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| **Assessed Coursework Coversheet** | | | | | | | | | | |
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| Student ID Number: | 2 | | 0 | 1 | 5 | 9 | 6 | 9 | 1 | 8 |
| Module Code: | LUBS43001 | | | | | | | | | |
| Module Title: | Economics Research Methods | | | | | | | | | |
| Module Leader: | Dr Peter Howley | | | | | | | | | |
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The Preston Model: A difference-in-differences analysis to verify the theoretical underpinnings of Community Wealth Building

# Background

The city of Preston, prior to their implementation of Community Wealth Building (CWB) – the precise nature of which is now known as the Preston Model (Preston City Council, 2019) – suffered from a variety of detrimental health and economic problems.

## What Problems was Preston Experiencing?

In 2010, 2-3 years prior to the implementation of CWB, the median Lower layer Super Output Area (LSOA) (an LSOA is a collection of typically four or five Output Areas (OAs) which are the lowest level of geographical area for census statistics; an LSOA will typically contain 1,000-1,300 residents (Office for National Statistics, 2023)) in Preston ranked in the bottom 40% on the Index of Multiple Deprivation (IMD), as seen in Table 1 and Table 2.

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Table 1 - Distribution of the UK’s Index of Multiple Deprivation scores as deciles, where a higher score indicates a higher level of relative depravation.

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Table 2 - Distribution of Preston’s Index of Multiple Deprivation scores as quartiles.

Preston also had an unusually high rate of male suicidality, self-harm-related hospital admissions, eating disorders, etc., for its local area in 2012 (Lancashire JSNA, 2012, pp. 13, 24, 39). Its most deprived districts also featured in the bottom quintile nationally for child wellbeing (*ibid*, p. 58). Economic problems were further exacerbated when the £700mn Tithebarn regeneration project, proposed in 2005 and meant to bring investment and new jobs to the area, was scrapped in 2011 (Preston City Council, 2019). The local government decided to look towards Community Wealth Building to provide employment to ease poverty and other health issues.

## What is Community Wealth Building (CWB)?

CWB aims to keep local wealth from leaving the city and maximise the social value of what that wealth can produce. The city council forms an “anchor network” with “anchor institutions” where all parties agree to uphold certain key values (Preston City Council, 2019, p. 8):

1. Paying a living wage,
2. Progressive procurement,
   1. Contracts awarded to firms should ideally be split up to be available to SMEs.
   2. Procurement should begin locally.
3. Considering not just the economic but also social value of employment, investments, and land use.

The term “anchor institution” refers to large-scale, local employers who are “often tied to a place by their mission, physical assets and local relationships.” (Preston City Council, 2019, p. 10) Examples can include local authorities, NHS trusts, or large local businesses (*ibid*, p.10).

After an initial investigation in 2012, it was discovered that, of the £750mn spent by anchor institutions in Preston, only “5% of it was spent with organisations based in the Preston boundary, with 39% spent with organisations based in wider Lancashire.” (*ibid*, p.11) In total, over $458mn was leaving the Lancashire economy. By 2016/17, after the implementation of CWB by the Preston City Council and Lancashire City Council, locally retained spending in Preston increased to 18.2% and in Lancashire increased to 79.2% (*ibid*, p.11).

New anchor networks have been established by multiple other city councils, including Birmingham, Oldham, Salford, Kirklees, Islington, Enfield, Southampton, Wakefield, Bristol (Preston City Council, 2019) and Leeds (Leeds City Council, n.d.).

## Has the Preston Model helped Preston?

One paper, published in 2023 by Rose et al., has examined the Preston Model using a difference-in-differences analysis coupled with a synthetic control methodology. It found that Preston’s CWB has had statistically significant, positive effects on antidepressant prescriptions, depression diagnoses, life satisfaction scores, and median wages when compared to control cities. However, most of these parameters did not display statistically significant difference from the control pool in the final year of analysis, 2019, seen in Figure 1 and Figure 2.

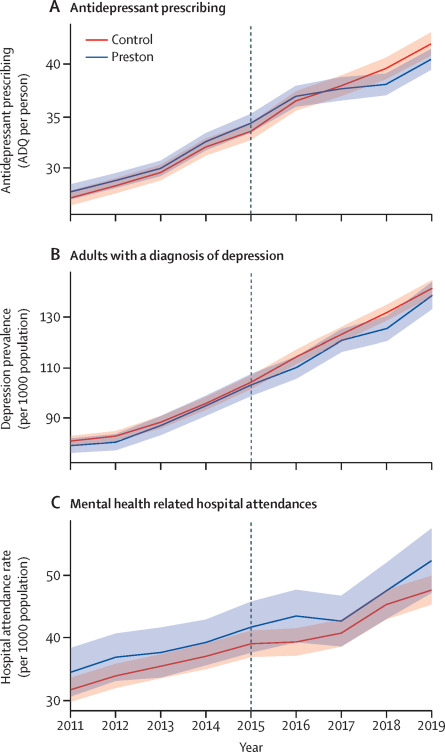


Figure 1 - (Rose, et al., 2023)

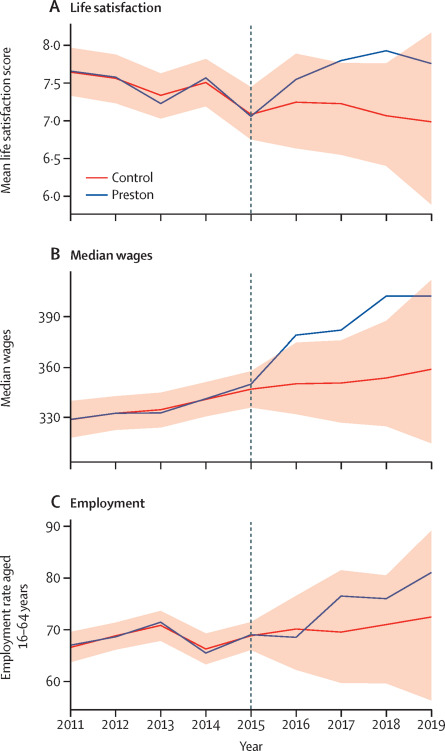


Figure 2 - (Rose, et al., 2023)

Furthermore, Whyman (2021) has published literature justifying the theoretical economic foundations of the Preston model, arguing that CWB falls within existing British values being pushed by Westminster, e.g., Whyman (2021, p. 137) suggests that CWB should theoretically enhance competition, stamp out rent-seeking and move the market closer to the social optimum. Whyman (2021, p. 142) also suggests that the evidenced economic impacts CWB has had, namely the growth of local procurement in Preston and Lancashire, should be indirectly corroborated by factors such as “growth rates, employment opportunities and human capital investment.”

# Rationale

As it stands, the existing scope of research is too narrow: such a self-admittedly large shift in not only the role of local government, but also local private institutions and businesses, ought to be carefully considered. Moreover, no potential negative effects that critics associate with CWB have been analysed, e.g., increased costs, reduced competition, rent-seeking, etc. Even if, as Whyman (2021, p. 137) claims, the charge of local protectionism is “certainly not a straightforward conclusion to reach,” the fact remains that local firms, given special priority over distant firms by virtue of their geographic location, extract economic rent (Fried & Bebchuk, 2004, p. 62). High rent tends to inhibit growth and innovation while increasing prices due to a misallocation of resources (Dabla-Norris & Wade, 2001; Murphy, Shleifer, & Vishny, 1993). This fact, coupled with the contentious view of the economic foundation of the Preston Model (The Economist, 2017) indicates that: first, further investigation is needed to specifically measure the veracity of Whyman’s (2021) theoretical foundations and predictions; second, further investigation is needed to provide policy evaluations: if CWB harms the local economy, councils who have adopted CWB – and their residents – may be paying for economic rents, missing out on alternatives which could have offered a better chance at alleviating hardships.

# Methodology

## Conceptual Framework

The outcomes I will be testing for statistical significance are:

* GDP per capita,
* Rent as a proportion of GDP,
* UK Competitiveness Index,
* Council expenditure.

A difference-in-differences (DiD) methodology will be used to compare how the different outcomes stated above have been affected by CWB in Preston, with a separate regression model for each outcome. DiD uses a control to predict, to a reasonable degree of certainty, what would have happened in the treatment city had the intervention not taken place; this unobserved alternative-reality is known as the *counterfactual*. Knowing this we can measure the intervention effect.

The regression model I’ll be using is a DiD multi-variate regression model, following the example set by Rose et al. (2023, Appendix, p. 8), Quan & Duan (2023, p. 7), and Wetwitoo & Kato (2019, p. 324). It is formulated as follows:

Where:

* is the outcome in city *i* at time *t* – this includes all outcomes mentioned prior.
* is a dummy variable taking the value 1 for Preston and 0 for all other cities.
* is a dummy variable taking the value 1 for time periods after 2015.
* indicates the change in outcome in Preston relative to the change in outcome in the control areas – this is also known as the DiD parameter (Rose, et al., 2023, Appendix, p. 8)

A diagram of a graph

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Figure 3 – Own illustration. Based on (Statistical Modeling and Forecasting, 2022).

Figure 3 illustrates how captures the effect size in the DiD regression. Only two periods are being modelled as this yields more consistent results than extending the analysis to multiple years (Wetwitoo & Kato, 2019, p. 324).

The null hypothesis is:

*H0: CWB has not affected Preston w.r.t. the outcomes detailed*

The alternate hypothesis will be:

*H1: CWB has affected Preston w.r.t. the outcomes detailed.*

Results of the regression will be seen as significant where . The p-value is determined by the proximity of the treatment to the counterfactual, post-treatment - calculating the standard deviation of the counterfactual will be discussed later.

The advantage of a DiD analysis over a different sort of natural experiment, such as a before-and-after (BaA) analysis, is that a more realistic counterfactual can be approximated. A BaA analysis creates a counterfactual based on previous trends, and as such would have difficulty capturing a global economic shock, possibly misattributing this to the intervention effect of the treatment. This dichotomy is shown in Figure 4 and Figure 5.

A diagram of a treatment cost

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Figure 4 – BaA analysis of treatment with global shock

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Figure 5 – DiD analysis of treatment with a global shock. The intervention effect is smaller than in Figure 4.

So, while DiD can produce a more accurate picture of the intervention effect, constructing the counterfactual requires finding a control which has parallel trends to the treated individual/group, and which reacts the same way to shocks. To generate a suitable control, I will be employing the synthetic control method proposed by Abadie (2021) and utilised by Rose et al. (2023, p. e405) in their original CWB study.

The method involves casting an initial wide-net to create a large “donor-pool” (Abadie, 2021, p. 394) made up of various cities. Each donor city will be assigned a weight based on a set of observable predictors, a predictor being a metric which is highly associated with an outcome; for example, Abadie (2021, p. 399) posits trade openness, inflation rate, industry share, schooling, and investment rate as predictors for GDP per capita. Each of these predictors are also assigned a weight, . All weights are generated using pre-treatment data. A similarity with Preston on weightier predictors will increase more than similarities on lighter predictors. Once all city weights have been assigned, a weighted mean and variance is calculated from the donor-pool to produce a synthetic control. In the post-treatment period, it is this synthetic control, i.e., synthetic Preston, which we compare the real Preston against. for a successful synthetic control implementation, indicating low probability of selection bias (Wetwitoo & Kato, 2019, p. 324) possibly indicating that the parallel trends assumption is correct (Abadie, 2021, p. 397).

## Data collection and outcome calculation

Data collection and calculations will be focused on:

1. Creating an adequate donor-pool,
2. Associating a set of predictors with each stated outcome,
3. Measuring the different outcomes, for synthetic and real Preston, for all time periods.

### Creating the donor-pool

To create the initial donor-pool, Rose et al. (2023, p. e405) grouped all lower tier local authorities in northern or central England which, pre-treatment:

* Have a population between 90,000-250,000,
* Are within the 25% most deprived local authorities,
* Are not already working on a CWB programme.

This paper will use the same donor-pool, because, as seen in figure 4, Rose et al’s (2023, p. e408) synthetic control lines up very closely with Preston pre-treatment, indicating a low .

The donor-pool has 16 local authorities, shown in Table 3 and Figure 6.

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Table 3 (Rose, et al., 2023, Appendix, p. 9)

A map of england with red and blue spots

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Figure 6 – LA stands for Local Authority (Rose, et al., 2023, Appendix, p. 9)

### Predictors

To create the predictors for each outcome, I will take associations from existing economic theory and econometric literature. The layout will be as follows:

#### Outcome

*Paper associating outcome with predictors*

|  |  |
| --- | --- |
| Predictor | Source |
|  |  |

#### GDP per capita

(Abadie, 2021, p. 399)

|  |  |
| --- | --- |
| Predictor | Source |
| Inflation rate | Available on a per city basis from (Centre for Cities, 2023) |
| Schooling | Available on per city basis (Centre for Cities, 2024). |
| Investment rate | (Eurostat, 2023). Gross fixed capital formation data is available from the Office for National Statistics (2023) and gross value added data is available on a per city basis from most local authorities (Lancashire City Council, 2017). |

Table 4

#### Rent as a proportion of GDP

(Dabla-Norris & Wade, 2001)

A close-up of a grey box

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#### Competitiveness

(Quan & Duan, 2023, p. 5)

|  |  |
| --- | --- |
| Predictor | Source |
| Gross Value Added | *See GDP per capita Investment Rate* |
| Operating profit | . *For GVA see row above. For investment see GDP per capita Investment Rate.* Employee compensation data per city is publicly available (Office of National Statistics, 2024; Office for National Statistics, 2018). |
| Population | Available on per city basis (Centre for Cities, 2024). |
| Employment | Available on per city basis (Centre for Cities, 2024). |

Table 6

#### Council Expenditure

(Albassam, 2020, p. 8)

|  |  |
| --- | --- |
| Predictor | Source |
| Economic Complexity | Economic complexity data can be accessed on a per city basis from Rodrigues & Breach (2021) and Mealy & Coyle (2019). |
| Human Development | *Unfortunately, human development numbers for Local Authority Units are not available, so council expenditure will only use two predictors.* |
| Unemployment rate | Available on per city basis (Centre for Cities, 2024). |

Table 7

### Outcomes

GDP per capita and UK competitiveness index will require very little calculation, as these figures are easily available and accessible in terms of local authorities (Office of National Statistics, 2024; Centre for International Competitiveness). Collecting council expenditure information is also trivial – it involves procuring the statement of accounts for Preston and each control city, for each of the years being analysed. This is publicly available information which every local authority must publish (Local Government Association, 2024).

I will employ the methodology laid out by Stemerding (2023) to calculate a city’s economic rent as a proportion of GDP. Stemerding’s (2023) method uses surplus cash flow as a proxy for rent. Surplus cash flow (SCF) is the difference between your actual return on investment and the normal return on investment, i.e.:

To calculate the normal return on investment (nROI), Stemerding (2023, p. 8) utilises the Capital Asset Pricing Model (CAPM), introducing *beta,* i.e., how strongly a firm’s returns correlate with the business cycle, and introducing the risk-free rate (RFR), i.e., the safest return on investment, represented with a 10-year government bond (Stemerding, 2023, p. 8). The nROI is simply:

I have collected all the variables necessary and corresponding data sources in Table 8.

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Table 8

# Strengths and Limitations

DiD analyses do suffer from unique drawbacks; for example, unobserved or unobservable differences between individual cities may mean that even with perfect pre-treatment parallel trends, serious bias could exist in post-treatment analyses. There are ways to control for these differences, which are commonly known as fixed effects; however, due to unfamiliarity with the methodology and time constraints I have not implemented them. A BaA could, conversely, control for fixed effects more easily as many unobserved values will stay constant in the same city.

Synthetic controls also presents some unique strengths and challenges. On the one hand, it presents clear advantages over other sorts of counterfactual generation, such as nearest neighbour or Propensity Score Matching (PCM), because the pre-treatment trends can be finetuned as to be sufficiently parallel (Abadie, 2021, p. 398). Furthermore, this finetuning eases the need to introduce controls in the DiD regression model as predictors of the outcome are already being controlled for. On the other hand, this finetuning may lead to high weights in some donor units leading to biased results. The many different methodologies for assigning predictor-weights also introduces possibilities for unintended bias. Robustness tests are typically run to check for unintended introduction of bias, and unfortunately the lack of these tests is likely the biggest weakness of this methodology.

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