Tourism and Economic Development: Evidence from Mexico's Coastline

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Motivation

- Tourism is a particular form of market integration.
  - Instead of shipping goods, people travel to consume otherwise non-traded local services and amenities.

- Tourism is one of the most visible and fastest growing facets of globalization in developing countries.
  - Tourism $>$ manu exports for 40% of developing countries, $>$ ag exports for 50%.
  - Average annual growth rate of 11% among developing countries 1982-2012.

- Existing views on tourism and development are divided.
  - Tourism as "Passport to Development" (World Bank, 1979) or "Untapped Potential" (DFID, 1999).
  - Tourism as capture of local public goods by multinationals (e.g. "Who Owns Paradise?" (Honey, 1999)).
  - Tourism as special form of the Dutch disease (Copeland, 1991).

- Despite fast growth and widespread policy interest, existing literature on trade and development has so far paid relatively little attention to this channel of market integration.

This Paper

- Aims to contribute to our understanding of two central questions:
  1. What are the long-term economic consequences of tourism in a developing country?
  2. What are the channels underlying these effects?

- To address these questions, the paper combines:
  - A rich collection of Mexican microdata.
  - A quantitative spatial eq model of trade in goods and tourism services.
  - A new empirical strategy.

Methodology

- The analysis proceeds in three main steps:

1. Estimate reduced form *local* effects of tourism in today's cross-section of Mexican municipalities (long-term effects).
   - IV strategy exploiting variation in beach quality along the coastline.

2. Write down spatial eq model to interpret reduced form effects (all regions affected), and guide estimation of *aggregate* implications.
   - Allow for trade in tourism services in addition to trade in goods and migration.
   - Allow for cross and within-sector sources of local production externalities.
   - Allow for input-output linkages between services and manufacturing.

3. Combine steps 1 and 2 for quantification.
   - Use reduced form moments to inform the calibration of the model.
   - Explore GE counterfactuals to quantify the gains from tourism, and underlying channels.

Preview of Findings

1. Tourism causes large and significant long-run *local* economic gains.
   - A 10% increase in local tourism revenues leads to 2.8% increase in municipality employment, 2.2% in population and a 4.3% increase in nominal GDP.

2. Local effects in part driven by sizable multiplier effects on traded sector production.
   - A 10% increase in tourism revenues increases local manufacturing GDP by 3.2%.
   - This effect holds after conditioning on infrastructure or local inputs.

3. Quantification reveals interesting interplay of channels.
   - Estimate both cross and within-sector spillovers on manuf TFP.
   - These reinforce one another leading to observed local effects.
   - However, they largely offset one another in aggregate national gains.
   - Per capita gains $\approx$4.4% mainly driven by classical market integration effect.

On Today's Menu

- Step 1: Reduced-form evidence
- Step 2: Model
- Step 3: Quantification
- Conclusion

Some Background on Tourism in Mexico

- Tourism activity accounts for roughly 10 percent of Mexican GDP.
- The bulk of domestic and international tourism in Mexico is driven by beach tourism.
  - Coastal municipalities account for two thirds of total tourism.

	Number of Municipalities	Sum of Hotel Revenues in 1998 and 2008 (Thousands of Pesos)	Share of National Hotel Revenues 1998 and 2008
Inland Municipalities	2305	46,070,000	0.365
Coastal Municipalities	150	80,130,000	0.635

- Beach tourism in Mexico started emerging in the 1950s and 1960s. (see graph)
  - Annual number of foreign visitors has grown from close to zero in 1950s to 29 million in 2014.

Empirical Strategy

- Using two most recent cross-sections of Mexican municipalities (2000 and 2010):

$$ln(y_{mct}) = \alpha_{ct} + \beta ln(HotelSales_{mct}) + \alpha' X_{mct} + \varepsilon_{mct}$$

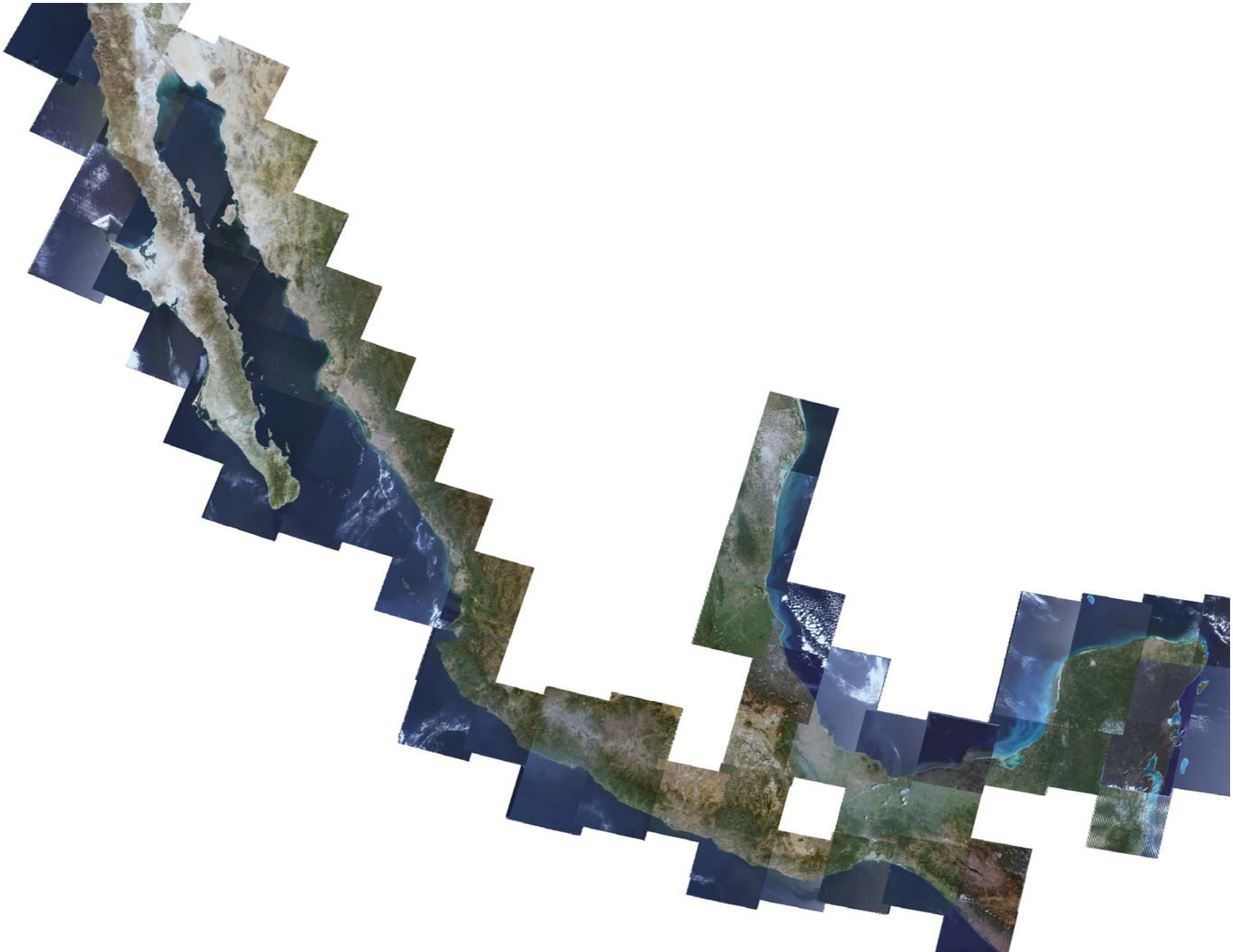
- Right-hand side:
  - Include coast-by-period fixed effects (α_{ct}).
  - Vector of pre-determined municipality controls (X_{mct}).
  - Use inverse hyperbolic sine (IHS) transformation to not kick out zero hotel sales.

- Identification of β:
  - Main concern is that variation in local tourism activity is driven by unobserved factors that also affect local economic outcomes.

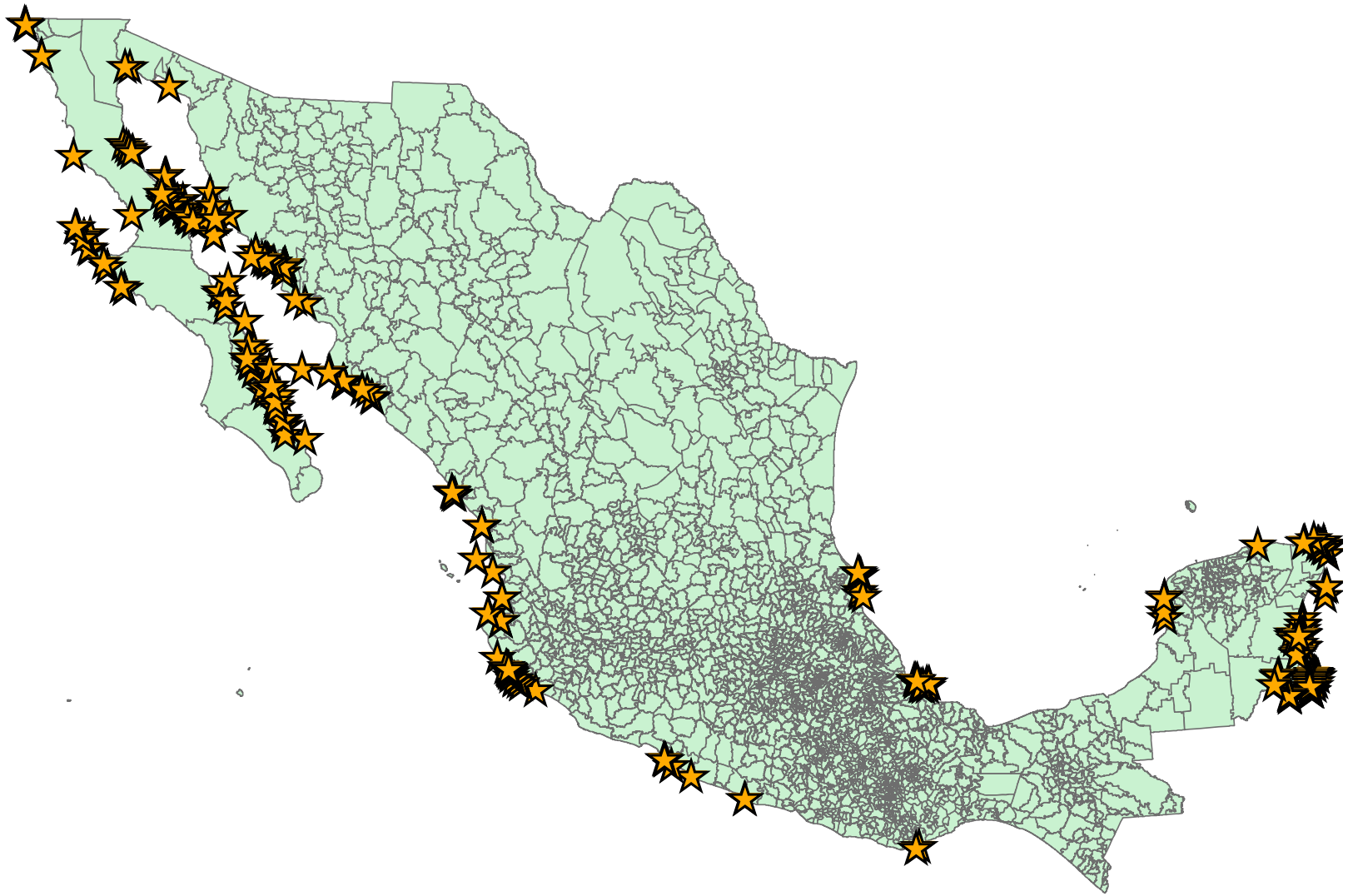
Instrumental Variables

- Idea from literature on tourism management:
  - Tourism activity to large extent determined by very specific natural amenities.
  - "*Beach Rating: A Methodological Approach*" (Leatherman, 1997, aka "Dr Beach").
- We identify two criteria that we can measure well using satellite data:
  - Presence of offshore island close to coastline (5 or 10 km).
  - Fraction of picturesque white-sand beaches within 100 or 200 m of shoreline.
- Binding our hands:
  - Take best existing Mexican beach rating.
  - Measure wavelength ranges of top-ranked beaches.
  - Use satellite data to classify pixels along the coastline.
- Results in 6 IVs for tourism attractiveness:
  - 1 Island IV, and 5 different IVs for onshore beach quality.

Satellite Data



Island Instrument



Identification

- Identifying assumption:
  - These features of beach quality affect local economic outcomes only through their effect on local tourism activity.
- Two potential remaining concerns:
  1. IVs are correlated with omitted factors that affect local production.
  2. IVs have direct effect on immigration through local amenities.
- We further assess the identifying assumption in several ways:
  - How do OLS and IV estimates change after inclusion of pre-determined controls?
  - Exclude origin municipality of top-ranked beaches.
  - Test whether 6 IVs lead to similar point estimates.
  - Placebo falsification: Test effects before beach tourism became discernible force.
  - Test for correlation of current-day model-based estimates of amenities with IVs.

Summary of Reduced-Form Effects

Dependent variables:	(1) Log Employment Both IVs	(2) Log Population Both IVs	(3) Log Wages Both IVs	(4) Log GDP Both IVs	(5) Log Manu+ Mining GDP Both IVs	(6) Log Manu GDP Both IVs
Log Hotel Sales	0.275***	0.221***	0.0333***	0.425***	0.273*	0.317**
	(0.0643)	(0.0686)	(0.0108)	(0.0932)	(0.147)	(0.124)
Log Distance to US Border	-0.00217	0.0444	-0.0872***	-0.317***	-0.405***	-0.282**
	(0.0486)	(0.0514)	(0.00893)	(0.0814)	(0.132)	(0.127)
Log Distance to Mexico City	-0.516***	-0.568***	0.0251*	-0.747***	-1.137***	-1.123***
	(0.0761)	(0.0809)	(0.0130)	(0.112)	(0.176)	(0.152)
Log Municipality Area	0.282***	0.343***	-0.0159	0.264**	0.478***	0.373**
	(0.0810)	(0.0863)	(0.0137)	(0.118)	(0.186)	(0.157)
State Capital Dummy	0.570*	0.540*	-0.0312	1.317***	1.659**	1.589**
	(0.304)	(0.328)	(0.0534)	(0.431)	(0.711)	(0.641)
Old City Dummy	0.809**	0.836**	-0.0367	1.454***	2.179***	2.064***
	(0.323)	(0.349)	(0.0562)	(0.447)	(0.751)	(0.690)
Colonial Port Dummy	0.483*	0.589*	-0.177**	0.693	1.326	1.275
	(0.291)	(0.308)	(0.0707)	(0.512)	(0.832)	(0.817)
Log Average Percipitation	0.253***	0.241***	-0.0677***	-0.571***	-0.917***	-0.900***
	(0.0425)	(0.0428)	(0.0105)	(0.0787)	(0.118)	(0.114)
Log Average Temperature	0.212*	0.273**	0.00815	1.083***	1.486***	1.518***
	(0.111)	(0.108)	(0.0282)	(0.187)	(0.291)	(0.291)
Year-By-Coast FX	✓	✓	✓	✓	✓	✓
Observations	4,889	4,889	4,889	4,889	4,889	4,889
Number of Municipalities	2455	2455	2455	2455	2455	2455
First Stage F-Stat	11.59	11.59	11.59	11.59	11.59	11.59
Over-ID Test P-Value	0.617	0.533	0.305	0.107	0.137	0.308

Interpretation of Multiplier Effects

- Two important questions remaining about positive effects on manufacturing production:

  1. To what extent driven by infrastructure investments? (airports, ports, roads, railways) (see results)

  2. To what extent driven by local inputs into tourism? (see results)

Welfare Implications of Tourism

- Takeaway from reduced-form analysis:
  - Strong positive long-term effects of tourism on local economic outcomes.
  - Multiplier effect on traded sector production.

- But no direct route from reduced form estimates to welfare effects:
  - Estimates based on relative regional outcomes, not aggregate.
  - Population mobile in the long run to arbitrage away real wage differences.
  - Not clear to what extent multipliers imply spillovers in GE.
    (Need to account for direct demand effect and input-output linkages.)

- Strategy to quantify aggregate welfare implications of tourism:
  1. Write down a spatial equilibrium model.
  2. Use reduced form moments to discipline the calibration.
  3. Explore counterfactuals w/o tourism to quantify the gains from tourism.

Model Summary

- Builds on Allen & Arkolakis (2014), Ahlfeldt et al (2015), Redding (2015).
  - Economic geography (labor mobility) with Eaton-Kortum trade structure.

- Introduce into this framework:
  - Trade in tourism-related services in addition to goods.
  - Within and cross-sector spillovers (agglomeration economies).
  - Input-output linkages.

- Tourism affects regional economies and aggregate welfare through two channels.
  - Classical gains from market integration (lowering travel costs between regions and countries).
  - Spillover effects on traded goods production (local and aggregate implications).

Bringing the Model to the Data

- Data on w_n, $L_{M,n}$, $L_{T,n}$ and $L_{S,n}$.
- Estimates of τ_{ij} and t_{ij} (parameterized based on distances). (gravity in tourism trade)
- Estimates of the elasticities ν_M, ν_T, α_{MT}, σ_T, θ, ρ, $\tilde{\kappa}$, γ_M and γ_S.

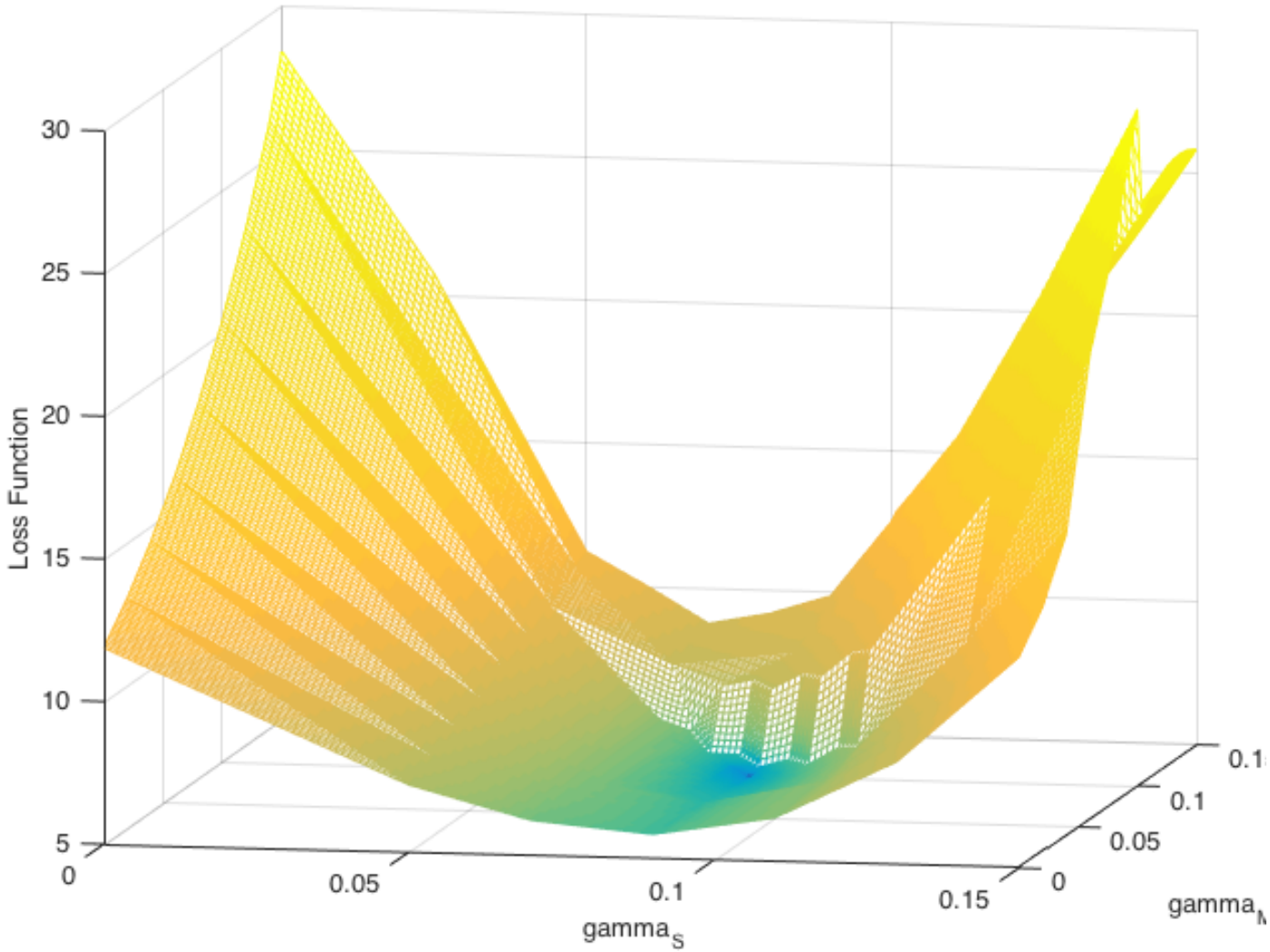
Estimation & Calibration: Steps and Key Parameters

- **Step 1**: Calibrate model to current-day EQ (requires ν_M, ν_T, α_{MT}, θ, σ_T, ρ).
  - Solve for (possibly endogenous) M_n and A_n that rationalize today's observed municipality cross-section. (more)

- **Step 2**: Estimate spatial labor supply elasticity ($\frac{\kappa}{1-\kappa\varepsilon}$).
  - Step 1 allows us to compute local real wages in absence of rich enough local price data.
  - Use IV strategy to estimate $\frac{\kappa}{1-\kappa\varepsilon}$. (more)

- **Step 3**: Use red-form moments to identify cross and within-sector spillovers.
  - Approach based on indirect inference combined with IV exclusion restrictions.
  - Simulate local effects of our IVs without tourism across grid of parameter combinations for γ_S and γ_M.
  - Choose parameters such that model fits cross-section today, but zero correlations between IVs and outcomes in absence of tourism.

Step 3: Identify Spillovers Using Indirect Inference



Best fitting counterfactuals: $\widehat{\gamma_S} = .088$ and $\widehat{\gamma_M} = .084$

Quantification of the Gains from Tourism

- Welfare gains from tourism:
  - Compute counterfactual equilibrium w/o tourism, compare welfare:

	Estimated	No Spillovers
Parameters	$\gamma_S = 0.088$ $\gamma_M = 0.084$	$\gamma_S = 0$ $\gamma_M = 0$
Gains from All Tourism	4.42% (1.09, 8.12) [2.52, 7.56]	4.16% (2.57, 7.82) [2.68, 6.57]
Gains from International Tourism	1.60% (-0.69, 3.09) [0.50, 2.86]	2.43% (2.02, 3.09) [2.05, 2.86]

- Spillovers have strong local effects but limited aggregate impact.
  - Spillovers induce strong co-agglomeration between tourism and manufacturing along the coast
  - But negative impact on manufacturing TFP in less touristic regions.
  - Reminiscent of Kline and Moretti (2014), but not driven by log-linear functional form.

Local and Aggregate Implications of Alternative Spillover Values

Dependent variable:	Counterfactual Change in Log Total GDP			
	(1)	(2)	(3)	(4)
Parameters	$\gamma_S = 0$ $\gamma_M = 0$	$\gamma_S = 0$ $\gamma_M = 0.15$	$\gamma_S = 0.15$ $\gamma_M = 0$	$\gamma_S = 0.088$ $\gamma_M = 0.084$
Log Tourism GDP	0.236*** (0.0575)	0.0501*** (0.0148)	0.637*** (0.144)	0.409*** (0.0928)
Coast FX	✓	✓	✓	✓
Full Set of Controls	✓	✓	✓	✓
Observations	300	300	300	300
Gains from Tourism	**0.0416**	**0.0111**	**0.0673**	**0.0442**
Number of Clusters	32	32	32	32

What Would Have Been the Local Gains in Absence of Migration?

Dependent variable:	Counterfactual Change in Log Local Worker Utility	
	(1)	(2)
Counterfactual	All Tourism	International Tourism
Parameters	$\kappa = 0$	$\kappa = 0$
Counterfactual Change in Log Tourism GDP	0.172***	0.171***
	(0.0496)	(0.0494)
Full Set of Controls	✓	✓
Coast FX	✓	✓
Observations	300	300
Number of Clusters	32	32

Robustness 1: Sensitivity to Endogenous Trade Cost Reductions

	Baseline Counterfactual	Allowing for 50 Percent Reduction in Transport Costs
Gains from Tourism	4.42	4.51
Gains from International Tourism	1.60	1.64
γ_S Estimate	0.088	0.080
γ_M Estimate	0.084	0.090

Robustness 2: Sensitivity Across Alternative Parameter Values

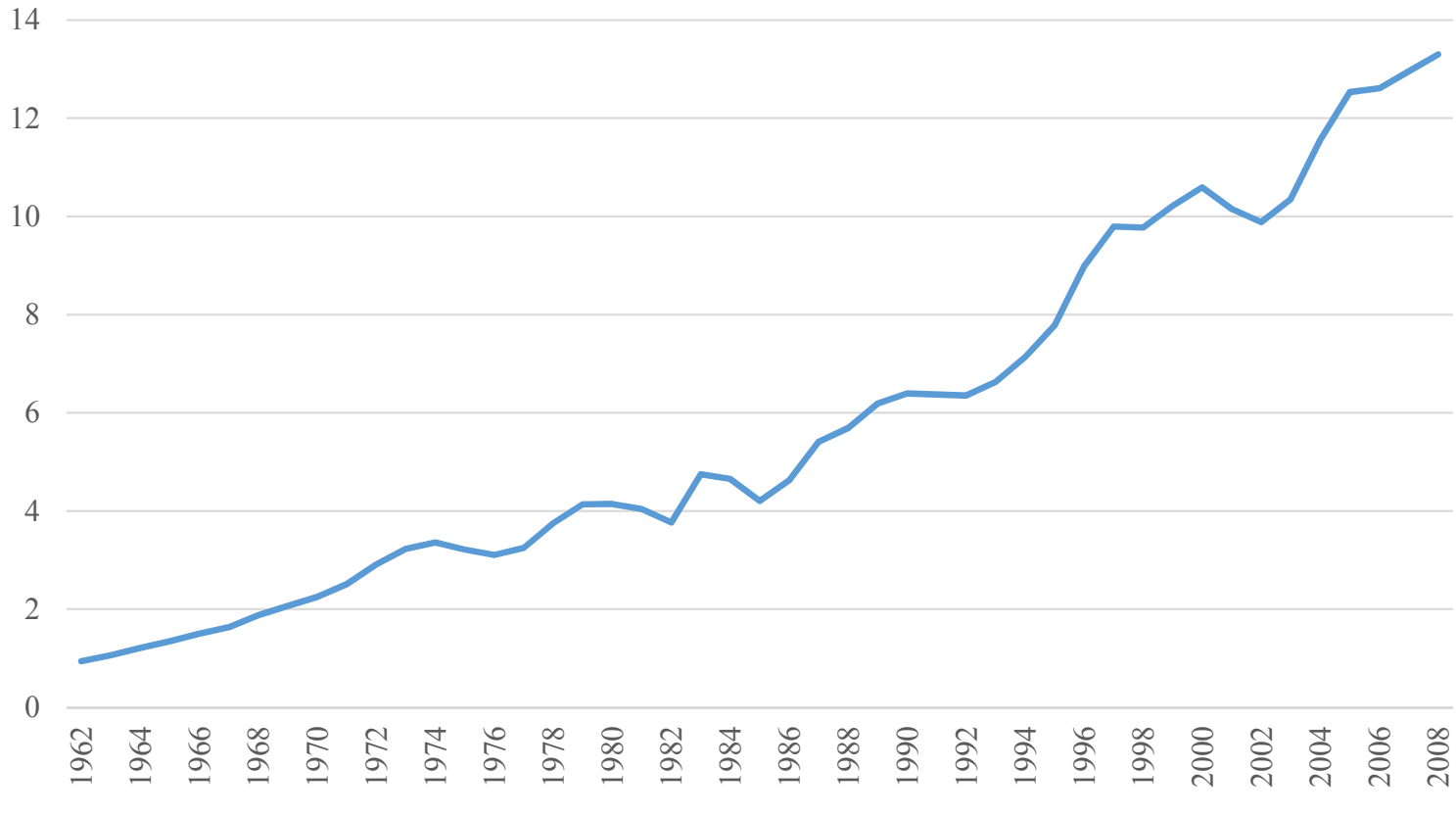
		Gains from Tourism								Gains from International Tourism							
		$\sigma=\rho=1.1$	$\sigma=\rho=1.3$	$\sigma=\rho=1.5$	$\sigma=\rho=1.7$	$\sigma=\rho=2.2$	$\sigma=\rho=2.7$	$\sigma=\rho=3.2$	$\sigma=\rho=3.7$	$\sigma=\rho=1.1$	$\sigma=\rho=1.3$	$\sigma=\rho=1.5$	$\sigma=\rho=1.7$	$\sigma=\rho=2.2$	$\sigma=\rho=2.7$	$\sigma=\rho=3.2$	$\sigma=\rho=3.7$
$\kappa/(1-\kappa\varepsilon)=7.8$	$\gamma_S=0$	8.34	4.04	2.95	2.46	1.95	1.75	1.66	1.63	1.47	0.93	0.83	0.78	0.73	0.69	0.67	0.65
	$\gamma_S=0.028$	8.83	4.77	3.68	3.18	2.65	2.44	2.34	2.29	1.98	1.43	1.32	1.27	1.19	1.14	1.09	1.05
	$\gamma_S=0.058$	9.11	5.41	4.37	3.86	3.3	3.07	2.97	2.91	2.32	1.79	1.67	1.61	1.51	1.44	1.37	1.3
	$\gamma_S=0.088$	9.06	5.79	4.89	4.42	3.85	3.62	3.49	3.42	2.29	1.79	1.67	1.61	1.49	1.4	1.32	1.24
$\kappa/(1-\kappa\varepsilon)=4.8$	$\gamma_S=0$	8.77	4.01	2.92	2.44	1.95	1.77	1.69	1.65	1.58	1.03	0.92	0.87	0.82	0.79	0.77	0.75
	$\gamma_S=0.028$	9.46	4.78	3.66	3.17	2.66	2.47	2.39	2.35	2.18	1.62	1.5	1.44	1.37	1.32	1.27	1.22
	$\gamma_S=0.058$	10.06	5.5	4.37	3.87	3.35	3.15	3.05	3.02	2.7	2.15	2.02	1.96	1.86	1.78	1.71	1.63
	$\gamma_S=0.088$	10.52	6.13	5.01	4.48	3.94	3.73	3.64	3.59	3.12	2.56	2.43	2.35	2.24	2.15	2.04	1.94
$\kappa/(1-\kappa\varepsilon)=1.8$	$\gamma_S=0$	9.25	3.99	2.91	2.45	1.98	1.81	1.74	1.71	1.73	1.16	1.05	1	0.95	0.92	0.9	0.87
	$\gamma_S=0.028$	10.07	4.78	3.67	3.21	2.73	2.56	2.49	2.46	2.41	1.83	1.71	1.66	1.57	1.52	1.48	1.42
	$\gamma_S=0.058$	10.88	5.54	4.43	3.96	3.48	3.31	3.22	3.2	3.06	2.48	2.35	2.29	2.2	2.11	2.04	1.96
	$\gamma_S=0.088$	11.63	6.26	5.13	4.65	4.17	3.98	3.91	3.87	3.67	3.08	2.94	2.87	2.75	2.65	2.54	2.43

Conclusion

- Tourism is a fast-growing facet of globalization in developing countries.
- Despite massive policy interest, we know little about its long-term economic impacts.
- This paper combines rich data with quantitative spatial eq model and new empirical strategy to try to fill this gap.
- Several findings:
  - 1) Tourism causes large and significant long-run local economic gains.
  - 2) These are in part driven by sizable positive spillovers on manufacturing.
  - 3) In aggregate, spillovers are muted and gains mainly driven by classic market integration effect.
- **Thank You!**

Backup Slides

Number of Tourist Arrivals in Mexico



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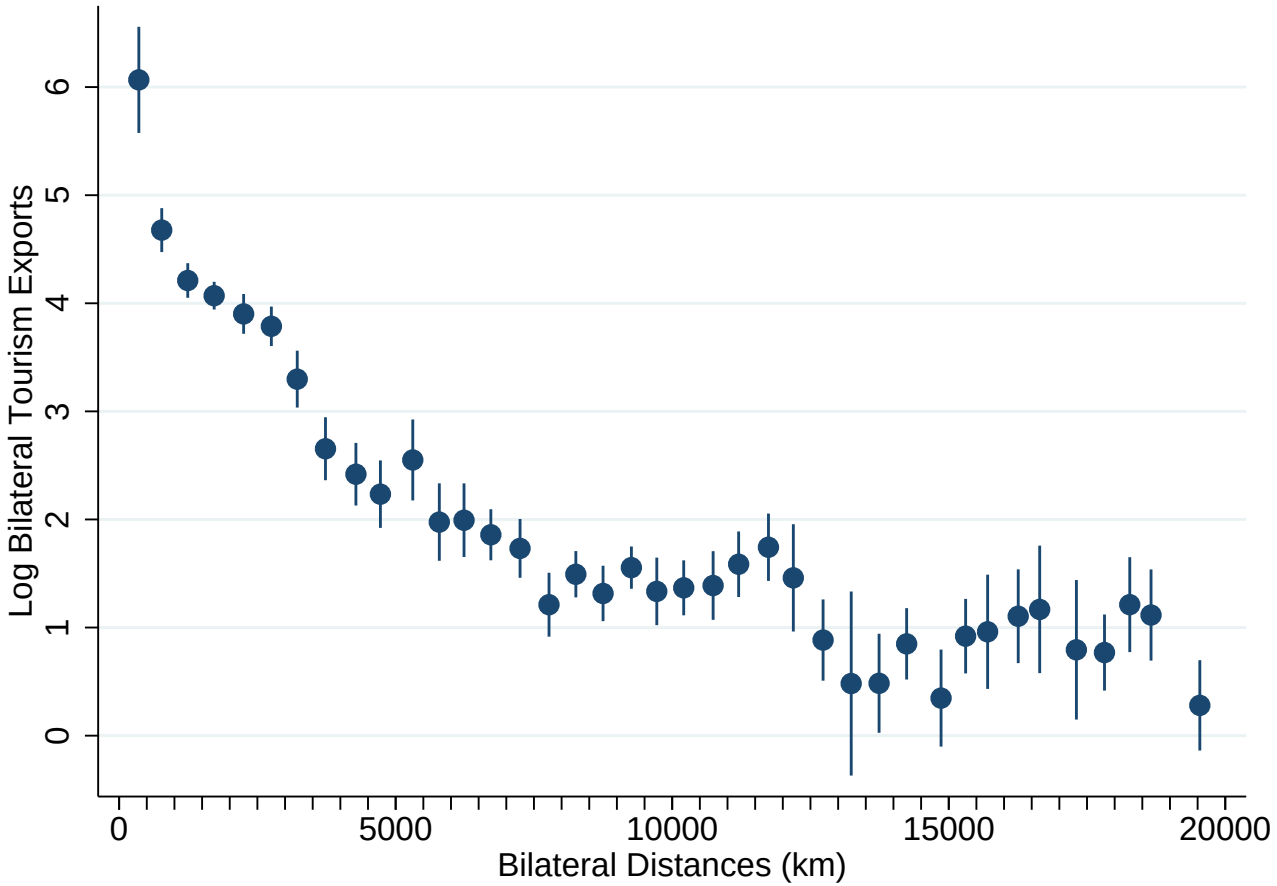
Are Effects Only Driven by Effects on Infrastructure?

	Population Census 2000, 2010				Censos Economicos 1998, 2008					
Dependent Variables:	(1) Log Employment	(2) Log Employment	(3) Log Population	(4) Log Population	(5) Log GDP	(6) Log GDP	(7) Log GDP (Manu+Mining)	(8) Log GDP (Manu+Mining)	(9) Log Manu GDP	(10) Log Manu GDP
	Both IVs	Both IVs	Both IVs	Both IVs	Both IVs	Both IVs	Both IVs	Both IVs	Both IVs	Both IVs
	Baseline	Infrastructure Controls	Baseline	Infrastructure Controls	Baseline	Infrastructure Controls	Baseline	Infrastructure Controls	Baseline	Infrastructure Controls
Log Hotel Sales	0.275***	0.257***	0.221***	0.201***	0.425***	0.400***	0.273*	0.245**	0.317**	0.287**
	(0.0643)	(0.0674)	(0.0686)	(0.0707)	(0.0932)	(0.0883)	(0.147)	(0.122)	(0.124)	(0.120)
Log Distance to US Border	-0.00217	-0.0113	0.0444	0.0373	-0.317***	-0.293***	-0.405***	-0.350***	-0.282**	-0.234**
	(0.0486)	(0.0433)	(0.0514)	(0.0448)	(0.0814)	(0.0704)	(0.132)	(0.111)	(0.127)	(0.109)
Log Distance to Mexico City	-0.516***	-0.417***	-0.568***	-0.450***	-0.747***	-0.430***	-1.137***	-0.645***	-1.123***	-0.654***
	(0.0761)	(0.0472)	(0.0809)	(0.0489)	(0.112)	(0.0666)	(0.176)	(0.0934)	(0.152)	(0.0932)
Log Municipality Area	0.282***	0.238***	0.343***	0.285***	0.264**	0.0188	0.478***	0.0343	0.373**	-0.0339
	(0.0810)	(0.0490)	(0.0863)	(0.0510)	(0.118)	(0.0676)	(0.186)	(0.0974)	(0.157)	(0.0962)
State Capital Dummy	0.570*	0.285	0.540*	0.223	1.317***	0.577*	1.659**	0.551	1.589**	0.514
	(0.304)	(0.241)	(0.328)	(0.255)	(0.431)	(0.307)	(0.711)	(0.463)	(0.641)	(0.466)
Old City Dummy	0.809**	0.605**	0.836**	0.620**	1.454***	0.885**	2.179***	1.251**	2.064***	1.164**
	(0.323)	(0.278)	(0.349)	(0.295)	(0.447)	(0.347)	(0.751)	(0.534)	(0.690)	(0.539)
Colonial Port Dummy	0.483*	0.0936	0.589*	0.127	0.693	-0.438	1.326	-0.340	1.275	-0.327
	(0.291)	(0.331)	(0.308)	(0.382)	(0.512)	(0.400)	(0.832)	(0.564)	(0.817)	(0.531)
Log Average Percipitation	0.253***	0.442***	0.241***	0.462***	-0.571***	-0.0189	-0.917***	-0.0714	-0.900***	-0.0841
	(0.0425)	(0.0793)	(0.0428)	(0.0817)	(0.0787)	(0.113)	(0.118)	(0.163)	(0.114)	(0.157)
Log Average Temperature	0.212*	-0.0339	0.273**	0.0179	1.083***	0.580***	1.486***	0.721***	1.518***	0.762***
	(0.111)	(0.104)	(0.108)	(0.100)	(0.187)	(0.169)	(0.291)	(0.262)	(0.291)	(0.265)
Log Distance to Nearest Airport		-0.373***		-0.414***		-0.807***		-1.113***		-1.104***
		(0.0678)		(0.0702)		(0.0982)		(0.142)		(0.140)
Log Distance to Nearest Seaport		-0.0616*		-0.0413		0.0128		0.0139		-0.00515
		(0.0341)		(0.0341)		(0.0580)		(0.0904)		(0.0907)
Log Paved Road Kilometers in Municipality		0.158**		0.188***		0.505***		0.825***		0.774***
		(0.0667)		(0.0700)		(0.0930)		(0.134)		(0.129)
Log Railway Kilometers in Municipality		0.0975***		0.105***		0.269***		0.441***		0.429***
		(0.0235)		(0.0244)		(0.0327)		(0.0452)		(0.0457)
Year-By-Coast FX	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	4,889	4,889	4,889	4,889	4,889	4,889	4,889	4,889	4,889	4,889
Number of Municipalities	2455	2455	2455	2455	2455	2455	2455	2455	2455	2455
First Stage F-Stat	11.59	11.87	11.59	11.87	11.59	11.87	11.59	11.87	11.59	11.87
Over-ID Test P-Value	0.617	0.603	0.533	0.529	0.107	0.0594	0.137	0.0665	0.308	0.208

Are Manufacturing Effects Only Driven by Local Inputs?

	(1)	(2)	(3)	(4)
Dependent variable: Log Manufacturing GDP	Below Median Input Intensity (10 Sectors)	Above Median Input Intensity (11 Sectors)	Sectors Not in Tourism Satellite Use Table (16 Sectors)	Sectors in Tourism Satellite Use Table (5 Sectors)
	Both IVs	Both IVs	Both IVs	Both IVs
	Panel A: Left Hand Side with HIS Transformation			
Log Hotel Sales	0.586***	0.625***	0.530***	0.790***
	(0.164)	(0.164)	(0.154)	(0.180)
Year-By-Coast-By-Sector FX	✓	✓	✓	✓
Full Set of Controls	✓	✓	✓	✓
Observations	53,779	48,890	73,335	29,334
Number of Municipalities	2455	2455	2455	2455
First Stage F-Stat	11.61	11.61	11.61	11.61
Over-ID Test P-Value	0.222	0.722	0.363	0.526

Gravity in Tourism Exports



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Step 1: Calibration to Today's Cross-Section of Regions

- Armed with:
  - Values for $\{w_i, L_i, L_{Mi}, L_{Ti}, L_{Si}\}$.
  - Aggregate trade and tourism shares $\{\pi_{MM}, \lambda_{MM}\}$.
  - Parametrization of trade and tourism costs within Mexico $dist_{ni}^{d_M}$, $dist_{ni}^{d_T}$.
  - Estimates for $(\theta, \sigma_T, \rho, d_M, d_T)$.
- We can solve uniquely for (possibly endogenous) M_n and A_n in today's cross-section of regions, given the structure of the model.
- In order to do so, need:
  - Trade-related elasticities taken from the trade literature ($\theta = 6.1$, $d_M = -1$).
  - Estimate tourism trade elasticity ($\sigma_T = 1.7$, $d_T = -1.46$). (see estimation).
  - Upper-tier elasticity between manufactured goods and tourism ($\rho = 1.7$).
  - Other quantities are directly observed or can be computed from census and trade data.

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Step 2: Spatial Labor Supply Elasticity

- Run model-based estimation equation:
  - $log\, L_n = K_o + \frac{1}{1-\kappa\varepsilon} log\, B_n + \frac{\kappa}{1-\kappa\varepsilon} log \left(\frac{w_n}{P T_n}\right) + \nu_n$
- Estimate local price indices P_n using grid of coordinates and knowledge of θ, σ_T, d_M, d_T, ρ, M_n and A_n. (details)
- Exploit beach IVs to instrument for $log \left(\frac{w_n}{P T_n}\right)$.
  - Identifying assumption is that IVs affect local employment only through their effect on local real wages.
  - Parameter estimate: $\frac{\kappa}{1-\kappa\varepsilon} = 7.8$. (see estimation)

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Estimate Tourism's Trade Elasticity (σ)

- Run model-based estimation equation:
  - $logE_{H,knt} = \delta_{kt} + \zeta_{nk} + (1 - \sigma_T) \ln w_{nt} + \nu_{knt}$.
- Use cross-country panel data on bilateral tourism flows 1990-2010.
  - w_{nt} are relative local consumption prices measured by PPP factors for final consumption goods (IPC Program).
- Aim is to identify long-run (conservative) estimate of σ_T.
  - Run this with contemporaneous and lagged relative prices on the RHS.
- Concerns for identifying σ_T:
  - Likely significant measurement error in PPP factors.
  - Potential endogeneity:
    e.g. destination-specific taste shocks lead to higher prices and higher tourism exports.
- Empirical strategy:
  - Use exchange rate changes to instrument for PPP changes.
  - Re-run same specification only including touristic destinations.

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Step 1: Estimate Tourism's Trade Elasticity (σ_T)

Dependent Variables:	Log Tourism Exports from Origin to Destination						
	(1) Same Year OLS	(2) Same Year IV	(3) 1-Year Lag IV	(4) 2-Year Lag IV	(5) 3-Year Lag IV	(6) 4-Year Lag IV	(7) 5-Year Lag IV
Panel A: All Destinations							
Log Inverse Consumption PPP	-0.140***	-0.201	-0.419*	-0.550**	-0.715**	-0.710**	-0.351
	(0.0402)	(0.205)	(0.227)	(0.222)	(0.281)	(0.301)	(0.227)
Log Destination GDP	0.438***	0.410***	0.238**	0.0699	-0.104	-0.102	0.0216
	(0.0492)	(0.103)	(0.121)	(0.121)	(0.152)	(0.165)	(0.129)
Origin-by-Destination FX	✓	✓	✓	✓	✓	✓	✓
Origin-by-Period FX	✓	✓	✓	✓	✓	✓	✓
Observations	25,089	25,089	20,935	18,328	16,084	14,361	12,497
Number of Orig-Dest Pairs	2899	2899	2596	2513	2265	2169	2098
First Stage F-Stat		171.5	159.9	136.4	72.74	76.19	102.5
Panel B: Touristic Destinations Only							
Log Inverse Consumption PPP	-0.114***	-0.298	-0.488**	-0.571**	-0.656**	-0.616*	-0.361
	(0.0442)	(0.204)	(0.249)	(0.251)	(0.311)	(0.339)	(0.293)
Log Destination GDP	0.402***	0.312***	0.132	-0.00375	-0.141	-0.159	-0.109
	(0.0631)	(0.110)	(0.138)	(0.137)	(0.162)	(0.182)	(0.162)
Origin-by-Destination FX	✓	✓	✓	✓	✓	✓	✓
Origin-by-Period FX	✓	✓	✓	✓	✓	✓	✓
Observations	17,165	17,165	14,294	12,535	11,052	9,874	8,603
Number of Orig-Dest Pairs	1981	1981	1771	1710	1511	1474	1428
First Stage F-Stat		138.0	119.4	125.4	62.48	65.19	69.67

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Price Indices

- PT_n: composite price index for the bundle of manufactured and tourism goods in region n:
  - $PT_n = \left(P_n^{1-\rho} + \Gamma_n^{1-\rho} \right)^{\frac{1}{1-\rho}}$.
- P_n: manufactured goods price index in region n:
  - $P_n = \left[K_1 \sum_{k=1}^{N} (\tau_{nk} w_k)^{-\theta} M_k^{\theta} \right]^{-\frac{1}{\theta}}$
- Γ_n : price index for the bundle of tourism-related services for a resident of region n:
  - $\Gamma_n = \left(\sum_{i \neq n} A_i t_{ni}^{1-\sigma} {w_i}^{1-\sigma} \right)^{\frac{1}{1-\sigma}}$.
- Aggregate local price index: Cobb-Douglas between traded and non-traded:
  - $w_n^{\alpha} PT_n^{1-\alpha}$.

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Estimate Spatial Labor Supply Elasticity

Dependent Variable:	Log Municipality Employment 2000, 2010					
	(1) OLS	(2) Island IV & Beach IV 1	(3) All Five IVs	(4) OLS	(5) Island IV & Beach IV 1	(6) All Five IVs
Log Nominal Wage	1.163***	5.425**	4.235***			
	(0.262)	(2.707)	(1.138)			
Log Real Wage				2.179***	9.446**	7.811***
				(0.447)	(4.582)	(2.018)
Log Distance to US Border	0.0325	0.469	0.347*	0.0410	0.466	0.371*
	(0.0986)	(0.336)	(0.186)	(0.0957)	(0.325)	(0.191)
Log Distance to Mexico City	-0.0291	0.0704	0.0426	0.0532	0.418	0.336*
	(0.142)	(0.153)	(0.114)	(0.138)	(0.306)	(0.175)
Log Municipality Area	0.297***	0.195*	0.224***	0.306***	0.241**	0.255***
	(0.105)	(0.100)	(0.0788)	(0.102)	(0.0938)	(0.0780)
State Capital Dummy	0.916***	-0.393	-0.0275	0.833***	-0.636	-0.306
	(0.312)	(0.875)	(0.452)	(0.302)	(0.961)	(0.496)
Old City Dummy	-0.321	-1.091	-0.876	-0.341	-1.108	-0.936*
	(0.479)	(0.697)	(0.533)	(0.468)	(0.681)	(0.518)
Colonial Port Dummy	2.906***	2.451***	2.578***	2.820***	2.120***	2.278***
	(0.298)	(0.444)	(0.323)	(0.285)	(0.564)	(0.363)
Log Average Percipitation	0.375*	0.702*	0.610**	0.349	0.560	0.513
	(0.211)	(0.423)	(0.298)	(0.212)	(0.397)	(0.315)
Log Average Temperature	-0.313	0.354	0.168	-0.282	0.431	0.271
	(0.897)	(1.011)	(0.962)	(0.891)	(1.030)	(0.985)
Coast FX	✓	✓	✓	✓	✓	✓
Observations	300	300	300	300	300	300
Number of Clusters	32	32	32	32	32	32
First Stage F-Stat		3.014	43.03		2.770	24.94
Over-ID Test P-Value		0.966	0.588		0.897	0.661