Supply-Chain Antitrust and Being Too Big in the Context of AT&T's 1984 Breakup

İsmail Serdar Dalkir
Ekonsilia Economic Consultancy

Ekrem Kalkan
Ekonsilia Economic Consultancy

In 1984, due to a US Department of Justice antitrust lawsuit, AT&T, the U.S. telecommunications monopoly, split into eight entities, including long-distance and local service providers known as Regional Bell Operating Companies (RBOCs). Vertical integration of suppliers typically benefits consumers by avoiding the issues associated with successive monopolies, where prices may be excessively high. The separation of long-distance and local services by the Department of Justice may seem counterintuitive, potentially driven by concerns over AT&T's size rather than economic rationale. This paper suggests that integrated monopolies have more willingness to build demand rigidity due to an absence of the free-riding problem, leading to higher prices. The implications extend to regulated firms and social media, highlighting the complexity of antitrust actions and their economic consequences on market dynamics and consumer welfare.

Keywords: competition policy, successive monopoly, double marginalization, vertical integration, free riding, demand elasticity, consumer welfare, profit, investment, Internet, telecommunications, social media

INTRODUCTION

In 1984, as a result of an antitrust lawsuit by the U.S. Department of Justice ("USDOJ"), the private U.S. telecommunications monopoly AT&T agreed to split itself into eight components: a long-distance-and-manufacturing company, plus seven local monopolies or Regional Bell Operating Companies ("RBOCs"). It has been argued that the splitting up of the local service from long distance ended the subsidization of local service through excessive pricing of the long-distance service and created an estimated annual efficiency gain of billions of dollars for the U.S. economy (Hausman, Tardiff and Belinfante, 1993).

Hausman et al. (1993) discussed the effects of the breakup of AT&T and thought that it should have been possible to solve the subsidization problem through a lump-sum surcharge on the local service. They must have in mind a surcharge paid by each telephone service user within a local area regardless of his or her usage of the local service. The surcharge amount could be set to eliminate the cross-subsidization of the local service through excessive pricing of the long-distance service. As a result, the price of long distance could have approached the competitive level, while the per-unit price of local service is not higher given

the surcharge's lump-sum nature. This could have solved the subsidy problem without splitting the company into eight components.

Hausman et al. (1993) imply that the U.S. national and regional regulators of telecommunication services may well have been aware of that solution. Surely, negotiating such a surcharge scheme within the antitrust settlement must have been possible. Yet this is not what happened. The question we aim to address in this paper is, why so?

A possible explanation is that there may have been a bureaucratic power struggle between the local and the national regulators, which may have impeded an ex-ante solution to the subsidization problem – e.g. by means of a surcharge. At the very least, there appears to have been a mismatch between the objectives or practices of the local and national regulators. The overall regulatory system that was in place may not have been conducive for the regulators at the local level to align their actions with the regulators at the national level, and *vice versa*. Specifically, Hausman et al. (1993) suggest that the local regulators may have been worried that a surcharge would reduce the speed of adoption of the local service – that is, telephone technology. However, there are at least three arguments against this view. First, it was known at the time that the price elasticity of demand for local service was nearly zero (Hausman, et.al.,1993, at 178); so even if the total user cost of local service were to increase as a result of the surcharge, it would not have significantly reduced the demand for local service. Second, there is the possibility that adoption depended on the price of the long-distance service as well as the price of the local service: there was empirical evidence of this being the case, so that the decrease in the long-distance price could have offset the downward effect of the local-service price on technology adoption (Hausman, et.al.,1993, at 179). Third, any remaining downward effect on technology adoption could have been made up by offering selective support for households that the new price system would have affected the most; Hausman et al. (1993) propose a version of this in the context of alleviating the effect of a surcharge on income distribution (*ibid.*). These arguments imply that offering the regulators' collective lack of willingness, or lack of agreement, as the sole reason for the absence of an ex-ante solution would be too simplistic, and, at any rate, incomplete.

We endeavor to answer the question "Could there have been an economically justifiable reason for preferring a structural (ex-post) solution to a behavioral (ex-ante) solution?" We suggest that AT&T may have been broken up vertically simply because it was too big. However, "big" isn't exactly an economic concept. "Big" does not necessarily mean "bad"; an *efficient monopoly* being the classical example of a "big" yet benign economic entity.

We attempt to tackle this issue by comparing a single vertically integrated firm to two separate firms in a supplier-customer relationship. The relation between long distance and local service is one of *vertical input supply*. Basic economics teaches that, *ceteris paribus*, vertical integration of suppliers is usually benign; because it eliminates what is known as the *successive monopolies problem*. To wit, two monopolies in a *vertical supply relationship* would create too high a price for the consumer; even higher than the monopoly price if the two monopolies were *vertically integrated* into a single firm. The reason for this seemingly irrational behavior on part of vertically related firms is similar to the "prisoner's dilemma" problem. Each of the two prisoners chooses an action that maximizes his or her benefit *given* the action of the other prisoner. The two self-serving actions result in a suboptimal outcome for them. If the two prisoners could coordinate, they would have selected the action to maximize their *collective benefit*. Similarly, each of the two successive monopolies chooses a price that maximizes its profit. If the two firms do not coordinate, the resulting consumer price and quantity demanded will be suboptimal for *the two firms collectively*. In addition to lower profits, this outcome reduces *consumer welfare* as well as *total welfare*, relative to an *integrated monopoly*.

The *successive monopolies problem* is closely related to the *complementary monopoly problem* describing producers of two inputs that are combined in a fixed proportion to produce an output. The complementary monopoly problem was first posited by Cournot (1838) where consumers purchase the output *brass* which is produced by combining the two inputs *zinc* and *copper* in a fixed proportion. The inputs are each supplied by a monopolist. The demand for each input is inseparable from the demand for the output (brass) since the two inputs must be combined in a fixed proportion. Therefore, each consumer's purchasing decision is based on the total cost of the two inputs, zinc plus copper. Consequently, each input

supplier (*zinc* or *copper*) sets a price that maximizes the profit of the supplier *given the price of the other input supplier*.

These individually-profit-maximizing input prices lead to a combined price that is *more than the price that would be charged if a single monopolist was setting the price for both inputs*. This outcome is because each firm acts as a monopolist on the *residual demand curve* determined after fixing the other firm's price, a phenomenon termed "double marginalization." The concept of "double marginalization" is often used to indicate monopolistic profit making in both the downstream and the upstream markets; this is how we will use it in the next section. In this section we use "double marginalization" to mean monopolistic profits in the (complementary) zinc and copper input markets. We refer the inquiring reader to Masson, Dalkir and Eisenstadt (2014), which extensively discusses double marginalization and its policy implications.

In light of the preceding, it appears that by separating long distance from local service, USDOJ was promoting a *suboptimal outcome*. The question is, "why?" A possible explanation is that USDOJ was concerned that AT&T was "too big." This sounds like a *political standard* more than a *welfare standard*. However, there may have been an "intuitive" economic rationale for it. We will attempt to explain this immediately below.

A DEMAND RIGIDITY APPROACH

A profit-maximizing firm may find it profitable to build *demand rigidity* – usually at the expense of consumers. We use the concept of *demand rigidity* as the opposite of *demand elasticity*. A demand is elastic ("not rigid") if, due to an X percent increase in price, the quantity demanded falls by *more than* X percent. Conversely, demand is inelastic ("rigid") if, due to an X percent price increase, quantity demanded falls by *less than* X percent. By undertaking certain costly behaviors, a firm may be able to make its demand more rigid, i.e. less elastic. Examples include *product advertising*, *product differentiation*, and *switching costs*. With a more rigid demand, the firm can charge a higher price without losing too many consumers, which increases its profit before investment expenditure. For the investment to be profitable, the investment cost of building a more rigid demand must be less than the increase in the pre-investment-cost profit.

For example, it may be profitable for a firm to create *excessive product differentiation* by investing a lump-sum amount toward developing *brand proliferation* in the market. The expectation from product differentiation is to *blunt price competition* in the market. Blunted price competition means that when a firm cuts its price relative to its rivals, it will attract fewer customers than before. This enables the firm to raise its price to the consumer because the firm expects less of a price cut from its rivals than before. If the increase in the firm's revenues minus production cost exceeds the present value of the lump-sum investment amount, the firm would be willing to build demand rigidity – meaning a lower demand elasticity.

There may be other methods for building demand rigidity. As another example, a firm may be able to exclude one of the existing rivals from the market, either partially or entirely. If the rival is entirely excluded, then *consumers as a whole will have fewer choices* than before. If the rival is partially excluded, then some consumers who could have bought from the rival will not be able to do so – as a result, *fewer consumers will have as many choices* as before. In either case the firm will be able to raise its price to consumers because it would face a less elastic, more rigid demand than before. Again, if the increase in the firm's revenue minus production cost exceeds the cost of excluding the rival, the firm would be willing to build demand rigidity by excluding its rival.

The thesis of this paper is that an *integrated monopoly* is more willing to build demand rigidity – for a fixed expenditure – than two monopolies in a vertical relationship ("successive monopolies"), *ceteris paribus*. If this thesis is true, then the *price benefit from a vertically integrated firm* – charging a lower price than two successive monopolies – must be compared to the welfare loss from the integrated firm's *higher willingness to build demand rigidity* to set a higher price.

The reason for an integrated monopoly being more willing to invest in a rigid demand than two successive monopolies is as follows. When one of the two successive monopolies plans to invest in demand rigidity and raise its price, it also expects its "sister monopoly" to raise its price. Now we will attempt to explain this curious – and rational – economic phenomenon.

Consider Cournot's example of combining zinc and copper to make brass, discussed above. Suppose that the supplier of zinc, "firm Z," sells zinc to the owner of copper, "firm C"; firm C then combines zinc with copper and sells the combination as brass to consumers. Seen in this way, Cournot's example becomes a model of two successive monopolies – *firm Z* and *firm C* – in a vertical supplier-buyer relationship. For simplicity, we assume that zinc has no other use; we also assume that the cost of any other input (e.g. chemicals, labor, machine use etc.) is zero. Lastly, we maintain the "ceteris paribus" assumption to rule out other factors changing between an integrated monopoly and two successive monopolies.

Virtually no monopoly can arbitrarily raise its price and not lose sales. In other words, practically every monopolist faces a downward-sloping demand curve which is somewhat elastic. Thus firm C, the producer of the final output, brass, is presented with a somewhat elastic demand curve by the consumers. Imagine that firm C is considering whether to invest in demand rigidity for brass. Suppose firm C builds additional demand rigidity, reducing demand elasticity for brass. In that case, it can raise the price of brass to the consumer and increase its short-term profit before investment cost. We will assume that the cost of investment is less than the additional short-term profit from raising the price of brass *as long as the price of zinc remains at the level before investment* – i.e. at the status-quo level. As discussed above, the demand for zinc is inseparable from the demand for brass, which is simply zinc plus copper. This implies that *increasing demand rigidity for brass* also increases *the demand rigidity of zinc*. With a more rigid demand, firm Z can charge a higher price for zinc and increase its *profit*. Firm C ends up paying a higher input-price to firm Z, and the net profitability of its investment is reduced *relative to a situation where firm Z did not raise the price of zinc, meaning a situation in which the price of zinc remained at the status-quo level*.

This scenario can be thought of as a "free ridership" problem. In a vertical relationship, at least with a fixed-proportion production technology, the sister monopoly firm Z has a rational incentive to increase its input-supply price to the downstream monopoly firm C, which has undertaken the investment toward demand rigidity. Since firm C has to pay a higher price for the zinc input, the profitability of investment for firm C decreases somewhat because of this free riding by its sister monopoly. In some cases, this free rider problem can even cause a seemingly profitable investment to become a loss-making proposition once the input-supplier's rational reaction is taken into account. In a perfect world, firm C can foresee this problem before investing and decide not to invest. This would save the consumers from paying a higher price for the output, brass.

On the other hand, a single integrated monopoly would not have to worry about this problem, thus making it *more willing to invest in demand rigidity and raise price to the consumer*. This is the counter-factual situation where firms C and Z combine, making them a single, vertically integrated monopoly that produces brass. Let this new, integrated entity be named "firm B." The integrated firm does not pay a third party for inputs. In other words, it is not in a vertical relationship with an input supplier. Imagine that firm B considers the same investment considered by firm C above. Remember that the profitability of firm C's investment is hampered by the opportunistic – yet rational – reaction of firm Z, the input supplier, to raise its price in response to firm C's attempt to build demand rigidity. Firm B does not suffer this free riding problem because it does not have an input supplier. It becomes obvious that a given investment toward a certain amount of demand rigidity would be more profitable for firm B than firm C. Consequently, a vertically integrated monopoly is more likely to harm consumers through investing in demand rigidity, relative to sequential monopolies.

TABLE 1
PRICES, PROFITS AND CONSUMER SURPLUS WITHOUT DEMAND RIGIDITY

Supply-chain structure	**Price setter**	**Price (p for zinc, P for brass)**	**Profit**	**Consumer welfare**
Successive monopolies	Firm C	$P_C > 0$	$(P_C - p_Z)\, Q_C > 0$	W_C
	Firm Z	$p_Z < P_C$	$p_Z Q_C > 0$	
	Total Z+C		$P_C Q_C > 0$	
Vertical integration	Firm B	$P_B < P_C$	$P_B Q_B > P_C Q_C$	$W_B > W_C$

Table 1 displays the "textbook" example of supply-chain (i.e. vertical) integration. Production of brass has two inputs, zinc and copper. The input supplier Z sells zinc to firm C, which adds copper to zinc and sells the combination as brass.Other than the cost of zinc all costs are zero. There is a one-to-one input relationship between zinc and copper; one unit of zinc is combined with one unit of copper to make one unit of brass.

Without integration, firm C sets the price of brass at $P_C = P(p_Z)$ *conditional on* the price of zinc p_Z. At this stage p_Z is not a numerical value, but a variable. Then firm Z solves its profit-maximization problem and determines the numerical value of p_Z. Next, firm C computes the unconditional value of P_C by incorporating the numerical value of p_Z into $P(p_Z)$. The quantity of brass demanded at that P_C is Q_C. Since there is a one-to-one input relationship between zinc and copper, the quantity of zinc demanded is also Q_C. Consumer surplus is measured as the region under the demand curve of brass between the choke price of brass, defined as the price at which $Q_C = 0$, and P_C.

With integration, firm Z is incorporated into firm C, creating a single firm. Since the new firm B owns both inputs zinc and copper, it does not have to pay a positive price for zinc. It can, therefore set the price of brass at the monopoly level, P_B, which is lower than the double-marginalized price P_C given identical costs. At this price the quantity of brass demanded is Q_B. Since this is the profit-maximizing price for a single, integrated monopoly, firm B's profit is higher than firm C's profit, hampered by the double marginalization problem. In fact, firm B's profit is higher than the sum of firms Z and C's total profits. With identical costs the price of brass is lower under vertical integration than under vertical separation, therefore consumer surplus W_B is also higher under vertical integration.

Table 2 modifies the example in Table 1 by introducing an investment toward demand rigidity. Profit-maximization calculus proceeds similar to that in Table 1 above. However, it is assumed that firm C (if the supply chain is unintegrated) or firm B (if the supply chain is integrated) has invested in demand rigidity for a fixed cost of "I" dollars; and, as a result of the investment, the demand for brass has become more rigid – less elastic – relative to the one underlying Table 1. The top three rows in Table 2 refer to the unintegrated structure, where demand for zinc has also become more rigid – less elastic– relative to the demand for zinc underlying Table 1. The reason, again, is the one-to-one relationship between the demand for brass and the demand for zinc; the two are inseparable. *Asterisked variables* in Table 2 are meant to reflect that profit maximization is being made based on the new, more rigid, demand curves for brass and for zinc.

TABLE 2
PRICES, PROFITS AND CONSUMER SURPLUS WITH DEMAND RIGIDITY

Supply-chain structure	**Price setter**	**Price (p for zinc, P for brass)**	**Profit before investment-cost accounting**	**Profit after investment-cost accounting**	**Consumer Welfare**
Successive monopolies	Firm C	P^*_C > P_C	$(P^*_C - p^*_Z)\,Q^*_C$ > 0	$(P^*_C - p^*_Z)Q^*_C - I$ < $(P^*_C - p_Z)Q^*_C - I$ [$(P^*_C - p_Z)Q^*_C - I > 0$ is assumed]	W^*_C < W_C if investment is realized; = W_C otherwise
	Firm Z	p^*_Z $p_Z < . < P^*_C$	$p^*_Z\,Q^*_C$	$p^*_Z\,Q^*_C$	
	Total Z+C		$P^*_C\,Q^*_C$ > *0*	$P^*_C\,Q^*_C - I$ ≤ *or* ≥ *0*	
Vertical integration	Firm B	P^*_B < P^*_C ; ≤ *or* ≥ P_C	$P^*_B\,Q^*_B$ > $P^*_C\,Q^*_C$; > $P_B\,Q_B$	$P^*_B\,Q^*_B - I$ > $P^*_C\,Q^*_C - I$; > 0	W^*_B $W^*_C < . < W_B$

Furthermore, in Table 2 it is assumed that *the investment is profitable for firm C if the price of zinc were to stay at the level in Table 1*, that is $(P^*_C - p_Z)Q^*_C > I$. The left-hand side of the inequality is firm C's short-term profit *assuming that the price of zinc stays at the level without investment as in Table 1*; the right-hand side is the investment cost. This is a counterfactual, however, since given the *more rigid demand for zinc* thanks to firm C's investment, firm Z would now rationally maximize profit on the basis of the more-rigid demand, and determine a new price for zinc (p^*_Z) which is higher than the previous price p_Z. *This higher price by firm Z reflects firm Z's free riding behavior on firm C's investment.* When the price of zinc is at this new, higher level, firm C's investment may or may not be profitable in an absolute sense; however, it is logically obvious that *the investment must be less profitable to firm C* than if the price of zinc were to stay at its previous level p_Z. Herein is the crux of this paper: in a supply chain consisting of separate firms, the expected opportunistic behavior of firms that are vertically related to a firm reduces the latter's willingness to build demand rigidity toward raising its price (and profit) at the consumers' expense.

Going back to Table 2, the integrated firm B sets the price of brass at the monopoly level *given demand rigidity*, P^*_B, which is lower than the double-marginalized price P^*_C but can be higher or lower than the double-marginalized price *without demand rigidity*, P_C from Table 1. At this price P^*_B, and given rigid demand, the quantity of brass demanded is Q^*_B. Since the integrated firm does not pay an input price to buy zinc, its investment profitability is unaffected by opportunistic behavior. Thus, the integrated firm's willingness to invest is not hampered by the opportunistic reaction of an input supplier. Therefore, given our initial assumption that *the cost of investment is less than the additional short-term profit from raising the price of brass if the price of zinc remains at the status-quo level,* we can predict that the integrated firm will proceed to invest for demand rigidity and raise its price and profit at the consumers' expense.

CONCLUSION

This paper highlighted that by separating long distance from local service, USDOJ appeared to promote a suboptimal outcome and asked why. It argued that a possible explanation is that USDOJ was concerned

that AT&T was "too big," which sounds like a political standard more than an economics standard, but there may have been an economic rationale for it. This paper argued that all else being the same an integrated monopoly is more willing to invest in rigidity of demand than two successive monopolies; the reason being that when one of the two successive monopolies plans to invest, it predicts that its "sister monopoly" would opportunistically – but rationally – raise its price as well, which can be thought of as a "free ridership" behavior. As a result, investment profitability decreases because of the sister monopoly's free riding. On the other hand, a single integrated monopoly would not have to worry about this problem, thus making it more willing to invest in demand rigidity and raise price to the consumer. The paper does not argue that USDOJ must have worked out a technical solution for the problem of "bigness." It is rather that whatever USDOJ's reasons – technical or intuitive – it may have ended up doing the right thing, which is instructive and relevant for today's antitrust theory and practice.

The above discussion assumed that firms are free to set their prices without regulatory constraints. AT&T was subject to price regulation at least to some extent, so how can the above discussion apply to it? A firm subject to price regulation can maximize its objective function – normally, profit – by determining the *level of the quality* of its product. In telecommunications, quality may be in the form of *ease of communication*. Still, it can also be in the form of *ease of access*, *the level of customer service* or *technical support*, and may include *waiting time*, *dropped calls*, *coverage area*, etc. More generally, considering any communication medium, quality may be in the form of "paid" or "pushed" content such as advertisement or "infotainment." It may also be in the form of the *relevance* and the *truth level* of the content, as well as its *appropriateness* and *addictiveness*, a higher level of addictiveness implying lower quality. It may be possible to arithmetically measure quality as the inverse of the duration (e.g., minutes) during which advertising messages are displayed to the viewer.

The long-distance versus the local service components of land-line telephone service present a natural example of a vertical relationship. Might this paper's conclusions apply to the emerging communications technology *social media*, where a vertical relationship may not be readily apparent? It is both interesting and instructive that the Internet technology, supposedly open and egalitarian, has increasingly become subject to observation – even criticism – as having morphed into several so-called "vertical Internets," which are closed systems that provide content and/or communication primarily through specialized applications – "apps" – that run on mobile devices (e.g. smartphones). The primary example of a *vertical Internet* is Meta, formerly Facebook, which now includes Instagram and WhatsApp. Although Facebook and Instagram are free of charge, at least in terms of money, business accounts on WhatsApp are paid channels through which businesses reach consumers and *vice versa*.

Moreover, it is clear that "Facebook plus Instagram" on the one hand and WhatsApp on the other constitute complementary services, very similar to Cournot's example of zinc and copper. Therefore, it should be possible to construct a stylized model in which, for example, a firm posts information – e.g., about its product – on "Facebook plus Instagram" and announces its post by sending messages to, and/or receiving messages from, existing or potential customers on WhatsApp. In such a model, the control variable may be the *quality* for "Facebook plus Instagram" and *price* for WhatsApp.

ACKNOWLEDGEMENTS

We thank Kenneth C. Baseman of MiCRA Microeconomic Consulting Associates, Inc., Washington, D.C., and previously of the U.S. Department of Justice's Antitrust Division, for having mentored İsmail Serdar Dalkir a.k.a. Serdar Dalkir on the ideas in this paper in different contexts. We also thank the organizers, the participants, and the discussants during the Seventh Biennial Conference webinar held in 2021 by Consumer Unity Trust Society Centre for Competition, Investment & Economic Regulation (CUTS-CCIER) for promotion and celebration of December 5th as the World Competition Day,including Pradeep S. Mehta, Secretary General of CUTS International, Geeta Gouri, formerly of Competition Commission of India, Valerie Mueller of the European Bank for Reconstruction and Development and Derek Ritzmann of Economic Partners. Any errors are solely our responsibility.

REFERENCES

Cournot, A. (1838). *Recherches sur Les Principes Mathématiques De La Théorie Des Richesses*. Paris: Chez L. Hachette; in translation: *Mathematical Principles of the Theory of Wealth*, Augustus M. Kelley, New York (1971).

Hausman, J., Tardiff, T., & Belinfante, A. (1993). The effects of the breakup of AT&T on telephone penetration in the United States. *The American Economic Review, 83*(2), 178–184.

Masson, R.T., Dalkir, S., & Eisenstadt, D. (2014). A note on complementary goods mergers between oligopolists with market power: Cournot effects, bundling and antitrust. *Review of Law & Economics*, *10*(1), 59–79. https://doi.org/10.1515/rle-2013-0014