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Aula 27: From Rivers to Roads – Spatial Mismatch and Inequality of Opportunity in Urban Labor Markets of a Megacity

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From rivers to roads: Spatial mismatch and inequality of opportunity in urban labor markets of a megacity ☆

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Highlights

- Workers with longer daily commuting are less productive.
- Workers with higher accessibility to jobs are more productive.
- Policy choices in the past may impose strong costs to spatial sustainability in the present.
- Geography and history reinforced the patterns of inequality of opportunity in the labor market in SPMR.

“São Paulo, a cidade dos rios invisíveis”



Fonte: <https://aquipassaumrio.wordpress.com/>

Introduction

Location decisions of firms and workers shape the spatial distribution of economic activity between and within cities

Conceptual framework: spatial general equilibrium model of land use with endogenous job locations in a circular city [Lucas and Rossi-Hansberg (2002)]

The theory determines the distribution of business and residential land together with employment and residential densities at all locations in the city, as well as urban prices (i.e. wages and land rents).

Given the general equilibrium nature of the theory, one should be aware of the **potential simultaneity bias in the empirical estimation of wage equations based on accessibility measures.**

General approach

In LRH approach, productivity is higher the higher is employment in neighboring locations.

The specification of the model considers such external effect of employment to decline exponentially with distance.

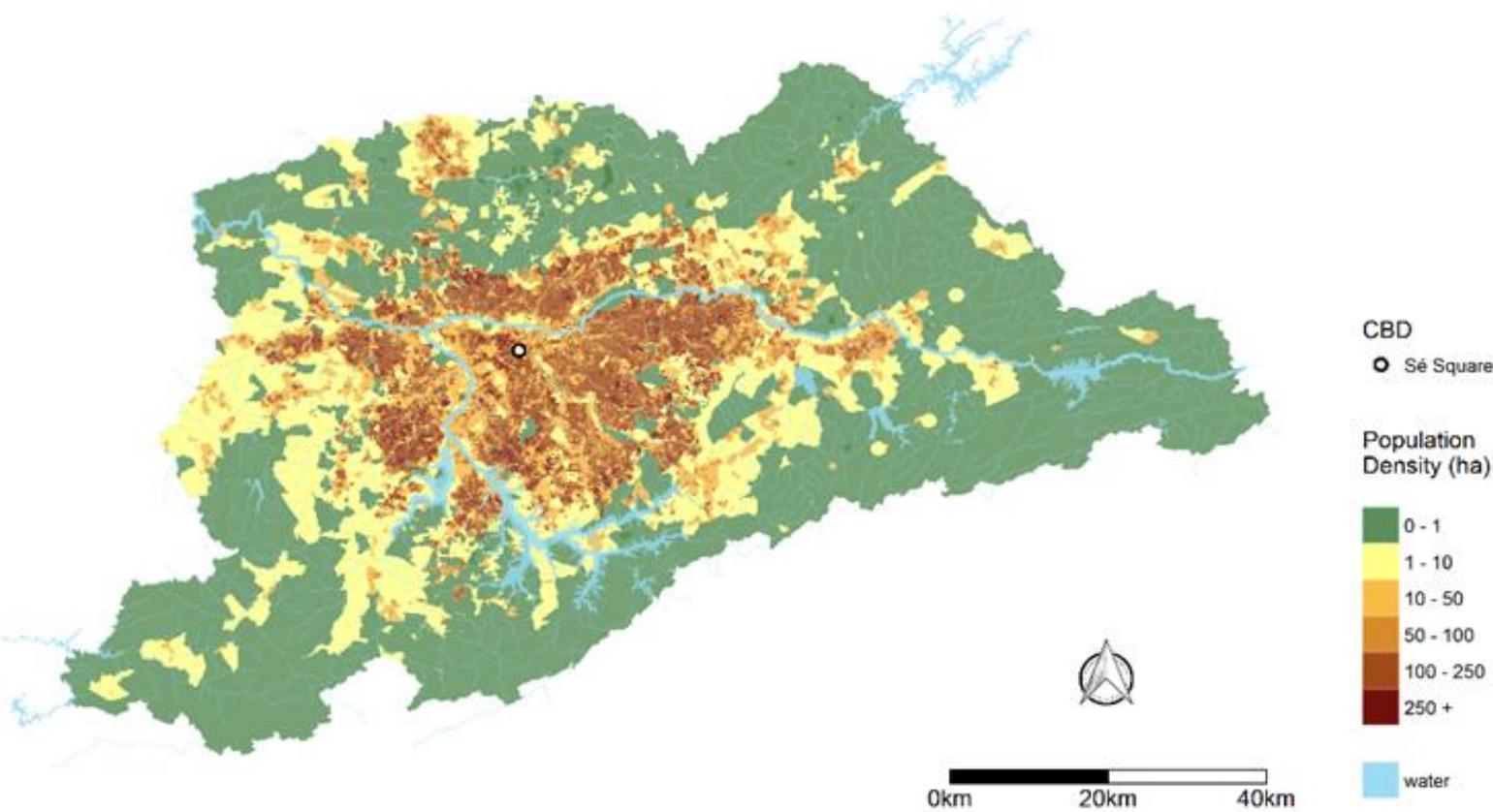
This arbitrary form of production externalities will prove to be very useful for our empirical work.

We will depart from reduced-form intra-urban prices equations based on accessibility to capture production externalities in the form proposed in LHR.

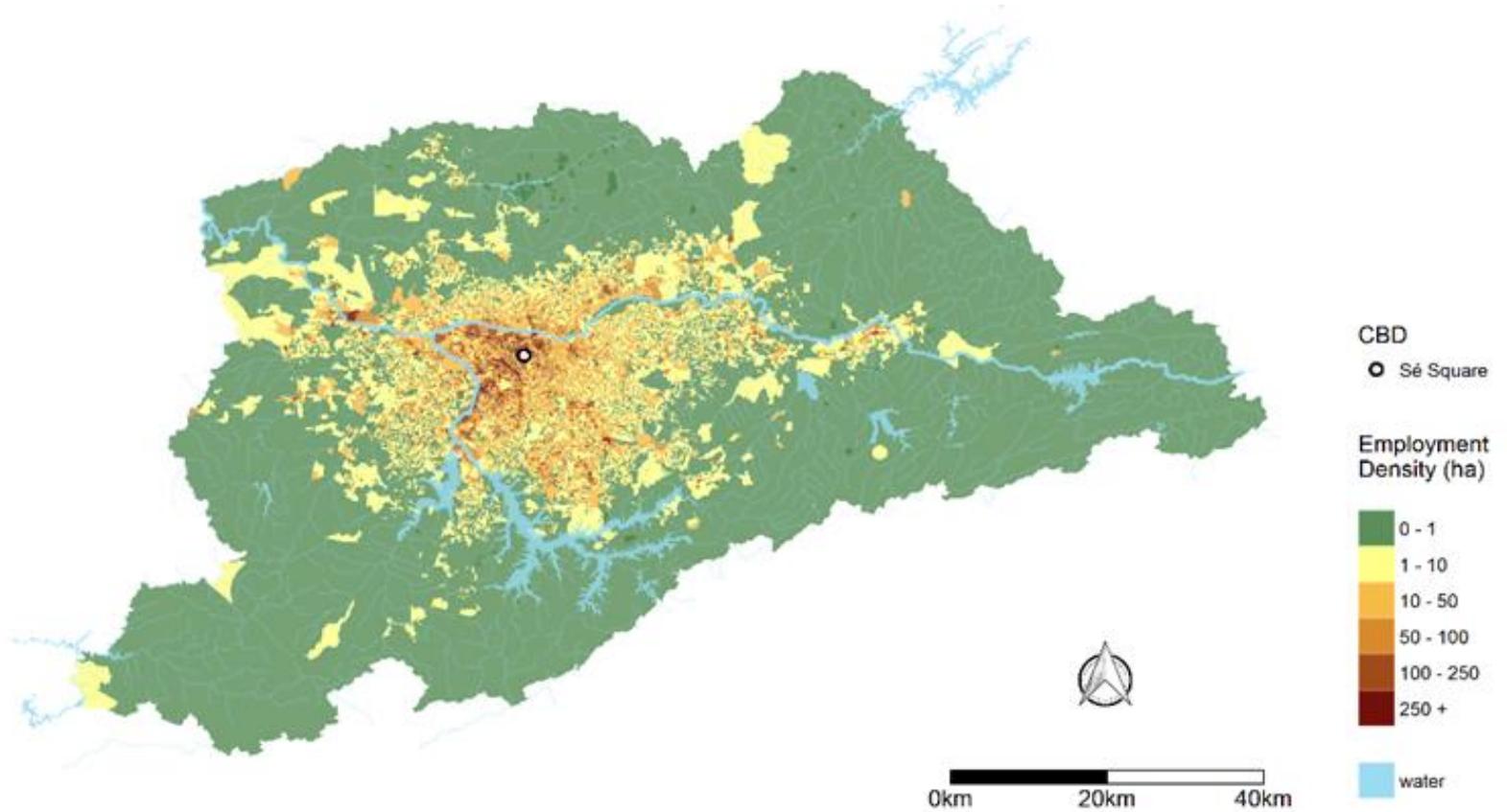
Lucas and Rossi-Hansberg (2002)

1. The model simultaneously determines the location of jobs and workers, as well as wages and land rents.
2. In equilibrium, wages within the city increase with employment density.
3. In equilibrium, land rents within the city also increase with density of workers.
4. As a consequence of (1)-(3), accessibility to jobs is also simultaneously determined, for any given commuting cost function.

Population Density in SPMR, 2010



Employment Density in SPMR, 2008

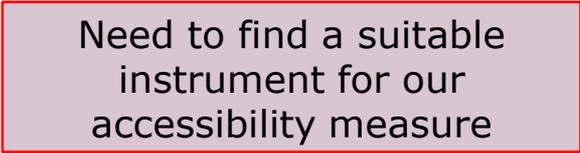


Econometric approach

Again: we depart from reduced-form intra-urban prices equations based on accessibility to capture production externalities in the form proposed in LHR.

We estimate the empirical models related to wages determination:

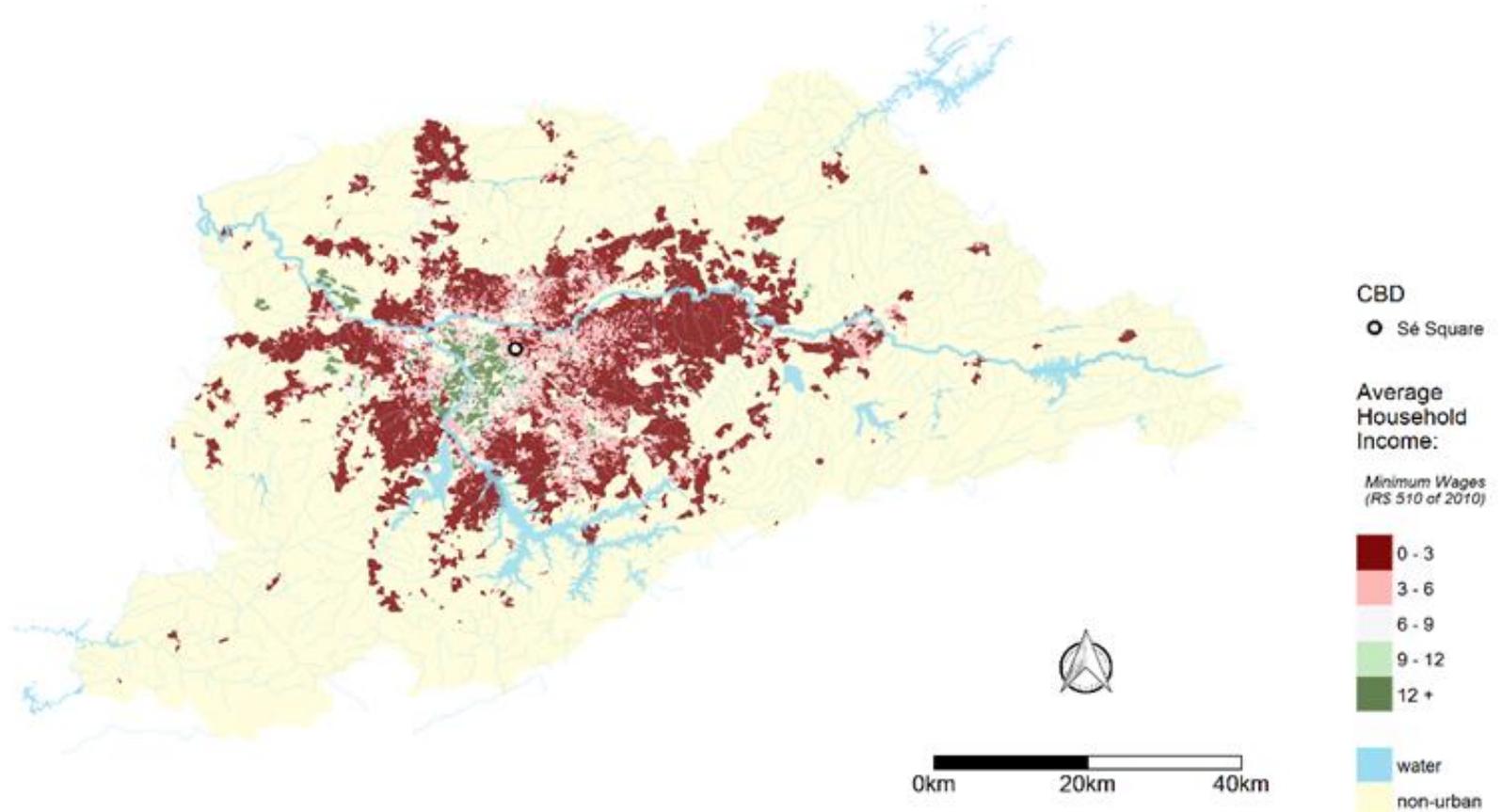
$$\ln w_i = \alpha_0 + X_i\beta + WP\gamma + \theta A_r + \varepsilon_i$$



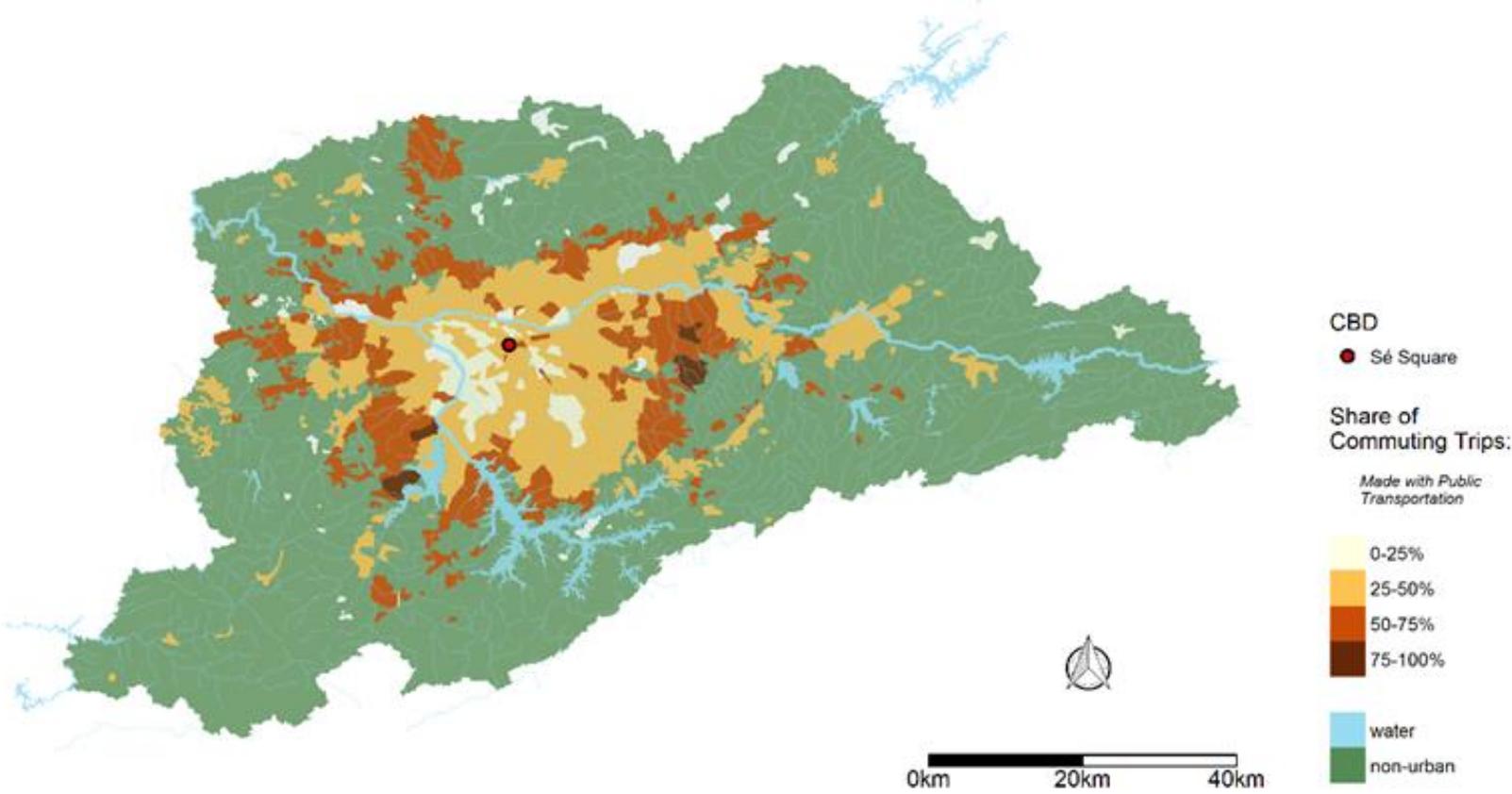
Need to find a suitable instrument for our accessibility measure

where the individual wage (w_i) is explained by a set of individual characteristics (X_i), attributes of the region of work (WP), the accessibility index (A_r), and the error term ε_i .

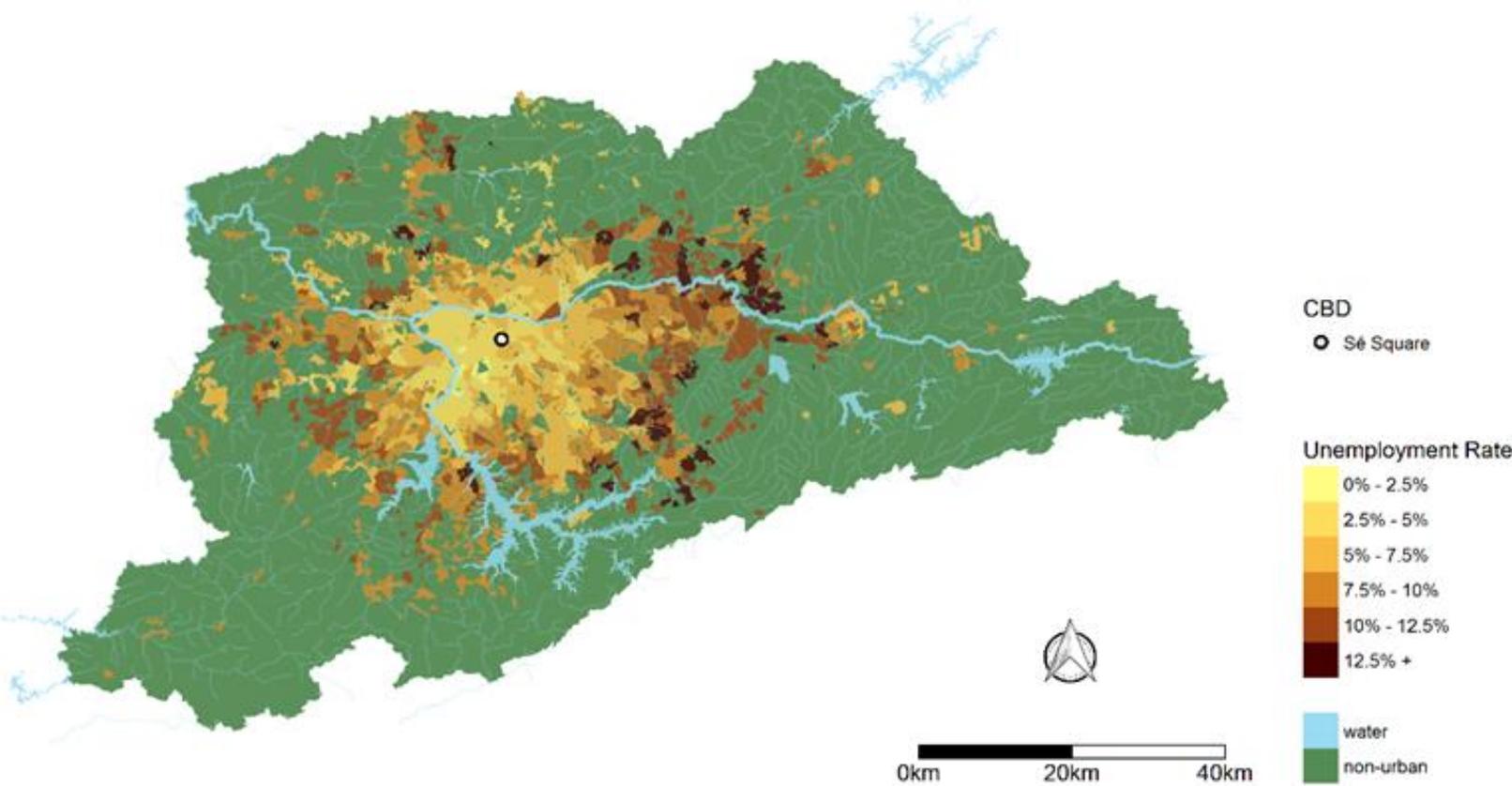
Average Household Income in SPMR, 2010



Share of Commuting by Public Transportation



Unemployment Rate in SPMR, 2010



Commuting time and productivity

Workers with longer daily commuting are less productive

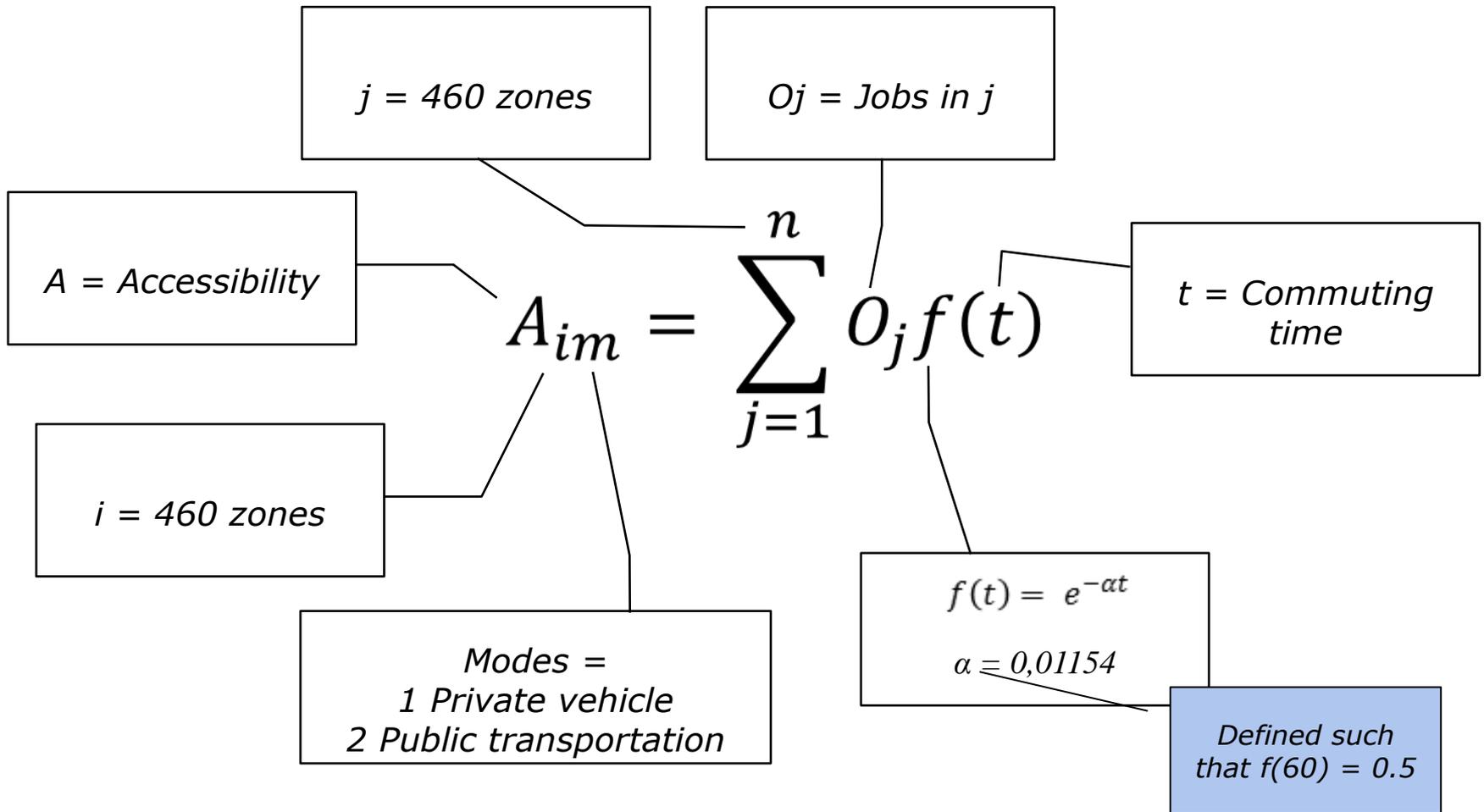
- Theoretical support (Zenou and Smith, 1995; Zenou, 2002; Brueckner and Zenou, 2003; Ross and Zenou, 2008; Zenou, 2008)
- On-the-job effort is negatively related to commuting time
- Empirical support (Van Ommeren and Gutiérrez-i-Puigarnau, 2009; Porsse et al., 2012)
- Excessive commuting time may induce workers to arrive late or leave early; it also increases the frequency of absenteeism, reducing workers' productivity

Accessibility to jobs and productivity

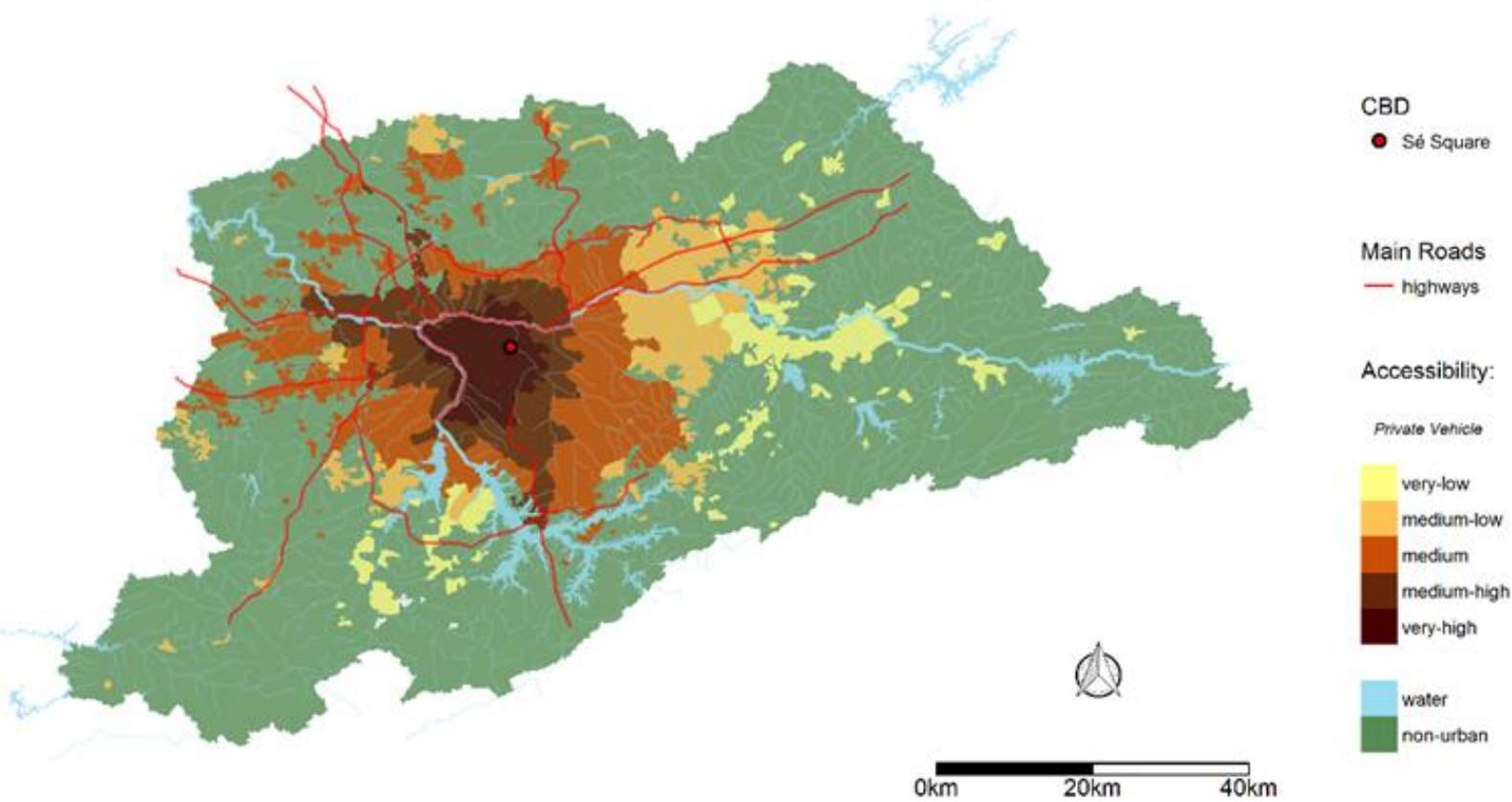
Workers with higher accessibility to jobs are more productive

- Theoretical support (“matching”)
- Effective size of labor market
 - Efficiency of transport system
 - Relative location of jobs and homes
 - Helps explaining labor productivity
- How many jobs can a worker access in, say, 60 minutes?
- Empirical support

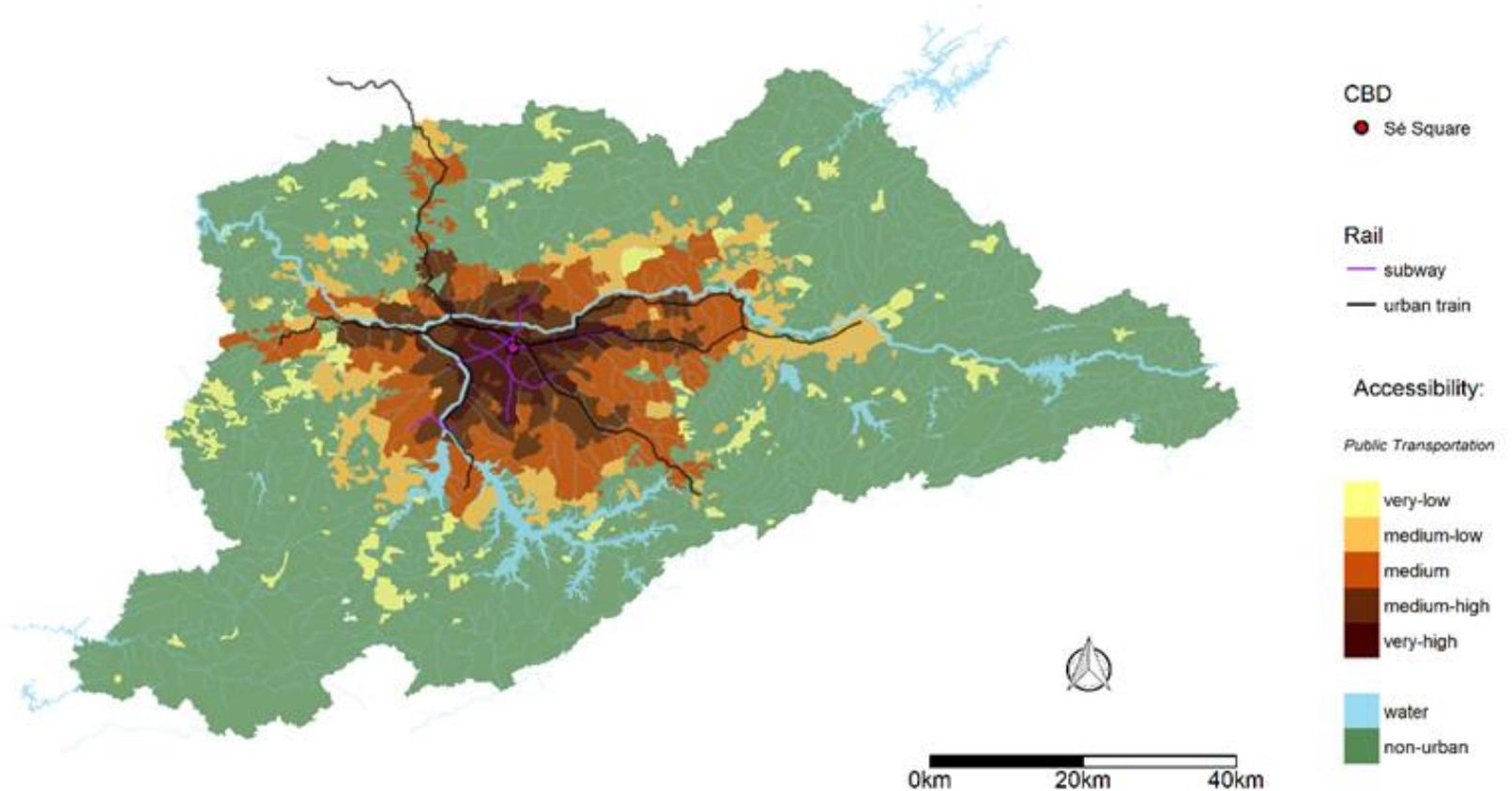
Measuring accessibility to jobs



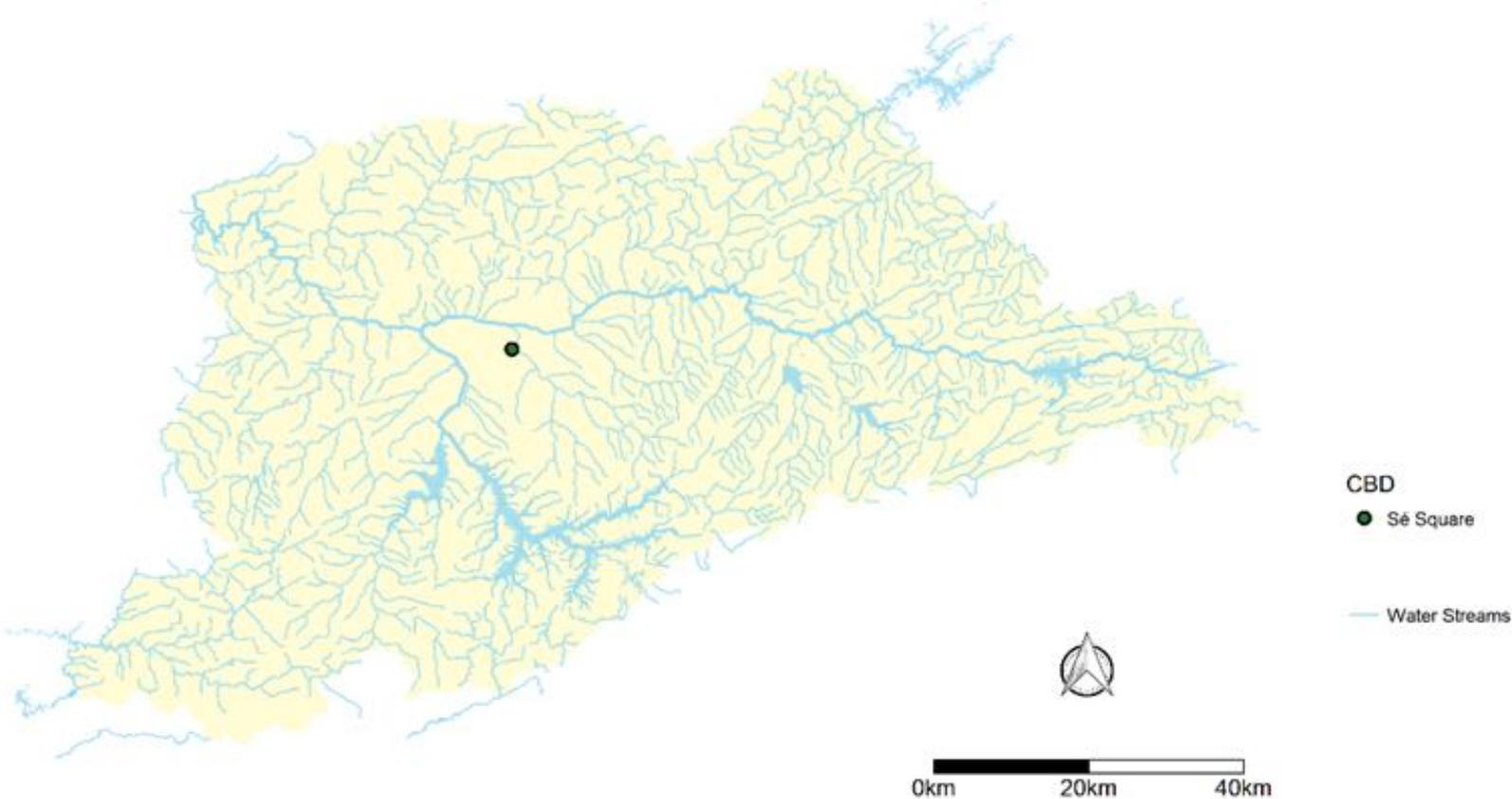
Spatial distribution of accessibility by private vehicle mode



Spatial distribution of accessibility by public transportation mode

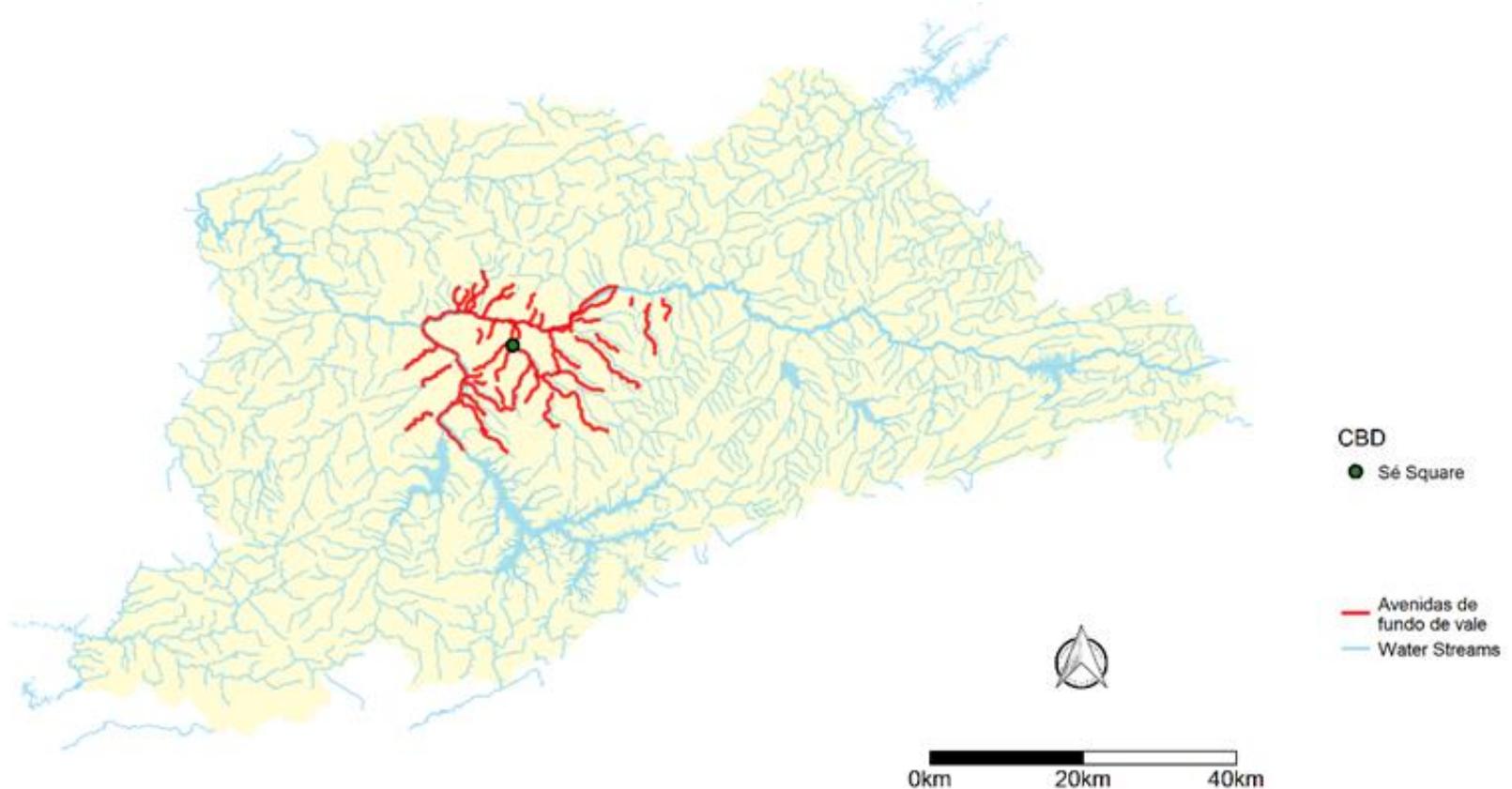


Watershed in SPMR

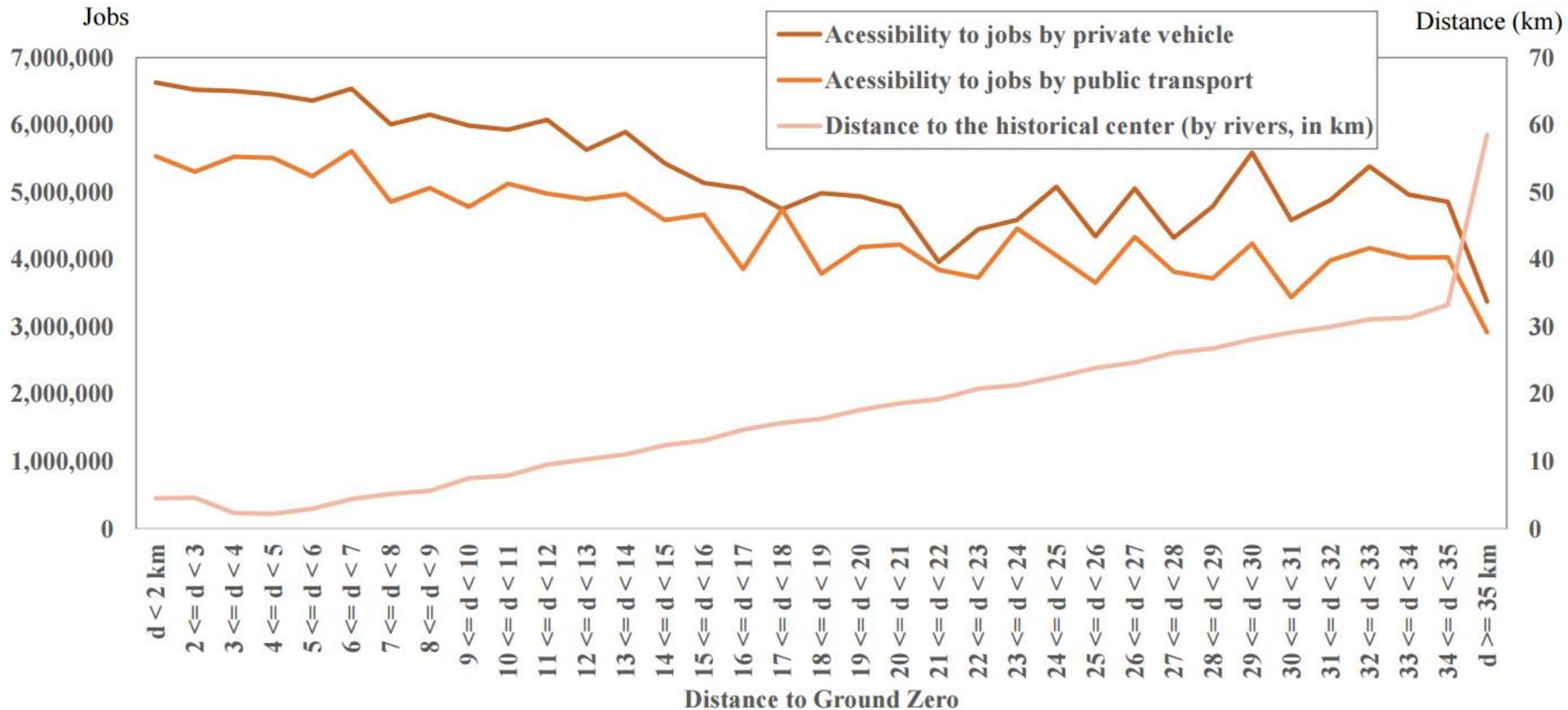


Urban Rivers Corridors in the City of São Paulo

The conception of the use of floodplains as the preferential space for circulation prevailed in the development plans for the city, so that thalwegs avenues represent nowadays the main arteries of São Paulo



Accessibility to jobs and Distance to *Pateo do Collegio* by Rivers



Source: Calculation by the authors

Descriptive statistics of the main variables for the OD Survey, 2007

	Private vehicle		Public transportation		Total	
	mean	s.d.	mean	s.d.	mean	s.d.
Wage (individual income)	R\$ 2,036	R\$ 2,035	R\$ 982	R\$ 909	R\$ 1,316	R\$ 1,455
Commuting time (min.)	39	29	76	40	64	41
Distance to Ground Zero (km)	34.6	21.5	39.8	21.1	38.1	21.4
Distance to Pateo do Collegio by rivers (km)	32.8	21.8	38.1	21.4	36.4	21.7
Accessibility to jobs through transportation	4,334,939	1,139,496	3,551,412	862,184		
	Individuals	%	Individuals	%	Individuals	%
Weighted sample	1,041,992	31.7%	2,247,343	68.3%	3,289,335	100.0%

*Sampling weights applied

Source: OD Survey

Estimation results for the wage equation

(Dependent variable – logarithm of wage)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	Private	Public	Private	Public	Private	Public	Private	Public
	vehicles	transp.	vehicles	transp.	vehicles	transp.	vehicles	transp.
	OLS	OLS	OLS	OLS	OLS	OLS	IV	IV
Ln(commuting time)	0.007 (0.016)	-0.058*** (0.015)						
Ln(Euclidean distance to Ground Zero)			-0.114*** (0.019)	-0.092*** (0.011)				
Ln(accessibility to jobs by car)					0.260*** (0.068)		0.466*** (0.073)	
Ln(accessibility to jobs by public transportation)						0.183*** (0.025)		0.418*** (0.050)
Instrument								
Ln(distance to Pateo do Collegio by rivers)							Yes	Yes
Observations	5,730	8,564	5,730	8,564	5,730	8,564	5,730	8,564
R-squared	0.526	0.397	0.530	0.401	0.530	0.401	0.527	0.391

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Obs.: Additional controls: age, age squared, gender, role in the household, schooling level, type of job, sector of activity, ln(time of departure from home), workplace zone dummies, constant term. Sampling weights are applied to the estimation.

Source: Calculation by the authors

Final remarks

Significant bias is generated by estimating directly the relationship between wages and accessibility

Instrument: exogenous geographical measure, of which economic agents are fully unaware (“invisible” rivers)

Complement the analysis by considering the other relevant urban price, namely the price of land (hedonic price model)

Our empirical analysis, despite being motivated by a theoretical general equilibrium framework, was based on partial equilibrium modelling strategies.

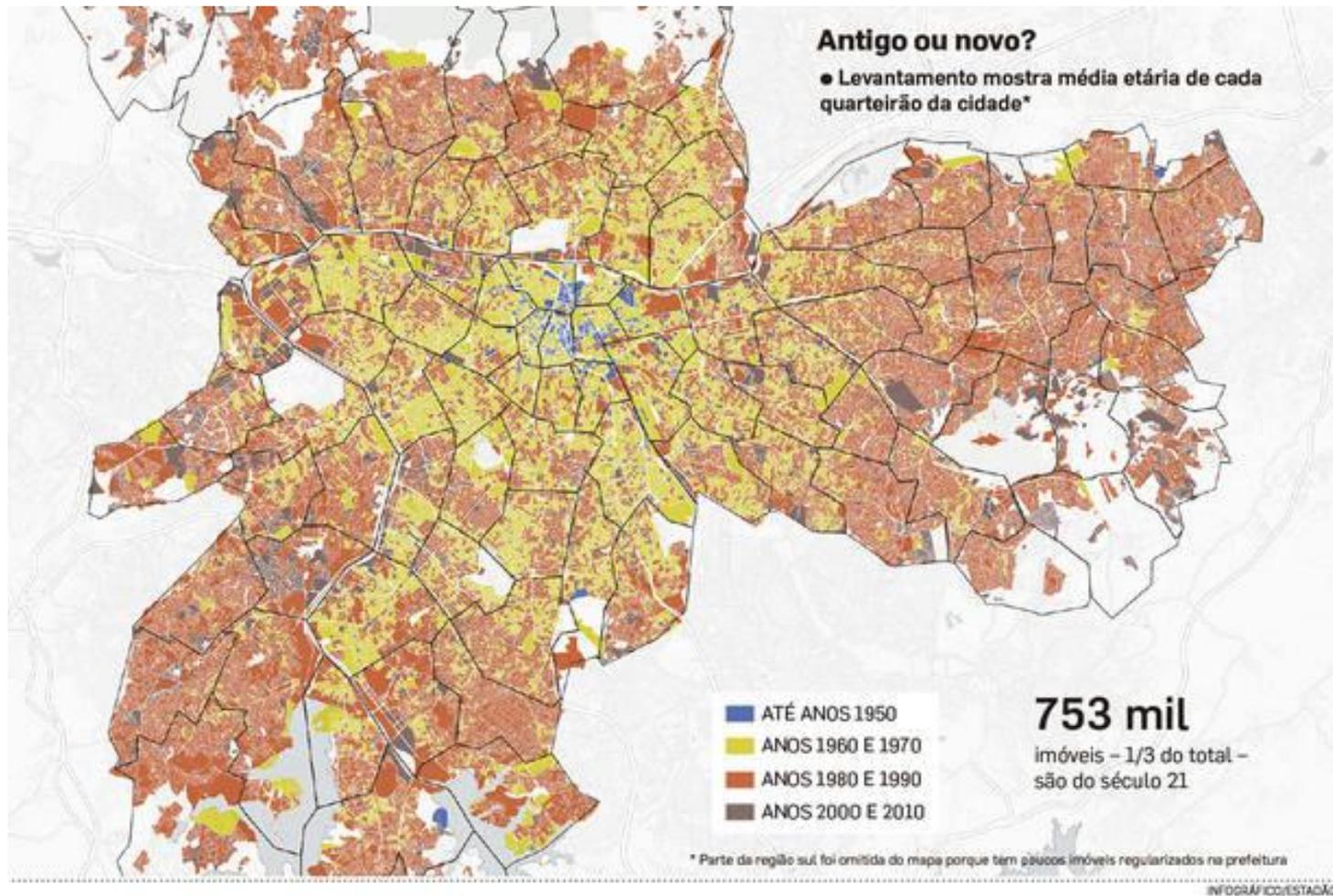
A complete structural model comprising the simultaneous determination of the housing and the labor markets can provide further insights on these relationships.

“From rivers to roads...”

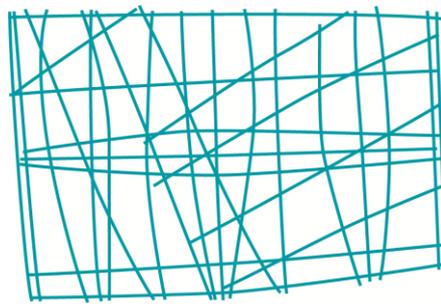


Fonte: <https://aquipassaumrio.wordpress.com/>

Food for thought: "São Paulo é uma cidade dos anos 70: 1/4 dos imóveis é daquela década"



Fonte: Estado de São Paulo, 16/04/2017



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Obrigado!

<http://www.sciencedirect.com/science/article/pii/S0197397516307433>

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