

# Characterising high-speed broadband availability across Ireland

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# 1 Outline

1/19

- 1 Motivation
- 2 Empirical Strategy
- 3 Results
- 4 Conclusions

Benefits of reliable and fast broadband in a post-Covid world increasingly apparent.

As essential goods and services are increasingly delivered in an online format (e.g. telemedicine, education) it is clear that high speed broadband must be universally available.

- ▶ maximise network effects
- ▶ prevent exclusion of individuals as fully participating members of society

Enshrined in EU Gigabit Strategy policy objective that by the year 2025;

- ▶ all European households have access to connectivity  $\geq 100$  Mbps,

## 1 Motivation II

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Despite consensus regarding the importance of universally available high speed broadband, huge variation in availability observed across populations.

Due to economies of density in high speed broadband infrastructure, concerns predominantly arise with respect to regional differences in availability; often termed the *urban-rural* digital divide.

However, characterising differences *within* rural (urban) areas, remains a relatively underexplored strand of the broadband availability literature.

Important to identify whether *within* areas with low connectivity, vulnerable sub-groups are being further marginalised.

# 1 Literature

4/19

Area based proxies of deprivation and high speed broadband;

- ▶ Gijón, Whalley, and Anderson 2016 → less deprived areas of Glasgow enjoy higher broadband speeds than areas with greater deprivation.
- ▶ Apatov, Chappell, and Grimes 2018 → more deprived areas of New Zealand, more likely to have current or future access to fibre, but relationship primarily driven by population density.
- ▶ Alizadeh, Grubestic, and Helderop 2020 → mixed results within Sydney, Melbourne and Birsbane.
- ▶ Hatef et al. 2021 → decreased connectivity for more disadvantaged neighbourhoods within the US State of Maryland and the City of Baltimore.

Contribution:

Population-wide analysis for all urban and all rural areas in Ireland.

## 1 Irish setting

5/19

Irish government has committed to financially assisting in the roll-out of high speed broadband to (mostly rural) areas where the cost is not commercially viable.

Formalised with the signing of the National Broadband Plan (NBP) contract on 19th November 2019.

Allowed for state aid in “Intervention Areas”, where commercial operators had no plans to make high speed broadband services available.

Highly divided commercial landscape provides an interesting setting for exploring whether measures of social advantage predict increased availability within non-urban areas.

## 2 Outline

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## 2 Unit of Analysis

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Focus on the smallest geographical unit, *Small Areas (SA)* released by CSO

- Small Areas boundaries defined by population density
- as of Census 2022 there are 18,919 Small Areas in Ireland [sa map](#)
- average Small Area has 97 households
- allows spatial and socio-economic characteristics to be compared across small numbers of households.



## 2 Data

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Link three sources of data together:

1 maps of urban boundaries

*CSO Census 2022 Urban Boundaries and Built Up Areas* [urban map](#)

2 maps of high speed broadband availability

*2022 National Broadband Plan Map* [nbp map](#)

3 area based measures of deprivation

*2022 Pobal HP Deprivation Index*

- indicator of social deprivation derived from census data
- encompasses a wide range of social inclusion metrics such as educational attainment, employment status and the age-dependency ratio making it comparable across urban/rural settings.

## 2 Potential Limitations

High speed broadband availability is based on NBP policy:

- rural populations could potentially have access to other types of coverage e.g. mobile broadband such as 5G
- definition of NBP Excluded Areas includes areas in which commercial operators have indicated plans to deliver high speed broadband but may not have yet done so

## 2 Calculating Coverage: Two Alternative Measures

10/19

We proxy high speed broadband availability using Excluded Area regions (NBP Map)

We calculate coverage using two alternative measures:

### Spatial Coverage

% of geographical area in Excluded Area regions, per Small Area

- ▶ Pro: Considers elements of availability at the area level (e.g. alongside roads).
- ▶ Con: Fails to consider geographical dispersion of households within Small Area

### Address Coverage

% of addresses (2019 Geodirectory) in Excluded Area regions, per Small Area

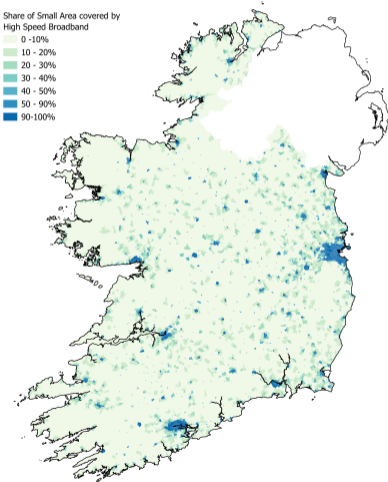
- ▶ Pro: Captures coverage at the address level
- ▶ Con: Based on 2019 (rather than 2022) addresses

## 3 Outline

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Figure 1: Broadband Coverage (spatial), per Small Area (NBP, Q2 2022)



### 3 Takeaways I:

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#### **Methodological:**

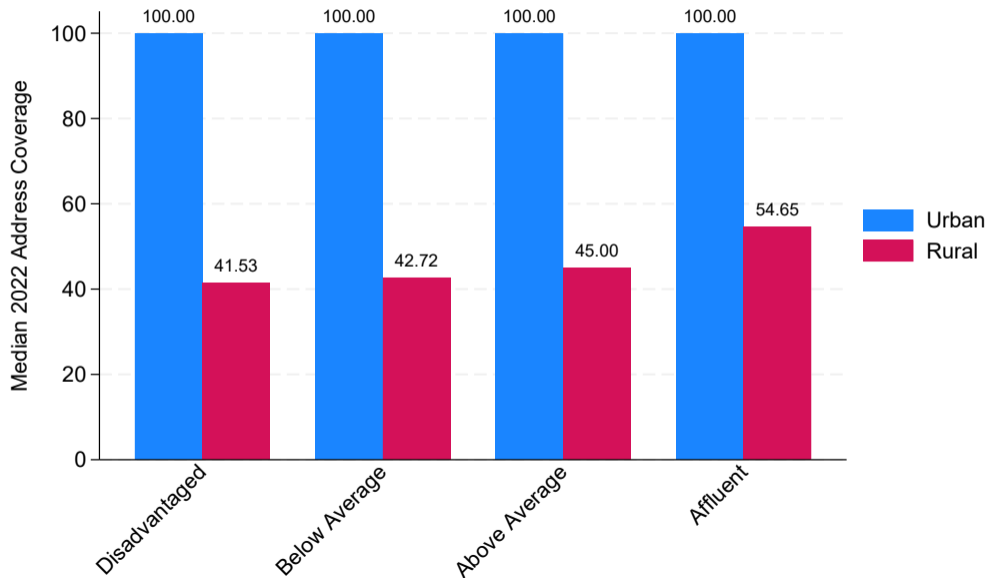
- ▶ spatial coverage significantly underestimated coverage levels as it did not take into consideration the geographical dispersion of households.

#### **Empirical:**

- ▶ Urban areas had near-universal high-speed broadband coverage ( $\geq 94\%$ ).
- ▶ Social deprivation patterns do not predict coverage within urban areas.
- ▶ European Commission has estimated rural coverage to stand at 54% by the end of June 2022.
- ▶ Our research estimated a lower level (44% of rural addresses) as we employed a different definition of rural areas (based on land use definitions) rather than population density.

Do patterns of social deprivation describe high speed broadband availability in rural areas?

Figure 2: Coverage by Deprivation Categories





### 3 Takeaways II:

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- ▶ Rural coverage is positively related to increased affluence.
- ▶ However, this relationship takes place within the context of low coverage
- ▶ Relatively limited variation between those living in rural areas characterised as disadvantaged/above average

## 4 Outline

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## 4 Conclusions

Empirically contribute to the limited literature exploring the relationship between measures of deprivation and coverage within urban and rural areas.

Encouragingly the results suggest that in urban areas with higher population density, the commercial rollout of high speed broadband does not follow a deprivation gradient. However, equity concerns more prevalent in less densely populated rural areas.




Suggests that telecommunication policy in rural intervention areas is not only helping to reduce digital divides between urban and rural areas, but also between more deprived rural areas and more affluent rural areas.

Dempsey, Seraphim, and Aislinn Hoy. “Exacerbating the divide? Investigating rural inequalities in high speed broadband availability.” *Telecommunications Policy* 48.9 (2024)



## 5 References I

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-  Gijón, Covadonga, Jason Whalley, and Gillian Anderson (2016). “Exploring the differences in broadband access speeds across Glasgow”. In: *Telematics and Informatics* 33.4. <https://doi.org/10.1016/j.tele.2015.11.003>, pp. 1167–1178.
-  Apatov, Eyal, Nathan Chappell, and Arthur Grimes (May 2018). *Is internet on the right track? The digital divide, path dependence, and the rollout of New Zealand's ultra-fast broadband*. Working Papers 1804. [https://ideas.repec.org/p/mtu/wpaper/18\\_04.html](https://ideas.repec.org/p/mtu/wpaper/18_04.html). Motu Economic and Public Policy Research.
-  Alizadeh, Tooran, Tony Grubestic, and Edward Helderop (2020). “Socio-spatial patterns of the national broadband network revealed: Lessons from greater Sydney, Melbourne, and Brisbane”. In: *Telecommunications policy* 44.5. <https://doi.org/10.1016/j.telpol.2020.101941>, p. 101941.

## 5 References II

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-  Hatef, Elham et al. (2021). "Internet access, social risk factors, and web-based social support seeking behavior: assessing correlates of the "digital divide" across neighborhoods in the State of Maryland". In: *Journal of medical systems* 45.11. <https://doi.org/10.1007/s10916-021-01769-w>, p. 94.

Figure 3: Census 2022 Urban Boundaries and Built Up Areas [back](#)

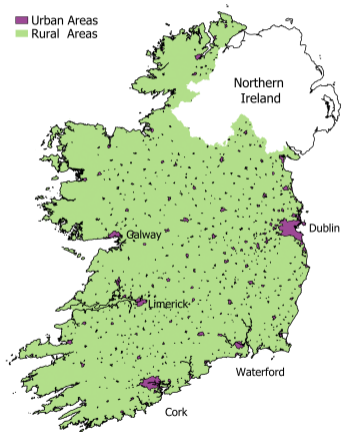


Figure 4: National Broadband Plan Map Q2 2022 [back](#)

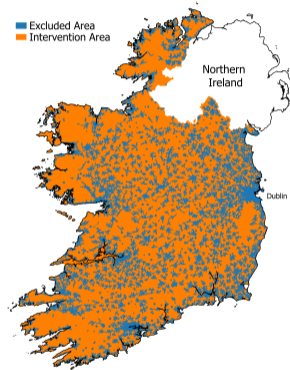




Figure 5: Census 2022 Small Areas (n=18,919) [back](#)

