

# ASSESSING THE ECONOMIC VALUE OF UNLICENSED USE IN THE 6 GHz BAND IN BRAZIL

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VI workshop de competição

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## THE VALUE OF UNLICENSED SPECTRUM: SOME BACKGROUND IN ECONOMIC THEORY

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- Spectrum management is the process of allocating and economic resource to maximize efficiency, encourage investment and promote innovation
- Spectrum is allocated through either exclusive licenses or is left for use unlicensed where users can operate their devices without authorization but with limits in interference
- Spectrum licensing has merits (preventing interference) and drawbacks (promoting industry concentration, maybe stifle innovation at the edge of the ecosystem)
- Unlicensed spectrum is an approach to manage a common resource pool (Ostrom-2009 Nobel Prize): have clear rules in respond to local conditions, collective decision making, effective monitoring and enforcement and conflict resolution mechanisms
- Given the amount of economic potential, it is critical to reserve a portion of the spectrum for unlicensed use (Milgrom-2020 Nobel Prize)

**OBJECTIVE OF THE STUDY: ASSESS THE ECONOMIC VALUE BY OPENING THE 6 GHz BAND TO UNLICENSED USE IN BRAZIL**

	GDP impact	Producer Surplus	Consumer Surplus
Aligning spectrum decision with other advanced economies		X	
Enhance broadband coverage and improve affordability	X		X
Increase speed by reducing Wi-Fi congestion	X		X
Deployment of AR/VR solutions	X	X	
Deployment of IoT	X	X	
Reduction of Enterprise wireless costs		X	
Cellular traffic offloading		X	X
Wi-Fi Municipal	X		X
Free Wi-Fi	X		X

## THE DECISION WILL ADD \$ 163.36 BILLION TO THE BRAZILIAN ECONOMY BY 2030

### ECONOMIC VALUE OF ALLOCATING 1200 MHZ IN 6 GHZ BAND (2020-2030)



**GDP IMPACT**  
\$ 112.14 billion

Enhance coverage, improve affordability, increase broadband speeds, accelerate deployment of the Internet of Things (IoT), and support the augmented reality/virtual reality (AR/VR) market



**PRODUCER SURPLUS**  
\$ 30.03 billion

Savings on enterprise wireless traffic and margins related to sales of IoT and AR/VR equipment



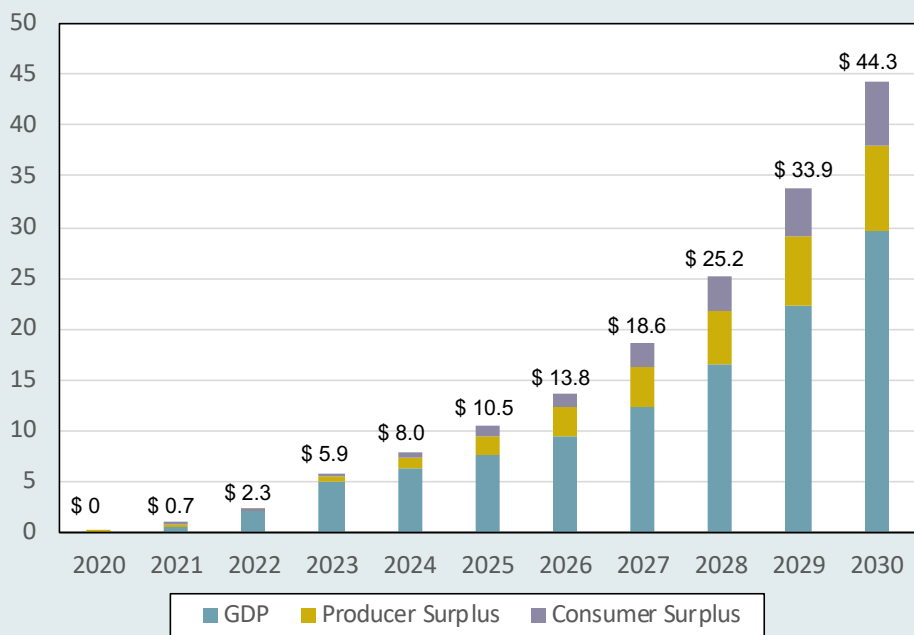
**CONSUMER SURPLUS**  
\$ 21.19 billion

Willingness to pay increased from faster broadband speeds

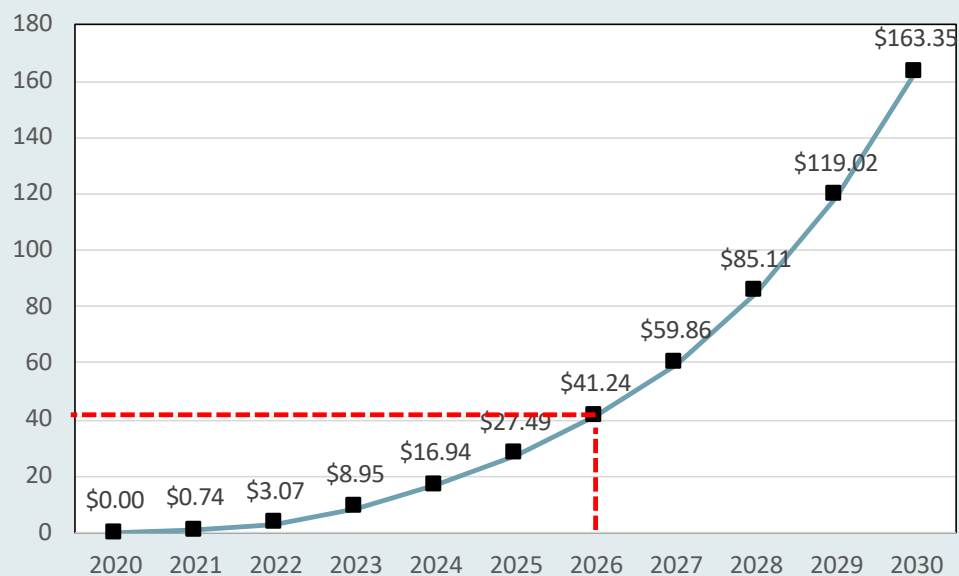
Source: Telecom Advisory Services analysis

## A QUARTER OF THE TOTAL ECONOMIC VALUE WILL ALREADY BE REALIZED IN FIVE YEARS

### Annual Economic Value



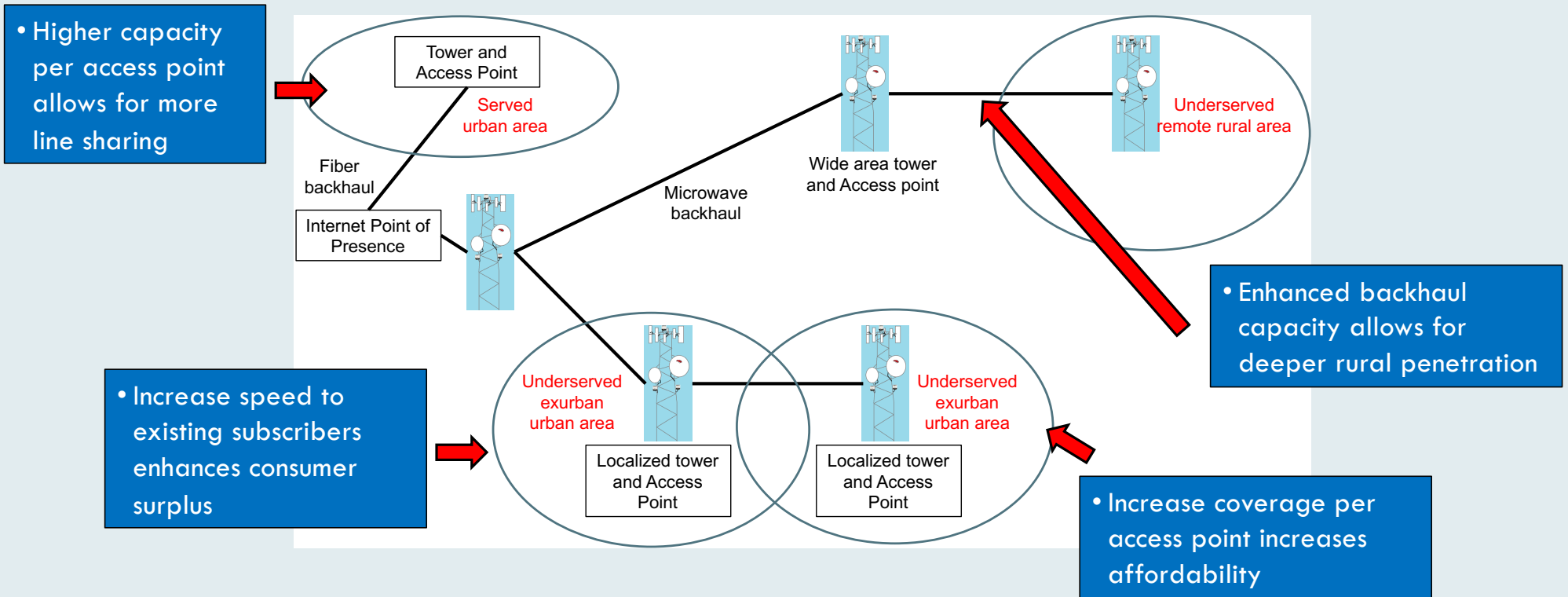
### Cumulative Economic Value



Source: Telecom Advisory Services analysis

**SOURCE OF VALUE 1. ACCESS TO THE 6 GHZ SPECTRUM BAND COULD HAVE AN IMPACT ON THE WISP BUSINESS AT FOUR LEVELS**

**IMPACT OF 6 GHZ SPECTRUM ON A WISP NETWORK**



Source: Telecom Advisory Services analysis

**SOURCE OF VALUE 1. THE SUM OF ECONOMIC EFFECTS RESULTS IN CUMULATIVE \$24.91 BILLION IN GDP AND \$1.21 BILLION IN CONSUMER SURPLUS**

- Extended coverage due to longer point-to-point backhaul
- Faster broadband speed
- Better coverage per access point
- Higher sharing ratio per access point

**Impact on GDP**

- Increase of additional 25% of 512,000 rural households that do not buy broadband because of lack of coverage (Cetic.br 2019)

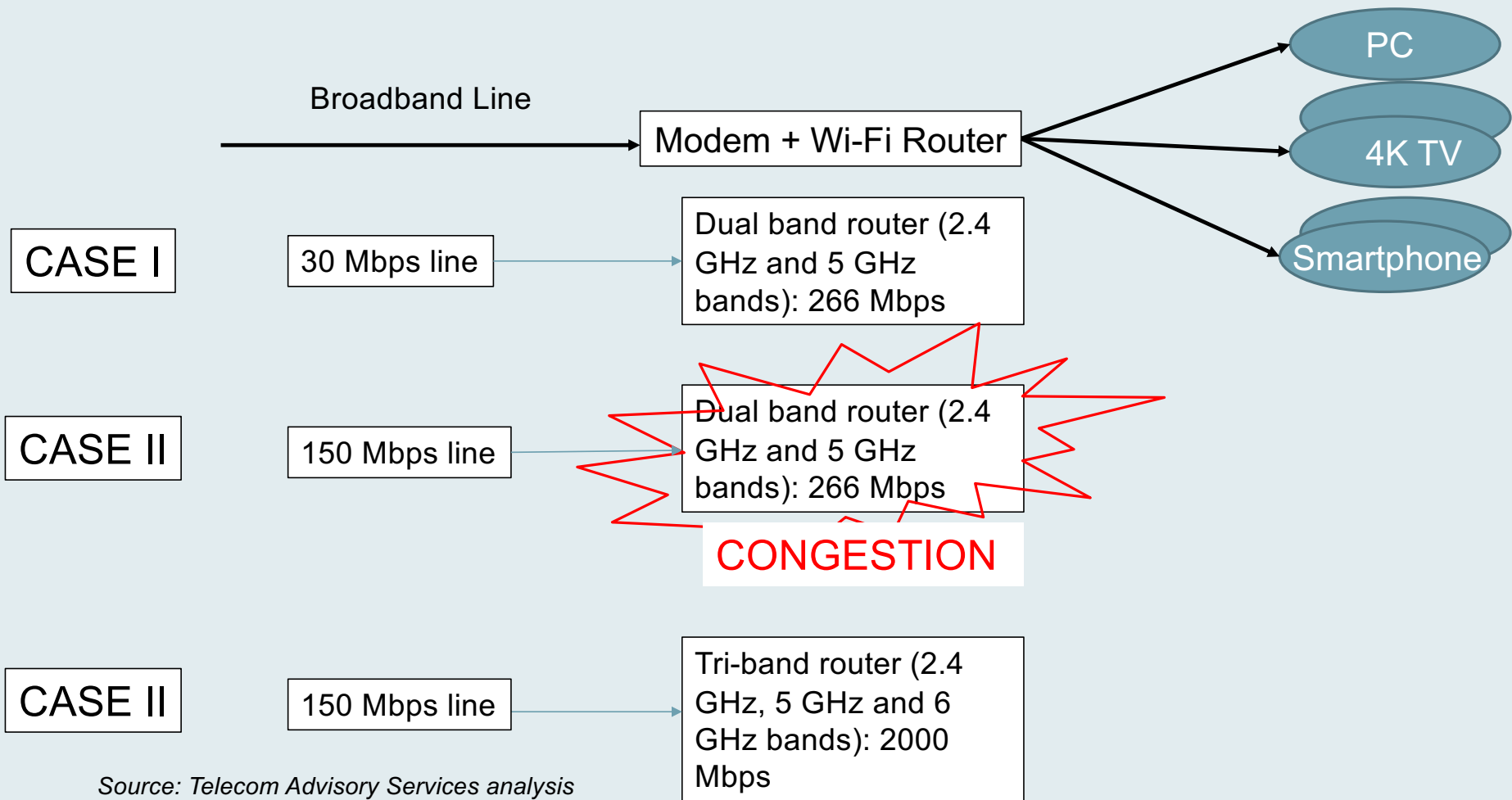
- Assuming price stability, affordability increases 3.60% per year

- Line sharing increases from 41% (Cetic.br 2020) to 83% (2030)

**Impact on consumer surplus**

- Average download speed increases from 9.54 Mbps (ANATEL 2019) to 33.83 Mbps (2030)

**SOURCE OF VALUE 2. BY ALLOCATING THE 6 GHz TO UNLICENSED USE, WI-FI CONGESTION WOULD BE REDUCED, YIELDING AN INCREASE OF BROADBAND SPEED AT THE DEVICE LEVEL**



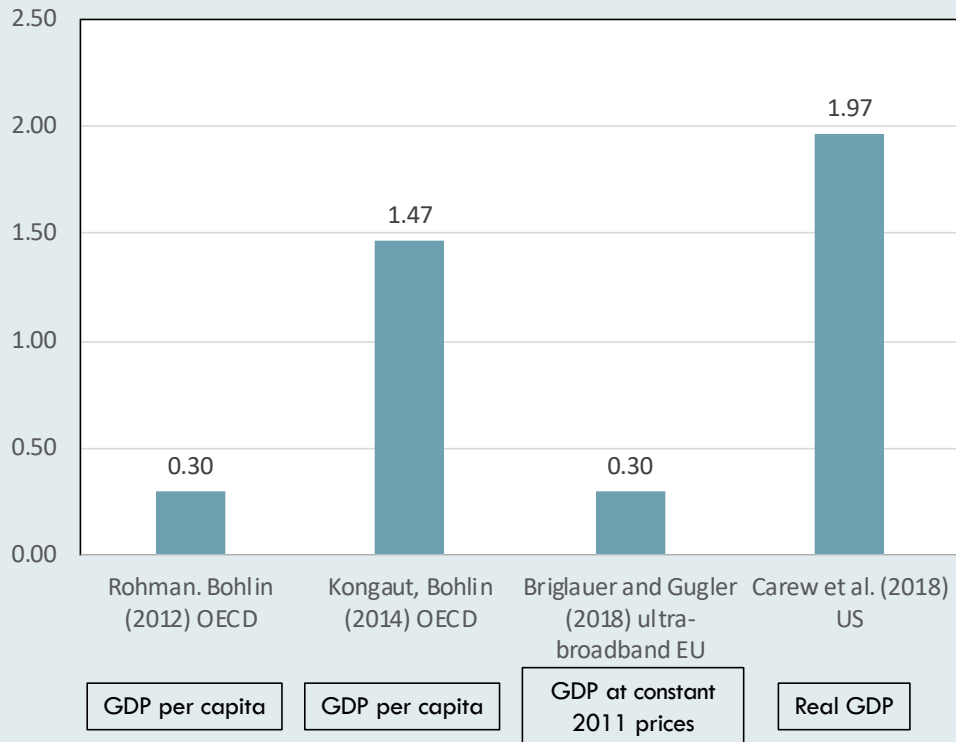
Source: Telecom Advisory Services analysis



**SOURCE OF VALUE 2. BY ADDRESSING THE WI-FI CONGESTION, TWO ECONOMIC EFFECTS EMERGE: A CONTRIBUTION TO THE GDP AND AN INCREASE IN CONSUMER SURPLUS**

**RETURN TO SPEED**

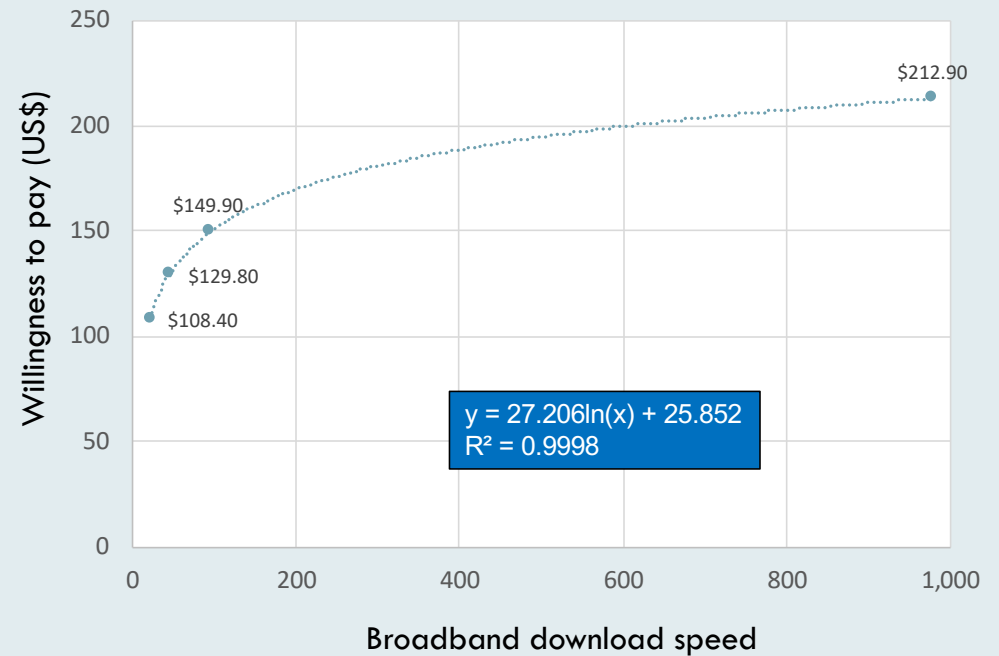
Studies measuring the GDP impact on Broadband Speed (impact of 100% increase in speed on GDP) (%)



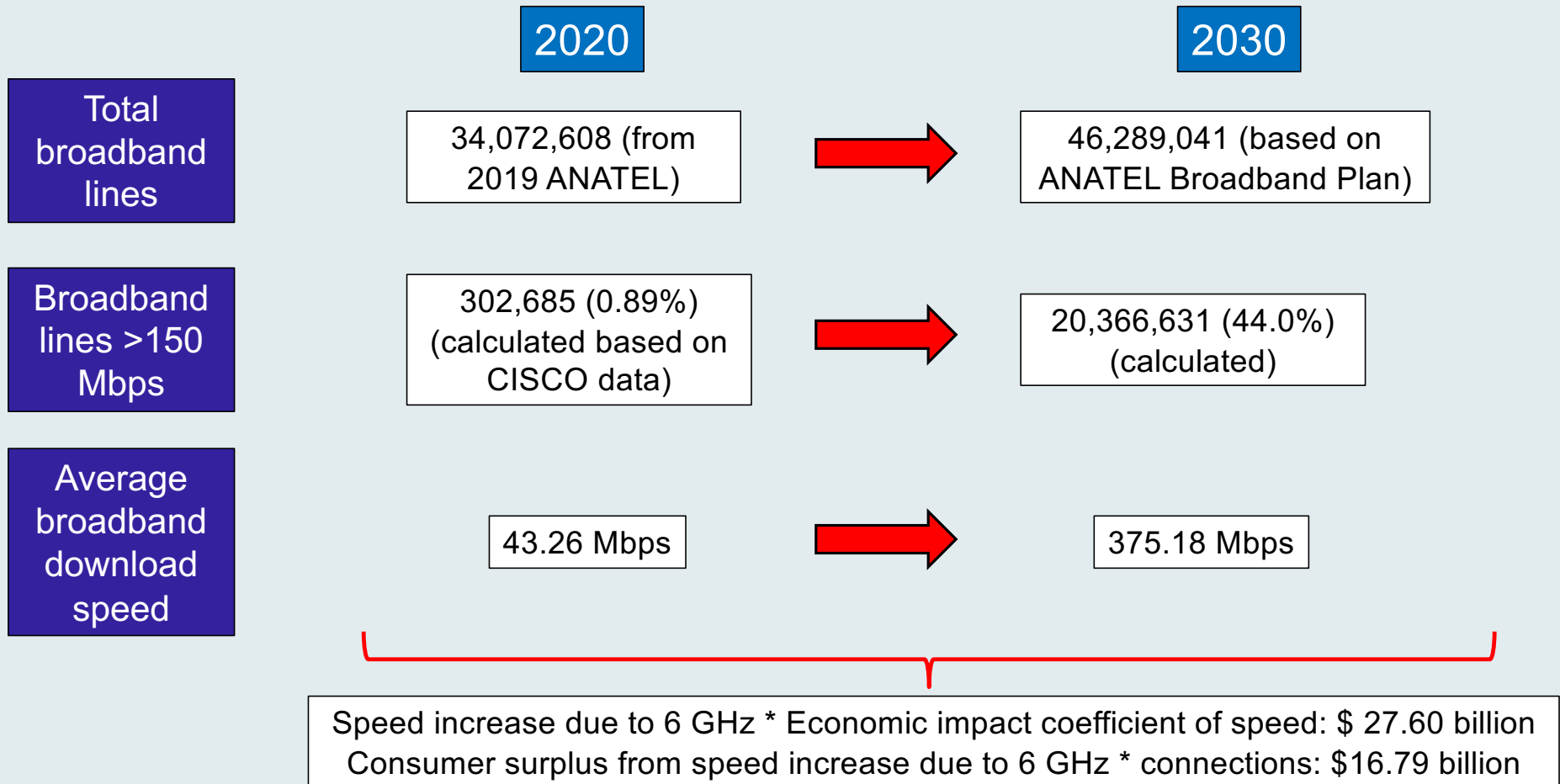
Source: compiled by Telecom Advisory Services

**CONSUMER SURPLUS**

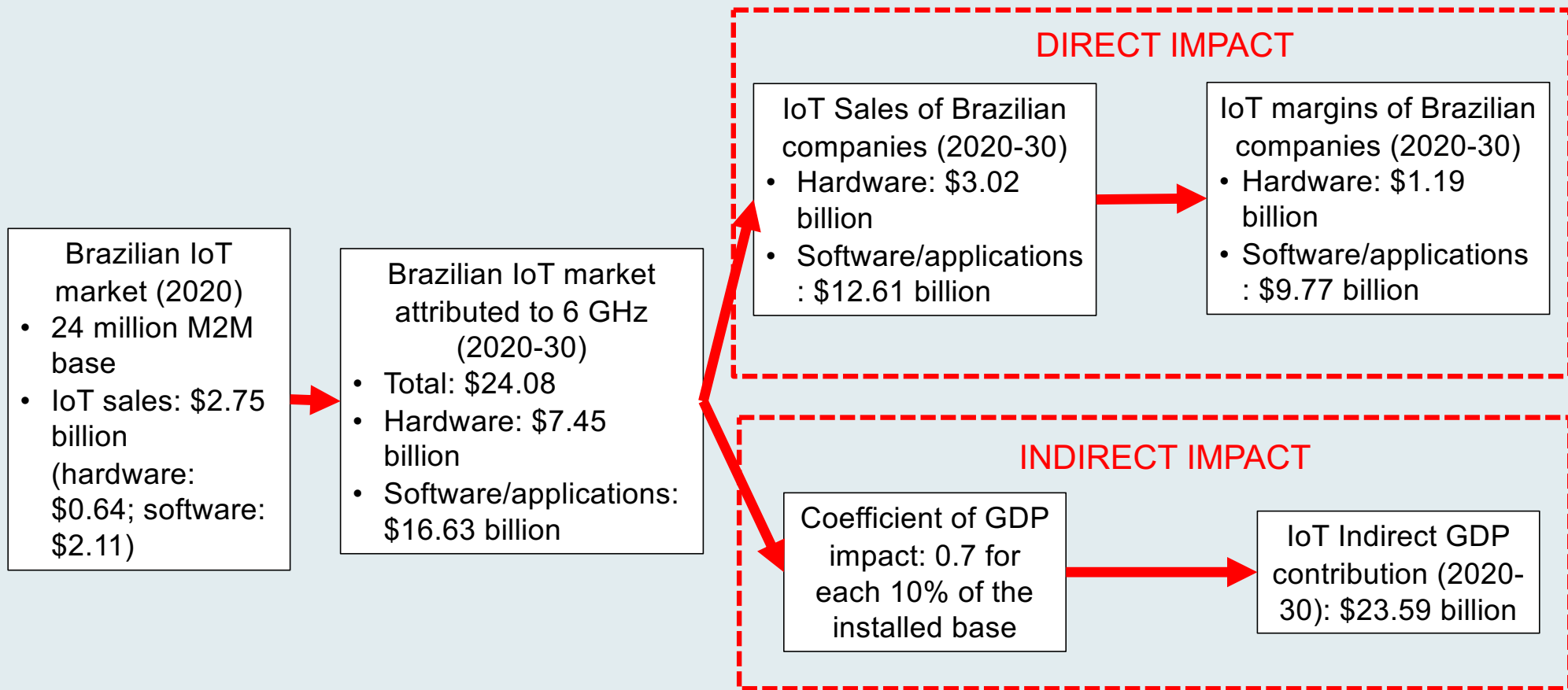
Log Curve of relationship between broadband speed and willingness to pay



**SOURCE OF VALUE 2. MITIGATING WI-FI CONGESTION WILL CONTRIBUTE \$27.60 BILLION TO THE BRAZILIAN GDP AND INCREASE BY \$16.79 BILLION TO THE SURPLUS OF BRAZILIAN CONSUMERS**

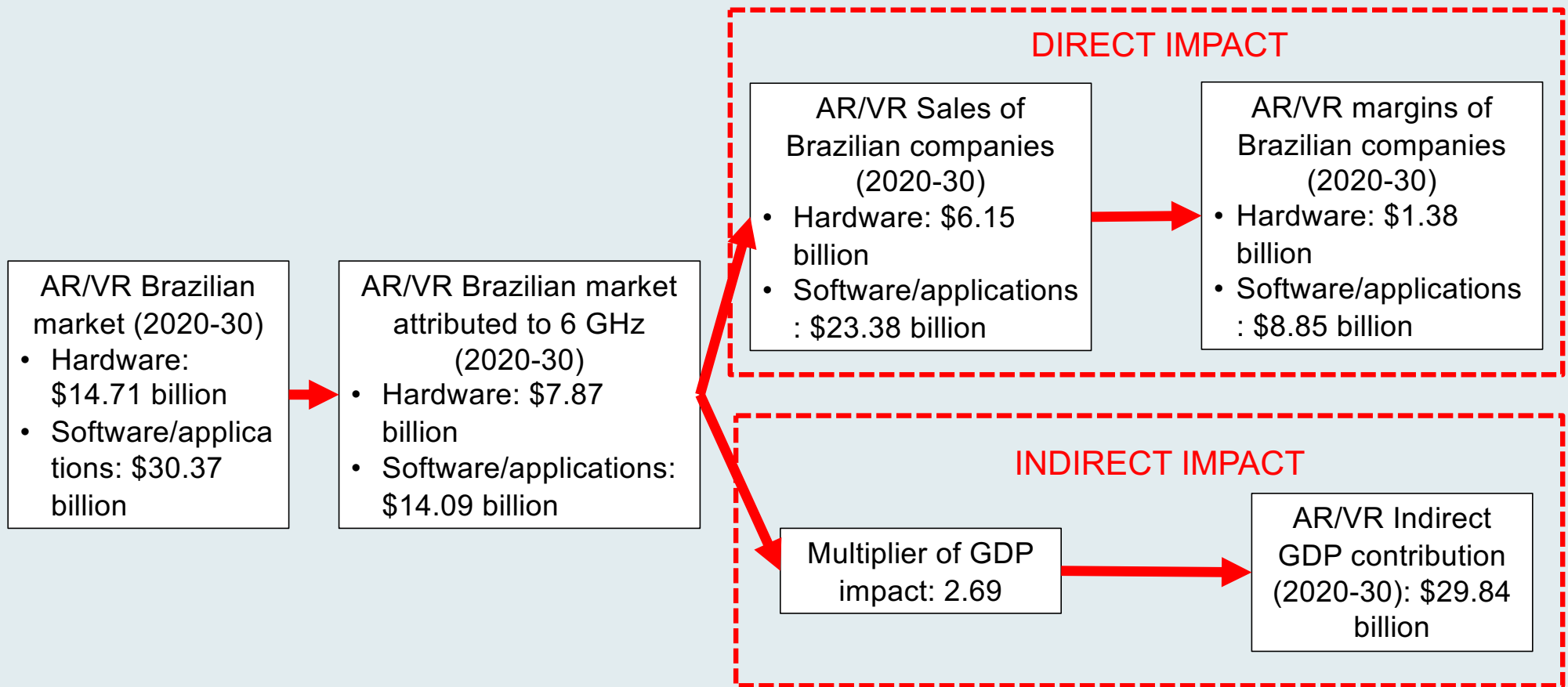


**SOURCE OF VALUE 3. THE BRAZILIAN IoT MARKET WILL GENERATE \$10.96 BILLION IN PRODUCER SURPLUS FROM BRAZILIAN FIRMS AND \$23.59 BILLION IN SPILLOVER EFFECTS**



Source: Telecom Advisory Services analysis

**SOURCE OF VALUE 5. THE BRAZILIAN AR/VR MARKET WILL GENERATE \$10.23 BILLION IN PRODUCER SURPLUS FROM BRAZILIAN FIRMS AND \$29.84 BILLION IN SPILLOVER EFFECTS**



Source: Telecom Advisory Services analysis

**SOURCES 6 AND 7. THE MUNICIPAL AND FREE WI-FI SITES WILL BENEFIT FROM 6 GHz THROUGH AN ENHANCEMENT OF THEIR CAPACITY TO HANDLE ADDITIONAL USERS AND PROVIDING HIGHER THROUGHPUT SERVICE**

	Municipal Wi-Fi	Free Wi-Fi hot spots
Current Situation	2,134 municipalities (38.3%) offer Wi-Fi service on 2.4 GHz and 5.8 GHz bands (IBGE)	2,325,921 free Wi-Fi sites in Brazil, of which 534,000 in Sao Paulo and 263,000 in Rio de Janeiro
Broadband unserved	<ul style="list-style-type: none"> <li>4,017,410 urban households do not acquire broadband for economic reasons while 392,645 because of lack of coverage</li> </ul>	<ul style="list-style-type: none"> <li>Households residing in municipalities with no W-Fi and that will not be reached by WISPs: 2,719,819 (91% due to lack of affordability and the remainder coverage)</li> </ul>
Economic impact	<ul style="list-style-type: none"> <li>10% of unserved households will benefit from municipal Wi-Fi</li> <li>Total 2020-2030 GDP impact: \$4.77 billion</li> <li>Total 2020-2030 consumer surplus impact: \$408 million</li> </ul>	<ul style="list-style-type: none"> <li>5% of households rely on free Wi-Fi hot spots</li> <li>Total 2020-2030 GDP impact: \$278 million</li> <li>Total 2020-2030 consumer surplus impact: \$2.777 million</li> </ul>

**THE ECONOMIC VALUE AMOUNTS TO US\$ 112.14 BILLION IN GDP CONTRIBUTION, US\$ 30.03 BILLION IN PRODUCER SURPLUS TO BRAZILIAN ENTERPRISES, AND US\$ 21.19 BILLION IN SURPLUS TO THE BRAZILIAN CONSUMERS**

**ECONOMIC VALUE OF ALLOCATING 1200 MHZ IN 6 GHZ BAND  
(2020-2030) (in US\$ billions)**

Source of Value	GDP contribution	Producer surplus	Consumer surplus
1. Enhance coverage and improve affordability	\$24.91		\$1.21
2. Increased speed by reducing Wi-Fi congestion	\$27.60		\$16.79
3. Wide deployment of Internet of Things	\$23.59	\$10.96	
4. Reduction of enterprise wireless costs		\$8.41	
5. Deployment of AR/VR solutions	\$29.84	\$10.22	
6. Enhanced deployment of municipal Wi-Fi	\$4.77		\$0.41
7. Deployment of Free Wi-Fi Hot Spots	\$1.42		\$2.78
8. Aligning spectrum decision with other advanced economies	Potential opportunity of creating a Wi-Fi equipment manufacturing sector	\$0.44	
9. Enhancing the capability for cellular off-loading		\$8.64 (excluded from total to avoid double counting)	
<b>TOTAL</b>	<b>\$112.14</b>	<b>\$30.03</b>	<b>\$21.19</b>

Source: Telecom Advisory Services analysis

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