

Consumer Savings Appendix

CONSUMER COST SAVINGS FROM 5G FIXED WIRELESS ACCESS ENTRY

Methodology and results for the three components and four variations of the estimate

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This document is the Consumer Savings Appendix for the report *The Impact of 5G Fixed Wireless Access Entry on Competition in the U.S. Residential Broadband Market*.

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CONSUMER SAVINGS FROM 5G FIXED WIRELESS ACCESS ENTRY

Methodology and results for the three components and four variations of the estimate

1 Overview and summary of results

This document estimates what American consumers saved on residential broadband service between 2023 and 2025 as a consequence of 5G fixed wireless access (FWA) entry. The estimate has three components, each covering a different set of households. They are constructed separately, reported separately, and then summed.

1.1 Three populations

Part I covers cable subscribers in the tracts and periods that identify the price effect. The Callaway–Sant’Anna estimator recovers an average treatment effect on the treated from a specific set of group-time cells, and Part I applies that effect only where it was estimated: the two cohorts of census tracts that first gained FWA coverage by AT&T, T-Mobile, and Verizon overlapping their cable footprint during 2023, followed for twelve months each. This is the narrowest and best-supported component. In particular, it is the only component supported directly by formal econometric estimates.

Part II covers cable subscribers in every other entered tract-period. Most census tracts in the FWA footprint were already covered when the panel opens, so no entry date is observed for them, and the two 2023 cohorts continue to be exposed to FWA competition after the twelve months included in Part I. Extending the estimated effect to these cells requires an assumption about where and when the effect applies, and the four comparators in section 2.3 formalize four such assumptions, in decreasing order of conservatism.

Part III covers FWA subscribers themselves. These households left cable, or never took it, and their saving is the difference between the price they would have paid for a cable plan of comparable delivered speed absent FWA entry and the price they actually paid for FWA.

The three populations are disjoint. A household is a cable subscriber in a Part I cell, or a cable subscriber elsewhere in the entered footprint, or an FWA subscriber. No household is counted in more than one part. Subscribers to DSL, fiber, and satellite fixed internet service and mobile phone and data subscribers are not included in the computations.

1.2 Results

Aggregate savings in millions of dollars over the six half-years, 2023 through 2025, appear in Table 1. Each column is a complete scenario: the same but-for-FWA-entry cable price governs all three parts within a column. Savings accrue as a flow over three years, so the nominal total adds dollars of differing purchasing power. Across the four scenarios, **total savings range from \$6.4 billion to \$28.5 billion in current dollars, or \$6.7 billion to \$30.0 billion in first-half-2026 dollars.**

TABLE 1. AGGREGATE CONSUMER SAVINGS FROM 5G FIXED WIRELESS ACCESS ENTRY, 2023–2025

\$millions	Comparator 1	Comparator 2	Comparator 3	Comparator 4
Part I: cable households, identifying cells	\$776	\$776	\$776	\$776
Part II: cable households, all other entered cells	\$1,017	\$7,666	\$14,756	\$19,994
Part III: FWA subscribers	\$4,608	\$5,674	\$6,811	\$7,779
Total, nominal	\$6,401	\$14,116	\$22,343	\$28,549
Total, 2026H1 dollars	\$6,726	\$14,860	\$23,534	\$29,984

Notes: Parts I and II cover cable subscribers; Part III covers FWA subscribers. The component rows are nominal millions of dollars; the final row converts each period's current amount to first-half-2026 dollars with the CPI-U before summing.

Converting each period's current amount to first-half-2026 dollars¹ raises the total from about \$6.4 billion to \$6.7 billion under Comparator 1 and from about \$28.5 billion to \$30.0 billion under Comparator 4. In the remainder of this document, if the base is not specified, monetary amounts are in current dollars.

The composition of the total is shown in Table 2. As stated above, Part I is the only component drawn entirely from cells the estimator identifies. It accounts for 12.1% of the total under Comparator 1 and 2.7% under Comparator 4. Conversely, between 15.9% and 70.0% of the total comes from extending the estimated effect to tract-periods where entry timing is unobserved. The two types of estimates should be interpreted differently: the \$776 million in Part I follows from a formal econometric model, whereas the estimates in Parts II and III are projections based on reasonable assumptions (made explicit herein) but that cannot be tested. The variance among the comparators is wide, and most of it comes from Part II, the large number of cable subscribers not covered directly by the econometric results.

TABLE 2. COMPOSITION OF THE TOTAL BY COMPONENT

Share of column total	Comparator 1	Comparator 2	Comparator 3	Comparator 4
Part I	12.1%	5.5%	3.5%	2.7%
Part II	15.9%	54.3%	66.0%	70.0%
Part III	72.0%	40.2%	30.5%	27.2%

Notes: The percentages are based on the nominal results in Table 1.

¹ Conversion is done with the CPI-U. US Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers: All Items, series CPIAUCSL, seasonally adjusted, retrieved from FRED; Half-year averages.

1.3 How to read the total

Three properties of the total should be kept in mind when using it.

- Three of the four comparators rest on a single coefficient, the statistically significant pooled average treatment effect across event times 1 and 2 ($\beta = -0.129$; s.e. 0.059; $p < 0.05$; 95% CI $[-0.247, -0.010]$). Section 2.1.1 reports the test supporting that restriction.
 - Comparator 4 is the exception. Since there is evidence in the Callaway-Sant’Anna estimation results that the effect size grows over time, from event time 3 onward Comparator 4 substitutes the $k = 2$ coefficient of -0.190 . While this estimate is not individually significant at the 5% level, it is at the 10% level. Using this larger effect size for subsequent periods stands in for the clear pattern of increasing effect size discussed in the econometric appendix to the main report, without adopting the much larger estimated effect size for the third period after entry that the appendix discards as resting on too tenuous a base in the data.
 - Comparators 1 through 3 therefore assume the effect neither grows nor decays beyond the twelve months over which it was estimated, and Comparator 4 assumes it grows in one step at the third period after entry.
- No confidence interval is attached to the total. The estimated price effect has a sampling variance, and the household conversion rates, the imputed entry dates, and the speed match each add uncertainty that is not quantified here.
- The comparators provide a menu of estimates, and rest on assumptions about where the estimated effect applies. While they are ordered from the most conservative to the most expansive, nothing in the data can be used to select among them.

Section 7 returns to these points once the three parts have been constructed.

2 The estimated price effect and the but-for cable price

All three parts rest on the same object: a but-for cable price, meaning the price that would have prevailed absent FWA entry. The observed cable price is not the but-for price, because FWA entry lowered it. This section constructs the but-for price and is common to Parts I, II and III.

2.1 Coefficients

The price effect is estimated by the Callaway–Sant’Anna staggered difference-in-differences estimator on log average monthly price, in the standalone-broadband sample with control set 2. See the Econometric Appendix to the main report. Table 3 reports the event-study coefficients used here.

The pooled coefficient of -0.1287 is applied in all three parts under Comparators 1 through 3, from event time 1 onward. Comparator 4 departs from it beyond event time 2, as section 2.3 describes. The entry period itself, $k = 0$, is omitted from estimation and assigned no effect, due to uncertain precedence of entry versus surveyed prices in that period (as discussed in the Econometric Appendix).

TABLE 3. CALLAWAY–SANT’ANNA EVENT-STUDY COEFFICIENTS FOR THE CABLE-PRICE EFFECT (MAIN ESTIMATES)

Event time	Estimate	Std. error	95% confidence interval
$k = 1$	−0.081	0.048	[−0.175, 0.013]
$k = 2$	−0.190	0.106	[−0.405, 0.026]
Pooled, $k = 1$ and 2	−0.129	0.059	[−0.247, −0.010]

Notes: Estimates are from Callaway–Sant’Anna regression of log average monthly price on FWA entry, for the standalone-broadband sample with control set 2 (See the Econometric Appendix to the main report). Event time k counts half-years since the tract first shows FWA coverage by one of the three national firms overlapping the cable footprint in the tract; $k = 0$ is the period in which entry is observed.

2.1.1 On the choice of a single pooled effect rather than an event-time profile

Although the estimator returns figures for the price effects in the first two entry periods individually, their average is used instead, for two reasons. First, they are individually insignificant at the 5% level (although they are significant at the 10% level) while their combined, average effect is significant at the 5% level. Averaging imprecise estimates typically results in more precise estimates of the aggregate effect. Second, there is no evidence that the three coefficients underlying the average effect for the first and second entry periods are not all equal ($p = 0.634$).² The data thus give no basis for distinguishing the group-time effects from one another, and imposing equality is the more parsimonious specification. A few practical consequences follow.

- Under Comparators 1 through 3 every dollar rests on the pooled coefficient, whose confidence interval excludes zero.
- The treatment of left-censored entry is clear. Tracts entering before the 2023 cohorts require no decision about which point on the profile applies to them under Comparators 1 through 3. With a flat effect the schedule is simply zero before entry and the pooled value after.

The restriction carries one substantive assumption: with Comparators 1 through 3, the effect neither grows nor decays beyond the twelve months over which it was estimated. The point estimates hint at growth, and the always-entered tracts that dominate Part II are by construction the longest exposed, so if the effect does build with exposure the figures understate it. The test above implies only that the data cannot distinguish that case from a constant effect. To see the impact of assuming (modest) growth in the entry effect, see the results for Comparator 4.

² While it might seem like there should be two coefficients, one for each period after entry, the estimator yields *cohort-specific* effects for each period after entry. The three coefficients are: the entry effect in 2023H2 for the cohort entering in 2023H1, the effect in 2024H1 for the same cohort, and the effect in 2024H1 for the cohort entering in 2023H2. The first and third of these both feed into the average effect for $k = 2$.

TABLE 4. CENSUS TRACTS BY FWA ENTRY CLASS

Tract class	Tracts	Cable households, 2025H2 (millions)	Entry date
Always entered	55,757	28.6	Not observed; precedes the panel (left-censored entry)
Entered during the panel, 2023 cohorts	12,537	5.3	Observed; identifies the estimate
Entered during the panel, other cohorts	12,326	5.1	Observed; outside the estimation window
Never entered	2,757	0.07	No overlap; carries no markup

Notes: Census tracts by FWA entry class (entry by AT&T, T-Mobile, and Verizon only at 5G speed). Household counts are estimated cable households as of 2025H2 (see section 3.1 below), in millions, and exclude the Part I cells. Always-entered tracts account for 81.2 percent of FWA consumer subscriber-months.

2.1.2 The relationship of the effect coefficient and cable prices

The prices observed in the data are prices after entry. The but-for price, P^{bf} , is therefore obtained by scaling the observed price (P) up:

$$P^{bf} = P \cdot e^{-\beta}$$

where β is the (negative) log-point effect coefficient. The saving per household-month is the difference,

$$P^{bf} - P = P \cdot (e^{-\beta} - 1)$$

Thus, with $\beta = -0.1287$ the multiplier is $\exp(0.1287) = 1.13735$ and the saving is 13.735 percent of the observed price. Expressed as a share of the but-for price, the same gap is 12.08 percent.

2.2 Where the markup is applied

The estimator is identified from tracts whose FWA and cable-footprint overlap began during the panel, which is a minority of tracts. Table 4 gives the classification. Note that the count of tracts in the table refers to the set of tracts in the FCC BDC data for the mainland U.S., not the smaller set of tracts matched to the price data from Recon Analytics used in the regressions.

The always-entered class dominates, holding roughly three-quarters of the cable households in the FWA footprint and 81.2 percent of FWA consumer subscriber-months. Any figure that extends the estimated effect to these tracts (i.e., Part II estimates) rests on an assumption about how the Part I impacts affect these tracts. The size of that assumption is the main reason the comparators differ so widely.

One further concern motivates the Comparator 2. For markets entering late, much of the national cable price decline had already occurred by the time entry was recorded, so attributing a full event-time effect to them risks double-counting a decline that the always-entered markets had already produced. Halving the effect outside the estimation sample is an arbitrary but transparent response to that concern.

2.3 Four but-for comparators

Comparator 1: the estimate applied only where identified. Tracts entering in 2023 receive the pooled markup from the first period after entry onward, with the period of entry itself assigned no effect.³ Every other tract receives no markup. This is the most conservative of the four, and the only one that confines the markup to the tracts from which the estimate is identified.

However, the periods for those 2023 cohorts are not restricted (as they are in the econometric estimation). Those cohorts reach event time 3, the third period after entry, in 2024H2 and run to event time 5 by the end of 2025, and the markup is carried forward at the pooled value throughout. Even the most conservative comparator therefore extrapolates in event time. Every dollar of Part II under Comparator 1 (\$1,017 million, all of it arising in 2024H2 and later) comes from that extrapolation. Part I is the only figure in this document that stays inside the identifying tract-period cells in both dimensions (area and time).

Comparator 2: always-entered tracts imputed a 2023H1 entry; effect is half strength outside the estimation sample. The 2023 cohorts take the full markup as estimated. However,

- Every other entered tract experiences only half the entry effect on cable prices: $\beta = -0.0644$ instead of -0.1287 . The halving is an arbitrary assumption. It discounts the effect wherever the effect is applied outside the cohorts from which it was estimated.
- This set covers two groups: the always-entered tracts and the cohorts entering within the examination period but outside 2023. The latter keep their own observed event time. Always-entered tracts, having no observed entry, are assigned an imputed entry at 2023H1 and carry half the pooled markup from that point on.
- That period is chosen because that is when cable pricing visibly turns. The speed-matched cable price index computed from the FCC Urban Rate Survey, described in section 6.6, is flat through 2022 and then falls 18.0 percent in the first half of 2023, the largest single move in the series and the first break in the sample.
- That year also coincides with the case-study evidence from the main report showing cable operators beginning to respond competitively to fixed wireless entry then.

Comparator 3: always-entered tracts imputed a 2023H1 entry; effect is full strength. Exactly as for Comparator 2, except that after entry, cohorts other than those from 2023 carry the full pooled

³ See the Econometric Appendix for explanation of this timing convention. Event time 0, the half-year of actual entry, has indeterminate temporal precedence of prices and entry in the data and therefore its estimated price effect, which is small (see Figure A-3 in the Econometric Appendix), is ignored.

markup. As with the previous, always-entered tracts are assigned an imputed entry at 2023H1 and other entry cohorts keep their own observed event time.

Comparator 4: as Comparator 3, with an effect that grows (once). Entry dates are assigned as in Comparator 3, but the $k = 2$ coefficient of -0.190 replaces the pooled value from $k = 3$ onward. If the price effect builds with exposure, as the point estimates at least weakly suggest, Comparator 4 rather than Comparator 3 is the relevant scenario. It is the most expansive of the four.

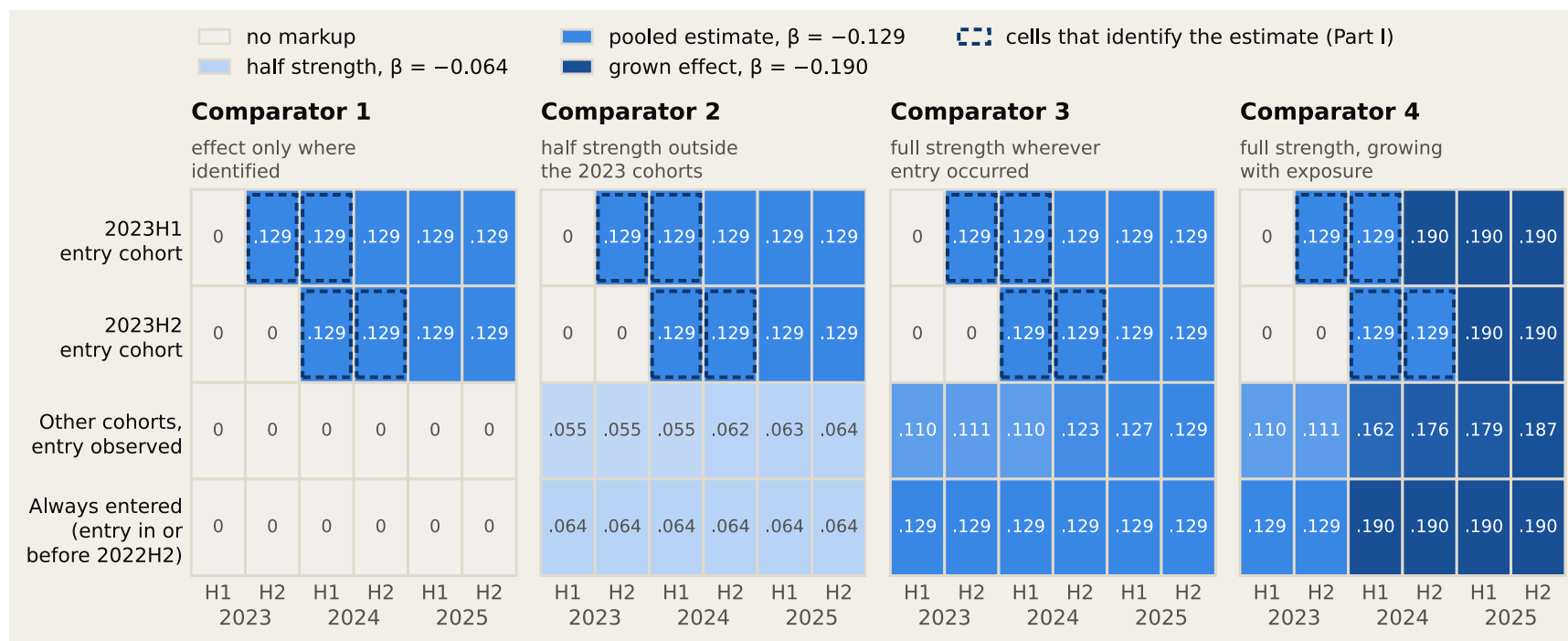
One minor data note concerns Connecticut, which replaced counties with planning regions during the study period, creating mismatch between tract identifiers over time among the many data sources used for the estimation. Accordingly, observations from the state were effectively dropped when any covariates were included in the regression (as in the main estimates). Since Comparator 1 applies the estimate only to the cohorts that identify it, the eighty Connecticut tracts that would otherwise fall in the 2023 cohorts are excluded from Part I as well. They hold roughly 36,000 cable households, so the choice is worth about \$5 million against a Part I total of \$776 million. To be conservative, therefore, areas in Connecticut are included only in Part II, even when entry occurs during 2023. Given the size and population of the state, however, this is only of minor concern for the aggregated total savings.

TABLE 5. SPECIFICATION OF THE FOUR BUT-FOR COMPARATORS

Comparator	Always-entered tracts	Entry cohorts other than 2023	Effect specification
Comparator 1	No markup (untreated)	No markup (untreated)	Single average post-entry effect ($\beta = -0.1287$), 2023 cohorts only
Comparator 2	Imputed 2023H1 entry	Own observed entry date	Half the average post-entry effect ($\beta = -0.0644$) outside the 2023 cohort
Comparator 3	Imputed 2023H1 entry	Own observed entry date	Full average post-entry effect ($\beta = -0.1287$) throughout
Comparator 4	Imputed 2023H1 entry	Own observed entry date	As Comparator 3, but the period-2 effect ($\beta = -0.190$) replaces the average from period 3 onward

Notes: Not shown in a column is the treatment of 2023 entry cohorts; these always receive a single average post-entry effect ($\beta = -0.1287$, the average effect for the first and second six-month periods after entry). For information on the estimation of the post-entry price effects on cable subscribers, see the Econometric Appendix.

FIGURE 1. DEPICTION OF WHERE AND WHEN THE PRICE EFFECT IS APPLIED ACROSS THE COMPARATORS



Notes: Cells give the markup that the comparator applies to the observed cable price, in log points, by tract group and half-year. The markup is applied to a price observed after entry, so the but-for price is $P \cdot \exp(-\beta)$ and $\beta = -0.129$ appears here as .129. For the relationship between β and the markup, see section 0. Cells outlined with a dashed border are the group-time cells that identify the econometric estimate, the two 2023 entry cohorts at event times 1 and 2, which are the cells Part I covers; every other non-zero cell extends that estimate by assumption. No markup is applied in the half-year in which entry is observed, so a cohort's schedule begins in the following half-year (see footnote 3). Markets with no observed entry date (i.e., those with entry during or before 2022H2) are assigned entry at 2022H2, which places their first exposed period at 2023H1 and their third at 2024H1, where Comparator 4 steps up to the $k = 2$ coefficient. Values in the "other cohorts" row are household-weighted averages across tracts whose entry dates differ, and so fall between the values the schedules assign. For example, the cell value of .055 for other entered cohorts in 2023H1 is a weighted average of the half-strength markup, 0.064, where entry is known to have occurred in the previous period and zero in other areas where future entry will be observed. Never-entered tracts carry no markup under any comparator and are omitted. Section 2.3 defines the four comparators, and Table 6 summarizes them.

3 The cable-household base and the cable price series

Parts I and II share a conversion from locations to households and a price series. Part III uses a different price construction, described in section 6.6, because it prices cable at the delivered speed of an FWA plan rather than at the average of what cable subscribers actually buy.

3.1 From locations to households

The FWA entry panel counts cable-serviceable locations per tract. A location is a serviceable address in the FCC’s Broadband Serviceable Location Fabric, not a subscriber, so two rates convert one to the other:

$$H_{jt} = L_{jt} \times S_{FTBB} \times S_{Cable}$$

where H is the estimated number of households in tract j during period t , and L is the number of cable-serviceable locations. The first rate, S_{FTBB} , is the share of households subscribing to some fixed terrestrial broadband service, from the American Community Survey one-year estimates, Table S2801. The second, S_{Cable} , is the cable share of fixed terrestrial broadband subscriptions, computed from reported subscriber counts across copper, cable, fiber and fixed wireless. These rates are listed in Table 6. Their product converts cable-serviceable locations to cable households, with a conversion factor given in the final column of the table.

3.2 The cable price series

Prices for cable internet service for Parts I and II are respondent-weighted mean monthly prices from the Recon Analytics broadband panel, restricted to entered tracts, for standalone plans at standard non-promotional rates. Given the lack of respondent-specific plan-speed data, these prices are not adjusted for quality, and thus reflect the average mix of plan speeds in the data. Part I uses the cohort-specific price in the base period following entry. Part II uses the average across all entered tracts in each half-year, which is the simplification that makes a tract-by-tract price unnecessary once the markup is applied at the tract level.

TABLE 6. BROADBAND AND CABLE SUBSCRIPTION RATES AND CABLE HOUSEHOLDS PER LOCATION

Half-year	Broadband subscription rate S_{FTBB}	Cable take rate S_{Cable}	Implied Cable Households per location
2023H1	76.3%	62.8%	0.479
2023H2	76.3%	61.7%	0.471
2024H1	76.5%	60.2%	0.461
2024H2	76.5%	58.3%	0.446
2025H1	76.5%	56.9%	0.435
2025H2	76.5%	55.9%	0.428

Notes: Broadband subscription rates are from US Census Bureau, American Community Survey, 1-Year Estimates, Subject Table S2801, household broadband subscription by type, where the type is “Broadband such as cable, fiber optic or DSL.” The cable take rate is observed each June and December in the FCC’s High-Speed Internet Access reports (Figure 18, Residential Connections over 200 kbps in at Least One Direction by Technology 2021-2025, with computation of the rates by the author); June maps to the first half-year, December to the second. June 2025 is the last observation, and so 2025H2 is extrapolated from an OLS linear trend fitted to all seven observations ($R^2 = 0.986$).

TABLE 7. CABLE PRICE SERIES FOR PARTS I AND II.

Half-year	Price	Half-year	Price
2023H1	\$75.58	2024H2	\$79.75
2023H2	\$78.97	2025H1	\$80.69
2024H1	\$79.40	2025H2	\$79.17

Notes: Respondent-weighted mean monthly price for standalone plans at standard non-promotional rates, averaged across entered tracts. Data are from the Recon Analytics broadband price panel (see the Econometric Appendix for details), respondent-weighted mean monthly prices for standalone plans at standard non-promotional rates, by tract and half-year.

4 Part I: Cable households in the identifying cells

Part I applies the econometric estimate of the entry effect on cable prices to the cohorts and event times from which it was estimated.⁴ The Callaway–Sant’Anna procedure identifies its average

⁴ Strictly speaking, the estimation sample is narrower than the application set for Part I. The regression is fitted only on tract-half-years with a matched price from the Recon Analytics data, since the price is the dependent variable, whereas Part I applies the resulting coefficient to every cable household in the two 2023 cohorts. The extension assumes price-matched tracts are representative of the cohorts containing them, as should be given the nature of the survey.

effect from the two 2023 entry cohorts observed at event times 1 (the first complete half-year after entry) and 2 (the second half-year after entry), which is twelve months of exposure for each cohort.⁵ Part I multiplies the pooled effect by the cable households in those tracts and by twelve months.

The base price for each cohort is the average monthly price in the half-year following entry in the Recon Analytics survey data, respondent-weighted, for standalone plans at standard rates in that cohort's tracts. Table 8 shows the calculation in full.

Part I comes to **\$776.4** million in nominal terms, or **\$827.3** million in first-half-2026 dollars. This figure for the Part I total is the same under all four comparators, because they differ only in how the effect is extended *beyond* the identifying cells. Each cohort's twelve months straddle two half-years, so the final row of Table 8 splits each cohort six months to each half-year before converting.

This figure is only a small part of the total consumer savings from FWA entry. It covers only 5.9 million cable households out of roughly 75 million nationally, and only twelve months out of the three-year window. So, by construction, by itself it is an extremely conservative lower bound on the total cable-side consumer savings.

TABLE 8. PART I OF THE SAVINGS CALCULATION

	Cohort entering 2023H1	Cohort entering 2023H2	Total
Base price period	2023H2	2024H1	
Observed average monthly price	\$79.68	\$80.07	
But-for monthly price	\$90.62	\$91.07	
Saving per subscriber per month	\$10.94	\$11.00	
Saving per subscriber, twelve months	\$131.32	\$131.97	
Cable-serviceable locations	10,549,041	2,044,029	12,593,070
Cable households	4,966,183	941,337	5,907,519
Savings (\$ millions, nominal)	\$652.2	\$124.2	\$776.4
Savings (\$2026H1, millions)	\$696.4	\$130.9	\$827.3

Notes: Table shows the Part I savings for cable households in the two 2023 entry cohorts, twelve months each, at the pooled Callaway–Sant’Anna effect of $\beta = -0.1287$. Dollar amounts are millions in the last two rows only.

⁵ See note 3.

5 Part II: Cable households elsewhere in the entered footprint

Part II covers savings for cable internet consumers in every entered tract-period that Part I does not claim. These tracts comprise three groups: the always-entered tracts, the entry cohorts outside 2023, and the two 2023 cohorts in the periods after event time 2.

5.1 Construction

For each tract and half-year outside the Part I cells, the saving is

$$S_{jt} = H_{jt} \cdot P_t \cdot (e^{-\beta(j,t)} - 1) \cdot 6$$

where H is cable households in the tract, P is the half-year average price from section 3.2, $\beta(j, t)$ is the comparator-specific event-time markup. Multiplying by six converts a monthly figure to a half-year. Tracts with no markup contribute zero, so never-entered tracts drop out.

The household base moves within the window for two reasons: coverage expands, and the Part I cells are removed from it in the periods they occupy. The base is 43.7 million cable households in 2023H1, falls to 36.3 million in 2024H1 when both 2023 cohorts sit inside the Part I window, and recovers only to 39.1 million by the end of 2025, since the conversion from locations to households falls across the window as the cable take rate declines.

5.2 Results

Table 9 gives the half-year path and Table 10 the split across the three tract groups.

5.3 What drives the differences among the comparators

Even with Comparator 1, Part II savings are not zero. Comparator 1 applies the estimate only to the 2023 cohorts, and those cohorts remain exposed to FWA competition *after* the twelve months Part I covers. The \$1,017 million in the first row is the continuation of the estimated effect in the same tracts Part I covers, in periods Part I does not claim. That row is identical under Comparators 1 through 3, because none of them alters the treatment of the 2023 cohorts. Comparator 4 raises it to \$1,550 million, since those cohorts pick up the larger assumed entry effect their third period after entry and beyond.

Taken together, Part I and the row for the 2023 cohorts in later periods (the first row in the table) give \$1,794 million of savings in current dollars. That sum rests on the estimated coefficient plus one extrapolation: that the effect holds at its pooled value past the twelve months over which it was estimated. Everything above that figure additionally requires extending the effect to tracts whose entry timing is never observed or occurs outside the estimation-identified window. The two extrapolations differ in kind, and the second accounts for far more of the total.

TABLE 9. PART II SAVINGS BY HALF-YEAR, \$ MILLIONS

Half-year	Cable households (millions)	Comparator 1	Comparator 2	Comparator 3	Comparator 4
2023H1	43.7	\$0	\$1,109.3	\$2,292.4	\$2,292.4
2023H2	38.1	\$0	\$1,143.1	\$2,362.2	\$2,362.2
2024H1	36.3	\$0	\$1,123.0	\$2,320.6	\$3,534.2
2024H2	39.8	\$306.8	\$1,415.8	\$2,598.5	\$3,940.1
2025H1	39.8	\$361.8	\$1,462.5	\$2,636.3	\$3,993.2
2025H2	39.1	\$348.7	\$1,412.0	\$2,546.0	\$3,871.4
Total Savings, nominal		\$1,017.3	\$7,665.7	\$14,756.0	\$19,993.6
Total Savings, \$2026H1		\$1,050.7	\$8,066.9	\$15,549.3	\$20,993.8

Notes: Dollar amounts are millions. The window opens at 2023H1: no tract reaches event time 1 before then, and the imputed schedule for always-entered tracts also begins there. For definition of the four comparators, see Section 2.3.

TABLE 10. PART II SAVINGS BY TRACT GROUP, \$ MILLIONS

Tract group	Comparator 1	Comparator 2	Comparator 3	Comparator 4
2023 cohorts beyond 2 periods after entry	\$1,017	\$1,017	\$1,017	\$1,550
Always-entered tracts	-	\$5,719	\$11,818	\$15,889
Other entry cohorts	-	\$929	\$1,920	\$2,555
Total Savings, nominal	\$1,017	\$7,666	\$14,756	\$19,994

Notes: Dollar amounts are millions.

The always-entered row moves from zero to \$11.8 billion between Comparator 1 and Comparator 3, and that single line accounts for most of the spread in the total. It rests heavily on the assumption that 55,757 tracts holding 28.6 million cable households began experiencing the effects of FWA competition in 2023H1. The reasons for this conservative choice were discussed in section 2.3 in the description of Comparator 2. Again, this assumption is conservative because it credits FWA competition with no effect on cable prices before 2023.

5.4 Parts I and II in one expression

Parts I and II share a structure. Each multiplies a count of cable households by a monthly cable price, by the proportional markup its comparator assigns, and by a number of months. They differ in which tract-half-years they cover, and in how the price and the household count are dated. Setting the two side by side shows both the common core and the differences.

Let G be the two 2023 entry cohorts, and let C be the set of tract-half-years those cohorts occupy at event times 1 and 2, which is the domain of Part I. Then Part I is

$$S_I = \sum_{g \in G} 12 \cdot H_g \cdot P_g \cdot (e^{-\beta} - 1)$$

and Part II is the sum, over every entered tract-half-year that Part I does not claim, of the tract-half-year saving defined in section 5.1:

$$S_{II} = \sum_{(j,t) \notin C} 6 \cdot H_{jt} \cdot P_t \cdot (e^{-\beta(j,t)} - 1)$$

Here H is cable households, converted from serviceable locations by the two rates in section 3.1; P is the observed monthly cable price from section 3.2; and β is the log-point effect of entry on price, which is negative, so the factor $e^{-\beta} - 1$ is the proportional markup applied to the observed price. The terms are collected in the table below.

The two expressions also differ in how their inputs are dated and in where the prices come from. Part I dates its price and its household count at the cohort's base period and holds both fixed across the twelve months that follow. Part II lets both move with the half-year. Part I also uses a price computed within the cohort's own tracts, whereas Part II uses the average across all entered tracts.

Those three choices pull the same way. Applying the Part II construction to the Part I cells gives \$757.6 million, against the \$776.4 million Part I reports, or 2.4 percent lower. The cohort base prices of \$79.68 and \$80.07 sit above the corresponding averages across all entered tracts of \$78.97, \$79.40 and \$79.75, and holding the household count at its base period avoids the decline in the cable take rate over the following year. Part I is the larger of the two constructions. It is the one reported because it prices the identifying cells using price data from those same tracts.

The exclusion of C from the second sum is what keeps the two parts disjoint. Every tract-half-year in the entered footprint falls in exactly one of them, so the cable-side total $S_I + S_{II}$ counts no household-month twice. Part III is disjoint from both because it covers a different population, FWA subscribers.

TABLE 11. TERMS IN THE EXPRESSIONS FOR PARTS I AND II SAVINGS

Term	Definition	Established in
S_I	Part I savings: cable households in the cells that identify the estimate, in dollars	Section 4
S_{II}	Part II savings: cable households in every other entered tract-half-year, in dollars	Section 0
G	The two 2023 entry cohorts, from which the price effect is identified	Section 2.2
C	The tract-half-years those cohorts occupy at event times 1 and 2, which Part I claims and Part II excludes	Section 4
H	Cable households in the tract: serviceable locations times the broadband subscription rate times the cable take rate	Section 3.1
P	Observed mean monthly cable price, respondent-weighted, for standalone plans at standard rates	Section 3.2
β	Pooled log-point effect of FWA entry on the cable price, estimated as -0.1287	Section 2.1
$\beta(j,t)$	The comparator's markup schedule: zero before entry and wherever the comparator assigns no effect, and equal to β or half of it thereafter	Section 2.3

Notes: Section references point to where each term is constructed. The subscript g indexes an entry cohort, j a census tract and t a half-year.

The schedule $\beta(j,t)$ carries the whole of what separates the four comparators: which tracts are treated as entered, the entry date imputed to the always-entered class, whether the effect is applied at full or half strength outside the identifying cohorts, and whether it grows after the second period. Section 2.3 sets those out. Everything else in the two expressions is common to all four.

6 Part III: FWA subscribers

6.1 Scope

Part III estimates the monthly price differential between 5G fixed wireless service and a comparable cable broadband plan, aggregated over the consumer subscriber base of the three national FWA providers across the same six half-years.

The quantity estimated is a price differential multiplied by subscriber-months. It illustrates what FWA subscribers *would have paid for cable* in the counterfactual world with no FWA option. It is deliberately narrower in scope than an economic welfare estimate versus a world without FWA. Households that would have chosen a digital subscriber line service, a cable tier at a lower speed,

satellite internet service, or no fixed broadband service at all are treated as though they bought the comparable cable plan, and quality differences between the two technologies enter only through the speed match described in section 6.6.4.⁶ Furthermore, the target of estimation is dollar savings, and readers should not treat the figure as a consumer surplus calculation.

As with the other parts, Part III is disjoint from Parts I and II. Those figures measure a price reduction enjoyed by households that *remained* with cable. Part III, instead, covers households that (are assumed to have) *left* cable for FWA.

As with the other parts, the window closes at the end of 2025 on data-quality grounds. The 2026 Urban Rate Survey panel is incomplete, with Charter absent from it entirely, and T-Mobile ceased disclosing 5G broadband subscriber counts in the first quarter of 2026.

6.2 Data

6.2.1 Subscriber counts

Quarterly end-of-period FWA subscriber totals come from carrier earnings releases and SEC Form 8-K filings, supplemented by secondary sources for the quarters in which a carrier stated only net additions.⁷

6.2.2 Deployment footprint

Census block level coverage comes from the FCC Broadband Data Collection, waves J22 through J25, aggregated from location-level microdata to census tract. These data, and their preparation for use for the analysis, are described in the Econometric Appendix to the main report. Two quantities matter for each provider: the count of locations covered, and the count of locations covered by both that provider and at least one cable operator. A companion file gives, for each state and FWA provider, the division of cable overlap across Cox, Charter, Comcast, and a residual “All Other Cable” category.

⁶ I.e., there is no adjustment for differences in latency or reliability, for example.

⁷ Sources: FWA subscriber data are compiled from company earnings releases, SEC filings, company fact sheets, and industry reporting. T-Mobile: [T-Mobile Q2 2023 Fact Sheet](#); [T-Mobile 4Q 2022 Earnings Release](#); T-Mobile SEC quarterly earnings filings ([Q1 2023](#) (which also has Q1 2022 net adds), [Q3 2023](#), [Q4 2023](#), [Q2 2024](#) (which also has Q2 2023 and Q1 2024 net adds), [Q1 2025](#) (which also has Q3 2024 and Q4 2024 net adds), [Q2 2025](#), and [Q3 2025](#)); [T-Mobile Q4 2025 earnings](#); [Light Reading](#), “[What T-Mobile Stopped Telling You About Q1 2026](#)”; and [GuruFocus](#), “[T-Mobile US Inc. \(TMUS\) Q2 2026 Earnings Call Highlights](#)”. Verizon: [Verizon Q3 2021 SEC filing](#); [Light Reading](#), “[Verizon Adds 78K Fixed Wireless Subs in Q4](#)”; [Verizon Q1 2022 earnings](#); [Verizon Q2 2022 earnings](#); [Light Reading](#), “[Verizon Crosses 1M Fixed Wireless Access Customers](#)”; [Verizon 4Q 2022 Earnings Release](#); [Verizon Q1 2023 Earnings Release](#); [Verizon Q2 2023 Earnings Release](#); [Light Reading](#), “[Verizon Tacks on Another 384K FWA Subs in Q3](#)”; [Verizon 2023 year-end earnings](#); [Verizon Q1 2024 earnings](#); [Verizon Q2 2024 Earnings Release](#); [Verizon Q3 2024 Earnings Release](#); [Verizon 4Q 2024 Earnings Release](#); [Verizon Q1 2025 earnings](#); [Verizon Q2 2025 earnings](#); [Verizon Q3 2025 Earnings Release](#); [Verizon Q4 2025 earnings](#); [Verizon year-end earnings release](#); and [Verizon Q2 2026 earnings](#). AT&T: [Fierce Network](#), “[AT&T Returns to Positive Broadband Growth, Fiber Subs Reach 8M](#)”; and AT&T SEC quarterly earnings exhibits ([Q4 2023](#), [Q1 2024](#), [Q2 2024](#), [Q3 2024](#), [Q4 2024](#), [Q1 2025](#), [Q2 2025](#), [Q3 2025](#), [Q4 2025](#), [Q1 2026](#), and [Q2 2026](#)).

6.2.3 Cable prices

Cable prices begin with results from the FCC Urban Rate Survey (URS).⁸ For the survey, sampling is over providers and places, and then every plan that provider offers there at that time is collected. Speeds appearing in a cell thus describe the provider’s actual menu at that location. The panel supplied covers 2020 through 2026 across all reported speed tiers for cable internet service, from 0.7 Mbps to 10 Gbps, in 4,115 rows and 637 state-company-year cells. Section 6.6.4 explains why the estimation sample is restricted to 100–300 Mbps. Four cable categories are created for the URS data: Cox, Charter, Comcast, and a residual “All Other Cable”. The latter category carries roughly 15 to 18 percent of consumer subscriber-months.

The survey excludes bundled rates by design. Since the unit priced is standalone broadband service on the cable side, it is the same on the FWA side too in the analysis here. This also keeps the comparison consistent with the difference-in-differences estimates, themselves fitted on standalone broadband prices.

The rates are non-promotional, which suits the assumed counterfactual household, which has held a cable subscription for years and no longer receives any introductory discounts. Section 6.8 reports a supplementary scenario applying the discounts Consumer Reports observed on real bills.

The price measure used is the average total charge, which incorporates mandatory recurring charges and fees and is tax-inclusive. It excludes equipment unless rental of such is required (which it typically is not for the major cable companies); section 6.2.5 sets out the resulting adjustment for equipment rental.

6.2.4 Technology scope, and a numerator–denominator mismatch

The FCC BDC data were processed to retain only locations with maximum advertised speeds of at least 100 Mbps downstream and 20 Mbps upstream, which makes the covered-location denominator 5G-qualifying service by construction. The subscriber numerator is drawn on a different basis for one carrier.

Verizon’s reported FWA subscription figure combines 5G Home with legacy LTE Home Internet, a 25 to 50 Mbps product aimed at rural markets that never enters the denominator. Dividing reported subscribers by covered locations gives implied penetration of 121 percent at June 2022 and 206 percent at December 2022, settling to a stable 14.7 to 21.3 percent from J23 onward once C-band scale makes 5G Home the dominant component. T-Mobile’s implied penetration rises smoothly from 11.6 to 32.9 percent across the same waves with no comparable break, and AT&T’s series already excludes its legacy CAF-II-era LTE product.

The June 2022 geography confirms this reading. Verizon shows coverage in 39 states with only tens of thousands of locations in each, the signature of millimeter-wave metropolitan pockets plus early C-band. The exercise is therefore scoped to subscribers whose service qualifies at 100/20. The

⁸ FCC Urban Rate Survey, annual filings 2020 through 2026, and the associated broadband methodology reports. See <https://www.fcc.gov/economics-analytics/industry-analysis-division/urban-rate-survey-data-resources>.

distortion is confined to the 2022 waves, which fall outside the savings window, so it does not affect the figures reported here.

6.2.5 Equipment and tax treatment

Two asymmetries between the FWA and cable price concepts require correction before the two are comparable.

Equipment. An FWA subscription includes the gateway. The Urban Rate Survey rate excludes equipment entirely,⁹ so a direct comparison sets an all-in FWA price against a partial cable price. The correction is billed incidence multiplied by the mean charge for equipment, with the level taken from Consumer Reports and the year-on-year path from published rack rates.

The incidence comes from Consumer Reports' 2022 study of 22,000 consumer bills,¹⁰ which records the share of bills carrying an equipment charge. Billed incidence is held flat across the study period, since no source measures billed incidence after 2022. The mean charge is taken from the same Consumer Reports figure for 2022 and then scaled by the movement in published rack rates, half-year by half-year. Consumer Reports' observed means sit close to published 2022 rack rates,¹¹ which supports splicing the level from one source to the growth from the other. The assumed rack rates and the expected charge they produce are set out in full in Table 12, so that the arithmetic can be checked and any rate replaced.

Charter's figure is low because Spectrum includes the modem and bills only for the WiFi router, which Consumer Reports classifies as an equipment charge. The residual category carries the highest expected charge of the four, driven by Optimum at 67 percent incidence. Subscriber-weighted, the equipment charge rises from \$3.59 per month in 2023H1 to \$3.97 in 2025H1, before falling to \$2.06 in 2025H2 when Comcast's change to national plans that include the WiFi gateway takes effect. Comcast carries roughly 40 percent of consumer subscriber-months, so eliminating its equipment charge produces most of the decline, reducing the subscriber-weighted equipment adjustment by \$1.92 per month and savings in that half-year by about \$127 million. Across the full window, equipment charges contribute roughly \$0.9 billion to the Part III figure.

Finally, note that in the savings calculations the equipment charge is applied after the but-for markup, since the event-study estimate was fitted to Urban Rate Survey service prices, which exclude equipment.

⁹ The rules for reporting rates to URS allow cable internet providers to not include gateway/modem equipment charges if renting such equipment is not mandatory. Since the major cable companies allow consumers to purchase their own equipment, the standard equipment rental fees are not including under the "other mandatory charges" section of the URS reported total charges.

¹⁰ Consumer Reports, Broadband Pricing Study, November 2022, based on more than 22,000 consumer bills. Figure 3.3 average prices, Figure 3.5 prevalence of promotional discounts, Figure 3.6 equipment charges (<https://advocacy.consumerreports.org/wp-content/uploads/2022/11/FINAL.report-broadband.november-17-2022-2.pdf>).

¹¹ In particular, Comcast \$16 observed against \$14 rack rate, Charter \$6 against \$5, Cox \$13 against \$11.

TABLE 12. CABLE EQUIPMENT CHARGES

	Charter		Comcast		Cox		All Other	
Half-year	Rack rate	Average charge	Rack rate	Average charge	Rack rate	Average charge	Rack rate	Average charge
Billed incidence, 2022	29%		28%		24%		37%	
Consumer Reports mean, 2022	\$6		\$16		\$13		\$14	
2022 (base)	\$5	\$1.74	\$14	\$4.48	\$11	\$3.12	\$10	\$5.18
2023H1	\$5	\$1.74	\$15	\$4.80	\$12	\$3.40	\$10	\$5.18
2023H2	\$5	\$1.74	\$15	\$4.80	\$12	\$3.40	\$10	\$5.18
2024H1	\$6	\$2.09	\$15	\$4.80	\$13	\$3.69	\$10	\$5.18
2024H2	\$6	\$2.09	\$15	\$4.80	\$13	\$3.69	\$10	\$5.18
2025H1	\$7	\$2.44	\$15	\$4.80	\$14	\$3.97	\$10	\$5.18
2025H2	\$7	\$2.44	\$0	\$0.00	\$14	\$3.97	\$10	\$5.18

Notes: The rack rate is the published monthly gateway rental for that operator and half-year.¹² The expected charge is billed incidence multiplied by the Consumer Reports 2022 mean, scaled by the rack rate relative to its 2022 level. Incidence and the 2022 mean come from Consumer Reports Figure 3.6. The residual column averages the cable-only operators in that figure: Optimum, Suddenlink, Atlantic Broadband, Wave, Sparklight, WOW! and RCN.

Taxes and Fees. The Urban Rate Survey rates are tax-inclusive, as are T-Mobile’s and Verizon’s prices¹³, so those two carriers require no adjustment for taxes. However, T-Mobile charged a \$1.40 “Regulatory programs/Telco recovery fee” in the early part of the period examined here,¹⁴ which it

¹² Comcast gateway rental rate path and transition to national all-in plans: Comcast’s monthly Xfinity gateway rental fee rose from \$14 to \$15 at the beginning of 2023; see G.E. Miller, “Beware of the Erroneous Comcast Xfinity Modem Rental Fee,” *20somethingfinance.com*, updated January 15, 2026, <https://20somethingfinance.com/erroneous-comcast-modem-rental-fee/>. Comcast subsequently moved to an all-in national pricing structure. On June 26, 2025, Comcast announced that its new national Xfinity Internet plans would include unlimited data and the Xfinity WiFi Gateway in the advertised monthly price: <https://corporate.comcast.com/press/releases/comcast-new-national-xfinity-internet-packages-unlimited-data-advanced-wifi-gateway>. Charter and Cox equipment rate paths: Spectrum, <https://www.spectrum.com/internet/wifi-service>; ConnectCalifornia, <https://www.connectcalifornia.com/providers/cox-communications>

¹³ Verizon, “5G Home Internet”. <https://www.verizon.com/home/internet/5g>.

¹⁴ TheStreet, “T-Mobile quietly sends stern warning to customers”, reporting the increase in the Regulatory Programs and Telco Recovery Fee effective 23 April 2025. <https://www.thestreet.com/retail/t-mobile-quietly-sends-stern-warning-to-customers>. The same increase was reported by Android Headlines, The Mobile Report and PhoneArena.

increased to \$1.60 in April 2025,¹⁵ which has been included in the price-differential analysis. AT&T Internet Air is quoted plus taxes and fees,¹⁶ but includes those in only a few states. Evidence from the FCC Urban Rate surveys indicates that these were charged in some locations until 2025,¹⁷ and the (small) weighted national average of such additional charges has been assumed to apply to Internet Air during the earlier years.¹⁸

6.3 The consumer subscriber base

Headline FWA subscriber counts mix residential and business customers in a proportion that shifts over time. Verizon's disclosed splits show business rising from roughly 31 percent of net additions in the fourth quarter of 2022 to 54 percent in the third quarter of 2025. Business rate plans differ from the consumer plans priced here, so business subscribers are removed.

- Verizon: the consumer share of net additions is interpolated linearly between the quarters in which Verizon disclosed a residential and business split, then cumulated to yield a consumer stock.
- AT&T: the Internet Air series is consumer-only as reported, so no adjustment applies.
- T-Mobile does not separately report consumer and business customers for its 5G FWA service. A flat business share of 6 percent of the stock is assumed. The company has not disclosed evidence suggesting that business customers constitute a substantial share of its 5G broadband customer base.¹⁹

Subscriber-months for a half-year are computed as the sum over its two quarters, with each quarter's figure estimated as three times the mean of the opening and closing consumer stock for the quarter.

¹⁵ While this fee was raised in January 2026, that month is outside the period examined in the analysis here.

¹⁶ HighSpeedInternet.com, "AT&T Internet Air vs. Verizon". <https://www.highspeedinternet.com/resources/att-internet-air-vs-verizon>

¹⁷ Author calculations from the FCC Urban Rate Survey. The figures are national weighted averages across AT&T observations of the Other Mandatory Charge and Surcharge fields. The two are never simultaneously nonzero for AT&T: the Surcharge field is populated in 2021 and 2022 and the Other Mandatory Charge field in 2023 and 2024, so their sum is simply whichever was active in that year and creates no double count. These are for wireline offerings; see footnote 18.

¹⁸ AT&T's Internet Air service does not appear in the FCC URS, but its wireline offerings do. Given that its consumer notices regarding its "State Cost Recovery Charge" lump discussion for all broadband types, it is assumed that a fee appearing in the URS for DSL or fiber would also be charged for Internet Air. The evidence in the URS also indicates that these fees are lump sums, varying by location but not by plan price. In any event, the national average of such charges for AT&T is small even in years in which they appear: the maximum is in 2023, with a weighted mean of \$0.44, which would be about 0.8% of the monthly Internet Air bill.

¹⁹ T-Mobile's FWA product has been marketed heavily as an add-on to consumer wireless service. T-Mobile's 2025 10-K describes 5G broadband as a fixed-wireless product available to "tens of millions of domestic households" using excess capacity on its nationwide 5G network. In addition, T-Mobile has recently identified expanded eligibility for business customers as one source of future 5G broadband growth (T-Mobile, "T-Mobile Raises the Bar..." [press release dated February 11, 2026, <https://www.t-mobile.com/news/business/t-mobile-capital-markets-day-update-feb-2026>]), suggesting that business customers represent a minority component of the existing base. All of these reasons point toward a small fraction of business subscribers.

6.4 The FWA price series

The headline price concept is the standalone list rate with autopay and paperless billing, which matches the standalone basis of the cable comparator. All three carriers offer substantially lower rates to subscribers who also hold a mobile line, in the range of \$25 to \$35, and a large share of FWA subscribers are converged customers, so restricting to standalone plans biases the estimated savings downward. Applying converged rates would require converged cable rates on the other side, which the Urban Rate Survey does not collect and no public source supplies at the granularity needed.

6.4.1 Subscription vintage

Carriers price-lock existing subscribers, so the rate paid by the installed base is a weighted average of the rates prevailing when each cohort signed up. This matters for T-Mobile, whose standalone autopay rate was \$50 from launch, rose to \$60 for new customers in January 2024,²⁰ returned to \$50 that summer,²¹ rose again to \$60 in the first half of 2025, and settled back at \$50. The savings computations therefore use a vintage-weighted price, in which cohorts are dated by the half-year of their net additions and retain the rate posted at signup. Verizon's standalone autopay rate is \$50 throughout,²² and AT&T Internet Air launched in August 2023 at \$55 with autopay, moving to a \$60 base in the second half of 2025.²³

Table 13 sets out the resulting series. The posted rate is what a new customer would pay in that half-year; the vintage rate is the subscriber-weighted average across the cohorts making up the installed base; the fee column is the mandatory recurring charge from section 6.2.5; and the all-in price is what enters the savings calculation.

6.4.2 Churn

The vintage calculation assumes no subscriber ever leaves, so every cohort persists at its locked-in rate. Real churn moves the installed base toward newer cohorts and therefore toward current posted rates. No public source gives FWA churn. The two price series in Table 13 bracket the average rate actually paid in each period. The vintage series is the zero-churn bound, in which the whole installed base retains its signup rate indefinitely. The posted series is the complete-turnover bound, in which every subscriber pays the current new-customer rate, as would hold if the entire base were replaced each period, or equivalently if every subscriber were automatically granted the most current rate, which is typically not the case. True churn lies between the two bounds, and so does the true average price.

²⁰ Mobile Internet Resource Center, "T-Mobile Home and Business Internet Plans Price Increase to \$60/Month, Changes Price Lock Terms", January 2024; <https://www.rvmobileinternet.com/t-mobile-increases-price-on-unlimited-home-and-business-internet-plans-to-60-month-and-changes-price-lock-terms>.

²¹ How-To Geek, "T-Mobile Home Internet Reverses Its Recent Price Increase", summer 2024; <https://www.howtogeek.com/t-mobile-home-internet-reverses-its-recent-price-increase>.

²² Verizon, "5G Home Internet".

²³ HighSpeedInternet.com, "AT&T Expands Internet Air". <https://www.hightspeedinternet.com/resources/att-5g-home-air-internet>

TABLE 13. PRICES FOR 5G FWA RESIDENTIAL INTERNET SERVICE, \$ PER MONTH

	T-Mobile			Verizon			AT&T		
Half-year	Posted	Vintage Weighted	All-in	Posted	Vintage Weighted	All-in	Posted	Vintage Weighted	All-in
2023H1	\$50.00	\$50.00	\$51.40	\$50.00	\$50.00	\$50.00	—	—	—
2023H2	\$50.00	\$50.00	\$51.40	\$50.00	\$50.00	\$50.00	\$55.00	\$55.00	\$55.44
2024H1	\$60.00	\$51.64	\$53.04	\$50.00	\$50.00	\$50.00	\$55.00	\$55.00	\$55.03
2024H2	\$50.00	\$51.40	\$52.80	\$50.00	\$50.00	\$50.00	\$55.00	\$55.00	\$55.03
2025H1	\$60.00	\$52.54	\$54.01	\$50.00	\$50.00	\$50.00	\$55.00	\$55.00	\$55.00
2025H2	\$50.00	\$52.16	\$53.76	\$50.00	\$50.00	\$50.00	\$60.00	\$56.63	\$56.63

Notes: Posted rates are standalone list rates with autopay and paperless billing. Vintage rates weight each cohort by the half-year in which it joined, holding it at the rate posted then. All-in adds the mandatory recurring fee: T-Mobile's Regulatory Programs and Telco Recovery Fee, and AT&T's state cost-recovery pass-through. AT&T Internet Air launched in August 2023 and carries no subscribers before 2023H2.

Which bound is the conservative one depends on the sign of the gap, and the sign is not constant. T-Mobile's posted rate stood above its vintage rate in 2024H1 and again in 2025H1, by enough to dominate the window once subscriber-months are weighted in. Complete turnover therefore gives the smaller figure, \$4,032 million at observed cable prices against \$4,413 million on the vintage series (see Table 18 for the latter). The headline computation uses the vintage series, so the whole question is worth \$381 million, or about 9 percent of the switching gain.

6.5 Allocating national subscribers to local markets

National subscriber counts are allocated to census tracts in proportion to each provider's count of covered locations in that tract and wave, which imposes a single national penetration rate per provider per period. The resulting tract allocation is then restricted to the cable-overlap subset by multiplying by the ratio of overlap locations to covered locations, and divided across the four cable categories using state-level overlap shares.²⁴

²⁴ The calculation is a hybrid. Overlap intensity is tract-level, aggregated from the Census block files from the FCC FBC. The split across Cox, Charter, Comcast and the residual comes from the state-level summaries and is applied uniformly within a state. This makes no difference to the totals. Within a state, allocated subscriber-months are proportional to overlap locations by construction, since they equal covered locations multiplied by the ratio of overlap to covered locations. The state share in the summary file is itself the block-level overlap count for that company divided by the block-level overlap total. Summing tract-level allocations weighted by tract-level company shares and multiplying the state total by the state share therefore both collapse to the same quantity, the state overlap count for that company.

TABLE 14. DENSITY-TILT ROBUSTNESS BRACKET

Allocation	Median locations per block	Observed savings (\$ million)	vs. base
Uniform (base case)	—	\$4,413	—
Low-density tercile only	11.3	\$4,013	–9.1%
Mid-density tercile only	21.6	\$4,681	+6.1%
High-density tercile only	35.4	\$4,411	0.0% ²⁵

Notes: Each row reallocates the same national FWA subscriber total entirely within one density tercile of entered tracts, holding the total and all other inputs fixed. Density is proxied by mean locations per census block within the tract, since blocks are small where settlement is dense. Any actual allocation across terciles is a weighted combination of these three cases, so the range they span bounds the aggregate under any tilt. Savings are those accruing to FWA subscribers, in current dollars.

This approach is appropriate because it first distributes each provider’s national subscriber base according to the geographic distribution of its available FWA service and then identifies the portion of those subscribers located where a cable alternative is available. The resulting overlap share declines from 94.2 percent in the first half of 2023 to 90.5 percent by the end of 2025, reflecting FWA expansion into areas without cable service.

Note that the procedure outlined above tacitly assumes that FWA subscribers are distributed across tracts in proportion to covered locations, regardless of tract density. However, FWA carriers sell it where cell sites have spare capacity, which skews toward lower-density areas,²⁶ so a uniform national penetration rate may understate uptake in low-density tracts. No public source calibrates a tilt, since FCC subscription counts are not broken out at tract level.

Instead of arbitrarily assuming a tilt parameter, the assumption is therefore bracketed here. The same national subscriber totals are reallocated entirely within one density tercile at a time, which bounds the aggregate under any reallocation across terciles. Density is proxied by mean locations per census block within the tract, since blocks are small where settlement is dense. Table 14 reports the bracket.

The bracket spans –9.1 to +6.1 percent, so the uniform assumption carries little weight in the result. The mechanism is partly self-correcting: reported Broadband Data Collection availability already reflects some capacity rationing, so the covered-location weights embed part of the tilt toward lower density areas.

²⁵ The high-density tercile has savings of \$4,411.3 million against a base of \$4,412.6 million, which is a difference of 0.03 percent. This rounds to the 0.0% entry shown in the table.

²⁶ Within limits. 5G FWA is typically not economic to deploy in very low density areas; colloquially speaking, it is often a suburban product.

6.6 The cable comparator

6.6.1 The hedonic price index

The Urban Rate Survey is an unbalanced sample of places. Matching FWA subscribers directly to observed cells produces a series dominated by which places happened to be drawn. The subscriber-weighted cheapest-tier price for Comcast moves from \$70.90 in 2022 to \$53.70 in 2023, \$80.70 in 2024, and \$30.00 in 2025; Cox moves from \$85 to \$30 to \$50. Movements of this size within a single operator lack credibility as describing real average price trends for all the operator's subscribers.

Prices p are therefore smoothed by a hedonic regression fitted to the panel:

$$\ln p_{isct} = f(\ln x_i) + \alpha_s + \gamma_{ct} + \theta_c \ln x_i \cdot (t - \bar{t}) + \delta_{sc} + \varepsilon_{isct}$$

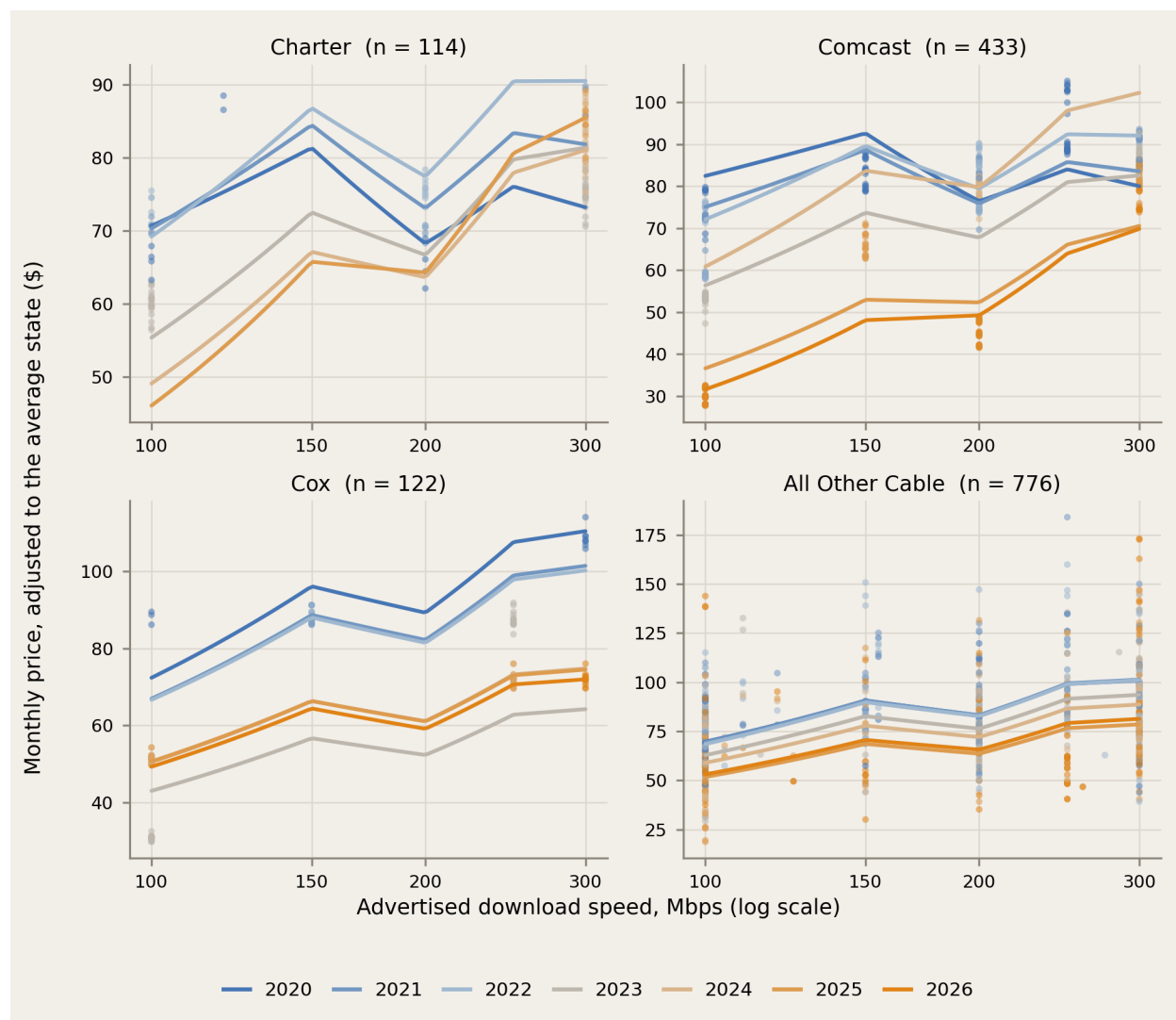
The subscripts index plan i , state s , company c and year t . Summand α is a full set of state intercepts, while γ is a saturated categorical variable with one free intercept per company-year cell, absorbing the company and year main effects. The θ term allows each operator's price per Mbps to fall at its own rate, and δ allows a state's price differential to differ by operator. The error term ε represents the remaining determinants of prices.

In the selected specification, the function f is piecewise linear in log speed, with knots at 150, 200 and 250 Mbps. The choice is dictated by how little variation in speed the panel actually contains. Across the 100 to 300 Mbps estimation range there are only fourteen distinct advertised speeds, and 100, 150, 200, 250 and 300 account for 97 percent of the 1,445 observations. A basis with three interior knots is therefore close to saturated at the tiers that carry the data, and between tiers it interpolates linearly.

Monotonicity is not imposed. With state and state-by-company effects removed, the mean price at 200 Mbps sits below the mean price at 150 Mbps in five of the seven survey years, which is consistent with operators positioning a mid-tier plan as the value option. Constraining the profile to rise degrades cross-validated prediction by 5.1 percent, the worst of any specification tried, which indicates that the non-monotonicity comes from the cable price schedules themselves.

Figure 2 shows the fitted surface against the observations to which it is fitted. Observations are adjusted to a common state by removing the estimated state intercept and the state-by-company term, each centered within the operator, so that what remains is the intercept, the speed profile, the company-by-year level, the company speed trend, and the residual. The curves are drawn on the same centered basis, one per year.

FIGURE 2. HEDONIC FIT OF THE RELATIONSHIP OF PRICE TO SPEED, BY CABLE OPERATOR.



Notes: Points are Urban Rate Survey observations between 100 and 300 Mbps, adjusted to the average state; lines are the fitted piecewise-linear price profile for each year on the same basis, with knots at 150, 200 and 250 Mbps. Color runs from 2020 in blue to 2026 in orange. The 2026 cells are used in fitting, which helps pin the trend through 2025, though the savings window closes at the end of 2025.

The figure shows three notable features. The profile is not monotone: prices rise from 100 to 150 Mbps, fall to 200, and rise again toward 300. That shape is present in the tier means themselves. The vertical spacing between curves is the estimated company-by-year price path, and it is much wider for Comcast than for the residual category. And the residual category shows by far the widest scatter, consistent with its being an aggregate of several operators with different price levels.

6.6.2 The estimator

The fit is partially penalized least squares.²⁷ The speed profile, the state intercepts, the company-by-year effects and the company speed trends are estimated without penalty. The state-by-company block δ alone carries an L2 (ridge) penalty.²⁸ This penalized estimator has an exact Bayesian interpretation as the posterior mode under a Gaussian prior on δ .²⁹ Cross-validation over a grid from 1 to 3,000, scored on held-out state-company-year cells, selects $\lambda = 3$. The residual standard deviation of 0.235 implies a prior standard deviation on the state-by-company effect of 0.136 in logs, about 14 percent, a seemingly plausible magnitude for operator price differentials within a state.³⁰

The same device was applied to a state $\times$ year block, to relax the assumption that state price levels hold constant over the window. It offers no improvement: cross-validated error falls monotonically as that penalty rises, converging on the model without the term, so the data prefer it shrunk to nothing.

6.6.3 Specification selection

Model selection was informed by cross-validation. Specifications were compared by out-of-sample prediction error, measured in the way the model is used. Whole state-company-year cells are held out in the cross-validation exercise.³¹ Error is scored on held-out observations between 75 and 150 Mbps, weighted by the survey population weight. Table 15 reports the results, with every row computed in a single run with the same cells held out each time, so the rows are directly comparable with one another.

²⁷ See Ruppert, D., M. P. Wand, and R. J. Carroll, *Semiparametric Regression*, Cambridge University Press, 2003. The mixed-model representation given there covers the partially penalized criterion used here, in which only the state-by-company block is shrunk. Ridge regression, empirical-Bayes shrinkage, and a mixed model with state $\times$ company as a random effect all describe the same computation here.

²⁸ The reason lies in the dimensions. The δ term contributes 122 columns, one for each state-operator pair the survey populates out of 204 possible, against 1,445 observations. Most pairs are well supported, with a median of eleven observations, though fifteen are seen once or twice and thirty-two five or fewer times, and unpenalized estimation would fit noise in those. The penalty also interpolates between two substantively different models. As the penalty grows without bound δ vanishes and the model reduces to the additive-state specification, in which a state's price differential is identical for every operator. At a zero penalty δ is unrestricted and each state-operator pair stands alone. The penalty sets where between those the fit sits, pair by pair: pairs with plentiful observations move almost freely, thin pairs are pulled toward the additive model.

²⁹ Minimizing the squared residuals plus $\lambda \|\delta\|^2$ is the posterior mode under a Gaussian prior $\delta \sim N(0, \sigma^2/\lambda)$, and also the best linear unbiased predictor when δ is treated as a random effect.

³⁰ At the selected penalty, the fit lies much nearer the unrestricted end than the additive one. Relative to unpenalized estimation δ retains 62 percent of its norm, and the model gives up about 21 of the block's 122 effective parameters, so the estimates stay close to least squares with state-by-operator fixed effects. The block nonetheless earns its place: omitting δ raises cross-validated error at the benchmark by 8.1 percent. The penalty disciplines the thin cells while leaving the well-observed ones essentially free.

³¹ Holding out random rows, by contrast, would leave some observations from each state-company-year cell in the training data, effectively revealing the cell's level and favoring specifications with cell effects.

The first four rows compare ways of representing speed, all at the estimation range of 100 to 300 Mbps. The first serves only as a reference point: speed enters linearly in logs, with state and company-by-year effects but without the pooled state-by-operator term or the company speed trend, and the comparison column is measured against it. The next three rows add both of those terms and then differ only in how speed enters. Among those three, speed entering linearly in logs predicts worst, at an RMSE of 0.1924.

The strongest competitor to the piecewise linear basis of section 6.6.1 is a natural cubic spline with knots placed at quantiles of the speed distribution. Because the distribution is so concentrated, those quantiles land on 150 and 200 and nowhere else, leaving a basis of four columns that is in substance a constrained cubic polynomial. The cubic fits the tier means about as well as the piecewise linear basis but connects them with a pronounced arc, and that arc comes from the functional form imposed on the data. FWA median speeds generally fall between the tiers that carry the data, so every price the comparator uses is an interpolated one. That is, across the whole window, no matched speed coincides with any of the five tiers that hold 97 percent of the observations, and the panel contains no observations at all between 155 and 200 Mbps or between 200 and 250. Because the training data do not contain the speeds the comparator needs, a flexible polynomial can fit the observed tier means closely while making large errors between them, and cross-validation scored on observed speeds cannot detect it. The piecewise linear basis is preferred for this reason: between tiers it interpolates linearly, which imposes minimal assumptions about shape where there are no data.

It is also the more accurate of the two where accuracy can be measured, at an RMSE of 0.1820 against 0.1845, or 1.4 percent lower. Choosing it therefore involves no loss of predictive accuracy.

The remaining six rows in Table 15 hold the piecewise linear basis fixed and vary the range of speeds the model is trained on. The fourth row (the preferred model) is their reference point, being that same basis trained on 100 to 300 Mbps.

Widening the speed range degrades prediction.³² Product heterogeneity offers the likely explanation. Sub-100 Mbps cable tiers are largely legacy and low-income offerings priced well below usual offerings, and gigabit-plus tiers are fiber-competitive flagship products. Both sit off the hedonic surface that governs mid-range plans.

Inverse-variance weighting also degrades prediction (not shown in the table). Each panel row is a mean over different numbers of plans, which argues for weighting to account for differing variances by row. Scored against the population-weighted estimand, this performs decisively worse, by around 18 percent, because it pulls the surface toward cells that happen to contain many plans and away from where the population is. Fitting is therefore unweighted.

³² The initial expectation was that predicting near 100 Mbps sits at the edge of a 100–300 Mbps support, so adding tiers above and below would place it in the interior. In practice error rises as the training range widens in either direction. Measured against the selected specification, dropping the floor to 50 Mbps costs 7.5 percent, raising the ceiling to 500 Mbps costs 5.4 percent, and doing both costs 12.0 percent.

TABLE 15. CROSS-VALIDATED PREDICTION ERROR AT THE BENCHMARK

Specification	Training speed range	Company speed trend	Rows		RMSE	RMSE vs. base
Linear in log speed, state effects only	100–300 Mbps	No	1,445		0.2165	—
Linear in log speed	100–300 Mbps	Yes	1,445		0.1924	–11.1%
Natural cubic spline, quantile knots	100–300 Mbps	Yes	1,445		0.1845	–14.8%
Piecewise linear, knots at 150, 200 and 250 Mbps	100–300 Mbps	Yes	1,445		0.1820	–15.9%
Piecewise linear, knots at 150, 200 and 250 Mbps	50–300 Mbps	Yes	1,788		0.1956	–9.7%
Piecewise linear, knots at 150, 200 and 250 Mbps	100–500 Mbps	Yes	2,040		0.1918	–11.4%
Piecewise linear, knots at 150, 200 and 250 Mbps	50–500 Mbps	Yes	2,383		0.2038	–5.8%
Piecewise linear, knots at 150, 200 and 250 Mbps	25–300 Mbps	Yes	2,036		0.2184	+0.9%
Piecewise linear, knots at 150, 200 and 250 Mbps	≥ 100 Mbps	Yes	3,311		0.2021	–6.6%
Piecewise linear, knots at 150, 200 and 250 Mbps	all tiers	Yes	4,115		0.2473	+14.2%

Notes: Selected model and training set in bold. Prediction errors are population-weighted, and cross-validation holds out whole state-company-year cells. Every row was computed in a single run with the same cells held out. The first row omits both the pooled state-by-company terms and the company speed trend; every other row carries both, with the state-by-company block penalized at $\lambda = 3$. The comparison column is measured against the first row.

Fitted values are generated for every state, company, period and provider, which serves two purposes. It removes the composition swings that contaminate the raw cells, and it fills every cell the survey leaves unobserved, which is what extrapolation to full subscriber coverage requires. The residual standard deviation is 0.235 in logs, on 1,445 observations with an effective 132 degrees of freedom.

6.6.4 The speed-matched benchmark

Cable is priced at the median FWA download speed for that provider and half-year, taken from Ookla’s US fixed wireless reports,³³ shown in Table 16.

TABLE 16. MEDIAN FWA DOWNLOAD SPEED, MBPS

Period	T-Mobile	Verizon	AT&T
2023H1	121.4	114.4	—
2023H2	128.7	126.9	109.6
2024H1	161.4	134.0	138.0
2024H2	196.6	133.1	128.0
2025H1	218.5	159.9	111.9
2025H2	209.1	137.8	104.6

Notes: Data are median download speeds from Ookla Speedtest reports. AT&T carries no Internet Air subscribers before 2023H2.

The conceptual case for matching FWA actual speeds to cable advertised speeds is strong. Ookla measures delivered speed while the Urban Rate Survey prices advertised speed. Cable typically delivers close to its advertised rate but FWA does not. For example, despite the high speeds in the first column of the table for T-Mobile, the company lists 100 Mbps as the maximum advertised download speed in the FCC BDC. So matching FWA delivered speed against cable advertised speed approximates a delivered-to-delivered comparison.

There are two caveats. Gaps in the Ookla series are linearly interpolated within provider and held flat beyond the first and last observation. The price-matching exercise ignored upload speeds.

6.7 Coverage

Table 17 records how much of the FWA subscriber base each stage of the construction reaches. Direct match rates run high, at 92 to 96 percent of subscriber-months, largely because the residual “All Other Cable” category has broad state coverage. The fourth row shows that roughly 82 to 85 percent of overlap subscriber-months attach to Cox, Charter, or Comcast specifically.

³³ Ookla, US Fixed Wireless Access reports, December 2023, March 2025 and December 2025. See <https://www.ookla.com/articles/fixed-wireless-access-us-q3-2023>, <https://www.ookla.com/articles/fwa-gets-robust-speeds>, and <https://www.ookla.com/articles/u-s-fwa-report-december-2025>, resp.

TABLE 17. COVERAGE AND COMPOSITION, WEIGHTED BY CONSUMER SUBSCRIBER-MONTHS

Concept	2023H1	2024H1	2025H2
Share of FWA subscribers in cable footprint	94.2%	91.9%	90.5%
Share with a direct URS price match	95.7%	96.1%	91.6%
Effective direct coverage (product)	90.2%	88.3%	82.9%
Matched to a named MSO, excluding the residual	85.4%	83.2%	82.1%
Coverage after model-based imputation	100%	100%	100%
Share in always-entered tracts	85.2%	81.4%	79.8%
Share receiving the Comparator 1 markup	0%	8.6%	9.7%

The final coverage row (“Coverage after model-based imputation” in the table) follows from the hedonic model. Because the model returns a fitted price for every combination of state, operator, period and provider, no subscriber-month is dropped for want of a matched survey cell, so Part III covers the whole consumer FWA base inside the cable footprint. Filling the unobserved cells uses the estimated model itself, evaluated at cells the survey did not sample. The same speed profile, state, operator and year effects that the observed cells identify carry over to the unobserved ones.³⁴

Using the hedonic model to fill the unobserved cells carries a bias whose direction can be signed. The Urban Rate Survey samples urban places, while FWA subscribers are concentrated in exurban areas, where cable faces less competition and posts higher prices. The fitted counterfactual therefore likely sits below what these subscribers would have paid, which understates Part III savings.

³⁴ The familiar alternative (not followed here), cell-mean imputation, assigns each unmatched cell the average of the matched cells for its operator and year. That amounts to the present model with the state intercept and the state-by-operator term restricted to zero, making it a special case of the specification used here and one that discards the state-level price variation the survey identifies.

TABLE 18. PART III AGGREGATE SAVINGS FOR FWA SUBSCRIBERS

Cable price scenario	Total savings (current dollars, millions)	Total savings (\$2026H1, millions)
Observed cable price (switching gain only)	\$4,413	\$4,645
Comparator 1	\$4,608	\$4,848
Comparator 2	\$5,674	\$5,966
Comparator 3	\$6,811	\$7,158
Comparator 4	\$7,779	\$8,163

Notes: Row headers specify what is assumed about cable prices in the savings calculation. See accompanying text for explanation of the switching gain in first row. As described in this section, the calculations involve consumer subscribers within the cable footprint, vintage standalone autopay FWA pricing, equipment-adjusted total prices, and cable priced from the chosen hedonic model at the median FWA download speed. For definition of the four comparators, see Section 2.3.

6.8 Results

Aggregate Part III savings over 2023H1 through 2025H2 appear in Table 18, in millions of dollars. The first row measures only one component of the saving. An FWA subscriber's saving against a counterfactual world without FWA is the but-for cable price less the FWA price, and that difference splits exactly into two terms:

$$p^{bf} - p^{fwa} = (p^{bf} - P) + (P - p^{fwa})$$

where P is the factual, observed cable price. The first term is the price reduction the household would have enjoyed had it stayed with cable. The second is the further gain from switching, which is what the observed-price row measures. Only the comparator rows are complete, and only they enter the total in section 7. The switching gain is the same under every comparator, at \$4,413 million, because it does not involve the markup. Table 19 gives the same totals by calendar year.

Now consider a discount scenario for cable prices. The base case prices cable at non-promotional rates on the reasoning that the counterfactual household has held cable for years. Consumer Reports' bill data allows the alternative to be quantified. Applying the discounts observed on real 2022 bills (Charter 34 percent of bills at a mean \$25, Comcast 19 percent at \$37, Cox 8 percent at \$26, other cable averaged) reduces the observed-price total switching gain from \$4,413 million to \$2,387 million. This is reported as a supplementary scenario here and is not carried through to the aggregate savings calculations elsewhere in this report. The reduction in Part III saving from applying these discounts, about \$2.0 billion, is only 26% to 44% of the totals under the various comparators, and so there is no danger of the savings turning negative even with reasonable alternative assumptions about promotional discounting.

TABLE 19. PART III SAVINGS BY CALENDAR YEAR, \$ MILLIONS

Year	Subscriber-months (millions)	Switching gain	Comp. 1	Comp. 2	Comp. 3	Comp. 4
2023	57.5	\$1,016	\$1,036	\$1,268	\$1,515	\$1,515
2024	89.4	\$2,103	\$2,181	\$2,569	\$2,983	\$3,420
2025	122.6	\$1,293	\$1,391	\$1,837	\$2,313	\$2,844
Total, nominal	269.6	\$4,413	\$4,608	\$5,674	\$6,811	\$7,779
Total, \$2026H1		\$4,645	\$4,848	\$5,966	\$7,158	\$8,163

Notes: All figures are in millions. For definition of the four comparators, see Section 2.3.

6.9 Summary: Part III in one expression

The work described in this section sets out the FWA-subscriber calculation as a sequence of steps: a national subscriber count, a split between consumer and business accounts, an allocation to census tracts, a restriction to the cable-overlap subset, a division across cable operators, a hedonic cable price at the matched speed, an equipment adjustment, and a but-for markup. Taken together, the steps amount to a single sum over cells, which is stated explicitly below.

6.9.1 The formula

Let a cell be a half-year period p , an FWA provider r , a census tract j , and a cable operator c .

Aggregate savings S to FWA subscribers are

$$S = \sum_{j,r,p,c} m_{jrpc} [(Q_{scrp} e^{-\beta_{jp}} + E_{cp}) - (F_{rp} + \varphi_{rp})]$$

where the consumer subscriber-months allocated to the cell are

$$m_{jrpc} = N_{rp} \frac{o_{jrp}}{\sum_{j'} L_{j'rp}} \sigma_{crp},$$

$s = s(j)$ denotes the state containing tract j , on which the cable price and the operator shares are defined, and j' indexes all tracts in the provider's covered footprint, so the denominator is its national covered total. The other variables are defined as described in Table 20.

The bracketed difference in the formula is a monthly price gap in dollars: what a household would have paid for a comparable cable plan had FWA not entered, less what it paid for FWA. Multiplying by subscriber-months and summing over cells converts that monthly gap into an aggregate over the window.

TABLE 20. TERMS IN THE EXPRESSION FOR PART III SAVINGS

Term	Definition	Established in
S	Aggregate savings to FWA subscribers over the window, in dollars	Section 6.8
m	Consumer subscriber-months allocated to the cell	Sections 6.3 and 6.5
N	National consumer subscriber-months for the provider in the half-year, after the business share is removed	Section 6.3
O	Locations in the tract that the provider covers and a cable operator also serves	Sections 6.2.2 and 6.5
L	Locations in the tract that the provider covers at 100 Mbps down and 20 Mbps up or better	Sections 6.2.2 and 6.2.4
σ	The operator's share of cable overlap locations in the state, applied uniformly within it	Section 6.5
Q	Hedonic fitted cable price at the provider's median delivered speed, excluding equipment	Section 6.6
E	Expected monthly equipment charge: billed incidence times the mean charge	Section 6.2.5
β	But-for markup in log points for the tract and half-year, zero wherever the comparator applies none	Sections 2.3 and the Economic Appendix
F	Vintage-weighted standalone autopay FWA rate paid by the installed base	Section 6.4
ϕ	Mandatory recurring FWA fee: T-Mobile's regulatory and telco recovery charge, AT&T's state cost-recovery pass-through	Section 6.2.5

Two elements of the Part III calculation do not appear explicitly in the formula, although both are part of the calculation.

The first is extrapolation to full coverage. No coverage-rate factor appears anywhere in the expression, because the hedonic price index of Section 6.6 returns a price for every combination of state, operator, half-year and matched speed, regardless whether the Urban Rate Survey observed that cell. The term Q is therefore always defined. Section 6.7 reports the share of the base priced from directly observed survey cells. That share affects confidence in the figure but does not enter the arithmetic.

The second is the vintage weighting inside F . The rate paid by the installed base is itself a weighted average over signup cohorts, each holding the rate posted when it joined, so F conceals a further

sum. Section 6.4 sets that out and brackets it between a zero-churn and a complete-turnover bound.

7 The combined total savings

7.1 Summation

The totals of the three parts are those given in Table 1: \$6.4 billion under Comparator 1, \$14.1 billion under Comparator 2, \$22.3 billion under Comparator 3, and \$28.5 billion under Comparator 4, all in current dollars. Table 21 sets out the same figures by calendar year, with Part I, Part II and Part III shown separately under each comparator.

7.2 Caveats on the total

Seven qualifications apply to any use of the summed figure. Most have been noted earlier.

- Except for Comparator 4, all three parts of the savings total use only the pooled effect of -0.1287 . The restriction assumes the effect neither grows nor decays past twelve months of exposure. If it does build, as the visual (if not statistical) evidence indicates, the figures understate the savings, and they understate most for the always-entered tracts that carry the largest household base.
- No confidence interval is reported, and since some of the unknown quantities are assumed rather than estimated, there is no basis for formal statistical inference regarding the aggregated savings.
- The comparators are illustrative scenarios. Nothing rules out an effect larger than Comparator 4 or smaller than Comparator 1, and the four do not carry probabilities.
- One factor may inflate the total. Part III prices every FWA subscriber against a comparable cable plan. Subscribers who would otherwise have bought a cheaper tier, a digital subscriber line service, satellite internet, or nothing at all had no such spending to avoid, so their counterfactual outlay may be set too high and their savings are overstated. However, perhaps not, since some legacy DSL plans and satellite internet carried far higher price per unit of download speed than either FWA or cable.
- Three biases deflate the total savings. The Urban Rate Survey samples urban places while FWA skews exurban, so the imputed cable counterfactual sits below what these households would have faced. If FWA entry contributed to the national decline in cable prices, control markets were partly treated, and the difference-in-differences estimate understates the total price effect. And the standalone price convention charges FWA subscribers a rate above what converged households actually pay (although the same is true of some cable bundles as well).
- The window is fixed at 2023H1 through 2025H2. It opens there because no tract reaches event time 1 before 2023, so Parts I and II would contribute nothing in 2022 by construction and the three parts would not otherwise cover the same periods.
- The nominal total is what households actually kept in their pockets at the time; the real total restates it in first-half-2026 purchasing power and, given inflation, therefore runs higher.

TABLE 21. ALL THREE PARTS BY CALENDAR YEAR, \$ MILLIONS

	2023	2024	2025	Total, nominal	Total, \$2026H1
Part I: cable households in the identifying cells					
All comparators	\$326	\$450	—	\$776	\$827
Part II: cable households elsewhere in the entered footprint					
Comparator 1	\$0	\$307	\$711	\$1,017	\$1,051
Comparator 2	\$2,252	\$2,539	\$2,875	\$7,666	\$8,067
Comparator 3	\$4,655	\$4,919	\$5,182	\$14,756	\$15,549
Comparator 4	\$4,655	\$7,474	\$7,865	\$19,994	\$20,994
Parts I and II together: subtotal for cable households					
Comparator 1	\$326	\$757	\$711	\$1,794	\$1,878
Comparator 2	\$2,579	\$2,989	\$2,875	\$8,442	\$8,894
Comparator 3	\$4,981	\$5,369	\$5,182	\$15,532	\$16,377
Comparator 4	\$4,981	\$7,925	\$7,865	\$20,770	\$21,821
Part III: FWA subscribers					
Comparator 1	\$1,036	\$2,181	\$1,391	\$4,608	\$4,848
Comparator 2	\$1,268	\$2,569	\$1,837	\$5,674	\$5,966
Comparator 3	\$1,515	\$2,983	\$2,313	\$6,811	\$7,158
Comparator 4	\$1,515	\$3,420	\$2,844	\$7,779	\$8,163
All three parts					
Comparator 1	\$1,362	\$2,938	\$2,102	\$6,401	\$6,726
Comparator 2	\$3,846	\$5,558	\$4,712	\$14,116	\$14,860
Comparator 3	\$6,496	\$8,352	\$7,495	\$22,343	\$23,534
Comparator 4	\$6,496	\$11,344	\$10,708	\$28,549	\$29,984

Notes: Dollar amounts are millions. Part I is dated to the half-years in which its cohorts are actually exposed, \$326 million in 2023 and \$450 million in 2024; the cohort entering 2023H2 completes its twelve months in 2024H2, so Part I contributes nothing in 2025. The three year columns are nominal. The final column converts each period's current amount to first-half-2026 dollars with the CPI-U before summing, so it exceeds the nominal total. Rows may not add across exactly because of rounding, and the totals match Table 1 on the same basis. For definition of the four comparators, see Section 2.3.