Studying the Effect of Natural Disasters on Economic Activity:

A first Approach using Night-Time Luminosity Data

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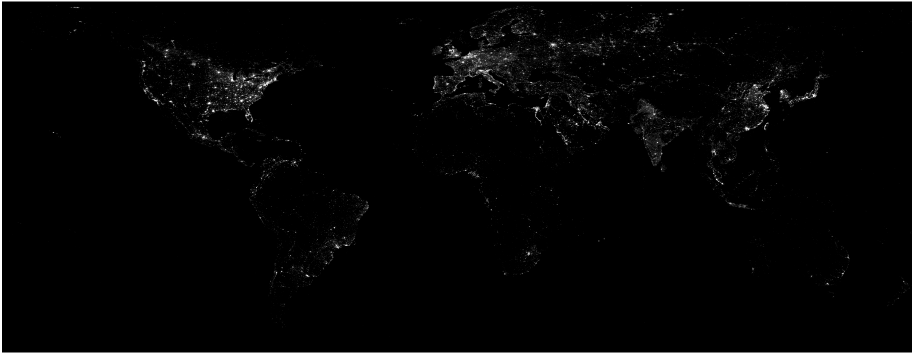

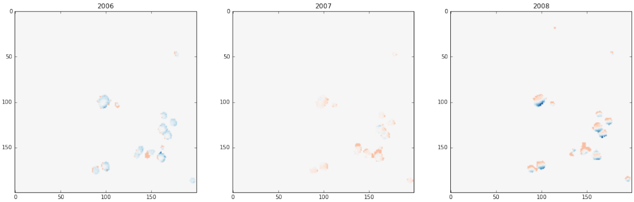

Figure: Absolute change in luminosity in Tocopilla

Figure: Absolute change in luminosity in Maule

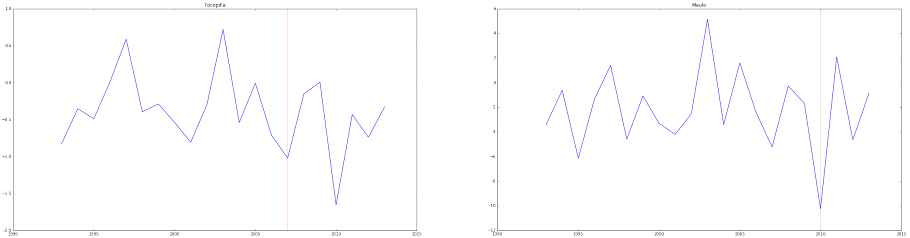

Figure: Tocopilla and Maule Luminosity Sum Time Series

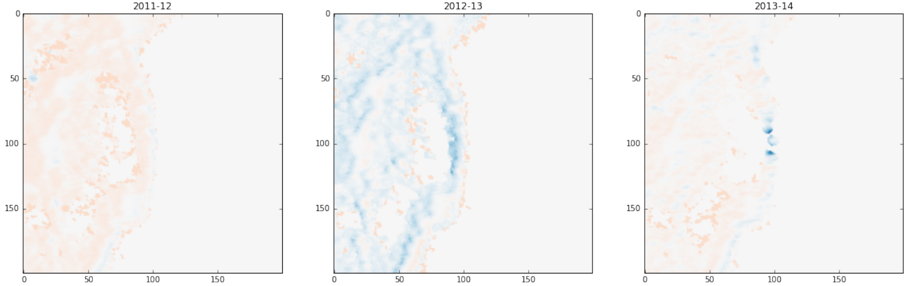

Figure: Fukushima Luminosity Delta around Tsunami Occurance

Modelling Earthquake Impact Linearly Decaying with Distance

Disco vs. Luminosity

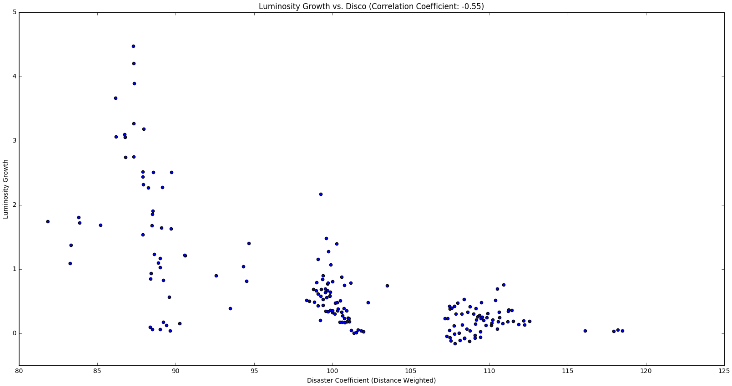

Figure: Luminosity Growth 1992-2013 plotted against a linearly decaying disaster coefficient for 150x150 image sections.

Modelling Earthquake Impact based on Institutional Reports

Earthquake Lag Coefficients

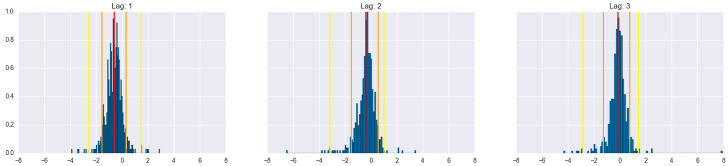

Figure: Distribution of Lag Coefficients for Earthquakes in Vector Autoregression Models per City with 95th and 99th Percentiles

Modelling Earthquake Impact based on Institutional Reports

Earthquake Lag Coefficients

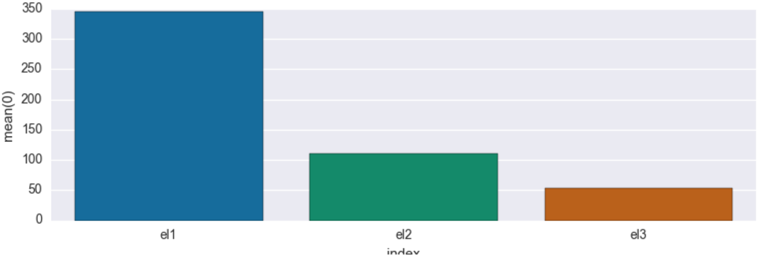

Figure: Count of the most impactful earthquake lag coefficient across all cities

Panel Model

Region Series

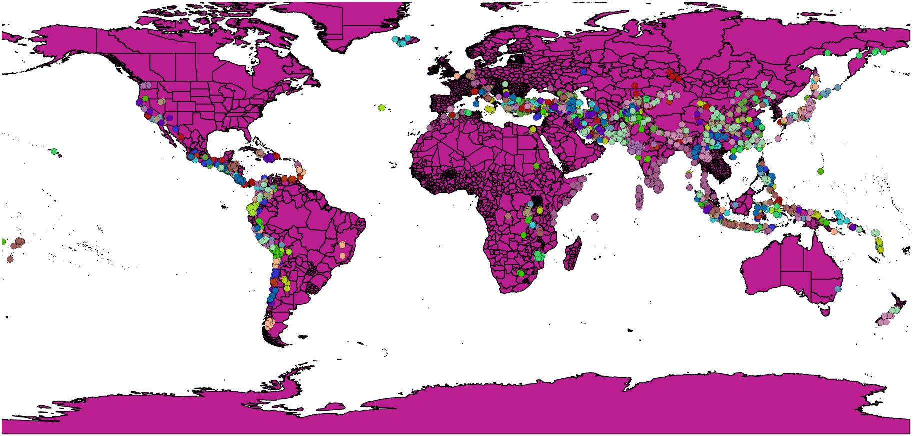

Figure: Administrative regions and earthquakes

Panel Model

Section Series

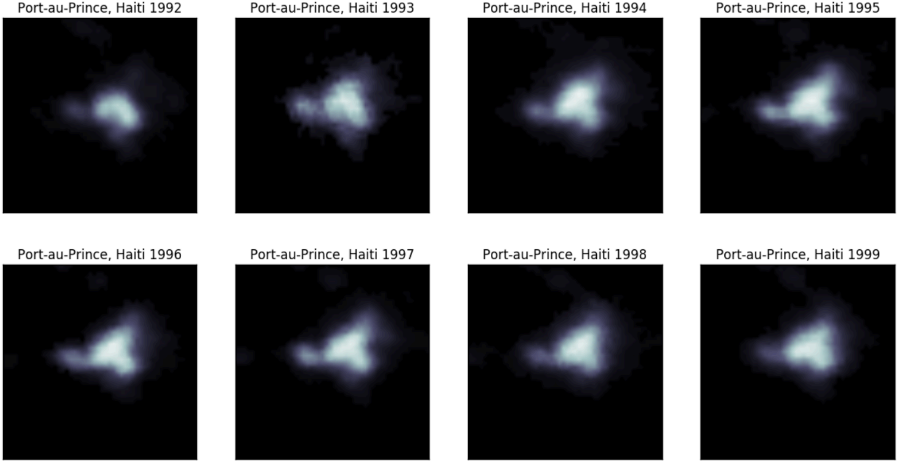

Figure: 50x50 pixel atellite image cutout of Port-au-Prince, Haiti

Dynamic Panel Model with Fixed Effects

Formula

$$y_{i,t} - y_{i,t-1} = \alpha_i + \beta_t + \gamma(y_{i,t-1} - y_{i,t-2}) + \delta EQ_{i,t} + \eta EQ_{i,t-1} + \epsilon_{i,t}$$

City-level Dynamic Panel Regression

Table 3: Regression using cities data, separated by geographic regions(all the events)

	World	E. Asia & Pacific	Europe & C. Asia	LA & Caribbean	ME & N Africa	North America	South Asia	Sub-Saharan Africa
lum_gr_1	-0.400**	-0.427**	-0.410**	-0.387**	-0.271**	-0.445**	-0.317**	-0.359**
	(-415.58)	(-160.80)	(-290.78)	(-162.52)	(-23.47)	(-138.06)	(-88.81)	(-66.85)
eq	-0.00772	0.0135	-0.0285	-0.0313**	0.0114	0.0103	0.0217	-0.0492
	(-0.86)	(0.50)	(-1.37)	(-2.51)	(0.12)	(0.25)	(0.85)	(-0.42)
eq_1	-0.00386	0.00274	-0.00375	-0.00698	-0.0213	0.0370	-0.0107	-0.136
	(-0.43)	(0.10)	(-0.18)	(-0.56)	(-0.22)	(0.96)	(-0.40)	(-1.16)
Observations	798844	104184	373310	116333	6977	71460	64807	26164

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$

Table 1: Regression using regional data, separated by geographic regions (all the earthquakes)

	World	E. Asia & Pacific	Europe & C. Asia	LA & Caribbean	ME & N Africa	North America	South Asia	Sub-Saharan Africa
lum_gr_1	-0.344**	-0.369**	-0.378**	-0.344**	-0.168**	-0.479**	-0.233**	-0.301**
	(-113.60)	(-47.16)	(-85.28)	(-42.27)	(-14.67)	(-25.88)	(-13.16)	(-35.62)
eq1	0.00957	0.00313	0.0249	-0.00331	0.0107	-0.0139	0.0400	0.0352
	(1.15)	(0.18)	(1.60)	(-0.26)	(0.94)	(-0.22)	(1.10)	(0.46)
eq1_1	0.000435	-0.0253	0.00323	-0.00384	0.00661	-0.0171	0.0694*	0.0677
	(0.05)	(-1.39)	(0.21)	(-0.30)	(0.57)	(-0.28)	(1.88)	(0.96)
Obs.	86126	13337	37588	11089	7481	2215	2621	11795

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$

Table 2: Regression using regional data, separated by geographic regions (using only big earthquakes)

	World	E. Asia & Pacific	Europe & C. Asia	LA & Caribbean	ME & N Africa	North America	South Asia	Sub-Saharan Africa
lum_gr_1	-0.344**	-0.369**	-0.378**	-0.344**	-0.168**	-0.479**	-0.232**	-0.301**
	(-113.59)	(-47.16)	(-85.27)	(-42.27)	(-14.64)	(-25.89)	(-13.08)	(-35.64)
eq2	-0.00363	-0.0439	0.0190	0.00675	0.0789*	0	0.0471	0.0326
	(-0.18)	(-1.02)	(0.41)	(0.23)	(1.65)	(.)	(0.65)	(0.29)
eq2_1	-0.0303	-0.0507	-0.109**	-0.0250	-0.0547	0	0.00537	0.113
	(-1.41)	(-1.07)	(-2.37)	(-0.84)	(-1.15)	(.)	(0.07)	(1.02)
Obs.	86126	13337	37588	11089	7481	2215	2621	11795

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$

Table 4: Regression using regional data, separated by income groups (all the events)

	Low	Lower Middle	Upper Middle	High
	lum_gr	lum_gr	lum_gr	lum_gr
lum_gr_1	-0.293**	-0.335**	-0.335**	-0.410**
	(-27.49)	(-49.95)	(-60.79)	(-89.00)
eq1	0.0989*	-0.0112	0.0141	0.00165
	(1.65)	(-0.60)	(1.44)	(0.11)
eq1_1	0.105*	-0.0271	-0.00630	0.0258*
	(1.75)	(-1.41)	(-0.64)	(1.71)
Observations	7378	18426	24620	35702

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$

Table 5: Regression using regional data, separated by income groups (only big earthquakes)

	Low	Lower Middle	Upper Middle	High
	lum_gr	lum_gr	lum_gr	lum_gr
lum_gr_1	-0.293**	-0.335**	-0.335**	-0.410**
	(-27.48)	(-49.94)	(-60.75)	(-89.00)
eq2	-0.0209	-0.0229	0.0262	-0.0108
	(-0.18)	(-0.54)	(0.93)	(-0.31)
eq2_1	-0.0577	0.000736	-0.0974**	0.0545
	(-0.48)	(0.02)	(-3.45)	(1.55)
Observations	7378	18426	24620	35702

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$

Table 6: Regression using cities data, separated by income groups (all the events)

	Low	Lower Middle	Upper Middle	High
	lum_gr	lum_gr	lum_gr	lum_gr
lum_gr_1	-0.338**	-0.412**	-0.374**	-0.452**
	(-39.78)	(-197.27)	(-224.92)	(-304.29)
eq	-0.110	0.0249	-0.0147	-0.0618**
	(-1.04)	(1.13)	(-1.03)	(-3.91)
eq_1	-0.0617	-0.00828	-0.00307	-0.000879
	(-0.56)	(-0.37)	(-0.21)	(-0.06)
Observations	10824	171641	272415	308355

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$

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