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EXTENDED ABSTRACT

UK regional urbanization patterns: Implications for inter-regional inequality

André Carrascal-Incera,

University of Birmingham, City REDI - Birmingham Business School, Ash House,
Edgbaston, B15 2TT, Birmingham, UK, a.carrascalincera@bham.ac.uk

Diana Gutiérrez-Posada,

University of Birmingham, City REDI - Birmingham Business School, Ash House,
Edgbaston, B15 2TT, Birmingham, UK, d.gutierrezposada@bham.ac.uk

Stephan Weiler,

Colorado State University, Regional Economic Development Institute (REDI@CSU),
Fort Collins, CO 80523-1771, USA, stephan.weiler@colostate.edu

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Abstract:

I. Introduction

The UK is a country where more than 60% of the population live in regions with a density of more than 350 inhabitants per square kilometre. In the last 15 years – from 2002 to 2017 – this urbanization process has accelerated, showing higher population growth rates for larger and denser agglomerations. Furthermore, in the last 5 years the speed of this process has further increased. In the period 2002-2012, the UK's urban population grew at an annual pace 1.32 times higher than the rural one, accelerating to a pace 2.20 times faster from 2012 through 2017.

Economic activity has similarly accelerated in urbanized areas, creating natural questions of the implications for such divergent patterns on inter-regional inequality, particularly between more urbanized versus less urbanized areas. In particular, do such population shifts into urban areas themselves reinforce and exacerbate diverging regional growth trajectories by shifting the aggregate patterns of consumption that further advantage urbanized sectors? In that sense, the comparative characteristics of regions could be entrenching inter-regional inequalities, creating further incentives for population movement and growth towards urban areas, thus generating a reinforcing cycle of differential growth alongside growing inequality between rural and urban areas.



There is a set of advantages for why people choose to move to larger cities already studied in the related literature such as higher expected wages, better searching and matching processes linked to a larger labour market, further access to amenities, among others. However, instead of evaluating the *causes* of urbanization, this paper assesses one of the main potential economic *consequences* of this demographic trend. In particular, we focus on the fact that urban and rural populations clearly differ in their lifestyles and, consequently, in their consumption patterns. According to the Living Costs and Food Survey data of 2017, while urban populations spend significantly more on Housing, Fuel and Power as well as in Clothing and Footwear; rural households spend more on Transport. At the same time, urban regions depend on the primary products and energy produced in rural areas, while cities are mainly specialized in the provision of services. We can further control for differences in levels and sources of income, given divergences in rural and urban regions in terms of wage/salary, and asset-based income flows.

As a first approximation to this issue, we extend the SEIM-UK multiregional model, including different types of households and workers in a Miyazawa fashion, to account for the main employment, output, and value-added effects that urbanization process has on the different 37 UK regional economies. We group the NUTS-2 regions in four different classes depending on their population density: rural, predominantly rural, predominantly urban and urban.

II. Motivation

Divergent patterns of regional growth have long been noted in the United States. These divergences are regaining scholarly and popular attention more recently as divergences have become both clearer economically and have had significant political ramifications. The American 2016 presidential election was largely split along urban and rural lines, with the latter areas – which have outsized weight in the Electoral College system – voting strongly in favour of the winning candidate based on decades-long frustration with their increasingly lagging economic situations. Crystallizing research (e.g. Chetty et al., 2014; Chetty et al., 2018) is clearly demonstrating that the widening gap in wealth and income highlighted by Piketty's ground-breaking *Capital in the Twenty-First Century* monograph (Piketty and Goldhammer, 2014) at the individual level holds even more strongly at the regional level. These differences are particularly pronounced between rapidly-growing larger urban areas and economically stagnating rural regions, often literally bordering each other. Where you are born fundamentally determines your ultimate economic situation far more strongly than previously understood.

Economic dynamism is a key aspect that can help explain inter-regional differences in economic growth prospects. This dynamism systematically differentiates urban and rural areas trajectories, with these differences themselves widening the inter-regional growth gap in the United States. The vast majority of job and income creation in the US come from startups, employer establishments younger than five years with less than 10 employees. Dynamism is a product of both business openings as well as closures. The former is unsurprising, but the informational content from even business closures has been shown empirically to enhance longer-term regional job growth prospects (Bunten et al, 2015). This feature of dynamism reflects the impact of geographical informational



asymmetries, where entrepreneurial ecosystems benefit from the deeper information set provided by wider and deeper patterns of business openings and closures.

The key to the implications for growth trajectories is that both business openings and closures are closely correlated and highly persistent within regions. Game-theoretic (Weiler, 2000) and social-network (Conroy and Weiler, 2019) methodologies demonstrate that there are multiple regional entrepreneurial equilibria, ranging from low-dynamism business births and deaths to high dynamism churning of such openings and closures. Even accounting for the larger populations of urban areas, the per capita level of both business births and deaths are significantly higher in urban areas. In turn, higher dynamism leads to greater job growth, *ceteris paribus*. Thus, urban areas' relatively stable equilibrium of high dynamism leads to improved job creation, incentives for population movements to such areas, further enhancing business dynamism.

Furthermore, there is evidence that sectoral concentrations in dynamism significantly affect growth prospects, with again inherent advantages to those sectors most concentrated in urban areas. The effect of identical openings and closings resonate more strongly, effectively, and widely in urban sectoral contexts, which have the further advantage of Marshallian deep labour markets that allow workers greater flexibility and options for both employment self-employment. In contrast, the informational echoes in rural areas are more constrained, as the utility of information sets are highly localized in terms of both supply- and demand-side revelations. In this sense, the sectoral context matters more in urban areas as well, since births and deaths reveal more in non-tradable sectors that illuminate both demand- (via local goods/services markets) and supply-side (via local factor markets) characteristics. Urban areas have higher abilities to recycle local expenditures on non-tradables, while also having larger markets for precisely such goods and (especially) services, leading to the classic divergence between rural and urban multipliers. Rural areas are more reliant on tradables for inflows of income, but dynamism only reveals supply-side characteristics for such goods/services given the increasingly global nature of underlying market demand. Thus, even given the same amount of dynamism, urban areas would still have inherent advantages on the sectoral level for informational revelation.

In this paper, we focus on a complementary source of urban and rural growth divergences, namely the understudied consumption channel for such inter-regional growth prospects, leveraging the differences in consumption patterns between regions. If urbanization is accelerating and urban consumption patterns themselves reinforce urban-oriented sectors, urbanization itself will reinforce the rapidly-evolving evidence for widening disparities in economic opportunity and outcomes.

III. Modelling Approach

Methodologically speaking, extended Input-Output (I-O) models provide an excellent systemic framework to understand how the income distribution work and why regional disparities are so difficult to counteract. This type of general equilibrium models shows a picture of the economy where rural and urban households are endogenous, accounting for the interaction between the economic institutions and the industries involved in the production process. In this first approach, we close the circular flow of income



regarding factorial income (Pyatt, 2001) to see how the system allocates the main direct, indirect and induced effects of the urbanization process.

By means of a Miyazawa decomposition (Miyazawa, 1976; Miller and Blair, 2009), among other results, we are able to show the interrelational income multipliers, i.e. the total increase in the income of one group that results from expenditure of an additional unit of income by another group (Kim and Hewings, 2019). This relation between different household groups illustrates the income formation impacts across UK regions, providing a first look to the expected urban/rural asymmetries (see Hewings et al. (2001) and Hewings and Parr (2007) for an example of the Chicago metropolitan area).

Miyazawa models (Miyazawa and Masegi, 1963; Miyazawa, 1976) address the problem of modeling the interactions between household categories among themselves and among the rest of the economy. As an alternative to the standard IO model, Miyazawa proposes to treat household consumption and their factor remuneration endogenously — i.e. not accounting for income transfers between institutions (Pyatt, 2001)—. That is, these activities are not assumed to be exogenous anymore, but are explained as a function of other variables. He thereby assumes that households can be sub-divided in q households groups by regions and that full information exists on workers consumption and payments patterns in each income group.

This leads to the expanded IO system

$$(1) \begin{pmatrix} \mathbf{x} \\ \mathbf{y} \end{pmatrix} = \begin{pmatrix} \mathbf{A} & \mathbf{C} \\ \mathbf{V} & \mathbf{0} \end{pmatrix} \begin{pmatrix} \mathbf{x} \\ \mathbf{y} \end{pmatrix} + \begin{pmatrix} \mathbf{f}^* \\ \mathbf{g} \end{pmatrix}$$

Here \mathbf{x} again stands for the gross output vector, \mathbf{y} is the vector of total income per income group, \mathbf{f}^* the vector of final demand excluding the q endogenized households categories, and \mathbf{g} a vector of exogenous income (if any) for the income groups. Solving for $\begin{pmatrix} \mathbf{x} \\ \mathbf{y} \end{pmatrix}$ we have

$$(2) \begin{pmatrix} \mathbf{x} \\ \mathbf{y} \end{pmatrix} = \begin{pmatrix} \mathbf{I} - \mathbf{A} & -\mathbf{C} \\ -\mathbf{V} & \mathbf{I} \end{pmatrix}^{-1} \begin{pmatrix} \mathbf{f}^* \\ \mathbf{g} \end{pmatrix}$$

Again following Miyazawa decomposition, we now simplify the notation and write $\mathbf{L} = \mathbf{VBC}$ and $\mathbf{K} = (\mathbf{I} - \mathbf{L})^{-1} = (\mathbf{I} - \mathbf{VBC})^{-1}$, where Miyazawa identifies \mathbf{VBC} as the matrix of inter-income-group coefficients and the inverse $(\mathbf{I} - \mathbf{VBC})^{-1}$ as the interrelational income multiplier matrix. This results in the familiar equation

$$(3) \begin{pmatrix} \mathbf{x} \\ \mathbf{y} \end{pmatrix} = \begin{pmatrix} \mathbf{B}(\mathbf{I} + \mathbf{CKVB}) & \mathbf{BCK} \\ \mathbf{KVB} & \mathbf{K} \end{pmatrix} \begin{pmatrix} \mathbf{f}^* \\ \mathbf{g} \end{pmatrix}$$

Compared to the standard IO model of section 2, the addition of the **BCKVB** component is a significant step towards further endogenization of an economy's main variables. The interpretation of the additional component is straightforward. Exogenous final demand will generate (through **B**) direct and indirect changes in production. The product **VB** provides the direct and indirect income that will be generated, and the product **CVB** tells us how that income is spent, via connections brought about by **K**, the interrelational income multiplier that indicates how income change in one household group will generate additional income in other groups. The total impact then is



BCKVB. In this way, decomposing the Miyazawa approach provides a ‘walk through the system’, comparable to the $M_3M_2M_1$ decomposition of SAMs by Pyatt and Round (1985).¹

Additionally, the **K** matrix shows very interesting insights on the relationships between the endogenous institutional sectors considered. In the previous literature, it has been used to present the income generation and distribution between households of different ages (Kim and Hewings, 2019), but also of different regions (Hewings et al., 2001; Hewings and Parr, 2007), revealing important asymmetries that otherwise would remain hidden.

A slightly different set of extended I-O models are the Batey-Madden ones (Batey and Madden, 1981; Batey and Weeks, 1989; Batey, 2018). They allow us to simulate how the different parts of the system are going to be affected due to the increase in population in urban areas. This particular model works under a hybrid approach, where output and consumption are defined in monetary terms and the labour market is expressed in persons, including a constraint for the total labour supply in each different region.

IV. Implications

Through this paper’s analyses, this research will identify and empirically assess the potential ramifications of the urbanization trends in the UK through the generally-ignored channel of shifting aggregate consumption patterns and their implications for widening already-disparate economic prospects for urban and rural regions. CGE modelling is especially well-suited to such analyses, offering longer-term comparisons of inter-regional economic situations under a variety of different scenarios, founded in this case on consumption but extending into the effects of varying elasticities for sectoral impacts, household choice patterns, and demographic structures. The results should be of interest not only to scholars of regional inequalities, but also to policymakers’ understanding of reinforcing causations for differing regional growth trajectories due to the potentially important implications of consumption patterns in determining longer-term economic prospects.

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