Health in All Polices Approach:

A Dynamic Modelling of Social Policies' Effect on Mental Health

Ekaterina Melianova

Background

- Population health is a persistent policy problem

- **Health in All Policies**: actions in all policy arenas are important to effectively confront disease

- Understanding government spending is important for implementing multifaceted interventions

- Practical value of studying spending choices for policymakers

Research Gaps

- Mental Health

- Local government level (vs. country level)

- Dynamic (i.e., lagged) health impacts of spending

- Budget streams as an interconnected system

- Reverse causality

- Unobserved time-invariant heterogeneity and trends

Aim and Hypotheses

- The aim is to simultaneously estimate the dynamic (short-run and long-run) effects of a spectrum of local government spending policies on population mental health.

- **H1.** In the long run, greater local government spending in each sector analysed will improve mental health.

- **H2.** In the short run, greater local government spending in each sector will lead to less pronounced positive mental health changes compared to the long-run effects.

DATASETS

Spending Data

Spending categories:

1. Healthcare
2. Adult social care
3. Children social care
4. Environment (environment + planning + culture)
5. Law & order (police + housing)
6. Infrastructure (transport +central + fire & rescue + other)

Fiscal Years

By Lower Tier Local Authorities (LTLA)

Revenue Outturn (RO) 2020-21 Final: Social Care and Public Health (RO3) data for ENGLAND

Department for Levelling Up, Housing & Communities

|	Employees (C1)	Running Expenses (C2)	Total Expenditure (C3 = C1 + C2)	Sales, Fees and Charges (C4)
Adult Social Care				
32 Physical support - adults (18–64)	82,308	1,602,365	1,684,669	175,223
33 Physical support - older people (65+)	608,550	6,022,935	6,631,489	1,549,252
34 Sensory support - adults (18–64)	5,274	63,924	69,200	7,079
35 Sensory support - older people (65+)	14,035	115,400	129,433	29,226
36 Support with memory and cognition - adults (18–64)	10,245	123,809	134,051	16,314
37 Support with memory and cognition - older people (65+)	109,108	1,536,838	1,645,944	418,602
40 Learning disability support - adults (18–64)	408,184	5,960,293	6,368,480	404,151
41 Learning disability support - older people (65+)	44,630	777,434	822,063	80,090
44 Mental health support - adults (18–64)	54,591	1,034,074	1,088,663	66,703
45 Mental health support - older people (65+)	32,549	646,649	679,197	107,201
48 Social support: Substance misuse support	4,707	40,030	44,739	2,714
Public Health				
61 Sexual health services - STI testing and treatment (prescribed functions)	11,070	315,488	326,557	2,921
62 Sexual health services - Contraception (prescribed functions)	5,529	155,476	161,005	1,947
63 Sexual health services - Advice, prevention and promotion (non-prescribed functions)	3,959	42,964	46,922	117
65 NHS health check programme (prescribed functions)	6,186	28,056	34,239	67
66 Health protection - Local authority role in health protection (prescribed functions)	17,327	26,864	44,193	252
68 National child measurement programme (prescribed functions)	2,442	17,639	20,080	21
70 Public health advice (prescribed functions)	29,469	17,231	46,702	135
71 Obesity - adults	9,354	42,909	52,263	137
72 Obesity - children	7,227	33,405	40,633	73

Mental Health Data

Small Area Mental Health Index (SAMHI):

1. Hospital Admission - Number of mental health hospital admissions

2. Antidepressants Use - Number of antidepressants per population

3. Depression - % of NHS patients diagnosed with depression

4. Incapacity Benefits - % of people in receipt of incapacity benefit and employment support allowance for mental illnesses (IBESA)

Calendar years

By Lower Super Output Areas (LSOA)
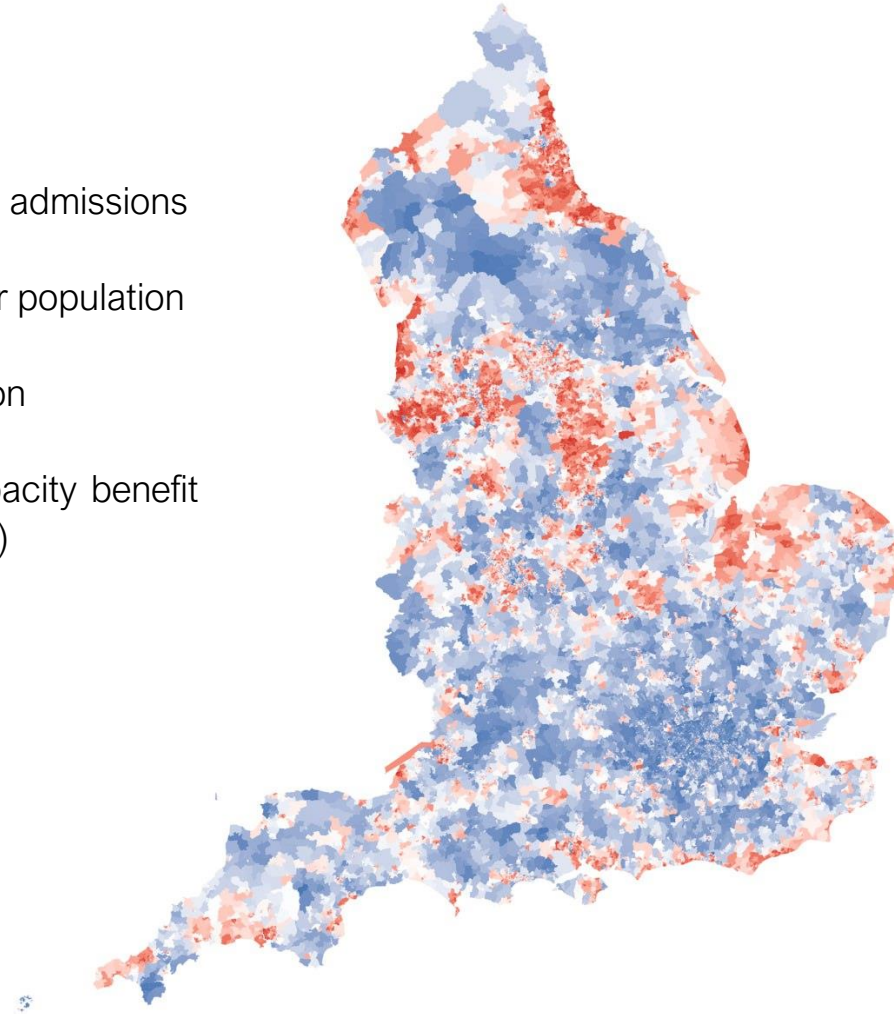
Final Sample

- 299 Lower Tier Local Authorities

- 31,310 Lower Super Output Areas (primary units of analysis)

- 7 measurement points: 2013-2019

- Spending data: logarithm per capita, adjusted for inflation, Z-standardised

- Mental health data: Z-standardised

- Controls: Index of Multiple Deprivation; population size; rurality; % of people aged 65+, females, non-white ethnicities; and some other variables.

Spending by Lower Tier Local Authorities, £ per capita
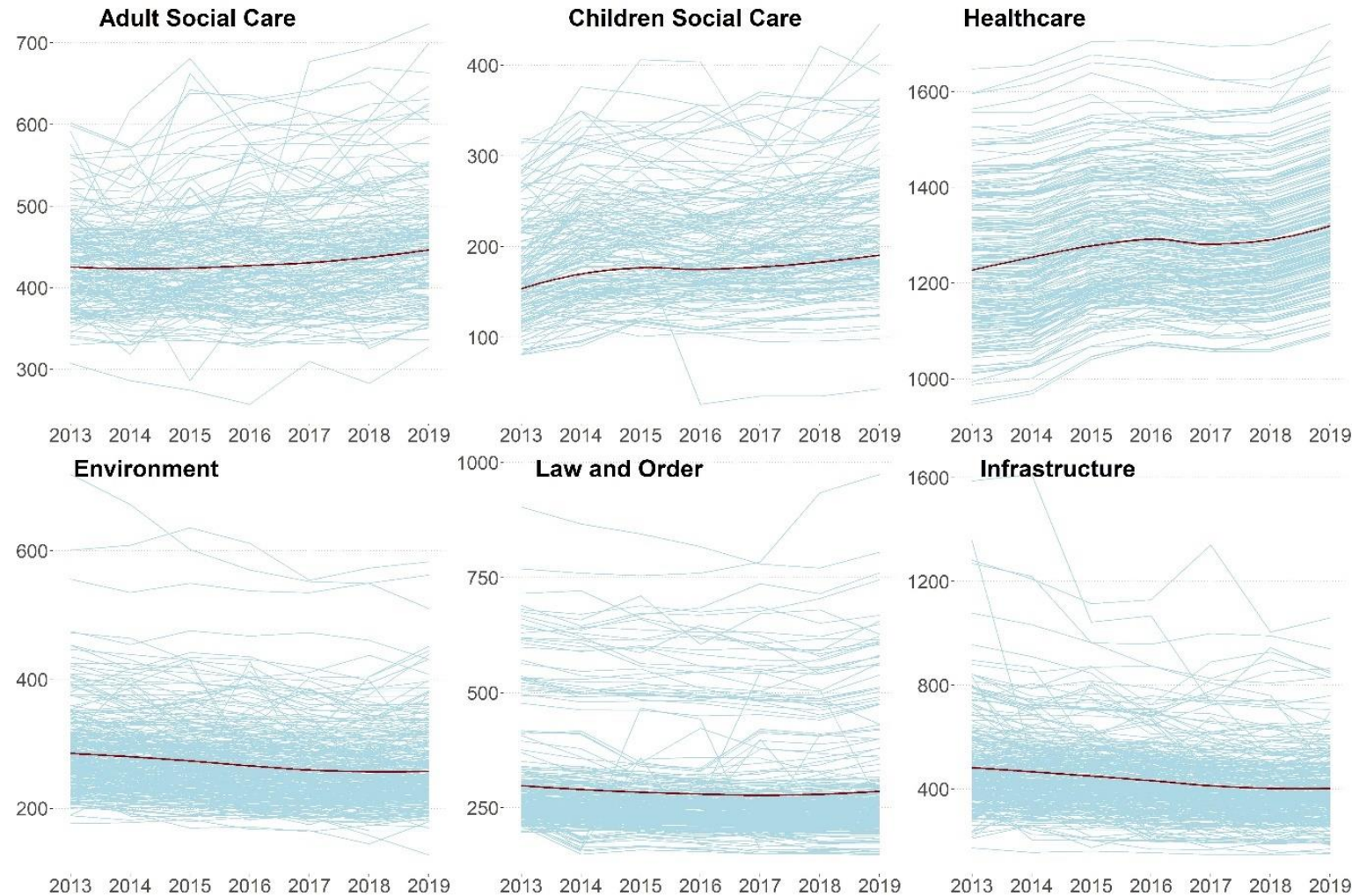
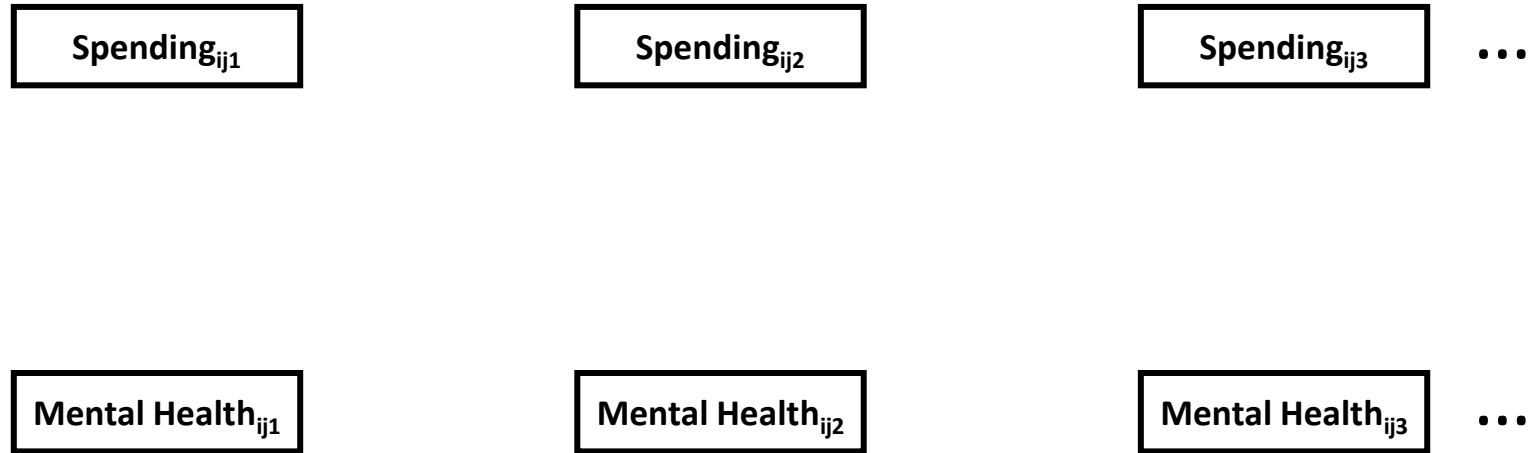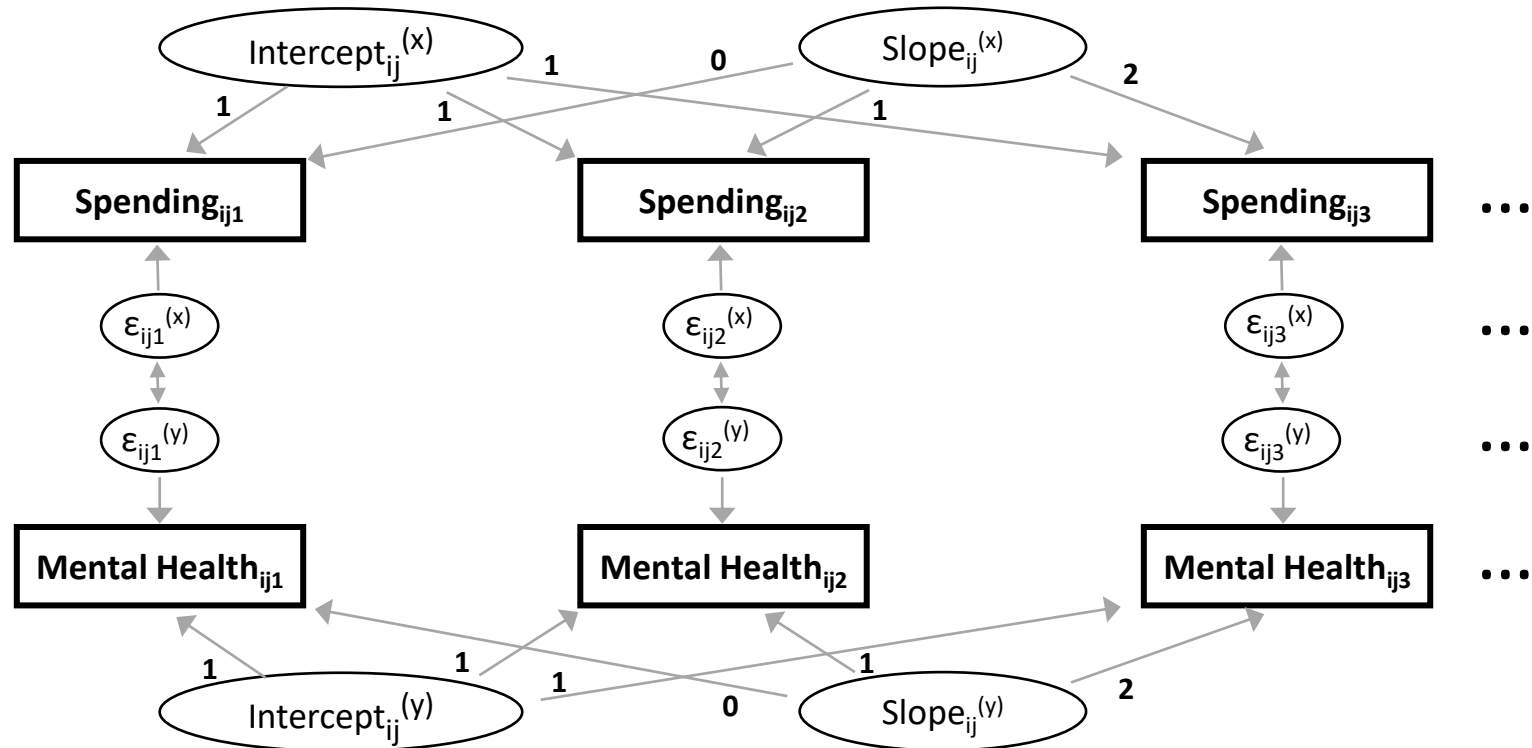# Mental Health by Lower Tier Local Authorities, z-scale
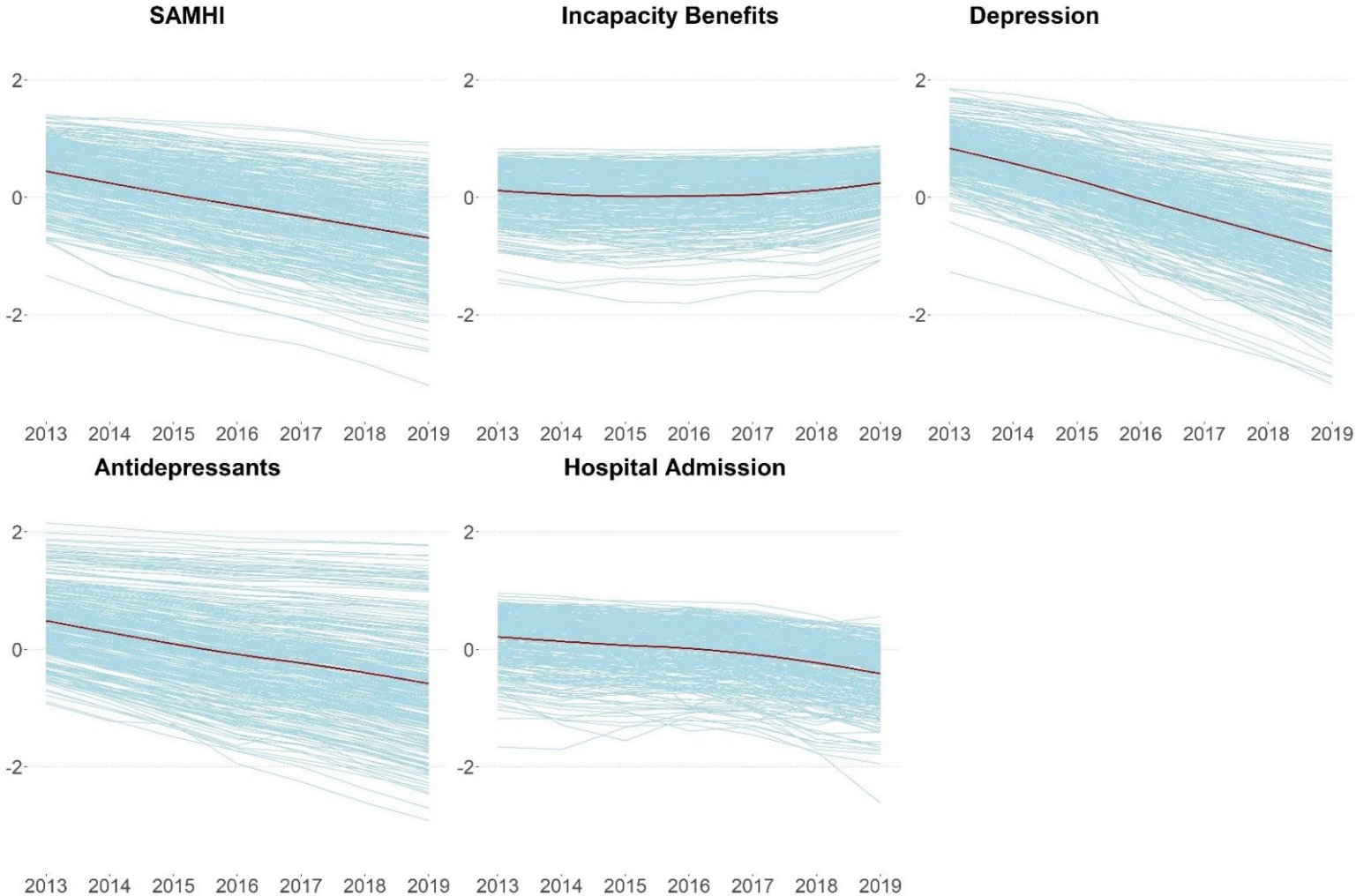
METHOD

Random Curve General Cross-Lagged Model

- Dynamic separation of effects

- Explicit modelling of reverse causality

- Accounting for stable differences between local areas

- Accounting for the trend in spending and mental health

- Capturing confounders of growth parameters
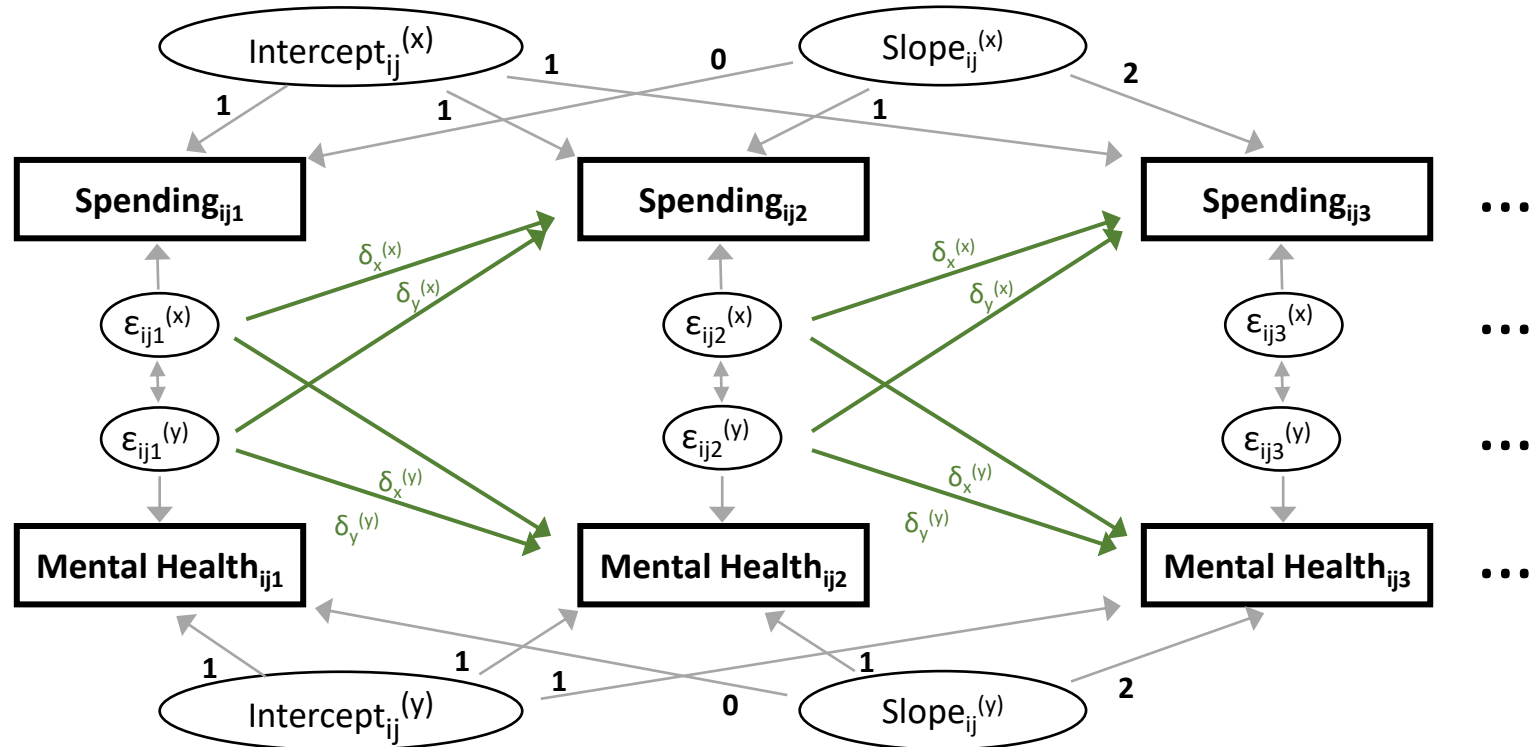
Random Curve General Cross-Lagged Model

| Spending$_{ij1}$ | Spending$_{ij2}$ | Spending$_{ij3}$ ... |

| Mental Health$_{ij1}$ | Mental Health$_{ij2}$ | Mental Health$_{ij3}$ ... |

Introducing Random Effects

$$mental\_health_{ijt} = \left(\gamma_0{}^{(y)} + r_{0ij}^{(y)}\right) + occ_t\left(\gamma_1{}^{(y)} + r_{1ij}^{(y)}\right) + \varepsilon_{ijt}{}^{(y)}$$

$$spending_{ijt} = \left(\gamma_0{}^{(x)} + r_{0ij}^{(x)}\right) + occ_t\left(\gamma_1{}^{(x)} + r_{1ij}^{(x)}\right) + \varepsilon_{ijt}{}^{(x)}$$
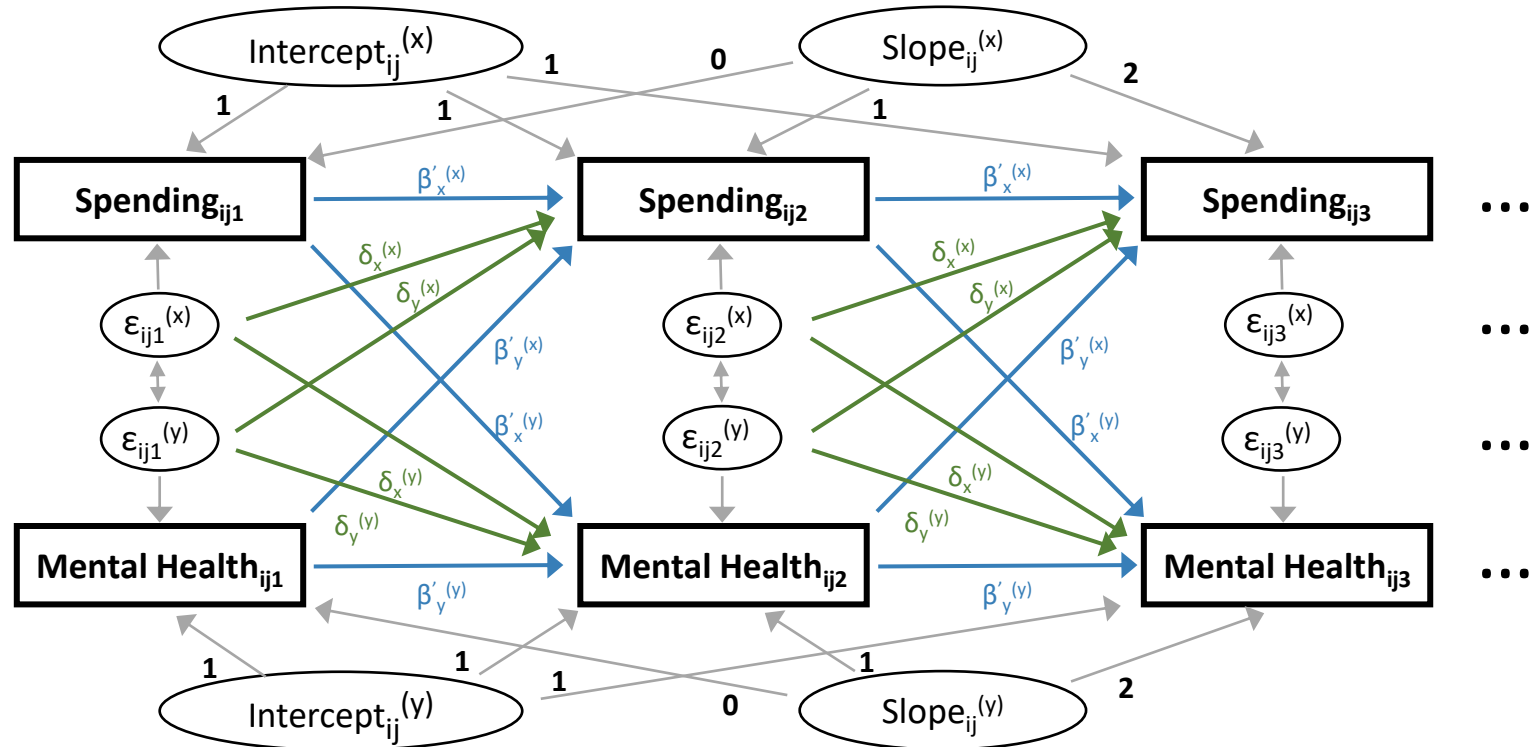
Introducing Short-Run Effects

$$mental\_health_{ijt} = \left(\gamma_0^{(y)} + r_{0ij}^{(y)}\right) + occ_t\left(\gamma_1^{(y)} + r_{1ij}^{(y)}\right) + \varepsilon_{ijt}^{(y)} + \boldsymbol{\delta_y^{(y)}}\boldsymbol{\varepsilon_{ij,t-1}}^{(y)} + \boldsymbol{\delta_x^{(y)}}\boldsymbol{\varepsilon_{ij,t-1}}^{(x)}$$

$$spending_{ijt} = \left(\gamma_0^{(x)} + r_{0ij}^{(x)}\right) + occ_t\left(\gamma_1^{(x)} + r_{1ij}^{(x)}\right) + \varepsilon_{ijt}^{(x)} + \underbrace{\boldsymbol{\delta_x^{(x)}}\boldsymbol{\varepsilon_{ij,t-1}}^{(x)} + \boldsymbol{\delta_y^{(x)}}\boldsymbol{\varepsilon_{ij,t-1}}^{(y)}}_{\text{Short-Run}}$$

Introducing Long-Run Effects

$$mental\_health_{ijt} = \left(\gamma_0^{(y)} + r_{0ij}^{(y)}\right) + occ_t\left(\gamma_1^{(y)} + r_{1ij}^{(y)}\right) + \varepsilon_{ijt}^{(y)} + \boldsymbol{\delta_y^{(y)}\varepsilon_{ij,t-1}^{(y)}} + \boldsymbol{\delta_x^{(y)}\varepsilon_{ij,t-1}^{(x)}} + \boldsymbol{\beta_y'^{(y)}mental\_health_{ij,t-1}} + \boldsymbol{\beta_x'^{(y)}spending_{ij,t-1}}$$

$$spending_{ijt} = \left(\gamma_0^{(x)} + r_{0ij}^{(x)}\right) + occ_t\left(\gamma_1^{(x)} + r_{1ij}^{(x)}\right) + \varepsilon_{ijt}^{(x)} + \boldsymbol{\delta_x^{(x)}\varepsilon_{ij,t-1}^{(x)}} + \boldsymbol{\delta_y^{(x)}\varepsilon_{ij,t-1}^{(y)}} + \boldsymbol{\beta_x'^{(x)}spending_{ij,t-1}} + \boldsymbol{\beta_y'^{(x)}mental\_health_{ij,t-1}}$$

Short-Run   Long-Run
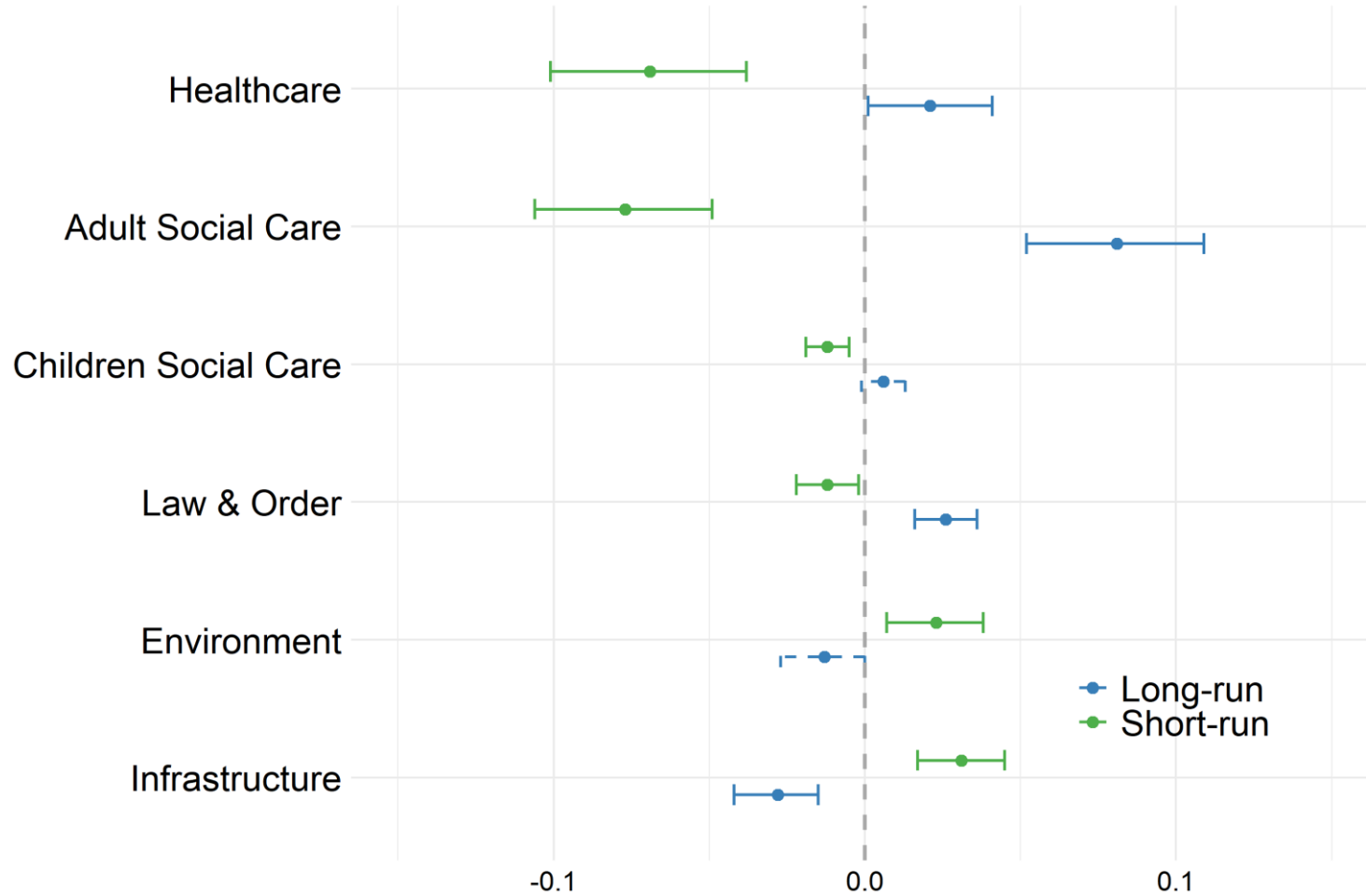
RESULTS

SAMHI
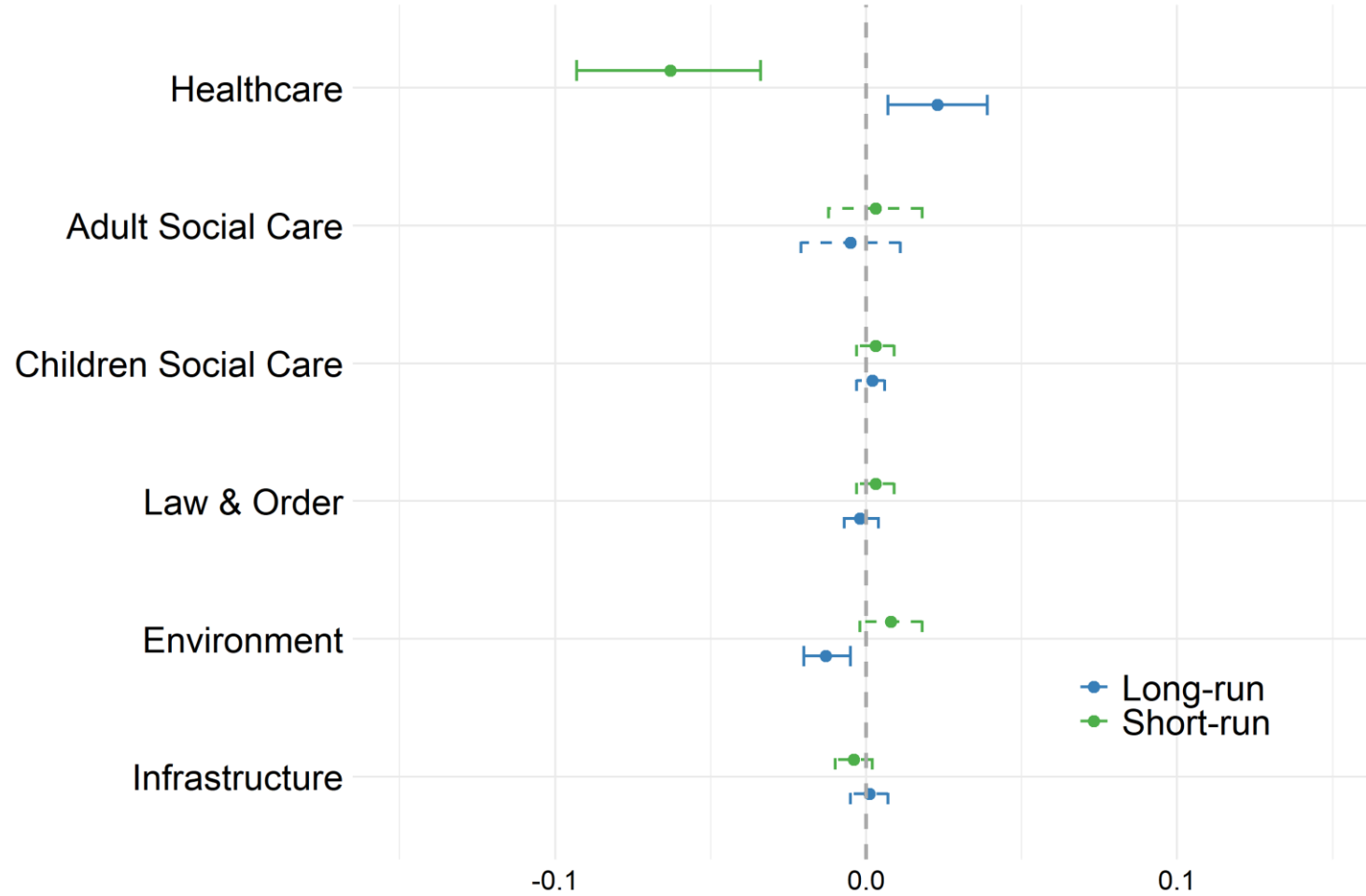## SD Change from a 10% Increase in Spending
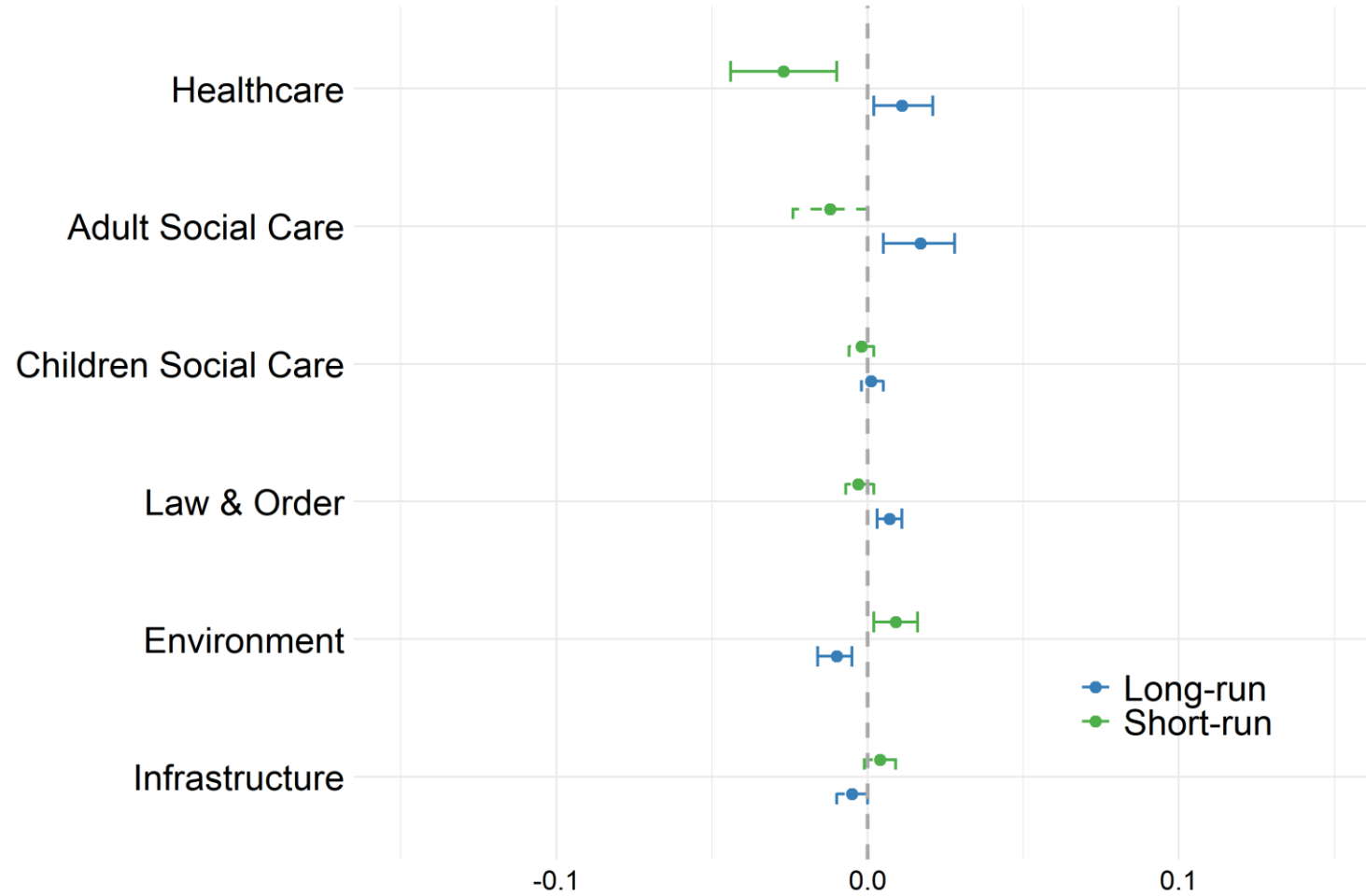
Incapacity Benefits
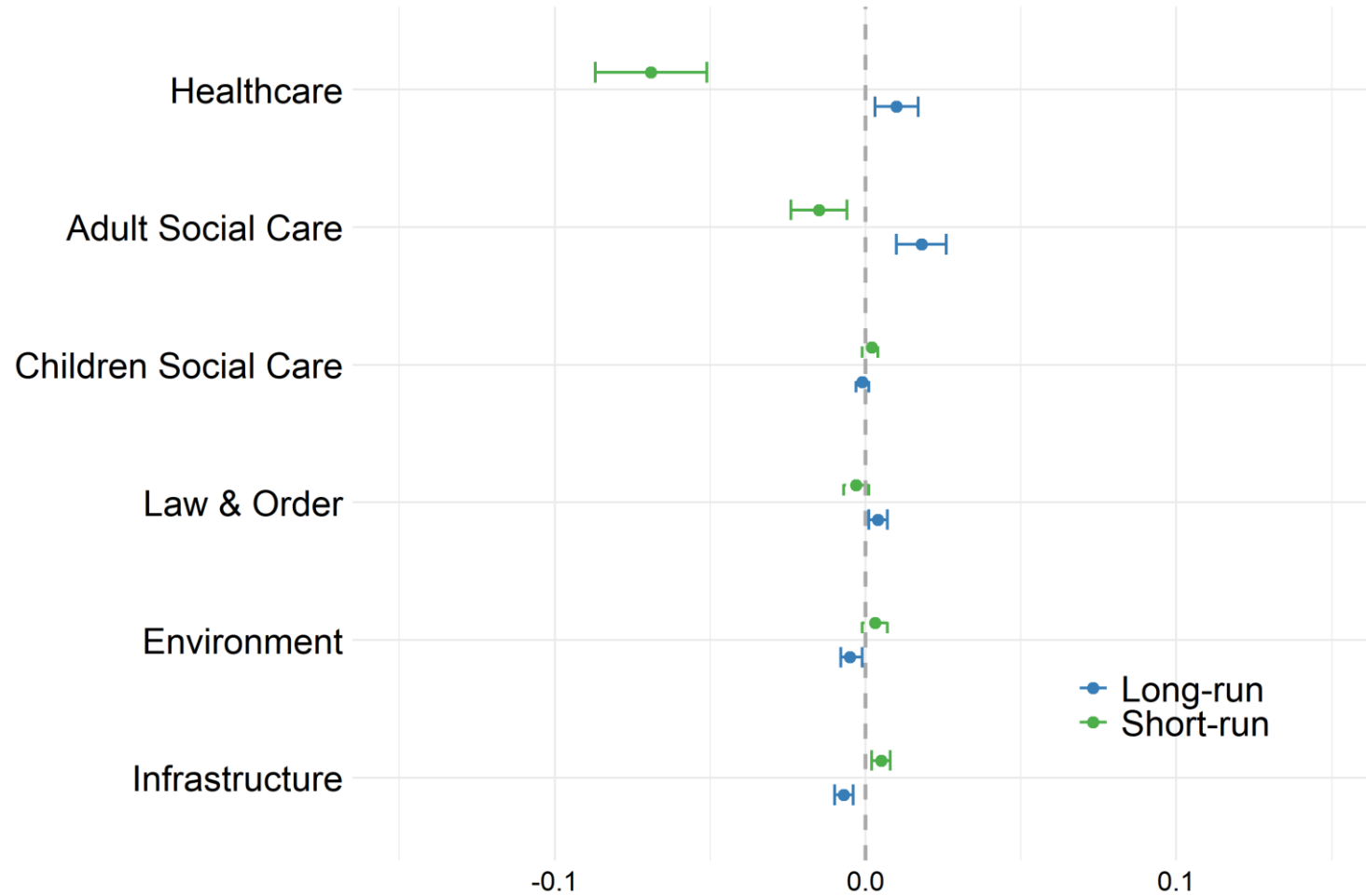## SD Change from a 10% Increase in Spending

Depression
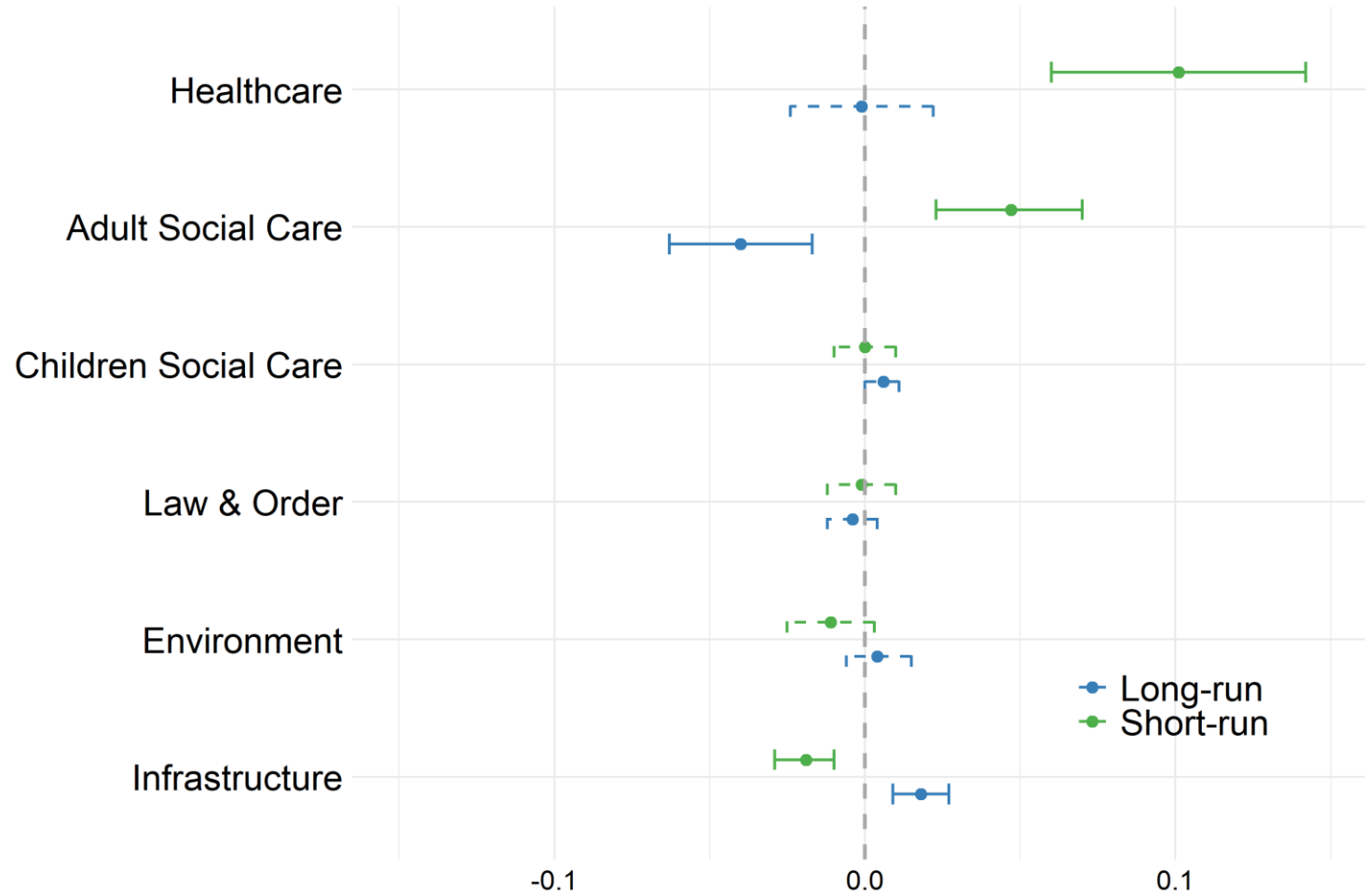SD Change from a 10% Increase in Spending

Antidepressants Use
SD Change from a 10% Increase in Spending

Hospital Admission
SD Change from a 10% Increase in Spending

DISCUSSION

Discussion & Conclusion

Non-health spendings:

- Evidence of certain effectiveness, but only in the short-run

- Exceptions: *law & order* for preventing employment disability and *infrastructure* for preventing psychiatric hospitalisations

Health-related spendings:

- Positive long-run impacts on mental health seemed relatively strong, but were diminished by the short-run negative impulses

- *Adult social care* and *healthcare* appeared unproductive in the long term for preventing hospitalisations

Policy Implications

- A need to re-evaluate how local governments spend their financial resources

- A need to identify and mitigate short-term adverse impacts of expenditures on mental health

- Policymakers will also gain from carefully considering the specific manifestations of mental health and tailoring spending efforts accordingly

- Overall, these issues may not be surprising for period of austerity

Thank you for your attention