

Landlocked or Policy Locked?

**– How Services Trade Protection
Deepens Economic Isolation**

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Motivation

- Telecom and air transport are “linkage” sectors vital for a country’s international connectedness
 - Protectionism and services: prevalence of regulatory measures rather than classic border instruments
 - Many landlocked countries exhibit poor access to telecom and air transport services
- ⇒ Are poor outcomes a consequence of poor policy?

Research Questions

- How do services trade policies in landlocked countries compare with policies in other countries?
- Can concentrated markets and poor performance be attributed to poor policy?
- Why do observed policies choices arise?

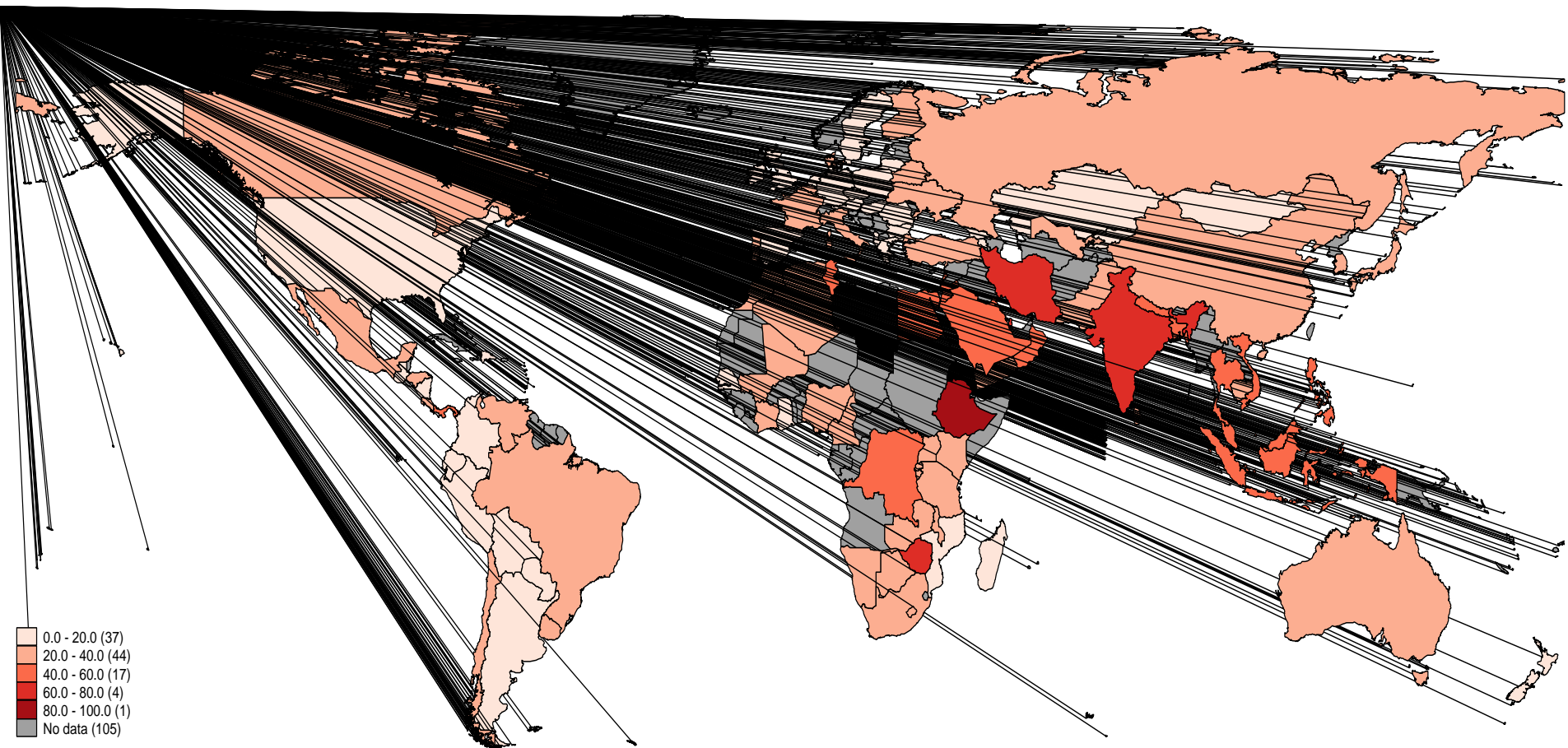
Findings:

- ⇒ Landlocked countries characterized by more restrictive policies in telecom and air transport
- ⇒ Restrictive policies are associated with more concentrated markets and less access to services
- ⇒ Protection may be attributable to the interplay of geography and institutions

Structure of presentation

1. Services Trade Policies
2. Political Economy of Trade Openness
 - a. Understanding policy choices
 - b. Addressing endogeneity of policies
3. Empirical Results
 - a. Telecommunications
 - b. Air Transportation
4. Conclusions

Data: country coverage



Data: Services Policies

- 103 countries (81 coastal, 22 landlocked)
- Services sectors:
 - Fixed and mobile telecom (commercial presence)
 - International air transport (cross-border trade, commercial presence)
 - [financial, insurance, maritime, road, retail, professional services]
- Multiple policy dimensions but focus on discriminatory policy measures
 - Barriers to entry and ownership
 - Licensing
 - Operations and regulatory environment
 - Provisions of Bilateral Air Service Agreements (BASAs)
- Policy information subjected to government review

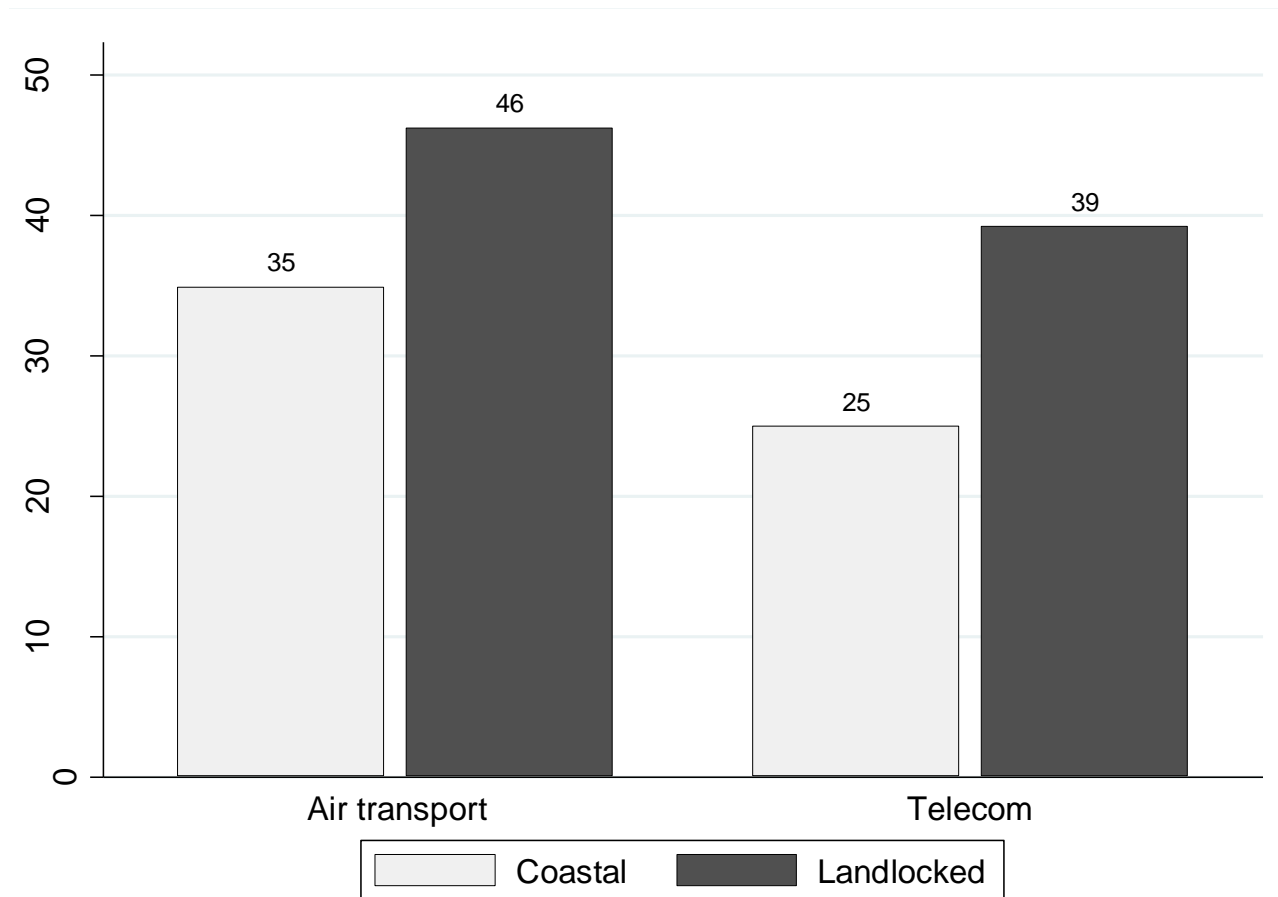
Quantitative analysis

Quantitative analysis is conducted using

- Directly using *individual policy variables*
 - Quantitative variables
 - Qualitative variables
- Constructing *aggregate index* (STRI) of degree of openness
 - scoring rules and mapping into 5-point scale: [0, .25, .50, .75, 1]
 - Air transport mode 1: WTO's ALI
 - Use as set of discrete indicators
 - Use as (quasi-)continuous variable to illustrate policy differences and for IV estimation

The Policy Wedge

Landlocked countries have more restrictive policies than coastal countries in air transport and telecommunications



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Political Economy

Simple oligopoly model, assume government controls n

- Suzumura and Kiyono (1987, RES); Zhao (2009, JEcon)
- Characterize $n^* \equiv \arg \max_{n>0} W(n, q^*)$

$$\begin{aligned} W(n, q(n)) &= CS(n) + \gamma \cdot \Sigma \pi(n) \\ &= \int_0^{nq(n)} P(z) dz - P(nq(n))nq(n) \\ &\quad + \gamma [P(nq(n))nq(n) - nC(q(n))] \end{aligned}$$

$$P(n^* q^*(n^*)) = \frac{\gamma \varepsilon}{\gamma(\varepsilon + 1) - 1} \cdot \left[\frac{C(q^*)}{q^*} - \frac{\alpha}{\beta} (AC'(q^*)Q^*) \right]$$

Political Economy

Government's choice of n as depending on γ (and ε):

$$\frac{dn^*}{d\gamma} < 0 \quad \left(\frac{dn^*}{d\varepsilon} < 0 \right) \quad \frac{d(n^*)^2}{d\gamma d\varepsilon} < 0$$

- Focus on welfare-mindedness for IV strategy
- Political institutions affect welfare-mindedness by constraining responsiveness to lobbying
- Democracy index – Polity IV project
(Institutions affect policy choices through accountability)

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Estimation

- Telecom market structure
 - Herfindahl index (HHI) of market concentration
- Telecom accessibility
 - Number of mainlines/100; # of cellular subscriptions/100
- Air transportation
 - Number of flights; seat capacity

Estimate reduced form:

$$Y_i = \beta_0 + \beta_1 X_i + \beta_2 Z_i + \beta_3 STRI_i + \varepsilon_i$$

IV first-stage estimation:

$$STRI_i = \gamma_0 + \gamma_1 X_i + \gamma_2 Z_i + \gamma_3 DI_i + \eta_i$$

Results: Telecom Market Structure

	(1)	(2)	(3)	(4)	(5)	(6)
		Fixed line			Mobile	
	OLS	OLS	IV	OLS	OLS	IV
Log GDP (2007)	-743.4872*** (144.0017)	-798.2878*** (133.2533)	-809.0922*** (144.2164)	-355.4413*** (111.9333)	-430.3521*** (116.0360)	-434.3159*** (113.7538)
Log GDP p.c. (2007)	337.5251 (290.1874)	408.2233 (261.1358)	594.7895* (309.7016)	407.5149** (167.7087)	583.2758*** (182.1849)	658.5521*** (184.0177)
Urban population (% of total)	-4.6006 (13.5589)	-4.2191 (14.1653)	-10.0375 (15.8076)	-1.6786 (8.0325)	-6.7183 (8.6059)	-7.4386 (9.6040)
Population Density (people/sqkm)	-0.4287 (0.8240)	-0.2019 (0.6933)	-0.7863 (0.9776)	-0.1148 (0.4587)	-0.3848 (0.5504)	-0.5329 (0.6303)
LLC Dummy	-1209.7363*** (455.2252)	-728.4651 (465.9156)	-1042.8145** (495.3117)	285.2628 (322.4555)	-10.0693 (377.2240)	-101.0782 (389.1188)
Africa Dummy	851.3010 (553.7653)	909.5038* (526.0141)	741.3573 (572.6307)	594.0262 (397.5506)	632.0786 (438.5653)	434.1480 (504.4995)
License Limit	1636.2611*** (454.2623)			843.8367* (449.6106)		
Public Lic Criteria	-948.1628* (485.0377)			-2607.8056*** (782.2153)		
Foreign Ownership Limit	-15.1185* (7.6787)			-16.5561** (6.3750)		
Indep Regulator	552.6018 (477.1015)			-122.2010 (331.6972)		
STRI Tel Fixed M3		1338.7055** (564.5126)	3787.6651*** (1.4e+03)			
STRI Tel Mobile M3					2830.4262*** (798.9577)	4434.4475*** (1.6e+03)
Constant	10423.0639*** (1.9e+03)	8018.9008*** (1.8e+03)	6199.9453*** (2.2e+03)	6494.5364*** (1.5e+03)	1099.5716 (1.5e+03)	165.6405 (1.7e+03)
Obs	101	103	103	100	103	103

Results: Telecom Access

	(1)	(2)	(3)	(1)	(2)	(3)
	F-OLS	F-OLS	F-IV	M-OLS	M-OLS	M-IV
Log GDP (2007)	2.4746*** (0.6573)	2.3557*** (0.6778)	2.4097*** (0.6719)	-2.1839 (1.5264)	-2.2545 (1.4774)	-2.2555 (1.4775)
Log GDP p.c. (2007)	9.6955*** (1.7905)	10.0248*** (1.8087)	9.0947*** (1.7524)	23.0129*** (2.9013)	24.1328*** (2.6189)	24.1509*** (2.7118)
Urban population (% of total)	0.0085 (0.0647)	-0.0024 (0.0714)	0.0267 (0.0799)	0.1778 (0.1331)	0.1558 (0.1372)	0.1556 (0.1379)
Population Density (people/sqkm)	0.0032 (0.0035)	0.0052 (0.0038)	0.0082** (0.0038)	0.0072 (0.0121)	0.0072 (0.0120)	0.0071 (0.0120)
Africa Dummy	3.4644 (2.7466)	2.5261 (2.8603)	3.3690 (3.0360)	0.0528 (4.9500)	-0.4793 (4.6949)	-0.5268 (5.0101)
LLC Dummy	2.3882 (2.4563)	4.6915* (2.3725)	6.3080** (2.9229)	-2.0470 (3.9509)	-0.4325 (4.1121)	-0.4543 (4.2005)
Log HHI residual	0.0002 (0.0004)	-0.0001 (0.0005)	-0.0007 (0.0006)	-0.0041*** (0.0015)	-0.0036** (0.0015)	-0.0036** (0.0016)
STRI (F) = 0.25	-5.5564** (2.4903)			-12.9708** (5.6347)		
STRI (F) = 0.50	-1.1689 (2.5797)			-16.2788*** (5.5890)		
STRI (F) = 0.75	2.5276 (8.2894)			-28.9742*** (10.4050)		
STRI (F) = 1.00	-5.7834 (4.5554)			-17.3247** (8.3479)		
STRI Fixed Line		-4.0226 (4.0397)	-16.4599** (7.8692)		-27.9711*** (7.8014)	-27.5863 (18.7148)
Constant	-77.6332*** (13.7494)	-80.8423*** (13.2233)	-71.7368*** (13.0698)	-124.8579*** (22.2814)	-135.9442*** (19.7363)	-136.1684*** (21.7501)

Results: Air Transportation

	(1)	(2)	(3)
	OLS-STRI	OLS-STRI	IV-STRI
Log GDP (2007)	0.5804*** (0.0381)	0.5903*** (0.0393)	0.6033*** (0.0460)
Log GDP p.c. (2007)	0.2824** (0.1255)	0.2757** (0.1224)	0.2510** (0.1233)
Urban population (% of total)	-0.0056 (0.0049)	-0.0056 (0.0049)	-0.0063 (0.0053)
Population Density (people/sqkm)	-0.0000 (0.0003)	-0.0001 (0.0003)	-0.0001 (0.0002)
Percent Tourists/Population	0.3151** (0.1359)	0.3282** (0.1325)	0.3313** (0.1321)
LLC Dummy	-0.1526 (0.1602)	-0.1657 (0.1585)	-0.1075 (0.1655)
Africa Dummy	0.1004 (0.1666)	0.0885 (0.1673)	0.1161 (0.1702)
airports paved runways	0.0000 (0.0001)	0.0000 (0.0001)	0.0000 (0.0001)
STRI intermed	-0.1486 (0.1319)		
STRI high	-0.4234*** (0.1317)		
STRI AirPass MO		-0.7003** (0.2738)	-1.4157* (0.8168)
Constant	5.8828*** (0.9141)	5.9809*** (0.8780)	6.4229*** (0.9164)

Results: Air Transport (Decomp)

Intensive margin vs extensive margin:

	(1)	(2)	(3)
	OLS		
	F-STRI	F/A-STRI	A-STRI
Log GDP (2007)	0.5804*** (0.0381)	0.2000*** (0.0328)	0.3804*** (0.0346)
Log GDP p.c. (2007)	0.2824** (0.1255)	0.2427*** (0.0723)	0.0397 (0.0866)
Urban population (% of total)	-0.0056 (0.0049)	-0.0039 (0.0030)	-0.0017 (0.0033)
Population Density (people/sqkm)	-0.0000 (0.0003)	-0.0001 (0.0002)	0.0000 (0.0003)
Percent Tourists/Population	0.3151** (0.1359)	0.1126* (0.0570)	0.2026* (0.1042)
LLC Dummy	-0.1526 (0.1602)	0.0443 (0.1269)	-0.1967 (0.1590)
Africa Dummy	0.1004 (0.1666)	0.2669* (0.1468)	-0.1667 (0.1771)
airports paved runways	0.0000 (0.0001)	0.0001** (0.0000)	-0.0001 (0.0000)
STRI intermed	-0.1486 (0.1319)	-0.2907*** (0.0961)	0.1420 (0.1127)
STRI high	-0.4234*** (0.1317)	-0.4941*** (0.1106)	0.0707 (0.1346)

Conclusions

- Landlocked countries apply significantly more restrictive policies in telecom and air transport services than coastal countries.
- More restrictive policies lead to higher market concentration and more limited access to services.
 - Telecom STRI 50 → 25: gain in cellular subs by 7 percentage points, mainlines by 4 percentage points
 - Air transport STRI 50 → 25: increase in flights by 20 percent
- Addressing policy restrictions in services sectors could be as important as alleviating infrastructure bottlenecks, and vital to maximizing returns to aid for trade.
- But countries cannot unilaterally reform international transport; GATS excludes air traffic rights.

Thank you for your attention!

Additional Slides

Data: Sample Stats

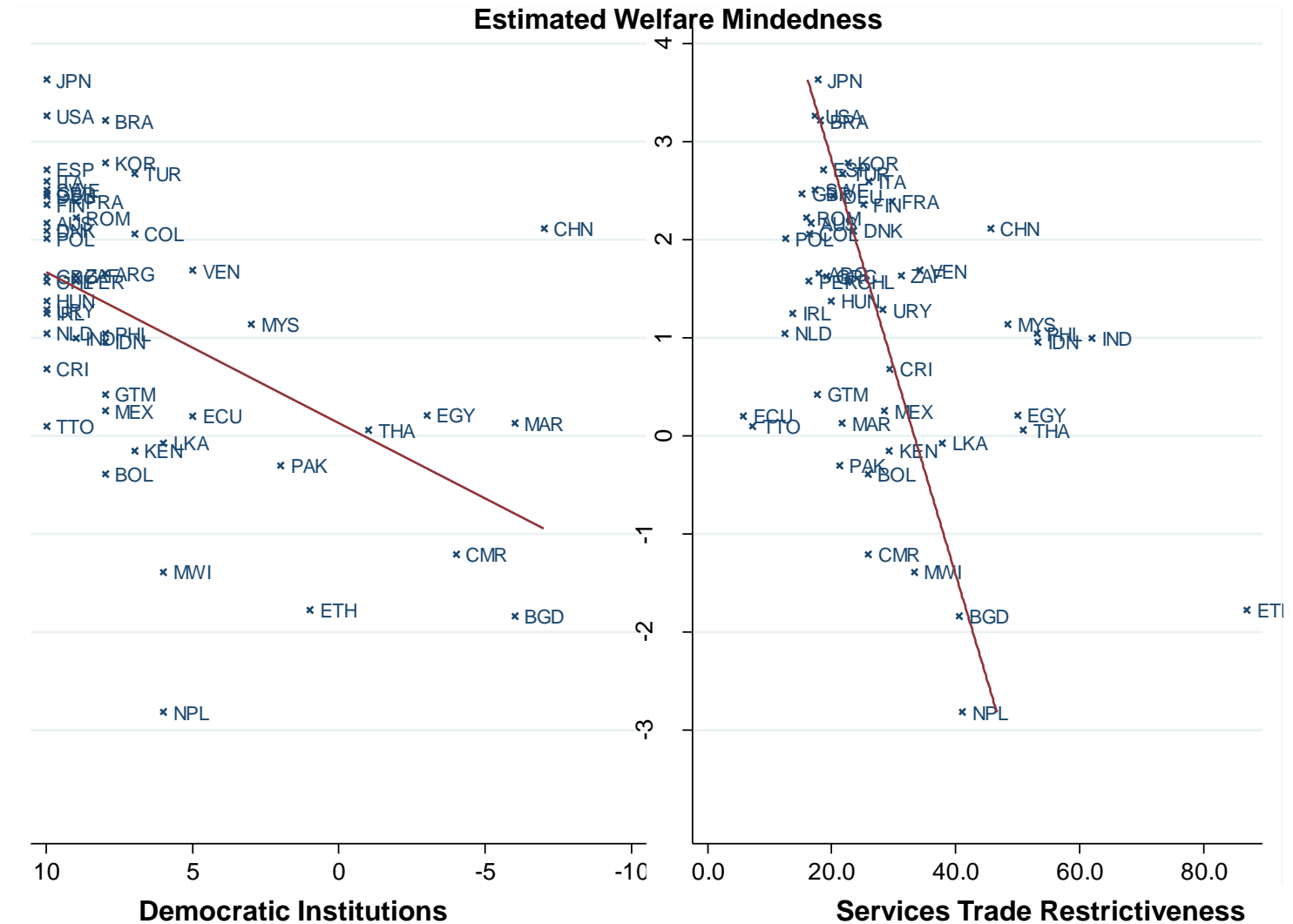
Sample stats/balancing property:

STRI Fixed	Mean_t	SD_t	Mean_c	SD_c	NormDiff
Log GDP (2007)	4.4	1.9	5	1.7	-0.3
Log GDP p.c. (2007)	8.4	1.5	9.1	1.1	-0.5
Urban population (% of total)	51.2	25.8	61.7	20	-0.5
Population Density (people/sqkm)	159.6	265.3	110.3	117.5	0.2
LLC Dummy	0.4	0.5	0.1	0.3	0.6
Africa Dummy	0.3	0.4	0.2	0.4	0.2

STRI Mobile	Mean_t	SD_t	Mean_c	SD_c	NormDiff
Log GDP (2007)	4.2	2	5	1.6	-0.4
Log GDP p.c. (2007)	8.2	1.5	9.1	1.1	-0.6
Urban population (% of total)	49	27.5	62	19	-0.6
Population Density (people/sqkm)	145.8	209.2	120.3	175.7	0.1
LLC Dummy	0.4	0.5	0.1	0.4	0.5
Africa Dummy	0.4	0.5	0.1	0.4	0.5

STRI AirPass M0	Mean_t	SD_t	Mean_c	SD_c	NormDiff
Log GDP (2007)	4.3	1.9	5.1	1.7	-0.4
Log GDP p.c. (2007)	8.2	1.3	9.2	1.2	-0.8
Urban population (% of total)	47.7	22.9	65.1	19.8	-0.8
Population Density (people/sqkm)	133.7	210.9	124.8	168.5	0
LLC Dummy	0.3	0.5	0.1	0.4	0.4
Africa Dummy	0.3	0.5	0.1	0.3	0.5

Political Economy



IV First-stage Estimation (telecom)

	(1)	(2)	(3)	(4)
	STRI Fixed Line	STRI Fixed Line	STRI Mobile	STRI Mobile
Log GDP (2007)	0.0068 (0.0191)	0.0021 (0.0193)	0.0040 (0.0173)	0.0008 (0.0174)
Log GDP p.c. (2007)	-0.0311 (0.0363)	-0.0663 (0.0463)	-0.0183 (0.0363)	-0.0405 (0.0427)
Urban population (% of total)	0.0019 (0.0016)	0.0024 (0.0017)	0.0002 (0.0014)	0.0006 (0.0014)
Population Density (people/sqkm)	0.0001 (0.0002)	0.0001 (0.0001)	0.0000 (0.0001)	-0.0000 (0.0001)
LLC Dummy	0.1027 (0.0780)	0.0976 (0.0822)	0.0405 (0.0617)	0.0305 (0.0640)
Africa Dummy	0.1358 (0.0923)	0.1165 (0.0948)	0.1659** (0.0803)	0.1629* (0.0833)
Polity IV Index	-0.0240*** (0.0057)	-0.0365*** (0.0100)	-0.0152*** (0.0047)	-0.0222*** (0.0079)
EIU Demo Score		0.0490 (0.0323)		0.0298 (0.0256)
Constant	0.4742* (0.2721)	0.5577* (0.2940)	0.4121 (0.2498)	0.4596* (0.2636)
Obs	103.0000	99.0000	103.0000	100.0000
Log L	-4.4725	-4.8630	19.4451	18.4263
R-sq	0.3223	0.3328	0.3031	0.3031

First-stage results (dependent variable: HHI)

Results: Telecom (Poisson IV)

	(1)	(2)	(3)	(1)	(2)	(3)
	F-ZTP	F-ZTP	F-PIV	M-ZTP	M-ZTP	M-PIV
Number fixed operators						
Log GDP (2007)	0.3743*** (0.0600)	0.3634*** (0.0522)	0.3210*** (0.0467)	0.2369*** (0.0345)	0.2355*** (0.0384)	0.2035*** (0.0284)
Log GDP p.c. (2007)	-0.2758** (0.1214)	-0.2326** (0.1131)	-0.2119*** (0.0677)	-0.2029*** (0.0514)	-0.2292*** (0.0534)	-0.1941*** (0.0387)
Urban population (% of total)	0.0041 (0.0047)	0.0045 (0.0050)	0.0029 (0.0038)	0.0011 (0.0027)	0.0018 (0.0026)	0.0011 (0.0021)
Population Density (people/sqkm)	0.0009* (0.0005)	0.0006 (0.0005)	0.0007* (0.0004)	0.0000 (0.0001)	0.0000 (0.0001)	0.0001 (0.0001)
LLC Dummy	0.3134 (0.2042)	0.1715 (0.2193)	0.2943** (0.1223)	-0.0485 (0.0952)	0.0164 (0.0908)	0.0234 (0.0831)
Africa Dummy	-1.0241*** (0.3762)	-1.0058** (0.4068)	-0.2512 (0.1627)	-0.1836 (0.1228)	-0.2072 (0.1298)	-0.1290 (0.1035)
License Limit	-0.8177** (0.3914)			-0.0077 (0.1251)		
Public Licensing Criteria	0.6561 (0.4128)			0.4195 (0.2756)		
Foreign Ownership Limit	0.0047 (0.0054)			0.0045* (0.0028)		
Independent Regulator	0.0253 (0.2081)			0.0729 (0.0903)		
STRI Fixed Line		-0.5764 (0.3955)	-1.2620*** (0.3468)		-0.5690** (0.2261)	-0.7526* (0.3908)
Constant	0.0409 (0.8060)	0.8759 (0.8209)	1.3323** (0.5225)	1.0012** (0.4978)	2.1844*** (0.4062)	2.1565*** (0.3460)

Results: Telecom Access

	(1)	(2)	(3)	(4)	(5)
	M-OLS	M-OLS	M-OLS	M-OLS	M-OLS
Log GDP (2007)	-2.5614* (1.4972)	-2.5522* (1.4072)	-2.6259* (1.5230)	-2.6756* (1.5144)	-2.8138* (1.5597)
Log GDP p.c. (2007)	25.4453*** (2.6757)	24.5318*** (2.7566)	25.5349*** (2.9678)	25.4823*** (2.7830)	24.4109*** (2.6785)
Urban population (% of total)	0.1297 (0.1426)	0.1959 (0.1407)	0.1283 (0.1501)	0.1171 (0.1420)	0.1722 (0.1451)
Population Density (people/sqkm)	0.0062 (0.0105)	0.0063 (0.0116)	0.0035 (0.0105)	0.0031 (0.0109)	0.0062 (0.0119)
Africa Dummy	-4.7465 (4.8912)	-4.6610 (4.5889)	-3.7420 (4.7865)	-4.5563 (5.2421)	-5.8182 (4.9394)
LLC Dummy	-0.1133 (4.5384)	-2.7555 (4.3037)	-1.0930 (4.5809)	-1.3938 (4.8433)	-0.3004 (4.6098)
Log HHI residual	-0.0027 (0.0017)	-0.0028** (0.0014)	-0.0028* (0.0017)	-0.0017 (0.0016)	-0.0027* (0.0015)
VoIP/IG not allowed	-11.5082** (4.7472)				-6.2002 (4.9653)
Minority stake publ		-12.9983*** (4.2341)			-11.2175** (4.9144)
License Limit			-4.8368 (4.6228)		-0.0339 (4.1854)
Public Licensing Criteria				14.4144** (6.8861)	4.4386 (7.4526)
Independent Regulator					1.8224 (4.6506)
Constant	-149.0247*** (19.5466)	-142.0864*** (20.1769)	-149.8065*** (21.3301)	-162.1428*** (21.3525)	-143.3345*** (21.3576)
Obs	99.0000	102.0000	101.0000	99.0000	97.0000

STRI by Region and Sectors

Telecom and air transport STRI in comparison:

