

THE IMPACT OF TAXATION IN THE SUPPLY AND DEMAND OF BROADBAND SERVICES

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Telecom Advisory Services, LLC



Intel Latin America
Broadband and USF
Leaders Forum
Progressing from Plans to Programs



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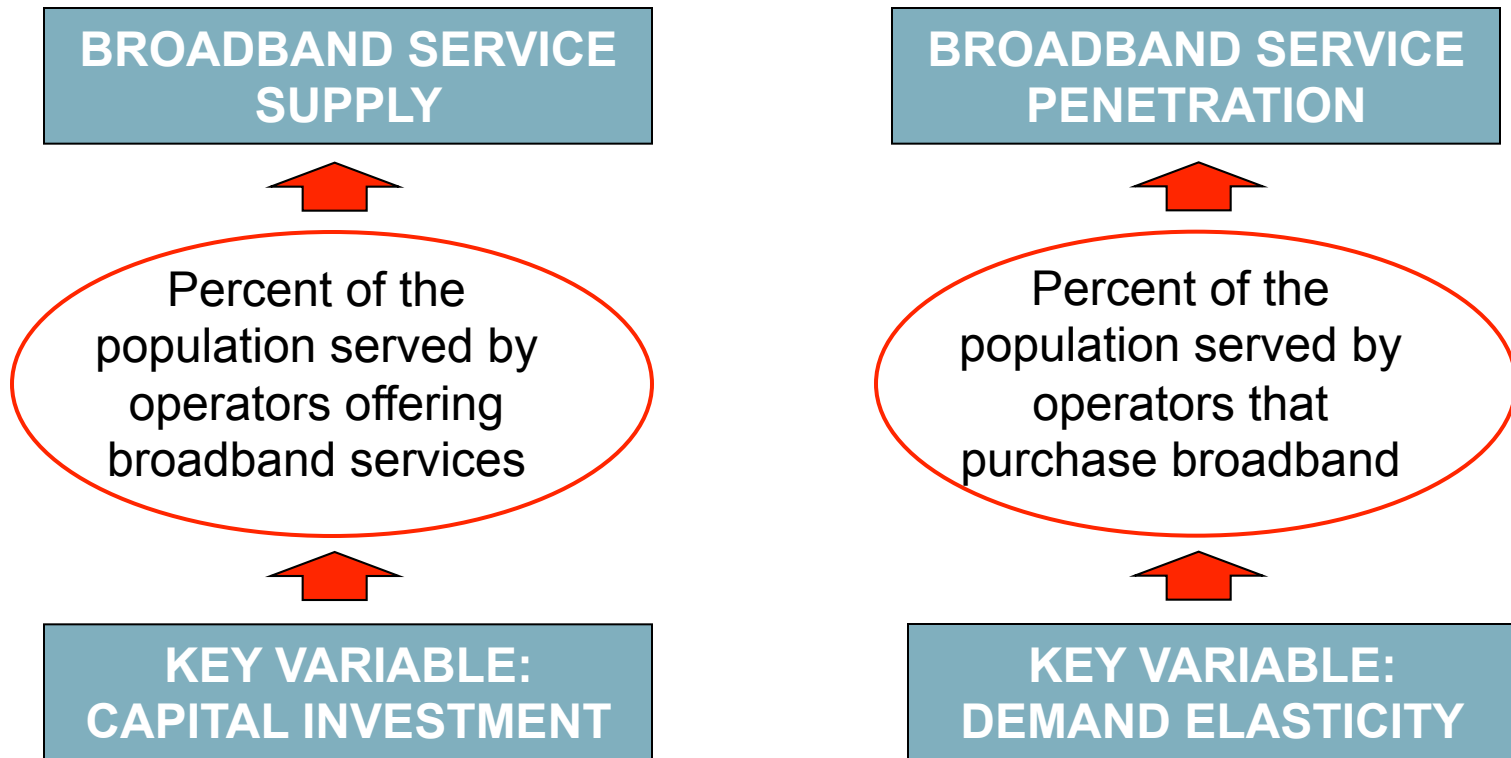


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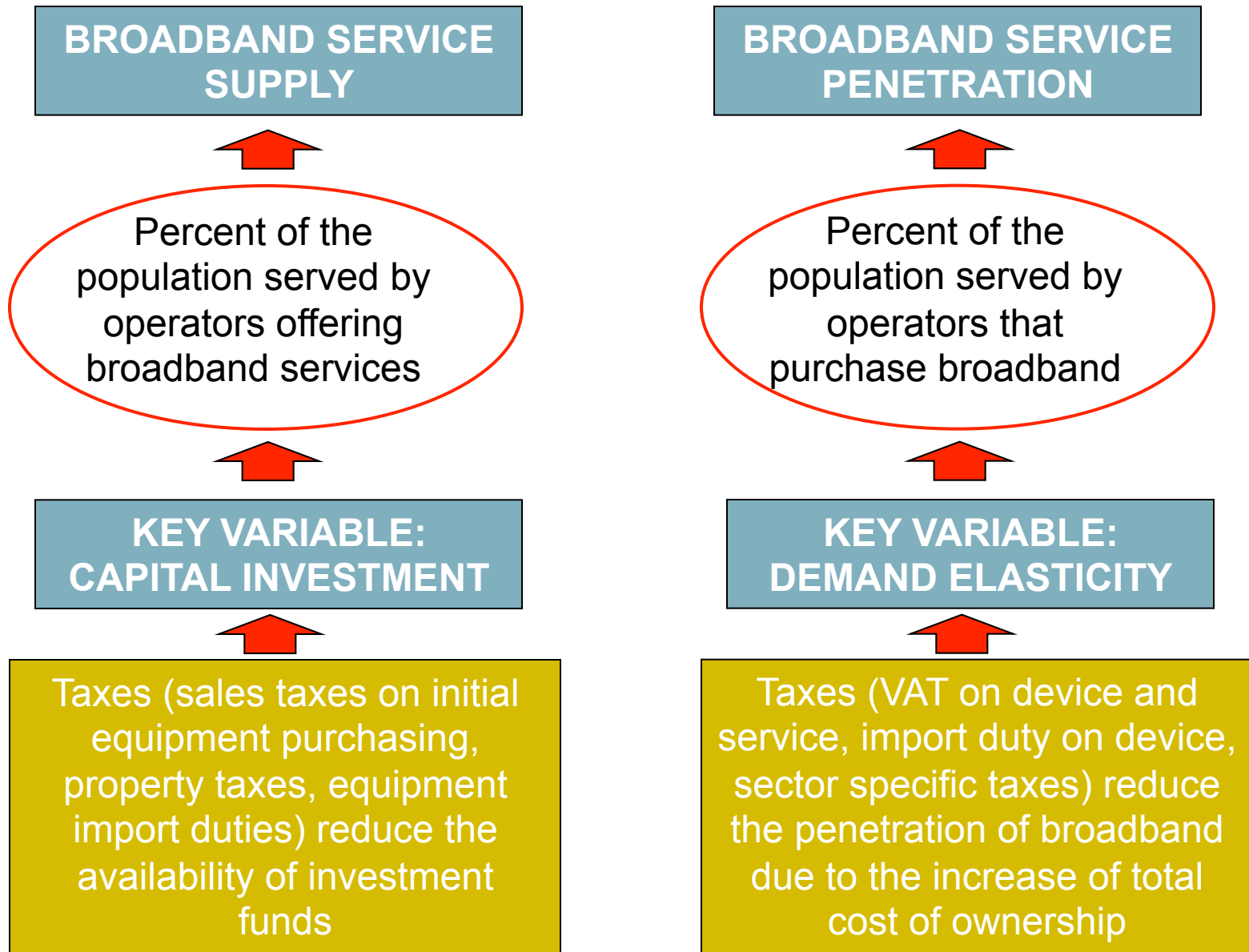


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BROADBAND DEVELOPMENT DEPENDS ON NETWORK DEPLOYMENT AND ADOPTION BY CONSUMERS AND ENTERPRISES



TAXES HAVE A NEGATIVE IMPACT ON BROADBAND PENETRATION BOTH ON THE SUPPLY AND DEMAND FOR BROADBAND



AGENDA

- The impact of taxation on broadband deployment
- The impact of taxation on broadband adoption
- Policy implications and best practices

TAXES MAY AFFECT THE INCENTIVES TO MAKE BROADBAND INVESTMENTS AND REDUCE THE SUPPLY OF FUNDS AVAILABLE TO THEM

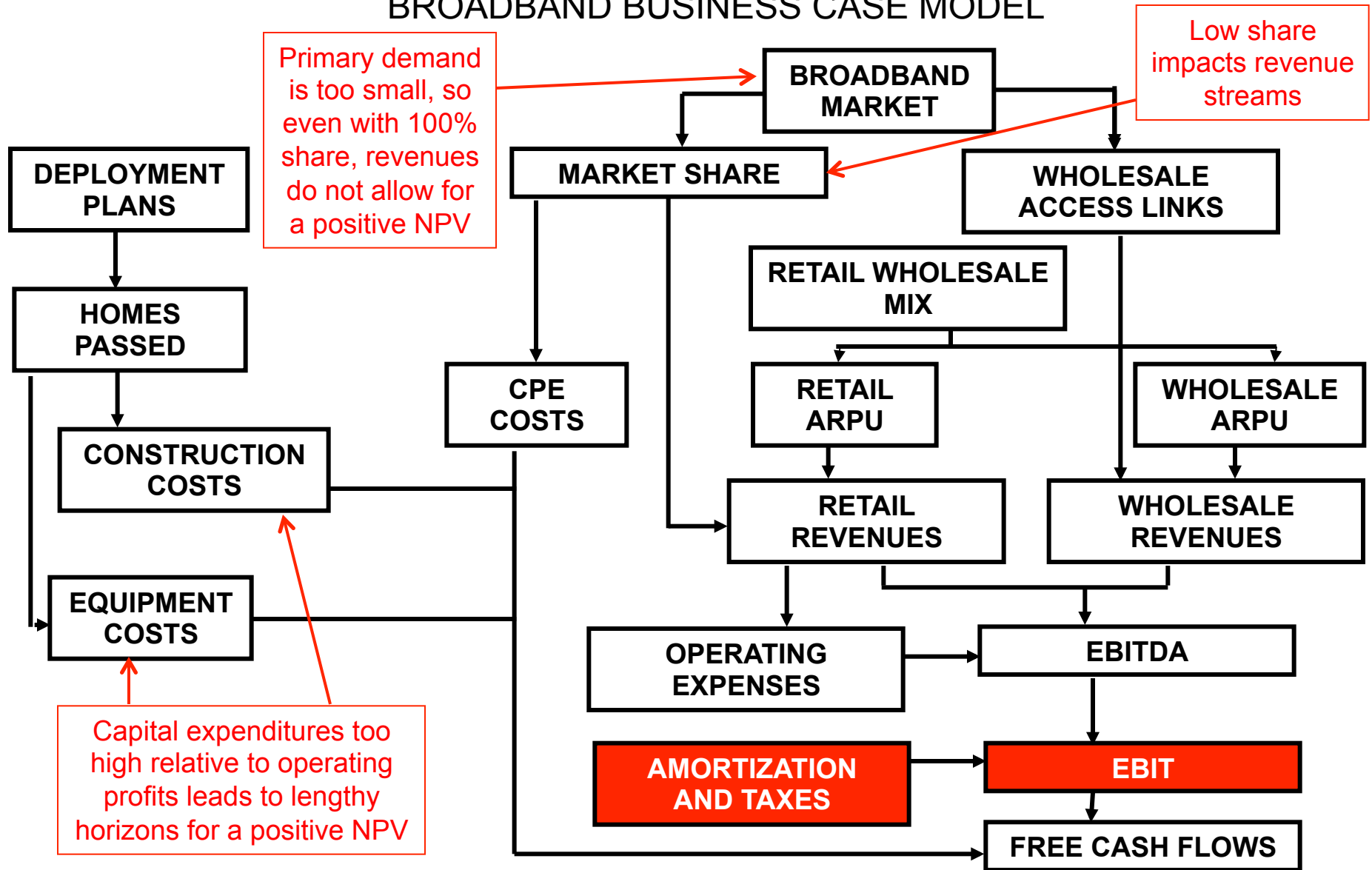
- Since taxes raise the required pre-tax rate of return of capital invested, aggregate capital stock depends on the effective tax rate
 - Over time, a reduction of corporate income taxation determines an increase in the level of gross fixed capital formation
- The impact of taxation varies according to the state of the business cycle
 - During economic expansion, taxes affect the supply of funds more than incentives to invest
 - During downturns, taxes primarily affect incentives to invest
- On the other hand, taxes have an impact on three types of decision
 - Which business?
 - Where to invest?
 - How much to invest?

IN FAIRNESS, TAXES ARE ONLY ONE VARIABLE AFFECTING TELECOMMUNICATIONS INVESTMENT

- Capital planning in communications comprise three types of decisions
 - Maintenance of existing plant
 - Capacity upgrades
 - Network modernization
- Taxes affect primarily modernization decisions
 - Maintenance capex is largely multi-year, non discretionary, and less subject to tax effects
 - Capacity upgrades is generally linked to revenue generation opportunities and therefore, less affected by tax regimes
 - Network modernization capex is affected by allocation decisions influenced by taxes
- In addition, telecommunications investment is driven by other non-taxation variables
 - Imperative to capture market share
 - Inertia in budgetary processes

THE ROLE OF TAXATION BECOMES HIGHLY RELEVANT UNDER CONDITIONS OF A CONSTRAINED BUSINESS CASE

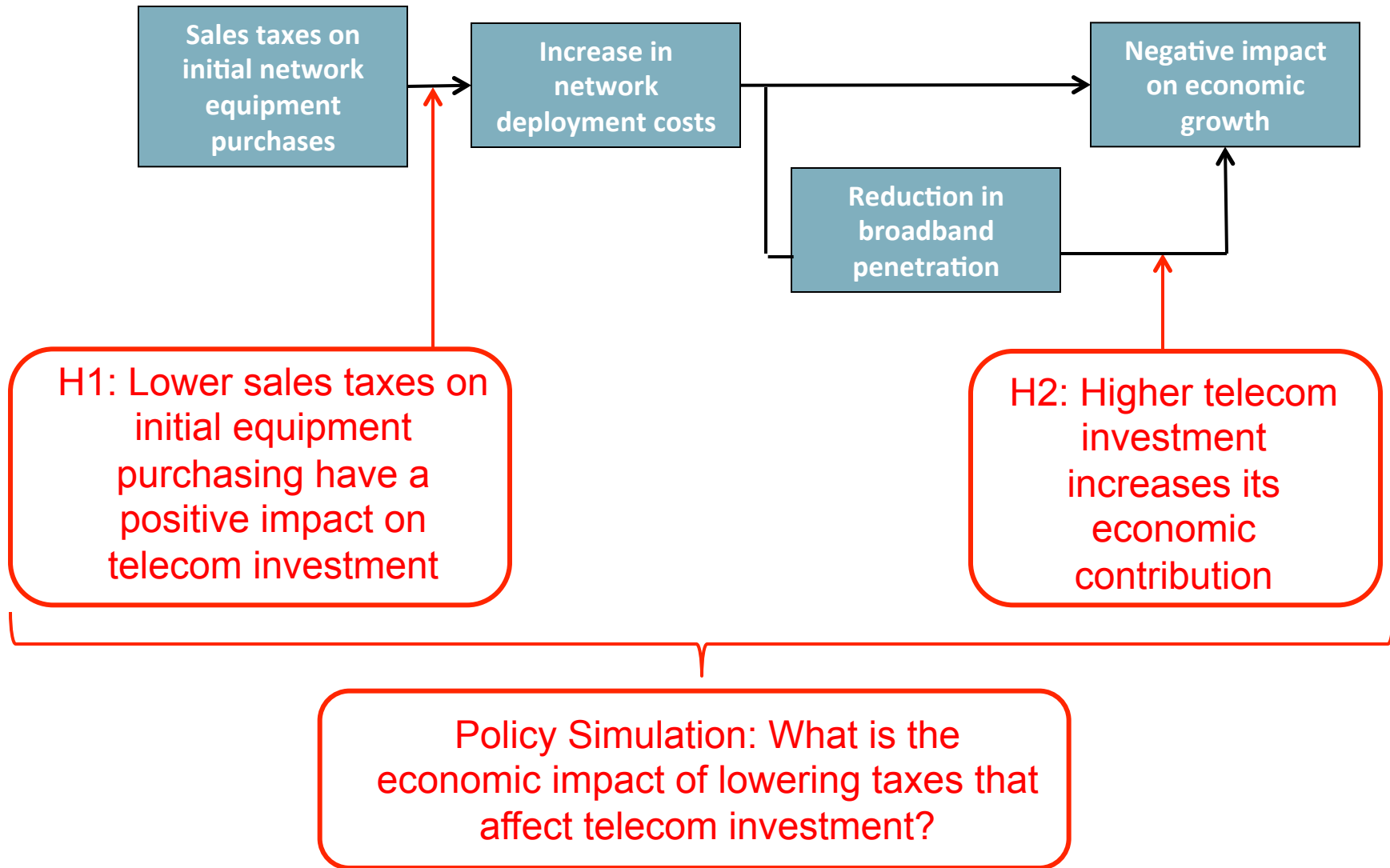
BROADBAND BUSINESS CASE MODEL



AS AN EXAMPLE, WE PRESENT THE RESULTS OF A STUDY ASSESSING THE IMPACT OF TAXATION ON NETWORK EQUIPMENT INVESTMENT, PARTICULARLY BROADBAND, IN THE UNITED STATES

- Based on econometric analyses of the impact of sales taxes on telecommunications and cable TV provider investment in the United States between 2006 and 2010
- Compiled case studies of actual investment behavior resulting from sales tax rate changes in specific states
- Assessed the social and economic impact of enhanced broadband deployment resulting from changes in sales taxes

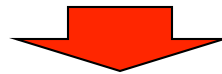
THE STUDY TESTED TWO HYPOTHESES AND SIMULATED A POLICY OUTCOME



TELECOMMUNICATIONS AND CABLE TV EQUIPMENT INVESTMENT IN 2010 IN THE UNITED STATES REACHED \$42.133 BILLION (OR \$137.12 PER CAPITA) (*)

EVOLUTION OF TELECOM AND CABLE TV INVESTMENT PER CAPITA IN THE UNITED STATES (2006-10)

YEAR	2006	2007	2008	2009	2010	Total
Mean Total Investment	\$ 141.98	\$ 136.12	\$ 126.01	\$ 116.02	\$ 137.12	\$ 131.45
Mean Taxable Investment	\$ 93.71	\$ 89.84	\$ 83.17	\$ 76.57	\$ 90.50	\$ 86.76
Std. Dev.	\$ 46.15	\$ 38.76	\$ 38.94	\$ 43.01	\$ 60.58	\$ 46.23
Minimum State	\$ 17.03	\$ 38.60	\$ 29.49	\$ 28.39	\$ 35.84	\$ 17.03
Maximum State	\$ 243.57	\$ 192.56	\$ 214.68	\$ 229.50	\$ 447.44	\$ 447.44



- The industry estimates that approximately 66% of all investment (\$27.80 billion or \$90.50 per capita) is on equipment subject to sales taxes
- Of the total investment, \$1.394 billion was paid in sales taxes (on average 4.02% for telecommunications carriers and 4.45% for cable TV)

() This figure represents the sum of the four major telecommunications carriers (ATT, Verizon, Sprint, and Qwest) and almost all cable TV operators. As such, it is estimated that this number represents 80% of all investment by telecommunications carriers and nearly all the cable TV industry*

Source: TAS analysis

OF THE TOTAL INVESTMENT, \$1.394 BILLION WAS PAID IN SALES TAXES (ON AVERAGE 4.02% FOR TELECOM CARRIERS AND 4.45% FOR CABLE TV)

EVOLUTION OF SALES TAX ON INVESTMENT IN THE U.S.
(2006-10)

WIRELESS/WIRELINE

Year	2006	2007	2008	2009	2010
Mean	3.88%	3.94%	3.96%	4.12%	4.02%
Max.	9.25%	9.25%	9.25%	9.25%	9.25%
Standard deviation	3.50%	3.55%	3.58%	3.60%	3.67%
States without taxes	20	20	20	19	20

CABLE TV

Year	2006	2007	2008	2009	2010
Mean	4.14%	4.20%	4.23%	4.42%	4.45%
Max.	9.25%	9.25%	9.25%	9.25%	9.25%
Standard deviation	3.55%	3.58%	3.60%	3.62%	3.65%
States without taxes	20	20	20	19	19



- The five year average sales tax rate is fairly stable over time, although it exhibits an increasing divergence across states
- Taxation on telecom equipment purchasing is not homogeneous across the country since 20 states and D.C. do not apply sales taxes to telecom equipment, while 19 do not tax cable TV equipment

ANALYSIS OF HISTORICAL DATA INDICATES A DECREASE OF 1 PERCENTAGE POINT IN THE TAX RATE INCREASES INVESTMENT IN CABLE TV BY \$0.31 PER CAPITA AND \$0.85 IN TELECOM

Independent Variables: Sales Tax Rate, Median Income, Population, Human Capital, Rural Population, Investment lagged, Age of Population

<i>Dependent Variable</i>	Cable Investment		Wireless & Wireline Investment	
Sales Tax Rate	-0.3085	*	-0.8529	*
	(0.1586)		(0.5142)	
Median Income (2010 Dollars)	-0.1655		0.5817	*
	(0.1239)		(0.3524)	
Population	0.2508	**	-0.3662	
	(0.0984)		(0.2690)	
Human Capital	0.2382		0.2689	
	(0.1893)		(0.5602)	
Rural Population	-0.0936	**	-0.0620	
	(0.0441)		(0.1461)	
Investment the last year	0.5019	***	0.4375	***
	(0.0465)		(0.0408)	
60 years or more	-0.3200		-8.7256	
	(0.8200)		(6.3690)	
Between 20/34 years	-0.5230		-3.8209	
	(1.2667)		(6.7247)	
Between 5/19 years	-0.8622		-6.9562	*
	(0.6340)		(3.5852)	
Constant	28.6410		434.7922	
	(47.9686)		(301.4056)	
R ²	0.7984		0.4808	
F (9,190)	50.99		37.61	
Prob > F	0.0000		0.0000	
Number of Observations	200		200	

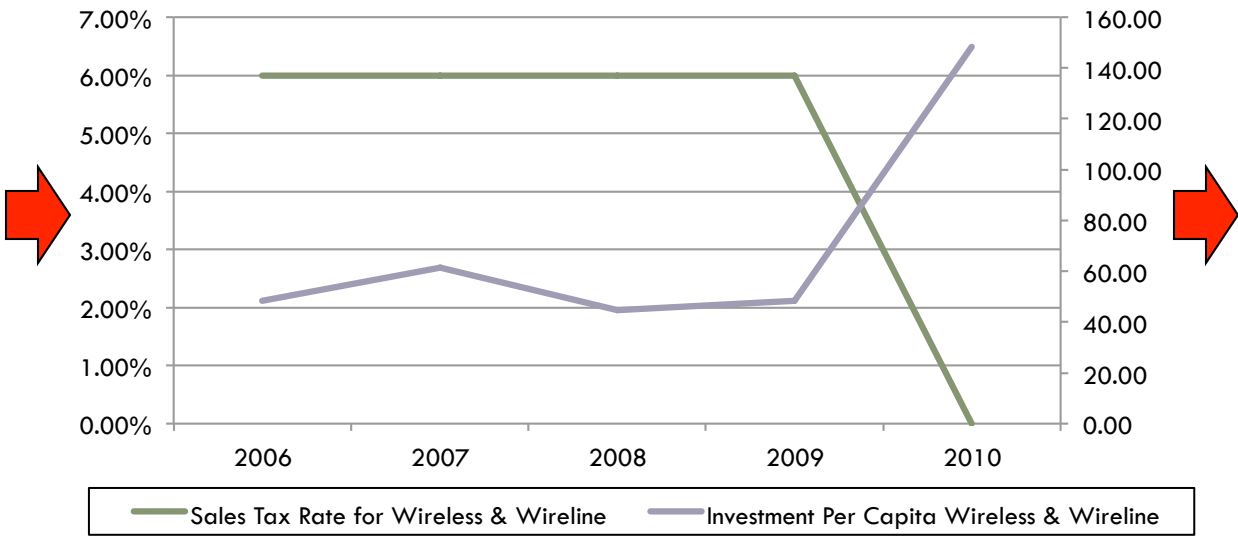
Note: ***, **, * significance at 1%, 5% & 10% level

Source: TAS analysis

THIS EFFECT CAN BE ALSO VERIFIED BY EXAMINING ACTUAL INVESTMENT BEHAVIOR IN SPECIFIC STATES

NORTH DAKOTA: SALES TAX RATE AND TELECOM INVESTMENT (2006-10)

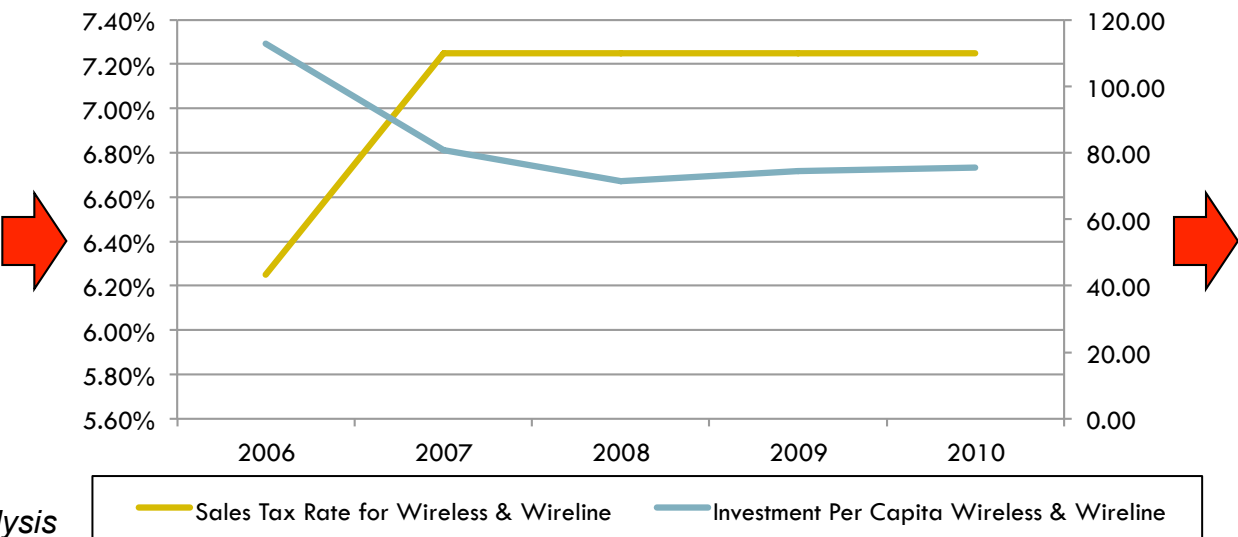
N. Dakota adopted a six-year phase-out of the sales tax on network equipment purchases



Telecom investment increased three-fold from \$48 to \$148.30 per capita

SOUTH CAROLINA: SALES TAX RATE AND TELECOM INVESTMENT (2006-10)

S. Carolina increased the sales tax rate from 6.25% in 2006 to 7.25% in 2007



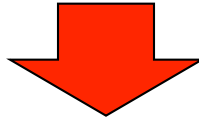
Telecom investment decreased 33% from \$115.37 to \$77.44 per capita

Source: TAS analysis

BASED ON THIS EVIDENCE, WE ESTIMATED THAT A REDUCTION OF SALES TAXES BY AN AVERAGE OF 2% WOULD GENERATE AN INVESTMENT OF \$ 763 MILLION (BASELINE SCENARIO) IN THE 1ST YEAR

Current Total Telecom Investment (2010): \$ 42.133 billion

Total Sale Tax paid for Telecom Investment (2010): \$ 1.394 billion



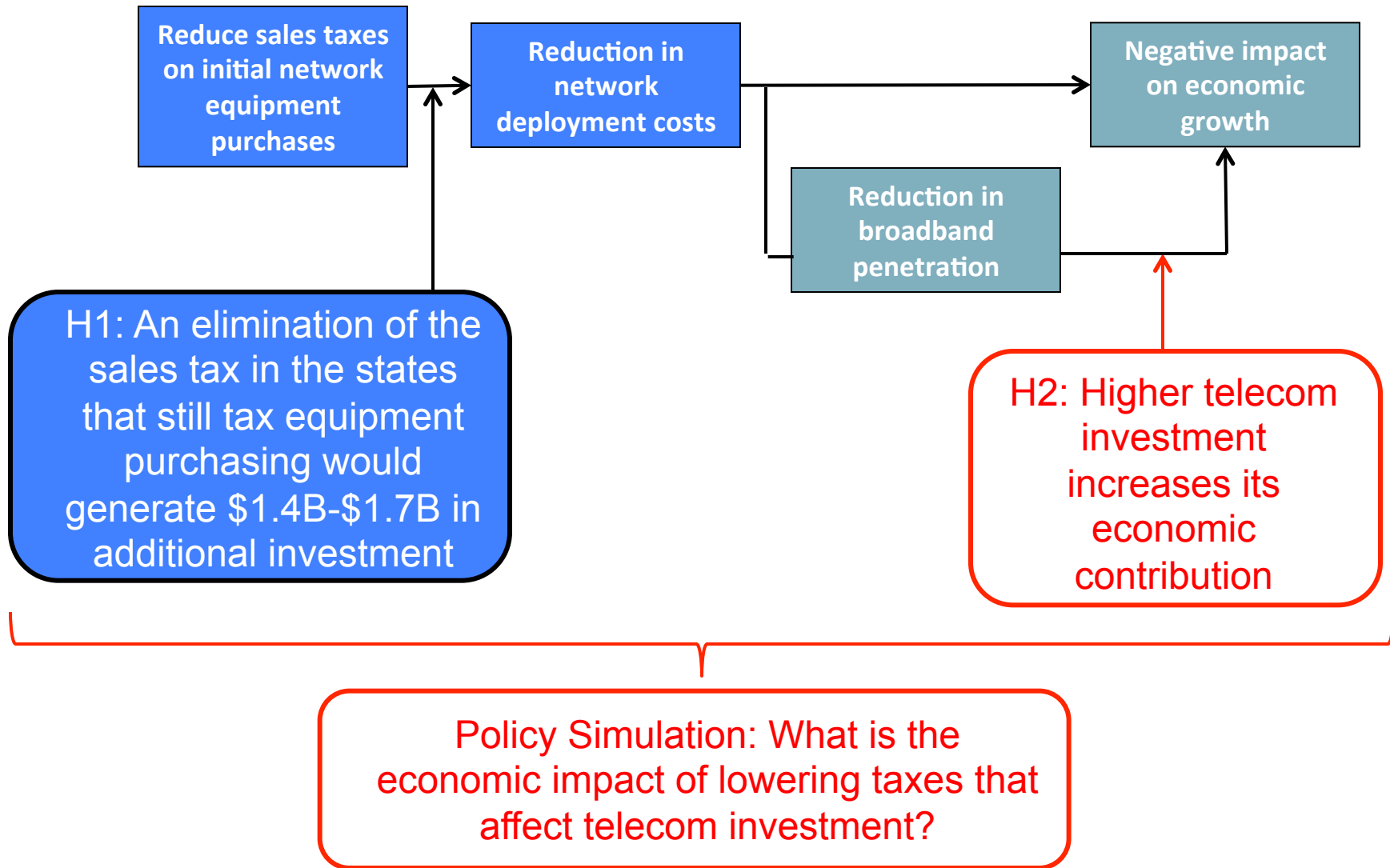
Sales Tax Rate	Scenario 1 (Pessimistic)		Scenario 2 (Baseline)		Scenario 3 (Optimistic)	
	Total Investment Growth	Total Investment	Total Investment Growth	Total Investment	Total Investment Growth	Total Investment
3.00%	0.90%	\$ 380,102,600	0.96%	\$ 405,704,812	1.11%	\$ 466,860,828
2.00%	1.71%	\$ 720,140,922	1.81%	\$ 763,399,831	2.10%	\$ 884,512,727
1.00%	2.52%	\$ 1,060,179,244	2.66%	\$ 1,121,094,850	3.09%	\$ 1,302,164,625
0.00%	3.32%	\$ 1,400,217,566	3.51%	\$ 1,478,789,870	4.08%	\$ 1,719,816,524

Industry invests the full benefit of tax decrease

Industry invests beyond the supply of funds benefit of the tax decrease (106%)

Industry invests beyond the supply of funds benefit of tax decrease (123%)

SO FAR, WE HAVE PROVEN THAT A REDUCTION IN SALES TAXES HAS A POSITIVE IMPACT ON TELECOMMUNICATIONS CAPITAL INVESTMENT – LET’S NOW MOVE TO ECONOMIC IMPACT



INVESTMENT IN BROADBAND TELECOMMUNICATIONS NETWORKS HAS TWO TYPES OF ECONOMIC EFFECTS

DIRECT EFFECTS

Direct jobs and output

- Employment and economic production generated in the short term in the course of deployment of network facilities

- Telecommunications technicians
- Construction workers
- Civil and RF engineers

Indirect jobs and output

- Employment and production generated by indirect spending (or businesses buying and selling to each other in support of direct spending)

- Metal products workers
- Electrical equipment workers
- Professional Services

Induced jobs and output

- Employment and production generated by household spending based on the income earned from the direct and indirect effects

- Consumer durables
- Retail trade
- Consumer services

INDIRECT EFFECTS

Retail and Wholesale Trade

- Decentralization of warehouses and distribution centers

Health Care

- Deployment of satellite centers for health care delivery

Manufacturing

- Optimization of supply chains, marketing expenditures and access to labor pools

Financial Services

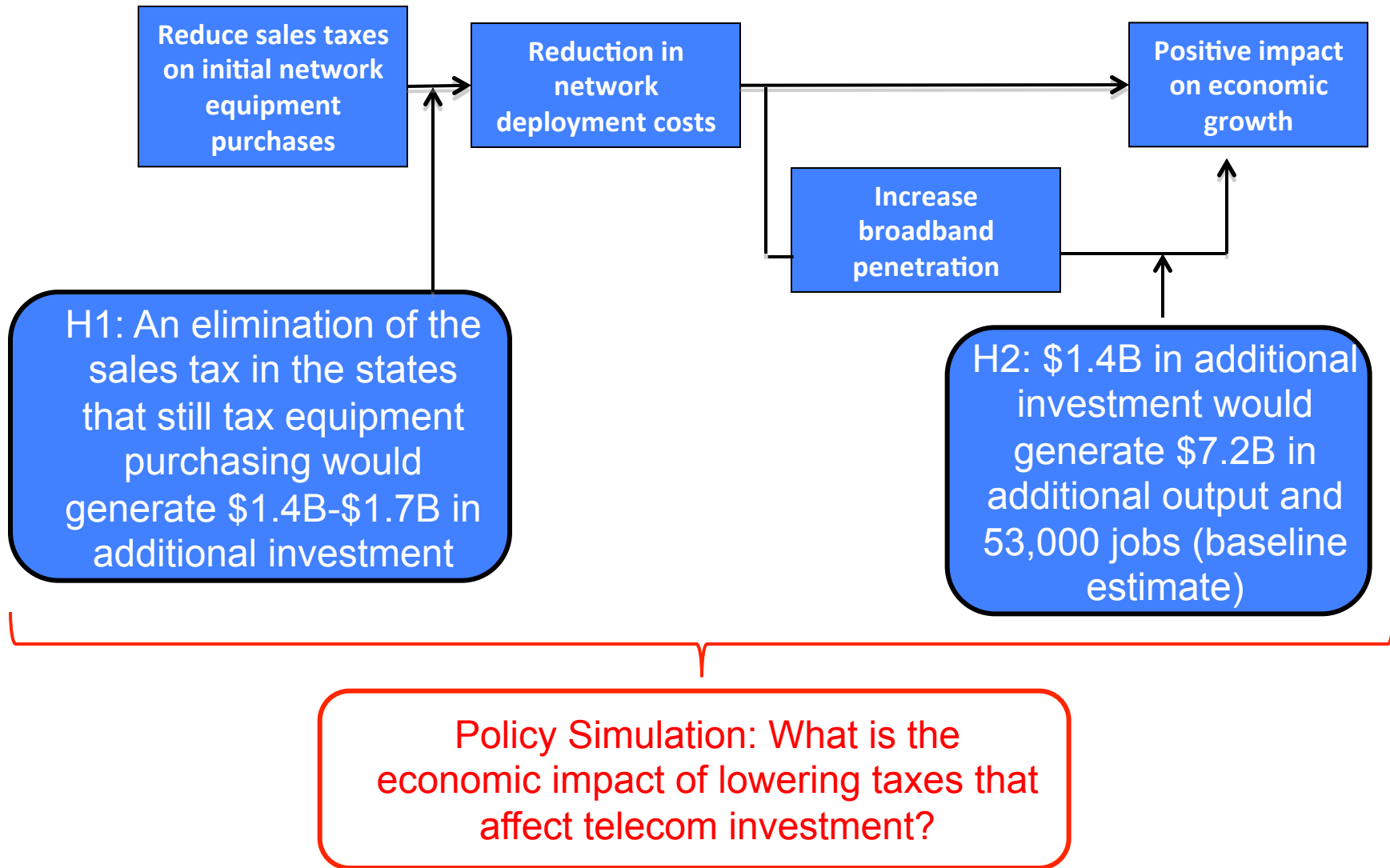
- Decentralization of financial processing centers to profit from labor cost arbitraging

IT IS ESTIMATED THAT THE ELIMINATION OF SALES TAXES IN THE REMAINING STATES WOULD GENERATE 50,000-62,000 DIRECT JOBS AND \$6.8 B - \$8.4 B IN OUTPUT

DIRECT AND INDIRECT SHORT-TERM ECONOMIC EFFECT OF CHANGES IN SALES TAX ON NETWORK EQUIPMENT PURCHASING (ALL \$ FIGURES IN BILLIONS)

Sales Tax Rate	Scenario 1 (Pessimistic)			Scenario 2 (Baseline)			Scenario 3 (Optimistic)		
	Investment	Jobs (000)	Output	Investment	Jobs (000)	Output	Investment	Jobs (000)	Output
3.00%	\$ 0.38	14	\$ 1.86	\$ 0.41	15	\$ 1.99	\$ 0.47	17	\$ 2.29
2.00%	\$ 0.72	26	\$ 3.52	\$ 0.76	27	\$ 3.74	\$ 0.88	32	\$ 4.33
1.00%	\$ 1.06	38	\$ 5.19	\$ 1.12	40	\$ 5.49	\$ 1.30	47	\$ 6.37
0.00%	\$ 1.40	50	\$ 6.85	\$ 1.48	53	\$ 7.24	\$ 1.72	62	\$ 8.42

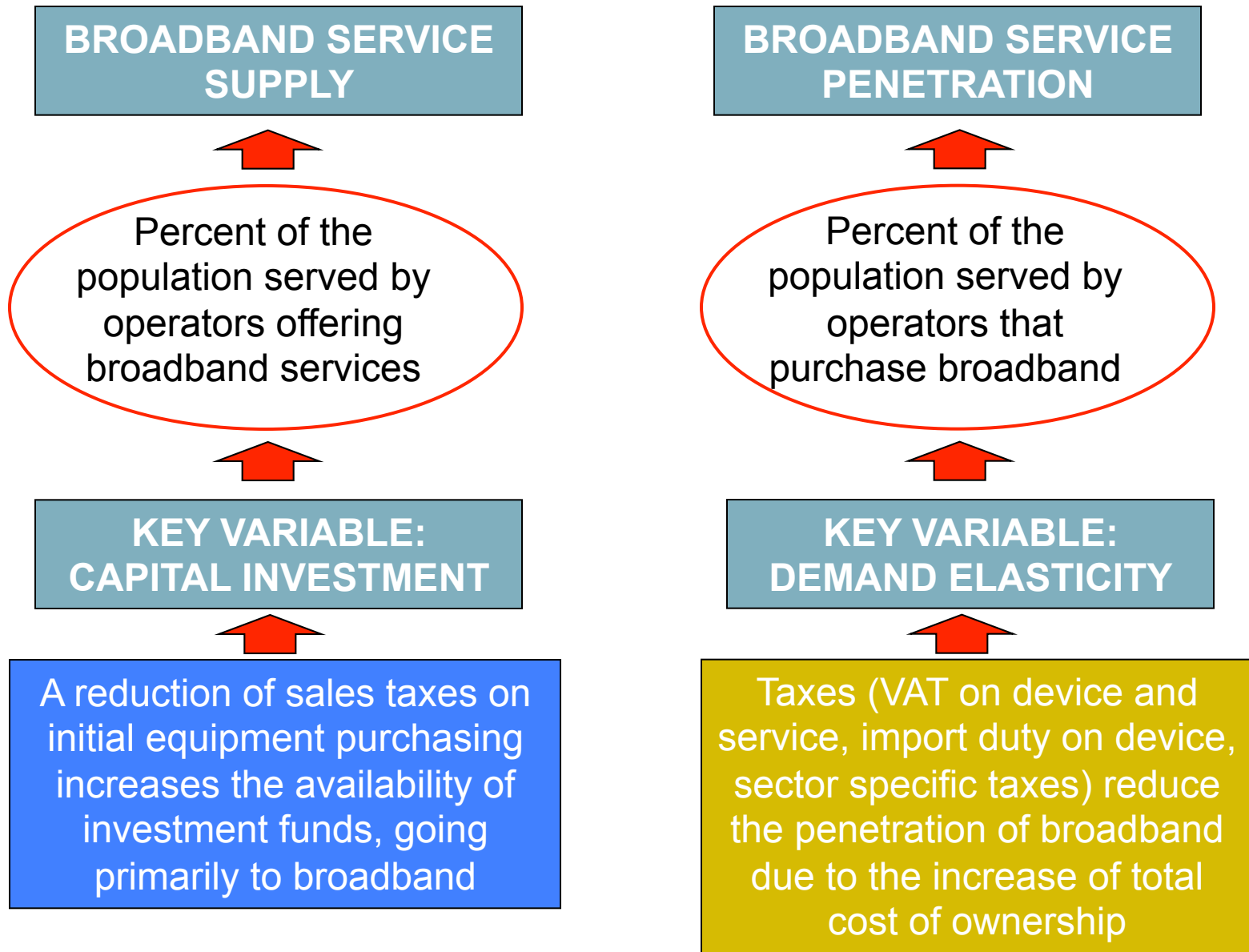
THIS PROVES THE POSITIVE ECONOMIC CONTRIBUTION THAT A REDUCTION OF SALES TAXES ON EQUIPMENT PURCHASING MIGHT HAVE



AGENDA

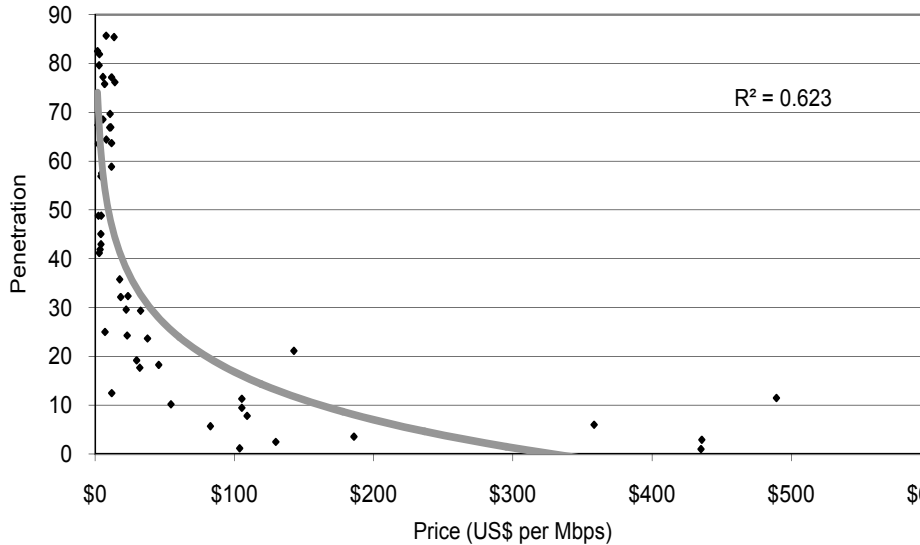
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WE HAVE, SO FAR, PROVEN THAT A REDUCTION ON TAXES AFFECTING CAPITAL INVESTMENT HAVE A POSITIVE IMPACT ON BROADBAND – WE WILL MOVE NOW TO IMPACT ON ADOPTION



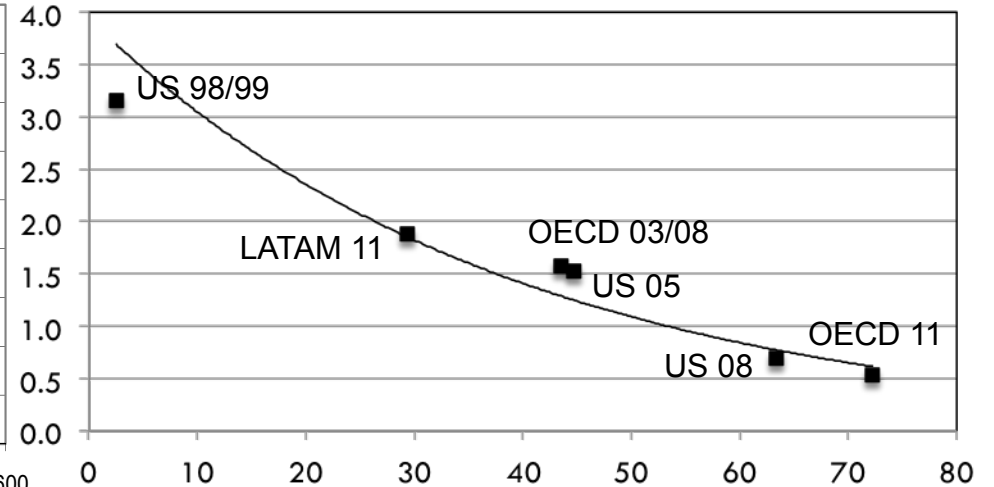
THE EVIDENCE REVEALS THE EXISTENCE OF STRONG PRICE ELASTICITY EFFECTS IN BROADBAND

OECD Y LATAM: CORRELATION BETWEEN BROADBAND PRICE AND PENETRATION



Source: Galperin and Ruzzier (2012)

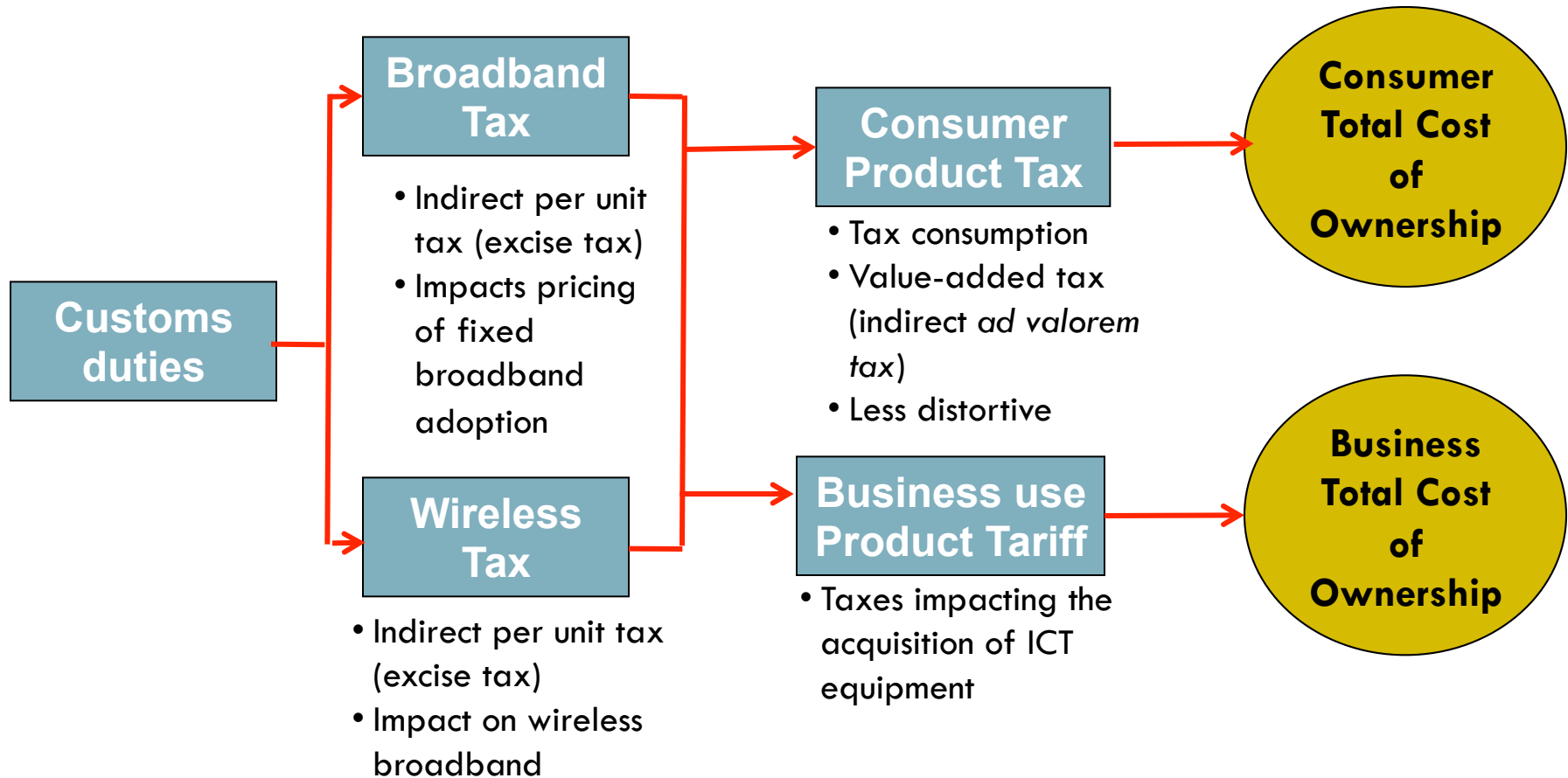
BROADBAND PENETRATION VS. ELASTICITY



Source: Katz (2013)

- Penetration and price elasticity are inversely related
- Price elasticity of fixed broadband in Latin America is 1.88
- Accordingly, a reduction of broadband prices of 10% in Latin America would result in an increase in penetration of 19%

TAXATION IMPACT OF TOTAL COST OF ICT OWNERSHIP

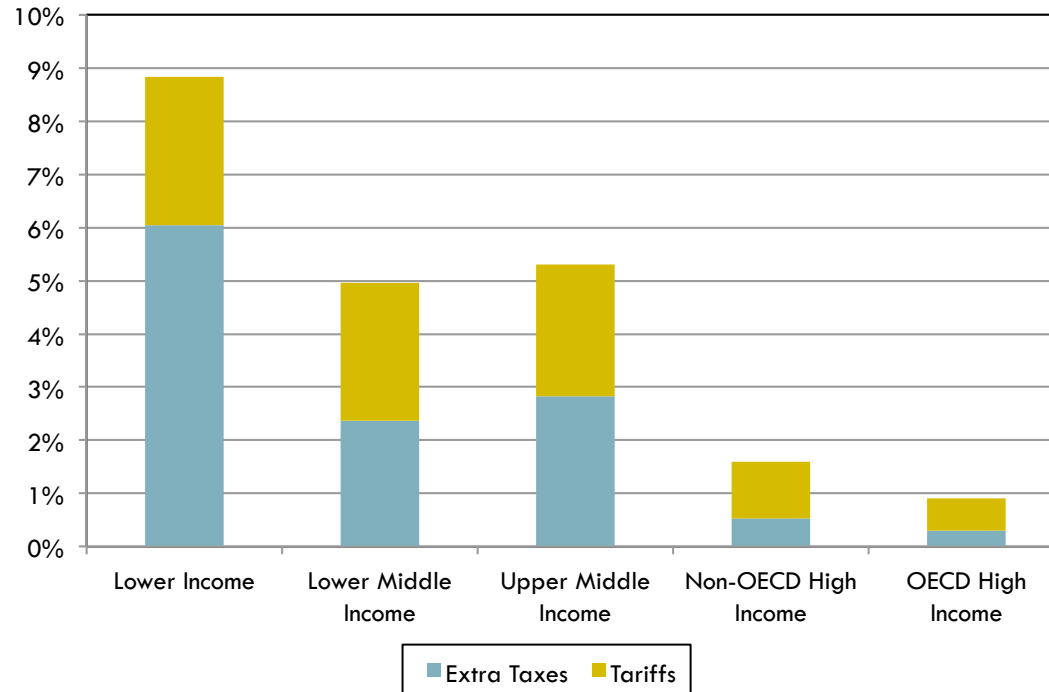


FOR EXAMPLE, DIFFERENT TAXES CAN AFFECT THE ADOPTION OF BROADBAND SERVICES

- Taxes on computer/handset purchasing and service subscription increase the total cost of ownership
 - Value-added taxes and import duties increase the cost of hardware acquisition, reducing penetration and/or hardware upgrade
 - Value-added taxes on service and telecommunications specific fees also restrict broadband adoption and reduce the usage volume (in prepaid offerings)
- Lower broadband service penetration reduces the return to scale of deployment, and consequently its margins
- Lower margins require operators to keep subscription prices high, which further reduces penetration

INDIRECT ICT TAX AND CUSTOMS DUTIES DECREASE AS COUNTRY INCOME INCREASES

SPECIFIC ICT TAXES AND TARIFFS BY COUNTRY INCOME LEVEL



Source: Miller and Atkinson. *Digital drag: How ICT taxes and tariffs hold up growth*. Washington, DC: The Information Technology and Innovation Foundation. (2014)

DIFFERENT APPROACHES TO TAXATION RESULT IN VARYING IMPACT IN HANDSET AND SERVICE ACQUISITION COSTS

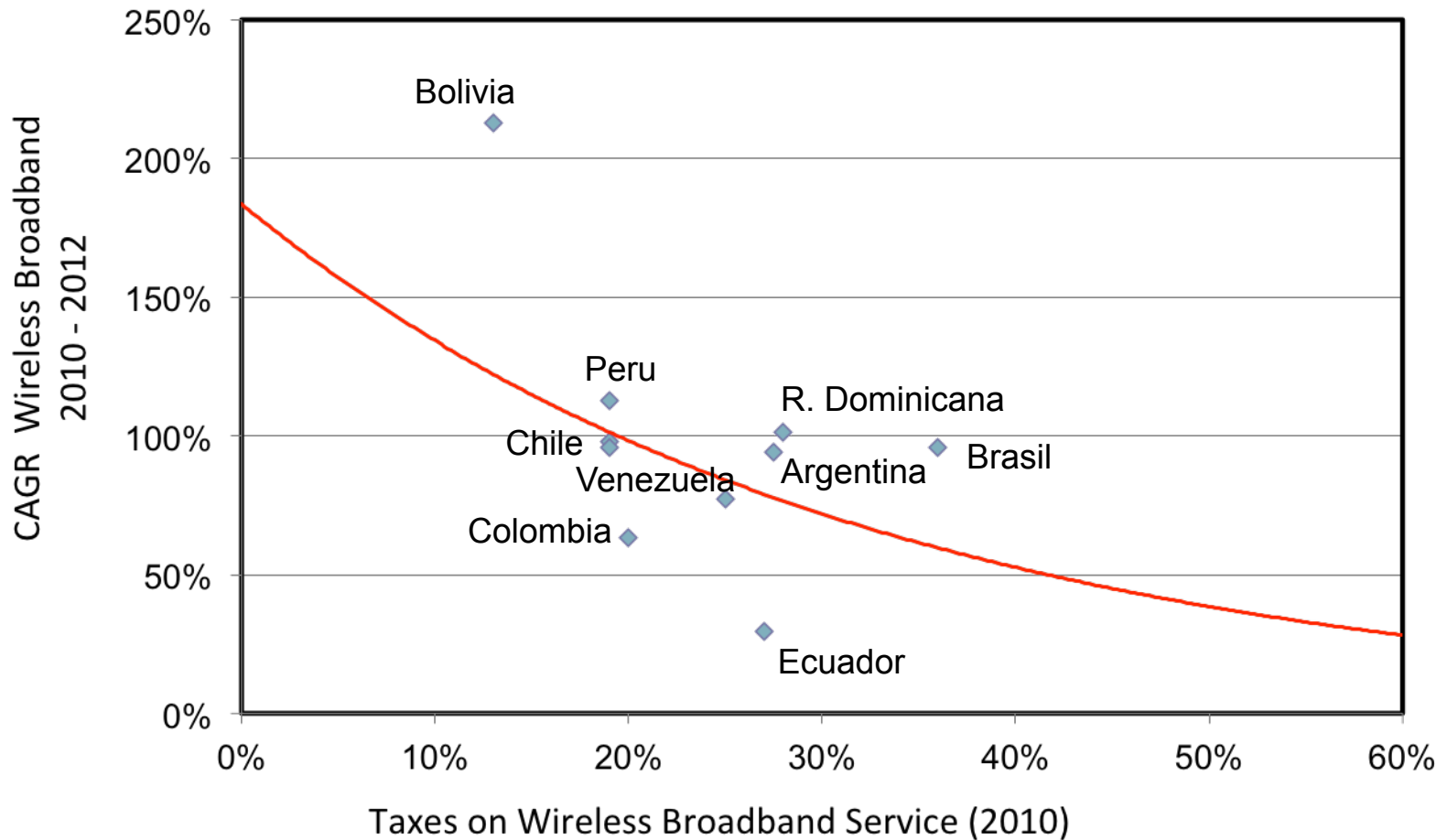
TAXATION APPROACHES TO MOBILE SERVICES

Country	Services			Handset				Taxation approach
	VAT	Other taxes	Fixed Taxes	VAT	Customs duty	Other taxes	Fixed Taxes	
Malaysia	5 %	---	---	10 %	---	---	---	Universalization and protectionism
South Africa	14 %	---	---	14 %	7.60 %	---	---	Protectionism
Mexico	16 %	3 %	---	16 %	0 %	---	---	Sector distortion
Brazil	27 %	10 %	---	18 %	20 %	9.30 %	\$ 13.35	Tax maximization and sector distortion
Bangladesh	15 %	35 %	\$ 11.76	15 %	12 %	---	\$ 11.63	

Source: Deloitte (2008); updates by TAS

TAXES HAVE A DIRECTIONALLY NEGATIVE IMPACT ON THE OVERALL GROWTH IN PENETRATION OF WIRELESS BROADBAND IN LATIN AMERICA

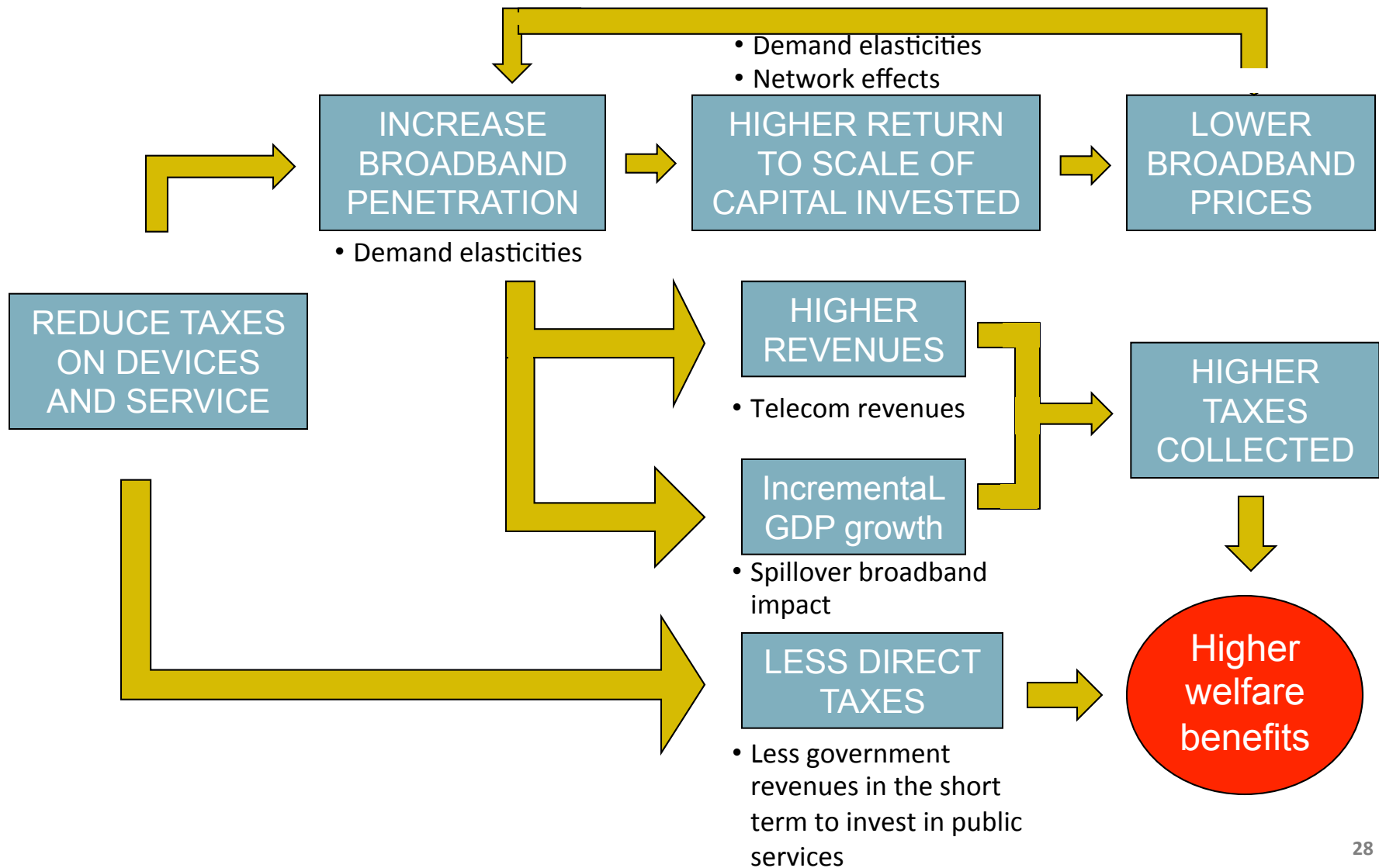
LATIN AMERICA: CORRELATION BETWEEN WIRELESS TAXES AND GROWTH RATE IN PENETRATION OF WIRELESS BROADBAND



Sources: Katz et al (2010); Wireless Intelligence; TAS analysis

LOWERING TAXES ON CONSUMER ACCESS DEVICES AND BROADBAND SERVICE SUBSCRIPTIONS
COULD HAVE A NON NEGLIGIBLE IMPACT BOTH ON GDP GROWTH AND WELFARE

VIRTUAL CIRCLE OF TAX REDUCTION ON BROADBAND DEVICES AND EQUIPMENT



**LOWERING TAXES IN CERTAIN EMERGING COUNTRIES TO THE LEVEL SIMILAR OF MALAYSIA
WOULD GENERATE ADDITIONAL GDP, COMPENSATING THE FOREGONE TAX REVENUES**

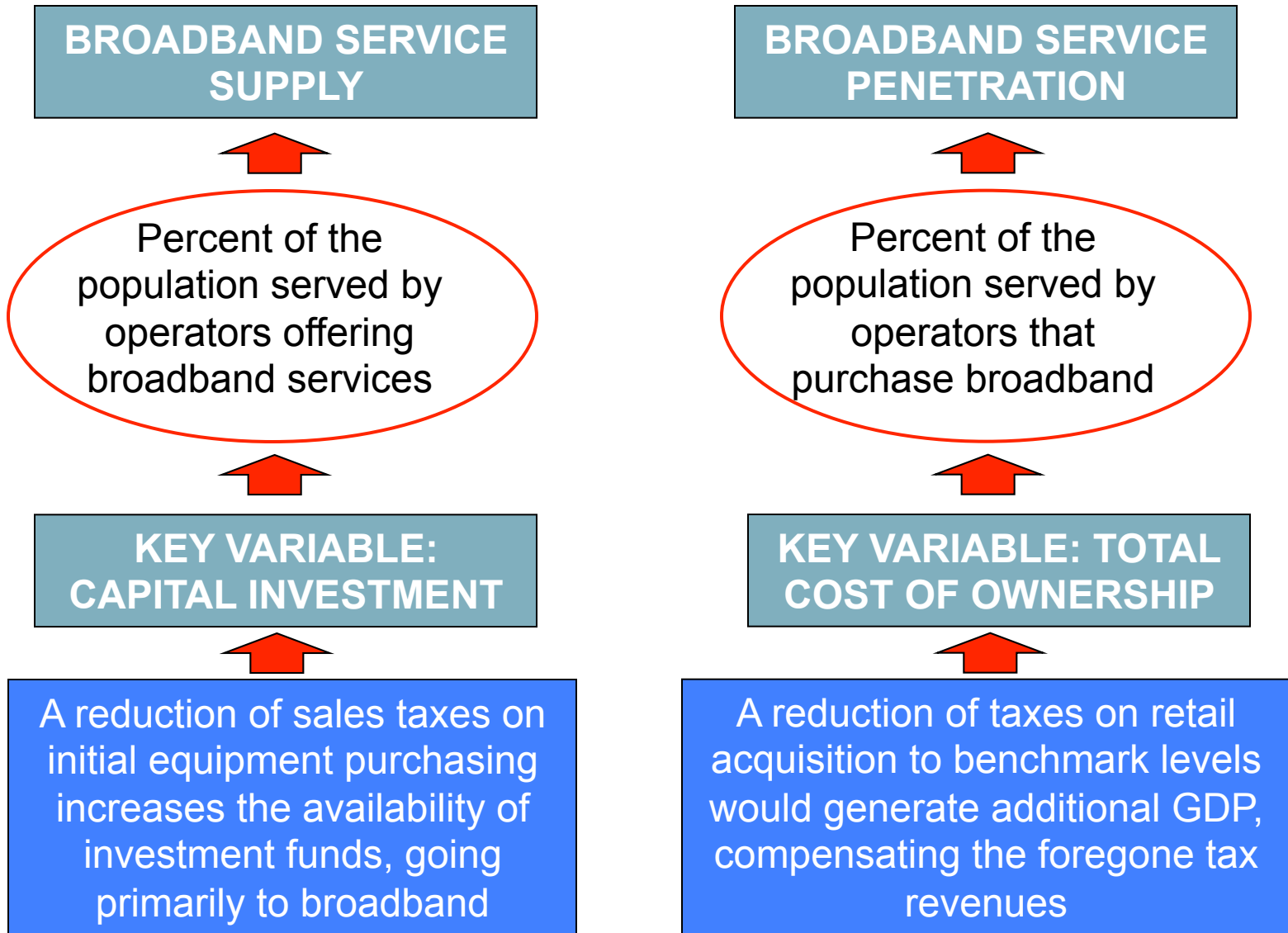
OVERALL IMPACT ON ECONOMIC VALUE (GDP)

COUNTRY	TAXATION IMPACT ON TCO	IMPACT OF SHIFT IN TAXATION IMPACT (1)	INCREASE IN WIRELESS PENETRATION (in percentage points)	TOTAL TAX GAIN/LOSS (Billion) (2)	INCREMENTAL GDP GENERATION (Billion)
MEXICO	18.4 %	6.1%	4.6	\$(0.38) - \$1.7	\$5.9 - \$27.9
BRAZIL	43.3 %	6.1%	24.0	\$2.9 - \$73.1	\$27.3 - \$205.5
S. AFRICA	14.9 %	6.1%	9.0	\$(0.34) - \$2.8	\$1.2 – \$13.4
BANGLADESH (3)	54.8 %	6.1%	11.4	(\$640)	\$4.9

- (1) Benchmark chosen as the tax rate impact on wireless services TCO in Malaysia (6.1%)
- (2) The range in estimates is driven by alternative views of elasticity coefficients
- (3) Lower impact reflects the initial penetration of mobile broadband in the country

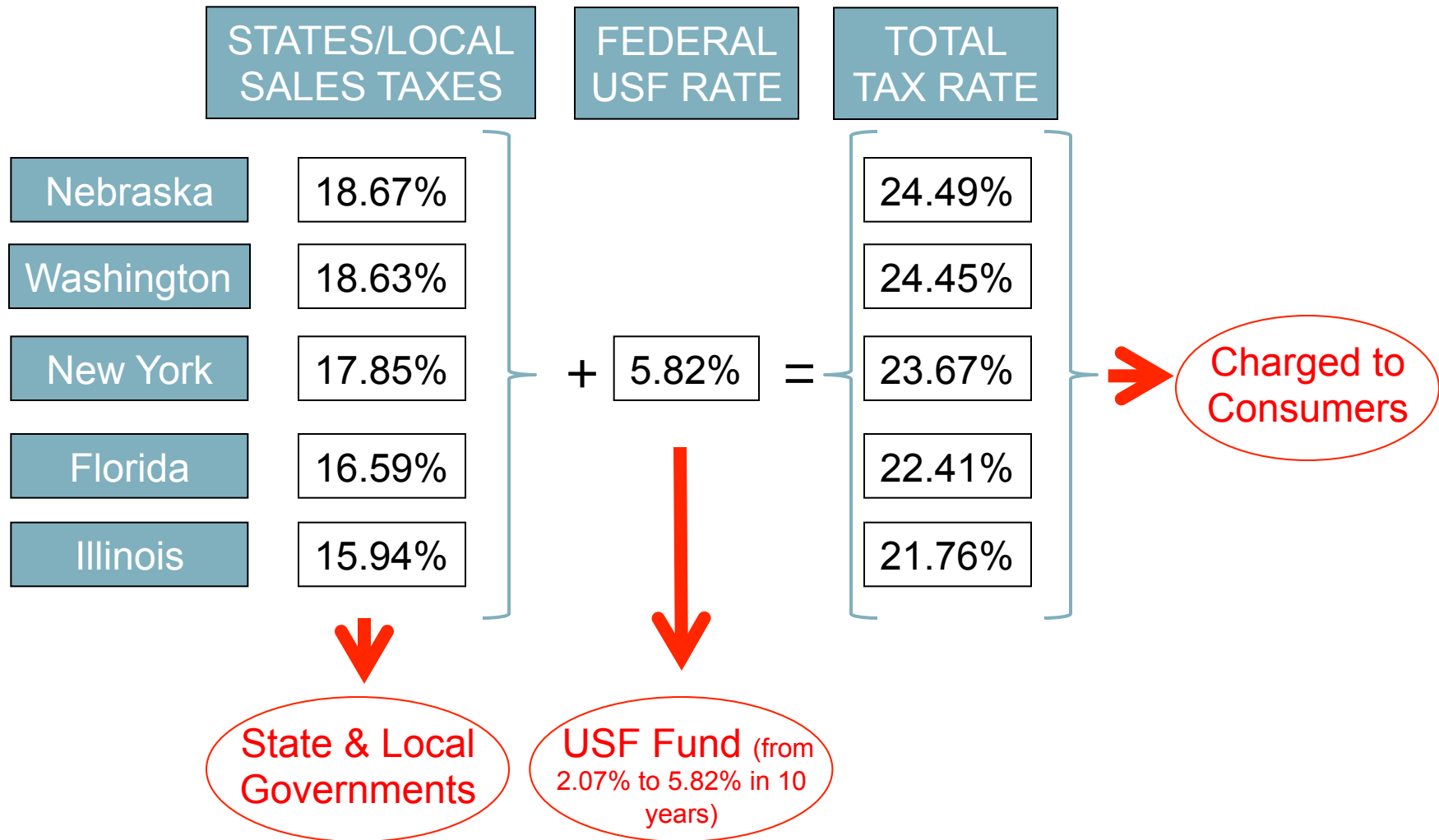
Source: Telecom Advisory Services analysis

WE HAVE ALSO PROVEN THAT A REDUCTION ON TAXES AFFECTING RETAIL ADOPTION OF BROADBAND ALSO HAS A POSITIVE IMPACT ON PENETRATION



A SPECIAL CASE OF SERVICE TAXATION ENTAILS THE CONTRIBUTIONS TO THE UNIVERSAL SERVICE FUNDS

UNITED STATES: WIRELESS TAXES (TOP STATES)



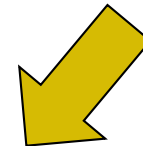
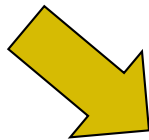
THIS POLICY NEEDS TO BE ASSESSED IN TERMS OF ITS COSTS AND BENEFITS

COSTS

- **Market distortion**
 - Limited competitive neutrality
 - Taxes affect purchasing behavior
- **Impact on lower income households**
 - Regressive nature of taxes on wireless services due to elasticity of demand
 - Negative impact on underprivileged segments

BENEFITS

- Taxes collected that could be redistributed in other public services
- Reinvestment of universal service funds in infrastructure deployment



- Is there a potential erosion in the collected base before services are offered?
- Up to what point are universal service funds invested appropriately and efficiently (it is estimated that slightly less than 50% of funds collected are disbursed)?

AGENDA

- The impact of taxation on broadband deployment
- The impact of taxation on broadband adoption
- Policy implications and best practices

COUNTRIES NEED TO EXAMINE THEIR BROADBAND TAXATION POLICIES AND ALIGN THEM WITH ICT DEVELOPMENT OBJECTIVES

- While recognizing that sales taxes have a positive contribution to public services delivery, the economic effect of their reduction on CAPEX is significant
 - A reduction of the sales tax rate on equipment purchasing could yield an increase in investment at least proportional to a reduction of the levy
- The issues identified in the taxation of retail broadband equipment and services are not exclusively to a few countries; at least 27 countries in the emerging world have adopted distortive taxation approaches, hampering broadband penetration
 - Adopting similar taxation as Malaysia could create significant wealth with a relatively low cost to the tax collector
 - If mobile broadband is understood as a key social and economic development lever, taxes cannot represent an obstacle for diffusion
- There are clear policy inconsistencies in numerous countries, where ICT development objectives run counter to a perception that ICT firms are perceived as “cash cows”
- Tax policy should aim to be neutral (avoid distortion), simple (to stimulate optimal business decisions), effective (avoid double taxation) and flexible (to keep up with technological developments)

A NUMBER OF BEST PRACTICES IN THE MANAGEMENT OF USF FUNDS CAN HELP IMPROVE THEIR EFFICIENCY

- Structuring of an independent and separate entity in charge of managing the USF fund (potentially led by a board with public and private sector representatives)
- Regular consultation with private sector operators to avoid redundancy between deployments and prevent “crowding out”
- Alignment of goals and targets with development plans (Peru, Colombia)
- Transparent financial reporting of fund performance (Colombia)
- Define business plans for USF projects that comprise not only deployment but also sustainability costs (Dominican Republic, Colombia)
- Fund management should include competitive bidding for USF projects (Colombia), combined with incentives for efficient fulfillment of plans (Chile)

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