THE IMPACT OF STATE POLICY ON WIRELESS BROADBAND DEPLOYMENT

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NCSL
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TELECOMMUNICATIONS NETWORKS, PARTICULARLY BROADBAND, HAVE A POSITIVE IMPACT ON ECONOMIC DEVELOPMENT

- Generate jobs and output as a result of the construction of networks
  - Estimates for network construction jobs are fairly robust and consistent across prior research
  - Employment multipliers between 1.92 and 3.42 (*)
  - Output multiplier: every dollar invested in network infrastructure generates 0.73 dollars in domestic value added (*)

- Promote innovation and create new businesses once the networks are deployed
  - Accelerate development of core regions
  - Attract new industries, with employment potential
  - Improve quality of life which, in turn, attracts investment

(*) Katz, R. (2012). *The economic impact of broadband: research to data and policy issues*. Geneva, Switzerland: International telecommunication Union.

HOWEVER, PRIVATE INVESTMENT IN BROADBAND NATURALLY TENDS TO FLOW TO AREAS WITH HIGH DENSITY AND SIGNIFICANT DEMAND

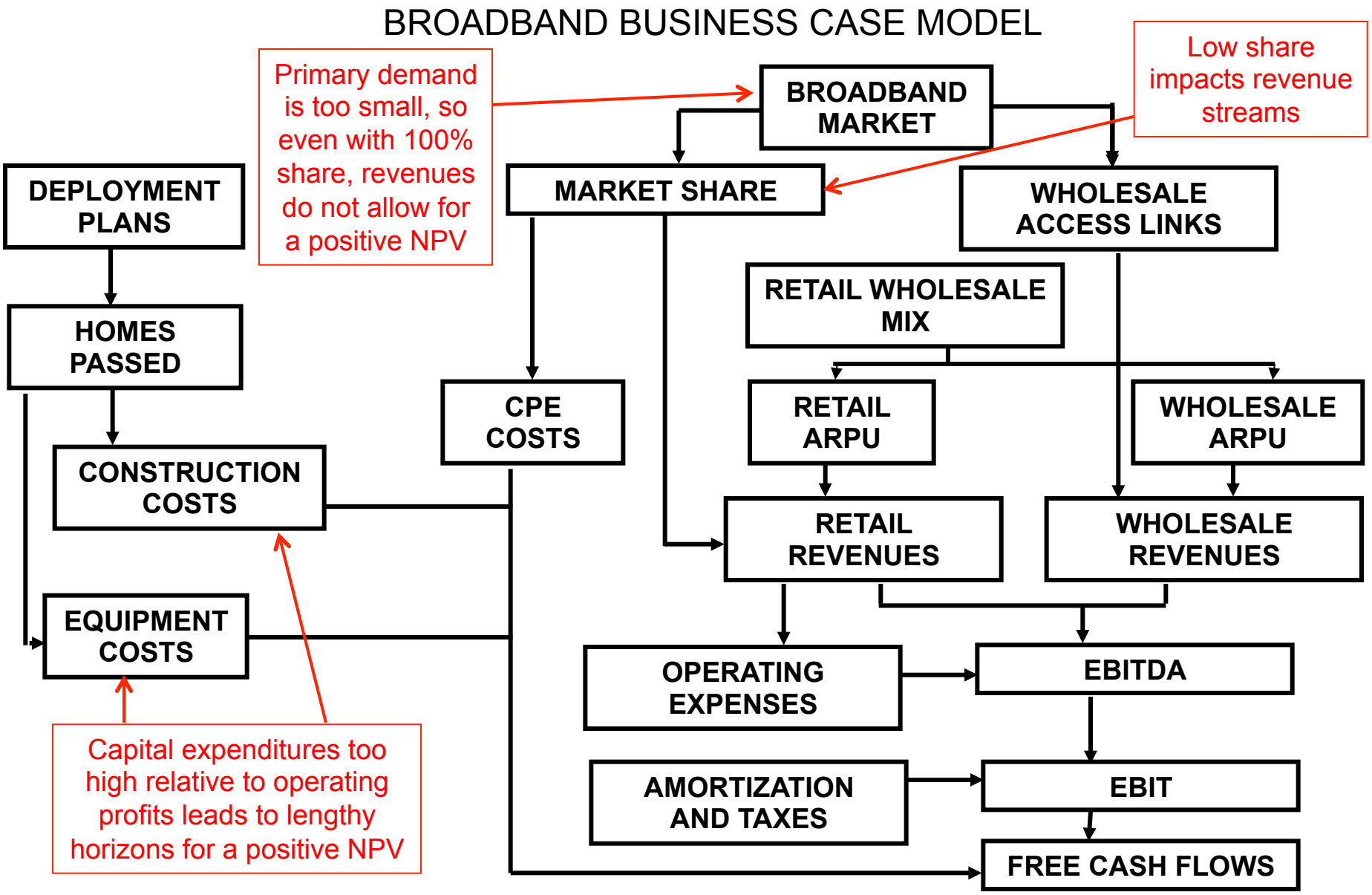
		MARKET STRUCTURE			
		SEVERAL OPERATORS	2-3 OPERATORS	1 OPERATOR	NO OPERATOR
DENSITY AND MARKET SIZE	HIGH	High residential and commercial density			
	MEDIUM		High density suburban areas		
	LOW			Suburban areas with low residential density	
	VERY LOW				Rural areas with low residential density

WHAT ARE THE PUBLIC POLICY OPTIONS FACING STATE GOVERNMENTS TO SOLVE FOR THE MARKET FAILURE?

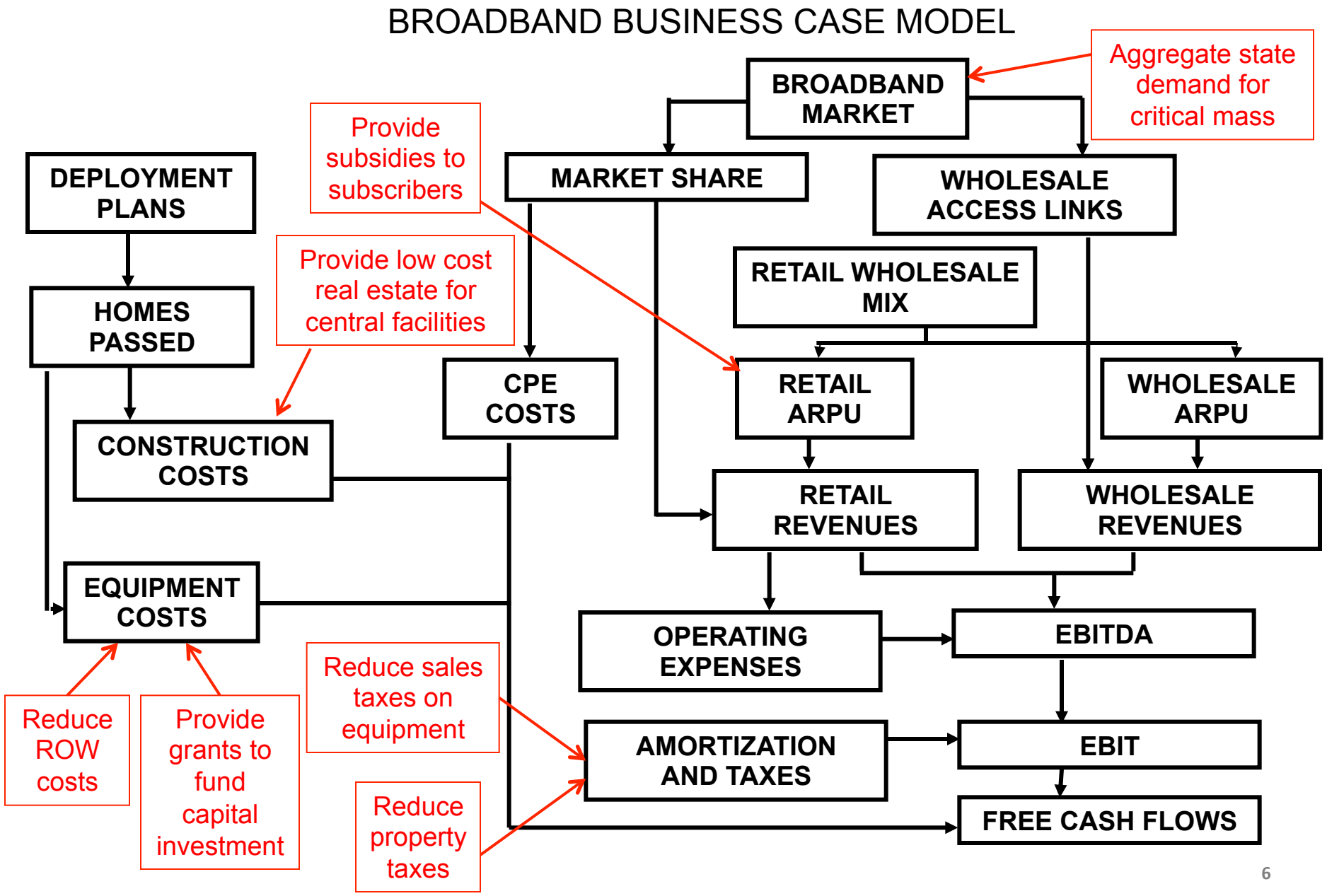
If a project does not generate sufficient private investment because it does not represent a sound financial business case, government intervention is justified if the expenditures are outweighed by the broader socio-economic benefits

OPTION 1: Rely on Federal Funding Programs (BTOP, RUS,..)	OPTION 2: Invest in a publicly-owned broadband utility	OPTION 3: Alleviate the private investment constraints
Federal funds are invested in the private deployment of a broadband network	State or local funds are invested in the deployment of a broadband network	Public policy initiatives (subsidies, anchor contracts, tax reduction, access cost reduction)
ISSUES		
• Limited funding (e.g. BTOP: $4.7 B) • Slow time to market due to limited staff and cumbersome approval process • Project sustainability issues	• Less dynamic and innovative • No checks and balances • More regulation to protect open access • Unintended consequences in terms of utility behavior	• A reduction of revenues in the short term (e.g. less taxes) need to be carefully outweighed in terms of the socio-economic benefits in the long run

STATE AND LOCAL GOVERNMENTS SHOULD FOCUS THEIR INTERVENTION ALLEVIATING THE FINANCIAL CONSTRAINTS OF PRIVATE INVESTMENT



ALONG THESE LINES, STATE AND LOCAL GOVERNMENTS COULD INTERVENE IN NUMEROUS LEVERS OF THE BROADBAND BUSINESS CASE



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

- 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

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
- The variance of investment across states is fairly wide and increasing over time
- While market potential and competitive pressure drive investment intensity, sales taxes also play a role

(*) 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 TELECOMMUNICATIONS CARRIERS AND 4.45% FOR CABLE TV)

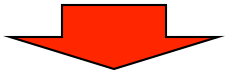
EVOLUTION OF SALES TAX ON INVESTMENT IN THE UNITED STATES (2006-10)

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

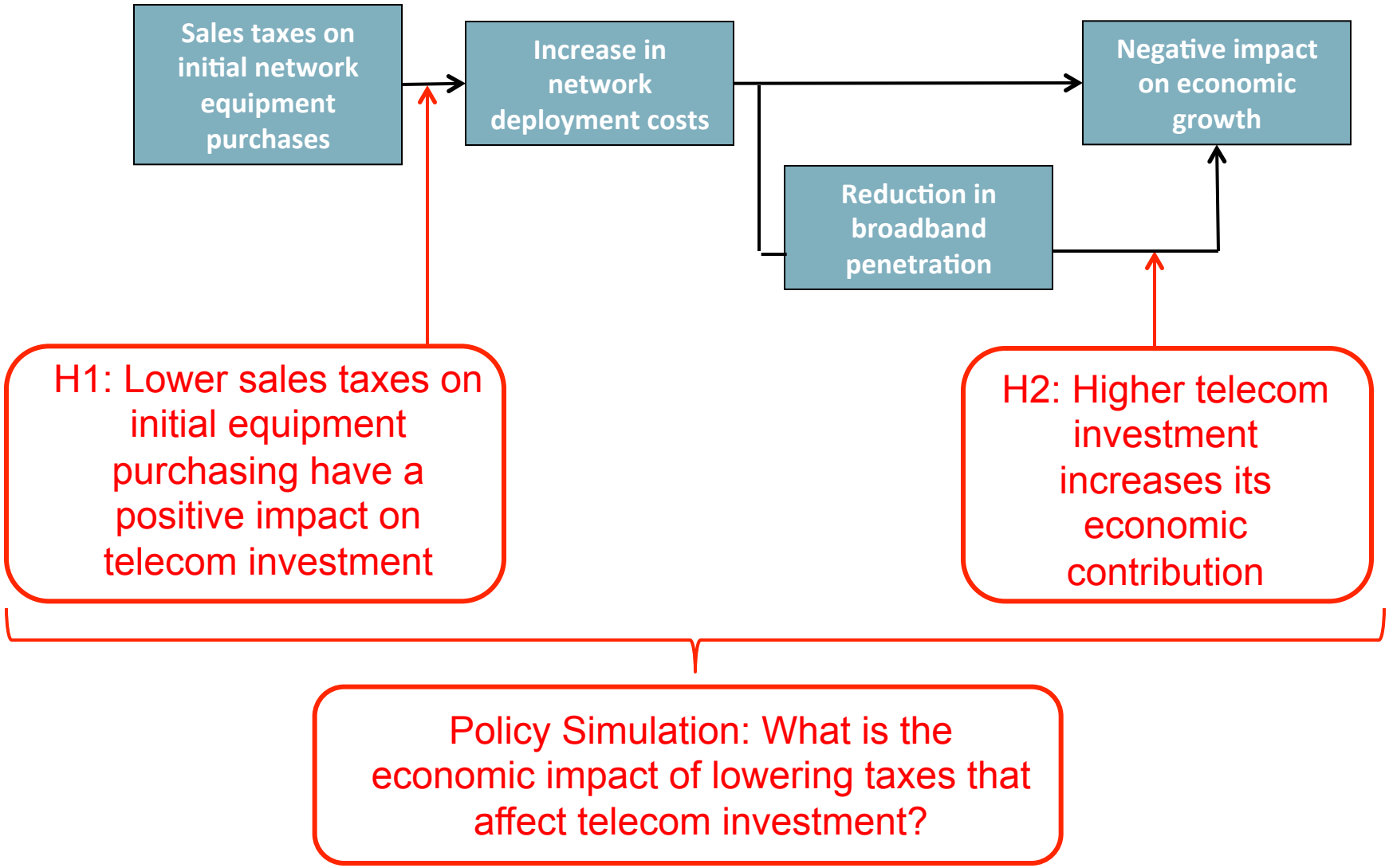
Year	2006	2007	2008	2009	2010
Mean	4.14%	4.20%	4.23%	4.42%	4.45%
Max.	9.25%	9.25%	9.25%	9.25%	9.25%
Standard deviation	3.55%	3.58%	3.60%	3.62%	3.65%
States without taxes	20	20	20	19	19



- The five year average sales tax rate is fairly stable over time, although it exhibits an increasing divergence across states
- Taxation on telecommunications equipment purchasing is not homogeneous across the country since twenty states and the District of Columbia do not apply sales taxes to telecommunications equipment, while nineteen do not tax cable TV equipment

Source: TAS analysis

THE STUDY TESTED TWO HYPOTHESES AND SIMULATED A POLICY OUTCOME



DO SALES TAXES HAVE AN IMPACT ON OVERALL INVESTMENT? THIS QUESTION WAS INVESTIGATED THROUGH ECONOMETRIC AND CASE STUDY EVIDENCE

WHAT IS THE EXPECTED EFFECT ON INVESTMENT OF LOWERING SALES TAXES ON EQUIPMENT?

ECONOMETRIC ANALYSIS

- Specify models for the telecommunications and cable industries
- State data for 2006-2010
- Control for states fixed effects such as wealth of the economy, demographic profile, and urban/rural population

CASE STUDY ANALYSES

- Examine the actual investment behavior of telecommunications carriers and cable TV operators in states that increased or reduced the sales tax rate
- State-specific data for 2006-2010

A DECREASE OF 1 PERCENTAGE POINT IN THE TAX RATE WOULD INCREASE 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

Dependent Variable	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	

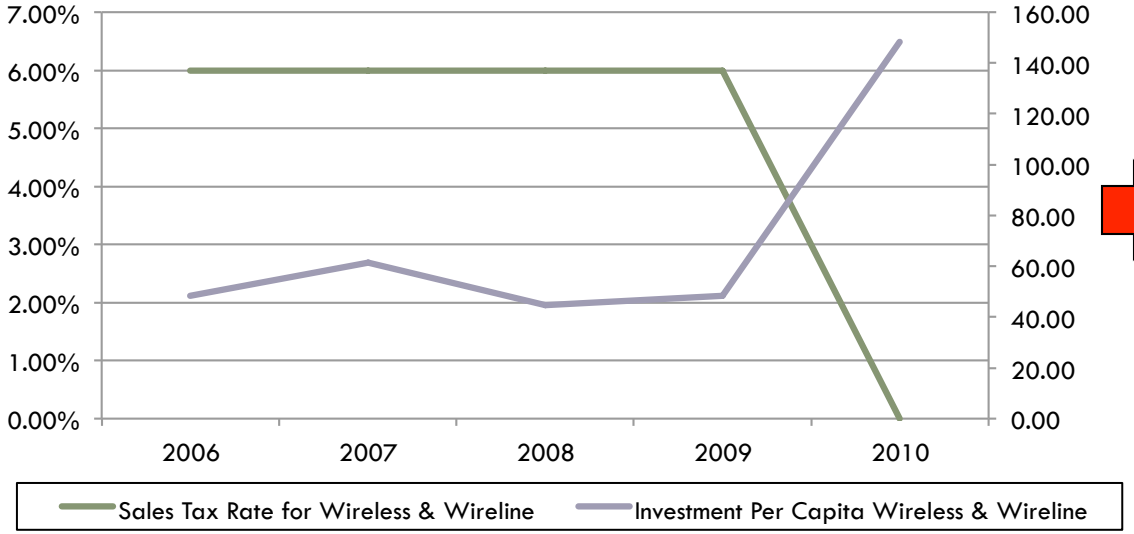
Note: ***, **, * significance at 1%, 5% & 10% level

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)

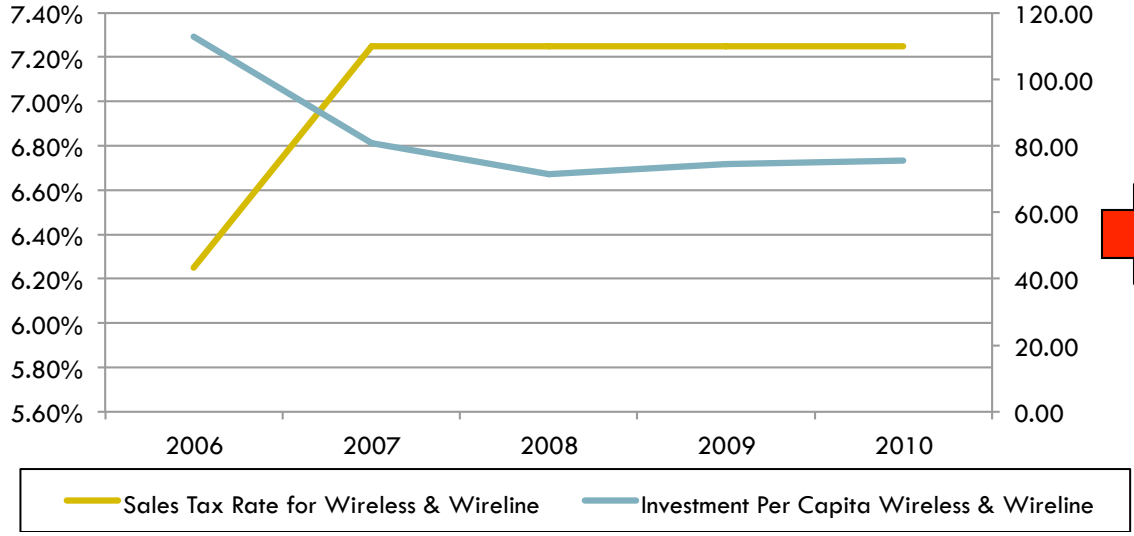
N. Dakota adopted a six-year phase-out of the sales tax on network equipment purchases



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

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

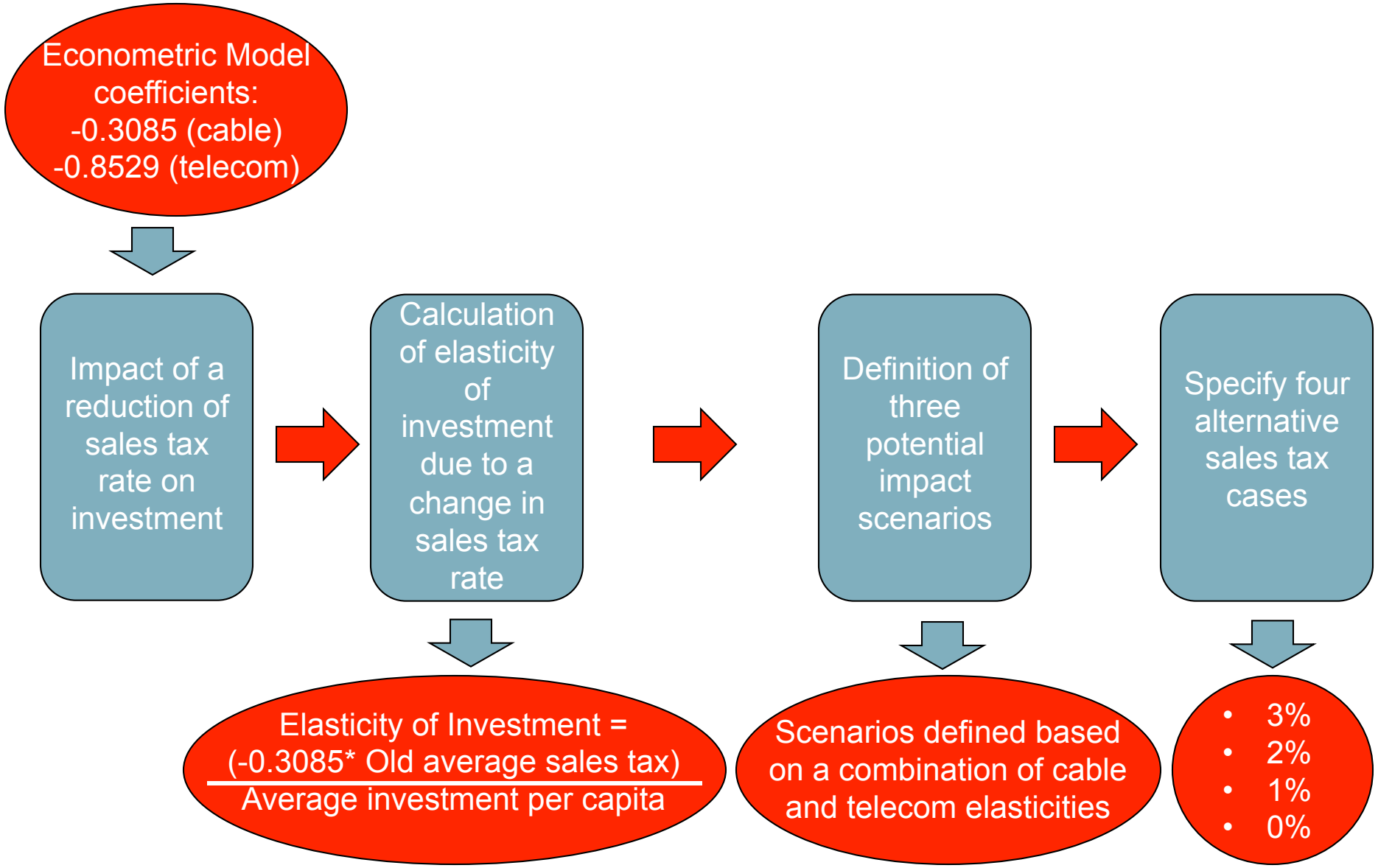
S. Carolina increased the sales tax rate from 6.25% in 2006 to 7.25% in 2007



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

Source: TAS analysis

WITH THIS EVIDENCE, THE IMPACT OF A POTENTIAL REDUCTION OF SALES TAXES ON EQUIPMENT WAS ESTIMATED



Source: TAS analysis

A REDUCTION OF SALES TAXES TO AN AVERAGE OF 2% WOULD GENERATE AN INVESTMENT OF $ 763 MILLION (BASELINE SCENARIO) IN THE FIRST YEAR

Current Total Telecom Investment (2010): $ 42.133 billion

Total Sale Tax pay 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

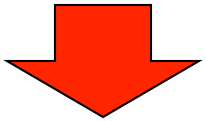
Industry invests beyond the supply of funds benefit of the tax decrease (106%)

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

Source: TAS analysis

FURTHERMORE, DUE TO THE INERTIA EFFECT OF CAPITAL PLANNING IN SUBSEQUENT YEARS, THE LONG TERM EFFECT ON NETWORK INVESTMENT TENDS TO INCREASE

- The econometric analysis indicates that, due to multi-year deployment programs, network investment is heavily dependent on the amount invested in prior years
  - In the cable TV industry, 50.19% of investment in year 2 is dependent on the amount invested in year 1
  - In the telecommunications industry, that percentage is 43.75%
- Consequently, the elimination of sales taxes produces not only a short-term effect but also an impact in the long term

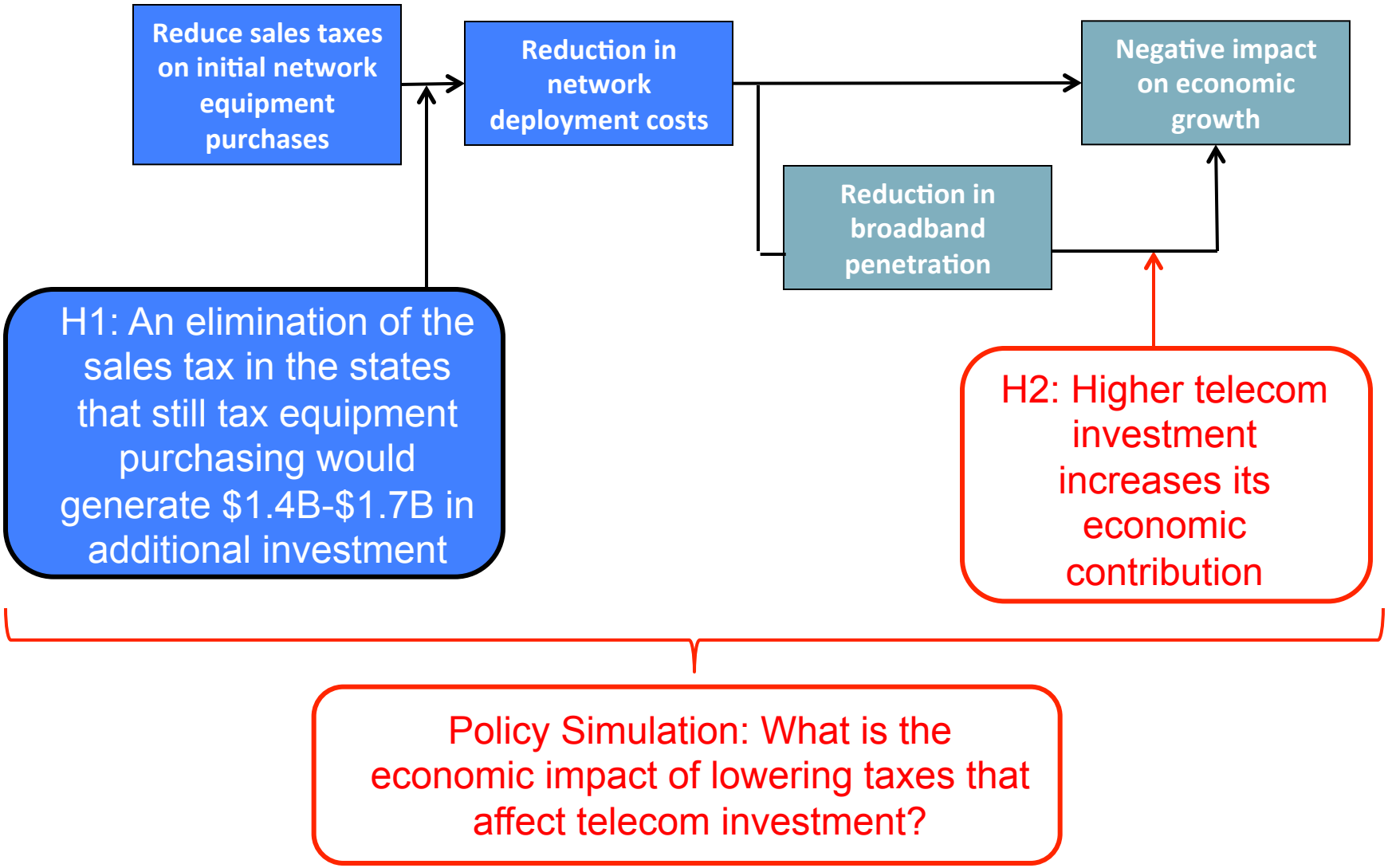


INCREMENTAL LONG-TERM NETWORK INVESTMENT RESULTING FROM CHANGES IN SALES TAX RATE (SUM OF YEARS 1, 2 AND 3)

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%	4.13%	$ 1,740,403,115	4.42%	$ 1,862,208,288	5.07%
2.00%	1.71%	7.81%	$ 3,291,529,106	8.30%	$ 3,497,337,847	9.60%
1.00%	2.52%	11.49%	$ 4,842,655,097	12.18%	$ 5,132,467,406	14.12%
0.00%	3.32%	15.18%	$ 6,393,781,087	16.06%	$ 6,767,596,965	18.64%

Source: TAS analysis

SO FAR, WE HAVE PROVEN THAT A REDUCTION IN SALES TAXES HAS A POSITIVE IMPACT ON TELECOMMUNICATIONS CAPITAL INVESTMENT



Source: TAS analysis

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

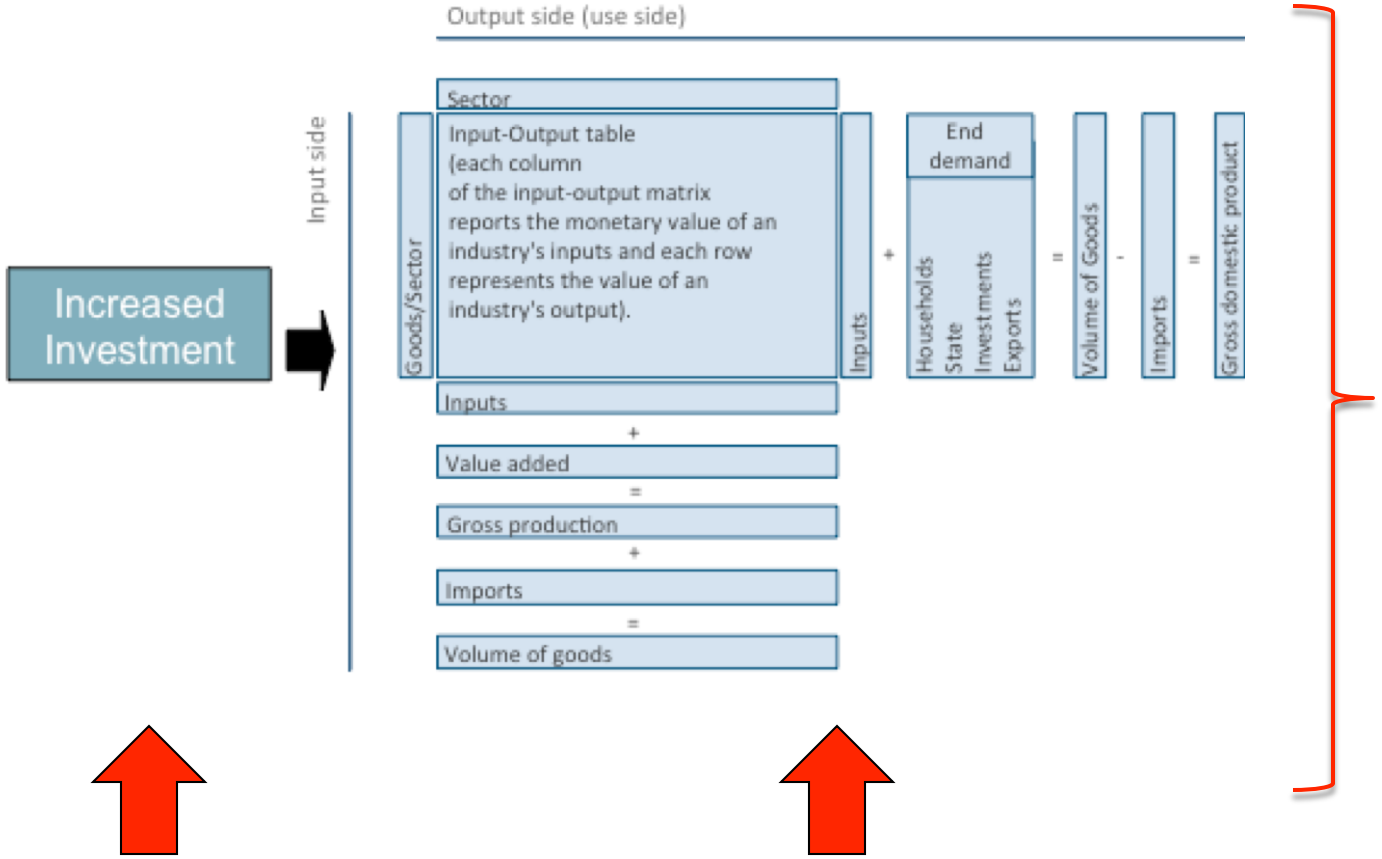
- Optimization of supply chains, marketing expenditures and access to labor pools

Financial Services

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

TO ESTIMATE THE DIRECT EFFECTS, AN INPUT/OUTPUT MATRIX CALCULATED THE VALUE ADDED AND EMPLOYMENT GENERATED FROM THE ADDIITONAL INVESTMENT

STRUCTURE OF INPUT/OUTPUT MATRIX



- Value added and jobs generated in telecom eq. manufacturing, construction and telecom industry
- Value-added and jobs generated in other industrial sectors
- Total industry output and multipliers

Source: TAS. Investment impact yielded by tax reduction

Source: US Department of Commerce Bureau of Economic Analysis

IT IS ESTIMATED THAT THE ELIMINATION OF SALES TAXES IN THE REMAINING STATES WOULD GENERATE 30,000-37,000 DIRECT JOBS AND $2.8 B - $3.4 B IN OUTPUT

DIRECT 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	8	$ 0.76	$ 0.41	9	$ 0.81	$ 0.47	10	$ 0.93
2.00%	$ 0.72	16	$ 1.44	$ 0.76	17	$ 1.53	$ 0.88	19	$ 1.77
1.00%	$ 1.06	23	$ 2.12	$ 1.12	24	$ 2.24	$ 1.30	28	$ 2.60
0.00%	$ 1.40	30	$ 2.80	$ 1.48	32	$ 2.97	$ 1.72	37	$ 3.44

Source: TAS analysis

TO CALCULATE THE INDIRECT EFFECTS, AN ECONOMETRIC MODEL WAS SPECIFIED THAT ESTIMATE THE JOB AND OUTPUT IMPACT OF ADDITIONAL INVESTMENT

Models of Impact of Investment on socio economic factors of U.S. economy (2006-2010)
Fixed effects models by year and state.
Independent Variables (1): Investment Growth, Population Growth
Independent Variables (2): Investment Growth, GDP Growth

Model	Fixed Effects (By Year & State)			
Dependent Variable	GDP Growth (1)		Unemployment Rate Growth (2)	
Investment Growth	0.0138311	***	-0.0750849	*
	(0.0028857)		(0.0479899)	
Population Growth	-1.583572	**		
	(0.6250086)			
GDP Growth			-2.821014	***
			(0.8847934)	
Constant	0.4026913		18.66292	***
	(0.5784295)		(0.953621)	
R^2 adjusted	0.0917		0.1113	
F	13.42		7.19	
Prob > F	0.0000		0.0018	
Number of Groups	50		50	
Number of Observations	200		200	

Note: ***, **, * significance at 1%, 10% & 20% level

- If network investment increases by 1%, state GDP per capita would grow by 0.014% (with a confidence interval between 0.08% and 0.20%)
- If network investment increases by 1%, state unemployment rate would decrease by 0.075% (direct effect)

Source: TAS analysis

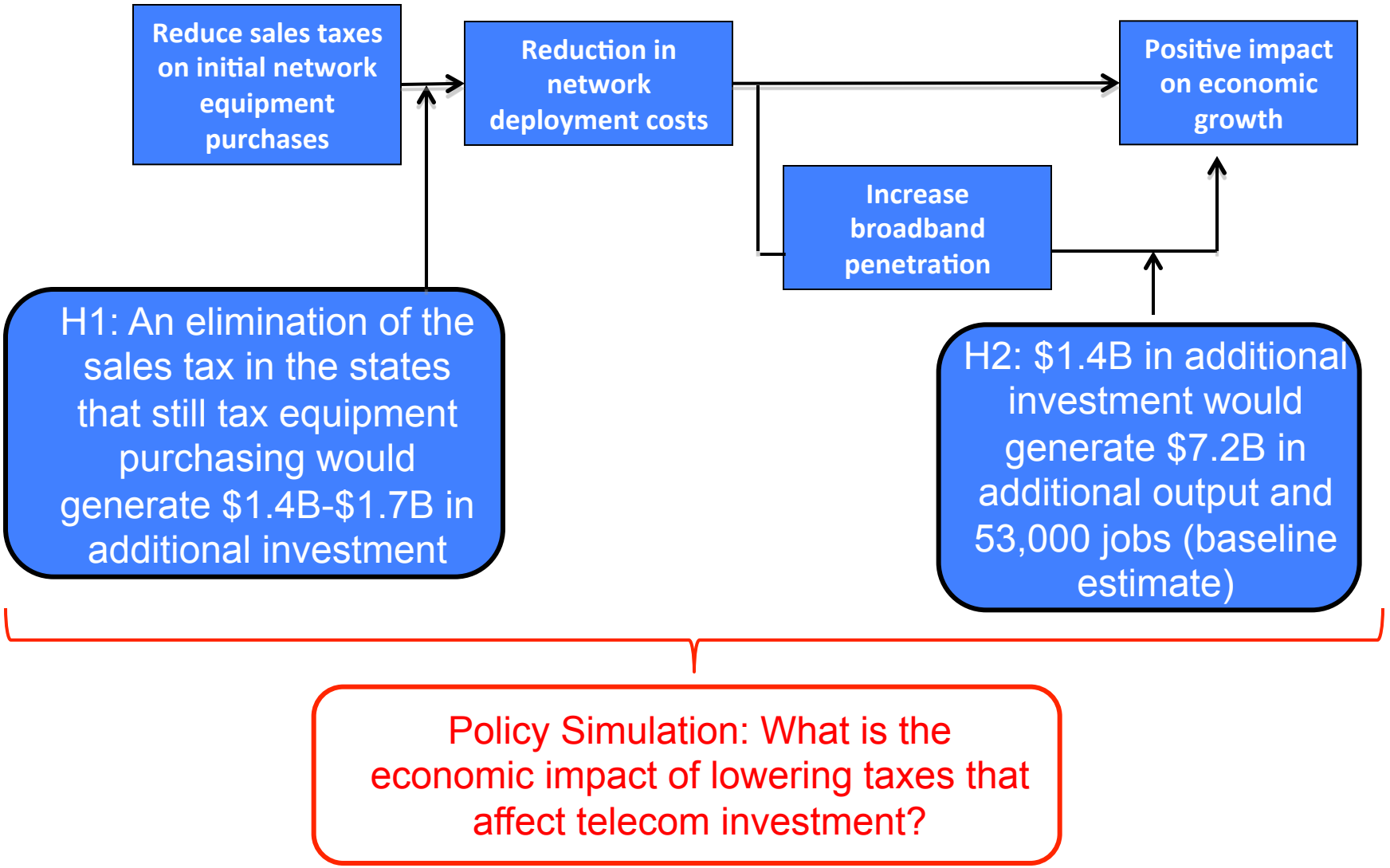
THE INDIRECT EFFECTS COMBINED WITH THE DIRECT EFFECTS WOULD REPRESENT 50,000-62,000 DIRECT JOBS AND $6.8 B - $8.4 B IN OUTPUT

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

Source: TAS analysis

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



Source: TAS analysis

WHILE RECOGNIZING THAT SALES TAXES HAVE A POSITIVE CONTRIBUTION TO PUBLIC SERVICES DELIVERY, THE ECONOMIC EFFECT OF THEIR REDUCTION IS SIGNIFICANT

- Current Situation: 30 states impose a sales tax on telecommunications equipment purchasing, while 31 (plus the District of Columbia) do so on cable TV equipment
  - Telecommunications average rate: 4.02%, but some states 9.25%
  - Cable TV average rate: 4.45%, but some states 9.25%

- By raising the required pre-tax rate of return of capital invested, sales taxes are reducing the investment on network equipment, especially broadband

- 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
  - Reduction of the average rate to 2%: $3.74 B and 27,000 jobs (baseline scenario)
  - Elimination of the sales tax: $7.24 B and 53,000 jobs (baseline scenario)

SHOULD STATE GOVERNMENTS INTERVENE IN BROADBAND AND WIRELESS DEPLOYMENT? YES, BUT FACILITATING MARKET FORCES NOT PREEMPTING THEM

- Coordinate with governments, communities, businesses, and operators to identify supply and demand conditions and tailor services to unmet needs
- Identify barriers to consumer adoption where broadband exists
- Identify areas that might need investment
- Help establish a “business case” to deploy broadband

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