

**NEREUS**

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# Modeling the Impacts of Tourism: Insights for Modelers and Practitioners

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# Introduction

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## Tourism as an economic base:

- ✓ Locations with special attractions (natural, cultural, historical) attract revenue from tourists in the same way as production that is exported
- ✓ Tourism is increasingly “man-made” in urban areas (convention facilities, shopping outlets...)
- ✓ Promotion of “hallmark” events to secure the attention of the tourism market for a short, defined period of time (legacy?)
- ✓ Seasonality of tourism makes it an unstable economic base

# Introduction

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Tourism is a problematic sector to identify:

- ✓ Tourism Satellite Accounts; surveys

Tourism tends to be labor-intensive:

- ✓ Tourism is an industry with very low entry requirements (lodging, restaurants, shops)
- ✓ Employment is part-time and seasonal nature
- ✓ Tourism provides entrepreneurial opportunities that can supplement income from the other jobs held by local residents

# Introduction

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## Tourism infrastructure:

- ✓ In developing countries, infrastructure shortages of all kinds (transportation, sanitation, energy) remain an issue to lure tourists
- ✓ The dominance of the large hotel chains and international tour companies reduces the income which any tourist region actually receives
- ✓ The luxury hotel requires disproportionate water, energy, food, land and construction materials

# Introduction

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## Tourism impacts:

- ✓ Domestic *versus* international tourists
- ✓ Financing tourist expenditures – potential crowding-out effects
- ✓ Single-region *versus* interregional systems
- ✓ National *versus* regional effects
- ✓ Opportunity cost of investing in tourism infrastructure
- ✓ Short term *versus* long term

# Focus of this presentation

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Provide *ex ante* modeling-based evidence:

- ✓ Sub-national spaces (regions and urban areas)
- ✓ Input-output and CGE modeling; integrated modeling
  - ✓ Wider economic effects: “value chain approach”
- ✓ Interface between modeling, statistical techniques and spatial issues
- ✓ Use of big data
- ✓ Eight case studies

# 1. Linkages matter

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*The benefits of tourism as an economic base depend on the degree of linkage within and leakage from the regional economy*

Multiplier effects of the economic base of the Azores

Interisland input-output model for the Azores

- ✓ Decomposition of final demand components – economic base

Other issues: determinants of tourism (Bedo and Dentinho, 2007); rural tourism (Calado et al., 2011); tourism and regional growth (Fortuna and Vieira, 2007); Azormod Dynamic CGE Model for Azores (Fortuna, 2009)

# Example: Interisland input-output model



Haddad, E.A., Silva, V., Porsse, A.A. and Dentinho, T.P. 2015. Multipliers in an Island Economy: The Case of the Azores. In: Batabyal, A.A. and Nijkamp, P. (Org.). *The Region and Trade: New Analytical Directions*. Singapore: World Scientific, 205–226.



The economic base of the archipelago represents 25.1% of the final demand, and its composition varies from island to island

Table 8.2. Structure of the economic base of the islands.

	Santa Maria (%)	São Miguel (%)	Terceira (%)	Graciosa (%)	São Jorge (%)	Pico (%)	Faial (%)	Flores (%)	Corvo (%)	Total (%)
Exports agro Portugal	13.8	31.4	33.7	51.1	41.5	33.9	30.8	29.6	21.8	32.0
Exports agro other	0.2	0.4	0.5	1.6	0.4	0.3	1.1	0.3	0.1	0.5
Exports fishery Portugal	1.8	2.5	1.8	1.7	3.9	12.6	3.4	1.0	3.1	3.0
Exports fishery other	1.0	1.3	0.9	0.6	2.3	7.5	1.9	0.4	1.2	1.6
Exports other Portugal	44.6	22.5	9.6	5.5	12.8	5.4	17.1	18.9	4.9	18.6
Exports other other	14.5	6.6	3.6	2.2	2.5	2.3	5.7	6.5	2.6	5.8
Tourism Portugal	2.8	3.9	4.6	4.7	3.3	5.2	7.4	6.0	1.5	4.4
Tourism other	2.8	7.0	3.9	2.3	3.2	6.5	7.1	6.9	1.0	6.0
Government (dependent)*	18.5	24.3	41.4	30.4	30.2	26.0	25.6	30.4	64.0	28.1
Economic base	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: \* Government expenditures financed by external transfers.

## Multiplier effects on the Archipelago are different

**Table 8.5.** Economic-base total output multipliers in the Azores, by component.

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Exports agro Portugal	1.96
Exports agro Other	2.12
Exports fishery Portugal	1.61
Exports fishery other	1.66
Exports other Portugal	1.57
Exports other other	1.48
Tourism Portugal	1.83
Tourism other	1.83
Government (dependent)	1.31
<b>Economic base</b>	<b>1.65</b>

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## Lower island multiplier effects are associated with smallness and remoteness

**Table 8.6.** Island-economic-base output multipliers in the Azores.

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Santa Maria	1.78
São Miguel	1.65
Terceira	1.69
Graciosa	1.57
São Jorge	1.83
Pico	1.68
Faial	1.49
Flores	1.56
Corvo	1.53
<b>Total</b>	<b>1.65</b>

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## 2. It is important to understand the degree of spatial competition of tourist destinations

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Spatial competition occurs in a lower degree whenever we integrate more specialized spaces (tourism clusters)

- Specialization in different tourism outputs generates higher potential for tourism creation/integration (“shopping externalities”)

Spatial competition occurs in a higher degree whenever we integrate more similar spaces

- Structural similarity may lead to tourism diversion based on competitive/geographical advantage (“winner takes it all”)

Example: there is a **spatial hierarchy** in the context of the nine islands in the Azores; moreover, specialization matters

Table 8.7. Spatial decomposition of the multipliers of the islands' economic bases.

	Origin of the economic base									Total (%)
	Santa Maria (%)	São Miguel (%)	Terceira (%)	Graciosa (%)	São Jorge (%)	Pico (%)	Faial (%)	Flores (%)	Corvo (%)	
Santa Maria	84.1	1.4	0.5	0.5	0.4	0.5	0.6	0.6	0.4	3.8
São Miguel	12.1	87.6	15.4	15.4	13.8	14.3	13.3	10.5	10.7	55.5
Terceira	2.2	6.4	79.8	6.2	5.1	5.4	5.3	3.8	3.9	19.7
Graciosa	0.1	0.4	0.3	72.2	0.4	0.5	0.5	0.3	0.2	1.7
São Jorge	0.4	1.3	1.2	1.8	76.2	1.9	1.7	1.1	1.1	3.9
Pico	0.5	1.6	1.4	2.0	2.1	74.8	2.6	1.3	1.3	5.7
Faial	0.4	1.1	1.1	1.6	1.7	2.3	75.5	1.2	1.3	7.7
Flores	0.1	0.3	0.3	0.4	0.3	0.4	0.4	80.9	1.2	1.7
Corvo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	80.1	0.1
Multiplier	1.57	1.67	1.61	1.72	1.63	1.65	1.69	1.59	1.40	1.65
<i>Intra-regional</i>	1.32	1.46	1.28	1.24	1.24	1.23	1.28	1.29	1.12	—
<i>Interregional</i>	0.25	0.21	0.32	0.48	0.39	0.41	0.41	0.30	0.28	—

### 3. Spatial patterns of household consumption with tourism matter

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*How does the observed pattern of domestic tourist expenditures contribute to regional inequality in Brazil?*


Look at different **alternatives of financing tourist expenditures** and their implications for the net multipliers in an integrated framework:

- ✓ Reductions in personal savings
- ✓ Simultaneous monetary-equivalent reductions in consumption in the respective origin regions (substitution effect)

Haddad, E. A., Porsse, A. A., and Rabahy, W. A. (2013). Domestic Tourism and Regional Inequality in Brazil. **Tourism Economics**, v. 19, p. 173-186.

## Use of **large-scale survey** data for domestic tourism to estimate an interregional matrix of expenditures by tourists

### Domestic Tourists Expenditures in Brazil, by Origin-Destination Flows (in BRL millions)

		Destination					Total
		North	Northeast	Southeast	South	Center-West	
Origin	North	316,77	212,51	263,59	63,62	136,57	993,07
	Northeast	61,51	1.438,24	751,57	110,59	110,60	2.472,51
	Southeast	163,07	 3.124,31	4.947,93	814,07	517,31	9.566,69
	South	20,93	349,62	397,42	2.163,94	113,16	3.045,07
	Center-West	81,53	579,21	360,34	266,72	384,24	1.672,05
Total		643,81	5.703,89	6.720,86	3.418,95	1.261,88	17.749,39

## National results: “a zero-sum game” (1)

### Gross Total Effects of Tourist Expenditures on National Output, by Origin-Destination Flows (in BRL millions)

		Destination					Total
		North	Northeast	Southeast	South	Center- West	
Origin	North	502,57	342,13	420,72	104,08	220,64	1.590,14
	Northeast	99,73	2.314,97	1.232,59	181,28	181,29	4.009,85
	Southeast	267,88	5.088,38	8.269,18	1.352,49	856,17	15.834,10
	South	34,28	562,09	637,82	3.577,41	187,18	4.998,78
	Center- West	132,71	940,87	594,80	438,77	629,49	2.736,64
Total		1.037,17	9.248,44	11.155,11	5.654,02	2.074,76	29.169,50



## National results: “a zero-sum game” (2)

### Total Effects of **Foregone Home Consumption** on National Output, by Origin-Destination Flows (in BRL millions)

		Destination					Total
		North	Northeast	Southeast	South	Center-West	
Origin	North	-507,33	-340,36	-422,16	-101,90	-218,73	-1.590,47
	Northeast	-97,84	-2.287,70	-1.195,47	-175,91	-175,93	-3.932,86
	Southeast	-262,46	-5.028,37	-7.963,37	-1.310,20	-832,57	-15.396,97
	South	-33,91	-566,55	-644,01	-3.506,61	-183,38	-4.934,46
	Center-West	-132,91	-944,20	-587,41	-434,79	-626,37	-2.725,68
Total		-1.034,44	-9.167,18	-10.812,43	-5.529,41	-2.036,97	-28.580,44

## National results: “a zero-sum game” (3)

### Net Total Effects of Tourist Expenditures on National Output , by Origin-Destination Flows (in BRL millions)

		Destination					Total
		North	Northeast	Southeast	South	Center-West	
Origin	North	-4,75	1,77	-1,44	2,18	1,91	-0,34
	Northeast	1,88	27,27	37,12	5,37	5,36	76,99
	Southeast	5,42	60,01	305,81	42,29	23,60	437,13
	South	0,37	-4,47	-6,19	70,80	3,80	64,32
	Center-West	-0,20	-3,32	7,39	3,98	3,12	10,96
Total		2,73	81,26	342,68	124,61	37,79	589,07

# Regional results: Domestic tourism as a mechanism of interregional transfers (1)

## Net Total Effects of Tourist Expenditures on Regional Output of the **Southeast**, by Origin-Destination Flows (in BRL millions)

		Destination					Total
		North	Northeast	Southeast	South	Center-West	
Origin	North	-105,72	-79,52	260,43	-21,89	-40,76	12,54
	Northeast	-11,63	-365,25	862,34	-23,59	-14,61	447,26
	Southeast	-180,56	-3.623,75	1.063,87	-928,95	-551,45	-4.220,84
	South	-3,39	-81,55	447,50	-455,06	-14,26	-106,77
	Center-West	-29,61	-240,86	349,66	-105,07	-129,60	-155,48
Total		-330,92	-4.390,93	2.983,81	-1.534,55	-750,69	-4.023,29

## Regional results: Domestic tourism as a mechanism of interregional transfers (2)

### Net Total Effects of Tourist Expenditures on Regional Output of the **Northeast**, by Origin-Destination Flows (in BRL millions)

		Destination					Total
		North	Northeast	Southeast	South	Center-West	
Origin	North	-35,71	254,28	-41,66	-10,10	-19,40	147,41
	Northeast	-53,20	641,43	-684,75	-101,04	-99,20	-296,78
	Southeast	2,71	4.147,47	-111,15	-25,97	-7,81	4.005,26
	South	0,68	467,28	-5,52	-27,08	0,41	435,76
	Center-West	-1,16	752,70	-20,84	-16,78	-17,21	696,72
Total		-86,68	6.263,16	-863,92	-180,96	-143,22	4.988,37

## 4. Scenario-building as a tool to assess potential impacts of investments in tourism infrastructure

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*How to increase the region's attractiveness?*

Long term issue

Behavior of domestic tourists using **choice models of touristic destinations**:

- ✓ Parameterize exogenous shocks

Dynamic interregional CGE model:

- ✓ Baseline *versus* policy scenarios
- ✓ Consistency in all levels of aggregation

# Example: PRODETUR-RJ – marginal flows

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1. Implementation of the investments (2010-2013)
2. Changes in the matrix of expenditures by tourists (2020)

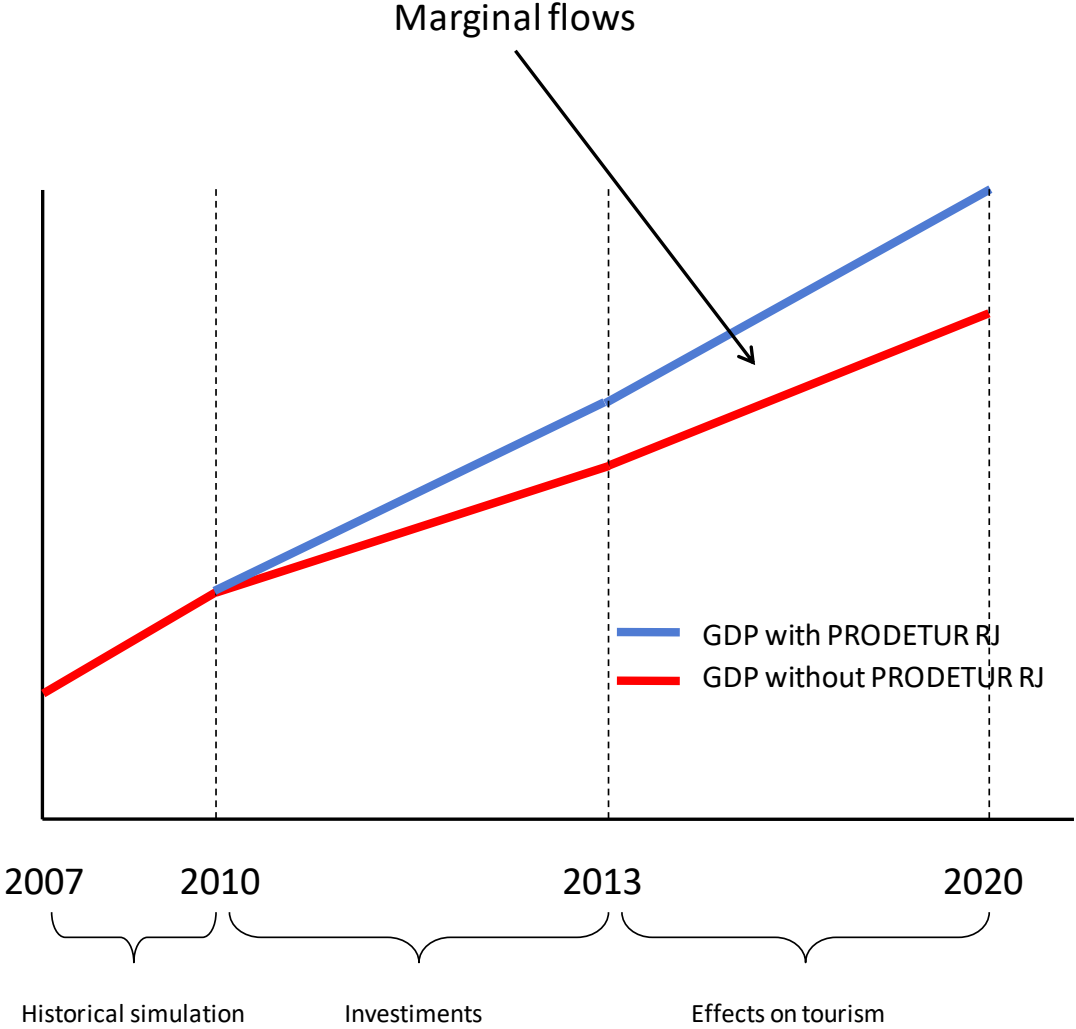
Development of tourism in the hinterland:

- ✓ Increase in the average expenditure by tourists
- ✓ Reduction in seasonality
- ✓ Increase in the duration of stay

Improvement in the profile of tourism demand:

- ✓ Increase in the average expenditure by tourist
- ✓ Diversification of tourism segments

# Results are evaluated considering deviations from the *baseline*



# Definition of the baseline

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A **baseline** is needed as a reference for the magnitude of the impacts

The baseline was defined taking into account:

- i. baseline for GDP and per capita GDP for the regions
- ii. estimates (magnitude and forecasts) of the matrices of tourists flows
- iii. estimates for the (domestic and international) tourists expenditure profiles as well as for indicators of average duration of stay



# Scenarios: basic hypotheses

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The assessment of the impacts of the investments considers two different phases:

- the first one related to the **construction phase** of the planned investments (2010-2013);
- the second one related to the **effects on tourism** (2013-2020)

We have considered different sets of hypotheses for the parameters of tourism, as well as for the sources of financing the additional expenditures by tourists

We designed three scenarios associated with the direct effects of PRODETUR-RJ on the profile of tourists in the “sub-pólos”. The scenarios were built so that the expected effects in Scenario 1 tend to be gradually magnified in the subsequent scenarios

# Assumptions on financing – Government

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## **Government expenditure**

For the **expenditures in the construction phase**, we assume the investments from IDB will have no impact in the State government accounts during the forecast period, while the counterpart will be financed with a reduction (increase) in the fiscal surplus (deficit)

For the **expenditures on maintenance/operation**, it is assumed that the sources of financing are traditional fiscal sources, and, thus, do not represent any benefit for the State

# Assumptions on financing – Tourists

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## **Expenditures by tourists**

In the case of the additional expenditures by tourists, two alternative financing hypotheses are considered:

*Closure "A"*: additional expenditures by tourists are financed by equivalent reductions in consumption in the respective origin regions, representing an induced substitution effect in the consumption basket of travelers

*Closure "B"*: additional expenditures by tourists are financed by reduction in personal savings, maximizing the multiplier effects of expenditures

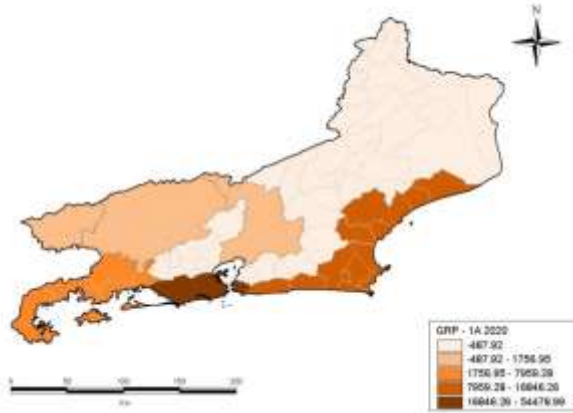
# Scenario 1A

## Dimensions

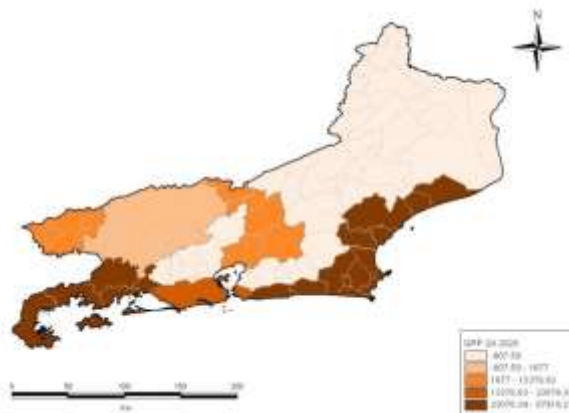
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Gross output (USD thousands 2008)	Metropolitano	29.755	24.154	5.867	5.320	16.885	28.893	48.524	58.786	74.914	92.155	110.386
	Costa Verde	4.446	4.816	2.972	10.793	11.254	11.971	12.773	13.417	14.204	15.020	15.873
	Costa do Sol	8.235	10.173	5.045	23.485	24.302	25.770	27.401	28.717	30.310	31.956	33.664
	Serra Verde Imperial	1.899	4.766	996	2.131	2.066	2.135	2.297	2.285	2.354	2.417	2.503
	Vale do Café	965	1.219	357	370	322	348	390	408	441	475	513
	Agulhas Negras	22.302	18.141	2.457	2.995	2.528	2.683	2.875	2.993	3.163	3.339	3.530
	Resto do RJ	2.003	2.009	638	81	-52	-114	-132	-233	-301	-374	-438
	Resto do Brasil	75.748	68.672	18.818	-14.887	-21.240	-25.375	-29.583	-34.760	-40.074	-45.746	-51.716
	Brasil	145.354	133.950	37.152	30.288	36.066	46.310	64.545	71.613	85.011	99.242	114.317
GRP (USD thousands 2008)	Metropolitano	15.782	12.456	2.943	937	6.818	12.913	22.951	28.159	36.382	45.176	54.479
	Costa Verde	2.328	2.571	1.641	5.439	5.661	6.018	6.417	6.736	7.128	7.534	7.959
	Costa do Sol	3.598	4.806	2.588	11.829	12.232	12.957	13.760	14.409	15.194	16.004	16.846
	Serra Verde Imperial	989	2.627	545	1.020	935	921	939	884	857	822	796
	Vale do Café	489	641	193	186	157	170	190	198	214	230	248
	Agulhas Negras	11.139	8.938	1.039	1.508	1.285	1.359	1.449	1.505	1.585	1.667	1.757
	Resto do RJ	976	984	307	-37	-125	-180	-221	-293	-357	-424	-488
	Resto do Brasil	28.078	25.442	6.972	-7.700	-10.923	-13.340	-16.132	-18.954	-22.096	-25.449	-28.990
	Brasil	63.379	58.465	16.229	13.182	16.041	20.819	29.354	32.645	38.906	45.559	52.608
Wage payments (USD thousand 2008)	Metropolitano	5.991	4.782	1.147	1.243	3.838	6.515	10.869	13.165	16.756	20.595	24.652
	Costa Verde	967	1.052	653	2.467	2.580	2.750	2.942	3.095	3.282	3.477	3.680
	Costa do Sol	1.545	1.991	1.041	5.280	5.478	5.812	6.176	6.479	6.840	7.214	7.601
	Serra Verde Imperial	394	1.022	212	458	444	458	489	488	502	515	532
	Vale do Café	211	271	81	77	65	71	79	82	88	95	102
	Agulhas Negras	4.501	3.608	419	662	574	608	648	673	709	746	786
	Resto do RJ	385	394	129	-1	-35	-55	-69	-96	-118	-143	-165
	Resto do Brasil	11.598	10.499	2.873	-2.862	-4.062	-4.926	-5.898	-6.920	-8.039	-9.232	-10.491
	Brasil	25.591	23.619	6.555	7.323	8.882	11.231	15.235	16.966	20.021	23.266	26.696
EHA	Metropolitano	1.021	761	169	613	1.549	2.484	3.982	4.791	6.038	7.371	8.777
	Costa Verde	183	204	132	953	1.003	1.067	1.138	1.196	1.266	1.338	1.413
	Costa do Sol	169	278	179	2.035	2.137	2.268	2.409	2.528	2.670	2.815	2.966
	Serra Verde Imperial	76	206	42	178	182	192	206	212	223	234	246
	Vale do Café	31	46	15	27	26	28	31	33	36	38	41
	Agulhas Negras	848	671	65	229	220	233	249	260	275	290	306
	Resto do RJ	70	73	24	-3	-10	-13	-16	-21	-25	-29	-33
	Resto do Brasil	1.840	1.667	457	-422	-586	-701	-807	-959	-1.107	-1.265	-1.432
	Brasil	4.237	3.905	1.083	3.610	4.521	5.559	7.192	8.040	9.375	10.792	12.286
ICMS (USD thousand 2008)	Metropolitano	289	242	61	199	417	638	990	1.181	1.475	1.788	2.119
	Costa Verde	43	46	27	215	227	242	258	271	288	304	322
	Costa do Sol	85	101	48	461	484	514	548	576	609	644	679
	Serra Verde Imperial	20	45	10	47	49	53	58	61	65	69	73
	Vale do Café	9	11	3	7	7	8	9	9	10	11	12
	Agulhas Negras	220	180	26	55	53	56	61	64	68	72	77
	Resto do RJ	27	27	9	7	6	7	8	9	10	11	12

# Regional distribution of marginal flows of GDP in 2020

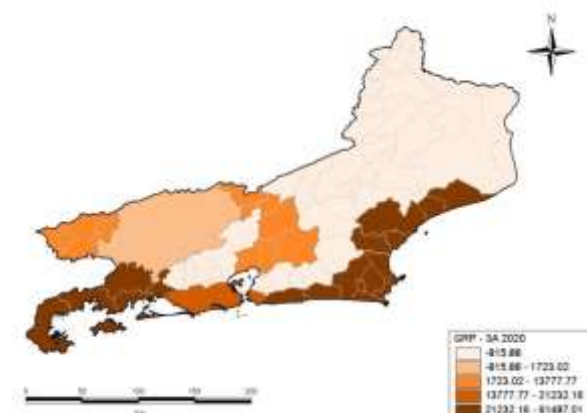
Scenario 1A



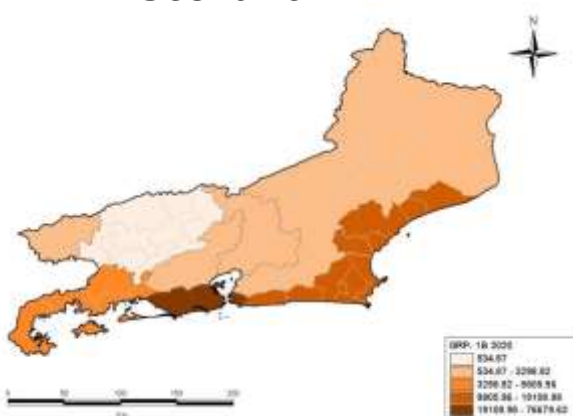
Scenario 2A



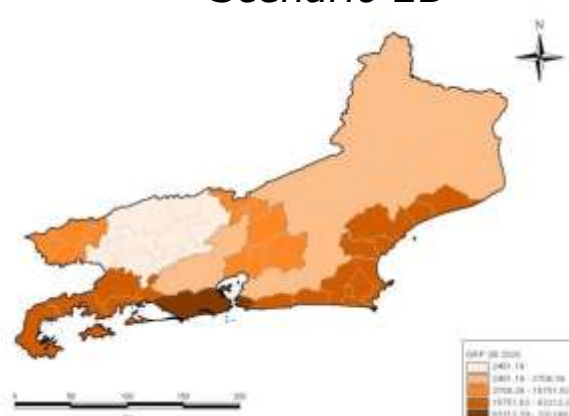
Scenario 3A



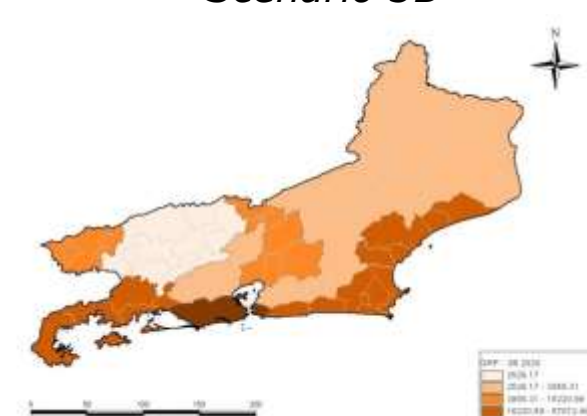
Scenario 1B



Scenario 2B



Scenario 3B



# Effects on tourism activities

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**Reallocation effect** associated with movements away from activities that are not directly related to tourism towards tourism activities

Tourism activities are, in relative terms, **activities of lower value added for the regions, with a higher potential for employment generation with lower wages**

- ✓ Information from structural coefficients of the model (input-output database)

## *Ex post* evaluation of place-based policies

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- ✓ What is the increase in the flows of tourists that is associated with the Program?
- ✓ What was the change in the duration of stay?
- ✓ What was the change in the profile of expenditures by tourists?

Advances in causal inference literature and a growing influence of this literature on regional economics + use of geographic information systems (GIS)

- ✓ Randomized experiments, regression discontinuity design (RDD), synthetic control method (SCM)...

## 5. Uncertainty about projections of costs may overestimate long-term impacts (legacy)

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Planned *versus* realized investments

- ✓ Perfect targeting in investment plans
- ✓ *Ex-ante* analysis provides upper-bound in terms of efficiency of expenditures

Role of corruption:



- ✓ Leakages:  $K_{t+1} = (1 - \delta)K_t + \lambda I_t$ ,  $0 < \lambda < 1$  (similar for  $G_t$ )
- ✓ How do resources feed back into the economic system?

Haddad, E. A. and Haddad, P. R. (2010). Major Sport Events and Regional Development: The Case of the Rio de Janeiro 2016 Olympic Games. **Regional Science Policy and Practice**, 2 (1).



# Example: Bidding to host 2016 Olympic Games

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Core of application:

- ✓ Big enough?
  - ✓ Tourists, athletes, journalists, and politicians
  - ✓ New stadiums and venues
  - ✓ House all the people in adequate hotels
  - ✓ Transport everyone with reliable mass transit
  - ✓ Security needs
  
- ✓ Evidence that locals agree to cover expenses (new taxes?) for city improvements and jobs
  
- ✓ **Must show likely tangible effects of hosting**

# Example: Bidding to host 2016 Olympic Games

**Table 2.** Partial criteria for assessing investment for the Rio 2016 Games: PV of GDP marginal flows for Brazil (in US\$millions as of 2008)

	Games hosting (2009–2016)	Post Games (2017–2027)	Investment
PV (1%)	12,169.0	18,243.7	13,206.2
PV (3%)	10,982.4	13,468.5	11,994.6
PV (6%)			10,443.6

*The final cost of the 2016 Rio Olympics has risen around 60% more than originally planned*

**Table 3.** Partial c

Rio 2016 Games:

	(2016)	Post Games (2027)
MPI (1%)	0.92	2.30
MPI (3%)	0.92	2.04
MPI (6%)	0.91	1.74

## 6. Alternative accommodation has important structural local effects in tourist destinations

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*What if Airbnb guests presented the same expenditures profile as hotel guests?*

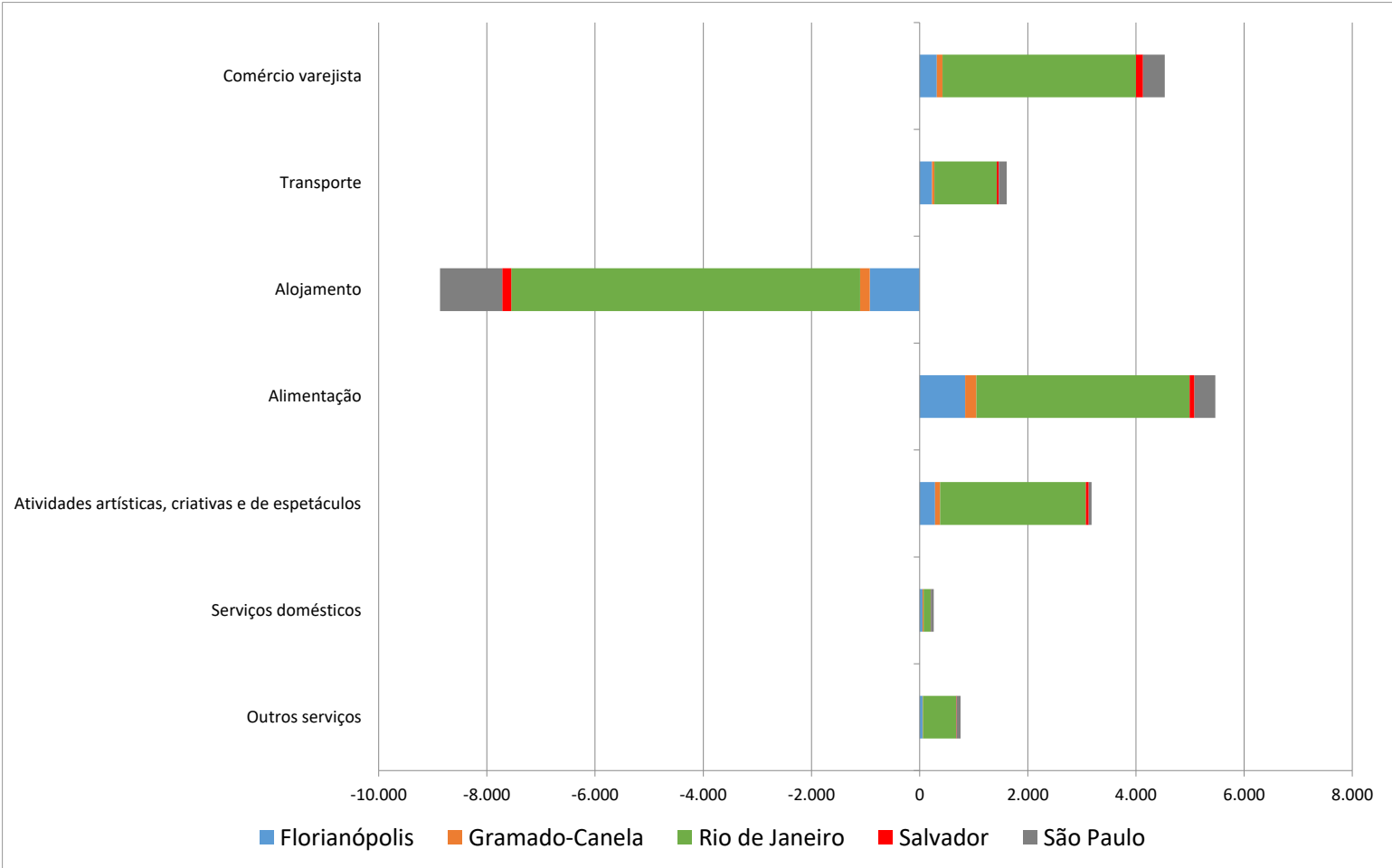
Value chain approach to Airbnb operations in Brazil:

- ✓ Direct, indirect and induced effects (IO models)
- ✓ Florianópolis, Gramado-Canela, Rio de Janeiro, Salvador, São Paulo

Airbnb data:

- ✓ Number of guests, number of hosts, expenditures in the destination (+ accommodation), origin of hosts, length of stay...

# Pattern of expenditures by Airbnb guests favors generation of local jobs, less concentrated in sectoral terms...



Florianópolis (864); Gramado-Canela (300); Rio de Janeiro (5,774); Salvador (155); São Paulo (-30)

... and its net effects on GDP favor sectors with less pressure on natural resources

	Florianópolis	Gramado-Canela	Rio de Janeiro	Salvador	São Paulo
Agropecuária	169	130	779	117	630
Extrativa mineral	294	120	1,373	98	374
Indústria alimentícia	443	169	2,496	116	564
Outras indústrias	27	107	-396	61	487
Bens de consumo duráveis	118	52	762	52	497
S.I.U.P.	-263	-21	-2,209	-52	-241
Comércio atacadista	265	166	1,163	96	472
Comércio varejista	2,951	1,185	21,742	998	4,033
Transporte	1,899	544	13,756	444	2,610
Alojamento	-8,169	-1,321	-74,241	-1,598	-13,786
Alimentação	4,446	875	26,891	576	3,013
Serviços públicos	11	10	194	8	61
Atividades artísticas...	1,509	425	15,029	228	354
Serviços domésticos	75	49	207	35	372
Outros serviços	771	738	6,925	499	4,340
<b>TOTAL</b>	<b>4,545</b>	<b>3,228</b>	<b>14,469</b>	<b>1,678</b>	<b>3,778</b>

Nota: Valores em USD 1.000

## 7. Use of telecom data provides an opportunity to complement TSA and surveys on tourists profiles

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*Can we map the number and the profile of visitors in local events?*



# Example: Mobile phones – Belo Horizonte Carnival Parade 2018

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## Data:

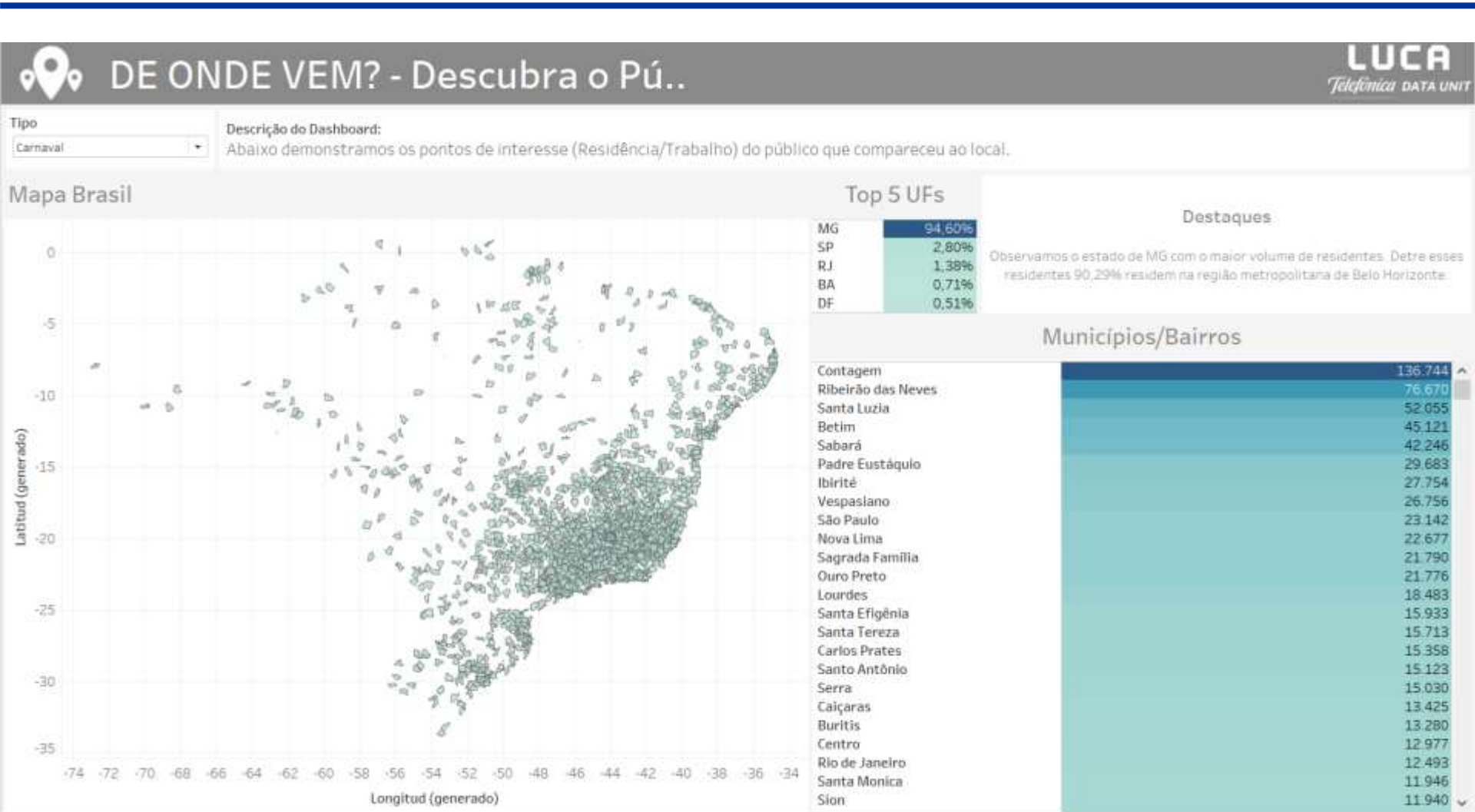
- ✓ Number of visitors: Tourist + Excursionist + Resident
- ✓ OD matrix: Highly disaggregated data, high precision (neighborhood movements)
- ✓ Visitor profile: gender, age, income class, residential address
- ✓ Event participation: numbers of days, overnights stays, Tourist *versus* Excursionist
- ✓ All data are expanded and population-representative

# Example: Mobile phones – Belo Horizonte Carnival Parade 2018 (Who?)

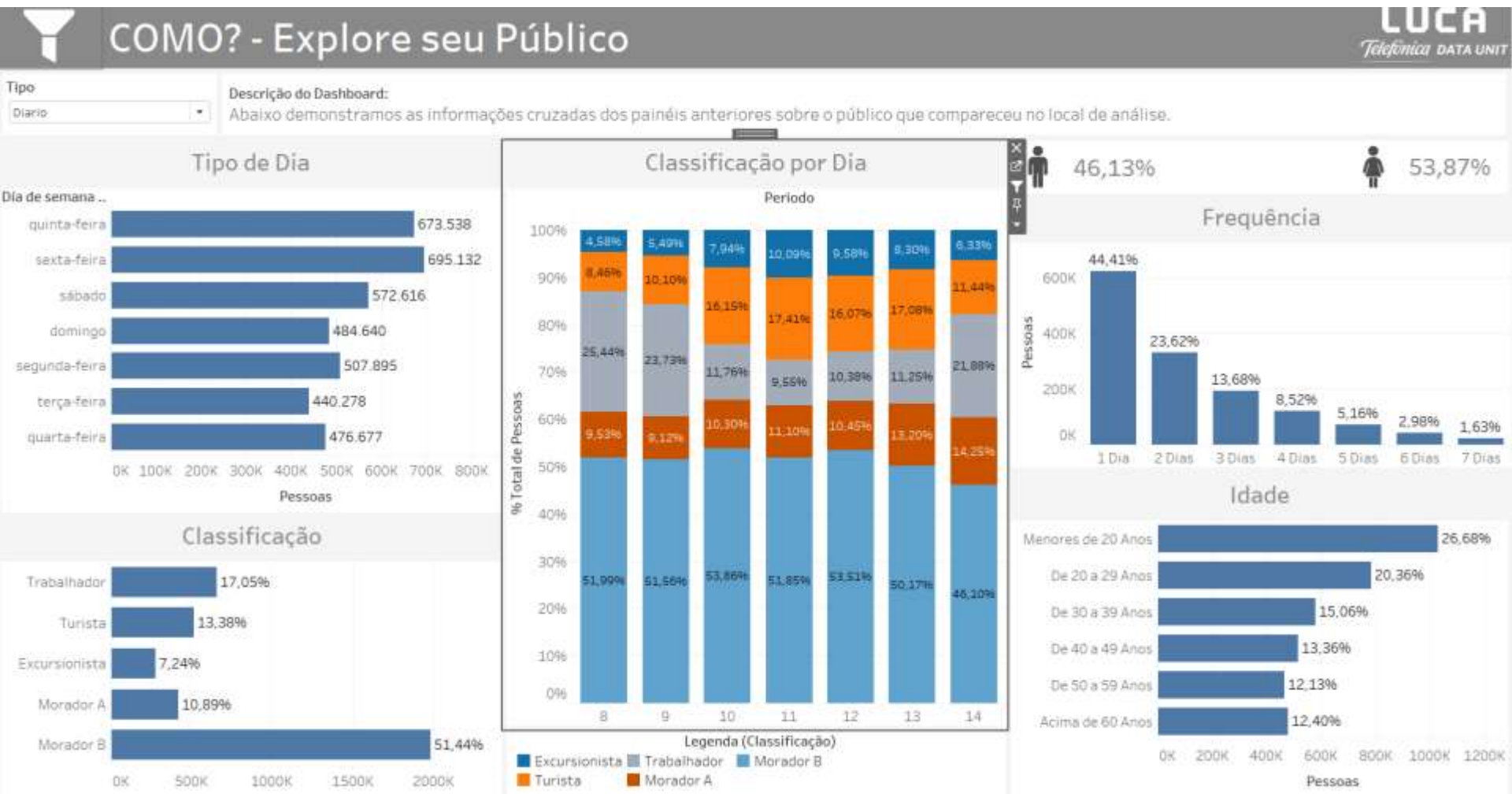




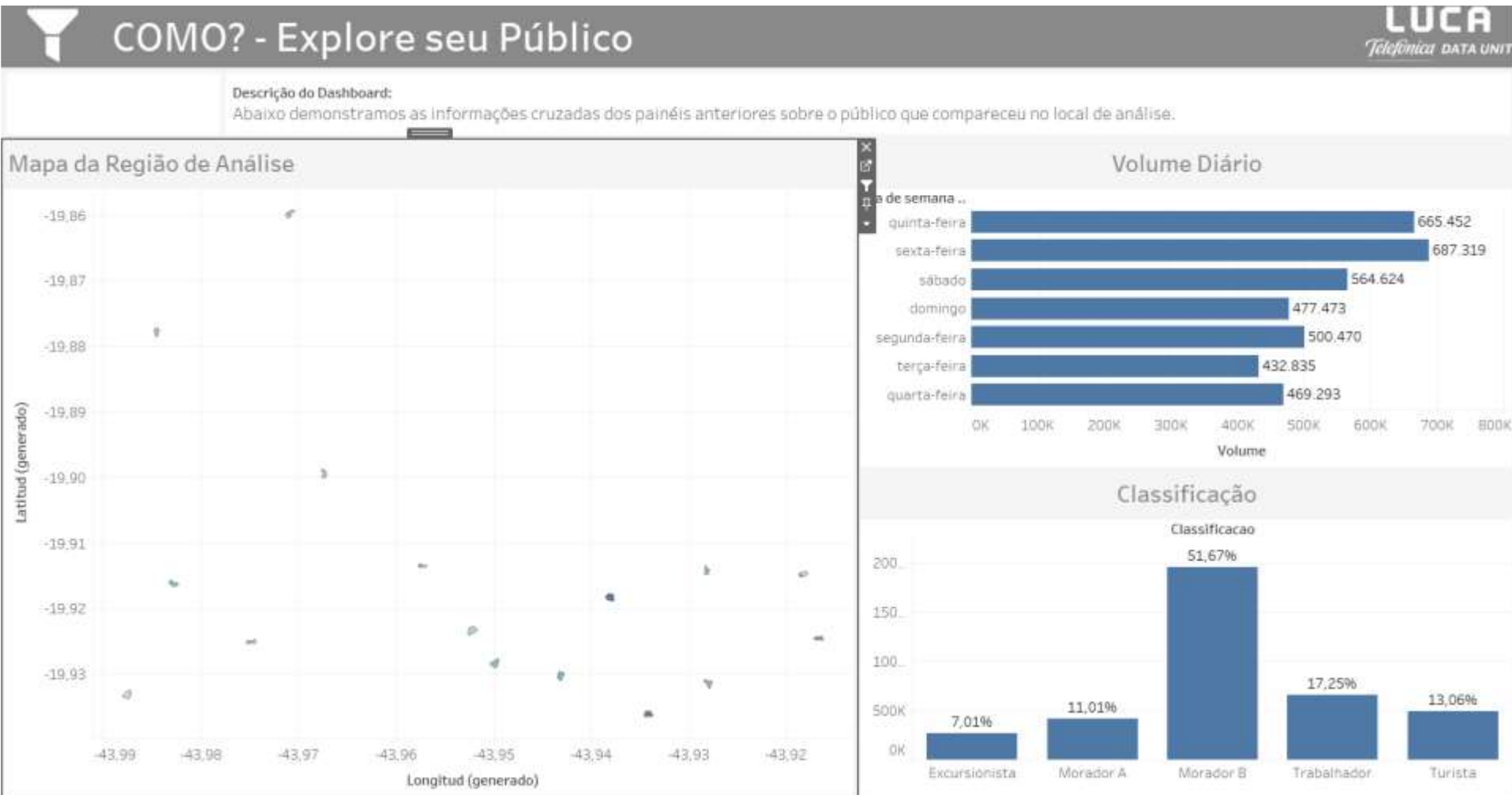
# Example: Mobile phones – Belo Horizonte Carnival Parade 2018 (Where from?)



# Example: Mobile phones – Belo Horizonte Carnival Parade 2018 (How?)



# Example: Mobile phones – Belo Horizonte Carnival Parade 2018 (Where in the city?)



# Complemented with direct survey data...

Daily expenditure profile:

- ✓ Excursionist
- ✓ Internal tourist
- ✓ International tourist
- ✓ Resident

The event attracted 354 K visitors, who have spent BRL 191 millions in the city

20% of residents decided to stay in Belo Horizonte

Local/Município \_\_\_\_\_  
 Nome do (a) Respondente (a) \_\_\_\_\_  
 Rua do Respondente \_\_\_\_\_ / Nº / CEP \_\_\_\_\_

1) Idade: \_\_\_\_\_

2) Residência permanente:  
 1. Cidade: \_\_\_\_\_ Se BH, Bairro: \_\_\_\_\_ / Regional ou RMBH  
 2. Estado: \_\_\_\_\_ 3. País: \_\_\_\_\_

**APENAS PARA TURISTAS**

3) Você pretende permanecer (dormir) em BH?  
 1. Sim. 2. Não (pule para 4)

3.1 Quantos pernhoites?  
 4) Qual meio de hospedagem? (RU)  
 1. Hotel/Paróquia  
 2. Casa de Aluguel/Apartamento  
 3. Casa própria/Alugado  
 4. Albergue  
 5. Outros \_\_\_\_\_

5) Qual o meio de transporte utilizado para chegar a cidade? (RU)  
 1. Carro/Veículo 2. Ônibus (incluindo 3. Trem 4. Avião 5. Outro: \_\_\_\_\_

6) O Carnaval foi o PRINCIPAL motivo desta viagem a Belo Horizonte?  
 1. Sim. 2. Não

6.1) Se não. Qual foi? (RU)  
 1. Lazer  
 2. Visitar amigos e parentes  
 3. Negócios no Trabalho  
 4. Congressos, feiras ou convenções  
 5. Estudos ou cursos  
 6. Saúde  
 7. Realização ou participação  
 8. Compras pessoais  
 9. Outros \_\_\_\_\_

**PARA TODOS**

7) Quantos dias pretende participar/participou do evento? \_\_\_\_\_

8) Qual será / foi seu gasto total estimado em todos os dias que você participará / participou do evento: R\$ \_\_\_\_\_  
Marque "0" se não houve gasto ou BH se não respondeu / não sabe

9) Quantas pessoas estão incluídas nesses gastos, incluindo você? \_\_\_\_\_

10) Qual será / foi seu gasto com:  
Marque "0" se não houve gasto ou BH se não respondeu / não sabe  
\*Turistas

	Vizos	Morais
Hospedagem *	_____	_____
Alimentação	_____	_____
Transporte interno	_____	_____
Atrativos e passeios *	_____	_____
Compras	_____	_____
Ingressos	_____	_____
Outros	_____	_____

11) Como você ficou sabendo do Carnaval? (RÉ e RU)  
 1. Amigos/Familiares 4. Redes Sociais (Facebook, Twitter, Instagram)  
 2. Internet (site) 5. Outros: \_\_\_\_\_  
 3. Jornais/Revistas

12) Você já participou do Carnaval nesta cidade em anos anteriores? 1. Sim 2. Não  
 12.1) Em caso afirmativo, você acredita que o Carnaval deve ser:  
 1. Melhorou  
 2. Nem melhorou, nem piorou  
 3. Piorou. Por quê? \_\_\_\_\_

13) De acordo com suas expectativas, o que achou do Carnaval de BH este ano?  
 1. Superou  
 2. Atendeu plenamente  
 3. Atendeu em parte  
 4. Não atendeu/decepcionou  
 5. Insuficiente

14) Avalie de 1 a 10 as seguintes afirmações (Mostrar cartão)

	Verdadeiro	Falso
Avaliação Geral do Carnaval de BH 2018		
Os banheiros disponíveis são suficientes		
Sinto-me seguro no carnaval de rua		
Os preços praticados são adequados		

15) Você pretende participar de uma próxima edição do Carnaval de BH? 1. Sim 2. Não. Por quê? \_\_\_\_\_

16) Quais atividades realizou neste carnaval?  
 10. Blocos de Rua  
 11. Decifras de Escadas de Samba e de Blocos Caricatas  
 12. Eventos Privados  
 13. Fofos  
Somente para turistas  
 14. Visita a amigos e parentes  
 15. City tour  
 16. Visitas culturais (museus e atrações)  
 17. Compras  
 18. Gastronomia (festa/cantina de alta cozinha ou tradicional)

17) Quem você considera que seja o principal patrocinador do Carnaval? \_\_\_\_\_  
 17.1) Algum outro? \_\_\_\_\_

18) Tradema em uma palavra sua experiência com o Carnaval de BH 2018? \_\_\_\_\_

19) Saberes (marque sem praportar) 1. Famílias 2. Amizades

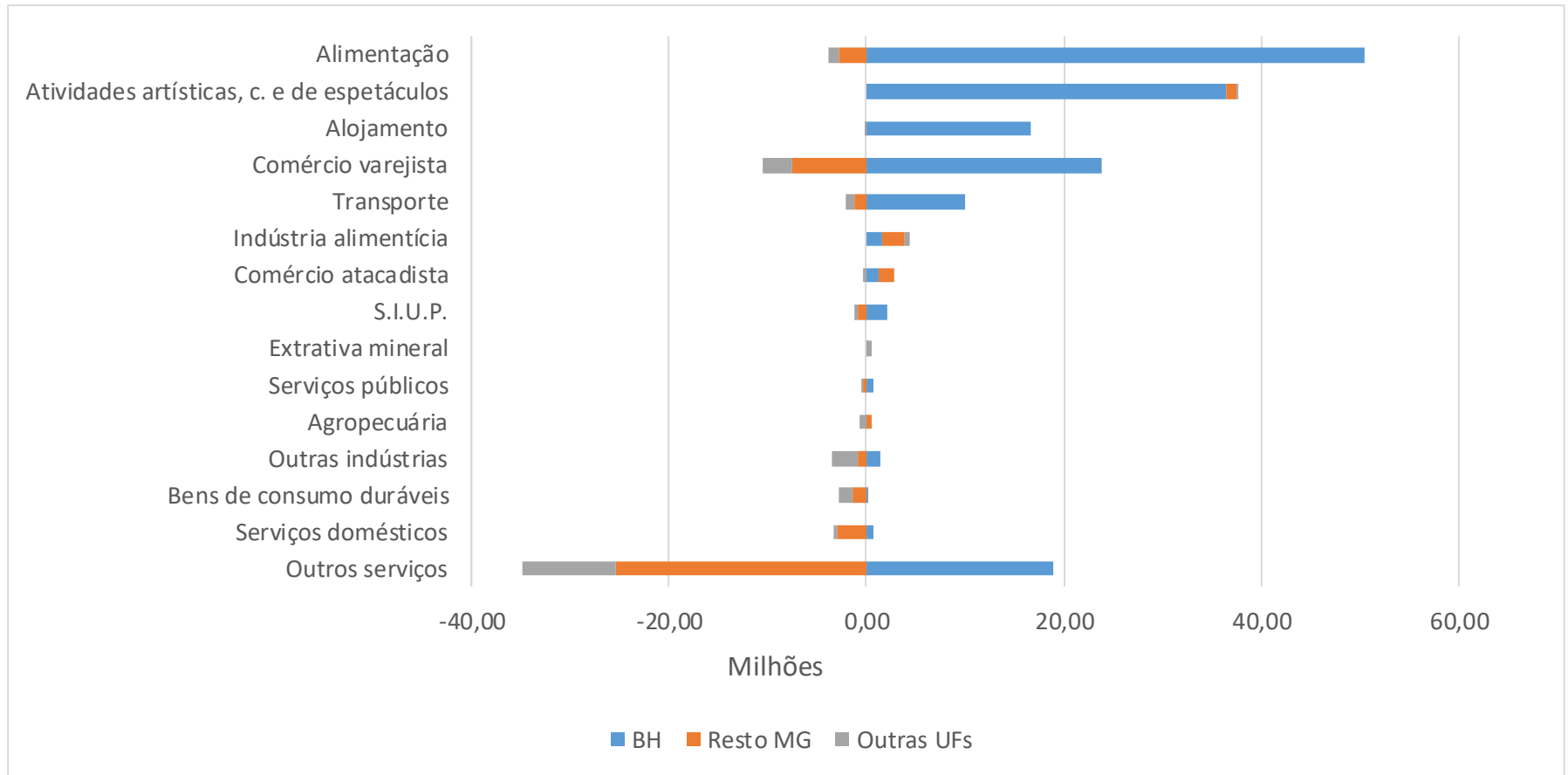
20) Escolaridade (completo ou incompleto) (RU)  
 1. Fundamental 3. Pós-graduação  
 2. Médio 4. Técnico  
 3. Superior completo 5. Técnico  
 4. Superior incompleto

21) Estado civil: 1. Solteiro (a) 3. Casado (a)  
 2. Divorçado (a) 4. Viúvo (a)

22) Qual a sua faixa de renda familiar? (Mostrar cartão)  
 Resposta: \_\_\_\_\_

... and integrated with an interregional CGE model

## Regional GDP effects



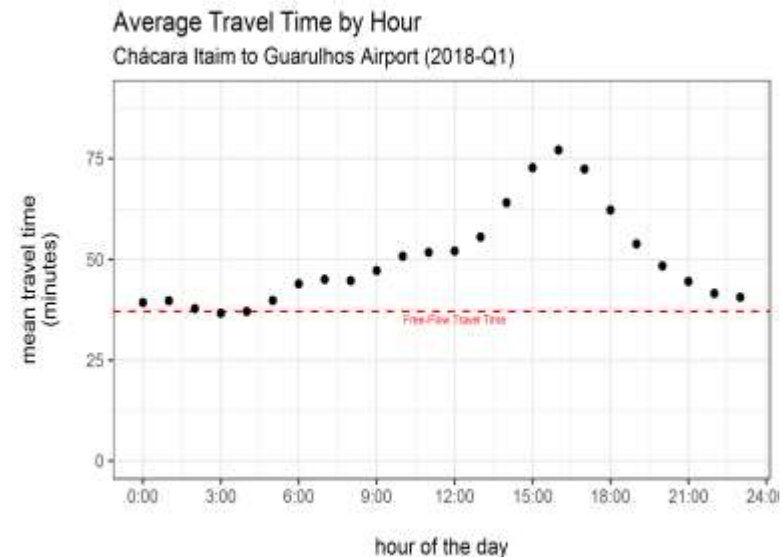
Net effect: BRL 107,1 millions

## 8. Traffic data help understanding localized impacts of tourist events

*How do mega cultural events affect cities?*

Measure hourly congestion in São Paulo Metropolitan Region (SPMR) using information from **Uber Movement**

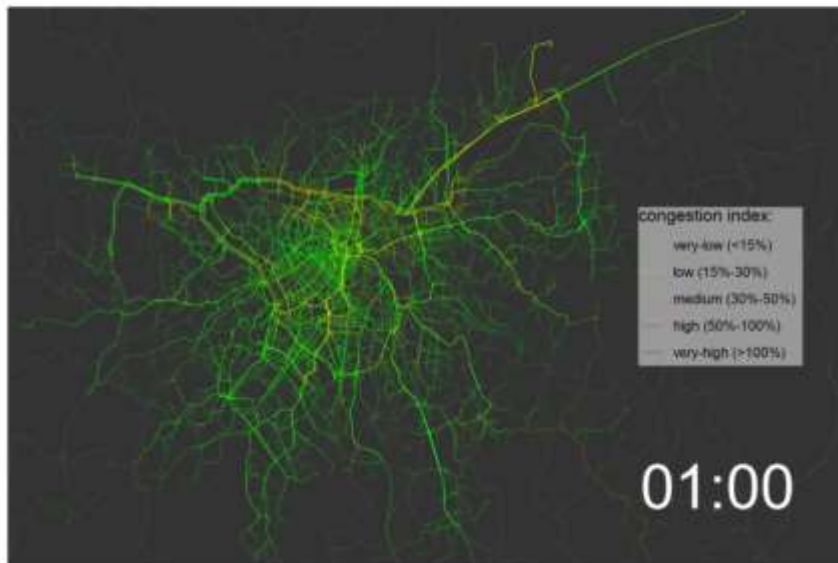
- ✓ Average travel time (OD pairs)
- ✓ Different levels of aggregation (space and time)
- ✓ Free flow approach



# Example: Working day *versus* Holiday

**Dia Útil**

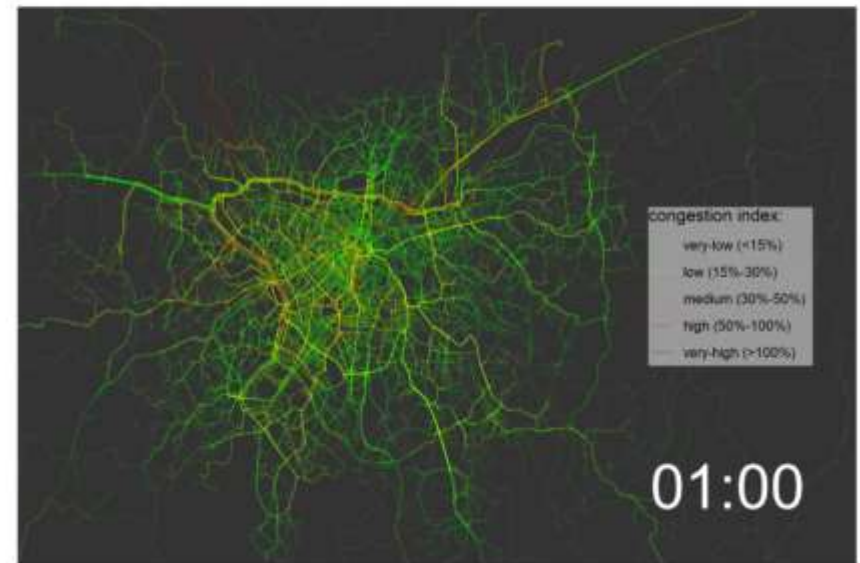
08/11/2017 - Quarta-feira



Working day

**Feriado**

15/11/2017 - Quarta-feira - Dia da Republica

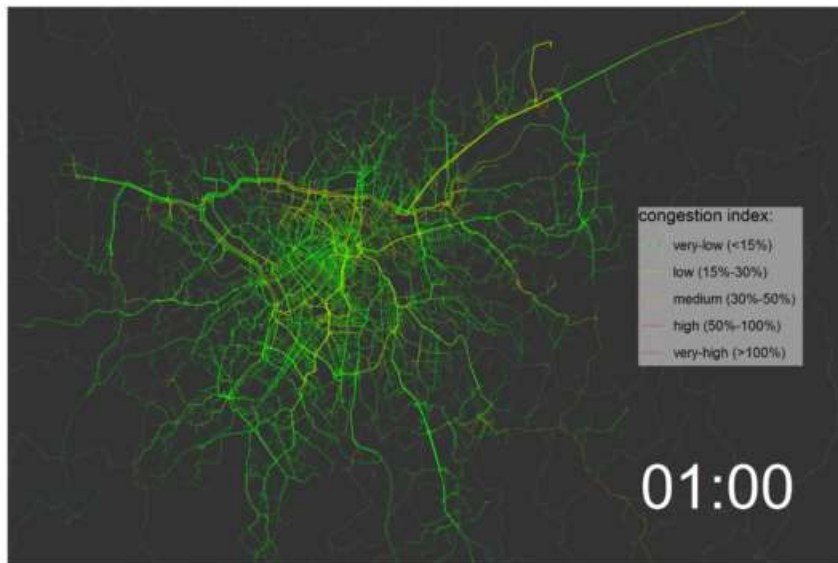


Holiday

# Example: Working day *versus* Holiday

**Dia Útil**

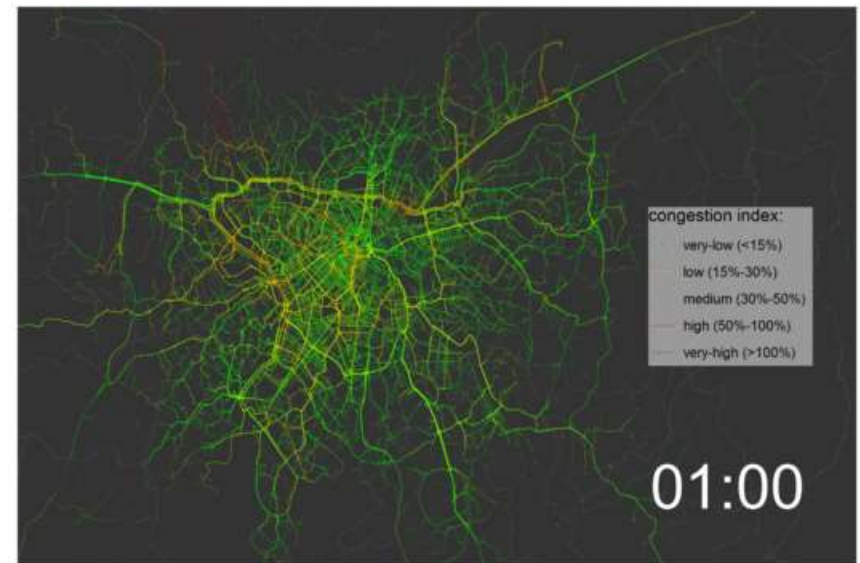
08/11/2017 - Quarta-feira



Working day

**Feriado**

15/11/2017 - Quarta-feira - Dia da Republica



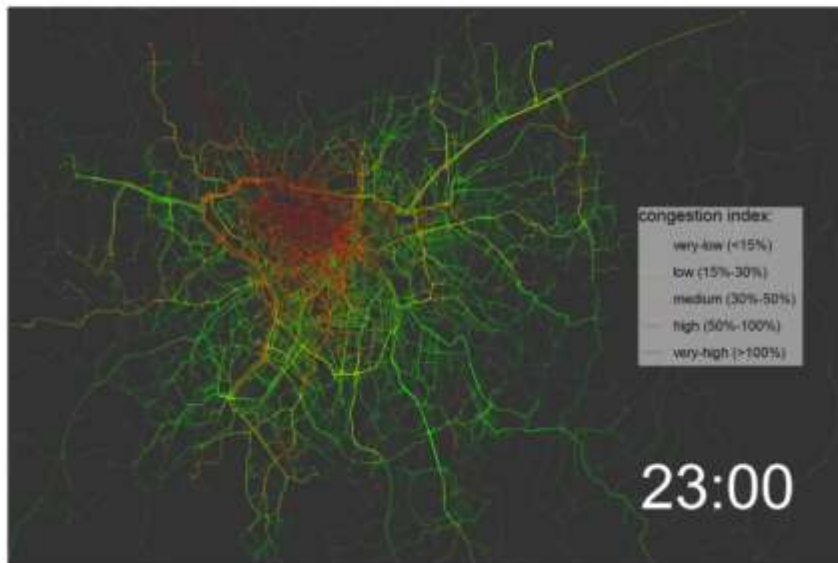
Holiday



# Example: Working day *versus* Holiday

**Dia Útil**

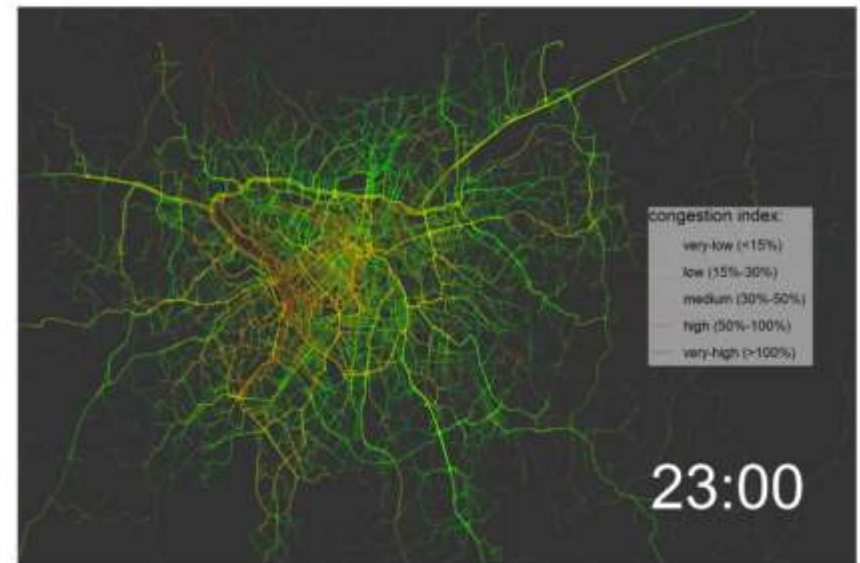
08/11/2017 - Quarta-feira



Working day

**Feriado**

15/11/2017 - Quarta-feira - Dia da Republica



Holiday

# Some potential issues

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Is tourism welfare enhancing i.e. does it improve or worsen income inequality?

Proper accounting for tourism impact analysis

- ✓ Short-term nature of many tourism impacts is not fully accounted (e.g., what happens in the non-tourist season to these employees? Who compensates them – e.g., unemployment compensation, welfare etc.)
- ✓ How could the Tourism Satellite Accounts consider these (and other neglected) factors?

Other issues: regulation, financing, pricing, etc...

# Final remarks

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Models are issue-specific; developing policy priorities based on answers from models that are inadequate for articulating particular issues can cause severe unintentional consequences to crop up in the course of policymaking (Agénor et al. 2007).

It is therefore important for policy analysts to maintain a reasonably broad array of instruments in their tool bag.

Our discussion illustrates the potential of interregional/spatial economic modeling approaches to understand potential impacts of tourism activities.

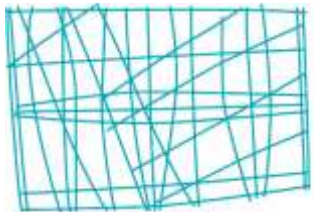
Further amendments should cope with methodological advances in both economic and spatial modeling.

Gracias!

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