The contribution of fixed broadband to the economic growth of the United States between 2010 and 2020

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- Telecom Advisory Services -

# Why study the economic contribution of fixed broadband between 2010 and 2020?

- Isolate the effect after the 2008 recession and before COVID-19

- In 2010 fixed broadband came into maturity

  - Average speed started growing at 33.03% CAGR (13.71% percentage points faster than before)

  - Household penetration of the 2015 FCC broadband standard was absolutely marginal before 2010, and started increasing at a CAGR of 61.7%

	2005	**2010**	**2020**
Average speed (Mbps)	4.15	10.03	174.23
Households over 25/3 Mbps	0.06% (2006)	0.87%	65.69% (mid-2019)

Sources: FCC; Ookla Speedtest; Telecom Advisory Services analysis

Broadband penetration and state economic performance are directly linked

GDP per capita and Fixed Broadband Penetration by State (2020)
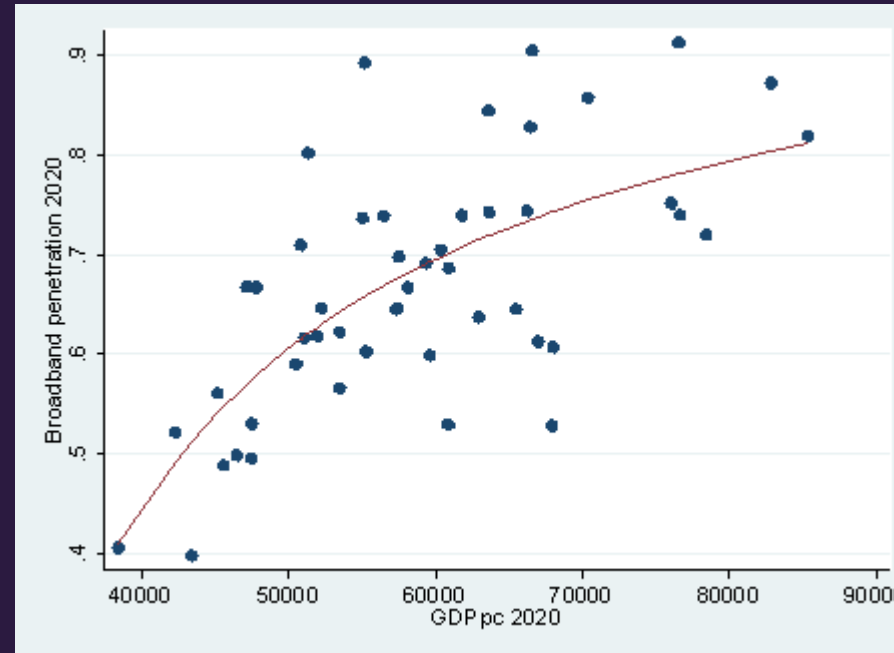
Sources: FCC; Bureau of Economic Analysis; Telecom Advisory Services analysis

However, is this a correlation or are both variables linked causally?

We developed four models to prove the causal chain linking broadband and economic growth

Economic growth is driven by capital accumulation, labor and increase in productivity driven by technological progress

Long-run economic growth model

The impact of broadband on the economy should consider the potential spillovers of neighboring states

Spatial error model

Does broadband contribute to economic growth **or** is higher economic development driving broadband penetration?

Instrumental Variable model

Can we assess the robustness of models to validate broadband's contribution to economic growth?

Structural four-equation model

All four models confirm the economic contribution of broadband, highlighting also a "return to speed"

Long-run economic growth model

Between 2010 and 2020, a 10% growth in broadband penetration drives 0.04% increase in GDP, but in states with higher speed the economic impact is 0.11%

Spatial error model

The economic contribution of broadband is not affected by potential border externalities

Instrumental Variable model

The economic contribution of broadband is higher when controlling for endogenous effects

Structural four-equation model

The economic contribution of broadband between 2016 and 2020, with substantially higher broadband speed is higher: 10% growth in broadband drives 1.15% increase in GDP

We averaged the impact coefficients of the three models to estimate the contribution to economic growth

Variable coefficients	Long-run economic growth model	Spatial error model	Instrumental variable model	Average
Capital stock	0.481	0.479	0.387	0.449
Labor	0.644	0.694	0.609	0.649
Human Capital	0.003	0.004	0.000	0.002
Broadband penetration	0.006	0.005	0.016	0.009
Broadband penetration * $Speed_{400\_850}$	0.002	0.001	0.009	0.004
Broadband penetration $*$ $Speed_{400\_850}$	0.005	0.002	0.017	0.008
Advantages	Better fit (R-sq=0.972)	Accounts for spatial correlation	Accounts for endogeneity	
Disadvantages	Does not account for endogeneity or spatial correlation	Does not account for endogeneity	Does not account for spatial correlation	

Sources: Telecom Advisory Services analysis

The average impact coefficients allow estimating the relative contribution to economic growth since 2010 (2010 GDP: $ 15.05 trillion)
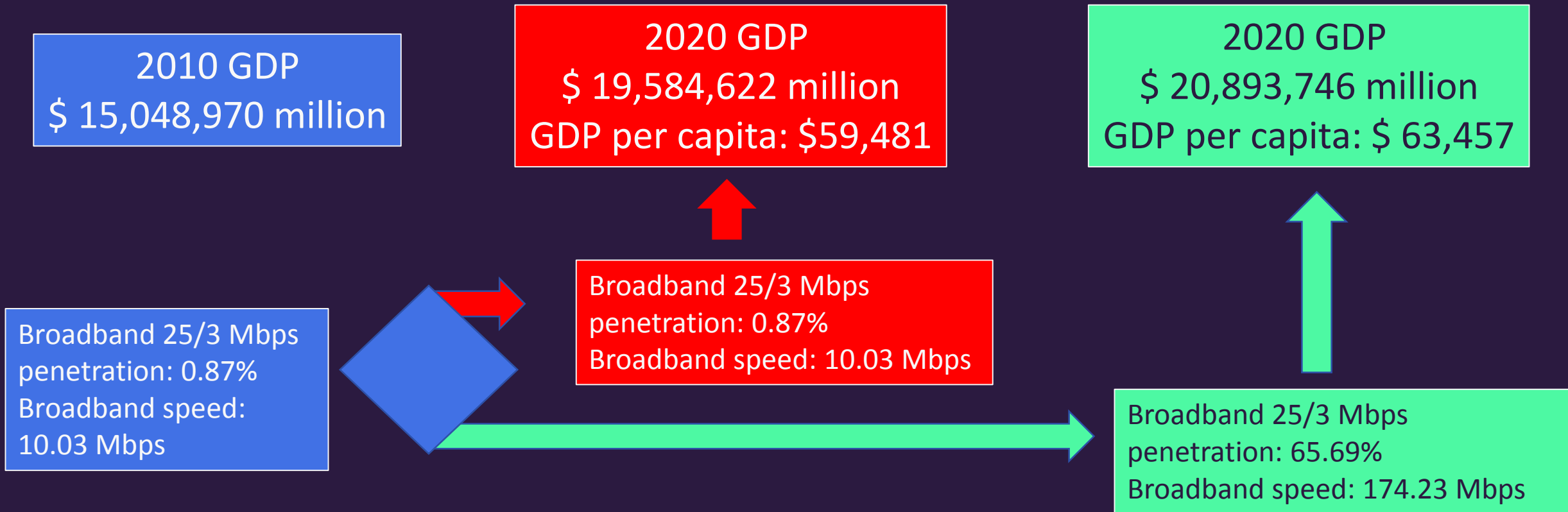
Sources of GDP Growth 2010-2020
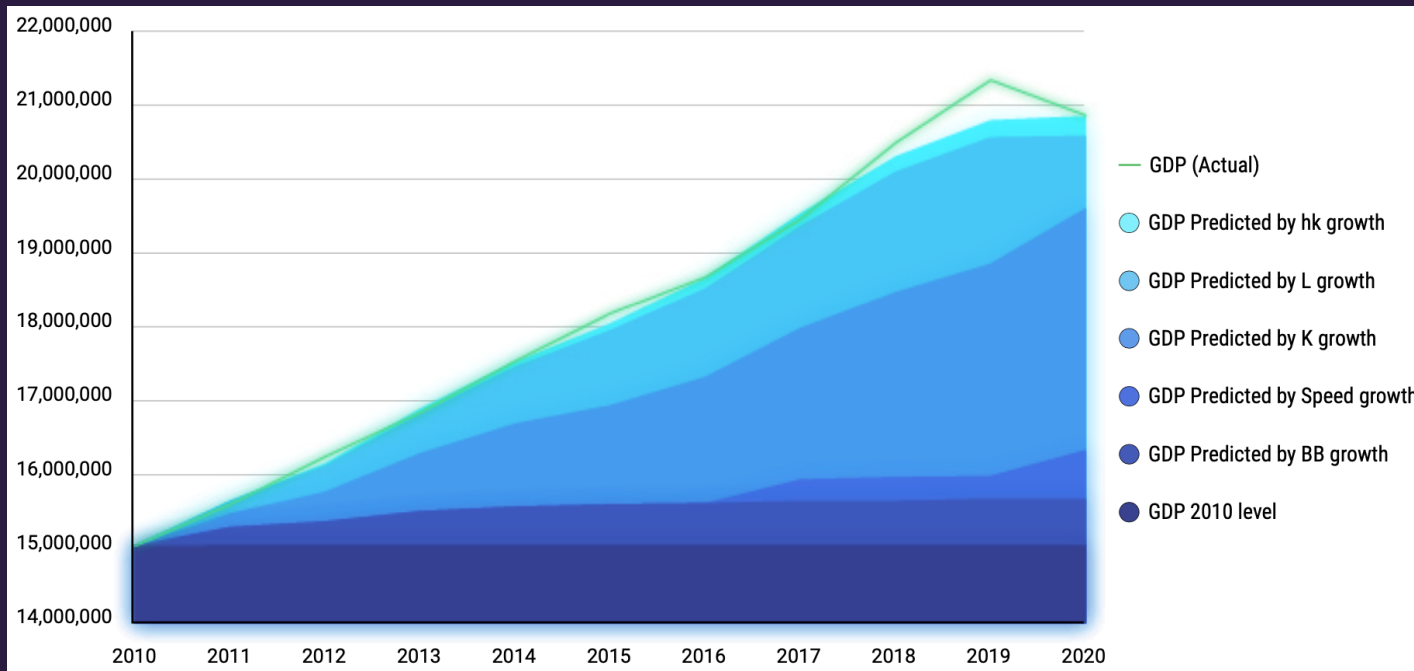
- Capital accumulation explains 56.2% of GDP growth
- Labor accounts for 16.8 % of GDP growth
- Fixed broadband penetration drove 10.9% while speed increase resulted in an additional 11.5%

Sources: Telecom Advisory Services analysis

If broadband adoption and speed had stayed unchanged since 2010, the 2020 GDP would be 6.27% lower

2010 GDP
$ 15,048,970 million

2020 GDP
$ 19,584,622 million
GDP per capita: $59,481

2020 GDP
$ 20,893,746 million
GDP per capita: $ 63,457

Broadband 25/3 Mbps
penetration: 0.87%
Broadband speed:
10.03 Mbps

Broadband 25/3 Mbps
penetration: 0.87%
Broadband speed: 10.03 Mbps

Broadband 25/3 Mbps
penetration: 65.69%
Broadband speed: 174.23 Mbps

Sources: Telecom Advisory Services analysis

In conclusion….

- In 2010 fixed broadband came into maturity
  - Average speed started growing at 33.03% CAGR (13.71% percentage points faster than before)
  - Household penetration of the 2015 FCC broadband standard was absolutely marginal before 2010, and started increasing at a CAGR of 61.7%

- This study confirmed the economic contribution of broadband, highlighting also a "return to speed"
  - 10% growth in broadband penetration drives 0.04% increase in GDP, but in states with higher speed the economic impact is 0.11%

- Fixed broadband penetration contributed to 10.9% of GDP growth since 2010 while speed increase resulted in an additional 11.5%
- If broadband adoption and speed had stayed unchanged since 2010, the 2020 GDP would be 6.27% lower