Is Tourism Good for Locals? Evidence from Barcelona

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Tourism is important

- Big part of the economy
  - Accounts for 7pc of world exports and 330m jobs
  - In Spain: Tourism equals 50pc of total goods exports (11pc of GDP)
- Growing part of the economy
  - 50pc increase globally in past 10 years
  - In Spain: Second fastest growing sector
- Increase in export demand ought to be welfare improving?

Local Backlash against Tourism

This Paper: Three Contributions

1. New intra-city spatial **patterns of consumption** for locals and tourists
   - Raw data: 500M electronic payments in Metro Area of Barcelona
   - Bilateral expenditure flows b/w 1,000 census blocks (orig-dest-product-month)
2. Urban **Specific Factor Model** with rich geography
   - Complex spatial patterns of consumption and production
   - Welfare effects depend on trade-off between income effects vs price effects
   - Intuitive analytical expression enabling intra-city welfare analysis
3. **"Hybrid" empirical approach** marrying applied & general equilibrium tools
   - Use GE theory to design non-parametric regressions
   - Use plausibly exogenous variation in tourist composition to estimate them

Literature

Urban Quantitative Spatial Economics

- Ahlfeldt et al. (2015), Monte et al. (2018), Allen and Arkolakis (2016)

Big Data Spatial Economics

- Athey et al. (2018), Athey et al. (2020), Couture (2016), Couture et al. (2020), Davis et al. (2019), Agarwal et al. (2017), Carvalho et al. (2020)

Impact of Tourism

- Almagro and Domínguez-Iino (2019), García-López et al. (2019), Faber and Gaubert (2019)

Ricardo-Viner trade models

- Mussa (1974), Mussa (1982), Jones (1975), Kovak (2013), Dix-Carneiro and Kovak (2017)

Outline

1. New Intra-city Patterns of Consumption
2. Urban Specific Factors Model with Rich Geography
3. Empirics & Welfare Effects

New Intra-city Patterns of Consumption

A new Spatial Dataset for Barcelona

- Electronic transaction data from Caixa Bank (CXBK)
  - Account data for customers + point-of-sale data
  - Annually: 165+M transactions, 3B Euros of value (3pc of GDP)
  - January 2017 - December 2019
- Our data:
  - Locals (bilateral): 1095 residential tiles x 1095 cons tiles x 20 sectors x 36 months
  - Tourists: country of origin x 1095 cons tiles x 20 sectors x 36 months
- Other data:
  - Commuting data (from mobile phone locations)
  - Housing prices (from "Spanish Zillow")

Three Stylized Facts

1. Tourism is spatially concentrated
2. Local's consumption geographies differ by residence
3. Tourist consumption crowds out local consumption

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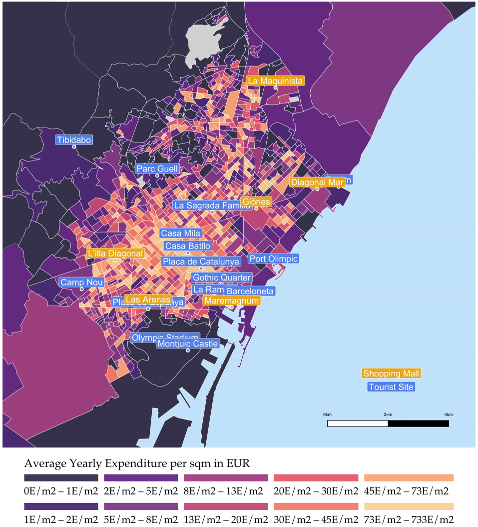
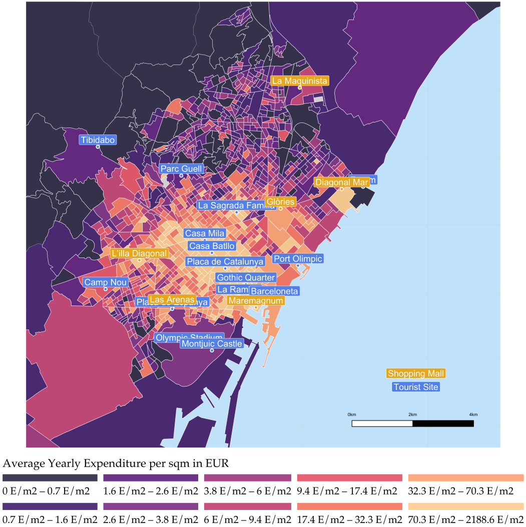
Fact 1: Tourism is spatially concentrated

Local Expenditures in Barcelona



Source: CXBK Payment Processing (2019)

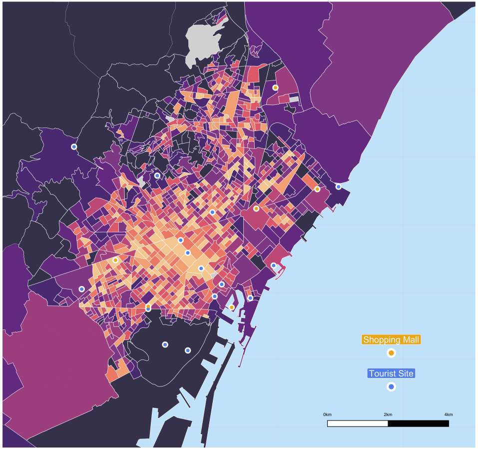
Tourist Expenditures in Barcelona



Source: CXBK Payment Processing (2019)

Fact 1: Tourism is spatially concentrated

Local Expenditures in Barcelona



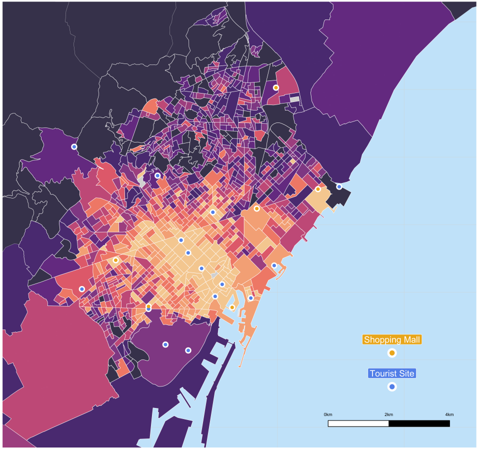
Average Yearly Expenditure per sqm in EUR

0E/m2 – 1E/m2 | 2E/m2 – 5E/m2 | 8E/m2 – 13E/m2 | 20E/m2 – 30E/m2 | 45E/m2 – 73E/m2

1E/m2 – 2E/m2 | 5E/m2 – 8E/m2 | 13E/m2 – 20E/m2 | 30E/m2 – 45E/m2 | 73E/m2 – 733E/m2

Source: CXBK Payment Processing (2019)

Tourist Expenditures in Barcelona



Average Yearly Expenditure per sqm in EUR

0 E/m2 – 0.7 E/m2 | 1.6 E/m2 – 2.6 E/m2 | 3.8 E/m2 – 6 E/m2 | 9.4 E/m2 – 17.4 E/m2 | 32.3 E/m2 – 70.3 E/m2

0.7 E/m2 – 1.6 E/m2 | 2.6 E/m2 – 3.8 E/m2 | 6 E/m2 – 9.4 E/m2 | 17.4 E/m2 – 32.3 E/m2 | 70.3 E/m2 – 2188.6 E/m2

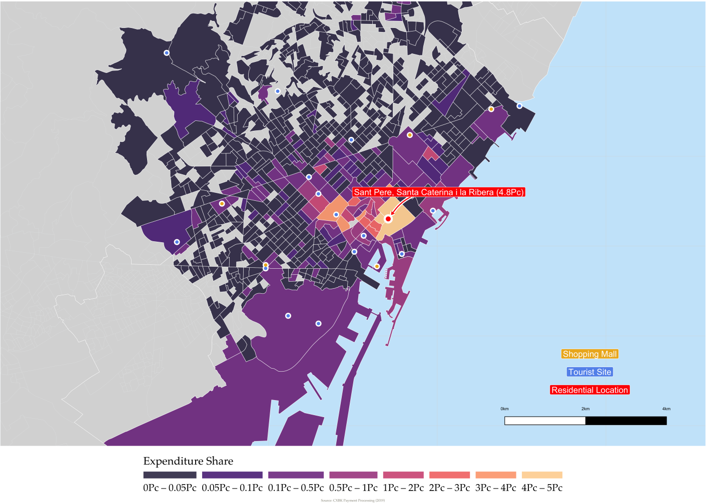
Source: CXBK Payment Processing (2019)

Three Stylized Facts

1. Tourism is spatially concentrated
2. **Local's consumption geographies differ by residence**
3. Tourist consumption crowds out local consumption

Fact 2: Local's consumption geographies differ by residence

Spatial Expenditure Shares for a Resident of Sant Pere, Santa Caterina i la Ribera



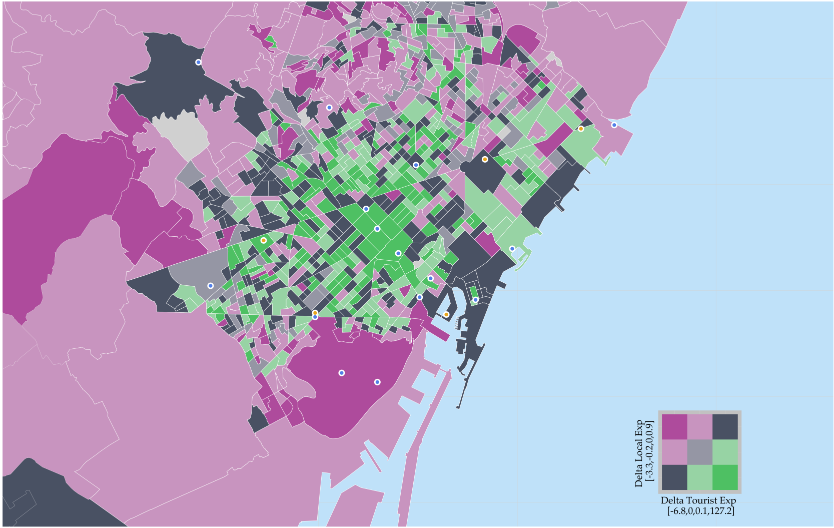
Sectoral Gravity Results

Three Stylized Facts

1. Tourism is spatially concentrated
2. Local's consumption geographies differ by residence
3. **Tourist consumption crowds out local consumption**

Fact 3: Tourist consumption crowds out local consumption

Change Tourist and Local Expenditure (August vs February 2019, Euro/m2)



Source: CXBK Payment Processing (2019)

Urban Specific Factors Model

A Specific Factors Trade Model with rich Urban Geography

- Specific Factors
  - Production requires local labor and an (externally owned) specific factor.
- Trade Model
  - Numeraire sector $s = 0$ costlessly traded.
  - Sectors $s \in 1, ..., S$ consumed by locals and tourists.
  - Total tourism expenditure exogenously given (tourist "shock").
- Rich Urban Geography
  - N locations. A good is a sector x location.
  - A local residing in block n chooses what goods to (spatially) consume & produce.

Intuitive analytical expression for intra-city welfare analysis

Theorem (Welfare Effect of a Shock)

Consider a representative local with **homothetic preferences** *residing in block n. Applying envelope theorem to consumption, production optimization problems yields:*

$$d \ln u_n = \underbrace{\sum_{i,s} \sigma_{ni,s} \times \partial \ln w_{is}}_{\Delta \textit{Spatial Income}} - \underbrace{\sum_{i,s} \pi_{nis} \times \partial \ln p_{is}}_{\Delta \textit{Spatial Price Index}} .$$

- Estimating the welfare effects of tourism requires:
  - Commuting data $\{\sigma_{ni}\}_{n=1,i=1}^{N,N}$
  - Spatial Expenditure data $\{\pi_{ni,s}\}_{n=1,i=1,s=0}^{N,N,S}$
  - Estimates of key elasticities: $\left\{ \frac{\partial \ln p_{is}}{\partial \ln E_i^T}, \frac{\partial \ln w_i}{\partial \ln E_i^T} \right\}_{i=1,s=0}^{N,S}$

Theory Details

Empirics & Welfare effects

Empirics

1. A “deductive” approach: Simple regressions
    - Advantage: Intuitive
    - Disadvantage: Average elasticities, SUTVA assumption (no GE effects)
2. An “inductive” approach: Theoretical predictions
    - Advantage: Heterogeneous treatment effects for welfare
    - Disadvantage: Additional assumptions (e.g. market clearing, functional form)
3. Hybrid Approach: Theory predicts the welfare effects, data validates.

Empirics

1. **Deductive Approach**
2. Inductive Approach
3. Hybrid Approach

Deductive Approach

- **Idea:** Recover average treatment effects from regressions

$$\Delta \ln p_{ismt} = \gamma_{is} + \gamma_{ts} + \beta_s^p \times \Delta \log E_{itm}^T + \epsilon_{ismt}, \quad (1)$$

$$\Delta \ln w_{imt} = \gamma_{it} + \gamma_{im} + \gamma_{tm} + \beta^w \times \Delta \log E_{itm}^T + \epsilon_{imt}, \quad (2)$$

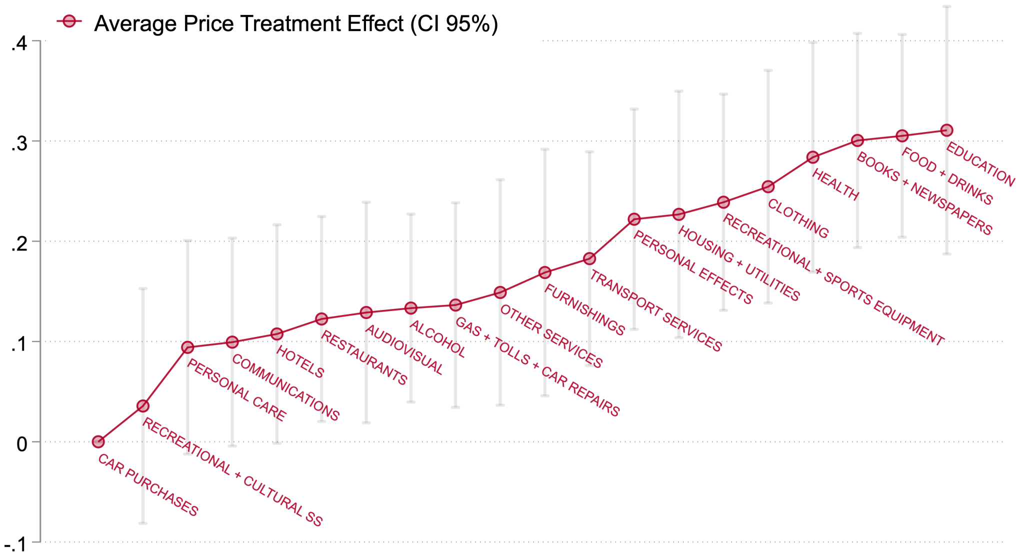
  - Recover prices from gravity fixed effects, i.e. $\Delta \ln p_{ismt} = \frac{1}{1-\sigma_s} \Delta \ln \delta_{istm}$
  - Recover wages from gravity commuting model, i.e. $w_{imt} = \sum_{n=1}^{N} \left(\frac{L_{ni}}{R_n} \right) v_{nmt}$

- Bartik decomposes expenditures into group composition and seasonal demand

Bartik Detail | First Stage | Tourist By Origin

- Note: Empirically impractical to estimate $\left\{ \beta_{i,s}^p, \beta_i^w \right\}$

Average Price effects by Sector (β_s^p)



Empirics

1. Deductive Approach
2. **Inductive Approach**
3. Hybrid Approach

Analytical Expression for Price and Wage effects

Theorem ('Short Run' Elasticities for Prices and Wages)

Imposing **market clearing**, **wage equalization within location** *across sectors, and* **keeping expenditure shares and labor allocation constant**, *we can obtain,*

$$\frac{\partial \ln p_{is}}{\partial \ln E^T} = \underbrace{X_{is}^T / y_{is}}_{\text{Direct Effect}} + \underbrace{\sum_n \frac{v_n}{y_{is}} \pi_{nis} \sum_j \sigma_{nj} \frac{\partial \ln w_j}{\partial \ln E^T}}_{\text{GE Spillover via Spatial Exp Patterns}}$$

$$\frac{\partial \ln w_i}{\partial \ln E^T} = \underbrace{\frac{\sum_s X_{is}^T}{\sum_s y_{is}}}_{\text{Direct Effect}} + \underbrace{\sum_j \sum_s \sum_n \pi_{nis} \frac{\nu_n}{y_{is}} \sigma_{nj} \left(\frac{\sum_s X_{js}^T}{\sum_s y_{js}} \right) + \dots}_{\text{GE Spillover via Spatial Exp Patterns}}$$

- Note: In the paper we do long run elasticities too using "exact hat"

Empirics

1. Deductive Approach
2. Inductive Approach
3. **Hybrid Approach**

Hybrid Approach

- **Idea:** GE theory predicts locations that are most/least affected & data validates

- Non-parametric regressions with theory predicted bins

$$\Delta \ln p_{ismt} = \gamma_{is} + \gamma_{ts} + \beta_s^{p,high} \times \mathbb{1}_{is}^{p,high} \times \Delta \log E_{imt}^T + \beta_s^{p,low} \times \mathbb{1}_{is}^{p,low} \times \Delta \log E_{imt}^T + \epsilon_{ismt}$$

$$\Delta \ln w_{imt} = \gamma_i + \gamma_t + \beta^{w,high} \times \mathbb{1}_i^{w,high} \times \Delta \log E_{imt}^T + \beta^{w,low} \times \mathbb{1}_i^{w,low} \times \Delta \log E_{imt}^T + \epsilon_{imt}$$

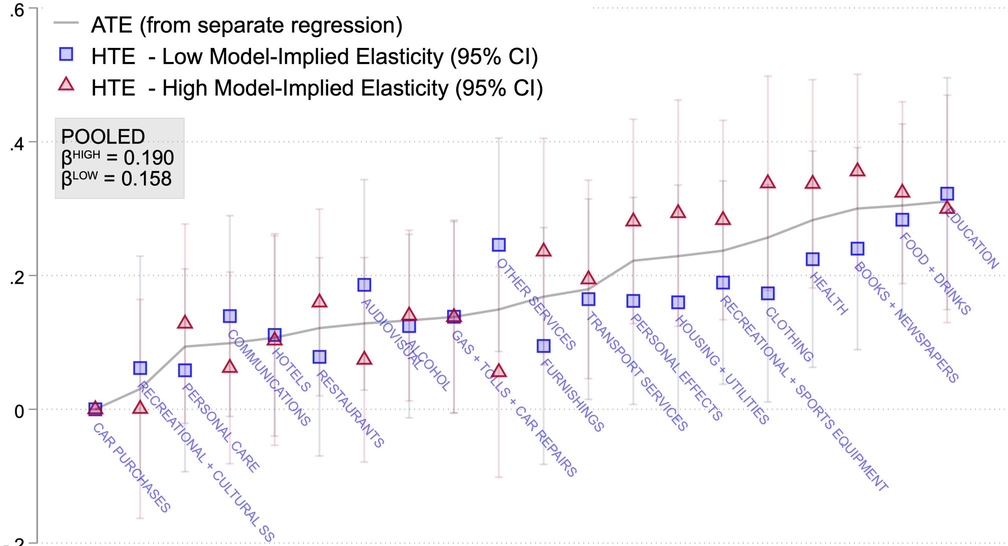
- where

$$\mathbb{1}_{is}^{p,high} = \mathbb{1}\left\{\eta_{is}^p > median\left(\eta_{is}^p\right)|s\right\}$$

$$\mathbb{1}_{is}^{p,low} = \mathbb{1}\left\{\eta_{is}^p \leq median\left(\eta_{is}^p\right)|s\right\}$$

- Non-parametrically identifies heterogenous treatment effects

Heterogeneous Price Effects by Sector ($\beta_s^{p,low}, \beta_s^{p,high}$)



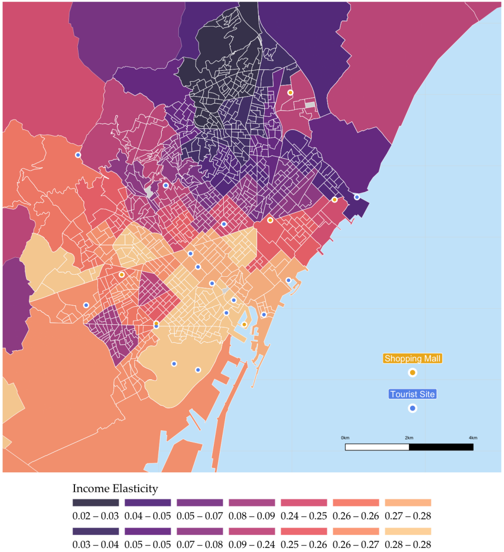
Heterogeneous Income Effects

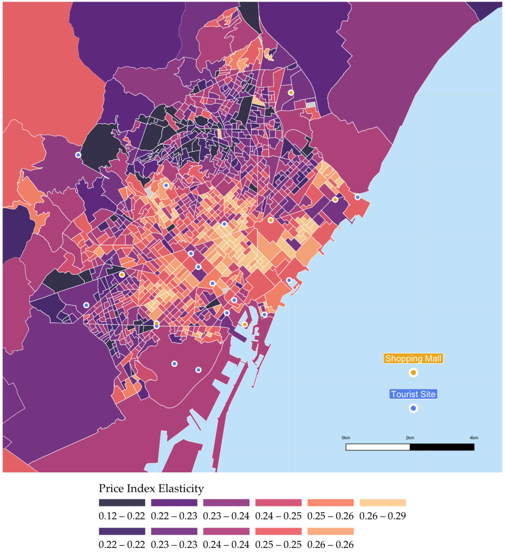
	(1) First Stage	(2) SR
S.ln(Tourist Expenditures)	0.0530**	0.00326
	(0.0173)	(0.0109)
x Short Run Wage Elasticity > Median		0.289**
		(0.0940)
Observations	24238	24238
IV	1	1
FE location-year	1	1
FE year-month-type	1	1
FE location-month	1	1

Standard errors in parentheses

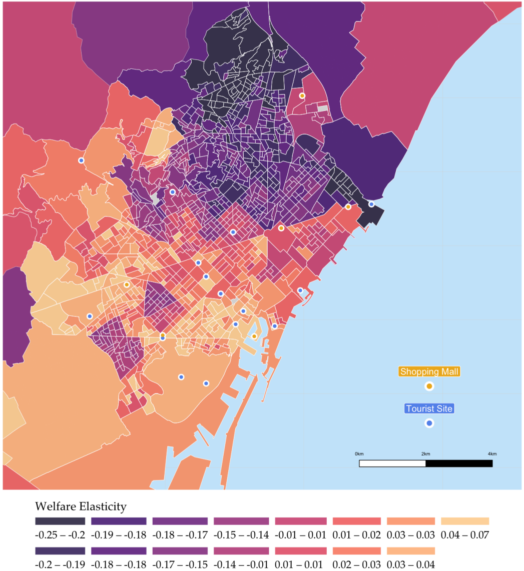
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Hybrid: Income and Price Index Effects





Hybrid: Welfare Effects



Is tourism good for locals?

- Results (February vs July $\approx$ 70.3pc increase in Tourist Exp)
  - Median Welfare deterioration of 8.6pc
  - Substantial heterogeneity
  - 10th percentile: -13.65pc
  - 90th percentile: $+$2.5pc

Conclusion

Conclusion

New Data

- New intra-city spatial patterns of consumption for locals and tourists

New Theory

- Urban Specific Factors model for intra-urban welfare analysis

New Methodology

- Estimate welfare effects by "hybrid" approach

New Insights

- On average tourism hurts locals, but large heterogeneity

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Additional Data

- Idealista imputed data on housing price trends (Euro/m2)
    - Frequency: Monthly
    - Time Period: January 2010 - June 2020
    - Spatial Resolution: Neighborhoods in Barcelona (Barrios)
    - Available for rental rates and housing prices

Back

Consumption of Locals

- Nested CES preferences across sectors and locations with elasticities $\{\sigma_s, \eta\}$

$$u_n = \frac{v_n}{\left(\sum_{s=0}^{S} \alpha_s \left(\left(\sum_{i=1}^{N} \gamma_{is} \tau_{isn}^{1-\sigma_s} p_{is}^{1-\sigma_s}\right)^{\frac{1}{1-\sigma_s}}\right)^{1-\eta}\right)^{\frac{1}{1-\eta}}} B_n$$

- Demand function,

$$X_{isn} = \left(\frac{\tau_{isn}^{1-\sigma_s} p_{is}^{1-\sigma_s}}{\sum_j \tau_{jsn}^{1-\sigma_s} p_{js}^{1-\sigma_s}}\right) \alpha_{n,s} v_n$$

where $\alpha_{n,s}$ corresponds to the nested CES sectoral expenditure share

back

Consumption of Tourists

- For tourists we abstract from bilateral trade costs and define symmetrically,

$$X_{is}^{T} = \left(\frac{\gamma_{is}^{T} p_{is}^{1-\sigma_s}}{\sum_j \gamma_{js}^{T} p_{js}^{1-\sigma_s}} \right) \alpha_s^T E^T,$$

  where α_s^T corresponds to the nested CES sectoral expenditure share

back

Production and Labor supply

- Production with a Cobb-Douglas production function with a specific factor,

$$Q_{is} = A_{is} L_{is}^{\beta_s} K_{is}^{1-\beta_s}.$$

- Labor Supply is defining disposable income,

$$v_n = \left(\sum_i \mu_{ni}^{-\theta} w_i^{\theta} \right)^{\frac{1}{\theta}}$$

- which generates

$$L_{ni} = \frac{\mu_{ni}^{-\theta} w_i^{\theta}}{\sum_{i,s} \mu_{ni}^{-\theta} w_i^{\theta}} L_n$$

back

Equilibrium

For any initial distribution of residential labor endowment $\{R_i\}$, a given level tourist expenditures $\{E^T\}$, a given level of sector-location factor endowment $\{M_{is}\}$, parameters defining the preference and production structure $\{\sigma_s, \eta, \alpha_s, \beta_s, \theta\}$, and geography $\left\{A_{i,s}, \gamma_{is}, \gamma^T_{i,s}, \tau_{nis}, \mu_{ni}\right\}$, an equilibrium is $\{w_i, p_{is}\}$ s.t.

1. Sector-location specific market clearing

$$p_{is}Q_{is} = \sum_n \left(\frac{\tau_{isn}^{1-\sigma_s} p_{is}^{1-\sigma_s}}{\sum_j \tau_{jsn}^{1-\sigma_s} p_{js}^{1-\sigma_s}} \right) \alpha_s \left(\sum_i \mu_{ni}^{-\theta} w_i^{\theta} \right)^{\frac{1}{\theta}} + X^T_{is}$$

2. Labor Market clearing

$$L_i \sum_s \frac{1}{\beta_s} w_i \left(\frac{L_{is}}{L_i} \right) = \sum_s \sum_n \left(\frac{\tau_{isn}^{1-\sigma_s} p_{is}^{1-\sigma_s}}{\sum_j \tau_{jsn}^{1-\sigma_s} p_{js}^{1-\sigma_s}} \right) \alpha_s \left(\sum_i \mu_{ni}^{-\theta} w_i^{\theta} \right)^{\frac{1}{\theta}} + \sum_s X^T_{is}$$

back

	(1)
	S.ln Tourists Expenditures
Tourists, group component of ivT	0.602***
	(0.106)
Observations	24238
F	32.05
FE location-year	1
FE year-month	1
FE location-month	1

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

back

Inductive Approach: Exact Hat Algebra

- Goods market clearing condition

$$\hat{p}_{is}^{\frac{1}{1-\beta_s}} \hat{w}_i^{-\frac{\beta_s}{1-\beta_s}} = \sum_n \left(\frac{X_{nis}}{y_{is}}\right) \frac{\left(\left(\sum_{i=1}^N \pi_{nis}\hat{p}_{is}^{1-\sigma_s}\right)^{\frac{1}{1-\sigma_s}}\right)^{1-\eta}}{\sum_{s=0}^S \left((\pi_{n,s})\left(\left(\sum_{i=1}^N \pi_{nis}\hat{p}_{is}^{1-\sigma_s}\right)^{\frac{1}{1-\sigma_s}}\right)^{1-\eta}\right)} \frac{\hat{p}_{is}^{1-\sigma_s}}{\sum_j \pi_{jsn}\hat{p}_{js}^{1-\sigma_s}}$$

$$+ \frac{X_{is}^T}{y_{is}} \frac{\left(\left(\sum_{i=1}^N \pi_{is}^T \hat{p}_{is}^{1-\sigma_s}\right)^{\frac{1}{1-\sigma_s}}\right)^{1-\eta}}{\sum_{s=0}^S \left(\pi_s^T \left(\left(\sum_{i=1}^N \pi_{is}^T \hat{p}_{is}^{1-\sigma_s}\right)^{\frac{1}{1-\sigma_s}}\right)^{1-\eta}\right)} \frac{\hat{p}_{is}^{1-\sigma_s}}{\sum_j \left(\pi_{js}^T\right)\hat{p}_{js}^{1-\sigma_s}} \hat{E}^T, \tag{3}$$

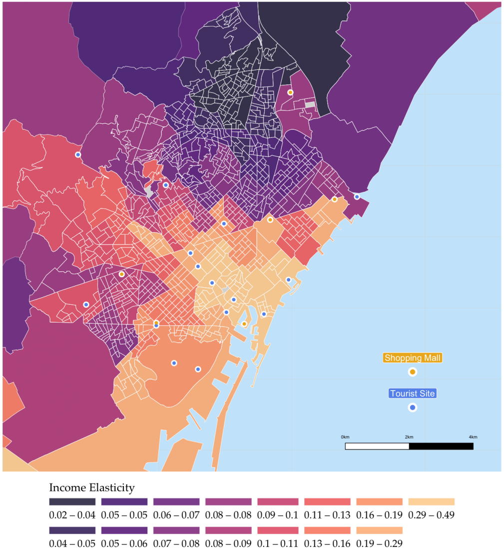
- Labor Market clearing condition,

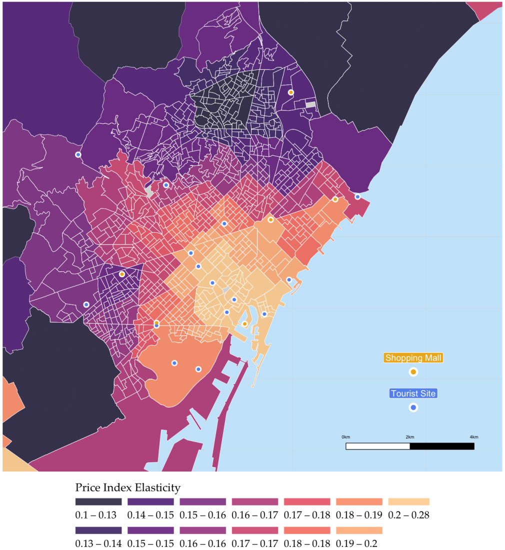
$$\sum_s \left(\frac{\beta_s y_{is}}{\sum_s \beta_s y_{is}}\right) \hat{p}_{is}^{\frac{1}{1-\beta_s}} \hat{w}_i^{-\frac{\beta_s}{1-\beta_s}} = \sum_n \sigma_{ni}\left(\frac{R_n w_i}{\sum_s \beta_s y_{is}}\right) \frac{\hat{w}_i^{1+\theta}}{\sum_j \sigma_{nj}\hat{w}_j^{\theta}}.$$

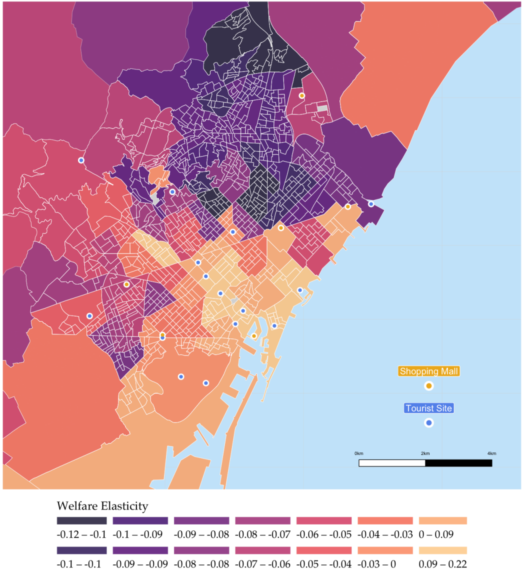
Inductive Approach: Calibration

- Factor share of labor, $\beta_s = .66$
- Labor Supply elasticity $\theta = 3.3$ (Monte et al.; 2018)
- Lower nest elasticity of substitution $\sigma_s = 3.9$ (Hottman et al.; 2016)
- Upper nest elasticity of substitution $\eta = 1.8$

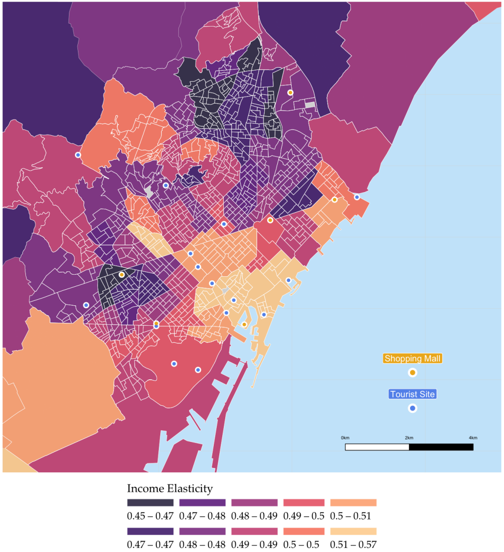
back

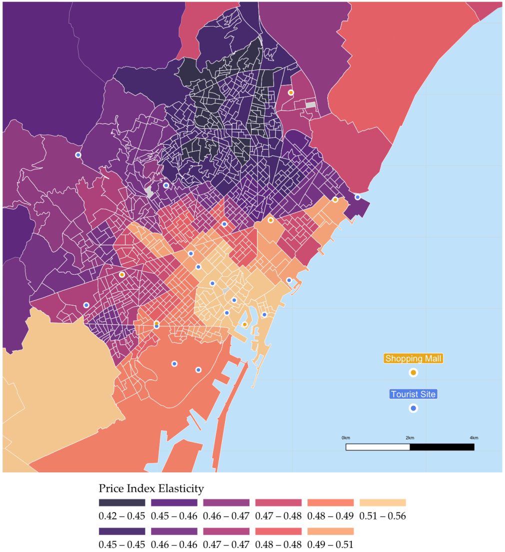

Shopping Mall
Tourist Site
0km
2km
4km
Income Elasticity
0.02 – 0.04
0.05 – 0.05
0.06 – 0.07
0.08 – 0.08
0.09 – 0.1
0.11 – 0.13
0.16 – 0.19
0.29 – 0.49
0.04 – 0.05
0.05 – 0.06
0.07 – 0.08
0.08 – 0.09
0.1 – 0.11
0.13 – 0.16
0.19 – 0.29

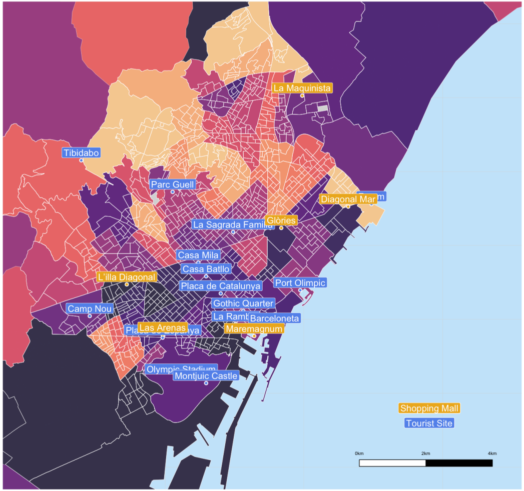

Shopping Mall
Tourist Site
0km
2km
4km
Price Index Elasticity
0.1 – 0.13
0.14 – 0.15
0.15 – 0.16
0.16 – 0.17
0.17 – 0.18
0.18 – 0.19
0.2 – 0.28
0.13 – 0.14
0.15 – 0.15
0.16 – 0.16
0.17 – 0.17
0.18 – 0.18
0.19 – 0.2


Shopping Mall
Tourist Site
0km
2km
4km
Welfare Elasticity
-0.12 – -0.1
-0.1 – -0.09
-0.09 – -0.08
-0.08 – -0.07
-0.06 – -0.05
-0.04 – -0.03
0 – 0.09
-0.1 – -0.1
-0.09 – -0.09
-0.08 – -0.08
-0.07 – -0.06
-0.05 – -0.04
-0.03 – 0
0.09 – 0.22

back


Shopping Mall
Tourist Site
0km
2km
4km
Income Elasticity
0.45 – 0.47
0.47 – 0.48
0.48 – 0.49
0.49 – 0.5
0.5 – 0.51
0.47 – 0.47
0.48 – 0.48
0.49 – 0.49
0.5 – 0.5
0.51 – 0.57


Shopping Mall
Tourist Site
0km
2km
4km
Price Index Elasticity
0.42 – 0.45
0.45 – 0.46
0.46 – 0.47
0.47 – 0.48
0.48 – 0.49
0.51 – 0.56
0.45 – 0.45
0.46 – 0.46
0.47 – 0.47
0.48 – 0.48
0.49 – 0.51



Welfare Changes

-0.39 – 0.06pc	0.18 – 0.25pc	0.32 – 0.42pc	0.52 – 0.61pc	0.71 – 0.85pc	0.99 – 1.17pc	1.28 – 1.42pc	1.64 – 2.81pc
0.06 – 0.18pc	0.25 – 0.32pc	0.42 – 0.52pc	0.61 – 0.71pc	0.85 – 0.99pc	1.17 – 1.28pc	1.42 – 1.64pc	

Bartik

- Local Expenditure growth can be decomposed into,

$$g_i^T = \underbrace{\sum_g \varsigma_{i,g|i} \times g_{E_g}^T}_{\text{Group Composition}} + \underbrace{\sum_g \sum_s \varsigma_{i,s,g|i} \times g_{\kappa,s,g}^T}_{\text{Seasonal Demand}}$$

- initial group composition and initial consumption shares are given by,

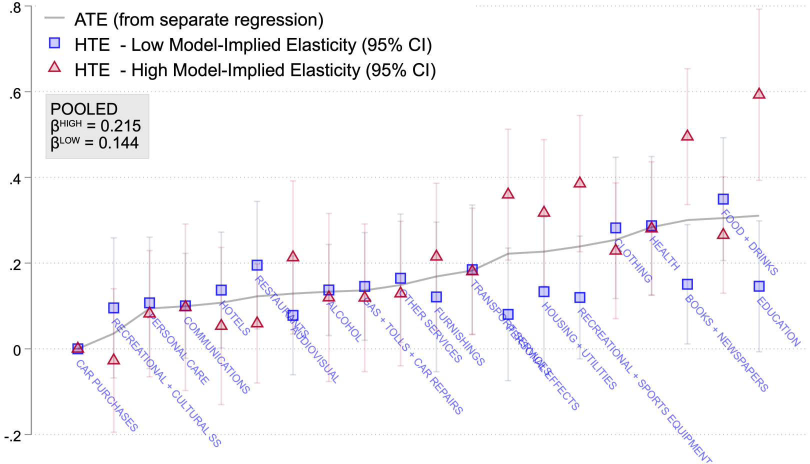
$$\varsigma_{i,s,g|i} \equiv \frac{E_{i,s,g}^T}{E_i^T} \quad \varsigma_{i,g|i} \equiv \frac{E_{i,g}^T}{E_i^T}$$

- and where changes in total group's income and in within-group category spending are given by,

$$g_{E_g}^T \equiv \frac{\Delta E_g^T}{E_g^T} \quad g_{\kappa,sg}^T = \frac{\Delta \kappa_{sg}^T}{\kappa_{sg}^T}$$

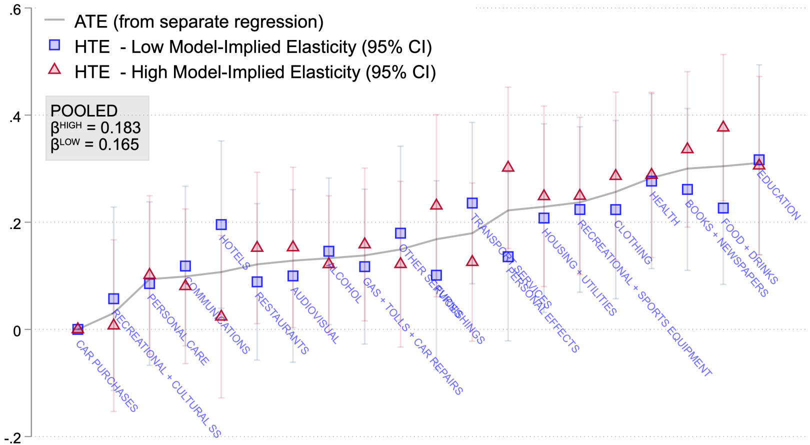
- Initial Shares exogenous i.e. orthogonal to local amenity shifts (Goldsmith-Pinkham et al.; 2018)

back



ATE (from separate regression)
HTE - Low Model-Implied Elasticity (95% CI)
HTE - High Model-Implied Elasticity (95% CI)
POOLED
βHIGH = 0.215
βLOW = 0.144
.8
.6
.4
.2
0
-.2
CAR PURCHASES
RECREATIONAL + CULTURAL SS
PERSONAL CARE
COMMUNICATIONS
HOTELS
RESTAURANTS
AUDIOVISUAL
ALCOHOL
GAS + TOLLS + CAR REPAIRS
OTHER SERVICES
FURNISHINGS
TRANSPORT SERVICES
PERSONAL EFFECTS
HOUSING + UTILITIES
RECREATIONAL + SPORTS EQUIPMENT
CLOTHING
HEALTH
BOOKS + NEWSPAPERS
FOOD + DRINKS
EDUCATION

back



ATE (from separate regression)
HTE - Low Model-Implied Elasticity (95% CI)
HTE - High Model-Implied Elasticity (95% CI)
POOLED
βHIGH = 0.183
βLOW = 0.165
.6
.4
.2
0
-.2
CAR PURCHASES
RECREATIONAL + CULTURAL SS
PERSONAL CARE
COMMUNICATIONS
HOTELS
RESTAURANTS
AUDIOVISUAL
ALCOHOL
GAS + TOLLS + CAR REPAIRS
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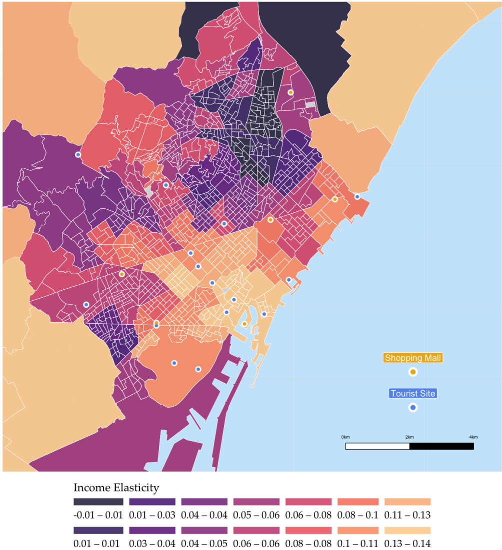
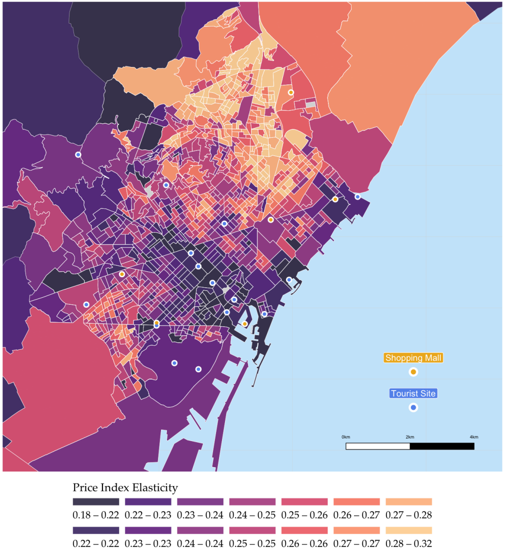
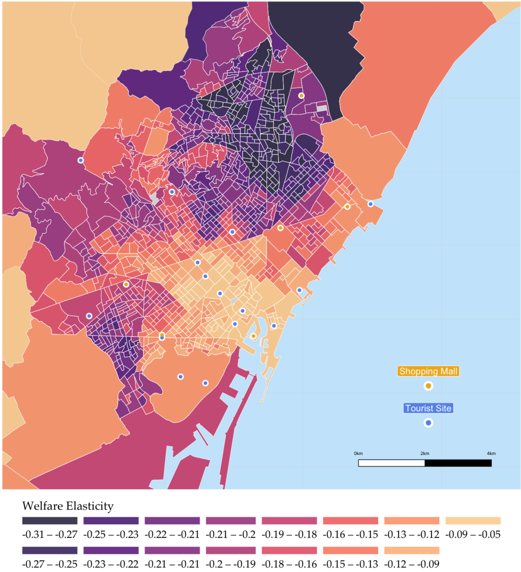
EDUCATION

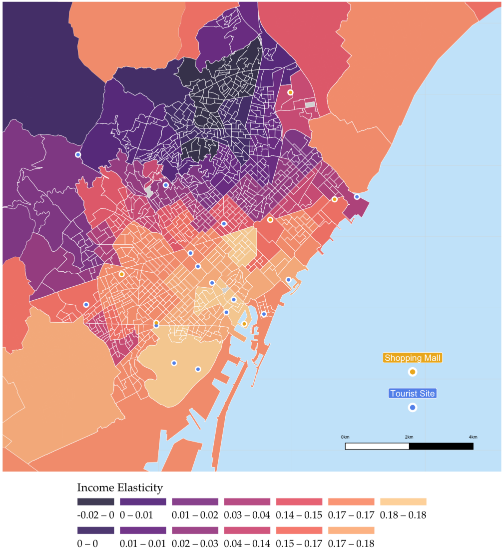
back

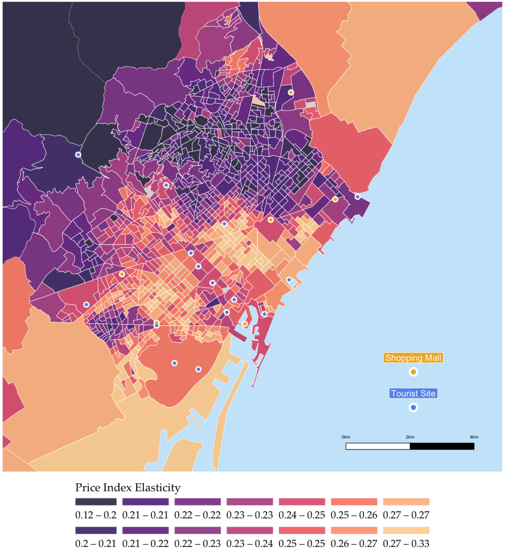

Shopping Mall
Tourist Site
0km
2km
4km
Income Elasticity
-0.01 – 0.01
0.01 – 0.03
0.04 – 0.04
0.05 – 0.06
0.06 – 0.08
0.08 – 0.1
0.11 – 0.13
0.01 – 0.01
0.03 – 0.04
0.04 – 0.05
0.06 – 0.06
0.08 – 0.08
0.1 – 0.11
0.13 – 0.14

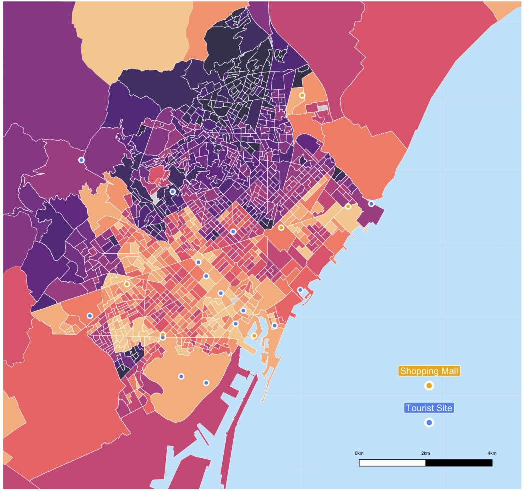

Shopping Mall
Tourist Site
0km
2km
4km
Price Index Elasticity
0.18 – 0.22
0.22 – 0.23
0.23 – 0.24
0.24 – 0.25
0.25 – 0.26
0.26 – 0.27
0.27 – 0.28
0.22 – 0.22
0.23 – 0.23
0.24 – 0.24
0.25 – 0.25
0.26 – 0.26
0.27 – 0.27
0.28 – 0.32


Shopping Mall
Tourist Site
0km
2km
4km
Welfare Elasticity
-0.31 – -0.27
-0.25 – -0.23
-0.22 – -0.21
-0.21 – -0.2
-0.19 – -0.18
-0.16 – -0.15
-0.13 – -0.12
-0.09 – -0.05
-0.27 – -0.25
-0.23 – -0.22
-0.21 – -0.21
-0.2 – -0.19
-0.18 – -0.16
-0.15 – -0.13
-0.12 – -0.09

back


Shopping Mall
Tourist Site
0km
2km
4km
Income Elasticity
-0.02 – 0
0 – 0.01
0.01 – 0.02
0.03 – 0.04
0.14 – 0.15
0.17 – 0.17
0.18 – 0.18
0 – 0
0.01 – 0.01
0.02 – 0.03
0.04 – 0.14
0.15 – 0.17
0.17 – 0.18


Shopping Mall
Tourist Site
0km
2km
4km
Price Index Elasticity
0.12 – 0.2
0.21 – 0.21
0.22 – 0.22
0.23 – 0.23
0.24 – 0.25
0.25 – 0.26
0.27 – 0.27
0.2 – 0.21
0.21 – 0.22
0.22 – 0.23
0.23 – 0.24
0.25 – 0.25
0.26 – 0.27
0.27 – 0.33



Welfare Elasticity

-0.32 – -0.22	-0.21 – -0.21	-0.2 – -0.2	-0.19 – -0.18	-0.12 – -0.1	-0.09 – -0.09	-0.08 – -0.08	-0.06 – -0.02
-0.22 – -0.21	-0.21 – -0.2	-0.2 – -0.19	-0.18 – -0.12	-0.1 – -0.09	-0.09 – -0.08	-0.08 – -0.06	

back

$$\Delta \ln w_{imt} = \gamma_{it} + \gamma_{im} + \gamma_{tm} + \beta^{w} \times \Delta \log E^{T}_{itm} + \epsilon_{imt},$$

	(1)
	S.ln Income
S.ln Tourists Expenditures	0.0530**
	(0.0173)
Observations	24238
IV Bartik	1
FE location-year	1
FE year-month	1
FE location-month	1

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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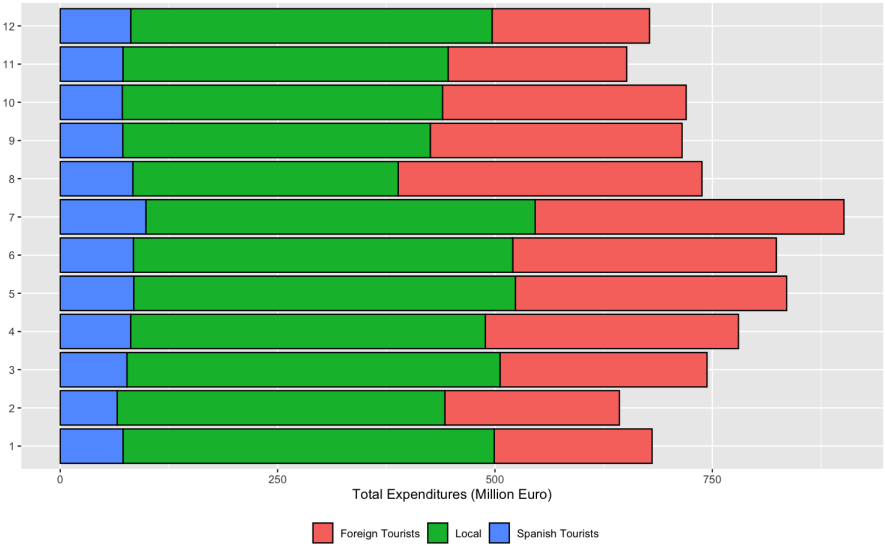
Expenditure by Month



Source: CXBK Payment Processing (2019)

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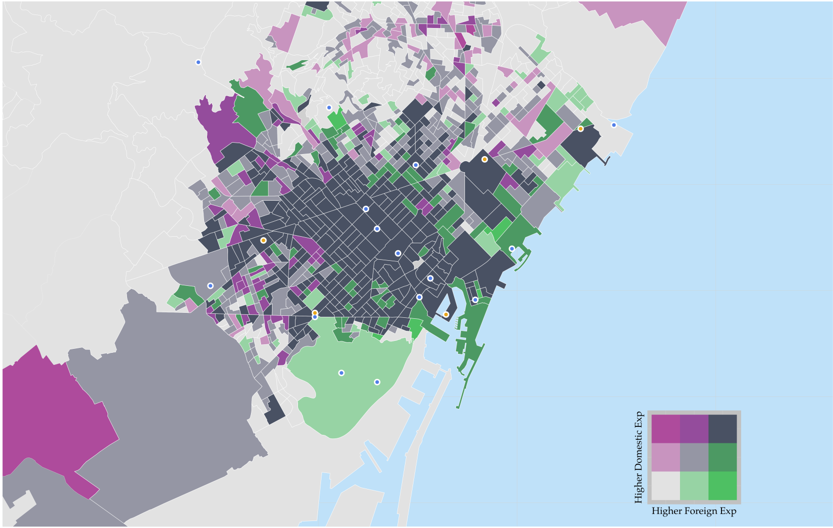
Spanish Tourists vs Foreign Tourist Expenditures



Source: CXBK Payment Processing (2019)

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Estimate gravity equation for commuting flows

$$\log\left(\sigma_{ij}\right) = \alpha \log\left(\tau_{ni}\right) + \gamma_n + \delta_i + \epsilon_{ni}$$

	(1) PPML	(2) OLS	(3) PPML	(4) OLS
Log(Distance)	-4.628***	-2.121***		
	(0.313)	(0.138)		
Distance			-0.485***	-0.127***
			(0.0294)	(0.0156)
Observations	11449	1633	11449	1633
FE: Origin	1	1	1	1
FE: Destination	1	1	1	1

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

back

Simple Theory: Overview

- Change in utility can be expressed as,

$$d \ln u_i = \partial \ln v_i - \sum_s \pi_{is} \partial \ln p_{is}$$

- Applying an envelope condition we can further simplify,

$$d \ln u_i = \sum_s (\sigma_{is} - \pi_{is}) \partial \ln p_{is}$$

  - Tourism is beneficial if i is a net producer of the tourist sector

- If residents allocate their labor to maximize income, we obtain,

$$d \ln v_n = \sum_{i,s} \sigma_{nis} \partial \ln w_{is},$$

back

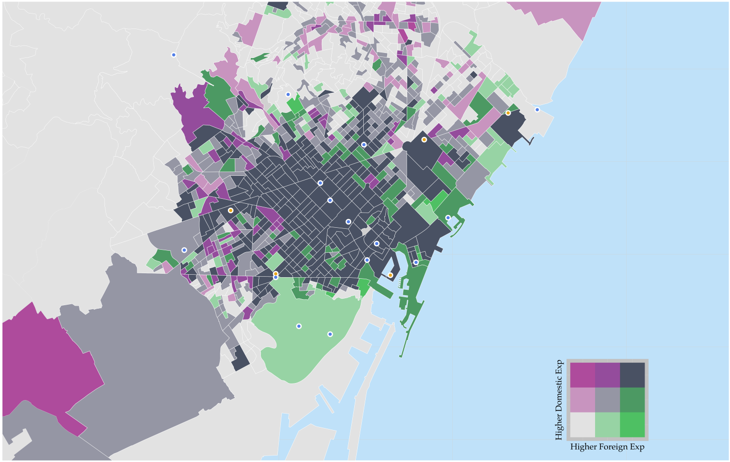
Inductive Approach: Outline

- Quantitative Urban Ricardo-Viner model in exact hat algebra DEK Equations
- Calibration using literature values Calibration
- Two exercises:
  - Short-run impact: Adjustment of consumption only DEK SR Results
  - Long-run impact: Adjustment of both consumption and labor allocations

back

Tourist's consumption geographies differ by their origin

Spanish Tourists vs Foreign Tourist Expenditures



Source: CXBK Payment Processing (2019)

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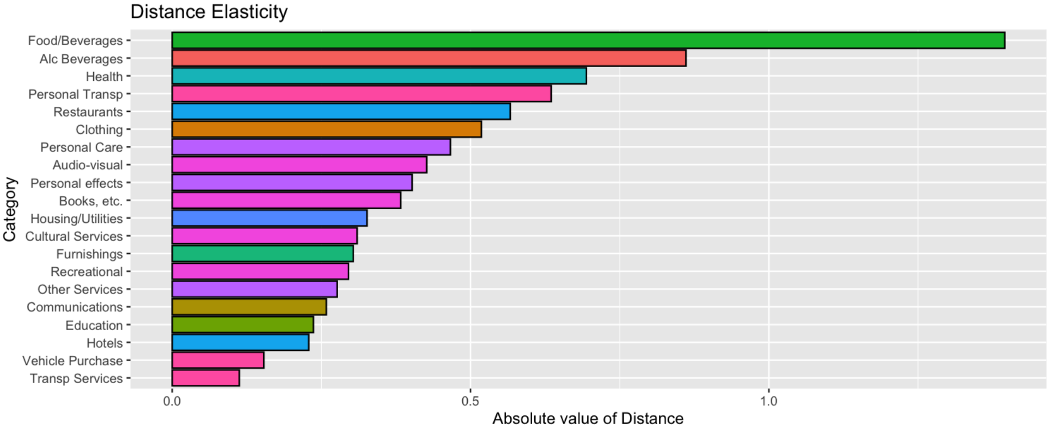
Stylized Facts

Estimate gravity equation for consumption flows

$$\log \pi_{nis} = \phi_s \log \tau_{ni} + \log \delta_{n,s} + \log \delta_{i,s} + u_{ni,s},$$



Source: CXBK Payment Processing (2019)