

REGULATORY INSTITUTIONS AND  
ECONOMIC PERFORMANCE:

WIRELESS COMMUNICATIONS  
IN MIDDLE-INCOME  
DEVELOPING NATIONS

by

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## BACKGROUND

### 1. Wireless Success Story

Over 4 billion wireless subscribers worldwide in 2009 (compared to 1.3 billion wire lines)

Wireless penetration in developing nations around 50% of population, over 100% in some middle income nations (several higher than US = 90%)

### 2. Generally good<sup>1</sup> policies in nations not noted for good economic policies

Mostly privatized

Multiple firms (3+ in most nations)

Permit foreign ownership

Narrow, targeted regulation

Licenses transferable

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<sup>1</sup> But not better than good!

# DIMENSIONS OF WIRELESS POLICY

## 1. SPECTRUM ALLOCATION AND ASSIGNMENT

- a. Definition of Right
- b. Amend Definition of Right
- c. Number of Licenses
- c. Selection of License Holder

## 2. METHOD OF REGULATION

- a. Regulator: Ministry, Independent
- b. Role of Competition Policy

## 3. SCOPE OF REGULATION

- a. On-network Prices
- b. Physical Interconnection Rules
- c. Roaming Rules
- d. Interconnection/Termination Prices
- e. Universal Service

**LARGE MIDDLE-INCOME NATIONS**  
**\$7,500 to 14,500 GDP(PPP)/POP**  
**POPULATION > 10 MILLION**

NATION	POPULATION (millions)	GDP(PPP)/POP (\$000)
Algeria	34.2	7.9
Argentina	40.9	14.0
Brazil	<b>198.7</b>	10.1
Chile	16.6	13.3
Columbia	45.6	8.5
Cuba	11.5	9.5
Ecuador	14.6	<b>7.8</b>
Iran	66.4	10.8
Kazakhstan	15.4	9.7
Malaysia	25.7	13.7
Mexico	111.2	<b>14.3</b>
Peru	29.5	8.1
Romania	22.2	13.5
South Africa	49.1	9.8
Tunisia	<b>10.5</b>	7.9
Turkey	76.8	13.8
Venezuela	26.8	12.8

## WIRELESS INDICATORS

Nation	Wireless Penetration (% Pop.)	Mobile Usage (min/mon)	Mobile Prices (\$/Mon.)
Algeria	93.2	141	7.4
Argentina	111.7	90	7.8
Brazil	75.8	99	26.2
Chile	89.2	147	11.8
Columbia	90.7	131	10.4
Cuba	2.9	na	22.8
Ecuador	79.5	69	18.9
Iran	26.4	na	2.7
Kazak.	96.8	100	11.4
Malaysia	105.6	199	5.5
Mexico	67.7	164	13.9
Peru	71.0	73	23.0
Romania	110.2	289	10.5
South Afr.	91.6	106	13.9
Tunisia	81.6	135	6.6
Turkey	85.7	69	12.7
Venezuela	101.0	na	1.2

## INCOME NOT THE ANSWER

Nation	GDP/POP.	Gini Coeff.	Wireless Penetration
Mexico	14.3	35	67.7
Argentina	14.0	49	93.2
Turkey	13.8	44	85.7
Malaysia	13.7	46	105.6
Romania	13.5	32	110.2
Chile	13.3	55	89.2
Venezuela	12.8	48	101.0
Iran	10.8	45	26.4
Brazil	10.1	57	75.8
South Africa	9.8	65	91.6
Kazakhstan	9.7	30	96.8
Cuba	9.5	na	2.6
Columbia	8.5	54	90.7
Peru	8.1	50	71.0
Tunisia	7.9	40	81.6
Algeria	7.9	35	93.2
Ecuador	7.8	46	79.5

# INSTITUTIONS AND POLICIES: SPECTRUM

Allocation (how will a given chunk of spectrum be used?) – Are uses and technologies fixed or flexible?

Assignment:

1. Competitive Applications vs. First Come, First Served
2. Payment:
  - a. Application Fee
  - b. Posted License Price
  - c. Auction
3. *Ex Post* Trades

Coase 1959: Advocated auction, flexible use, freely tradable rights

Coase 1960: Allocation method irrelevant: tradability, flexibility enough

## LICENSING POLICIES AMONG LARGE MIDDLE INCOME NATIONS

1. License-specific use (all countries)
2. 3+ licensees (most countries)
3. Mandatory interconnection (all)
4. Sale of license requires approval (all)
5. Incumbent given license (most)
6. Private firms (all but Cuba, but most incumbents not fully privatized)
7. Fixed-term license (typically 15 years)
8. Auctions common but not universal
9. Renewals typically at posted price, with threat of auction if price not met



# FACTORS AFFECTING COMPETITION

1. Number of licenses
2. Sequence of entry: first-in advantage
3. Payment system: who pays for termination?
4. Interconnection fees: negotiated or regulated?

Competition undermined if:

- Incumbent wire-line carrier (can use wire-line interconnection to advantage wireless affiliate)
- Calling party pays (monopoly in termination)
- Termination and interconnection charges negotiated (cartelization)

## COMPETITION AND OUTCOMES

Nation	Number Carriers		Share >50%	Penet.	Use
	Maj	Min			
Algeria	3			93	141
Argentina	3	1		112	90
Brazil	4	4		76	99
Chile	3			89	147
Columbia	3		X	91	131
Cuba	1		X	3	na
Ecuador	3		X	80	69
Iran	2	3	X	26	na
Kazakh.	3		X	97	100
Malaysia	3	1		106	199
Mexico	2	2	X	68	164
Peru	2	1	X	71	73
Romania	3	2		110	289
South Afr.	2	1	X	92	106
Tunisia	2		X	82	135
Turkey	3		X	86	69
Venezuela	3			101	na
Average: Dominant 83 vs. Competition 94					

## OWNERSHIP

- Algeria: SOE owns 1 of 3 carriers
- Argentina: All 4 private
- Brazil: Four private in each region 2002
- Chile: All 3 private
- Columbia: 1 of 3 SOE since 2003 (50% since 2005)
- Cuba: SOE monopoly
- Ecuador: 1 of 3 SOE since 2003
- Iran: 1 SOE “privatized” to Revolutionary Guard (2009), 1 part SOE, 1 private
- Kazakhstan: 2 of 3 50% owned by SOE
- Malaysia: 1 of 6 30% SOE
- Mexico: 4 private since 1997
- Peru: 3 private by 2000
- Romania: 5 private (50% SOE enter soon)
- South Africa: 1 of 3 50% SOE (sold 2009)
- Tunisia: 1 of 2 SOE (65%)
- Turkey: 1 SOE, 43% private mobile tax
- Venezuela: 1 of 3 private nationalized 2007

## OWNERSHIP EFFECT

Top 4 (over 100% penetration): Argentina, Malaysia, Romania, Venezuela.

- All have 3+ private carriers (although Venezuela renationalized in 2007)
- 1 small Malaysian carrier 30% public

Worst: Cuba, Iran (SOE dominance)

Unsuccessful complete privatization:

Brazil (76), Mexico (68), Peru (71)

- All have 3+ carriers
- All privatized 10+ years

Successful: large SOE and private presence:

Algeria (93), Columbia (91),

Kazakhstan (97), South Africa (92)

Rest: Middling performance: one fully privatized (Chile – 89), rest major SOE and private presence (Ecuador – 80, Tunisia – 82, Turkey – 86)

## OTHER FACTORS

1. Too little spectrum
2. Performance of wire-line
3. Interconnection/termination price system (or high tax)