APPENDIX TABLES

TABLE A. 1: The Impact of Motorways on Innovation Activity (Forward Citation Weighted Patent Fractional Count based on Applicant Address) - OLS and IV Estimates

Dependent Variable: *Applicant* $lnInnov_{i,88}$

	OLS		IV	
	(1)	(2)	(3)	(4)
$lnMotorways_{i,83}$	0.3680***	0.3858***	0.3622***	0.3861***
	(0.0890)	(0.0905)	(0.0996)	(0.1078)
$SpatialMotorways_{i,83}$		-1.3053***		-1.4841***
		(0.3004)		(0.3058)
Innovation	YES	YES	YES	YES
Geography	YES	YES	YES	YES
History	YES	YES	YES	YES
Observations	89	89	89	89
R-squared	.6346	.6463	.6346	.6461
F-statistic			9.423	4.356

Notes: *Applicant* $lnInnov_{i,88}$ is the forward citation weighted count of patents based on applicant address. Innovation controls include the lagged dependent variable and the (ln) number of applicants (per capita) in each NUTS-3 region in 1983. Geographical controls include surface, terrain ruggedness and elevation. Historical controls include the dummy related to the presence of a bishop and the dummy related to the presence of medium and large cities. We add one to all patents, inventors, and motorways before to taking the ln to preserve zero value observations. F is the First stage Kleinbergen-Paap Statistic. Robust standard errors corrected for cluster spatial correlation in parentheses in parentheses *** p< .01, ** p< .05, *p< .1.

Dependent Variable: *Unweighted lnInnov$_{i,88}$*

	OLS		IV	
	(1)	(2)	(3)	(4)
$lnMotorways_{i,83}$	0.0863**	0.0776**	0.0926	0.1435*
	(0.0389)	(0.0395)	(0.0692)	(0.0848)
$SpatialMotorways_{i,83}$		0.4918*		-0.9107**
		(0.2763)		(0.3808)
Innovation	YES	YES	YES	YES
Geography	YES	YES	YES	YES
History	YES	YES	YES	YES
Observations	89	89	89	89
R-squared	.7969	.7990	.7969	.7799
F-statistic			9.831	3.671

Notes: *Unweighted lnInnov$_{i,88}$* is the unweighted count of patents in region i in 1988. Innovation controls include the lagged dependent variable and the (ln) number of inventors (per capita) in each NUTS-3 region in 1983. Geographical controls include surface, terrain ruggedness and elevation. Historical controls include the dummy related to the presence of a bishop and the dummy related to the presence of medium and large cities. We add one to all patents, inventors, and motorways before to taking the ln to preserve zero value observations. F is the First stage Kleinbergen-Paap Statistic. Robust standard errors corrected for cluster spatial correlation in parentheses in parentheses *** p< .01, ** p< .05, *p< .1.

Table A. 3: The Impact of Motorways on Innovation by Region and Technological Sector - IV Estimates

Dependent Variable: *lnInnov$_{i,s,88}$ by Region and Tech. Sector*

	(1)	(2)	(3)	(4)	(5)	(6)
lnMotorways$_{i,83}$	0.2071***	0.2022***	0.1915**	0.2937***	0.3049***	0.3613***
	(0.0758)	(0.0761)	(0.0829)	(0.1134)	(0.1050)	(0.1223)
SpatialMotorways$_{i,83}$				-2.1932	-2.3364*	-2.8189**
				(1.4496)	(1.3388)	(1.3580)
Class FE	YES	YES	YES	YES	YES	YES
Innovation	YES	YES	YES	YES	YES	YES
Geography	NO	YES	YES	NO	YES	YES
History	NO	NO	YES	NO	NO	YES
Observations	445	445	445	445	445	445
R-squared	.5377	.5387	.5417	.5127	.5118	.5005
F-statistic	13.37	12.19	9.699	6.969	6.127	3.847

Notes: Two-Stage Least Squares estimates. *lnInnov$_{i,s,88}$* is the weighted forward citation count of patents in region *i*, in technological sector *s* in 1988. Class FE refers to five technological sectors classes. Innovation controls include the lagged dependent variable, the (ln) number of inventors (per capita) in sector *s* in each NUTS-3 region in 1983 and the total (ln) number of inventors in each NUTS-3 region in 1983. Geographical controls include surface, terrain ruggedness and elevation. Historical controls include the dummy related to the presence of a bishop and the dummy related to the presence of medium and large cities. We add one to all patents, inventors, and motorways before to taking the ln to preserve zero value observations. F is the First stage Kleinbergen-Paap Statistic. Robust standard errors corrected for cluster spatial correlation in parentheses in parentheses *** p< .01, ** p< .05, *p< .1.

TABLE A.4. The Impact of Motorways on Innovation in each Technological Sector - IV Estimates

Dependent Variable: $lnInnov_{i,88}$

	Electrical Engineering		Instruments		Chemistry		Mechanical Engineering		Other Sectors	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$lnMotorways_{i,83}$	0.1401	0.2587	0.1634	0.4660*	0.1872	0.2462	0.4064***	0.6484***	-0.0090	0.1444
	(0.1704)	(0.2452)	(0.1337)	(0.2480)	(0.1667)	(0.2190)	(0.1285)	(0.1885)	(0.1440)	(0.1335)
$SpatialMotorways_{i,83}$		-2.1994		-4.6538**		-1.1056		-4.0803		-2.4414
		(1.9343)		(1.9609)		(1.5987)		(2.4986)		(1.6342)
Innovation	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Geography	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Historic	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	89	89	89	89	89	89	89	89	89	89
R-squared	.3680	.2992	.5480	.4940	.5858	.5823	.5530	.4202	.5052	.5106
F-statistic	9.747	3.883	7.513	2.965	7.386	3.418	10.99	3.725	7.713	3.157

Notes: Two-Stage Least Squares estimates. $lnInnov_{i,88}$ is the weighted forward citation count of patents in region i, in 1988. Estimates are conducted separately for each technology sector, i.e. Electrical Engineering, Instruments, Chemistry, Mechanical Engineering, Other Sectors. Innovation controls include the lagged dependent variable, the (ln) number of inventors (per capita) in sector s in each NUTS-3 region in 1983 and the total (ln) number of inventors in each NUTS-3 region in 1983. Geographical controls include surface, terrain ruggedness and elevation. Historical controls include the dummy related to the presence of a bishop and the dummy related to the presence of medium and large cities. We add one to all patents, inventors, and motorways before to taking the ln to preserve zero value observations. F is the First stage Kleinbergen-Paap Statistic. Robust standard errors corrected for cluster spatial correlation in parentheses *** p< .01, ** p< .05, *p< .1.

TABLE A. 5: The Heterogeneous Impact of Motorways on Innovation (High/Low Density Regions) - IV Estimates

Dependent Variable: $lnInnov_{i,88}$	Low-Density		High-Density	
	(1)	(2)	(3)	(4)
$lnMotorways_{i,83}$	0.2557*	0.5499**	-0.1307	-0.1172**
	(0.1355)	(0.2558)	(0.0965)	(0.0588)
$SpatialMotorways_{i,83}$		-4.5172		-2.6686***
		(3.0363)		(0.2277)
Innovation	YES	YES	YES	YES
Geography	YES	YES	YES	YES
History	YES	YES	YES	YES
Observations	71	71	18	18
R-squared	.6152	.4942	.8827	.8878
F-statistic	12.34	3.346	1.425	0.487

Notes: Two-Stage Least Squares estimates. $lnInnov_{i,88}$ is the weighted forward citation count of patents in region i in 1988. Low (high) density NUTS-3 regions are characterized by inventor density ($Inventors_{i,83}/Surface_i$) below (above) the sample mean. Innovation controls include the lagged dependent variable and the (ln) number of inventors (per capita) in each NUTS-3 region in 1983. Geographical controls include surface, terrain ruggedness and elevation. Historical controls include the dummy related to the presence of a bishop and the dummy related to the presence of medium and large cities. We add one to all patents, inventors, and motorways before to taking the ln to preserve zero value observations. F is the First stage Kleinbergen-Paap Statistic. Robust standard errors corrected for cluster spatial correlation in parentheses in parentheses *** p< .01, ** p< .05, *p< .1.

TABLE A. 6: The Impact of Motorways on Innovation - IV Estimates with additional Socio-Economic Controls

Dependent Variable: $lnInnov_{i,88}$				
	OLS		IV	
	(1)	(2)	(3)	(4)
$lnMotorways_{i,83}$	0.1942***	0.1691***	0.2644*	0.4295**
	(0.0671)	(0.0653)	(0.1350)	(0.2075)
$SpatialMotorways_{i,83}$		1.1431*		-2.8090
		(0.6525)		(2.0019)
Innovation	YES	YES	YES	YES
Geography	YES	YES	YES	YES
History	YES	YES	YES	YES
Socioeconomic	YES	YES	YES	YES
Observations	89	89	89	89
R-squared	.7331	.7371	.7307	.6744
F-statistic			10.01	2.881

Notes: All specifications are estimated by Two-Stage Least Squares. $lnInnov_{i,88}$ is the weighted forward citation count of patents in region i in 1988. Innovation controls include the lagged dependent variable and the (ln) number of inventors (per capita) in each NUTS-3 region in 1983. Geographical controls include surface, terrain ruggedness and elevation. Historical controls include the dummy related to the presence of a bishop and the dummy related to the presence of medium and large cities. Socioeconomic controls include two binary variables for the presence of at least one airport and at least one university headquarters in each region in 1983, and the regional gross value added (per employed). We add one to all patents, inventors, and motorways before taking the ln in order to preserve zero value observations. F-statistics is the first stage Kleinbergen-Paap statistic. Robust standard errors corrected for cluster spatial correlation in parentheses *** p< .01, ** p< .05, *p< .1.

TABLE A.7: The Impact of Motorways on Innovation - IV Estimates – Additional Results I

Dependent Variable: $lnInnov_{i,88}$

	(1)	(2)	(3)	(4)	(5)	(6)
$lnMotorways_{i,83}$	0.2906***	0.3060***	0.2639**	0.3645***	0.4157***	0.4331***
	(0.1016)	(0.1049)	(0.1118)	(0.1297)	(0.1314)	(0.1621)
$SpatialMotorways_{i,83}$				-2.2641	-2.7536	-2.9173
				(1.8683)	(1.8311)	(2.0975)
Lagged Dep.Var.	NO	NO	NO	NO	NO	NO
Inventors	YES	YES	YES	YES	YES	YES
Geography	NO	YES	YES	NO	YES	YES
History	NO	NO	YES	NO	NO	YES
Observations	89	89	89	89	89	89
R-squared	.6725	.6754	.6877	.6470	.6392	.6405
F-statistic	16.41	13.47	10.02	7.861	6.315	3.482

Notes: All specifications are estimated by Two-Stage Least Squares. $lnInnov_{i,88}$ is the weighted forward citation count of patents in region *i* in 1988. Inventors controls include the (ln) number of inventors (per capita) in each NUTS- 3 region in 1983. Geographical controls include surface, terrain ruggedness and elevation. Historical controls include the dummy related to the presence of a bishop and the dummy related to the presence of medium and large cities. We add one to all patents, inventors, and motorways before taking the ln in order to preserve zero value observations. F- statistics is the first stage Kleinbergen-Paap statistic. Robust standard errors corrected for cluster spatial correlation in parentheses *** p< .01, ** p< .05, *p< .1.

TABLE A.8: The Impact of Motorways on Innovation: IV Estimates - Additional Results II

Dependent Variable: $lnInnov_{i,88}$

	(1)	(2)	(3)	(4)	(5)	(6)
lnMotorways$_{i,83}$	0.2879**	0.3159***	0.2853**	0.3590***	0.4217***	0.4562**
	(0.1121)	(0.1096)	(0.1253)	(0.1391)	(0.1337)	(0.1817)
$SpatialMotorways_{i,83}$				-2.1381	-2.6016	-2.9147
				(1.7372)	(1.6487)	(1.8906)
Social Capital	YES	YES	YES	YES	YES	YES
Innovation	YES	YES	YES	YES	YES	YES
Geography	NO	YES	YES	NO	YES	YES
History	NO	NO	YES	NO	NO	YES
Observations	89	89	89	89	89	89
R-squared	.7240	.7387	.7503	.6971	.7069	.7037
F-statistic	16.78	13.47	10.34	7.592	5.828	3.420

Notes: All specifications are estimated by Two-Stage Least Squares. *lnInnov$_{i,88}$* is the weighted forward citation count of patents in region *i* in 1988. Social capital refers to the turnout in the referendum on divorce (1974). Innovation controls include the lagged dependent variable and the (ln) number of inventors (per capita) in each NUTS-3 region in 1983. Geographical controls include surface, terrain ruggedness and elevation. Historical controls include the dummy related to the presence of a bishop and the dummy related to the presence of medium and large cities. We add one to all patents, inventors, and motorways before taking the ln in order to preserve zero value observations. F-statistics is the first stage Kleinbergen-Paap statistic. Robust standard errors corrected for cluster spatial correlation in parentheses *** p< .01, ** p< .05, *p< .1.