Health in All Polices Approach:
A Dynamic Modelling of Social Policies' Effect on Mental Health

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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)
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
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_{ij_1}  Spending_{ij_2}  Spending_{ij_3}  ...

Mental Health_{ij_1}  Mental Health_{ij_2}  Mental Health_{ij_3}  ...

Introducing Random Effects

\[
\text{mental_health}_{ijt} = (\gamma_0^{(y)} + r_0^{(y)}(y)) + \text{occ}_t (\gamma_1^{(y)} + r_1^{(y)}(y)) + \epsilon_{ijt}^{(y)}
\]

\[
\text{spending}_{ijt} = (\gamma_0^{(x)} + r_0^{(x)}(x)) + \text{occ}_t (\gamma_1^{(x)} + r_1^{(x)}(x)) + \epsilon_{ijt}^{(x)}
\]
Introducing Short-Run Effects

\[
\text{mental\_health}_{ijt} = (\gamma_0(\gamma) + r_{0ij}^{(\gamma)}) + \text{occ}_t \left( \gamma_1(\gamma) + r_{1ij}^{(\gamma)} \right) + \epsilon_{ijt}(\gamma) + \delta_{y}(\gamma) \epsilon_{ij,t-1}(\gamma) + \delta_{x}(\gamma) \epsilon_{ij,t-1}(x)
\]

\[
\text{spending}_{ijt} = (\gamma_0(\alpha) + r_{0ij}^{(\alpha)}) + \text{occ}_t \left( \gamma_1(\alpha) + r_{1ij}^{(\alpha)} \right) + \epsilon_{ijt}(\alpha) + \delta_{x}(\alpha) \epsilon_{ij,t-1}(x) + \delta_{y}(\alpha) \epsilon_{ij,t-1}(\gamma)
\]
Introducing Long-Run Effects

\[
\text{mental\_health}_{ijt} = (\gamma_0(y) + r_{0ij}^{(y)}) + \text{occ}_t (\gamma_1(y) + r_{1ij}^{(y)}) + \epsilon_{ijt}^{(y)} + \delta_y^{(y)} \epsilon_{ijt-1}^{(y)} + \delta_x^{(y)} \epsilon_{ijt-1}^{(x)} + \beta_y^{(y)} \text{mental\_health}_{ij,t-1} + \beta_x^{(y)} \text{spending}_{ij,t-1}
\]

\[
\text{spending}_{ijt} = (\gamma_0(x) + r_{0ij}^{(x)}) + \text{occ}_t (\gamma_1(x) + r_{1ij}^{(x)}) + \epsilon_{ijt}^{(x)} + \delta_x^{(x)} \epsilon_{ijt-1}^{(x)} + \delta_y^{(x)} \epsilon_{ijt-1}^{(y)} + \beta_x^{(x)} \text{spending}_{ij,t-1} + \beta_y^{(x)} \text{mental\_health}_{ij,t-1}
\]

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 & 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