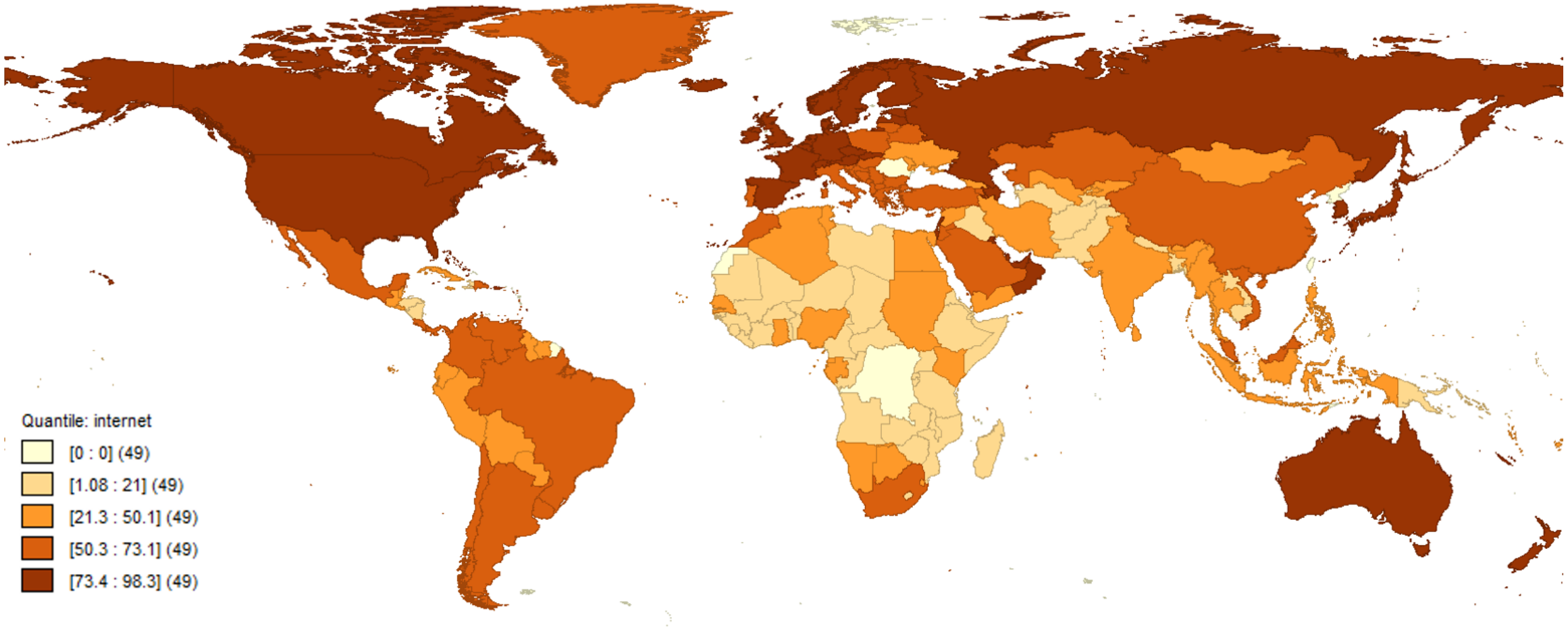
Bad Neighbors and The Internet

A GEOSPATIAL ANALYSIS OF INTERNET ADOPTION

Research Question

- Does geographic location matter in a country's internet adoption?
- Are there spatial clusters (of countries) of low or high internet adoption?



2015 Quintile World Map of Internet Adoption

Our Contribution

- There is a rich literature dealing with the determinants of the internet adoption and the digital divide
- Little attention has been paid on the possibility of cross-country (spatial) interactions in the adoption process

The Importance of the Internet

Digitalization

- rewriting the rules of international competition
- bringing about many opportunities for newcomers to enter the global value chains and catch up with incumbents
- applicable not only to companies, but also countries

However, it is unclear:

- the digital revolution will help developing countries better integrate into the world economy
- or enable rich countries to sustain or accelerate their competitive advantage.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Developed Countries	53.45	59.03	61.27	62.90	66.51	67.68	73.84	76.87	79.50	82.25
Developing Countries	9.40	11.92	14.64	17.42	21.07	24.05	26.99	29.51	32.41	35.28
Digital Divide	44.05	47.11	46.63	45.48	45.44	43.63	46.85	47.36	47.09	46.97

Thus, it will be important to look at the determinants of internet adoption in developing countries and relook at strategies to abridge the digital gap.

Data

Compiled panel data on 63 developing countries on telecommunication and technology usage, country demographic and institutional characteristics from 2000 to 2015.

Variable	Obs	Mean	Std. Dev.	Min	Max
Internet User	557	8.78348	9.966485	0.065239	56
Neighbor	472	12.17857	11.72404	0.255	57
Percentage of urban population	567	36.80471	14.61583	9.375	69.274
Telephone fixed lines	554	4.852888	6.240416	0	30.64515
GDP per capita	558	3261.009	2320.175	530.9611	10580.9
Average years of schooling	562	5.055872	2.643623	1.3	12.1
Freedom of press	567	58.903	16.7821	24	97
Older than 64	567	4.262633	2.472458	2.176046	16.13981

Methodology

1. Adopt a spatial econometric methodology
2. Spatial dependence can be introduced in the regression specification in two ways
    1. Observational units (Spatial autocorrelation)
    2. Error term (Spatial error autocorrelation)
3. Conduct the diagnostic test for the presence of spatial autocorrelation and spatial error autocorrelation to determine model specification
4. Perform non-spatial diagnostic tests for multicollinearity, non-normality and heteroskedasticity
5. Perform Hausman Wu to determine the use of Random Effects and Fixed Effects estimation
6. Control for potential endogeneity problems with spatial lag of the dependent variable
    - most appropriate instruments are the spatially lagged explanatory variables

Methodology

According to the results of spatial diagnostic tests, our model is specified with a spatial lag and control variables:

$$internet_{i,t} = \alpha + Winternet_{i,t} + \beta' X + \alpha_i + \varepsilon_i$$

- Dependent variable: Percentage of the population as internet users in a country
- α: Constant for all observations
- *X*: vector of control variables
- $Winternet_{i,t}$: spatial lag of dependent variable
- α_i: unobserved heterogeneity for each country
- ε_i: error term