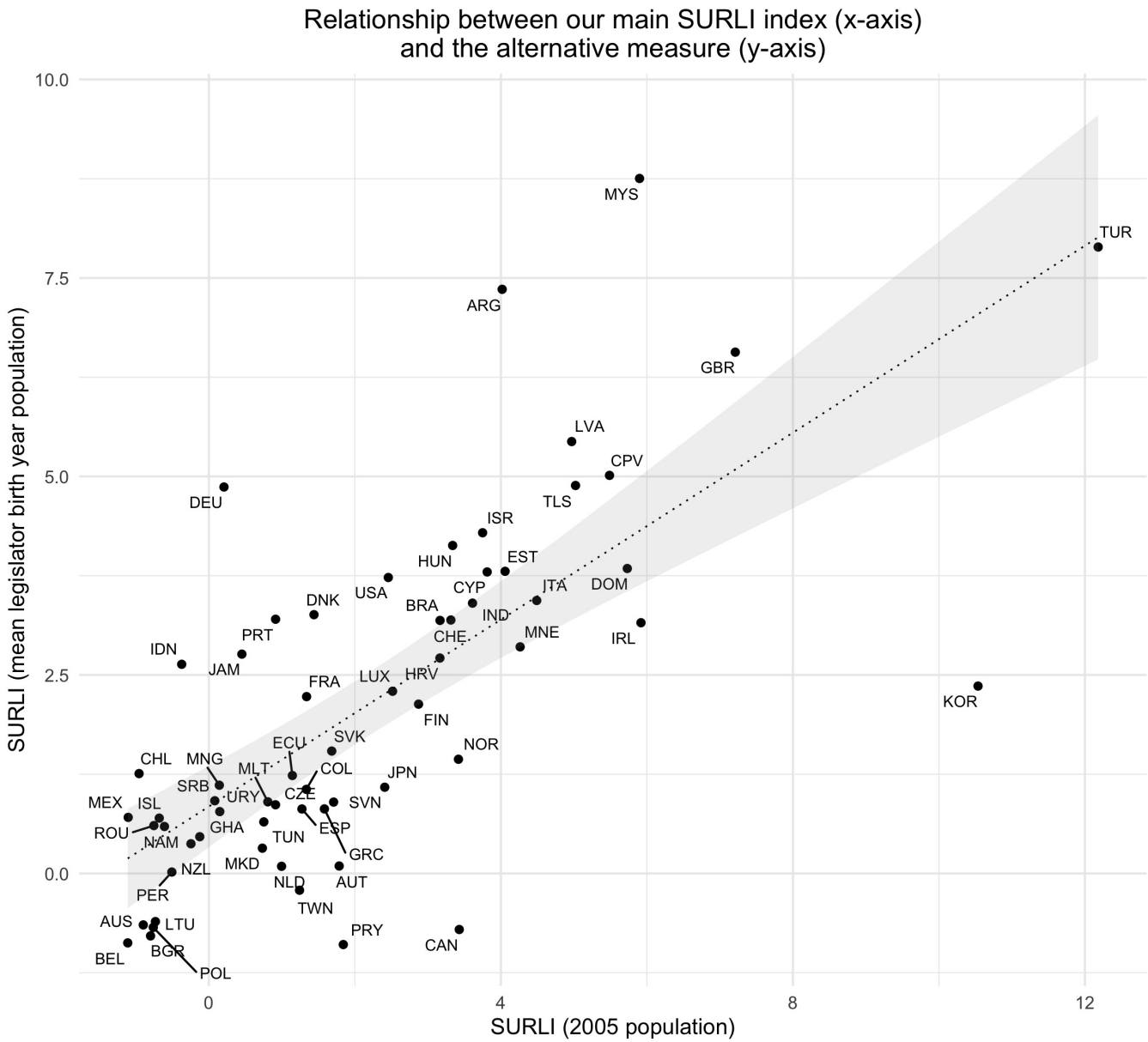
- We draw 500 parliaments 'at random' (each grid has a probability of expressing an MP proportional to population).
- We compute EMDs for each random draw of MPs and use this distribution as the benchmark against which we compare the 'real' EMD.
- SURLI is *the number of standard deviations between the mean of the simulated parliaments' EMDs and the 'real' EMD.*


Germany
density
20
15
10
5
0
0.0
0.1
0.2
0.3
Hungary
density
20
15
10
5
0
0.0
0.1
0.2
0.3
EMD score of 500 simulated distributions of MPs

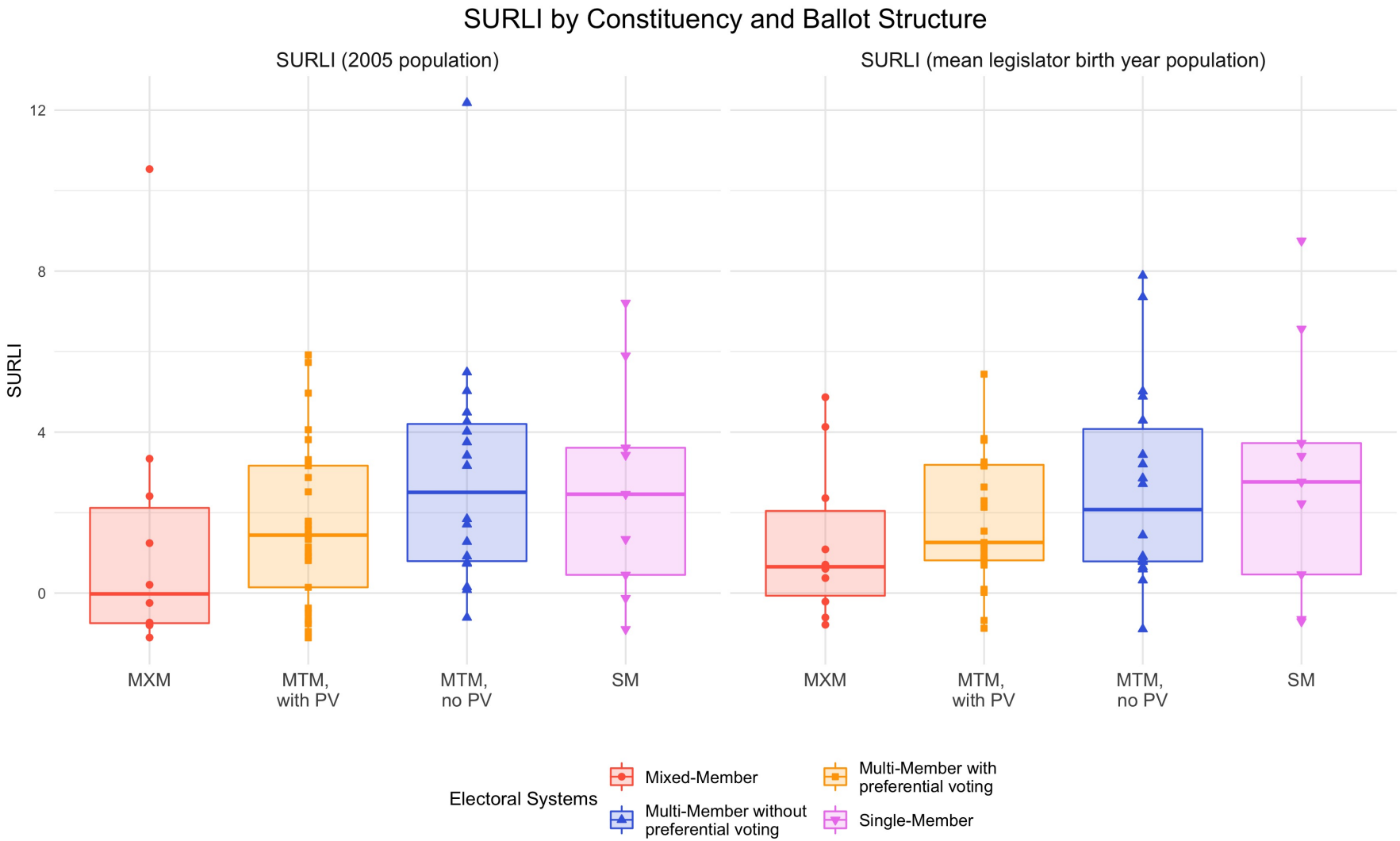
Our Solution: SURLI

5. **Accounting for internal migration.**

- Areas that experienced high inward migration may appear underrepresented because there are fewer 'locals' than voters today.
- We repeat the calculation using a proxy for the distribution of birthplaces: population distribution in the mean legislator birth year (data from HYDE3.2).
- All analysis is conducted on both measures of SURLI.


Relationship between our main SURLI index (x-axis)
and the alternative measure (y-axis)
SURLI (mean legislator birth year population)
SURLI (2005 population)
10.0
7.5
5.0
2.5
0.0
0
4
8
12
MYS
TUR
ARG
GBR
LVA
CPV
TLS
DEU
ISR
HUN
EST
USA
CYP
ITA
DOM
DNK
BRA
IND
IRL
PRT
CHE
MNE
IDN
JAM
FRA
LUX
HRV
KOR
FIN
ECU
SVK
NOR
CHL
MNG
MLT
COL
JPN
SRB
CZE
MEX
ISL
URY
SVN
ROU
GHA
ESP
NAM
TUN
GRC
MKD
NZL
NLD
AUT
PER
TWN
AUS
LTU
PRY
CAN
BEL
BGR
POL

Cross-Country Analysis



Cross-Country Analysis

- Constituency Structure
  1. Single-, Multi- and Mixed-Member Categorical Variable.
  2. Share of MPs elected in MTM seats + Mixed Dummy.
- Ballot Structure: Preferential Voting Dummy.
- District Magnitude (Median/Mean)
- Controls: population, land area, GDP per capita, democracy score, federalism, spatial economic inequality (spatial GINI in GDP per capita).

Cross-Country Analysis

	SURLI (2005 population)	
Multi-Member	2.63** (1.15)	
Single-Member	1.56 (1.28)	
Share Multi-Member Seats		0.64 (1.34)
Mixed-Member Dummy		−2.08** (1.01)
Preferential Vote	−1.58* (0.82)	−1.46* (0.81)
log(Median DM)	−0.40 (0.30)	−0.35 (0.29)
log(Population)	0.39 (0.32)	0.37 (0.32)
log(Land Area)	−0.43* (0.25)	−0.43 (0.26)
log(GDP p.c.)	1.10* (0.56)	1.13* (0.56)
Democracy Score	−1.73 (1.09)	−1.82* (1.09)
Constant	−8.31 (5.49)	−6.46 (5.50)
Observations	62	62
F Statistic (df = 8; 53)	1.74	1.68

Note: *p<0.1; **p<0.05; ***p<0.01

Cross-Country Analysis

	SURLI (mean MP birthyear population)	
Multi-Member	1.63* (0.96)	
Single-Member	2.19** (1.07)	
Share Multi-Member Seats		−0.35 (1.12)
Mixed-Member Dummy		−1.92** (0.84)
Preferential Vote	−0.82 (0.68)	−0.88 (0.68)
log(Median DM)	−0.01 (0.25)	−0.03 (0.25)
log(Population)	0.29 (0.27)	0.30 (0.27)
log(Land Area)	−0.28 (0.21)	−0.28 (0.21)
log(GDP p.c.)	0.68 (0.47)	0.66 (0.47)
Democracy Score	−1.55* (0.91)	−1.51 (0.91)
Constant	−5.12 (4.60)	−3.07 (4.59)
Observations	62	62
F Statistic (df = 8; 53)	1.44	1.42

Note: *p<0.1; **p<0.05; ***p<0.01

Within-Country Analysis

Analysis of aggregate patterns is complemented by an analysis of UK and German single-member districts, which are matched with their MPs' birthplaces. We find:

- Germany's single-member seats are more competitive than the UK's (median margin of victory: 12% vs 20%).
- MPs are more likely to be born in their seats in Germany than in UK: respectively, 71% and 29%, with median distances between birthplace and seat of 22km and 80km.
- In the UK, likelihood of local representation decreases with seat safety, but this is not the case in Germany's single-member tier.

Conclusion

- The paper proposes a method to compare spatial inequalities, and applies it to representation of places in parliament.
- This index is related to constituency structure: MXM perform better than MTM and (perhaps surprisingly) SM systems.
- Comparison of district-level data from UK and Germany suggest that this may be due to 'contamination effects' in the SM tier of MXM systems.
- Weaker evidence of a positive effect of PV rules.

Thank you for your kind attention