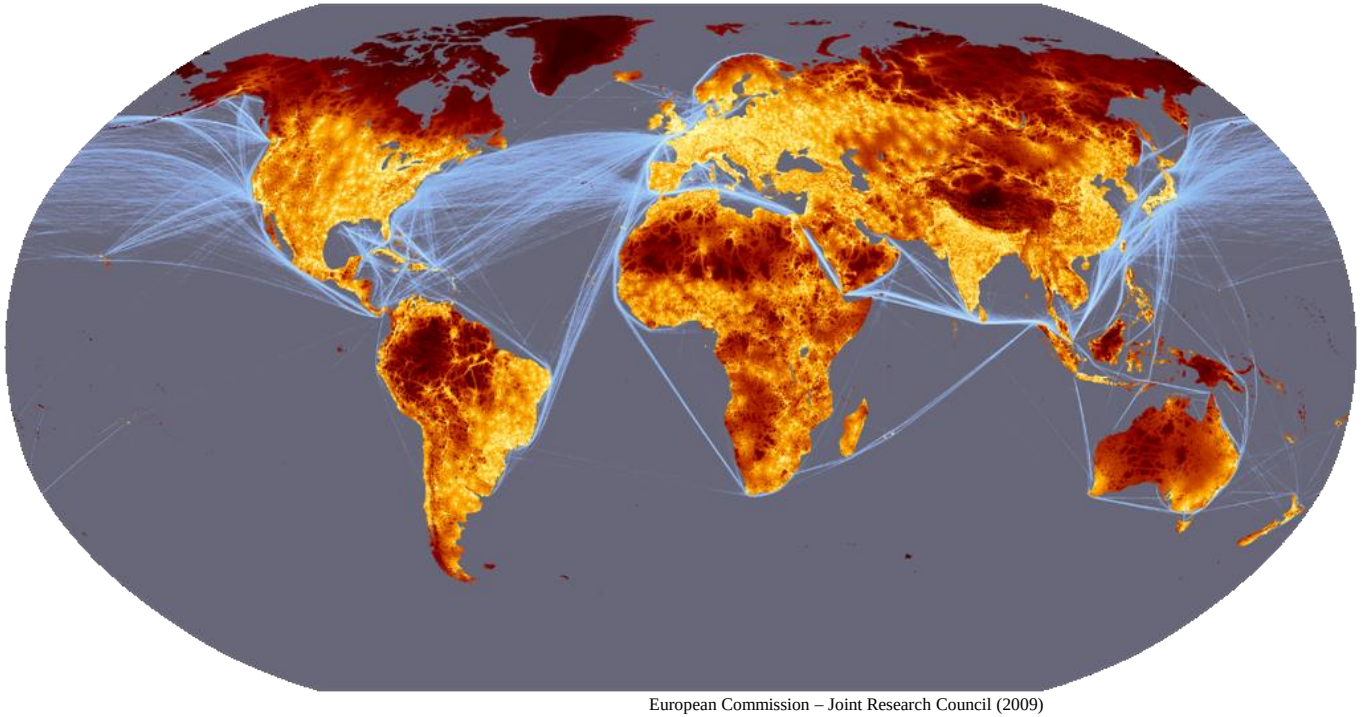
Market access and economic growth: Insights from a new dimension of inequality



European Commission – Joint Research Council (2009)

Jacob Hochard Edward Barbier

THE UNIVERSITY OF WYOMING EQUALITY 1886

Initiative for Policy Dialogue

Azim Premji University

Inequality and economic growth

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- How does income inequality affect economic growth?
- Asset inequality (Birdsall and Londono 1997)

- **Does poor access to markets affect growth?**
- **What about the distribution of that access?**

Model assumptions

- Each household is a producer.
- Initial wealth equality.
- Diminishing marginal product of capital.
- **Barriers to relocation (access distribution exogenous).**
- **Spillovers originate in market centers and diffuse across space.**

Overlapping generation households

$$\max_{c_t^i, f_t^i} U_t^i = ln(c_t^i) + \rho ln(f_t^i) \qquad i \in [0, 1]$$

subject to

$$c_t^i = \bar{w} - k_t^i$$
$$f_t^i = y_t^i = k_t^{i\alpha} A_t^i (A_t, \delta^i)^{1-\alpha} \quad 0 < \alpha < 1$$

---

c_t^i = current consumption
f_t^i = future consumption
ρ = discount rate
$\bar{w}$ = endowed wealth

y_t^i = output
α = returns to scale
A_t = technology spillover
δ^i = distance to market center

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$$A_t = \int_0^1 y_{t-1}^i di = y_{t-1} \qquad \frac{\partial A_t^i}{\partial A_t} > 0$$

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Growth decomposition

Each household invests a constant share of income

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Aggregate growth follows

$$g_t = ln\left(\frac{y_t}{y_{t-1}}\right)$$

$$= \overbrace{\alpha ln\left(\frac{\bar{w}\rho\alpha}{1+\rho\alpha}\right)}^{\text{Investment}} + \overbrace{(1-\alpha)ln\left(\int_0^1 A_t^i(y_{t-1},\delta^i)di\right)}^{\text{Production spillovers}} - \overbrace{ln(y_{t-1})}^{\text{Prior output}}.$$

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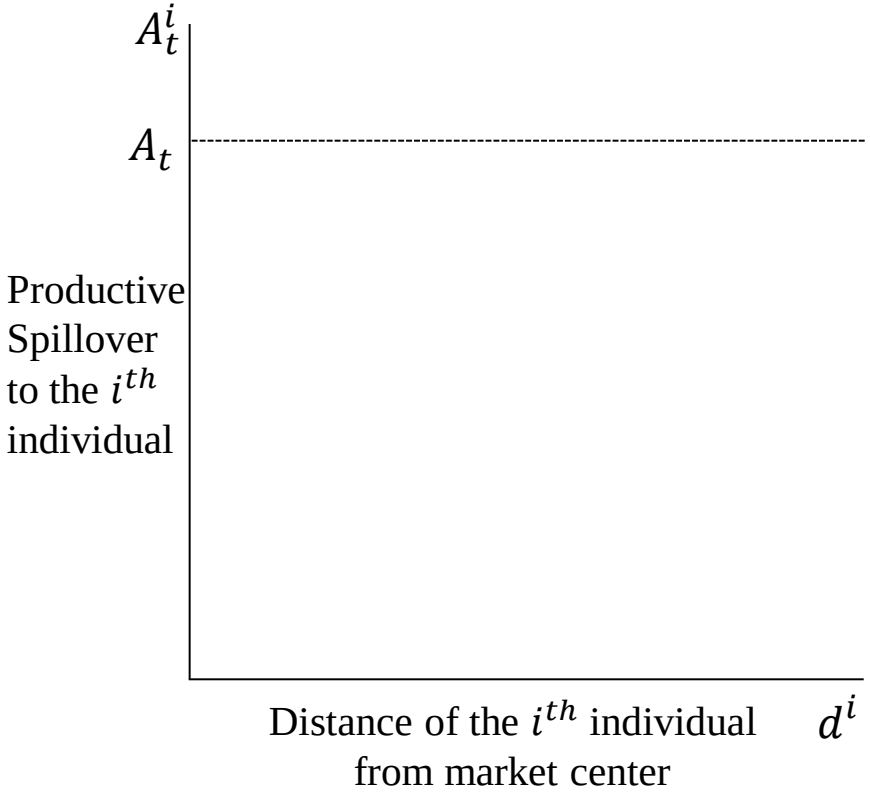
Access inequality and growth

Effect of access inequality on growth depends on $\frac{\partial A_t^i}{\partial \delta^i}$ and $\frac{\partial^2 A_t^i}{\partial \delta^{i2}}$...



If production spillovers do not diminish, distance to markets and equality of access do not affect growth.

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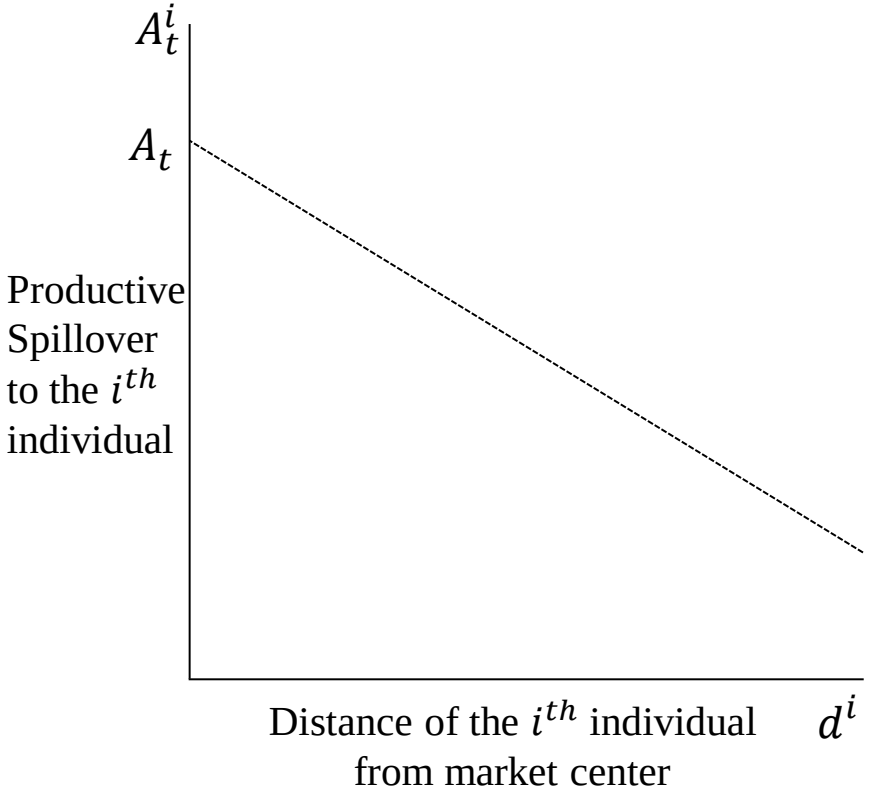

If production spillovers diminish, increased distance to markets decreases growth.

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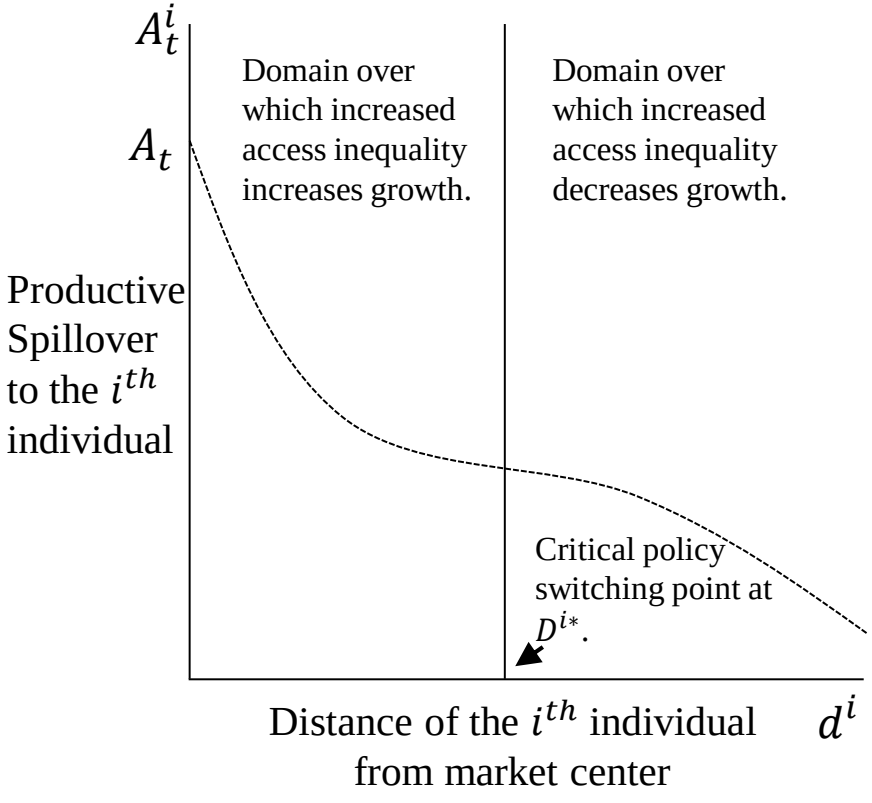

If production spillovers diminish convexly (concavely) across space, increased access inequality increases (decreases) growth.

Measure 1: Average household distance to market center.

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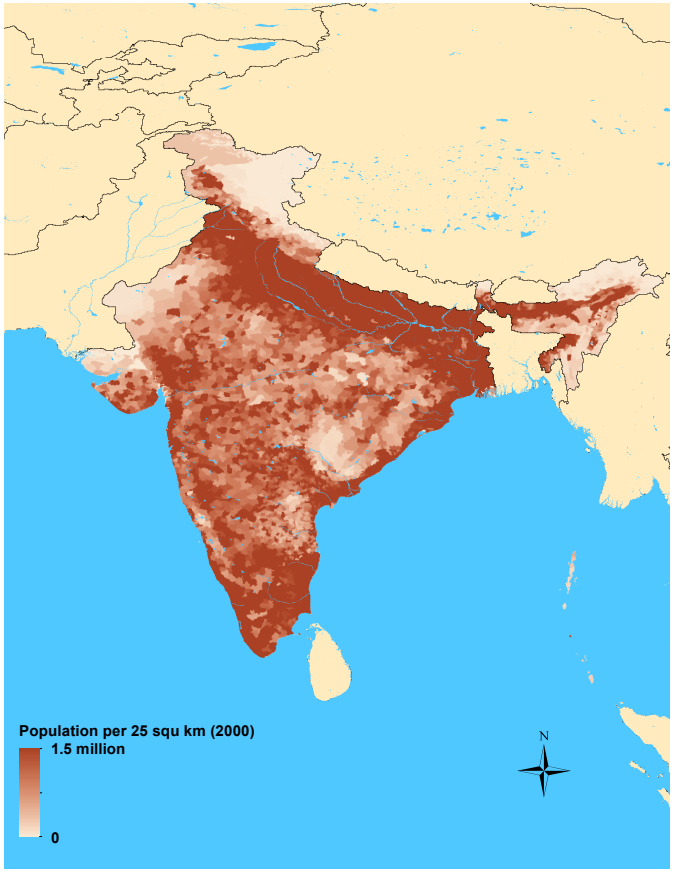
Location of individuals:



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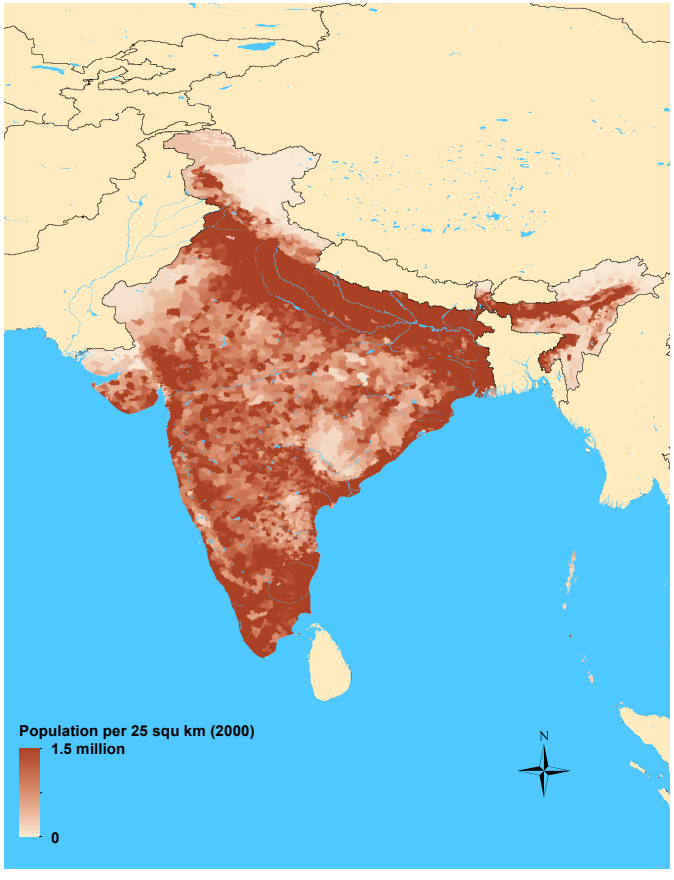
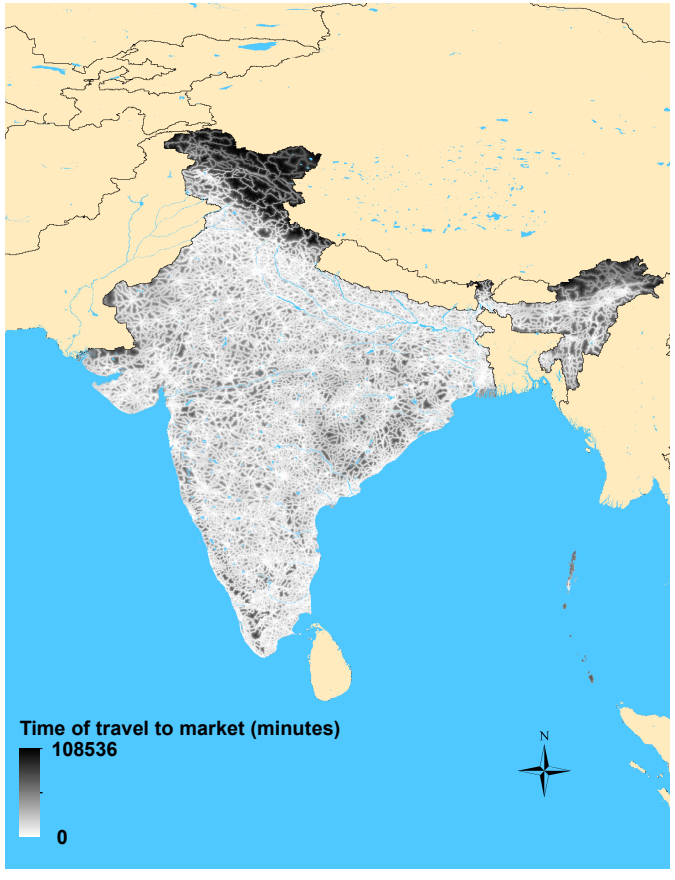


Distance of individuals:



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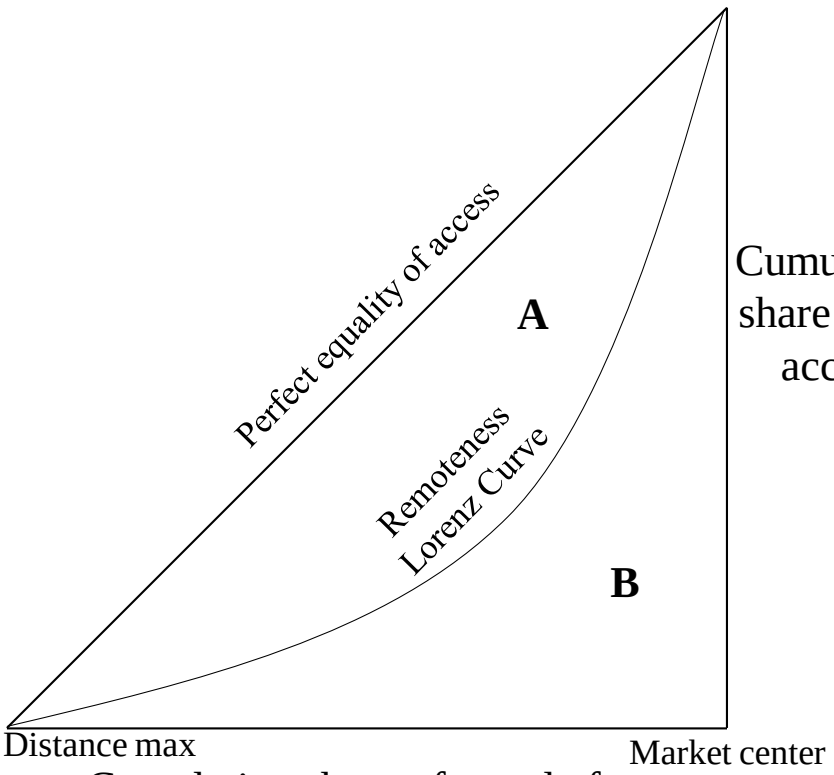

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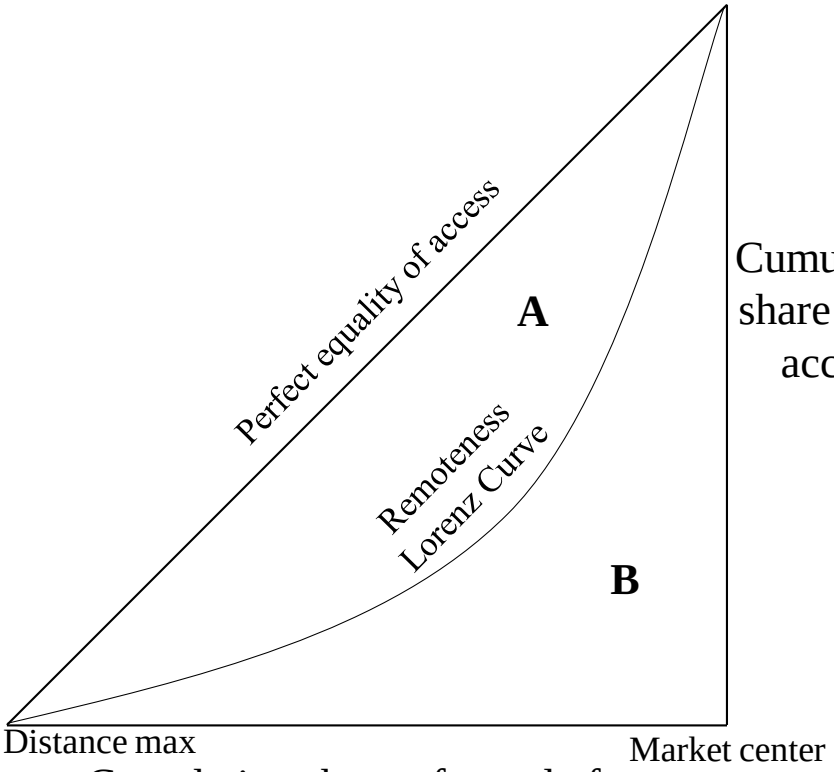

$$RGINI = \frac{A}{A+B}$$

Perfectly equal access $= 0$

Perfectly unequal access $= 1$

Endogenous regressors

Dependent variable: Average growth rate from 2000-2012.

Average growth from 2000-2012 of country *i* =

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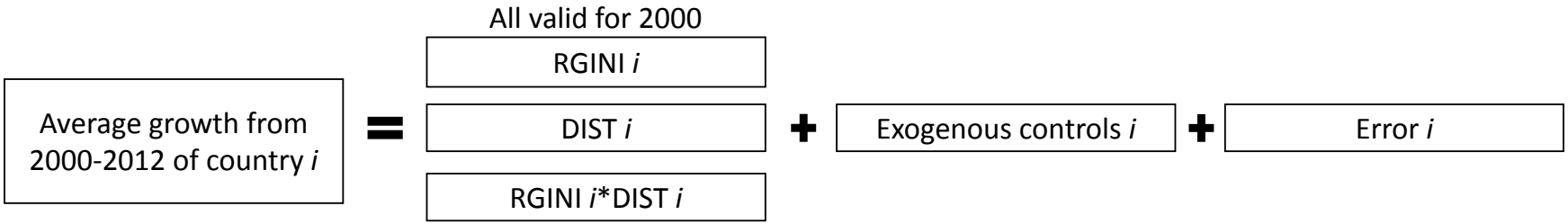

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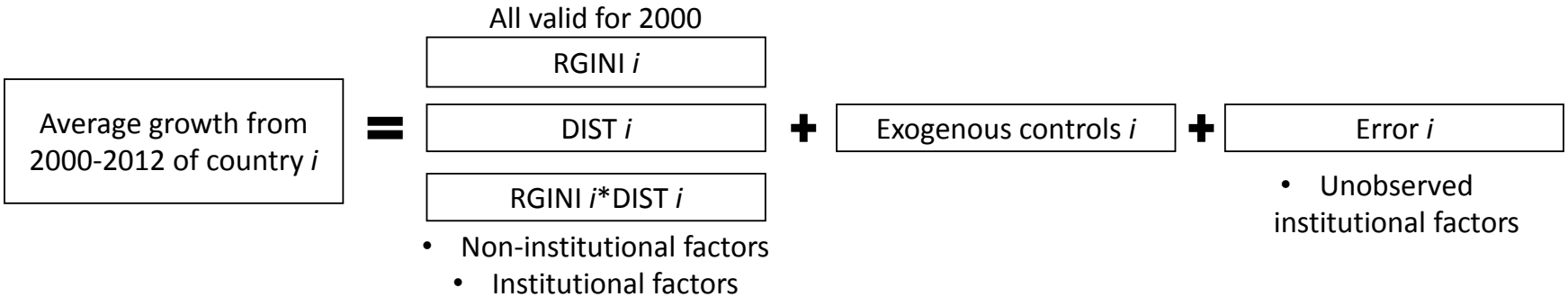

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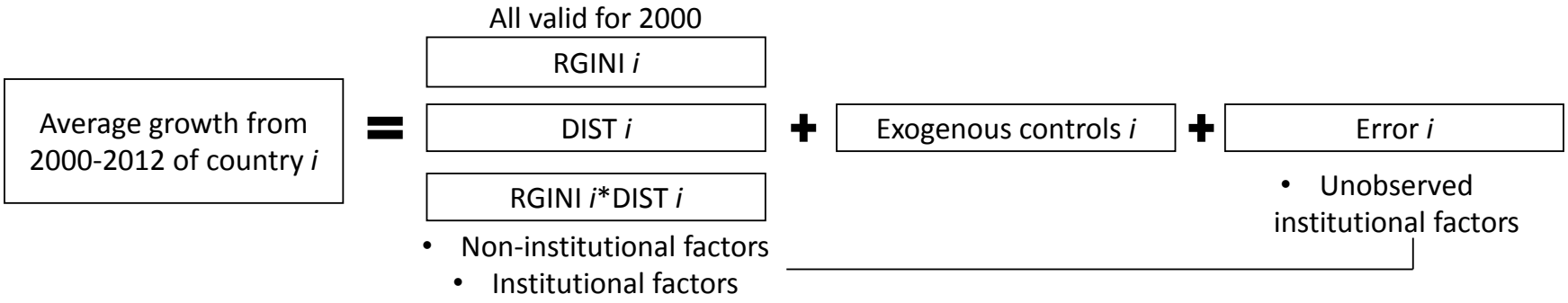

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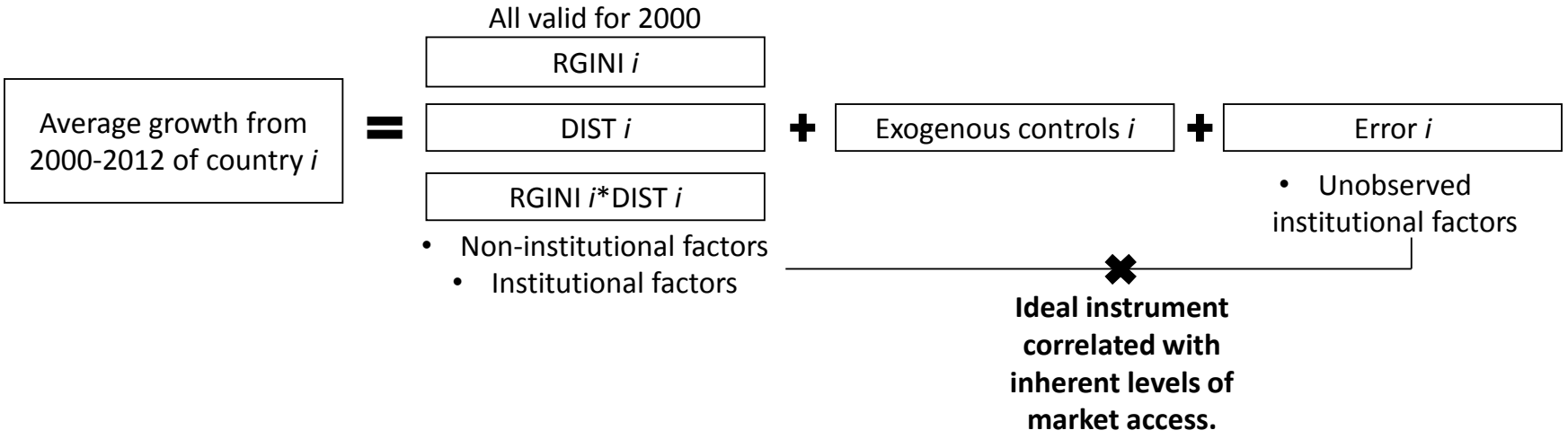

Instruments

Instrument 1: Average slope (terrain slope index).
Instrument 2: Average elevation (meters).
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*Include all linear interactions.

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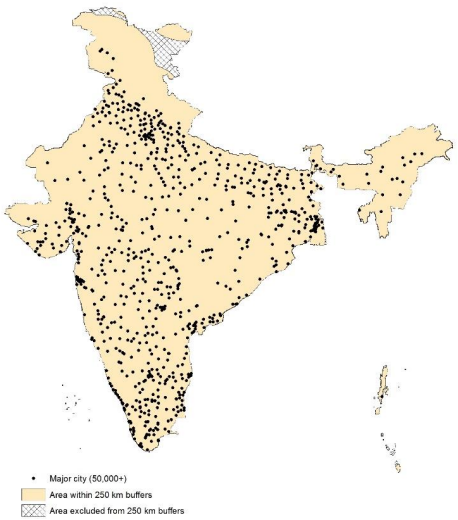

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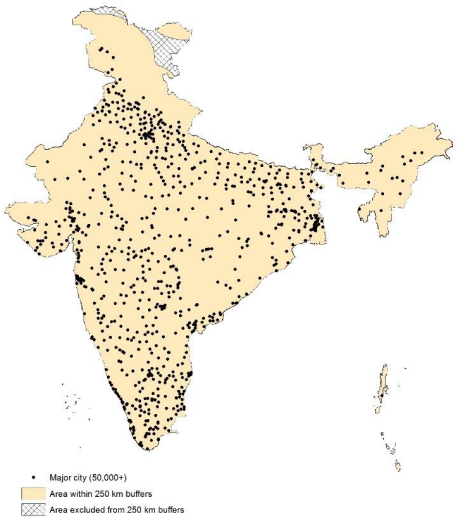
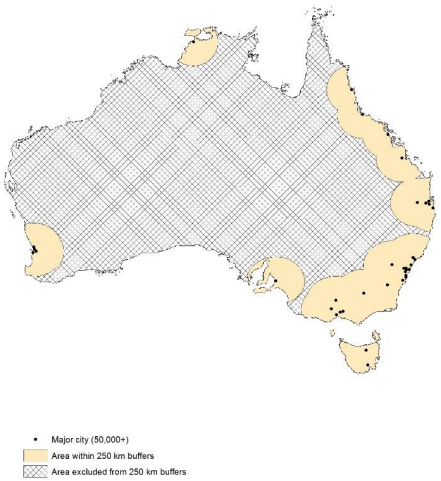


Australia



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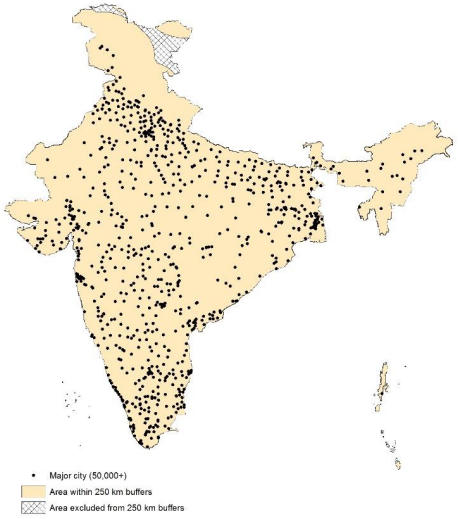

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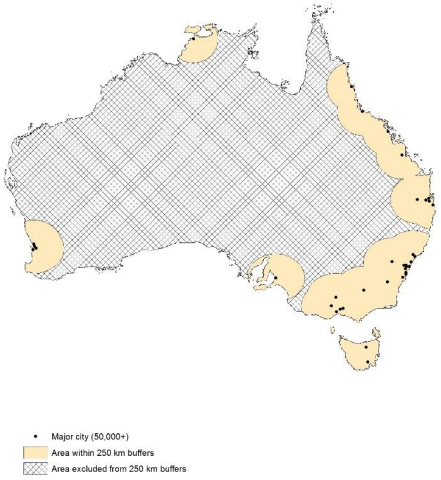
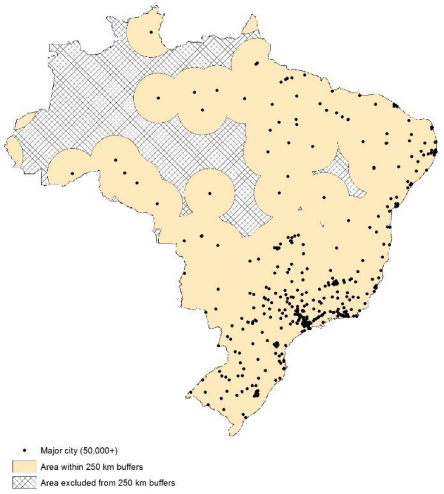


Brazil



Descriptive statistics

Summary Statistics.

Dependent	Time	Source	Obs	Mean	STD	Min	Max
GROWTH	AVG 2000-2012	World Bank	192	0.029	0.034	-0.083	0.206
Endogenous	Time	Source	Obs	Mean	STD	Min	Max
RGINI	2000	EU-JRC	204	0.7562	0.148	0.284	0.994
DIST	2000	EU-JRC	204	355.393	669.528	11.656	4588.458
AGRI	AVG 2000-2012	World Bank	181	33.137	49.279	6.889	382.532
Exogenous	Time	Source	Obs	Mean	STD	Min	Max
TRADE	AVG 1995-2000	World Bank	182	83.797	47.046	1.698	341.543
ROL	AVG 1995-2000	World Bank	194	-0.0450	0.995	-2.279	1.928
CAPITAL	AVG 1995-2000	World Bank	175	22.607	8.699	3.481	83.899
EDU	AVG 1995-2000	World Bank	200	6.322	0.853	4	9
GOVT	AVG 1995-2000	World Bank	173	16.198	6.517	4.548	48.207
DEV	AVG 1995-2000	World Bank	205	0.678	0.468	0	1
Instruments	Units	Source	Obs	Mean	STD	Min	Max
SLOPE	Terrain slope index	GAEZ	205	65.238	27.187	0	97.885
ELEV	Meters	GAEZ	187	521.806	529.798	5.023	2864.940
RIVER	Meters/Ha	ESRI	205	0.008	0.036	0	0.497

IV-GMM estimation

	(1) Growth (2000-2012)	(2) Growth (2000-2012)	(3) Growth (2000-2012)	(4) Growth (2000-2012)	(5) Growth (2000-2012)	(6) Growth (2000-2012)	(7) Growth (2000-2012)	(8) Growth (2000-2012)
RGini	0.127	0.254	0.299	0.340**	0.416**	0.417**	0.458**	0.455**
	(0.47)	(1.10)	(1.46)	(2.03)	(2.25)	(2.18)	(2.22)	(2.29)
DIST	-0.00416**	-0.00362**	-0.00245	-0.00229	-0.00263	-0.00288	-0.00317	-0.00315
	(-2.03)	(-2.11)	(-1.50)	(-1.37)	(-1.35)	(-1.44)	(-1.49)	(-1.50)
DIST*RGini	-0.000581	-0.000911	-0.000987*	-0.00107**	-0.00127**	-0.00123**	-0.00159***	-0.00157***
	(-0.83)	(-1.51)	(-1.79)	(-2.06)	(-2.40)	(-2.27)	(-2.67)	(-2.70)
AGRI	0.0559***	0.0520***	0.0391**	0.0380**	0.0448**	0.0472**	0.0541**	0.0537**
	(2.78)	(3.08)	(2.50)	(2.30)	(2.08)	(2.18)	(2.23)	(2.25)
Controls	1	2	3	4	5	6	7	8
Diagnostic tests - pass (P) or fail (F)								
Kleibergen-Paap	F	F	F	F	F	F	P	P
Hansen J stat	P	P	P	P	P	P	P	P
Anselin-Kalejian	P	P	P	P	P	P	P	P
N	154	154	150	150	148	148	145	145

z statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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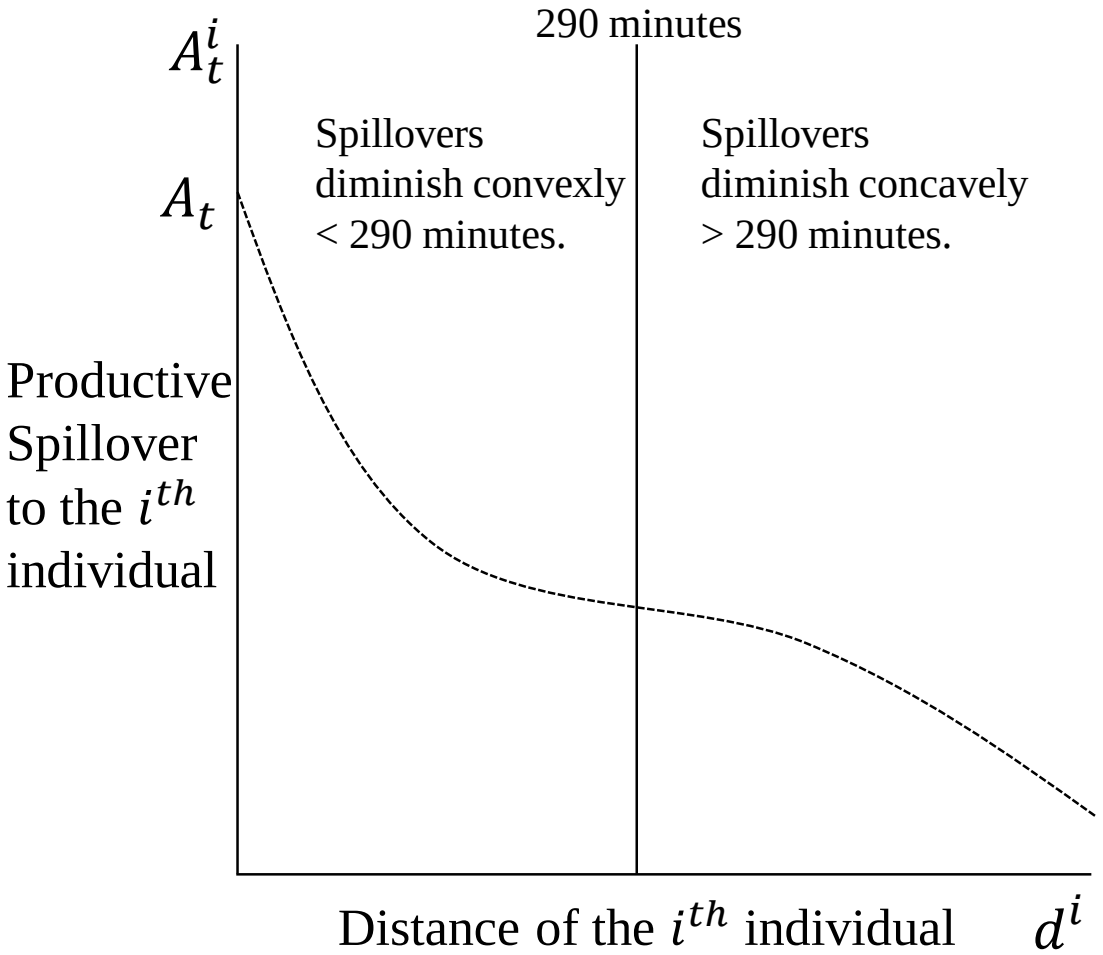
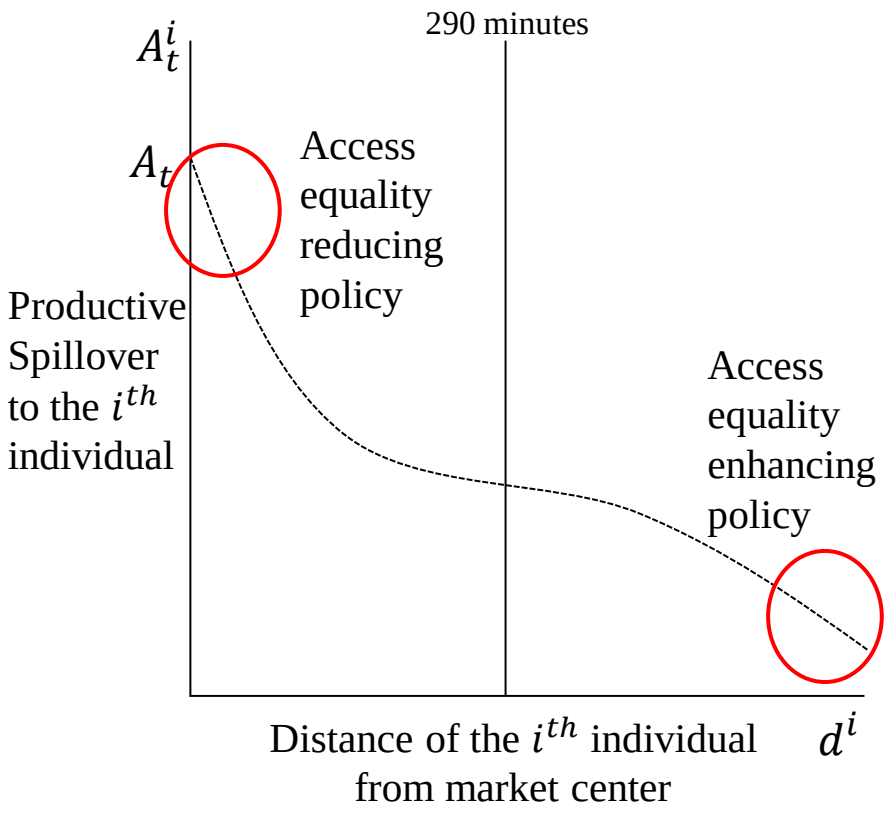
How do production spillovers diminish?



Where should growth-oriented investment be focused?

- Access equality enhancing policies can be (but are not always) growth enhancing.
- Policy makers rank the marginal consumer of access.
- Need to further examine production spillovers across space to implement policy.



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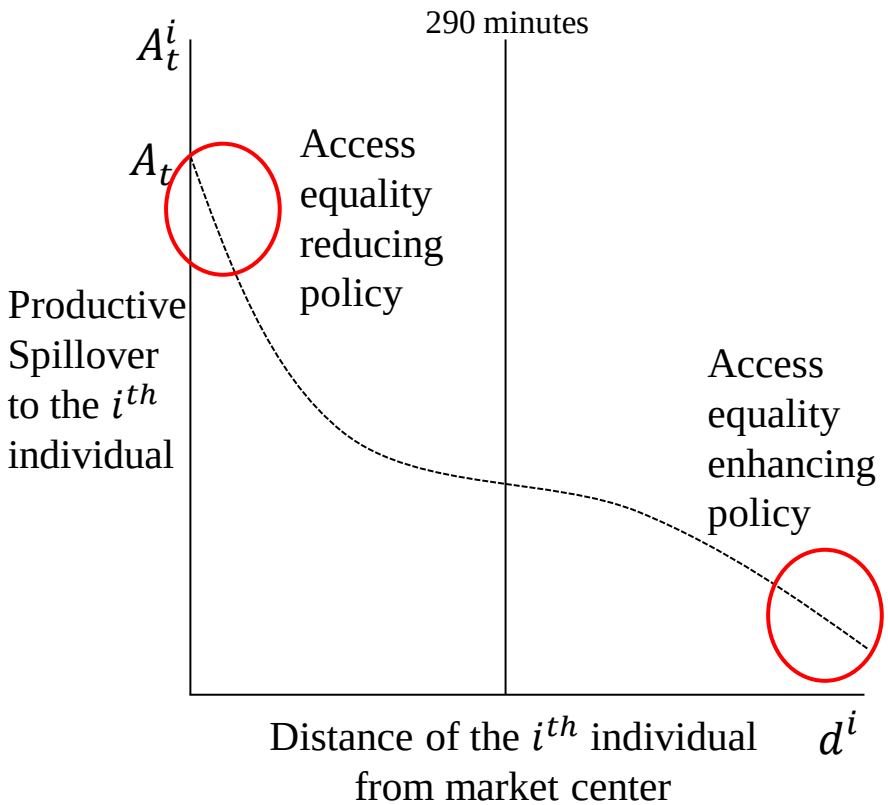

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	(2.78)	(3.08)	(2.50)	(2.30)	(2.08)	(2.18)	(2.23)	(2.25)
GDP	-0.0512***	0.121*	0.0923	0.0852	0.0763	0.0766	0.118	0.119
	(-3.01)	(1.67)	(1.36)	(1.32)	(1.10)	(1.10)	(1.47)	(1.51)
GDP2		-0.0239**	-0.0188*	-0.0178*	-0.0170	-0.0171	-0.0234*	-0.0235*
		(-2.13)	(-1.80)	(-1.76)	(-1.58)	(-1.58)	(-1.84)	(-1.87)
TRADE			0.000117	0.000128	0.000267	0.000278	0.000318*	0.000321*
			(0.82)	(0.90)	(1.55)	(1.62)	(1.82)	(1.83)
ROL				0.00304	0.00824	0.00773	0.0133	0.0146
				(0.33)	(0.68)	(0.64)	(0.85)	(0.89)
CAPITAL					-0.00169	-0.00180	-0.00279*	-0.00274*
					(-1.21)	(-1.28)	(-1.66)	(-1.68)
EDU						-0.00811	-0.00982	-0.00960
						(-1.02)	(-1.04)	(-1.03)
GOVT							-0.00159	-0.00155
							(-1.24)	(-1.21)
DEV								0.00564
								(0.29)
Constant	-0.272	-0.633***	-0.568***	-0.584***	-0.653***	-0.615***	-0.701***	-0.705***
	(-1.44)	(-4.29)	(-4.20)	(-4.14)	(-3.33)	(-3.61)	(-3.42)	(-3.45)
Observations	154	154	150	150	148	148	145	145
Underidentification test (Kleibergen-Paap)	2.691	2.645	2.912	4.256	6.728	4.777	11.677	12.193
p-value	0.6107	0.6188	0.5727	0.3725	0.1510	0.3110	0.0199	0.0160
Overidentification test (Hansen J stat)	0.455	1.433	0.656	0.806	0.665	0.466	0.164	0.149
p-value	0.9287	0.6978	0.8834	0.8480	0.8814	0.9262	0.9832	0.9854
Spatial dependence test (Anselin-Kalejian)	1.281	1.485	1.665	1.640	1.256	1.391	1.294	1.331
p-value	0.2577	0.2230	0.1970	0.2004	0.2624	0.2382	0.2552	0.2486

z statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$