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An Economic Analysis of the T-Mobile - Sprint Merger

Before the
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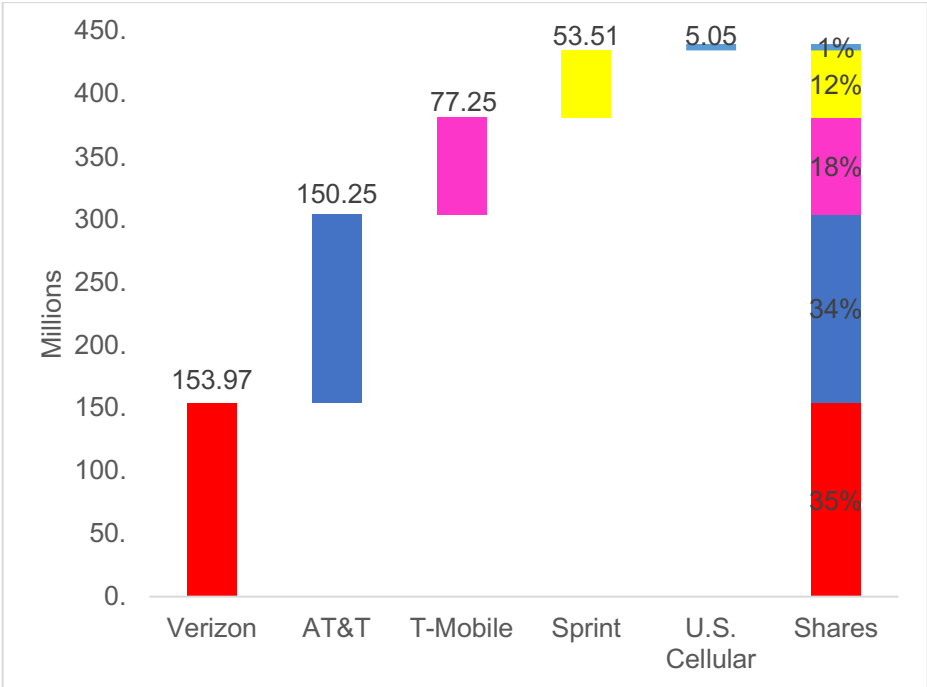
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Introduction

The proposed T-Mobile – Sprint transaction is a horizontal merger that would reduce the number of major cellular wireless providers that own and operate their own infrastructure from four to three plus several very small regional companies (Figure 1). The key question facing antitrust authorities is whether the expected efficiencies gained from combining the third and fourth largest firms outweigh the possibility that the combined firm could harm competition either on its own or by coordinating with its competitors.

Figure 1: Number of Subscribers to Largest Wireless Providers



Source: Strategy Analytics and Fierce Wireless via Statista.

A useful starting point for analyzing a proposed horizontal merger is to determine the change in market concentration were the merger to occur. The most common concentration measure is the Herfindahl-Hirschman Index (HHI)—the sum of squared market shares.¹ Considering only the largest four wireless companies that own national networks and considering all wireless subscribers as a standalone market, a T-Mobile–Sprint transaction may increase the HHI of the mobile wireless market by 400-500 points to between 3250 and 3500.²

The Federal Trade Commission (FTC) and Department of Justice (DOJ) Horizontal Merger Guidelines note that “Mergers resulting in highly concentrated markets that involve an increase in the HHI of more than 200 points will be presumed to be likely to enhance market power. The

¹ $HHI = \sum_i^N s_i^2$, where s is the market share of firm i , and N is the number of firms in the market.
² American Antitrust Institute, “Petition to Deny of the American Antitrust Institute,” https://ecfsapi.fcc.gov/file/1082877863636/AAI_Sprint-T-Mobile_FCC%20Petition%20to%20Deny.pdf, 7 (OTI, 6).

presumption may be rebutted by persuasive evidence showing that the merger is unlikely to enhance market power.”³

The Guidelines go on to note:

The purpose of these thresholds is not to provide a rigid screen to separate competitively benign mergers from anticompetitive ones, although high levels of concentration do raise concerns. Rather, they provide one way to identify some mergers unlikely to raise competitive concerns and some others for which it is particularly important to examine whether other competitive factors confirm, reinforce, or counteract the potentially harmful effects of increased concentration. The higher the post-merger HHI and the increase in the HHI, the greater are the Agencies’ potential competitive concerns and the greater is the likelihood that the Agencies will request additional information to conduct their analysis.⁴

In other words, the HHI and change in the pre- to post-merger HHI indicate that the DOJ should investigate the merger, which it is doing, but not that the government should necessarily block it. This approach is consistent with economic analysis, which has demonstrated that market structure by itself does not determine how firms behave in the market. Determining whether the expected benefits of the merger outweigh expected costs requires asking more detailed and complicated questions than concentration measures alone can answer.

The merging parties contend that the transaction will yield a net present value of \$43.6 billion in savings via “cost synergies.”⁵ Those savings, plus “the unique combination of spectrum, sites, and equipment of T-Mobile and Sprint, will produce a network that will deliver unprecedented services to consumers, increasingly disrupt the wireless industry, and ensure U.S. leadership in the race to 5G.”⁶ Opponents counter that reduced competition will increase prices of existing consumer wireless services, particularly for low-income and rural customers, and slow the rollout of 5G service.

Like all merger investigations, this one involves predicting the future under two different states of the world, meaning that it is not possible to know the answers with certainty. While the Horizontal Merger Guidelines note that “certainty about anticompetitive effect is seldom possible and not required for a merger to be illegal,”⁷ this merger arguably involves more uncertainty than most. The imminent arrival of 5G means the industry is on the cusp of radical changes in its underlying technology. Antitrust analysis requires some understanding of the equilibrium state of the industry or at least what we believe to be an efficient industrial organization. Nobody knows what 5G demand or supply will look like, making it especially difficult to estimate the medium- to long-term costs and benefits of the merger.

This analysis concludes that the evidence does not convincingly show why the incentives, and therefore likely behavior, of a merged firm would be different from those facing the two firms

³ U.S. Department of Justice and the Federal Trade Commission, “Horizontal Merger Guidelines,” August 19, 2010, 19, <http://www.justice.gov/atr/public/guidelines/hmg-2010.html>.

⁴ U.S. Department of Justice and the Federal Trade Commission, 19.

⁵ T-Mobile and Sprint, “Description of Transaction, Public Interest Statement, and Related Demonstrations,” June 18, 2018, 15.

⁶ T-Mobile and Sprint, 16.

⁷ U.S. Department of Justice and the Federal Trade Commission, “Horizontal Merger Guidelines,” 1.

today. Empirical analysis of 4-3 mergers, meanwhile, yields no consistent result in the economic literature. In some cases, 4-3 mergers led to price increases, sometimes to price decreases, and sometimes to no price change.

The absence of consistent evidence suggesting overall competitive harm implies that merger authorities should approve the merger. Antitrust authorities should, however, pay particular attention to possible effects of the merger on low-income and wholesale consumers, since T-Mobile and Sprint serve particularly large shares of those market segments.

Meanwhile, regardless of the merger, the FCC and NTIA should move vigorously to continue bringing more spectrum to market and introducing market-based, competitive, mechanisms for distributing universal service funds.

This analysis proceeds as follows. The following section describes various aspects of the existing industry structure and market. It then turns to evaluating efficiency claims, followed by possible effects on competition. From there it discusses the inherent uncertainty in how 5G will evolve and how that uncertainty affects the analysis, distributional concerns regarding low-income and rural service, and concludes.

The Industry and Markets

Wireless service providers offer wireless network access by combining spectrum, technology, labor, and business models. Consumers then use wireless service for various purposes. Supply and demand for wireless service together yield a set of prices and services.

Economists define product markets by considering whether goods or services from different firms are substitutes or complements. In other words, a product market is based on how much products compete with each other to replace or enhance other products in the same market.

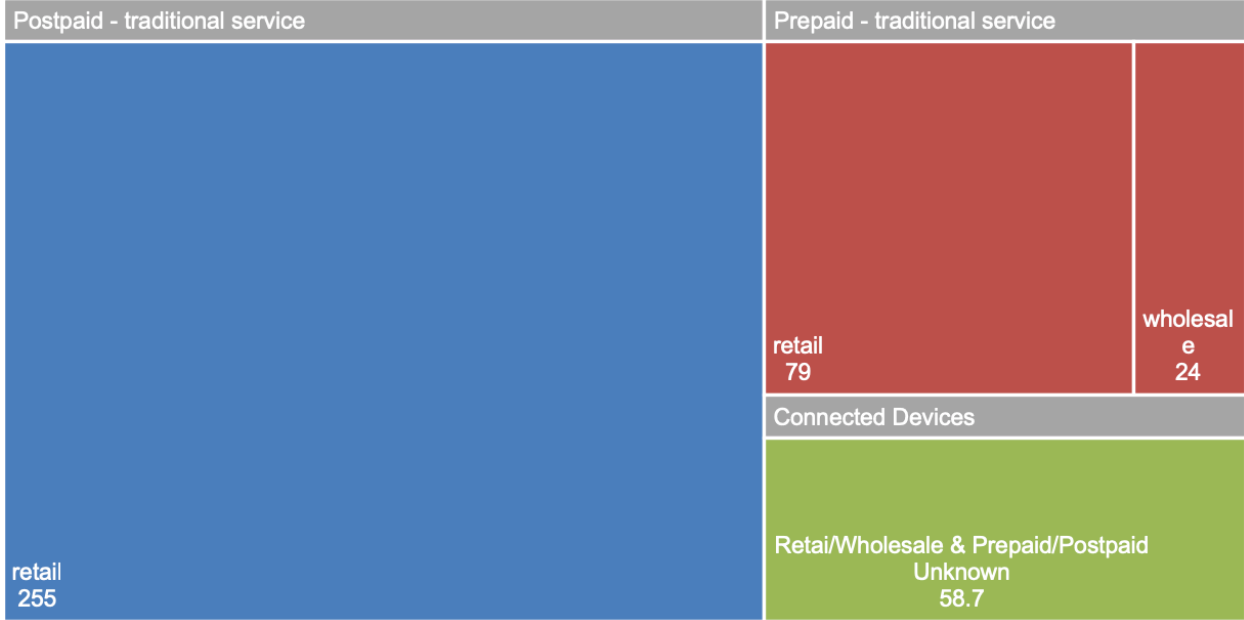
Defining relevant markets for antitrust analysis can be complicated because some aspects of each product compete with others to lesser and greater degrees. Unlimited data plans from AT&T, Verizon, T-Mobile, and Sprint compete directly with each other. If one company changes the price or features of its unlimited plans the other companies will react, or at least consider whether they need to react.⁸ However, determining the extent to which a limited-data, pay-as-you-go plan competes with unlimited data plans is more complicated, requiring empirical analysis of cross-price elasticities.

As a starting point for thinking about market definition for antitrust analysis, consider various dimensions of the market. Traditional wireless services include voice, text, and data services offered to residential and business consumers. Newer services include the Internet of Things (IoT), which generally refers to connected devices that talk to each other (also called machine-to-machine, or M2M), also rely on wireless infrastructure. Providers sell retail and wholesale connectivity for traditional and newer services. For retail, the infrastructure-based carrier sells

⁸ Scott Wallsten, “Is This Data’s One-Rate Moment?,” *Technology Policy Institute Blog* (blog), March 21, 2017, <https://techpolicyinstitute.org/2017/03/21/is-this-datas-one-rate-moment/>.

the service directly to the end user. For wholesale, the carrier sells network access to another firm, which resells mobile service subscriptions to end-users. Firms that resell service purchased wholesale are called “mobile virtual network operators” (MVNOs). Figure 2 shows the number of subscribers by type.

Figure 2: Number of Connections in Millions, By Type of Service, Q4 2016



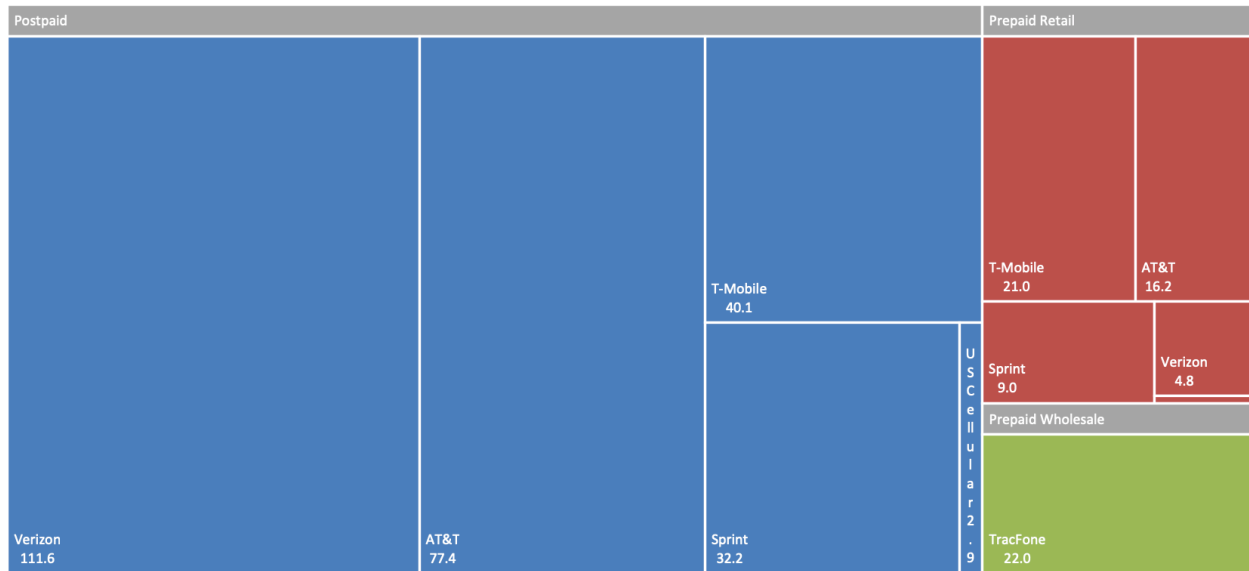
Note: 416.7 million total connections in Q4 2016. The number of connected devices by retail and wholesale connections does not appear to be publicly available.

Source: FCC Mobile Competition Report (2017)⁹

Each of these segments can be further broken down by the firms offering service, although shares of wireless provision for connected devices do not appear to be available. Traditional wireless services are sold in two ways—postpaid and prepaid. As their names imply, consumers pay for postpaid service at the end of some billing period, and for prepaid service in advance. Figure 3 shows the share of subscribers to traditional wireless service by postpaid and prepaid service. The degree to which prepaid services compete with traditional postpaid plans should be reflected in the cross-price elasticities, but I am not aware of any studies that attempt to estimate them.

⁹ Federal Communications Commission, “Twentieth Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services,” September 17, 2017, fig. II.B.2, <https://docs.fcc.gov/public/attachments/FCC-17-126A1.pdf>.

Figure 3: Number of Subscribers by Firm by Type in Millions, Q2 2018



Sources: Moffett (2018a, b), Kovacs (2018), and Dano (2018).¹⁰

Note: Many MVNOs operate in the U.S. Only TracFone has enough subscribers to show up in this figure. US Cellular is the unlabeled rectangle below Verizon in prepaid retail.

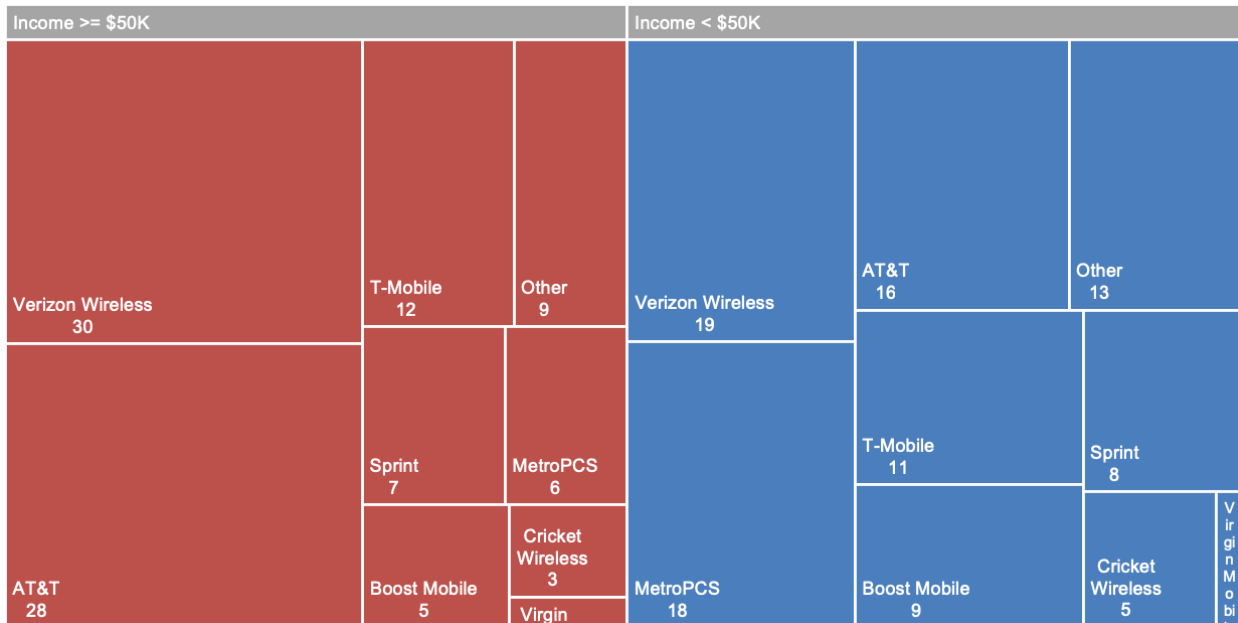
Different product offerings, however, do not necessarily define relevant product markets. Prepaid plans are popular among low-income people, and firms offering prepaid-retail and prepaid-wholesale service compete for those customers. In contrast, postpaid plans, which can be lower priced than prepaid plans, may also be part of the relevant market for low-income people. As a result, it may be the case that share of low-income subscribers by firm is unrelated to the share of prepaid or postpaid plans offered by each firm.

Figure 4 suggests that, firms' share of low-income consumers differs from the share of firms providing prepaid service. This information does not appear to be widely available, but one survey found that among people whose incomes are under \$50,000, 29 percent have service through T-Mobile, 21 percent from AT&T, 19 percent from Verizon, 18 percent from Sprint, and 13 percent from "other" providers (likely primarily TracFone).¹¹

¹⁰ Craig Moffett, "U.S. Wireless: Is This a Market in Need of 'Repair?' Downgrading Verizon to Neutral" (MoffettNathanson Research, September 4, 2018); Craig Moffett, "AT&T Q2 2018 Earnings: That's Showbiz, Folks" (MoffettNathanson Research, July 24, 2018); Anna-Maria Kovacs, "Competition in the U.S. Wireless Services Market," Georgetown Business and Public Policy Working Paper, August 2018, <https://cbpp.georgetown.edu/sites/default/files/Policy%20Paper%20-%20Kovacs%20-%20Wireless%20Competition%202018-08.pdf>; Mike Dano, "Wireless MVNO Straight Talk Remains the Bright Spot in America Movil's U.S. Business," *FierceWireless*, July 19, 2018, <https://www.fiercewireless.com/wireless/mvno-straight-talk-remains-bright-spot-america-movil-s-u-s-business>.

¹¹ T-Mobile total includes MetroPCS, AT&T total includes Cricket Wireless, and Sprint total includes Boost Mobile and Virgin Wireless.

Figure 4: Current Wireless Provider, by Percent of Wireless Population by Income in 2017

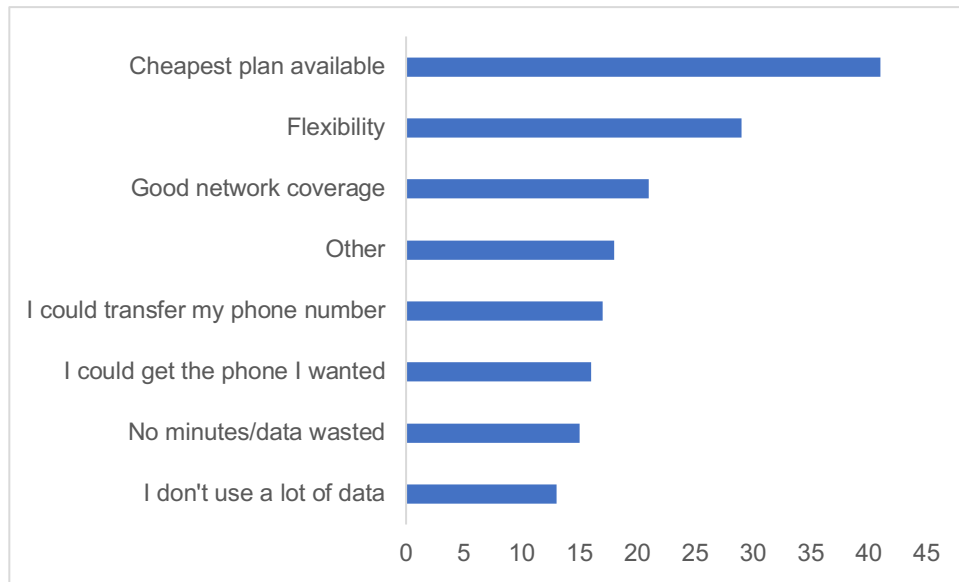


Source: Fluent (2017).¹²

Additional evidence suggests that while prepaid plans appeal to low-income people, they are not the only people who choose prepaid options. Figure 5 shows that while the most popular reason for choosing prepaid plans is because of their low prices, only 41 percent of respondents listed price as a reason for using prepaid service. To be clear, choosing other options in the survey does not necessarily mean that the respondent is in a higher income group. “No minutes/data wasted” is likely to be important to low-income people since that can also imply not spending extra money. Still, with more than half of respondents choosing plans for reasons explicitly other than price suggests that prepaid plans may appeal to a range of groups.

¹² Fluent, “Telecom Report 2017: Consumer Attitudes and Loyalty,” May 2017, http://www.fluentco.com/wp-content/uploads/2017/06/Fluent_TelecomReport_2017.pdf.

Figure 5: Reasons for Choosing Prepaid Plans



Source: Fluent (2017).¹³

Merger Efficiencies

T-Mobile and Sprint claim a net present value of \$43.6 billion in cost savings¹⁴ from the merger and an ability to build out a better 5G network than either firm would have on its own. A better combined network, the parties contend, would yield not just more and better connectivity, but also “a bona fide alternative to traditional in-home broadband providers,” better rural broadband service, and “thousands of additional American jobs.”¹⁵

Cost Savings

Cost savings from ending duplicative spending are economic benefits of the merger. The \$43.6 billion in cost savings will come, T-Mobile President G. Michael Sievert says, from \$25.7 billion in savings from eliminating the “duplication of T-Mobile’s and Sprint’s existing networks...”, \$11.2 billion in savings from “sales, service and marketing cost-related synergies...”, and \$6.1 billion in savings in “back office synergies from I.T. and billing improvements and other general and administrative synergies.”¹⁶ Actual cost savings may be higher or lower than the firms claim, but efficiencies resulting in lower fixed costs are a primary rationale for horizontal mergers.

¹³ Fluent.

¹⁴ T-Mobile and Sprint, “Description of Transaction, Public Interest Statement, and Related Demonstrations,” 15.

¹⁵ T-Mobile and Sprint, ii–iii.

¹⁶ T-Mobile and Sprint, “Description of Transaction, Public Interest Statement, and Related Demonstrations” Appendix C, Declaration of G. Michael Sievert.

A Better 5G Network

The main public interest benefit, according to the merging parties, is that T-Mobile's and Sprint's combined resources would allow the new firm "to invest in new network technology, innovation, and operations to rapidly construct and deploy the first true, nationwide 5G network."¹⁷ The merging parties describe the consumer benefits they anticipate their network generating:

New T-Mobile also will be positioned to use its 5G network to deliver increased competition in broadband, enterprise, and video offerings. Moreover, New T-Mobile will use the increased capacity realized by the combination of T-Mobile and Sprint's networks to deliver lower prices and allow for increased data usage by subscribers.¹⁸

Specifically, they argue, the combination of resources—particularly spectrum—makes a leading 5G network possible.

The transaction will enable New T-Mobile to build a network with distinct advantages over both the standalone 5G networks planned by T-Mobile and Sprint and will provide a platform for an unrivaled nationwide 5G mobile service. On a standalone basis, neither company has enough or the right combination of spectrum or cell site resources to deliver the enormous gains in capacity that New T-Mobile will provide in the near term. By having the option to use cell sites from either company, the transaction will allow the merged entity to have almost immediate access to more cell sites than either company would have absent the merger. New T-Mobile's deployment of T-Mobile's and Sprint's combined spectrum portfolios, together with the addition of many more radios across the combined network than either party would install on its own, will create a massive increase in capacity that would not be possible but for the transaction. The merger will also enable the combined company to dedicate more spectrum to 5G much sooner than either company could do individually, while also allowing New T-Mobile to more efficiently utilize existing spectrum assets for continued and unimpaired LTE services.¹⁹

Thus, according to T-Mobile and Sprint, the combined firm will build a higher quality 5G network more quickly than either firm could build on its own, thereby yielding larger 5G benefits than their separate networks would. They note that the benefits include wireless service, connected devices, and additional competition for in-home broadband.

These claims are difficult to evaluate. We know almost nothing about the demand for 5G. 5G's expected benefits flow not just from faster speeds, but also from lower latency, and is variously touted as supporting better wireless consumer connections, better home connections, and massive connectivity of devices. It may do all of those things and more. But, it is also possible that the hype will prove to be unjustified, with wireless innovation continuing at its current—albeit fast—pace. It is not possible to know.

On the one hand, this uncertainty may imply that a larger number of firms investing in 5G is socially beneficial because it may mean more experimentation in how to implement the technology and business models. A larger number of wireless firms competing for 5G customers

¹⁷ T-Mobile and Sprint, 15.

¹⁸ T-Mobile and Sprint, 16.

¹⁹ T-Mobile and Sprint, 17.

may increase the odds of finding which types of networks and plans best stimulate additional innovation.

On the other hand, this uncertainty increases the chances that firms may not succeed in their initial rollout of 5G, requiring costly retrofits. Deep-pocketed firms with lower costs of capital are probably better suited to such an environment than smaller competitors.

Investment in what turns out to be the “wrong” technology has happened in the past. Sprint and Clearwire, for example, both invested in WiMax rather than LTE, requiring a costly rebuild of their 4G networks. In its first rollout of 5G-based fixed wireless service, Verizon apparently based its equipment on technologies inconsistent with certain 5G standards and will eventually have to change equipment.²⁰ Verizon’s reliance on what turned out not to be the relevant standard may not have been a mistake, per se. The firm believed it was valuable to be first to market with 5G and was willing to invest early despite the risk. Fortunately, Verizon has the resources for course correction. Smaller companies, such as T-Mobile and Sprint as separate competitors, may not.

Aside from the uncertainty about 5G itself, there is little agreement about how antitrust analysis should explicitly incorporate technological change. The combination of real-world and theoretical uncertainty makes antitrust analysis in this case especially difficult. To reach meaningful and actionable conclusions, antitrust analysis must have some view of what constitutes “better” and “worse” outcomes. With technology so new that almost no consumers have even used it yet, we cannot predict with any accuracy how 5G will interact with current technologies, how 5G will affect prices, what 5G will mean for entry, and whether 5G’s benefits are likely to flow disproportionately to any particular group of Americans.

Jobs Are Not a Benefit

Mergers allow firms to eliminate duplicative jobs in order to reduce costs and operate more efficiently. In other words, net job losses from a merged firm is an economic argument in favor of merger since it means the firm has become leaner, more profitable, and more productive with less costs of labor.

Politicians, public opinion, and unions do not view the reallocation of labor as a benefit, however. The difference between political and economic perspectives leads to a curious reversal in the arguments each side makes. In this merger, T-Mobile and Sprint claim that “the incremental increases for the combined direct internal and external employees will be 9,600 more jobs relative to the standalone companies’ baselines for 2021.”²¹ This increase in jobs would seem to negate some of the efficiency arguments described above. Some opponents of the merger argue that the merger should be denied because jobs will likely be eliminated. As one opponent said, “the proposed transaction would likely lead to substantial job losses in the United

²⁰ <https://www.theverge.com/2018/10/2/17927712/verizon-5g-home-internet-real-speed-meaning>

²¹ T-Mobile and Sprint, “Description of Transaction, Public Interest Statement, and Related Demonstrations,” 9.

States.... Importantly, both companies have a history of layoffs in prior mergers.”²² The claim that a combined firm will operate with less labor supports the merging parties’ efficiency claims.

Merger Competition Considerations

Antitrust authorities must balance potential efficiencies with harms from loss of competition. A key step, then is evaluating the expected effects on competition. Several issues can help shed light on this issue. First, what can we learn from other wireless or telecommunications mergers that involved going from four to three major competitors? Second, what is the role of T-Mobile as a “maverick,” and is the merger is likely to change its behavior? Finally, what do we expect Sprint’s future to be absent a merger, and how does that matter?

Evidence on 4-3 Mergers

In principle, economic studies of 4-3 mergers should provide significant insights into what we might expect to see following a merger of two of the four largest American wireless carriers. In one study, the Body of European Regulators for Electronic Communications (BEREC) reviewed 14 separate existing empirical studies of 4-3 mergers.²³ Some studies find higher prices after a merger, with some of those increases being persistent and other increases disappearing quickly. Some studies find decreasing prices. Some studies find no change in prices after a merger. One study found that 4-3 mergers resulted in price increases but also increased investment.²⁴ But the 14 empirical studies each have flaws. Most importantly, none properly addressed reasons why the merger happened in the first place (i.e., endogeneity).

²² “Petition to Deny of Common Cause, Consumers Union, New America’s Open Technology Institute, Public Knowledge and Writers Guild of America, West, Inc.,” August 27, 2018, 30, <https://ecfsapi.fcc.gov/file/10827862305575/T-Mobile%20Sprint%20Petition%20to%20Deny%20CC%20CU%20OTI%20PK%20WGA.pdf>.

²³ Body of European Regulators for Electronic Communications, “BEREC Report on Post-Merger Market Developments - Price Effects of Mobile Mergers in Austria, Ireland and Germany,” n.d., https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/8168-berec-report-on-post-merger-market-devel_0.pdf.

²⁴ “Using data from 28 European countries from 2002-2014, the Centre on Regulation in Europe (CERRE, 2015) investigates the effect of market structure on prices and investment. The paper finds that 4-to-3 mergers on average result in price increases and more investment per operator. The combined effects of higher investment per operator and the reduction from four to three operators result in no significant effect on total investment by all operators in the market.” Body of European Regulators for Electronic Communications, 7.

Table 1: 4-3 Merger Studies Reviewed in BEREC (2018)

Table 1: Overview of Related Literature

No.	Study by	Prepared For	Scope	Specific Merger Examined?	Effects of 4-to-3 Mergers on			Effects of 5-to-4 Mergers on	
					Price	Investment	Quality	Price	Investment
1	Affeldt/Nitsche (2014)	Telefónica	EU, 2003-2012	no	~/- ¹⁾				
2	Houngbonon/Jeanjean (2014)	Orange	World, 2000-2014	no		+			
3	CERRE (2015)		≥28 countries, 2002-2014	no	+	+/~ ²⁾		~	+/~ ²⁾
4	Csorba, Pápai (2015)		27 countries, 2003-2010	no	+			~	
5	Frontier Economics (2015)	GSMA	EU, 2010-2014	no	~	~			
6	Houngbonon (2015)	Orange	40 countries, q1/13-q3/14	AT, 2013	-				
7	HSBC (2015)		see 2) and 6)	AT, 2013 (price)	-	+			
8	WIK (2015)	Ofcom	12 countries	no	~	~	~	~	~
9	Aguzzoni et al / ACM, EC, RTR (2015)		AT, NL and 12 controls, 2004-2010	AT, 2006, NL, 2007	+			~	
10	RTR (2016)		AT and 10 controls, 2011-2014	AT, 2013	+				
11	BWB (2016)		AT, 2011-2014	AT, 2013	+				
12	Ofcom (2016)		25 countries, 2010-2015	no	+				
13	GSMA (2017)		AT and 17 controls, 2011-2016	AT, 2013			+		
14	Lear/DIW Berlin/Analysys Mason (2017)	EC	UK and 9 controls, 2007-2014	UK, 2010				-	+/~ ³⁾

+: increasing effect, -: decreasing effect, ~: no significant effect

¹⁾ No evidence for positive relationship between concentration and prices; some indications that the relationship may be negative

²⁾ positive effects at the operator-level, no effects at the market level

³⁾ increase in total investment, no effect on investment per subscriber

Source: BEREC (2018), Table 1.

In its report, BEREC also examined three 4-3 European mergers—in Austria, Germany, and Ireland. They found weak evidence of short-term retail price increases, but the findings were not robust. An OECD study supports these generally inconsistent results with 2018 data. Today, the OECD considers Austria to be “inexpensive,” Germany to be “relatively inexpensive,” and Ireland to be “expensive.”²⁵

The bottom line is that the history of 4-3 mergers provides little guidance on future results of prices in the T-Mobile and Sprint merger. Opponents of the merger can point to the examples of price increases as evidence that the proposed merger will harm consumers, while proponents of the merger can point to examples where prices decreased or remained unchanged.

Every merger is different. The following two subsections discuss two additional aspects of this merger.

Mavericks

T-Mobile has had significant market success with its “un-carrier” approach, which includes innovations such as eliminating “termination fees and penalties for over-usage.”²⁶ The FTC-DOJ merger guidelines note that these types of firms deserve special scrutiny in a potential merger:

The Agencies consider whether a merger may lessen competition by eliminating a “maverick” firm, i.e., a firm that plays a disruptive role in the market to the benefit of customers. For example, if one of the merging firms has a strong incumbency position and the other merging firm threatens to disrupt market conditions with a new technology or business model, their merger can involve the

²⁵ http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=50378, p.33

²⁶ T-Mobile and Sprint, “Description of Transaction, Public Interest Statement, and Related Demonstrations,” 15.

loss of actual or potential competition. Likewise, one of the merging firms may have the incentive to take the lead in price cutting or other competitive conduct or to resist increases in industry prices. A firm that may discipline prices based on its ability and incentive to expand production rapidly using available capacity also can be a maverick, as can a firm that has often resisted otherwise prevailing industry norms to cooperate on price setting or other terms of competition.²⁷

While “maverick” has no specific definition in the FTC-DOJ guidelines, the merging parties and their opponents seem to agree that T-Mobile is one.

A 2016 study by the British telecommunications regulator Ofcom found that wireless markets with a maverick tend to have lower consumer prices than markets without one.²⁸ It was partly for this reason that the DOJ challenged the proposed merger of AT&T and T-Mobile in 2011, noting, “AT&T’s elimination of T-Mobile as an independent, low-priced rival would remove a significant competitive force from the market.”²⁹ Several petitions against the proposed merger cite the rejection of the AT&T—T-Mobile merger as evidence that the government should reject this merger, too.³⁰

The AT&T merger, however, involved T-Mobile disappearing as a distinct, independent company and merging with one of the top two providers. The proposed merger between T-Mobile and Sprint leaves the maverick in place, but as a larger entity as a third competitor. The key question that comes from the maverick debate, then, seems to be whether the merger is likely to create incentives that cause T-Mobile to change its behavior and compete less aggressively in ways different from their approach today.³¹

In other words, the maverick debate is a variation on the 4-3 question addressed above: Will a maverick firm remain a maverick if it grows larger to compete with its two main rivals? More specifically, is the merger likely to affect the firm’s costs and incentives in ways that change its approach to gaining and keeping customers? Similarly, did Sprint generate competitive pressure on T-Mobile that caused it to differentiate itself as a maverick, or was Sprint irrelevant to T-Mobile’s ‘un-carrier’ marketing and network investments?

Economic theory does not suggest that small firms are necessarily more innovative or likely to take risks than large firms, or vice versa.³² We do not know T-Mobile’s behavior as a maverick

²⁷ U.S. Department of Justice and the Federal Trade Commission, “Horizontal Merger Guidelines,” 3–4.

²⁸ Ofcom, “A Cross-Country Econometric Analysis of the Effect of Disruptive Firms on Mobile Pricing,” March 15, 2016, https://www.ofcom.org.uk/_data/assets/pdf_file/0019/74107/research_document.pdf.

²⁹ U.S. Department of Justice, “Complaint: United States of America v AT&T Inc. and T-Mobile USA Inc. and Deutsche Telekom AG,” August 31, 2011, para. 3.

³⁰ See, for example, American Antitrust Institute, “Petition to Deny,” August 27, 2018, https://ecfsapi.fcc.gov/file/1082877863636/AAI_Sprint-T-Mobile_FCC%20Petition%20to%20Deny.pdf.

³¹ Saturday Night Live addressed the question of what a maverick does in a 2008 parody of the vice-presidential debate:

Gwen Ifill: How will you solve the financial crisis by being a maverick?

Gov. Sarah Palin: You know, we’re gonna take every aspect of the crisis and look at it and then we’re gonna ask ourselves, “What would a maverick do in this situation?” And then, you know, we’ll do that!

³² For an early test of firm size and innovation, see Zoltan J. Acs and David B. Audretsch, “Innovation in Large and Small Firms: An Empirical Analysis,” *American Economic Review* 78, no. 4 (1988): 678–90.

will change after the merger. As with the broader 4-3 question, the maverick issue does not provide strong evidence in favor or against the proposed merger.

Sprint's Future

Sprint's future as a standalone fourth competitor is directly relevant to this analysis. If one of the firms of a merger is likely to disappear absent the merger, then the merger itself is unlikely to increase market power. The Horizontal Merger Guidelines describe this "failing firm" argument as follows:

Notwithstanding the analysis above, a merger is not likely to enhance market power if imminent failure, as defined below, of one of the merging firms would cause the assets of that firm to exit the relevant market. This is an extreme instance of the more general circumstance in which the competitive significance of one of the merging firms is declining: the projected market share and significance of the exiting firm is zero. If the relevant assets would otherwise exit the market, customers are not worse off after the merger than they would have been had the merger been enjoined.

The Agencies do not normally credit claims that the assets of the failing firm would exit the relevant market unless all of the following circumstances are met: (1) the allegedly failing firm would be unable to meet its financial obligations in the near future; (2) it would not be able to reorganize successfully under Chapter 11 of the Bankruptcy Act; and (3) it has made unsuccessful good-faith efforts to elicit reasonable alternative offers that would keep its tangible and intangible assets in the relevant market and pose a less severe danger to competition than does the proposed merger.³³

The failing firm argument is difficult to prove. Even if Sprint declared bankruptcy, it could reorganize in bankruptcy and possibly reemerge as a new competitor after recapitalization. Convincing antitrust authorities that a firm is failing for the purposes of merger review is difficult because the guidelines require the firm to meet several criteria, each of which will happen with some probability, therefore making the expected probability of all of them happening much smaller.

The merging parties do not argue that Sprint is failing,³⁴ although some petitioners have interpreted the merging parties' public interest statement that way.³⁵ Instead, the merging parties argue that Sprint is an ineffective competitor and lacks the resources to build a robust 5G network on its own.³⁶

³³ U.S. Department of Justice and the Federal Trade Commission, "Horizontal Merger Guidelines."

³⁴ T-Mobile and Sprint, "Description of Transaction, Public Interest Statement, and Related Demonstrations," 94.

³⁵ "Petition to Deny of Common Cause, Consumers Union, New America's Open Technology Institute, Public Knowledge and Writers Guild of America, West, Inc.," 19.

³⁶ T-Mobile and Sprint, "Description of Transaction, Public Interest Statement, and Related Demonstrations," 94–96.

Sprint ranks last among the big four wireless providers in terms of overall coverage,³⁷ rural coverage,³⁸ speed,³⁹ and customer satisfaction.⁴⁰ While discussing MVNOs, one petitioner opposed to the merger noted that “[n]etwork quality is critical to attracting customers and competing against rival providers,”⁴¹ seemingly making the case that Sprint’s lower-quality network makes it a less effective competitor.

The general trend for Sprint over the 2010s has not been good. In the first quarter of 2011, Sprint had 17 percent of all wireless subscriptions in the country, but by the third quarter of 2018 had only 12 percent of wireless subscriptions. Sprint has a higher churn rate than the other providers. and, as analyst Craig Moffett noted, “strikingly, it is getting worse.”⁴² Sprint’s free cash flow has generally been negative until the third quarter of 2016.⁴³ From then until the third quarter of 2018 it was somewhat positive, but not consistently so. In the fourth quarter of 2018, Sprint had between \$900 million and \$1.2 billion in negative cash flow.

Sprint may not be a failing firm by antitrust standards, but it is not thriving, either. Sprint’s problems suggest reasons to lean towards believing the parties’ claims that Sprint will not be able sustain investment required to compete, especially in the coming 5G world.

But then again, Sprint’s future has looked uncertain before. In 2012, for example, one analyst believed there was “a roughly 50/50 probability of bankruptcy.”⁴⁴ In 2014, T-Mobile and Sprint explored a merger on the grounds that neither alone could compete effectively with the two biggest carriers.

In short, Sprint remains a struggling firm in 2019. That does not necessarily mean it will fail or fail to stimulate competition. It probably does mean that the larger and more difficult the investments needed to build world-class 5G networks, the less likely it is that Sprint—or T-Mobile—would be able to compete effectively on its own.

Wholesale

Wholesale service is network access that infrastructure-based carriers sell to other firms, which use the access for a number of services, ranging from offering standard consumer wireless services to using connectivity and monitoring as inputs into their own services. Any firm providing service this way is considered an MVNO.

³⁷ Federal Communications Commission, “Twentieth Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services,” 54.

³⁸ Federal Communications Commission, 60.

³⁹ Federal Communications Commission, 68–70.

⁴⁰ Market Force, “Consumer Cellular Beats Our Big Four as Consumers’ Favorite Wireless Carrier, According to New Market Force Information Study,” July 31, 2018, <https://www.marketforce.com/2018-Market-Force-study-on-wireless-carriers>.

⁴¹ “Petition to Deny of Common Cause, Consumers Union, New America’s Open Technology Institute, Public Knowledge and Writers Guild of America, West, Inc.,” 16.

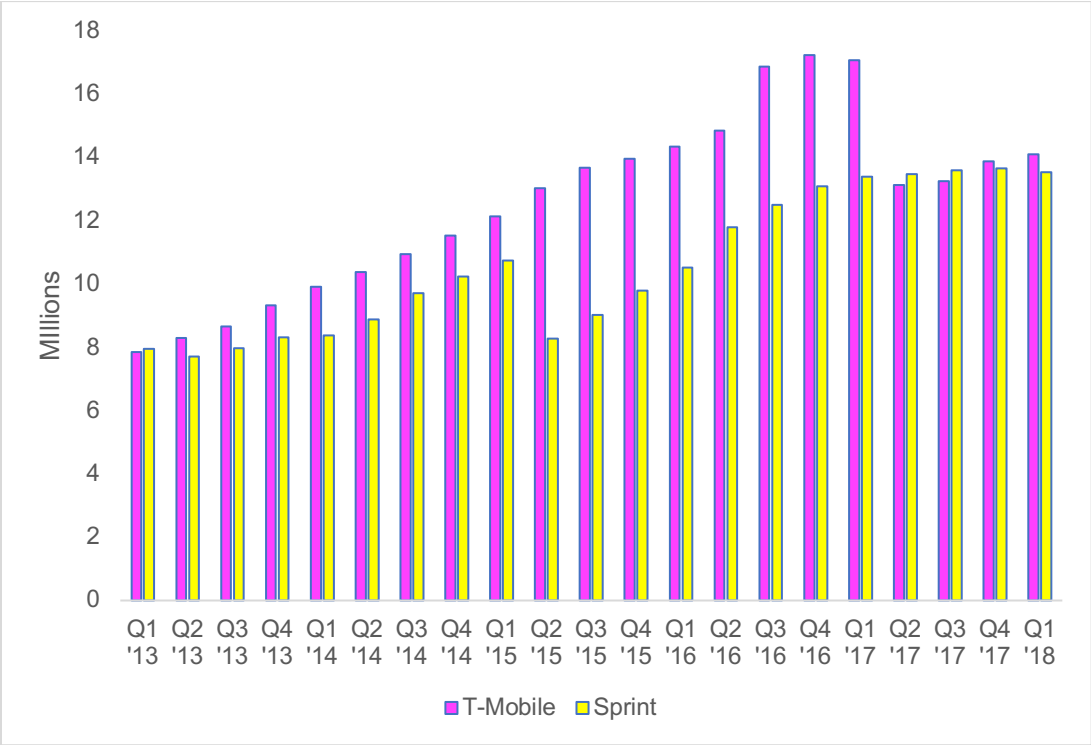
⁴² Craig Moffett, “Sprint CQ4 2018 Earnings: Do Politics Matter?,” January 31, 2019.

⁴³ Moffett.

⁴⁴ <https://seekingalpha.com/article/444511-sprint-downgraded-on-potential-bankruptcy-fears>

Wholesale may not be a market itself, but it serves two types of customers: MVNOs and machine-to-machine (M2M) connectivity, which is a large component of the “internet of things.” M2M matters because many predict that a key component of 5G will be its effects on the IoT. Figure 6 shows the number of T-Mobile’s and Sprint’s wholesale customers.

Figure 6: T-Mobile and Sprint Wholesale Customers



Note: In 2017, T-Mobile noted in its Annual Report that “regulatory changes have made the Lifeline program offered by our wholesale partners uneconomical” and removed “Lifeline customers from our reported wholesale subscriber base resulting in the removal of 4,528,000 reported wholesale customers.”⁴⁵ Similarly, Sprint stopped reporting Lifeline wholesale customers around the same time, but revised its data on wholesale customers back to Q2 2015.⁴⁶

Sources: FCC, Sprint and T-Mobile Quarterly and Annual reports, and carriers via Statista.

As the Figure shows, the number of wholesale customers for both providers has been generally increasing. Forbes noted in 2016 that, “[T-Mobile’s] wholesale subscriber base has risen from about 6 million in 2011 to close to 14 million in 2015 and we project that the number could grow to about 22 million by 2020.”⁴⁷ Together, the two providers account for a significant share of wholesale connections. Harrington, et al., in a declaration for Dish, noted that T-Mobile and Sprint together “account for more than 60% of wholesale connections (i.e., 26.6 million of the

⁴⁵ T-Mobile, “2017 Annual Report,” n.d., 24.
⁴⁶ Sprint Corporation, “Quarterly Report,” Form 10-Q, June 30, 2017, https://s21.q4cdn.com/487940486/files/doc_financials/quarterly/2017/q1/Q1-2017-10Q.pdf.
⁴⁷ <https://www.forbes.com/sites/greatspeculations/2016/07/06/a-look-at-t-mobiles-wholesale-wireless-business/#1bf539b07297>

estimated 42.5 million).⁴⁸ Common Cause, et al., put the total at 45 percent in their petition.⁴⁹ Altice estimated that “68% of the MVNO market relies on T-Mobile and Sprint today.”⁵⁰

The largest MVNO, TracFone, primarily sells prepaid service, but other MVNOs are beginning to compete for customers of postpaid services. These MVNOs include Google’s Google Fi, Comcast’s Xfinity Mobile, and Charter’s Spectrum Mobile. Comcast reported having more than 1 million subscribers by the end of the third quarter of 2018,⁵¹ with one analyst projecting it to have 3.3 million customers—probably about one percent of postpaid plans—by 2020.⁵²

Reliable, public, data on M2M service are scarce. T-Mobile and Sprint both sell M2M services under their own brands, but note in their public interest filing that T-Mobile “offers a small number of basic consumer IoT products”⁵³ and that “Sprint has made recent efforts to expand its IoT offerings, but has struggled to launch competitive products in part due to its lack of low-band spectrum.”⁵⁴

The large share of wholesale service provided by T-Mobile and Sprint as well as the growing importance of M2M suggests that antitrust authorities should pay particular attention to wholesale. Being a large wholesale provider does not necessarily mean the merger would be problematic. Entry or expansion by Verizon and AT&T in wholesale may be relatively inexpensive, constraining pricing power. Still, presumably DOJ and FCC have access to proprietary data that will allow them to examine these areas more carefully.

LTE to 5G Transition

The technology transition underway complicates the questions discussed above. The main problem is that we do not know what outcome or timeline will maximize total welfare. For the next several years, the most common wireless technology will continue to be LTE. The transition means that investment and subscriptions will shift from LTE to 5G over some period of time. Ericsson estimates that the majority of wireless subscriptions will continue to be LTE through 2023 (Figure 7Figure 3).

⁴⁸ Joseph Harrington et al., “Declaration of Joseph Harrington, Coleman Bazelon, Jeremy Verlinda, and William Zarakas,” August 27, 2018, 38, <https://ecfsapi.fcc.gov/file/108271088719800/REDACTED%20DISH%20PTD%20Sprint%20TMO%208-27-18.pdf>.

⁴⁹ Common Cause, et al., “Petition of Common Cause,” 28.

⁵⁰ Altice USA, Inc., “Petition to Condition or Deny,” August 27, 2018, 3, <https://ecfsapi.fcc.gov/file/10827968626122/Altice%20USA%20Inc%20-%20Petition%20to%20Condition%20or%20Deny.pdf>.

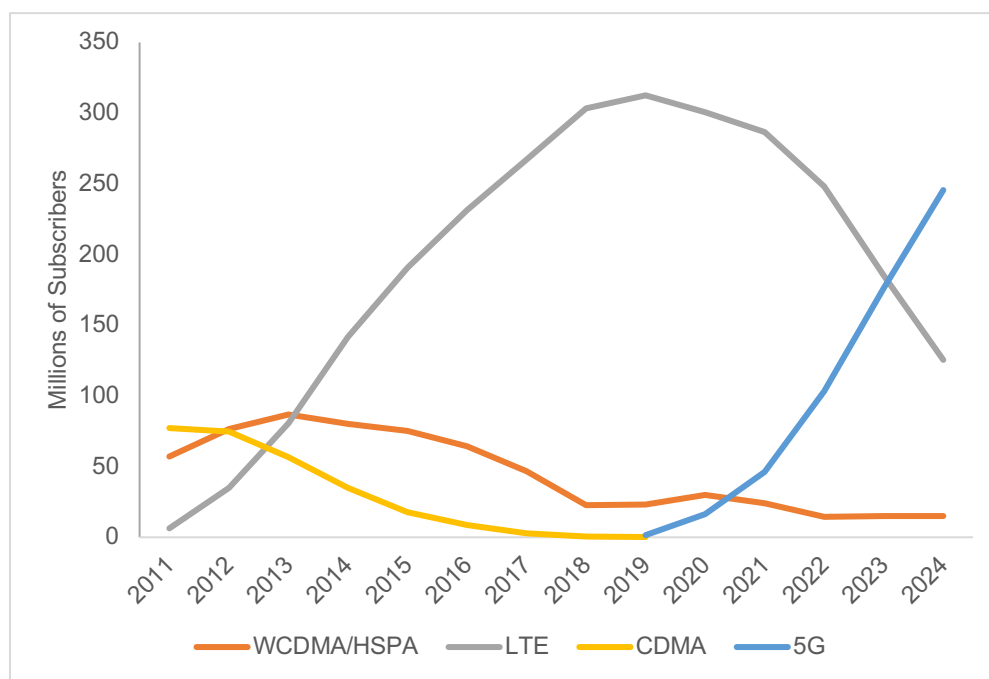
⁵¹ <https://www.fiercewireless.com/wireless/comcast-s-xfinity-mobile-begins-to-accelerate>

⁵² <https://www.fiercewireless.com/wireless/comcast-s-xfinity-mobile-to-grow-to-3-3m-customers-by-2020-analyst-predicts>. Google and Charter have not reported subscribership data.

⁵³ T-Mobile and Sprint, “Description of Transaction, Public Interest Statement, and Related Demonstrations,” 56.

⁵⁴ T-Mobile and Sprint, 56.

Figure 7: Wireless Subscribers in North America by Technology Over Time



Source: Ericsson.⁵⁵

The general working assumption by merger proponents and opponents is that a faster transition to 5G is better. But that is not necessarily true. For example, would consumers be better off with accelerated 5G deployment even if that would mean higher prices and costly handset upgrades sooner than consumers would have chosen otherwise? How should analysis weigh LTE service and prices tomorrow against 5G services and prices several years from now? Those questions have no easy answers and may affect what one views as the optimal transition plan.

Merger Distributional Effects

Antitrust authorities often consider distributional effects of the merger for public interest analysis. Economic analysis cannot determine how much weight to place on distributional effects when evaluating mergers, but it can help to identify them. In the case of the T-Mobile–Sprint transaction, a robust, interesting, debate is possible on the effects of the merger on low-income and rural service. I discuss each of these below.

Low Income

Some merger opponents have voiced concern about the effect of the merger on low-income consumers, claiming, as one group did, that the “proposed transaction would harm the prepaid and wholesale mobile wireless markets, which are critical for serving low-income consumers.”⁵⁶

⁵⁵ Ericsson Mobility Visualizer, accessed March 7, 2019. <https://www.ericsson.com/en/mobility-report/mobility-visualizer?f=1&ft=2&r=4&t=1,2,3,4,5,6,7&s=1,2,3&u=1&y=2011,2024&c=2>

⁵⁶ “Petition to Deny of Common Cause, Consumers Union, New America’s Open Technology Institute, Public Knowledge and Writers Guild of America, West, Inc.,” 25.

However, most discussions of low-income service seem to use the prepaid and wholesale segments as proxies for low-income. That is probably not accurate, as discussed above. If the survey cited above is accurate, then although T-Mobile has the largest number of low-income subscribers, AT&T and Verizon each have more low-income subscribers than Sprint. Additionally, as discussed, not all prepaid subscribers seem to be people with low incomes.

While the prepaid market may not be the correct proxy for low-income subscribers, the shares implied by the survey cited above suggest potential cause for concern. If the Fluent survey cited above is accurate, a combined T-Mobile – Sprint would serve about 47 percent of subscribers with incomes of less than \$50,000, and even more taking into account MVNO traffic that uses its network.⁵⁷

Antitrust authorities presumably have more detailed data on the demographic characteristics of subscribers than I do. The report filed in support of the merger by Asker, Bresnahan, and Hatziaskos, for example, uses Nielsen Mobile Performance data.⁵⁸ While most of the report is redacted, the paper’s table of contents suggests that these data include demographics by carrier or that the demographics can be derived. Data such as those can help officials make an informed decision, including what steps might mitigate negative effects on this group if the merger is approved.

Rural

Wireless, particularly LTE, coverage in rural areas is less robust than in the rest of the country.⁵⁹ In the latest publicly available data, the FCC noted that in December 2016 more than 98 percent of rural Census blocks had at least one LTE provider, but only 57 percent had at least four providers, compared to 96 percent of non-rural blocks.⁶⁰ Figure 8 shows LTE coverage by provider as of December 2016. The figure shows T-Mobile and Sprint with less coverage than AT&T or Verizon.

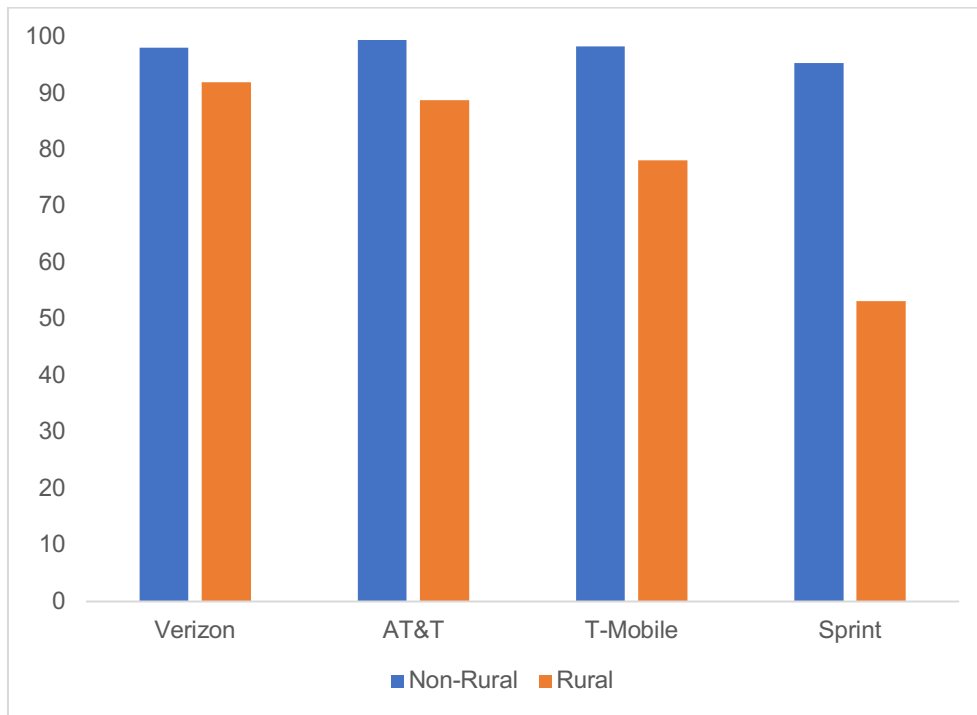
⁵⁷ Fluent.

⁵⁸ John Asker, Timothy F. Bresnahan, and Kostis Hatzitaskos, “Economic Analysis of the Proposed T-Mobile/Sprint Merger” (Cornerstone Research, November 6, 2018).

⁵⁹ Federal Communications Commission, “Twentieth Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services,” paras. 79–84. The most recent public FCC wireless coverage data is from December, 2016.

⁶⁰ Federal Communications Commission, fig. III.D.12. These number may overstate coverage because, while Census blocks are fairly small, the FCC notes that “the fact that a service provider reports coverage in a particular census block does not mean that it necessarily provides coverage everywhere in the census block.” Federal Communications Commission, “Twentieth Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services”, note under figure III.D.13.

Figure 8: Share of Rural and Non-Rural Population with LTE Service by Provider, December 2016



Source: FCC 20th Wireless Competition Report.⁶¹

T-Mobile and Sprint contend that the combined firm will improve wireless coverage, quality, speeds, and “in-home service” in rural areas.⁶² Contrarily, merger opponents, such as NTCA, argue that rural customers would be harmed because “T-Mobile has not traditionally focused on rural customers or markets...and the loss of Sprint as a competitor and partner [for roaming agreements].”⁶³

The key question is how incentives are likely to change for rural wireless deployment as a result of the merger compared to those faced by the firms separately. Neither opponents nor proponents of the merger make especially compelling arguments as to why incentives are likely to change with a merger.

T-Mobile and Sprint state that Sprint has poor rural coverage at least in part because its 2.5 GHz spectrum is not well-suited for rural service due to its propagation characteristics. The parties somewhat inconsistently argue, however, that Sprint’s 2.5 GHz spectrum will aid the New T-

⁶¹ Federal Communications Commission, “Twentieth Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services,” fig. III.D.13.

⁶² T-Mobile and Sprint, “Description of Transaction, Public Interest Statement, and Related Demonstrations,” 66.

⁶³ NTCA - The Rural Broadband Association, “Petition to Deny of NTCA - The Rural Broadband Association,” August 27, 2018, 1, [https://ecfsapi.fcc.gov/file/10827780817015/08.27.18%20Sprint%20TMobile%20Petition%20to%20Deny%20\(002\).pdf](https://ecfsapi.fcc.gov/file/10827780817015/08.27.18%20Sprint%20TMobile%20Petition%20to%20Deny%20(002).pdf).

Mobile’s rural buildout.⁶⁴ Incentives to invest in rural coverage could improve if new technologies are less costly, expected revenues from rural 5G service provision is higher than from LTE rural provision, urban and rural areas are complementary, or more competition for high-end customers creates demand for better rural coverage by those customers.

NTCA, meanwhile, argues that T-Mobile has had little incentive to invest in rural areas and, therefore, is unlikely to invest there in the future—that is, its incentives are unlikely to change following a merger. At the same time, NTCA somewhat inconsistently also argues that a merger would change the incentives facing the combined firm in ways that would threaten existing roaming agreements and, presumably, not be replaced by something that would benefit consumers.

As with many aspects of the proposed merger, we lack sufficient public evidence to fully evaluate the likely effects of the merger on rural areas.

Potential Remedies

Competitive effects of the merger can only be predicted with a great deal of uncertainty, as discussed above. Insufficient public data exist to offer coherent remedies to potential problems here.

Nevertheless, the government has tools available to promote deployment, competition, and connectivity regardless of whether the merger occurs. To promote deployment, the government should continue making spectrum available for flexible use. The FCC should continue conducting auctions and enhancing secondary spectrum markets. The National Telecommunications and Information Administration, meanwhile, should continue finding ways to make federal agencies incorporate the opportunity cost of their spectrum into their work in order to create incentives to deploy it more efficiently, including for non-governmental use. The FCC can also continue to smooth the path for new competitors such as OneWeb, SpaceX, and Telesat, which hope to offer Low-Earth Orbit satellite broadband connections, and allow Ligado, which wants to offer a wholesale IoT network, to begin operations.

Dealing with digital divide issues—low income and rural—requires rigorous thinking. The programs administered through the Universal Service Fund of over \$8 billion per year have had middling results at best over the last 20 years. In rural areas, the FCC is now running innovative reverse auctions as ways to subsidize service where there is none—those yield a far bigger bang for the buck than any previous method used and should be greatly expanded. The Lifeline program for low-income individuals, meanwhile, should be clearer on its objectives and priorities. Lifeline subsidizes low-income people but without specifically targeting people who would not be online otherwise. Policymakers should remember that Universal Service dollars are raised via a regressive tax that means that low-income people who do not qualify for subsidies pay into the fund.

⁶⁴ T-Mobile and Sprint, “Description of Transaction, Public Interest Statement, and Related Demonstrations,” 65–66.

Conclusion

The key economic question, as in all mergers, is whether the expected benefits of the efficiencies of the merged entity outweigh the potential costs of reduced competition. Much of the answer hinges on 5G, but we do not know enough about it yet to provide knowledgeable predictions about the future state of the world with a merged entity versus compared to one with a separate T-Mobile and Sprint. Despite the 5G hype, we still do not know the equilibrium characteristics of 5G demand. Business plans regarding 5G investment may change as we learn more about demand, and that could affect optimal industry structure.

The DOJ-FTC Guidelines focus antitrust analysis on identifying evidence of “adverse competitive effects.”⁶⁵ Given that focus, the lack of evidence showing harms suggests that the antitrust authorities should approve the merger.

The Guidelines leave room for antitrust authorities to incorporate public interest considerations in antitrust analysis, suggesting that “the Agencies consider whether those effects vary significantly for different customers purchasing the same or similar products.”⁶⁶ This guideline plus distributional concerns about digital divide issues suggests antitrust authorities may need to pay particular attention to how the proposed merger may affect wholesale markets and services targeted at low-income people.

⁶⁵ U.S. Department of Justice and the Federal Trade Commission, 2.

⁶⁶ U.S. Department of Justice and the Federal Trade Commission, 6.