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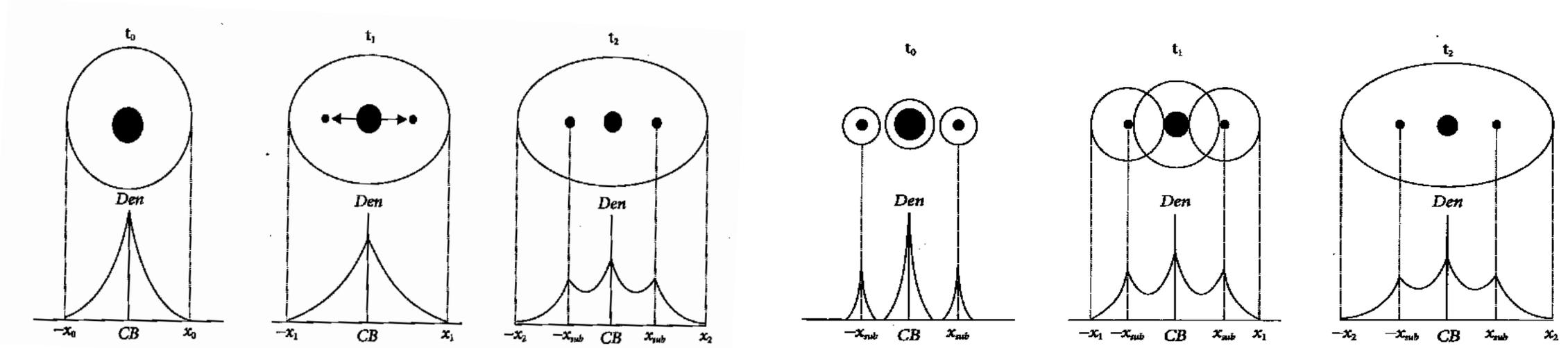
Spatial pattern of housing prices in polycentric cities

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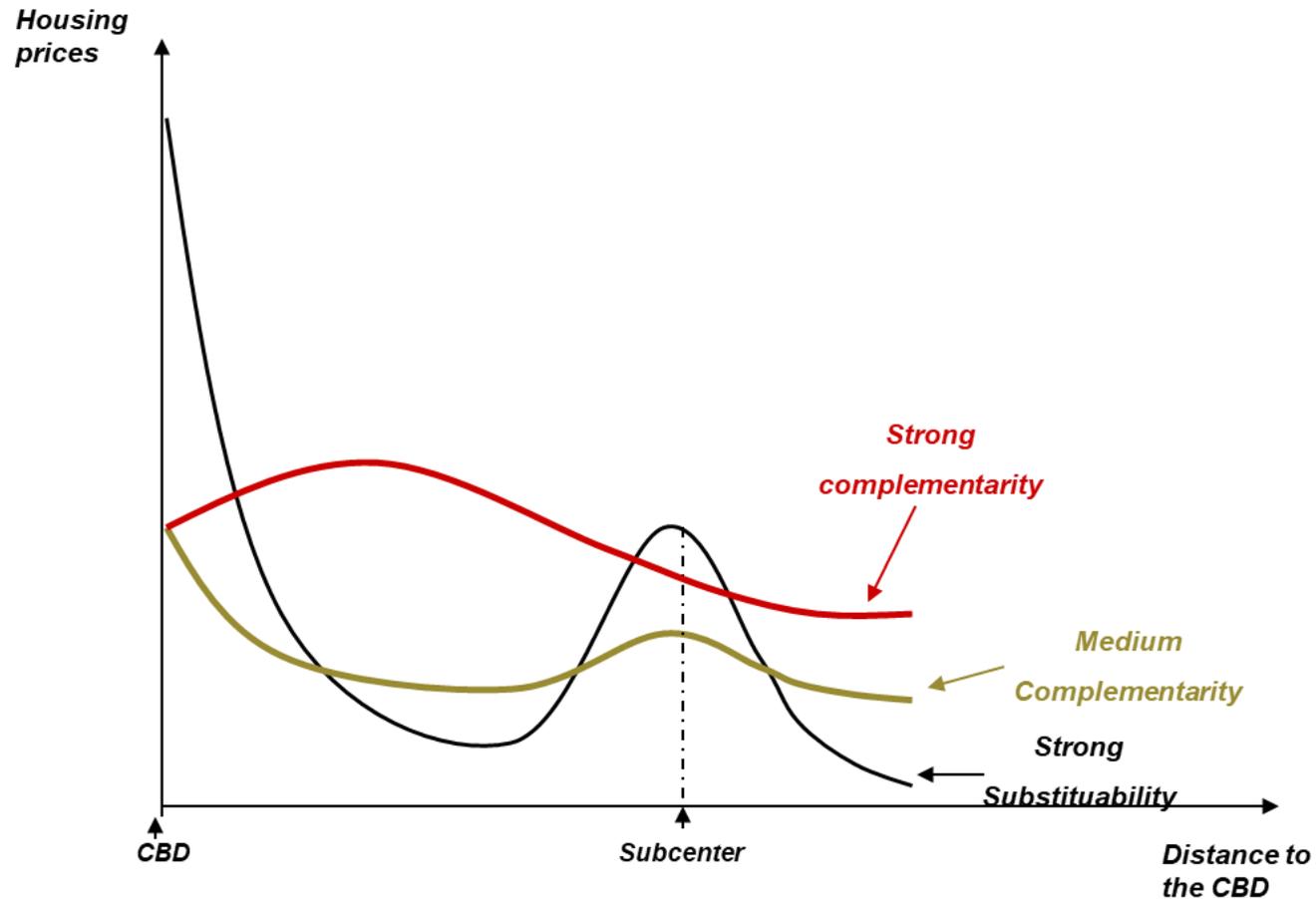
- ▶ The « polycentric city » :
 - ▶ Emergence of subcenters (Giuliano and Small, 1991; Cervero and Wu, 1997; Bogart and Anderson, 2001)
 - ▶ Economically specialized (Gaschet, 2001; Bingham and Kimble, 1995)
 - ▶ Two types of subcenters (Muniz *et al.*, 2009) :
Suburbanization of jobs - Integration of remote medium-sized city



- ▶ Density polycentric gradients
 - ▶ A growing impact of subcenters on :
 - ▶ Residential density (McMillen and McDonald, 1998)
 - ▶ Job density (Small and Song, 1994)

- ▶ The price gradient :
 - ▶ Impact of centralities on housing prices
 - ▶ Job accessibility and/or amenities (Ommeren et al, 1997; Brueckner et al, 1999; Décamps, Gaschet, 2013)
 - ▶ The form of the gradient: spatial pattern of real estate prices in a polycentric city (Geniaux, Napoleone, 2008; McMillen, Redfearn, 2010)

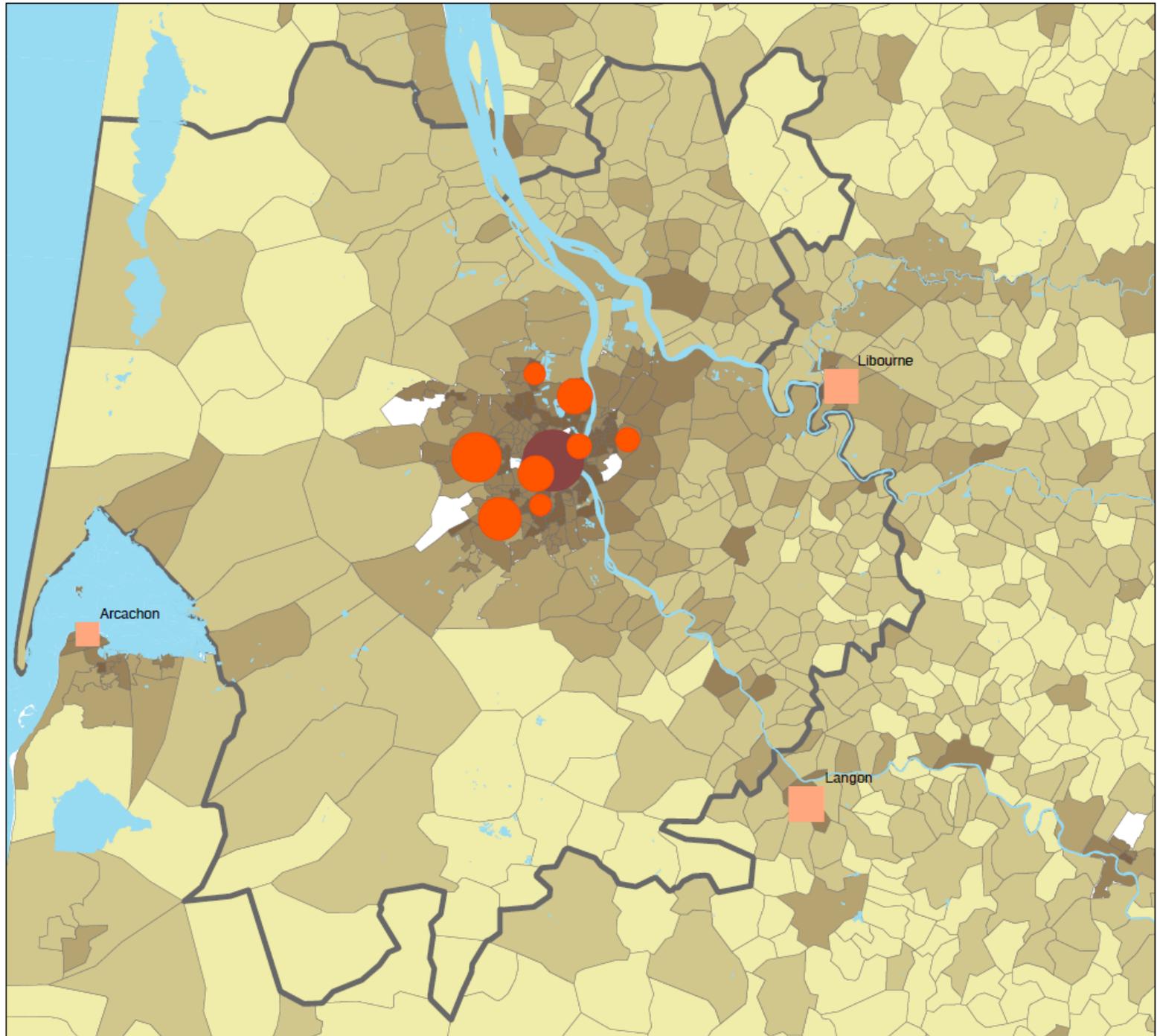
Substituability or complementarity?
Price gradient depending on the type of subcenters



- ▶ Comparison of the pattern of housing prices in two french polycentric cities : Bordeaux and Lyon
 - ▶ Impact of centralities on housing prices in a polycentric urban form
 - ▶ Accessibility vs. Amenities
 - ▶ Complementarity vs. Substituability
 - ▶ The form of the gradient
 - ▶ Spatial influence of each type of centralities

- ▶ A 3-steps approach
 1. Identification of subcenters
 2. Hedonic model of housing prices in two polycentric cities
 3. Semi parametric regression to estimate the form of the price gradient (Geniaux, Napoleone, 2008; McMillen, Redfearn, 2010)

- ▶ 1. Identification of subcenters
 - ▶ Giuliano and Small (1991)'s criterion : job density and minimum number of jobs (Geolocalized Data from INSEE)



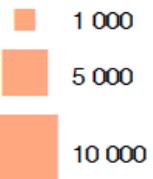
Centre principal



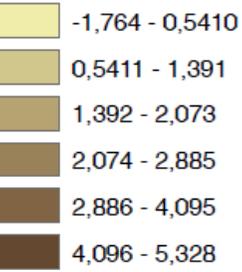
Sous-centres urbains



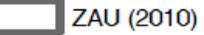
Villes satellites



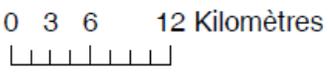
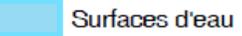
Densité d'emplois (log)

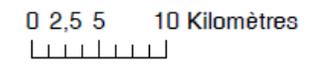
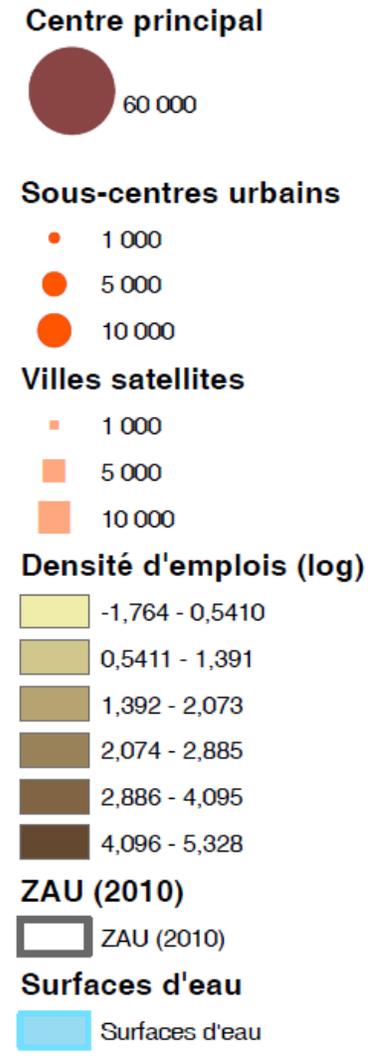
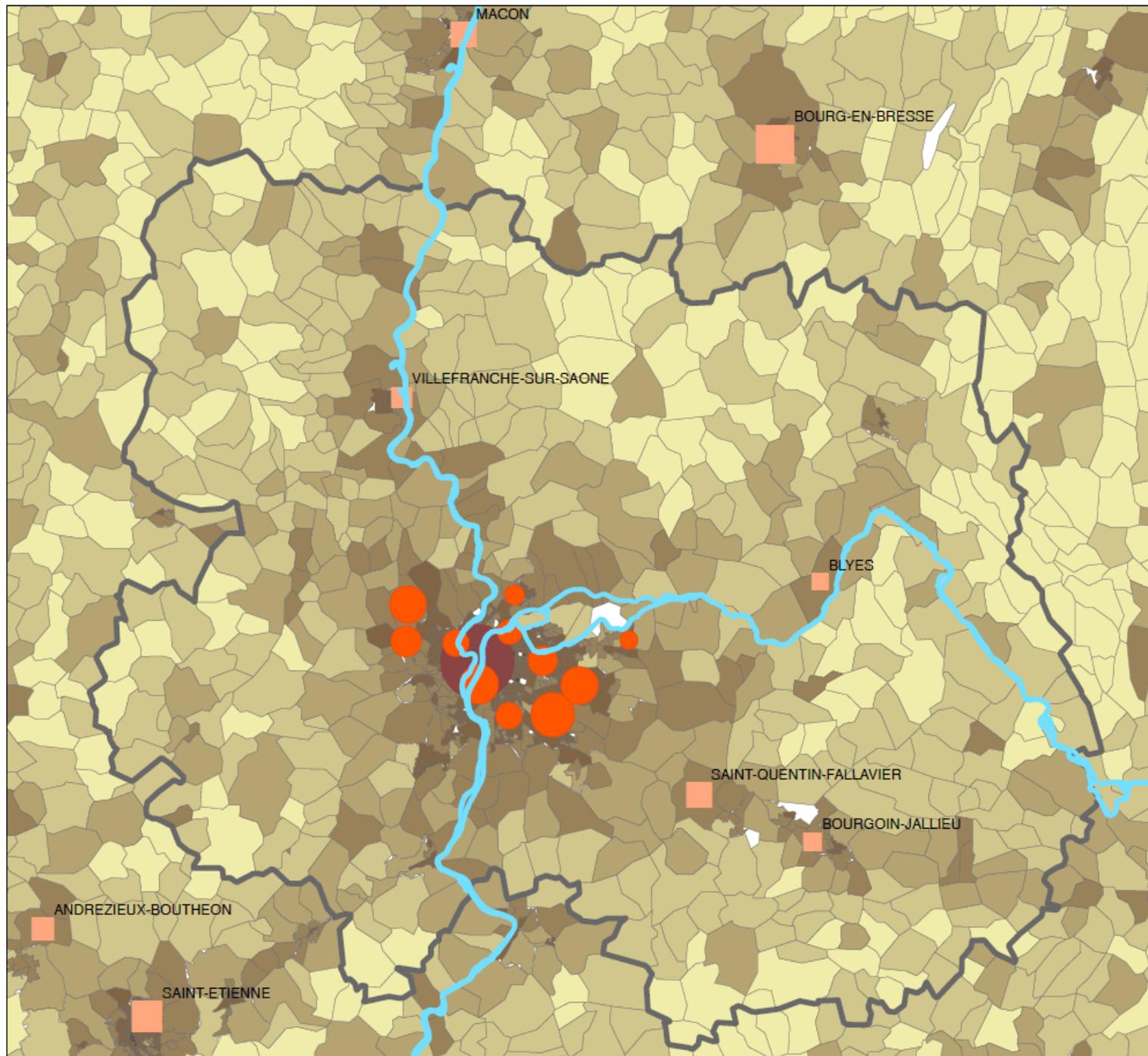


ZAU (2010)



Surfaces d'eau





- ▶ 2. A log linear hedonic model of housing prices

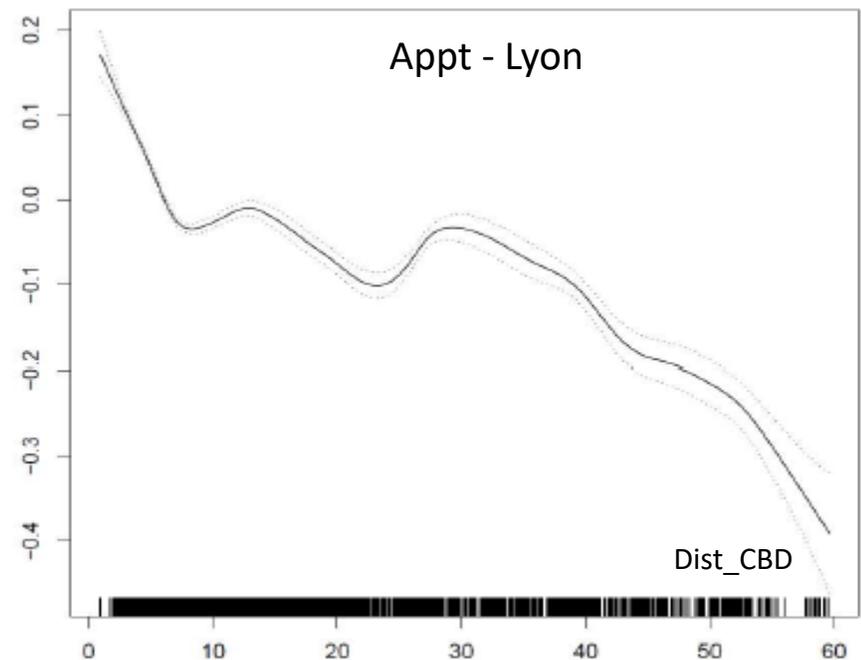
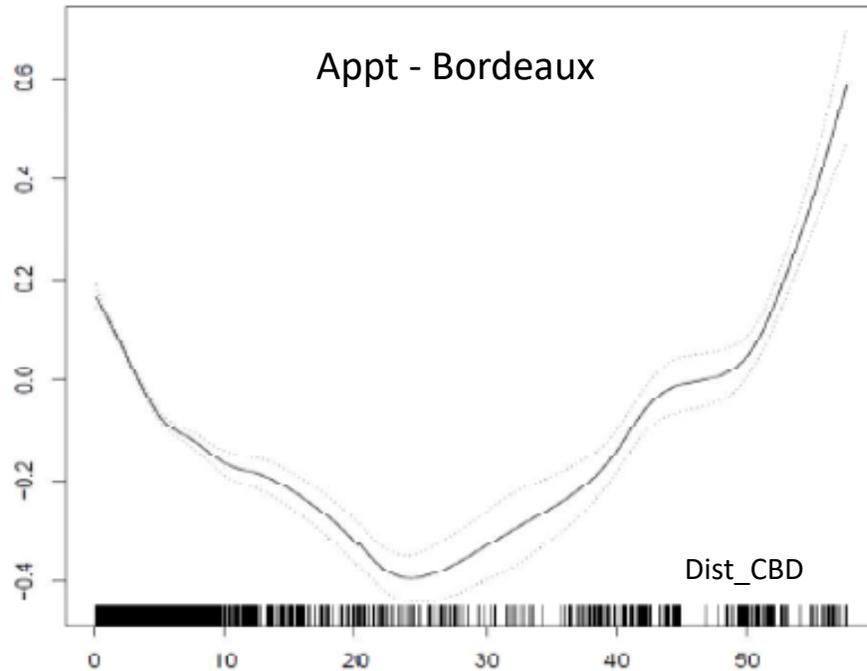
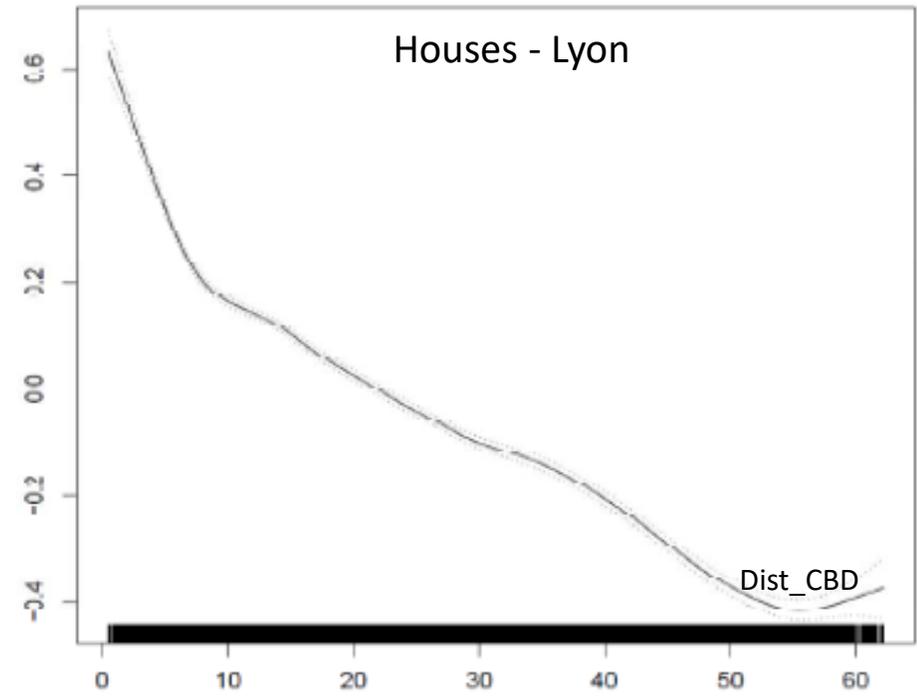
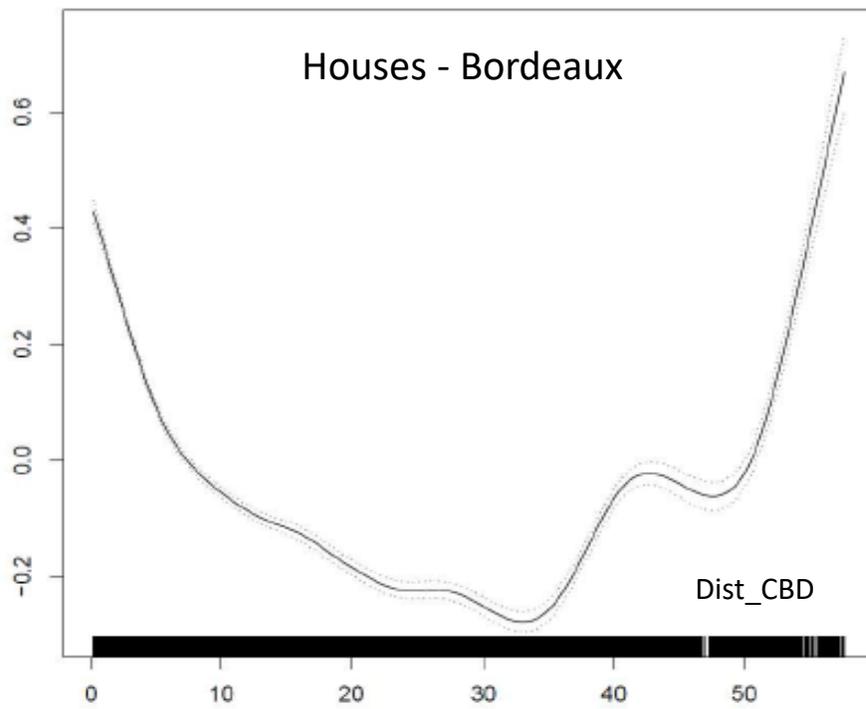
$$\ln P_i = \alpha + \sum_j \beta_j CI_{j,i} + \sum_k \delta_k V_{k,i} + \sum_m \lambda_m f(DC_{m,i}) + \varepsilon_i$$

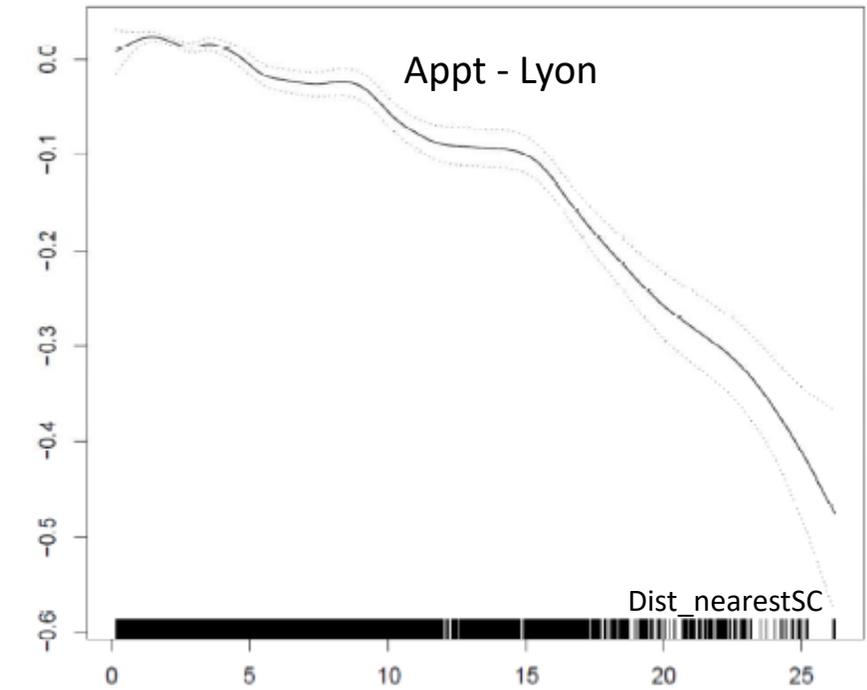
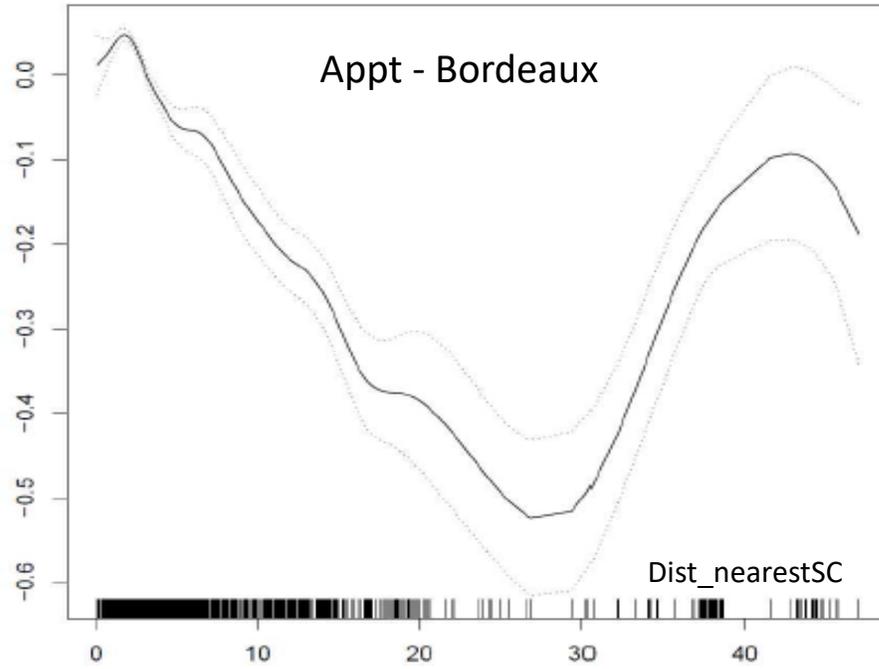
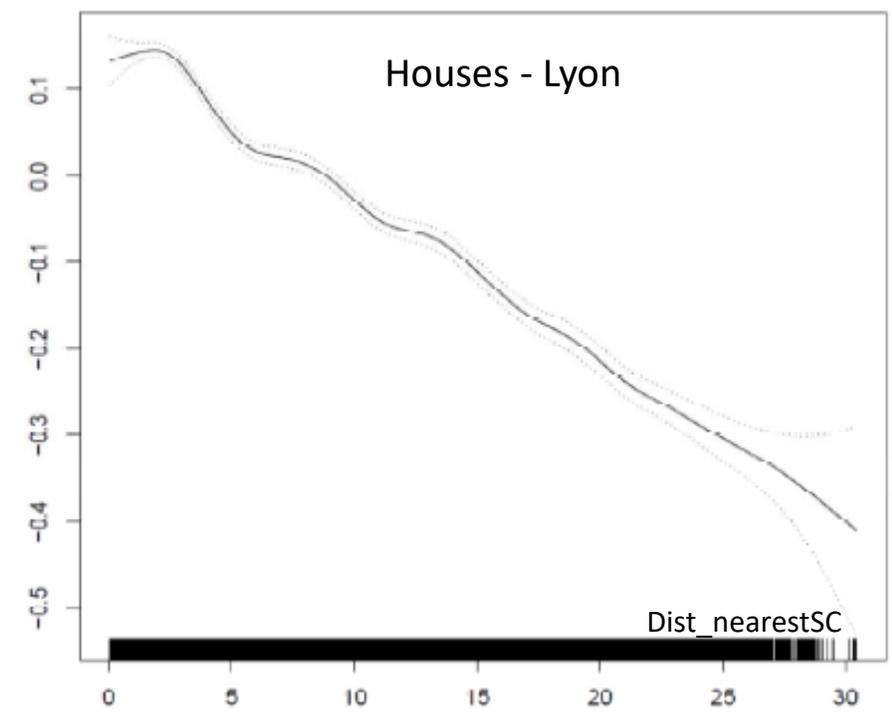
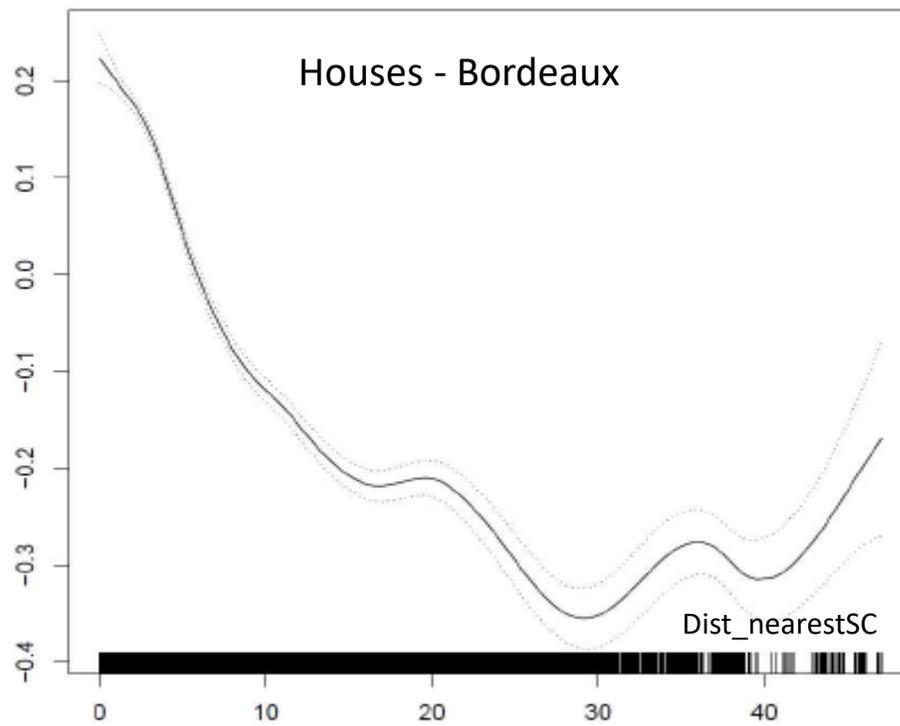
- ▶ Transaction prices and intrinsic characteristics: PERVAL (2000-2010)
- ▶ Location attributes (geolocalized database, INSEE and IGN)
 - ▶ Median income, proximity with transport infrastructures, schools and universities, commercial and industrial areas.
- ▶ 3 Polycentric specifications
 - ▶ Distance to CBD and each subcentres
 - ▶ Distance to CBD and the nearest subcentre
 - ▶ Generalized job accessibility
- ▶ 3. Semi parametric regression: GAM (General Additive Model)

$$\ln P_i = \alpha + \sum_j \beta_j CI_{j,i} + \sum_k \delta_k V_{k,i} + s(DC_{c,i}) + s(DSC_{pp,i}) + \varepsilon_i$$



- ▶ Polycentric hedonic model
 - ▶ Intrinsic characteristics and location attributes significant with the expected signs
 - ▶ Strong impact of CBD : amenities + job accessibility
 - ▶ Subcentres:
 - ▶ Similarity between adjusted R^2 of polycentric and generalized accessibility models
 - ▶ Strong impact of Arcachon for Bordeaux / remote medium cities for Lyon
 - ▶ Significant impact of several subcenters (number of jobs and specialization allowing complementarity with the CBD) and nearest subcenter





- ▶ The polycentric structure of housing prices is confirmed in the two cities

- ▶ Differentiated impact of centralities:
 - ▶ Complementarity, mix of localized amenities and job accessibility
 - ▶ Different spatial extent between Bordeaux and Lyon

- ▶ Research perspectives
 - ▶ Segmentation of sample between the several break-points of the price gradients to sharpen the analysis of spatial patterns of real estate prices
 - ▶ Spatial pattern of the recent boom in real estate prices in Bordeaux
 - ▶ Comparison with other metropolitan areas with different size (Ex: Paris)



Thank You!

Questions?

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