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Why Should the Postal Service Deter
Amazon's Competitive Entry into
Last-Mile Parcel Delivery?

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In its June 2017 Risk Analysis Research Center (RARC) Report, the Office of Inspector General (OIG) of the U.S. Postal Service identified the strategic opportunity for large retailers to deploy their own last-mile delivery networks as a threat to the traditional competitors in parcel delivery (namely, the Postal Service, FedEx, and UPS).¹ To understand better how such entry through vertical integration by large retailers could affect competition in parcel delivery, the OIG asked a world-renowned expert on postal economics, Professor John Panzar, to create a theoretical model of the modern parcel-delivery market. Panzar's 60-page white paper, appended to the RARC Report, presents in detail a mathematical model of Amazon's optimal dispatch strategy for last-mile parcel delivery as a function of different rates charged for such delivery by the Postal Service, FedEx, and UPS.² Panzar says that his model "reveals conditions under which the rates offered by the [Postal Service, FedEx, and UPS] are low enough to deter [Amazon] from operating its own delivery vans."³

As if promoting the creeping expropriation of a private industry, Panzar's analysis recommends that a state-owned enterprise cut its prices so far as to deter competitive entry by a more efficient and highly innovative private

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¹ John C. Panzar, "*Last Mile*" Parcel Competition with Real Time Routing by Shippers 4 [hereinafter Panzar, "*Last Mile*" Parcel Competition], in U.S. Postal Service, Office of Inspector General, *Play to Win: Competition in Last-Mile Parcel Delivery*, RARC Report No. RARC-WP-17-009 (June 5, 2017) [hereinafter U.S. Postal Service, Office of Inspector General, *Play to Win*], <https://www.uspsog.gov/sites/default/files/document-library-files/2017/RARC-WP-17-009.pdf>.

² *Id.* at 6.

³ *Id.*

firm. That policy recommendation ignores the inefficiency of state-owned enterprises. From Eastern Europe under Soviet domination to Venezuela under Chavez, history has repeatedly shown that consumers suffer when a state-owned enterprise is shielded from dynamic competition.⁴ Where is the wisdom in Panzar's advice to expand a state-owned monopoly? Panzar understates Amazon's capabilities and business acumen. In November 2014, the *Harvard Business Review* ranked Amazon's chief executive officer, Jeffrey Bezos, the best-performing CEO in the world.⁵ Amazon epitomizes the nimbleness of the Internet-based economy for having built a juggernaut with a market capitalization of nearly half a trillion dollars as of September 2017.⁶ It is difficult to believe that Amazon would not be a more efficient operator than the Postal Service in last-mile parcel delivery. Yet Panzar recommends that a state-owned monopolist adopt a pricing strategy to exclude a private entrant that has the reputation of being one of the world's most innovative firms.

Moreover, before advocating that the Postal Service undertake a pricing strategy to deter Amazon's competitive entry, Panzar must address whether the Postal Service can even lower its prices for parcel delivery without incurring losses or overcharging customers of market-dominant products. As I explain in this article, it is highly likely that the Postal Service's revenue from market-dominant products is subsidizing its provision of competitive products, including last-mile parcel delivery. With declining letter-mail volume, it is doubtful that the Postal Service will be able to continue to cover its infrastructure costs (let alone its other institutional costs) almost entirely through its market-dominant products. Under those circumstances, the Postal Service could not lower prices on its competitive products so as to preclude entry. Panzar's model thus lacks relevance to the real world.

In this article, I examine and challenge the analysis, conclusions, and recommendations of Panzar's model. I explain why broader and more plausible consequences than Panzar predicts could easily flow from the changes that he recommends relative to the status quo. What deserves close scrutiny in Panzar's paper is not the mathematics by which he derives his model's conclusions. Rather, what deserves skeptical scrutiny are the assumptions

⁴ See Panos Mourdoukoutas, *What Destroyed Venezuela's Economy: Big Government and Anti-Americanism*, FORBES (July 18, 2016), <https://www.forbes.com/sites/panosmourdoukoutas/2016/07/18/what-destroyed-venezuelas-economy-big-government-and-anti-americanism/#254935ee36d4>; *The Perils of Nationalisation*, ECONOMIST (June 17, 2017), <https://www.economist.com/news/finance-and-economics/21723408-more-state-ownership-not-right-answer-economic-ills-perils>.

⁵ Harvard Business Review Staff, *The Best-Performing CEOs in the World*, HARV. BUS. REV., Nov. 2014, <https://hbr.org/2014/11/the-best-performing-ceos-in-the-world>; see also BOSTON CONSULTING GROUP, THE MOST INNOVATIVE COMPANIES 2016: GETTING PAST "NOT INVENTED HERE" 4 (2017), <https://media-publications.bcg.com/MIC/BCG-The-Most-Innovative-Companies-2016-Jan-2017.pdf> (listing Amazon as the fifth most innovative company in 2016).

⁶ *Amazon.com, Inc. (AMZN): Statistics*, YAHOO! FINANCE, <https://finance.yahoo.com/quote/AMZN/key-statistics/> (reporting a market capitalization of \$472 billion as of September 13, 2017).

underlying his model, which lead inexorably to policy recommendations that find no authority in law and which no federal agency that is subject to the antitrust laws should advocate publicly, even as a theoretical exercise. Those assumptions are reckless and disparaging of the major firms in the express parcel delivery business. In short, a rebuttal is appropriate.

Part I of this article asks why Panzar is telling the Postal Service how to deter Amazon's entry. Part II reviews Panzar's analysis and findings. Part III explains that Panzar's model is highly stylized and rests on unreliable economic assumptions that depart from reality and produce unreliable predictions. Part IV explains how Panzar's analysis emphasizes benefits to the Postal Service and Amazon but curiously neglects potential harm to consumers of postal products. Part V shows how Panzar's stylized analysis fails to provide useful information about last-mile parcel delivery in the real world. Panzar's analysis is unhelpful because it implicitly mischaracterizes Amazon's entry decision as depending primarily on the cost of last-mile delivery, when Amazon more plausibly will predicate its entry decisions on the attainment of broader strategic goals, such as those motivating its acquisition of the Whole Foods grocery chain for \$13.4 billion in August 2017.⁷ Part VI analyzes whether Panzar's strategy of deterring Amazon's entry into parcel delivery would exceed the powers that Congress delegated to the Postal Service through postal legislation. Part VII examines whether the Postal Service, acting on the advice in Panzar's white paper, would violate the Sherman Act by soliciting its actual and potential competitors to engage in ostensibly independent but parallel action that would facilitate the Postal Service's deterrence of Amazon's entry into last-mile delivery.

I. WHY IS PANZAR TELLING THE POSTAL SERVICE HOW TO DETER AMAZON'S ENTRY?

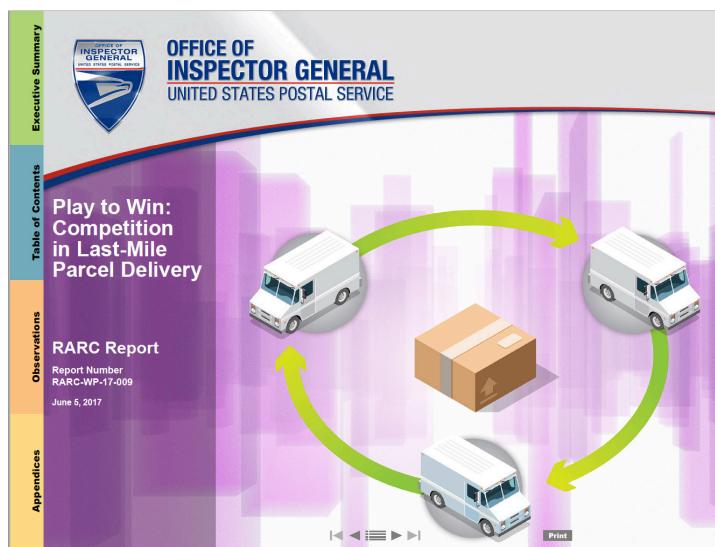
Panzar concocts pseudonyms for the U.S. Postal Service ("the Post"), Amazon ("Congo"), United Parcel Service ("Federal Parcel Service (FPS)"), and FedEx ("United Express (UX)").⁸ Figure 1 shows that, as of September 14, 2017, the cover of the RARC Report displays a parcel and three delivery trucks that are identical in color and design.⁹

⁷ See Nick Wingfield & Michael J. de la Merced, *Amazon to Buy Whole Foods for \$13.4 Billion*, N.Y. TIMES, June 16, 2017.

⁸ Panzar, "Last Mile" Parcel Competition, *supra* note 1, at 5.

⁹ U.S. Postal Service, Office of Inspector General, *Play to Win*, *supra* note 1, at cover.

Figure 1. Modified Cover Page of the RARC Report



Source: Panzar, "Last-Mile" Parcel Competition, *supra* note 1, at cover.

However, anyone who accessed the RARC Report shortly after its release understands that that cover is a sanitized version of the report's original cover, which Figure 2 shows.

Figure 2. Original Cover Page of the RARC Report



Source: Panzar, "Last-Mile" Parcel Competition, *supra* note 1, at cover (on file with author).

Consistent with the advice of the legendary movie director Billy Wilder to “make the subtleties obvious,”¹⁰ the original cover of the RARC Report depicts delivery trucks in the familiar color schemes of FedEx and UPS that bear Panzar’s ersatz company names as well as altered logos presumably supplied by the OIG’s graphic artist.¹¹ In addition, the original cover of the RARC Report features a parcel (circled by delivery trucks) that is identified by the self-consciously lower-case brand name “congo” (rather than “amazon”) appearing above Amazon’s unmistakable curved, smiley logo.¹²

Some might dismiss these obviously contrived company names and altered logos as labored but inconsequential. However, I prefer not to let them pass unremarked for two reasons. First, I doubt that Amazon, FedEx, and UPS ever consented to the Postal Service’s alteration and arguable dilution of their trademarks.¹³ Second, to distill the practical implications of Panzar’s theoretical model for consumers and competitors in the real world, I favor using the actual names of these four enterprises. Evidently, so do the management of the Postal Service¹⁴ and the OIG,¹⁵ when discussing Panzar’s white paper. Or at least within limits. Both clearly regard Panzar’s analysis as noteworthy because they understand Panzar not to be addressing four hypothetical firms given corny names, but rather Amazon, FedEx, UPS, and the U.S. Postal Service. The management of the Postal Service says that Panzar’s white paper “is a good analysis with more real-world implications than a typical economic paper because it pertains to four of the largest organizations in America” in a “market [that] is unusual, even unique[,] because a government is competing head-to-head with the private sector and the number one customer has the ability, or at least is fast developing the ability, to bypass its three primary suppliers.”¹⁶ Yet Amazon is the number one customer that Panzar and the Postal Service never identify by name. Search

¹⁰ See MAURICE ZOLOTOW, BILLY WILDER IN HOLLYWOOD 181 (Proscenium Publishers 3d ed. 1996).

¹¹ U.S. Postal Service, Office of Inspector General, *Play to Win*, *supra* note 1, at cover.

¹² *Id.*

¹³ One’s unauthorized alteration of another’s trademark can constitute trademark dilution, *see id.* 15 U.S.C. § 1125(c), and can violate state anti-dilution statutes, *cf.* Deere & Co. v. MTD Prods., Inc., 41 F.3d 39, 40–41 (2d Cir. 1994) (affirming the grant of a preliminary injunction under New York’s anti-dilution statute, N.Y. GEN. BUS. LAW § 368-d (McKinney 1984), of an advertiser’s depiction of an altered form of a competitor’s trademark to identify the competitor’s product in a comparative advertisement).

¹⁴ Letter from Steven W. Monteith, Vice President, Marketing, U.S. Postal Service, to Christopher Backley, A/Director RARC Central, June 2, 2017 (Management Comments) [hereinafter Postal Service Management Comments on Panzar White Paper], reprinted in U.S. Postal Service, Office of Inspector General, *Play to Win*, *supra* note 1, at 61 app.4 (referring to “USPS” and “UPS/FedEx” instead of “the Post,” “FPS,” and “UX” when discussing Panzar, “Last Mile” Parcel Competition, *supra* note 1, but omitting any reference to Amazon).

¹⁵ U.S. Postal Service, Office of Inspector General, *Play to Win*, *supra* note 1, at 1 (Executive Summary) [hereinafter OIG Executive Summary for Panzar White Paper] (referring to “the Postal Service,” “UPS,” and “FedEx” instead of “the Post,” “FPS,” and “UX” when discussing Panzar, “Last Mile” Parcel Competition, *supra* note 1, but omitting any reference to Amazon).

¹⁶ Postal Service Management Comments on Panzar White Paper, *supra* note 14, at 61.

the entire RARC Report, including Panzar's white paper, and one will find no instances of the word "Amazon." But there is no doubt what firm is implied.

Before beginning to analyze whether Panzar's theoretical conclusions hold water, one should pause to ask several higher-level questions. Why should the federal government attempt to deter competitive entry by Amazon—or any other firm, for that matter—into last-mile parcel delivery? Why was Panzar asked to study this question in the first place? Who made that managerial decision?

Sorting out the "who" requires some consideration of the precise relationship between the OIG and the Postal Service itself. Although funded by the Postal Service, the Inspector General is appointed by the nine presidentially appointed members of the Board of Governors of the Postal Service.¹⁷ The OIG reports twice yearly to that Board and to Congress.¹⁸ To preserve the OIG's independence from the Postal Service management, the OIG under its statutory charter reports to the nine presidentially appointed governors, but not to the Postmaster General or the Deputy Postmaster General.¹⁹ Unfortunately, as of September 2017, there are no sitting Governors.²⁰ So the OIG (actually the Acting OIG as of September 2017) has no one to whom to report. For that matter, neither does the Postal Service itself.²¹ Yet, both the OIG and the Postal Service commented on Panzar's paper.

How does Panzar's theoretical model inform the actual competitive strategy of the Postal Service? Does Panzar have a conflict of interest in advising the Postal Service to offer Amazon such low prices for parcel delivery as to deter the firm from deploying its own last-mile delivery network of vans? Is it problematic that Panzar has written and the Postal Service, writ large, has published his white paper during the pendency of a docket before the Postal Regulatory Commission (PRC) in which Panzar testified on behalf of Amazon in January 2017 that the PRC should excuse parcel delivery and other competitive products from any legal obligation to make any contribution to covering the institutional (overhead) costs of the Postal Service?²² Does the management of the Postal Service understand that the enterprise

¹⁷ 39 U.S.C. § 202(e).

¹⁸ 92 Stat. 1103.

¹⁹ 39 CFR § 221.3.

²⁰ U.S. POSTAL SERVICE OFFICE OF INSPECTOR GENERAL, SPRING 2017 SEMIANNUAL REPORT TO CONGRESS I (May 31, 2017), https://www.uspsoig.gov/sites/default/files/document-library-files/2017/SARC_Spring_2017_o.pdf ("The Board . . . is now without any independent governors for the first time since the Postal Reorganization Act of 1970 created the governing body.").

²¹ 39 U.S.C. § 202(a) ("The exercise of the power of the Postal Service shall be directed by a Board of Governors composed of 11 members. . . . Nine of the members, to be known as Governors, shall be appointed by the President."). The other two members of the Board of Governors are the Postmaster General (whom the nine Governors appoint) and the Deputy Postmaster General (whom the nine Governors and the Postmaster General appoint). *Id.* § 202(c)–(d).

²² See Declaration of John C. Panzar for Amazon Fulfillment Services, Inc., Institutional Cost Contribution Requirement for Competitive Products, Postal Regulatory Commission, Dkt. No. RM2017-1, at 2 (filed Jan. 23, 2017) [hereinafter Panzar Declaration for Amazon].

lacks antitrust immunity with respect to competitive products such as parcel delivery?²³ What market signal is Panzar's white paper expected to convey to Amazon, FedEx, and UPS? Do the congressional committees with oversight of the Postal Service and the antitrust laws believe that it is a wise use of the financial and managerial resources of the federal government to study how that state-owned enterprise can adjust its prices to suppress competition with the Postal Service in last-mile parcel-delivery services? Perhaps the OIG decided to sanitize its cover design over concern that it might face those questions.

II. PANZAR'S ANALYSIS AND FINDINGS

Panzar's white paper consists of a theoretical model of the U.S. parcel-delivery market and an analysis of some stylized market outcomes that the model predicts. Specifically, Panzar models Amazon's optimal dispatch strategy for last-mile parcel delivery in a given locality as a function of the rates that the Postal Service, FedEx, and UPS charge.²⁴ He emphasizes that his analysis "importantly . . . reveals conditions under which the rates offered by the [Postal Service] and its rivals are low enough to deter [Amazon] from operating its own delivery vans."²⁵ Upon analyzing several pricing scenarios, Panzar concludes that "the last mile delivery services of the [Postal Service] and its rivals are *complements* for one another rather than *substitutes*."²⁶ In this part, I briefly review Panzar's model and analysis.

A. Amazon's Optimization Problem

Under Panzar's model, Amazon receives a fixed volume of parcels (\mathcal{Q}) each day, some of which arrive at its local distribution center (and are ready for last-mile delivery) in the morning and some of which arrive in the afternoon.²⁷ Panzar models the proportion of parcels that arrive in the morning (t) as an exogenous random variable.²⁸ In other words, Amazon knows in advance the fixed volume of parcels that will be ready for last-mile delivery each day, but it does not know (and cannot control) the distribution of those parcels between morning and afternoon arrivals.²⁹

Each day, Amazon has three options for last-mile delivery of the day's parcels: (i) renting K units of self-delivery vans for a capital cost of B per van

²³ See J. Gregory Sidak, *Abolishing the Letter-Box Monopoly*, 1 CRITERION J. ON INNOVATION 401, 403 (2016).

²⁴ Panzar, "Last Mile" Parcel Competition, *supra* note 1, at 6.

²⁵ *Id.*

²⁶ *Id.* (emphasis in original).

²⁷ *Id.* at 7.

²⁸ *Id.*

²⁹ *Id.*

and incurring a variable cost (for labor or fuel) of b per parcel, (2) purchasing last-mile delivery for m per parcel from either UPS or FedEx, or (3) purchasing last-mile delivery for a per parcel from the Postal Service.³⁰ Amazon also can split its daily parcel volume between multiple delivery options.³¹ Panzar assumes that the Postal Service delivers parcels primarily on letter routes, so that parcels arriving at Amazon's local distribution center in the afternoon are not delivered by the Postal Service until the next day.³² Thus, option 3 is available only for morning delivery, whereas option 2 is available for both morning and afternoon deliveries.³³ Panzar treats the morning last-mile delivery services of UPS, FedEx, and the Postal Service as perfect substitutes from Amazon's perspective.³⁴

B. Market Outcomes Under Various Pricing Scenarios

Panzar models Amazon's optimal dispatch strategy as a function of the rates charged by the Postal Service, FedEx, and UPS in three cases:

- (1) the "base case," in which the Postal Service's rate a exceeds the private-carrier rate m (that is, $a > m$);³⁵
- (2) "case 1," in which the Postal Service's rate is lower than the private-carrier rate but higher than Amazon's unit variable cost b , such that m exceeds a , which exceeds b (that is, $m > a > b$);³⁶ and
- (3) "case 2," in which the Postal Service's rate is lower than both the private-carrier rate and Amazon's unit variable cost, such that m exceeds b , which exceeds a (that is, $m > b > a$).³⁷

Under the base case, the Postal Service does not offer a competitive unbundled last-mile delivery service; consequently, Amazon divides the delivery of its parcels between itself and the private carriers both in the morning and afternoon.³⁸ If Amazon's unit variable cost of self-delivery is less than the private-carrier rate ($b < m$), then Amazon will completely fill its vans during each morning and afternoon period before purchasing delivery services from

³⁰ *Id.* at 8.

³¹ *Id.*

³² *Id.* at 14.

³³ *Id.* at 8.

³⁴ *Id.* at 27 ("From [Amazon's] point of view, the morning parcel delivery services of the [Postal Service] and [UPS/FedEx] are perfect substitutes.").

³⁵ *Id.* at 9.

³⁶ *Id.* at 14.

³⁷ *Id.* at 16.

³⁸ *Id.* at 9–14.

the private carriers.³⁹ Under case 1, Amazon divides the delivery of its parcels between the Postal Service and itself in the morning, and between the private carriers and itself in the afternoon.⁴⁰ Under case 2, Amazon delivers its parcels through the Postal Service in the morning and divides the delivery of its parcels between itself and the private carriers in the afternoon.⁴¹ In each of those three cases, Panzar specifies conditions under which the rates of the Postal Service and the private carriers would deter Amazon from purchasing any vans.⁴²

Because by assumption the morning last-mile delivery services of the Postal Service, FedEx, and UPS are perfect substitutes in Panzar's model and (by further assumption) none of those carriers faces capacity constraints, as soon as the Postal Service's rate α falls below the private-carrier rate m , the Postal Service captures all of the morning last-mile delivery services that Amazon would otherwise purchase from UPS and FedEx in the base case.⁴³ In addition, as α decreases further below m , the Postal Service will also begin to capture morning parcel volumes that Amazon otherwise would have delivered itself.⁴⁴ Panzar observes that this substitution by Amazon away from self-delivery will decrease the number of vans that it rents for the day.⁴⁵ Through this mechanism, Panzar reasons that a decrease in the Postal Service's per-parcel price for morning delivery actually *increases* Amazon's demand for afternoon delivery by UPS and FedEx.⁴⁶ Simply put, the fewer vans Amazon rents, the greater its demand for afternoon delivery services from UPS and FedEx. Panzar concludes that, under his stylized model (and within a certain price range), the Postal Service's morning last-mile delivery is a complement to afternoon last-mile delivery by either UPS or FedEx.⁴⁷ He reasons that a decline in the Postal Service's price of (morning) parcel delivery to Amazon will increase its demand for (afternoon) parcel delivery by FedEx or UPS because Amazon will have made the anterior decision not to procure its own vans for last-mile delivery.

On the basis of that theoretical conclusion, Panzar further specifies a uniform distribution for parcel arrival times and determines a subgame perfect Nash equilibrium (SPNE) outcome for the competition between the Postal Service and its rivals.⁴⁸ (In layman's terms, a game's Nash equilib-

³⁹ *Id.* at 9.

⁴⁰ *Id.* at 14–16.

⁴¹ *Id.* at 16–17.

⁴² *Id.* at 14–17 (deriving conditions under which Amazon will not purchase any vans: (1) $B > 2(m - b)$ in the base case, (2) $m + \alpha < B + 2b$ in case 1, and (3) $m < B + b$ in case 2).

⁴³ *Id.* at 23.

⁴⁴ *Id.* at 24.

⁴⁵ *Id.*

⁴⁶ *Id.* at 24, 27.

⁴⁷ *Id.*

⁴⁸ *Id.* at 33–44.

rium is an outcome in which each player cannot improve its payoff (profit) by unilaterally changing its strategy. A Nash equilibrium is subgame perfect if no player makes a noncredible threat.⁴⁹ For reasons that will become clear, Panzar's analysis and conclusions are unreliable.

III. ARE PANZAR'S ASSUMPTIONS RELIABLE?

Nobel laureate Milton Friedman famously argued that it is not sufficient to attack an economic model because it is not sufficiently descriptive of the real world. Instead, one should ask whether the model produces correct predictions.⁵⁰ For example, it is clear to an economist that a consumer does not calculate partial derivatives when trying to decide whether to purchase a candy bar while waiting in line at a grocery store. However, consumer behavior is generally consistent with the predictions of a model that assumes that a consumer makes those calculations. Economists therefore use models that incorporate utility-maximizing behavior, even though that behavior is an unrealistic assumption. In some cases, however, unrealistic assumptions can also undermine a model's usefulness. When those assumptions affect the model's predictions directly, unrealistic assumptions can lead to unrealistic predictions.

A useful model is one that makes accurate predictions and generates testable hypotheses. One cannot analyze rigorously a model that lacks the ability to predict testable hypotheses. Thus, the usefulness of a model depends on its ability to survive attempts at empirical refutation. Judged by this standard, several of Panzar's assumptions are problematic because, apart from deviating from reality, they are likely to produce false predictions (or no predictions) of the economic behavior that Panzar seeks to explain. For example, Panzar's assumption of exogenous demand for parcel delivery makes it impossible to predict or test how changes in policy or new entry would affect total parcel-delivery demand. Identifying the effect of entry on consumer welfare requires an analysis of changes in total output and total costs, which Panzar assumes away. Because his model generates no testable hypothesis and is devoid of real-world applicability, Panzar's analysis lacks empirical falsifiability, which means that it cannot be tested in the real world. So of what value is it?

Panzar's analysis is unreliable and unhelpful as an economic matter. Moreover, it would be unreliable as an evidentiary matter in any proceeding governed by the Federal Rules of Evidence. The Supreme Court established

⁴⁹ See, e.g., MASSIMO MOTTA, COMPETITION POLICY: THEORY AND PRACTICE 543–44 (Cambridge Univ. Press 2004); MARTIN J. OSBORNE, AN INTRODUCTION TO GAME THEORY 166 (Oxford Univ. Press 2004).

⁵⁰ Milton Friedman, *The Methodology of Positive Economics*, in ESSAYS IN POSITIVE ECONOMICS 3, 5, 14–15 (Univ. of Chicago Press 1966).

the modern American jurisprudence on the admissibility of expert testimony (including expert economic testimony) in *Daubert*,⁵¹ *Joiner*,⁵² and *Kumho*.⁵³ In general, all “relevant” evidence is admissible,⁵⁴ which is evidence that “has any tendency to make a fact more or less probable than it would be without the evidence” and “is of consequence in determining the action.”⁵⁵ Federal Rule of Evidence 702 further provides specific requirements for the admissibility of expert testimony: (1) “the testimony is based on sufficient facts or data,” (2) “the testimony is the product of reliable principles and methods,” and (3) “the expert has reliably applied the principles and methods to the facts of the case.”⁵⁶ In *Daubert*, the Court specifically identified that “a key question to be answered in determining whether a theory or technique is scientific knowledge that will assist the trier of fact will be whether it can be (and has been) tested.”⁵⁷ Like economists, courts identify the value of a theory or technique (such as a model) on the basis of an evaluation of the accuracy of its predictions.

The Federal Rules of Evidence and the Supreme Court’s jurisprudence on admissibility of expert scientific testimony do not apply to an academic article. However, the same principles that guide the assessment of a theory’s helpfulness to a judge or jury also inform the helpfulness of an academic article to a policymaker. Panzar’s model is not testable and is therefore unhelpful in understanding the effects of policy changes in last-mile parcel delivery. Neither regulators nor legislators should suspend disbelief if presented Panzar’s paper as the basis for some policy prescription.

A. The Tacit Assumption That the Postal Service Maximizes Profits

In deriving the equilibrium of his model, Panzar defines the Postal Service’s best response as one that maximizes its profits.⁵⁸ In other words, he defines the Postal Service’s objective as profit maximization. That Panzar should make this tacit assumption in his white paper for the Postal Service is no

⁵¹ *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993).

⁵² *General Elec. Co. v. Joiner*, 522 U.S. 136 (1997).

⁵³ *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999).

⁵⁴ FED. R. EVID. 402.

⁵⁵ *Id.* 401.

⁵⁶ *Id.* 702.

⁵⁷ *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 593 (1993).

⁵⁸ Panzar, “Last Mile” Parcel Competition, *supra* note 1, at 24. The assumption that Postal Service maximizes profit permeates Panzar’s analysis. See, e.g., *id.* at 40 (“Having determined the coordinated Best Response of the parcel carriers for any chosen [price] a , the problem facing the [Postal Service] is to choose that a which maximizes its expected profits, *taking into account the response of the parcel carriers.*” (emphasis in original)); *id.* at 41 (“[T]he expected profit maximizing rate for the [Postal Service] to set in the case of low [Amazon] van costs is $a = b - e$: i.e., a rate (very, very) slightly below [Amazon]’s variable operating costs. This will induce [Amazon] to keep its vans off the street in the morning.”); *id.* at 59 (“Having determined the profit maximizing coordinated response of the parcel carriers to any rate offering of the [Postal Service], it is straightforward to determine the profit maximizing rate for the [Postal Service] to set.”).

accident, given that he made the same assumption in a declaration on behalf of Amazon before the PRC in January 2017, and that assumption was vigorously challenged.⁵⁹ Panzar had the opportunity to provide a credible response to those challenges and failed to do so.⁶⁰ In his reply declaration on behalf of Amazon in March 2017, Panzar ignored the presented evidence that the Postal Service has the incentive to diverge from profit maximization; instead, he asserted that such a divergence was merely an assumption.⁶¹ (That line of argument is curious given that his white paper is rife with unsupported assumptions—for example, the assumption that UPS and FedEx engage in “perfect coordination” to charge the monopoly price in last-mile delivery).⁶² Then as now, it is inescapable that the Postal Service does not maximize profits in practice. Panzar’s model is therefore an unreliable predictor of the Postal Service’s actual pricing behavior.

Absent from Panzar’s white paper is any recognition that, as a state-owned enterprise, the Postal Service’s incentives diverge from those of a privately owned, profit-maximizing firm.⁶³ The Postal Service, being a state-owned enterprise, has the incentive to sacrifice profit to expand its scale, in part due to statutory mandates and policy goals that diverge from profit maximization.⁶⁴ It is telling that the Postal Service’s incentive compensation explicitly rewards managers with bonuses that are tied to measures of scale

⁵⁹ See Reply Declaration of J. Gregory Sidak on Behalf of United Parcel Service, Institutional Cost Contribution Requirement for Competitive Products, Postal Regulatory Commission, Dkt. No. RM2017-1, at 3 (filed Mar. 9, 2017) [hereinafter Sidak Reply Declaration for UPS] (discussing Panzar Declaration for Amazon, *supra* note 22).

⁶⁰ Reply Declaration of John C. Panzar on Behalf of Amazon Fulfillment Services, Inc., Institutional Cost Contribution Requirement for Competitive Products, Postal Regulatory Commission, Dkt. No. RM2017-1, at 7–9 (filed Mar. 9, 2017) [hereinafter Panzar Reply Declaration for Amazon].

⁶¹ *Id.* at 7 (“The key assumption of [Sidak’s] analysis is that the Postal Service (or other State-Owned Enterprise ‘SOE’) maximizes a weighted sum of profits and total revenue rather than profit alone. Not surprisingly, *given that assumption*, the SOE *may* have an incentive to set below-cost prices for products with very elastic demands; i.e., competitive products. This, indeed, would be a problem if the SOE *did* have this desire and was allowed to act on it. Neither is the case.” (emphasis in original)).

⁶² Panzar, “Last Mile” Parcel Competition, *supra* note 1, at 30.

⁶³ In his declaration to the PRC on behalf of Amazon in January 2017, Panzar asserted that it “has been the standard conclusion of economists” that “[a] price floor equal to incremental costs ensures that competitive products are not being subsidized by other products, thereby promoting competition and benefiting consumers.” Panzar Declaration for Amazon, *supra* note 22, at 5 & n.4 (citing WILLIAM J. BAUMOL, JOHN C. PANZAR & ROBERT D. WILLIG, CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE (Harcourt Brace Jovanovich, rev. ed. 1988); Ronald Braeutigam, *Optimal Policies for Natural Monopolies*, in 2 HANDBOOK OF INDUSTRIAL ORGANIZATION 1289 (Richard Schmalensee & Robert Willig eds., Elsevier 1989); W. KIP VISCUSI, JOSEPH HARRINGTON & JOHN VERNON, ECONOMICS OF REGULATION AND ANTITRUST (MIT Press 4th ed. 2005)). However, the three sources that Panzar cited in support of that proposition do not specifically analyze optimal regulation of public enterprises whose objectives diverge from profit maximization. One of the three sources that Panzar cited includes a chapter on public enterprises. However, the chapter offers no conclusion with respect to the optimal price floor for such an enterprise—much less the optimal price floor for a public enterprise that operates in both reserved (monopoly) markets and competitive markets, as does the Postal Service. See VISCUSI, HARRINGTON & VERNON, *supra*, at 504–22.

⁶⁴ See J. Gregory Sidak, *Maximizing the U.S. Postal Service’s Profits from Competitive Products*, 11 J. COMPETITION L. & ECON. 617, 662 (2015); David E.M. Sappington & J. Gregory Sidak, *Competition Law for State-Owned Enterprises*, 71 ANTITRUST L.J. 479, 499–503 (2003); David E.M. Sappington & J. Gregory

(not profit), such as deliveries per hour and total revenue.⁶⁵ Even the Postal Service itself acknowledges that its goals diverge from profit maximization. The OIG said in November 2016 that “the Postal Service’s primary goal is to serve the public interest, rather than to maximize profits for shareholders.”⁶⁶ The Postal Service’s objective function therefore likely maximizes some weighted average of profit and scale, rather than profit alone.⁶⁷

That pressure to increase scale at the expense of profit creates a strong incentive for the Postal Service to decrease its prices below the profit-maximizing level and perhaps even below costs.⁶⁸ In antitrust terms, predatory pricing requires a high probability of recoupment of losses sustained from below-cost pricing.⁶⁹ Because the Postal Service does not seek to maximize profits, it is unlikely to raise prices to attempt to recoup any losses from a below-cost pricing strategy. However, the absence of loss recoupment does not make below-cost prices any less harmful to competition than predatory prices. In other words, the Postal Service’s unrecouped, below-cost pricing would be as much a violation of section 2 of the Sherman Act as would be conventional predatory pricing by a profit-maximizing firm that would be compelled to recoup its initial “investment” in predatory losses.

For several reasons, the Postal Service has not only the incentive but also the ability to expand scale at the expense of profit—and perhaps even at a loss. The Postal Service has repeatedly said in its annual reports that it expects Congress to bail it out if the need arises. In December 2014, for example, the Postal Service reported that “it is unlikely that in the event of a cash shortfall, the Federal Government would allow [the Postal Service] to significantly curtail or cease operations.”⁷⁰ Because it does not ultimately bear the risk of

Sidak, *Are Public Enterprises the Only Credible Predators?*, 67 U. CHI. L. REV. 271, 285–86 (2000) (arguing that a public enterprise has a greater incentive than does a private firm to engage in predatory pricing).

⁶⁵ See Jeffrey C. Williamson, U.S. Postal Service, *Fiscal Year 2014 Pay for Performance Program* 4 (2013), <http://www.nalc3825.com/PFP-Prog-FY-2014-31.pdf>; U.S. Government Accountability Office, GAO-08-996, U.S. Postal Service New Delivery Performance Measures Could Enhance Managers’ Pay for Performance Program (2008), <http://www.gao.gov/assets/290/280446.pdf>.

⁶⁶ U.S. Postal Service, Office of Inspector General, *Governance of the U.S. Postal Service*, RARC Report No. RARC-WP-17-002, at 7 (Nov. 10, 2016). The OIG report identifies a list of 19 stakeholders whose “differing concerns” the Board of Governors “must navigate . . . as they steer the organization.” *Id.* at 12 fig.1.

⁶⁷ For a formal model of a state-owned enterprise’s maximization of a weighted objective function consisting of profit and output (the most tractable measure of scale in a multiproduct firm), see Sappington & Sidak, *Competition Law for State-Owned Enterprises*, *supra* note 64; David E.M. Sappington & J. Gregory Sidak, *Incentives for Anticompetitive Behavior by Public Enterprises*, 22 REV. INDUS. ORG. 183 (2003).

⁶⁸ Some market analysts believe that the Postal Service is currently pricing its parcel rates below cost. See CITIGROUP, THE FREE SHIPPING TAX: EXAMINING THE UNSUSTAINABLE PRICING MODEL OF THE USPS 1 (2017) (“[T]he [Postal Service’s] average parcel rates would need to increase -50% initially to break even”).

⁶⁹ Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209, 225–26 (1993); Matsushita Elec. Indus. Co. v. Zenith Radio Corp., 475 U.S. 574, 590–91 (1986); *see also* A.A. Poultry Farms, Inc. v. Rose Acre Farms, Inc., 881 F.2d 1396 (7th Cir. 1989) (Easterbrook, J.).

⁷⁰ See U.S. Postal Service, Annual Report for the Fiscal Year Ended September 30, 2014 (SEC Form 10-K), at 32 (filed Dec. 5, 2014) [hereinafter Postal Service 2014 Form 10-K], <https://about.usps.com/who-we-are/financials/10k-reports/fy2014.pdf>.

a revenue shortfall, the Postal Service has the ability to underprice its rivals without adverse financial repercussions. Moreover, the process by which the Postal Service assigns costs to different products and product categories is complex and opaque. For example, the costs that the Postal Service attributes to its competitive products are not publicly available in sufficient detail to enable scrutiny of the Postal Service's costing procedures. The Postal Service provides relatively detailed cost data for its market-dominant products, but it releases costs for competitive products only in broad categories. The Postal Service considers costing information for competitive products to be proprietary.⁷¹ That lack of transparency, when combined with the incentive to expand output, provides the Postal Service ample opportunity to price its competitive products below cost. Indeed, this conjecture derived from economic principles finds empirical support in the Postal Service's actual record of chronic losses. It is implausible that a profit-maximizing entity would operate at a loss for nine consecutive years, particularly without any major overhaul of its operations.⁷²

Because it is unlikely that the Postal Service maximizes profits, Panzar's model, by implicitly assuming profit-maximizing behavior, likely overstates the prices that the Postal Service will actually charge for last-mile parcel delivery. Ultimately, the Postal Service's failure to maximize profits would harm competition in last-mile parcel delivery by leading the Postal Service to underprice more efficient competitors, to the detriment of consumers.⁷³ Panzar's implicit recommendation that the Postal Service decrease its prices for parcel delivery to deter entry by Amazon would exacerbate that problem. His erroneous assumption of profit maximization obscures potential harm to competition and consumers from the Postal Service's attempts to deter Amazon from vertically integrating into last-mile delivery.

B. The Explicit Assumptions of Exogenous Demand and Constant Per-Unit Costs

Panzar's model assumes that Amazon faces exogenous demand for parcel delivery and that Amazon, the Postal Service, FedEx, and UPS have constant per-unit costs of delivery.⁷⁴ Why? Those simplistic assumptions undermine the validity of his model because they are inconsistent with basic economic principles and lead to outcomes that prevent evaluation of the welfare effects of his analysis.

⁷¹ See, e.g., U.S. Postal Service, USPS-FY14-1, FY 2014 Public Cost and Revenue Analysis (PCRA) Report 1 (2015), <https://www.prc.gov/docs/91/91009/USPS-FY14-1.Preface.pdf>.

⁷² U.S. Postal Service, *United States Postal Service FY2016 Annual Report to Congress* 25 (2016), <https://about.usps.com/who-we-are/financials/annual-reports/fy2016.pdf>; U.S. Government Accountability Office, GAO-15-290, High-Risk Series: An Update 114 (2015), <http://www.gao.gov/assets/670/668415.pdf>.

⁷³ See Sappington & Sidak, *Are Public Enterprises the Only Credible Predators?*, *supra* note 64, at 285–86.

⁷⁴ Panzar, "Last Mile" Parcel Competition, *supra* note 1, at 7–9, 29, 32–33.

1. Exogenous Demand

In Panzar's stylized model, Amazon receives a known, fixed volume of parcels in a particular area on any given day, each parcel of which arrives in either the morning or the afternoon. Panzar treats the proportion of parcels arriving in the morning as an exogenous random variable.⁷⁵ In other words, he assumes curiously that Amazon "know[s] with certainty" the "volume of parcels . . . for last mile delivery in a particular local area on any given day,"⁷⁶ yet it has absolutely no knowledge about or control over the arrival times of its own parcels at its own local distribution centers. While Panzar assumes this degree of ignorance and impotence on Amazon's part about its expected daily parcel demand, he also "implicitly assum[es] that [Amazon] operates a large national network of warehouses and sorting centers that *optimally* distribute its merchandise from its suppliers to locations near its customers."⁷⁷ Somehow Amazon's triumph of optimal logistics fails to generate any useful information with which its management might predict the temporal profile of the firm's daily demand for parcel deliveries.

In practice, however, Amazon's expected daily parcel demand (and its demand in the morning and afternoon sub-periods) is a function of the prices that Amazon charges for its products and the prices that Amazon charges for the shipment of those products over the two sub-periods. Put differently, as any customer of Amazon Prime understands, the delivery terms that *Amazon itself* offers its consumers in any sale will determine the probability that that sale will require afternoon delivery. Amazon determines the prices that it charges for different types of delivery—for example, same-day delivery, next-day delivery, or standard delivery—and the firm will do so in a way that incorporates its expected costs of those different types of delivery. For example, Amazon might be more inclined to deliver a next-day-delivery parcel in the afternoon than to deliver a standard-delivery parcel in the afternoon. Thus, it is misleading for Panzar to model Amazon's demand for last-mile delivery of parcels as exogenous. On the contrary, such demand is endogenously determined by Amazon's larger strategy by which it prices its products and delivery options.

2. Constant Per-Unit Costs

Panzar assumes that Amazon, the Postal Service, FedEx, and UPS have per-unit variable costs (for labor or fuel) that remain constant as the quantity

⁷⁵ *Id.* at 7.

⁷⁶ *Id.*

⁷⁷ *Id.* at 5–6 (emphasis added).

of parcels delivered changes.⁷⁸ In other words, Panzar assumes away economies of scale (decreasing average costs as output increases). Yet, economies of scale in parcel delivery are well documented and are accepted by economists, including by Panzar himself.⁷⁹ By excluding economies of scale from his model, Panzar obscures any effect that Amazon's entry into parcel delivery would have on the Postal Service's per-unit costs. For example, by reducing the number of parcels that the Postal Service delivers, Amazon's entry would deny the Postal Service some economies of scale and increase the Postal Service's per-unit costs. Amazon's per-unit costs of delivery would also vary as it allocates parcels between its own trucks and third-party trucks. Consequently, it is impractical and misleading as an economic matter for Panzar to assume constant per-unit costs.

Moreover, if Amazon decides to enter last-mile parcel delivery, it would likely use its available capacity to deliver the lowest-cost parcels. In other words, when Amazon faces a capacity constraint for parcel delivery, it will use its available capacity to deliver parcels for which its incremental profit from transitioning to integrated delivery is highest. All other factors being equal, those deliveries are likely to be Amazon's lower-cost deliveries. For example, parcels that are delivered to apartment complexes with a centralized drop-off location (such as a concierge desk) will incur the lowest costs and therefore generate the highest profits. If Amazon can reserve for itself all or most of the lowest-cost deliveries of its parcels, it will skim the cream: Amazon will in effect increase the average cost of delivery for the parcels that it ships through the Postal Service and other carriers. Panzar preordains the outcome of his model by assuming that the Postal Service can prevent Amazon's vertical integration into last-mile delivery by charging Amazon an unbundled delivery rate that is below its per-unit variable cost of using its own delivery vans. In practice, because Amazon's variable costs are *not* constant per delivery, the Postal Service's charging of such an unbundled delivery rate will simply encourage Amazon to deliver the least costly parcels itself and to use the Postal Service to complete Amazon's most costly deliveries.

3. Summation

Panzar's unrealistic assumptions—that parcel demand is exogenous and that per-unit costs are constant, to name only two—distort his model's results and

⁷⁸ *Id.* at 8 (“The analysis that follows deals with [Amazon's] optimization problem in a *single* market: i.e., for particular values of *b* and *B*.”) (emphasis added); *see also id.* at 29, 33.

⁷⁹ See, e.g., Charles McBride, *The Calculation of Postal Inframarginal Costs* 5 (2014), <https://www.prc.gov/sites/default/files/reports/McBride%20092814.pdf> (“[T]he economies of scale and scope [are] inherent in many postal activities.”); John C. Panzar, *The Role of Costs for Postal Regulation* 10 (2014), <https://www.prc.gov/sites/default/files/reports/J%20Panzar%20Final%20093014.pdf> (deriving a method to “reflect[] the economies of scale associated with a particular cost component” (emphasis in original)).

thus prevent evaluation of the welfare effects of his analysis. To measure the welfare effects of any policy concerning last-mile delivery, it is necessary to analyze changes in the quantity demanded and changes in total costs, both of which are impossible to observe using Panzar's model. As I explain in Part IV, Panzar curiously neglects to analyze the effect of his model's outcomes on consumer welfare. That neglect might be a result of the simplistic assumptions that make it impossible to measure consumer welfare accurately.

C. The Lack of Constraints on Parcel-Delivery Capacity

One important factor in the Postal Service's entry (or exit) decision that Panzar's model omits is the parcel carriers' capacity constraints relative to Amazon's demand for parcel-delivery services. In other words, Panzar implicitly assumes that the Postal Service's and private carriers' current delivery capacity will necessarily exceed Amazon's and their own demand for parcel delivery at all times. That assumption is incorrect and unrealistic, and it distorts the results of Panzar's theoretical model.

For example, under Panzar's stylized model, if the Postal Service's last-mile delivery rate falls below both the private-carrier rate and Amazon's unit variable cost of self-delivery, the Postal Service will deliver all of Amazon's morning parcels.⁸⁰ However, that outcome will materialize only if the Postal Service's parcel-delivery capacity exceeds the sum of Amazon's and its own parcel-delivery demand. What happens if Amazon's parcel-delivery demand instead so increases that the Postal Service's current capacity cannot accommodate Amazon's morning parcels without the Postal Service purchasing more delivery trucks or delaying the delivery of letter mail? What is the definition of the "van" that each of the carriers (including Amazon) would deploy on the margin? (Because Amazon's delivery items would not include letters or flats, Amazon's vans are more likely to be optimized for parcel delivery—like UPS and FedEx vans, not Postal Service trucks.) How would the Postal Service's need to increase capacity change relative delivery rates? How would Amazon's incentives to purchase its own delivery vans change? It is impossible to answer any of those questions within a model that lacks constraints on delivery capacity.

Moreover, when the Postal Service agrees to deliver a parcel for Amazon, it forgoes its next-best option. For example, how much capacity for the delivery of market-dominant products (such as letter-mail) does an additional parcel displace? In other words, what is the Postal Service's opportunity cost of delivering a parcel for Amazon? Panzar's omission of capacity constraints makes it impossible for one to examine the tradeoffs that the Postal Service (or any other last-mile carrier, for that matter) faces in his theoretical model.

⁸⁰ Panzar, "Last-Mile" Parcel Competition, *supra* note 1, at 16.

Far from being the stuff of arcane economic theory, this flaw in Panzar's model is immediately apparent from the Postal Service's remarks to the contrary. The OIG's executive summary for Panzar's white paper explicitly identifies capacity constraints as a challenge for last-mile parcel delivery. A decade ago, the OIG says, "the Postal Service, FedEx, and UPS . . . compet[ed] over a predictable and manageable level of parcel volume with few concerns about capacity."⁸¹

The situation is now different. The OIG says that "the rise in online orders heightened customer expectations in terms of price, place, and time of delivery, which at times tested the flexibility and capacity constraints of the big three."⁸² As the OIG has acknowledged, demand for parcel delivery has grown rapidly over the past decade, and market research by McKinsey and by Pitney Bowes projects that demand will continue to grow between 2017 and 2026.⁸³ The OIG knows for a fact that "Amazon uses its own trucks for a full half of its deliveries in the United Kingdom because Royal Mail does not have the capacity to keep up with surging demand."⁸⁴ From fiscal year 2014 to fiscal year 2016, Amazon's net sales in the United Kingdom grew at a compound annual growth rate (CAGR) of 7.0 percent.⁸⁵ Over the same period in the United States, Amazon's net sales grew at a CAGR of 28.5 percent, a growth rate that is more than four times higher than that in the United Kingdom.⁸⁶ What basis is there to believe that the Postal Service will have sufficient capacity to meet Amazon's growing demand for parcel delivery in the United States? (It is worth noting that, unlike the Postal Service, the Royal Mail has been a private company since October 2013.⁸⁷ Perhaps the fact that the Royal Mail is delivering only half of Amazon's parcels in the United Kingdom is evidence that a profit-maximizing firm would not attempt to capture all of Amazon's parcels.) These statements by the OIG make Panzar's omission of capacity constraints from his model all the more

⁸¹ OIG Executive Summary for Panzar White Paper, *supra* note 15, at 1.

⁸² *Id.*

⁸³ See, e.g., MCKINSEY & CO., PARCEL DELIVERY: THE FUTURE OF LAST MILE 6 (2016) ("[T]he market is . . . highly dynamic, with growth rates in 2015 ranging between 7 and 10 percent in mature markets . . . , and almost 300 percent in developing markets. This means that, in mature markets, volumes could double over the next ten years, reaching roughly 5 billion and 25 billion parcels per year in Germany and the US respectively."); Rajeeb Mohapatra, *The New Reality of Parcel Delivery*, PARCEL (Mar. 15, 2017), <http://parcelindustry.com/article-4838-The-New-Reality-of-Parcel-Delivery.html> ("[T]he [Pitney Bowes Parcel Shipping Index] forecasts parcel shipping volume to grow annually at five to seven percent for a total increase of 20% by 2018.").

⁸⁴ U.S. Postal Service, Office of Inspector General, *The Evolving Logistics Landscape and the U.S. Postal Service*, RARC Report No. RARC-WP-16-015 at 19 (Aug. 15, 2016), https://www.uspoig.gov/sites/default/files/document-library-files/2016/RARC-WP-16-015_0.pdf.

⁸⁵ See Amazon.com, Inc., Annual Report for the Fiscal Year Ended December 31, 2016 (SEC Form 10-K), at 68 (filed Feb. 9, 2017).

⁸⁶ *See id.*

⁸⁷ *Privatisation*, ROYAL MAIL GROUP, <http://www.royalmailgroup.com/about-us/privatisation>.

conspicuous and indicate why Panzar's theoretical model will lose whatever relevance it might have had (if any) with each passing year.

It seems inconsistent for Panzar to assume that Amazon cannot predict the breakdown between morning and afternoon arrivals of its own parcels to its own distribution centers, yet it faces absolutely no uncertainty that it will be able to summon enough last-mile delivery capacity from the Postal Service, FedEx, and UPS in a daily spot market. In other words, Panzar implies that it is risky for Amazon to invest in vans because they might go empty on a given day; but the Postal Service, FedEx, and UPS have no problem holding plenty of excess capacity to make available at a constant unit cost to Amazon. Why? Are they foolish? And does Panzar also implicitly assume that the Postal Service, FedEx, and UPS do not bother to sell that peaking capacity to Amazon for any premium to reflect its substantial option value to Amazon? If so, why would that assumption be correct? Curiously, Panzar later concedes in an appendix that, “[i]n principle, the parcel carriers face a problem quite similar to [Amazon]’s in operating their network: i.e., they must arrange for transportation to deliver their parcel volumes while meeting their service standards.”⁸⁸ He says that, “[t]o be sure of meeting its service standards without co-operation, [an individual parcel carrier] must hire enough van capacity to deal with the possibility that *all* of its parcels will arrive in either the morning or afternoon.”⁸⁹

As noted above, the ultimate test of any economic model is its ability to predict real-world outcomes. Yet, by imposing no constraint on the parcel-delivery capacity of the Postal Service, FedEx, and UPS, Panzar’s theoretical model fails to consider what would happen if current capacity is insufficient to meet demand. That shortcoming drains his model of predictive value. Had Panzar included capacity constraints, the outcomes of his model surely would differ. For example, Amazon might enter last-mile delivery despite the Postal Service’s low rates to satisfy its parcel-delivery demand or to ensure a minimal level of quality or reliability with respect to the frequency, timing, placement, verification, or security of delivery. With no consideration of capacity constraints or (as I have explained above in Part III.C) cost functions that allow costs to vary with output, Panzar’s model offers no insight into how the industry will evolve to accommodate changes in demand for last-mile parcel delivery.

⁸⁸ Panzar, “Last Mile” Parcel Competition, *supra* note 1, at 52 app. 2.

⁸⁹ *Id.* (emphasis in original).

D. *The Explicit Assumption That FedEx and UPS Coordinate to Produce the “Monopoly Price”*

Panzar assumes that FedEx and UPS “coordinate on the monopoly price.”⁹⁰ Indeed, he makes the stronger assumption that FedEx and UPS achieve “perfect coordination” on price.⁹¹ Panzar purports “not . . . to suggest that [FedEx] and [UPS] are explicitly colluding or in violation of antitrust statutes,” though he expresses in the same sentence the opinion that the firms do face the “temptation to collude”⁹² and he uses the word “collusion,” “collusive,” or “collude” eleven times in his white paper.⁹³ Despite his caveats, Panzar’s poorly camouflaged terminology makes his assumptions reckless to a degree that would understandably disturb any company identified in this manner.

As I explain in Part VII, the existence of tacit collusion is an inherently difficult factual proposition to prove in an antitrust case. Panzar’s theoretical model does not present any evidence to support his assumption that coordination exists and successfully achieves “the monopoly price.” He simply stipulates that outcome as an assumption: FedEx and UPS “somehow” “coordinate on the joint profit-maximizing delivery price.”⁹⁴ Somehow? Considering that a price-fixing conspiracy among competitors can be a felony punishable by a fine of up to \$100 million and imprisonment for up to ten years,⁹⁵ Panzar seems not to recognize that his cavalier assumption of perfect price coordination between FedEx and UPS is commercially disparaging.

In oligopoly theory, the only way that the only two firms in a market could achieve “the monopoly price” would be through perfect collusion—which is conduct beyond conscious parallelism or tacit coordination. The monopoly price would equal the price of a perfectly functioning cartel. Without explicit collusion, standard economic theory teaches that the noncooperative interaction of duopolists would produce a lower equilibrium price than a monopolist’s price.⁹⁶ Absent repetition of an afternoon-delivery-only pricing game between FedEx and UPS, the monopoly price is only obtainable through perfect collusion, especially given the assumption of perfect substitution

⁹⁰ *Id.* at 7.

⁹¹ *Id.* at 30.

⁹² *Id.* at 7 n.5.

⁹³ *Id.* at 7 n.5 (three times), 30 (once), 30 n.19 (once), 31 (three times), 39 (twice), 45 n.25 (once).

⁹⁴ *Id.* at 30.

⁹⁵ 15 U.S.C. § 1.

⁹⁶ See, e.g., DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 160–80 (Prentice Hall 4th ed. 2004); ROBERT S. PINDYCK & DANIEL L. RUBINFELD, MICROECONOMICS 351–54, 441–56 (Pearson Education 6th ed. 2005); MICHAEL L. KATZ & HARVEY S. ROSEN, MICROECONOMICS 503 (McGraw-Hill 3d ed. 1998); HAL R. VARIAN, MICROECONOMIC ANALYSIS 291–92 (W. W. Norton & Co. 3d ed. 1992).

between the two companies' products.⁹⁷ With perfect substitution and no capacity constraints, the unique Nash equilibrium would be for both firms to charge a price that is equal to their marginal costs.⁹⁸ In fact, even if the game were repeated any finite number of times, the unique subgame perfect Nash equilibrium would be for each firm to charge a price that is equal to its respective marginal costs in each period.⁹⁹ To arrive at the monopolist price, the game would need to be repeated an *infinite* number of times, and even then, the monopolist price (in each period) would only be one of an *infinite* number of potential subgame perfect Nash equilibrium prices.¹⁰⁰ It is therefore baseless for Panzar to assert by assumption that the two firms that obviously correspond to FedEx and UPS in his model "somehow" perfectly "coordinate" on pricing and thereby set "the monopoly price."

Furthermore, as a benchmark example, the monopolist price is an unhelpful point of comparison. Analyzing Amazon's incentives to vertically integrate in a world where (1) FedEx and UPS perfectly collude to charge the monopolist price and (2) the Postal Service does not offer afternoon parcel delivery offers no insight into parcel delivery in the real world.

E. The Explicit Assumption That the Parcel-Delivery Services of FedEx, UPS, and the Postal Service Are Perfect Substitutes for One Another

Panzar assumes that the last-mile delivery services of FedEx, UPS, and the Postal Service are perfect substitutes from Amazon's perspective:

From [Amazon]'s point of view, the morning parcel delivery services of the [Postal Service] and [FedEx and UPS] are perfect substitutes. As a result, the firm charging the lower price gets *all* of the parcels not delivered by [Amazon]'s vans in the morning. However, in the afternoon, *all* of the parcels not delivered by [Amazon]'s vans are routed via [FedEx] or [UPS], regardless of those carriers' prices. In an important sense, the [Postal Service] and [FedEx and UPS] are competing more directly with [Amazon]'s vans than they are with each other.¹⁰¹

In other words, the three services are not in any way differentiated on the basis of quality or other attributes that matter to Amazon. This assumption is absurd and is contradicted by the OIG's own executive summary of Panzar's white paper, which says that "the rise in online orders heightened

⁹⁷ It is unlikely that Panzar intended to model a portion of the game (in which FedEx and UPS compete in afternoon delivery) as repeated, but the rest of the game as not repeated. To do so would be logically inconsistent.

⁹⁸ See CARLTON & PERLOFF, *supra* note 96, at 180.

⁹⁹ *Id.* at 187.

¹⁰⁰ *Id.* at 188.

¹⁰¹ Panzar, "*Last-Mile*" Parcel Competition, *supra* note 1, at 27 (emphasis in original).

customer expectations in terms of price, place, and time of delivery, which at times tested the flexibility and capacity constraints of the [Postal Service, FedEx, and UPS].”¹⁰² This observation implies increasing product differentiation, not static product homogeneity. The implausibility of Panzar’s assumption of perfect substitutability materially affects the predictions one would make about the competitive interaction between FedEx, UPS, and the Postal Service. Panzar’s assumption is plainly false for at least four reasons.

First, the assumption contradicts another assumption in Panzar’s model—namely, that the Postal Service cannot deliver parcels in the afternoon. If the Postal Service is so constrained, then its last-mile delivery service is qualitatively inferior to the services of FedEx and UPS. Panzar cannot have his cake and eat it too. He cannot assume that it matters whether a delivery is made in the morning or afternoon, but then assume that either time period is equally acceptable to Amazon and its customers. To do so is to assume away important, distinguishing features that have contributed to Amazon’s commercial success. If not for that commercial success, it would be uninteresting to ask whether Amazon might be able to enter last-mile delivery on its own—and it would be uninteresting for Panzar to theorize how the Postal Service might calibrate its pricing to deter Amazon’s entry.

Second, by statute only the Postal Service has access to the letter box belonging to the parcel recipient.¹⁰³ Ignoring this fact is more than an incomplete description of the real world by Panzar. This legal prohibition raises the costs of the Postal Service’s rivals and thus materially affects the predictions that one would make of any competitive interaction between FedEx, UPS, and the Postal Service. The OIG estimated that delivery to a centralized letter box costs the Postal Service \$160 per delivery point per year, that delivery to a curbside letter box costs \$224 per delivery point per year, and that delivery to a customer’s door costs \$353 per delivery point per year.¹⁰⁴ Likewise, the Postal Service’s rivals face higher costs when the parcel’s recipient is not present. The Postal Service’s monopoly over the letter box enables the Postal Service to make more deliveries more securely or cost effectively than can FedEx and UPS, which often must either leave parcels outside a recipient’s door or reschedule a delivery.¹⁰⁵ As the Postal Service enforces rules requiring the use of cluster letterboxes (complete with parcel lockers), the degree of product differentiation between Postal Service delivery and private-carrier

¹⁰² OIG Executive Summary for Panzar White Paper, *supra* note 15, at 1.

¹⁰³ Sidak, *Abolishing the Letter-Box Monopoly*, *supra* note 23, at 410.

¹⁰⁴ Robert J. Shapiro, *The Basis and Extent of the Monopoly Rights and Subsidies Claimed by the United States Postal Service*, SONECON, Mar. 2015, at 16, http://www.sonecon.com/docs/studies/Study_of_USPS_Subsidies-Shapiro-Sonecon-March_25_2015.pdf; see also U.S. POSTAL SERVICE OFFICE OF INSPECTOR GENERAL, DR-AR-II-006, AUDIT REPORT ON MODES OF DELIVERY 9 (2011), <https://www.uspoig.gov/sites/default/files/document-library-files/2015/dr-ar-II-006.pdf>.

¹⁰⁵ For a more thorough analysis of the benefits of the letterbox monopoly to the Postal Service, see Sidak, *Abolishing the Letter-Box Monopoly*, *supra* note 23.

delivery will increase. Although parcel lockers might offer increased security and protection relative to curbside delivery, they will also be less convenient for consumers who must travel to retrieve their parcels. Those tradeoffs are representative of differentiated products.

Third, Panzar contradicts his own assumption of perfect substitutability among the parcel-delivery services of these three carriers when he says that FedEx and UPS “coordinate” on “the monopoly price.” How can two firms achieve a “monopoly price” if a third firm (the Postal Service), by hypothesis, offers a perfect substitute but does not participate in the asserted price coordination among FedEx and UPS? Given that Panzar also assumes an absence of capacity constraints, it would be impossible for FedEx and UPS to charge “the monopoly price” because the price elasticity of supply by fringe competitors (namely, the Postal Service) would be infinite.¹⁰⁶ Consequently, Panzar’s perfectly price-coordinating duopoly of FedEx and UPS would have zero market power.

Fourth, if one alternatively considers afternoon delivery (in which FedEx and UPS supposedly collude perfectly to charge the monopoly price) and morning delivery (in which the Postal Service supposedly delivers all parcels) to be separate product markets, why would Amazon not hold its lower-cost parcels until the next morning for the Postal Service to deliver? Why would Amazon ship parcels with FedEx and UPS in the afternoon of Day 1 “regardless of those carriers’ prices”¹⁰⁷ when Amazon could ship those parcels on the morning of Day 2 at the lowest available price offered by the Postal Service, FedEx, or UPS? Without capacity constraints, the Postal Service could deliver *all* of Amazon’s parcels. Panzar does not explain why there exists an unbounded willingness to pay on the part of Amazon (or its customer, who as the parcel recipient might have explicitly made the tradeoff between the price and speed of delivery) to expedite the delivery of the parcel in question by roughly twelve to sixteen hours (bearing in mind that Panzar is *not* assuming that the delivery is “extremely urgent mail,” as that term is understood within postal regulation¹⁰⁸).

Perhaps the reason that Panzar twists himself into knots with this assumption of perfect substitutability is that his theoretical model of parcel delivery envisions a market with only one-sided demand, when in fact parcel delivery is a two-sided market.¹⁰⁹ The OIG expressly acknowledged that fact,

¹⁰⁶ The classic exposition on how to use market shares, the price elasticity of demand (for the market and for the defendant firm(s)), and the price elasticity of supply by fringe producers to assess market power is William M. Landes & Richard A. Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937 (1981).

¹⁰⁷ Panzar, “Last Mile” Parcel Competition, *supra* note 1, at 27.

¹⁰⁸ See Sidak, *Abolishing the Letter-Box Monopoly*, *supra* note 23, at 425 (explaining the regulatory treatment of “extremely urgent mail,” which is the familiar overnight mail delivered by FedEx and UPS).

¹⁰⁹ See, e.g., David S. Evans, *The Antitrust Economics of Multi-Sided Platform Markets*, 20 YALE J. ON REG. 325 (2003); Jean-Charles Rochet & Jean Tirole, *Platform Competition in Two-Sided Markets*, 4 J. EUR. ECON.

saying that “[t]he U.S. Postal Service also operates as a platform in a two-sided market. . . . [consisting of] mailers and recipients.”¹¹⁰ In a two-sided market of this sort, the demand that one party has for the product is complementary—and hence vertically additive—to the demand that the other party has for the same product. The choice of delivery quality (speed, timing, placement, verification, security, and so forth) depends on the summed demand of Amazon and the parcel recipient (who usually but not always will be generating his or her need for parcel shipment by having made an online purchase). The price of delivery will affect both a consumer’s decision to order a given Amazon product and Amazon’s decision to allocate its parcels for last-mile delivery among the three carriers. Exogenous demand, zero capacity constraints, and perfect substitutability are characteristic of an industry that does not exist.

F. *The Implicit Assumption That the Postal Service Will Make No Attempt to Enter into Afternoon Parcel Delivery*

Contrary to the Postal Service’s practice in the real world, Panzar implicitly assumes that the Postal Service will not attempt to compete in afternoon parcel delivery. If the Postal Service is currently competing on last-mile deliveries in the afternoon, then Panzar is implicitly assuming a state of the world in which the Postal Service *exits* a portion of the parcel delivery market (demarcated by time of day). Alternatively, if the Postal Service is not currently competing on afternoon deliveries (which seems more in keeping with the tenor of Panzar’s stylized model), then he is implicitly assuming that the Postal Service will make no attempt to enter the “afternoon market.” Given that Panzar has already assumed away capacity constraints on parcel delivery, the Postal Service could contest the afternoon market without acquiring more trucks with which to deliver parcels. Furthermore, Panzar has already assumed that FedEx and UPS have “coordinated” “perfect[ly]”¹¹¹ to achieve “the monopoly price.”¹¹² So why would the Postal Service pass up the opportunity to enter into afternoon parcel delivery and undercut the monopoly price?

Of course, in the real world, the Postal Service *does* send multiple trucks along a given letter route to deliver parcels on a given day. Moreover, the Postal Service sends trucks to deliver parcels *on Sunday*, even though it does not deliver letter mail on Sunday. Panzar evidently envisions the Postal

Ass’n 990 (2003). The seminal article on two-sided markets is William F. Baxter, *Bank Interchange of Transactional Paper: Legal and Economic Perspectives*, 26 J.L. & ECON. 541 (1983).

¹¹⁰ U.S. Postal Service, Office of Inspector General, *The Postal Service and Its User Base*, RARC Report No. RARC-WP-16-013, at 5 (July 18, 2016), <https://www.uspoig.gov/sites/default/files/document-library-files/2016/PSUserBase.pdf>.

¹¹¹ Panzar, “Last-Mile” Parcel Competition, *supra* note 1, at 30.

¹¹² *Id.* at 7.

Service forbearing from competing against FedEx and UPS in the afternoon as part of the subgame perfect Nash equilibrium that he describes.¹¹³

G. The Explicit and Simultaneous Assumptions That Amazon Minimizes Costs and Maximizes Profit

Initially, Panzar explicitly assumes that Amazon wants to minimize cost. Consequently, he focuses on Amazon's choice of his "van capacity coverage ratio":

The decision facing [Amazon] is to choose its van capacity K . For given [volume of parcels] \mathcal{Q} , this is equivalent to choosing its van capacity coverage ratio z . Because this decision must be made before the timing of the day's parcel arrivals is known, it is natural to assume that [Amazon] seeks to minimize the *expected* costs of its operations.¹¹⁴

But it is more plausible that Amazon wants to *maximize profit*, which of course is the difference between total revenue and total cost. Panzar does not consider that Amazon might believe it to be profit-maximizing to hold excess capacity for last-mile delivery, even if that decision does not minimize cost. Put differently, for some increment of excess capacity held for last-mile parcel delivery, the incremental revenue from greater demand for Amazon purchases exceeds the incremental cost of holding that delivery capacity, which necessarily might go unused.

Later, however, Panzar switches his assumption so that Amazon's objective function is to maximize profit. When he considers the case "in which [UPS] and [FedEx] aggressively compete for [Amazon's] parcel volumes" and the "price . . . available to [Amazon] for both morning and afternoon arriving parcels" is the same—set at the "identical unit parcel delivery cost[]" of both carriers—"the substantive issue that arises . . . is whether or not [Amazon] finds it *profitable* to operate any vans, given the extreme competitive behavior of its suppliers."¹¹⁵ The two alternative assumptions cannot both apply. Surely it is more plausible that Amazon is a profit maximizer.

¹¹³ Panzar ignores the probabilistic value of antitrust penalties associated with the (anticompetitive) subgame perfect Nash equilibrium outcomes that he derives. Each party's expected profits will be lower with the possibility of facing antitrust liability.

¹¹⁴ Panzar, "*Last-Mile* Parcel Competition," *supra* note 1, at 11 (emphasis in original); *see also id.* at 27 ("The analysis thus far has served to characterize [Amazon]'s cost minimizing dispatch choices as a function of the per piece parcel delivery rates a and m charged, respectively, by the [Postal Service] and the parcel carriers.").

¹¹⁵ *Id.* at 29 (emphasis added); *see also id.* at 32 ("Matters are somewhat more complicated if [Amazon] found it profitable to operate its own vans under parcel carrier competition.").

H. The Explicit Assumption That the Postal Service Is More Efficient in Last-Mile Parcel Delivery Than Amazon Would Be

To derive an equilibrium in his theoretical model, Panzar explicitly assumes that the Postal Service is more efficient than Amazon would be in last-mile parcel delivery. For example, he states: “The [Postal Service]’s unit delivery cost is assumed to be less than the variable (operating) cost of a van, which, in turn, is assumed to be less than the unit costs of [UPS] and [FedEx].”¹¹⁶ The problem is that there is no reason to expect this assumption to be true. To the contrary, there exists ample evidence that Amazon would likely be more efficient than the Postal Service in last-mile parcel delivery.

Amazon’s entry is efficient if it can provide last-mile delivery for at least some parcels at a lower cost relative to other parcel carriers, including the Postal Service. What basis is there to believe that Amazon would not be a lower-cost provider than the Postal Service? The standard argument, based on economies of scope, that the Postal Service’s daily delivery of letter mail makes the addition of parcel delivery to the route very cheap is no longer persuasive, at least with respect to Amazon. The Postal Service delivers only competitive products on Sundays and might renew its efforts to end letter delivery on Saturdays as well.¹¹⁷ Economies of scope evaporate when the Postal Service carries only one category of mail. In addition, although it is “standard practice” for the Postal Service to make only one delivery per day per address, customer feedback suggests that additional parcel-only deliveries are common.¹¹⁸ The Postal Service is even replacing its existing “ancient fleet of delivery vehicles,”¹¹⁹ to borrow Panzar’s words, with new vehicles that

¹¹⁶ *Id.* at 33.

¹¹⁷ U.S. Postal Service, Office of Inspector General, *No More Day of Rest for Postal Package Delivery* (Nov. 13, 2013), <https://uspsogig.gov/blog/no-more-day-rest-postal-package-delivery>; Paul Ziobro, *Trump’s Fix for Post Office’s Deep Losses: Cut Back Saturday Delivery*, Fox Bus. (May 26, 2017), <http://www.foxbusiness.com/features/2017/05/26/trumps-fix-for-post-offices-deep-losses-cut-back-saturday-delivery.html>.

¹¹⁸ See Nancy Pope, *Daily Deliveries Down to One*, SMITHSONIAN NAT’L POSTAL MUSEUM: PUSHING THE ENVELOPE (Apr. 2016), <http://postalmuseumblog.si.edu/2016/04/daily-deliveries-down-to-one-1950.html> (“[S]tandard practice today is a single delivery per day – business or residential.”). But see, e.g., Emilie Raguso, *Berkeley Mail Delivery Prompts Tidal Wave of Complaints*, BERKELEYSIDE (Oct. 28, 2016), <http://www.berkeleyside.com/2016/10/28/berkeley-mail-delivery-prompts-tidal-wave-of-complaints/>; Lobsterbib, Comment to *Can USPS Deliver to Your Home Twice in One Day?*, REDDIT, https://www.reddit.com/r/Ebay/comments/42113z/can_usps_deliver_to_your_home_twice_in_one_day/ (“I get two deliveries often. One just has mail and the other packages. They can be hours apart.”); Forcedfx, Comment to *id.* (“I’ve only had a second delivery when there was a package guaranteed to be delivered by a certain day and time and it didn’t make it to the sorting facility until after the carrier left.”); *USPS Delivers Twice a Day Now?*, AMAZON VINE MEMBER FORUM (Dec. 18, 2015), <https://www.amazon.com/gp/forum/cd/discussion.html?ie=UTF8&cdForum=Fx3BD3BKVVQOQXK&cdThread=TxRXSMH5SFHH5C> (“Ever since an [A]mazon warehouse opened in my state, most of [my A]mazon packages come by USPS. . . . [T]hey deliver twice. The two-day shipping packages come in the morning, 10-12 minutes after they were sorted[. . . . I live 8 minutes away, so they must . . . see the package and run out of the door to deliver it right away. Then they deliver the [V]ine package at the usual time [a] few hours later.”).

¹¹⁹ Panzar Reply Declaration for Amazon, *supra* note 60, at 8.

are designed to accommodate parcel delivery.¹²⁰ Any cost advantages that the Postal Service might have had are rapidly disappearing as demand for letter mail declines and parcel volume continues to increase.

A simple comparison between the hourly wage of an Amazon Flex delivery provider and the average hourly wage of the Postal Service's mail carriers reveals that Amazon's unit variable cost of last-mile parcel delivery is likely lower than that of the Postal Service. An Amazon Flex contractor earns between \$18 and \$25 per hour,¹²¹ and a Postal Service mail carrier (as of May 2016) earns, on average, \$24.33 per hour.¹²² As independent contractors, Amazon Flex drivers are not entitled to insurance packages and must supply their own vehicles.¹²³ Therefore, the difference between the actual unit variable costs of Amazon and the Postal Service is likely greater than the difference between the hourly wages of an Amazon Flex contractor and a Postal Service employee who is a mail carrier.

Moreover, in contrast to the Postal Service, Amazon would be building a local delivery network with the best technology currently available, and it would not be saddled with the Postal Service's labor force, its pension liability, its other debts, or its regulatory oversight. Those advantages almost certainly outweigh any remaining economies of scope from letter delivery. In addition, the only reason that the Postal Service is able to charge low prices for its competitive products is because mailers of market-dominant products are paying for most of the delivery network. For example, a 2014 analysis found that less than five percent of the Postal Service's city-carrier delivery time was attributable to the delivery of competitive products.¹²⁴ Consequently, it is absurd to assume that the Postal Service is a more efficient provider than Amazon would be for every possible parcel delivery.

¹²⁰ Press Release, U.S. Postal Service, USPS Statement on Next Generation Delivery Vehicles Prototype Selection and Request for Proposal for Commercial Off-the-Shelf Delivery Vehicles (Sept. 16, 2016), <http://about.usps.com/news/statements/091616.htm>.

¹²¹ *Amazon Flex*, AMAZON, <https://flex.amazon.com/>.

¹²² *Occupational Employment and Wages, May 2016: 43-5052 Postal Service Mail Carriers*, U.S. DEP'T OF LABOR, <https://www.bls.gov/oes/current/oes435052.htm>; see also *Letter Carrier Pay Schedule*, NATIONAL ASSOCIATION OF LETTER CARRIERS (Feb. 19, 2016), <https://www.nalc.org/news/research-and-economics/body/paychart-02-19-2016.pdf>.

¹²³ See Chris Opfer, *Amazon Flex Draws Uber-Like Driver Complaints*, BLOOMBERG BNA (Jan. 20, 2017), <https://www.bna.com/amazon-flex-draws-n73014450075/>.

¹²⁴ Report on the City Carrier Street Time Study, Postal Regulatory Commission, Dkt. No. RM2015-7, at 18 (filed Dec. 11, 2014), <https://www.prc.gov/docs/90/90869/Prop.13.City%20Carrier.REPORT.pdf>; Michael D. Bradley, Analysis of the Supplemental Report of Dr. Kevin Neels on Behalf of United Parcel Service, Dkt. No. RM2015-7, at 1 (July 8, 2015) <https://www.prc.gov/docs/92/92726/Bradley%20Analysis.Neels.Supplmnt.Rprt.pdf> ("[D]espite their growth, parcels still represent only a small proportion of city carrier volumes and times. A few years ago, the time to deliver parcels was only five percent of street time and, although that proportion may have nearly doubled in recent years, it is still a small percentage of total street time.").

I. *The Implicit Assumption That Amazon Has Not Already Entered Last-Mile Parcel Delivery*

Panzar surely knows that Amazon already operates Amazon Flex, an Uber-like delivery network in 30 U.S. cities and counting.¹²⁵ Amazon is hiring (as of September 2017) nearly 100 new employees to work on Amazon Flex, including software development engineers, managers, and designers.¹²⁶ (That figure excludes the independent contractors who actually deliver Amazon Flex parcels.) Amazon also has a separate program in which local companies provide last-mile delivery using Amazon's logistics software.¹²⁷ That program operates in 12 metropolitan areas as of September 2017, with plans to expand.¹²⁸ Even the OIG acknowledged in 2016 that

Amazon's last-mile delivery capabilities have direct implications for postal operators. For example, its CEO Jeff Bezos recently declared that Amazon uses its own trucks for a full half of its deliveries in the United Kingdom because Royal Mail does not have the capacity to keep up with surging demand. . . . [T]he Postal Service . . . may need to recognize that its volumes from Amazon may not grow forever.¹²⁹

Amazon's expanding delivery network casts serious doubt on the plausibility of the assumption in Panzar's stylized model that Amazon will find it difficult to enter the afternoon segment of last-mile delivery once that segment supposedly has been monopolized through the hypothesized coordination of FedEx and UPS. Amazon Flex drivers choose their own hours, and Amazon advertises to local delivery companies that “[d]elivery opportunities occur throughout the day, including both early in the morning and late in the evening.”¹³⁰ Thus, there exists no period of the day (“afternoon” or otherwise) in which Amazon's last-mile parcel delivery options are limited to (1) its own trucks rented at a fixed daily cost or (2) the services of UPS or FedEx.

Panzar says that, in his view, “the case of markets in which [Amazon]'s van costs are so low relative to the unit costs of [UPS] and [FedEx],” such

¹²⁵ *Amazon Flex*, AMAZON, <https://flex.amazon.com/about/>. As of September 2017, the cities are Arlington (Virginia), Atlanta, Austin, Baltimore, Boston, Brooklyn, Charlotte, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Denver, Detroit, Houston, Indianapolis, Jacksonville, Las Vegas, greater Los Angeles area, Manhattan, Miami, Milwaukee, Minneapolis/St. Paul, Nashville, New Jersey, New York, Orlando, Philadelphia, Phoenix, Pittsburgh, Portland, Raleigh, Richmond, San Antonio, greater San Francisco area, San Diego, Seattle, Springfield (Virginia), Tampa Bay, Tucson, and Virginia Beach. *Id.*

¹²⁶ AMAZON JOBS, <https://www.amazon.jobs/> (enter “United States” in location and search “Amazon Flex”).

¹²⁷ *Deliver with Amazon*, AMAZON, <https://logistics.amazon.com/> (click “Apply” and create an account or log in). As of September 2017, the metropolitan areas are Los Angeles, San Diego, San Francisco, San Jose, Oakland, Seattle, Chicago, Dallas, Austin, Phoenix, Philadelphia, and New York City.

¹²⁸ *Id.*

¹²⁹ U.S. Postal Service, Office of Inspector General, *The Evolving Logistics Landscape and the U.S. Postal Service*, *supra* note 84, at 19.

¹³⁰ *Deliver with Amazon*, *supra* note 127.

"that [Amazon] finds it desirable to operate at least some vans"—regardless of the last-mile delivery options available from the Postal Service—"is the case of primary interest because it reflects what is currently happening in many markets."¹³¹ That Panzar then identifies an equilibrium outcome dependent on deterring Amazon's entry into markets where it considers such entry to be "desirable" and where entry might already be occurring exemplifies the dissonance between the predictions of his theoretical model and the observed behavior of firms in actual markets for last-mile parcel delivery.

j. The Implicit Assumption That the Postal Service Can Deter Amazon's Vertical Integration Without Engaging in Predatory Pricing

Entry deterrence presumes that the entrant wants to avoid making a sunk investment that it cannot recoup if it later exits the market.¹³² That is, an incumbent can effectively deter entry only if it drives an entrant's expected operating profit from entry below the entrant's fixed and sunk costs of entry, including opportunity costs. In last-mile parcel delivery, one of the most significant fixed costs of entry is the capital cost of purchasing van capacity.¹³³

However, vans are salvageable investments.¹³⁴ They are literally transportable with minimal effort to another location and use. Thus, even if Amazon decides to exit last-mile parcel delivery after having purchased or leased delivery vans, it will easily be able to recover much if not most of (the remaining value of) its initial investment in van capacity. If nothing else, upon Amazon's hypothetical exit from last-mile delivery, demand for van capacity from Amazon's new last-mile delivery contractors would increase proportionally. Consequently, much of the fixed costs of entry for Amazon would be salvageable upon its exit. If a firm's capital investment is salvageable or re-deployable, as vans are, then the firm's capital costs are largely not sunk and its cost of exit is lower. Economists well recognize that, if the cost of exit is low, so is the cost of entry.¹³⁵ In the absence of sunk costs, a firm will

¹³¹ Panzar, "*Last-Mile* Parcel Competition," *supra* note 1, at 43.

¹³² See PINDYCK & RUBINFELD, *supra* note 96, at 215 (defining sunk costs as "an expenditure that has been made and cannot be recovered"); J. GREGORY SIDAK & DANIEL F. SPULBER, *Deregulatory Takings and the Regulatory Contract: The Competitive Transformation of Network Industries in the United States* 25 (Cambridge Univ. Press 1997) (defining sunk costs as "nonrecoverable, market-specific investments"); OLIVER E. WILLIAMSON, *The Economic Institutions of Capitalism* 169 n.6 (Free Press 1985) (defining sunk costs as "the nonsalvageable part of an advance commitment").

¹³³ See, e.g., MCKINSEY & CO., *PARCEL DELIVERY: THE FUTURE OF LAST MILE*, *supra* note 83, at 19.

¹³⁴ See William J. Baumol & Robert D. Willig, *Fixed Costs, Sunk Costs, Entry Barriers, and Sustainability of Monopoly*, 96 Q.J. ECON. 405, 407 (1981) ("[B]ecause [a railroad's locomotives and cars] constitute capital on wheels, most of their cost can easily and quickly be recovered by rolling them to another market. . . . Thus, little or none of this fixed cost is sunk. Airlines and postal delivery are probably better examples, since they are industries with relatively low sunk costs along particular routes, and their fixed costs may considerably exceed their sunk costs.").

¹³⁵ See B. Curtis Eaton & Richard G. Lipsey, *Exit Barriers Are Entry Barriers: The Durability of Capital as a Barrier to Entry*, 11 BELL J. ECON. 721 (1980).

enter if it expects to earn a positive incremental operating profit from entry. In the case of vertical integration, a firm will vertically integrate if the cost of providing the necessary input (in this case, last-mile delivery), net of the benefits of vertical integration, is less than the price of purchasing that input from another firm.

To deter Amazon's vertical integration and yet avoid predatory pricing, the Postal Service must charge Amazon a price that is beneath Amazon's standalone cost of providing last-mile parcel delivery (minus the benefits that Amazon derives from vertical integration) but above the Postal Service's incremental cost of providing last-mile parcel delivery. Put differently, if the Postal Service's incremental costs exceed Amazon's standalone costs, net of the benefits to Amazon of vertical integration, it is impossible for the Postal Service to deter Amazon's entry.

Delivery vans are readily re-deployable. Consequently, Amazon's standalone cost of providing last-mile delivery will not contain any significant sunk costs and will consist primarily of Amazon's variable costs. Thus, it is quite plausibly the case that Amazon's standalone cost (primarily variable cost) is *lower* than the Postal Service's incremental cost, which of course is directly contrary to Panzar's critical assumption. As I explained in Part III.H, it seems implausible that the Postal Service would have a lower unit variable cost of providing last-mile delivery than would Amazon for every parcel. Amazon has the freedom to deploy its own delivery fleet of vans only in dense locations, where the unit variable cost of last-mile parcel delivery will be low. Thus, it seems unlikely that Amazon's standalone cost less the benefits from its vertical integration would exceed the Postal Service's incremental cost of providing last-mile delivery. If the Postal Service's incremental cost exceeds Amazon's standalone cost, net of the benefits to Amazon from vertical integration into last-mile delivery, then the Postal Service can deter entry only through an anticompetitive strategy of pricing below cost.

IV. WHY NEGLECT CONSUMER WELFARE?

I turn now to the peculiar indifference to consumer welfare implicit in Panzar's theoretical model. When Panzar describes "win-win" outcomes from deterring Amazon's entry into last-mile delivery, he curiously neglects consumer welfare and instead draws normative conclusions that emphasize benefits to Amazon and the Postal Service. How odd is it that a federal agency would want its own interest to supersede consideration of the public interest? (Coincidentally, within the past year Panzar has been both an expert witness for Amazon and a consultant to the Postal Service.) Consequently, there is no reason to believe that the predicted outcomes of Panzar's model are Pareto efficient. Analysis of the welfare effects that Panzar ignores reveals

that the Postal Service's deterrence of Amazon's efficient entry would likely harm consumers of parcel delivery service. Moreover, such a strategy could increase the financial risk that taxpayers bear on behalf of the Postal Service by virtue of its being a state-owned enterprise.

Earlier, I explained that there is no reason to believe that the Postal Service is more efficient in last-mile parcel delivery than Amazon would be; Amazon would not be saddled with the Postal Service's labor force, its pension liability, and the familiar inefficiencies inherent in state-owned enterprises. So how could the Postal Service offer Amazon a price low enough to deter its entry? As I explained in Part III.A, one answer is that the Postal Service is not maximizing profits at all and might even price its NSA with Amazon below cost. Another possibility is that the Postal Service retains cost advantages from its implicit taxpayer subsidies. Those subsidies include Treasury loans at below-market interest rates, exemption from state and local property, income, and sales taxes, and the tacit understanding (acknowledged publicly by the Postal Service) that Congress will bail out the Postal Service should it become insolvent.¹³⁶ In that sense, the Postal Service's use of excessively low prices to deter Amazon's entry would shift some of the risk of low demand for Amazon's products and services to the taxpayer. In other words, the Postal Service need not price in the risk of low demand for parcel delivery, because the taxpayer acts as its guarantor.

In addition, the Postal Service's own economic expert has freely admitted that the delivery of competitive products by the Postal Service accounted for less than five percent of its total city carrier delivery time in 2014.¹³⁷ Put differently, mailers of market-dominant products are paying for a vast majority of its delivery network. So it is highly likely that consumers of market-dominant products are substantially subsidizing the low parcel delivery rates that the Postal Service currently offers.

In addition to causing potential to harm taxpayers, deterring Amazon's entry would harm consumers of parcel delivery. Surely, Amazon would be more innovative in designing and operating its last-mile delivery service than is the Postal Service.¹³⁸ Suppressing that innovation would harm dynamic efficiency and sacrifice consumer welfare. For example, if the Postal Service's below-cost pricing deters Amazon's entry, that deterrence might reduce the price of delivery that one pays implicitly when buying a shirt online. However, the

¹³⁶ See *supra* text accompanying note 70.

¹³⁷ See Michael D. Bradley, Analysis of the Supplemental Report of Dr. Kevin Neels on Behalf of United Parcel Service, *supra* note 124, at 1; Report on the City Carrier Street Time Study, Postal Regulatory Commission, *supra* note 124, at 18.

¹³⁸ See Harvard Business Review Staff, *The Best-Performing CEOs in the World*, *supra* note 5 (listing Amazon's CEO, Jeffrey Bezos, as the best performing CEO in the world); BOSTON CONSULTING GROUP, THE MOST INNOVATIVE COMPANIES 2016: GETTING PAST "NOT INVENTED HERE," *supra* note 5, at 4 (listing Amazon as the fifth most innovative company in 2016).

inconvenience of the subsequent delivery to one's residence might impose an incremental cost (due to inferior frequency, timing, placement, verification, or security of delivery) that exceeds the incremental savings that one obtains from the ostensibly lower cost of delivery. Put differently, the Postal Service offers a cheap product that imposes time costs on consumers of competitive products. Even assuming (strictly for purposes of exposition) that Amazon is less efficient than the Postal Service, deterring its entry into last-mile parcel delivery can harm consumers if Amazon offers a differentiated product.

It bears emphasis, however, that any attempt to deter Amazon's entry will have temporary success at best. Amazon has experimented with last-mile delivery,¹³⁹ grocery delivery,¹⁴⁰ restaurant delivery,¹⁴¹ and drone-based delivery.¹⁴² It requires a willing ignorance of reality to assume that the Postal Service's low rates will suffice to deter the entry into last-mile delivery of a firm that is best described as hell-bent on vertically integrating closer to the customer. Panzar's implicit recommendation that the Postal Service attempt to deter Amazon's entry through low pricing would merely create a temporary subsidy to fund Amazon's experimentation with new last-mile delivery methods. That strategy is certainly a "win" for Amazon, and it could be a "win" for the Postal Service's management (for example, if it delays the necessary contraction of the Postal Service's scale). But that "win-win" comes at the expense of consumers and taxpayers.

V. CAN PANZAR'S MODEL INFORM LAST-MILE DELIVERY IN THE REAL WORLD?

Panzar's model analyzes hypothetical scenarios that bear so little resemblance to the real world as to be irrelevant to the Postal Service's actual pricing decisions.¹⁴³ Panzar's model is not, as the OIG optimistically suggested in its executive summary, "a low-cost way of looking at various what-if scenarios [that] can help decision makers make better, more timely, practical decisions

¹³⁹ See Walter Loeb, *Amazon Will Deliver Their Own Packages – Revolution at the Delivery Door*, FORBES (Sept. 29, 2016), <https://www.forbes.com/sites/walterloeb/2016/09/29/amazon-will-deliver-their-own-packages-revolution-at-the-delivery-door/#24035ca54a05>.

¹⁴⁰ *AmazonFresh*, AMAZON, <https://www.amazon.com/AmazonFresh/b?ie=UTF8&node=10329849011>.

¹⁴¹ *Amazon Prime Now*, AMAZON, <https://primenow.amazon.com/onboard?sourceUrl=%2F>.

¹⁴² *Amazon Prime Air*, AMAZON, <https://www.amazon.com/Amazon-Prime-Air/b?node=8037720011>.

¹⁴³ For example, in a puzzling passage in his paper, Panzar discusses the Postal Service's *entry* into parcel delivery. Panzar, "*Last-Mile*" Parcel Competition *supra* note 1, at 7. This passage is odd because the Postal Service already provides parcel delivery services for FedEx and UPS, as Panzar acknowledges earlier in his white paper. *Id.* at 4 ("Substantial changes in market structure have accompanied this growth in parcel volume. These changes were made possible by the Postal Service's 'unbundling' of its 'last mile' delivery service. This enabled large mailers to obtain favorable rates by shipping their parcels directly to a Postal Service local delivery office."). Indeed, the OIG acknowledges this as well in OIG Executive Summary for Panzar White Paper, *supra* note 15, at 1 ("[T]he Postal Service often provide[s] last-mile delivery for FedEx and UPS.").

and design workable strategies.”¹⁴⁴ Apart from its other flaws, the model’s underlying assumptions about Amazon’s entry decision are so divorced from reality as to drain Panzar’s results of any real-world significance. Moreover, the model has a short shelf life: the rapid pace of changes in Amazon’s business would quickly render even a more accurate and sophisticated model obsolete. Thus, Panzar’s model is not a useful guide for the Postal Service’s pricing decisions or its regulatory oversight.

Panzar implicitly characterizes Amazon’s entry decision as depending primarily on the cost of last-mile delivery. That characterization is doubtful. To Amazon, last-mile delivery is merely one segment of its larger delivery network. Amazon seeks to maximize its profits from its entire business; it does not seek simply to minimize its delivery costs. In some instances, the delivery method that minimizes Amazon’s cost of a particular delivery will not maximize its profits from the sale and delivery of the product being delivered. Therefore, even if Panzar’s model predicts that Amazon will not enter last-mile delivery when the Postal Service charges low enough prices, Amazon might wish to enter for other reasons, such as providing on-demand delivery of high-profit items. Vertical integration offers many potential benefits beyond cost reduction.¹⁴⁵

Enhancing quality control is a standard rationale for vertical integration. Vertical integration can be a response to the difficulty of reliably specifying and measuring contractual performance. Armen Alchian explained: “If it is costly to determine the quality of [one of the inputs] objectively, and if the quality of [the input] cannot be costlessly inferred from the quality of the finished [product], vertical integration . . . can align [the companies’] interests better.”¹⁴⁶ A cost of vertical separation is the loss of a single point of accountability. It is difficult for a customer to hold multiple vendors accountable for some form of product failure. Without this single point of accountability, Alchian observed, consumers are left calling firms’ service departments and searching for the party responsible for the failure.¹⁴⁷ By assuming that parcel delivery has no effect on other strategic aspects of Amazon’s business—including the protection and enhancement of Amazon’s considerable brand¹⁴⁸—Panzar assumes away alternative (and potentially more compelling)

¹⁴⁴ OIG Executive Summary for Panzar White Paper, *supra* note 15, at 1.

¹⁴⁵ See, e.g., CARLTON & PERLOFF, *supra* note 96, at 396–412; Francine Lafontaine & Margaret Slade, *Vertical Integration and Firm Boundaries: The Evidence*, 45 J. ECON. LITERATURE 629 (2007).

¹⁴⁶ Armen A. Alchian, *Vertical Integration and Regulation in the Telephone Industry*, 16 MANAGERIAL & DECISION ECON. 323, 325 (1995).

¹⁴⁷ *Id.*

¹⁴⁸ Amazon had the fourth most valuable brand in 2017 according to the BrandZ Top 100 Most Valuable Global Brands ranking. See Anmar Frangoul, *Google, Apple, Microsoft, Amazon and Facebook Lead Most Valuable Global Brands List*, CNBC (June 6, 2017), <http://www.cnbc.com/2017/06/05/google-apple-microsoft-amazon-and-facebook-lead-most-valuable-global-brands-list.html>. *Forbes* ranked Amazon the sixth most valuable brand in 2017. *Forbes Releases Seventh Annual World's Most Valuable Brands List*, FORBES (May 23, 2017), <https://www.forbes.com/sites/forbespr/2017/05/23/forbes-releases-seventh-annual-worlds-most-valuable-brands-list/>.

explanations for why Amazon might wish to vertically integrate into last-mile delivery.

Amazon's business model and objectives appear to differ from those of other parcel shippers and continually evolve. Several commentators believe that Amazon's acquisition of Whole Foods—completed in August 2017, two months after the Postal Service released Panzar's paper—has already changed Amazon's incentives for its purchase or creation of a last-mile delivery network.¹⁴⁹ For example, quality-control considerations might dominate price considerations. Because food delivery is time-sensitive and can require refrigeration, Amazon might have a greater incentive to design and control its own last-mile delivery service. Indeed, following its acquisition of Whole Foods in August 2017, Amazon announced in a press release that "Amazon Lockers will be available in select Whole Foods Market stores."¹⁵⁰ Given its reputation for innovation, its economies of scale as a parcel shipper, and the ongoing improvements in delivery technologies, it seems highly plausible that Amazon will eventually vertically integrate—regardless of how the Postal Service chooses to price its parcel delivery service.

Panzar's model also fails to consider the possibility that Amazon would enter last-mile delivery by acquiring FedEx, UPS, or even the Postal Service, rather than by building its own last-mile delivery service from scratch. In determining whether to make such an acquisition, Amazon would consider additional factors absent from Panzar's model, such as Amazon's potential profit from contracts with the remaining parcel-delivery services for last-mile delivery of *their* parcels over *Amazon's* network.

When one considers Amazon's strategic incentives from a real-world perspective rather than a theoretical perspective, the notion that the Postal Service can control Amazon's entry decision concerning last-mile delivery

most-valuable-brands-list/#dba450e5b55d. Some market analysts believe that the mere news of Amazon's trademark application for prepared meal kits caused the shares of Blue Apron, an incumbent in prepared meal kits, to fall by 9 percent in one day. See Tim Worstall, *Amazon Takes on Blue Apron, Consumers to Benefit—What Always Happens in Free Market Capitalism*, FORBES (July 17, 2017), <https://www.forbes.com/sites/timworstall/2017/07/17/amazon-takes-on-blue-apron-consumers-to-benefit-what-always-happens-in-free-market-capitalism/#fffe8704fdca>.

¹⁴⁹ See, e.g., Julie Jargon, Annie Gasparro & Heather Haddon, *For Amazon, Now Comes the Hard Part*, WALL ST. J. (June 18, 2017), <https://www.wsj.com/articles/for-amazon-now-comes-the-hard-part-1497827240>; Ben Thompson, *Amazon's New Customer*, STRATECHERY (June 19, 2017), <https://stratechery.com/2017/amazons-new-customer/>; Bret Swanson, *Will Washington Allow Amazon to Boost Productivity?*, AEI IDEAS (June 21, 2017), http://www.aei.org/publication/will-washington-allow-amazon-boost-productivity/?utm_source=newsletter&utm_medium=paramount&utm_campaign=cict; *Amazon's Big Buy: What Whole Foods Brings to the Table*, KNOWLEDGE @ WHARTON, http://knowledge.wharton.upenn.edu/article/amazon-whole-foods-deal/?utm_source=kw_newsletter&utm_medium=email&utm_campaign=2017-06-20.

¹⁵⁰ Press Release, Amazon, *Amazon and Whole Foods Market Announce Acquisition to Close This Monday, Will Work Together to Make High-Quality, Natural and Organic Food Affordable for Everyone* (Aug. 24, 2017), <http://phx.corporate-ir.net/phoenix.zhtml?c=176060&p=irol-newsArticle&ID=2295514>; see also Antoine Gara, *Amazon Lays Out Its Whole Foods Strategy and Shakes Up Wall Street Anew*, FORBES (Aug. 24, 2017), <https://www.forbes.com/sites/antoinegara/2017/08/24/amazon-lays-out-its-whole-foods-strategy-and-shakes-up-wall-street-anew/#2650ae7c56fr>.

through low parcel rates seems far-fetched. Panzar's static model of faux Amazon as a parcel shipper offers no useful information about the real Amazon's likely behavior. Consequently, the results from Panzar's model cannot reliably guide either managerial decisions or postal policy.

VI. IS PANZAR'S ENTRY DETERRENCE *ULTRA VIRES*?

Panzar emphasizes that his analysis "*importantly*" reveals conditions under which the rates that the Postal Service, FedEx, and UPS charge will successfully deter Amazon's entry into last-mile parcel delivery.¹⁵¹ If one interprets Panzar's theoretical findings as implying a recommended strategy of entry deterrence for the Postal Service, that strategy would exceed the Postal Service's statutory mandate under the Postal Reorganization Act of 1970¹⁵² and the Postal Accountability and Enhancement Act (PAEA) of 2006.¹⁵³ The Postal Service has a statutory monopoly over only its "market-dominant" products.¹⁵⁴ Parcel delivery is not a market-dominant product that the Postal Service has the exclusive right by statute to supply. Deterring Amazon's entry into a non-reserved market would not be a legitimate exercise of the power that Congress has delegated to the Postal Service. Such conduct would therefore exceed the Postal Service's statutory mandate and be *ultra vires*.

A. Market-Dominant Products and Competitive Products

The Private Express Statutes define the Postal Service's original monopoly over the delivery of "letters" and (the archaic and now-irrelevant term) "packets" in the United States.¹⁵⁵ Today, the Postal Service has a statutory monopoly over "market-dominant products," which Congress initially defined to consist of First-Class mail letters and sealed parcels, First-Class mail cards, periodicals, standard mail, single-piece parcel post, media mail, bound printed matter, library mail, special services, and single-piece international mail.¹⁵⁶ All other products of the Postal Service are deemed to be "competitive products," which Congress initially defined to consist of

¹⁵¹ Panzar, "*Last-Mile* Parcel Competition," *supra* note 1, at 6 (emphasis added).

¹⁵² Pub. L. No. 91-375, 84 Stat. 719.

¹⁵³ Pub. L. No. 109-435, 120 Stat. 3198.

¹⁵⁴ 39 U.S.C. § 3642(b)(1).

¹⁵⁵ 18 U.S.C. §§ 1693-97. Yet those statutes are singularly vague as to what mail comprises a "letter." Thus, the scope of the monopoly, enforceable by criminal sanctions, is itself vague. The legislative and administrative histories of the Private Express Statutes do not cure the ambiguity, for one can simultaneously cite them to support both the broadest and narrowest possible interpretations of the scope of the Postal Service's monopoly. See *Associated Third Class Mail Users v. U.S. Postal Serv.*, 600 F.2d 824, 827 (D.C. Cir. 1979) (Wright, J., dissenting) (finding that ambiguities and contradictions surrounding the definition of the term "letter" under the Private Express Statutes " belie any notion that a single definition of 'letter' flows ineluctably from the materials at hand").

¹⁵⁶ 39 U.S.C. § 3621.

priority mail, expedited mail, bulk parcel post, bulk international mail, and mailgrams.¹⁵⁷ Competitive products, including parcels, are subject to cost accounting requirements that affect price indirectly.¹⁵⁸

The statutory definitions of market-dominant and competitive products are subject to regulatory modification: “Upon request of the Postal Service or users of the mails, or upon its own initiative, the Postal Regulatory Commission may change the list of market-dominant products under section 3621 and the list of competitive products under section 3631 by adding new products to the lists, removing products from the lists, or transferring products between the lists.”¹⁵⁹ The PRC has never reclassified parcels as a market-dominant product, and nowhere do the Private Express Statutes give the Postal Service a monopoly over competitive products.

B. *Statutory Obligations of the Postal Service*

Title 39, section 101(a) of the U.S. Code states that “[t]he Postal Service shall have *as its basic function* the obligation to provide postal services to bind the Nation together through the personal, educational, literary, and business *correspondence* of the people.”¹⁶⁰ Thus, the Postal Service’s essential mandate is to provide universal service to consumers of market-dominant products. Moreover, two other provisions in section 101 (which dictates postal policy in broad terms) explicitly direct the Postal Service to prioritize letter mail over other products. Section 101(e) specifies that, “[i]n determining all policies for postal services, the Postal Service shall give *the highest consideration* to the requirement for the most expeditious collection, transportation, and delivery of important *letter* mail.”¹⁶¹ Section 101(f), which directs the Postal Service to prioritize letter mail with respect to transportation and operations, states that “[m]odern methods of transporting mail by containerization and programs designed to achieve overnight transportation to the destination of important letter mail to all parts of the Nation shall be a primary goal of postal operations.”¹⁶²

Congress has not affirmatively imposed any duty on the Postal Service through the PAEA, the Postal Reorganization Act, or any earlier postal legislation that compels deterrence of Amazon’s entry into parcel delivery. Nor could such entry deterrence credibly be said to advance in an ancillary manner the Postal Service’s performance of any statutory duty that Congress

¹⁵⁷ *Id.* § 3631. Unless otherwise noted, I use “competitive products” as a term of art corresponding to this statutory classification, rather than as an economic assessment of the presence or absence of competition in a given market.

¹⁵⁸ *Id.* § 3633(a).

¹⁵⁹ *Id.* § 3642(a).

¹⁶⁰ *Id.* § 101(a) (emphasis added).

¹⁶¹ *Id.* § 101(e) (emphasis added).

¹⁶² *Id.* § 101(f).

did impose on the enterprise. In fact, the Postal Service's implementation of Panzar's implicit pricing recommendations in the real world could harm consumers of market-dominant products, in contravention of the Postal Service's statutory obligation to prioritize letter mail. The most obvious potential harm results from the capacity constraints that Panzar's model omits. Under sections 101(e) and 101(f), parcels may not lawfully crowd out market-dominant products. Extra truck rolls would imply higher costs for reserved products, and therefore higher prices for consumers of market-dominant products. Moreover, additional parcel deliveries would slow First-Class mail delivery and thus increase quality-adjusted prices.

The low prices for parcel delivery that would be necessary for the Postal Service to charge to achieve entry deterrence of Amazon could also harm market-dominant consumers by creating a revenue shortfall, as I have previously explained.¹⁶³ Although such a strategy maximizes profits from the Postal Service's competitive products within the stylized context of Panzar's model, in practice the Postal Service's incentives to expand scale and its flexibility in assigning costs would likely yield different results. If (as I argued in Part III.A) the Postal Service's current prices for competitive products do not maximize its profits, then decreasing prices further to deter Amazon's entry into last-mile delivery would only exacerbate the resulting revenue shortfall. In other words, a decrease in price would reduce competitive products' contribution to overhead (and possibly further imperil the Postal Service's financial condition). Therefore, there is no plausible argument that Congress affirmatively authorized the Postal Service, explicitly or implicitly, to undertake the kind of entry-deterrance strategy that Panzar recommends with respect to Amazon.

C. Statutory Constraints on the Postal Service: Limited Removal of Antitrust Immunity and the Obligation to Charge Fair and Equitable Rates

Congress explicitly imposed two significant constraints on the Postal Service that are relevant here. First, section 3622(c)(3) requires that market-dominant rate design consider "the effect . . . upon . . . enterprises in the private sector of the economy engaged in the delivery of mail matter other than letters."¹⁶⁴ This language (though it applies to market-dominant products only) indicates that in enacting the PAEA Congress wanted to ensure that the Postal Service's pricing policies would be fair to its competitors. The PAEA's elimination of the Postal Service's antitrust immunity with respect to competitive

¹⁶³ See Sidak, *Maximizing the U.S. Postal Service's Profits from Competitive Products*, *supra* note 64, at 666.

¹⁶⁴ 39 U.S.C. § 3622(c)(3).

products confirms that concern.¹⁶⁵ The PAEA amended title 39 to include section 409(e)(1), which provides:

To the extent that the Postal Service, or other Federal agency acting on behalf of or in concert with the Postal Service, engages in conduct with respect to any product *which is not reserved to the United States under section 1696 of title 18*, the Postal Service or other Federal agency (as the case may be)—

- (A) shall not be immune under any doctrine of sovereign immunity from suit in Federal court by any person for any violation of Federal law by such agency or any officer or employee thereof; and
- (B) shall be considered to be a person (as defined in subsection (a) of the first section of the Clayton Act) for purposes of—
 - (i) the antitrust laws (as defined in such subsection); and
 - (ii) section 5 of the Federal Trade Commission Act to the extent that such section 5 applies to unfair methods of competition.

For purposes of the preceding sentence, any private carriage of mail allowable by virtue of section 601 shall not be considered a service reserved to the United States under section 1696 of title 18.¹⁶⁶

Section 409(e)(1) therefore establishes the boundaries of the Postal Service's sovereign immunity and antitrust immunity. It clarifies that antitrust immunity does not extend to non-reserved products, which it defines by reference to two statutes: title 18, section 1696 (which establishes the postal monopoly¹⁶⁷) and title 39, section 601 (which enumerates exceptions to the postal monopoly¹⁶⁸).

In evaluating how antitrust law constrains the Postal Service's conduct to deter Amazon's entry into last-mile delivery, an analogy to the letter-box monopoly is instructive.¹⁶⁹ In the 1930s, banks and utilities vertically integrated into their own last-mile delivery networks to deliver monthly bills or statements to their customers. It took an act of Congress in 1934 to suppress such entry, through the statutory creation of the letter-box monopoly.¹⁷⁰ That historical precedent is strong evidence that Congress—not the Postal Service in the exercise of its managerial discretion—shall decide whether to suppress

¹⁶⁵ *Id.* § 409(e)(1).

¹⁶⁶ *Id.* (emphasis added).

¹⁶⁷ 18 U.S.C. § 1696.

¹⁶⁸ 39 U.S.C. § 601(b).

¹⁶⁹ 18 U.S.C. § 1725.

¹⁷⁰ H.R. REP. NO. 73-709, at 1 (1934); S. REP. NO. 73-742, at 1 (1934).

competition against the Postal Service's unreserved products, including competition taking the form of entry through vertical integration by a large parcel mailer into last-mile delivery of parcels.

The second explicit constraint on the Postal Service is title 39, section 101(d), which provides that “[p]ostal rates shall be established to apportion the costs of all postal operations to all users of the mail on a fair and equitable basis.”¹⁷¹ Moreover, the PRC reviews each of the Postal Service's custom-priced NSAs to ensure that “the agreement [appears to] be free of undue discrimination against competitors of the Negotiated Service Agreement's partner.”¹⁷² Is setting the rate for the Postal Service's largest customer so low as to ensure that it does not build its own last-mile delivery network a “fair and equitable” cost apportionment with respect to other mailers? Is the desire to achieve entry deterrence of Amazon a justifiable basis for the Postal Service to discriminate in the rates that it would charge customers for parcel delivery customers, through confidential NSAs? It seems doubtful that discounts for a single customer on the basis of entry deterrence would pass muster under either the statutory requirement to apportion costs fairly and equitably or the PRC's prohibition against undue discrimination in NSAs.

D. Summation

In sum, for the Postal Service to pursue a strategy of deterring vertical entry to protect its market share in parcel delivery exceeds its statutory mandate. Such action would, at a minimum, contravene the Postal Service's statutory obligations to prioritize letter mail and set rates that apportion costs fairly and equitably.

VII. DOES PANZAR'S ENTRY DETERRENCE VIOLATE THE SHERMAN ACT?

Panzar proposes an equilibrium outcome in which “the Post” would charge exceptionally low prices for parcel delivery—prices possibly below the Post's cost—that would suffice to deter entry through vertical integration by its largest customer, Congo.¹⁷³ One can interpret Panzar's model to achieve its predicted equilibrium outcome not by the Post's unilateral action, but rather by its successful solicitation of collective action with one or more competing carriers, including FPS and UX. In short, one can read Panzar's analysis to

¹⁷¹ 39 U.S.C. § 101(d).

¹⁷² Order Establishing Rules Applicable to Requests to Renew or Modify Previously Recommended Negotiated Service Agreements, Dkt. No. RM2005-3, Order No. 1439, at 3 (P.R.C. May 26, 2005).

¹⁷³ In this part, I use Panzar's pseudonyms to differentiate between the actions of actual firms and the actions of the hypothetical firms in his model. The Postal Service, UPS, FedEx, and Amazon are unrelated to the hypothetical conspiracy between the Post and its competitors that I describe.

describe a course of action, consciously pursued by competitors, that would violate antitrust law by collusively pricing parcel delivery services at a level intended to deter Congo's entry into the market for last-mile parcel delivery.

One might reason that the morning and afternoon segmentation of parcel delivery in Panzar's hypothetical world is so disconnected from reality that any criticism of the antitrust implications of the model's equilibrium outcomes is unnecessary. However, it is possible that some other market segmentation—for example, in terms of different product categories or geographic regions—theoretically exists between the Postal Service and the private carriers. To the extent that such market segmentation exists, the solicitation of collective action that I posit in this part is plausible despite the absence of an “afternoon” market that is distinct from a “morning” market. It is thus important to scrutinize carefully the antitrust implications of Panzar's analysis.

A. The Characterization of Congo as a Competitor of the Post Under Antitrust Enforcement Agency Guidelines

Amazon's current level of vertical integration is sufficient to classify it as a competitor for purposes of an antitrust analysis. Additionally, the Horizontal Merger Guidelines define conditions under which the Department of Justice and the Federal Trade Commission will consider a firm a market participant when the agencies are analyzing a proposed merger.¹⁷⁴

The agencies consider all firms earning revenue in the defined relevant product market to be market participants.¹⁷⁵ The agencies also include firms that have indicated their intent to enter a market but are not yet earning revenue in the market.¹⁷⁶ The agencies also consider some firms that do not produce a product within the relevant product market and have not committed to enter the market but would likely enter in response to a small but significant and non-transitory increase in price (SSNIP) to be market participants. One group of likely (but not committed) entrants that the agencies include as market participants is “rapid entrants,” which are firms that would likely “provide rapid supply responses with direct competitive impact . . . without incurring significant sunk costs” in response to a SSNIP.¹⁷⁷

As I have explained in Part III, Amazon has already partially entered last-mile delivery and has low sunk costs. Thus, in the event of a SSNIP, Amazon could rapidly enter (or expand the extent of its current entry). Consequently,

¹⁷⁴ U.S. DEPARTMENT OF JUSTICE & FEDERAL TRADE COMMISSION, HORIZONTAL MERGER GUIDELINES § 5.1 (2010) [hereinafter Horizontal Merger Guidelines], <https://www.justice.gov/atr/horizontal-merger-guidelines-08192010>.

¹⁷⁵ *Id.* § 4.I.I.

¹⁷⁶ *Id.*

¹⁷⁷ *Id.*

in analyzing Panzar's model, I assume that Congo would be similarly positioned to enter the market.

B. Attempted Joint Monopolization of Parcel Delivery by the Post Through Solicitation of Price Fixing and Market Allocation

An agreement in antitrust law is a "conscious commitment to a common scheme designed to achieve an unlawful objective."¹⁷⁸ Even in the absence of an agreement between competitors, the *solicitation* of a price-fixing agreement can constitute attempted monopolization under section 2 of the Sherman Act, as *United States v. American Airlines, Inc.* clearly established in 1984.¹⁷⁹ In that case, Robert Crandall (then president of American Airlines) proposed to the president of Braniff Airlines during a recorded telephone conversation that the two airlines raise their fares on flights from and through the Dallas-Fort Worth International Airport (DFW), saying, "You'll make more money and I will too."¹⁸⁰ Together, the two airlines accounted for more than 76 percent of monthly enplanements at DFW.¹⁸¹ The Antitrust Division sued American Airlines, claiming that Crandall's actions constituted attempted monopolization under section 2.¹⁸² The district court dismissed that complaint on the grounds that "more than an allegation of solicitation to monopolize was required to state a claim for attempted monopolization."¹⁸³ The Fifth Circuit emphatically reversed and said that "an agreement is not an absolute prerequisite for the offense of attempted joint monopolization."¹⁸⁴

Panzar's model presumes that the Post will make no attempt to enter into afternoon parcel delivery, even when it sets its delivery rate in the morning below the rates that FPS and UX charge. By declining to contest the profitable afternoon market (which Panzar asserts is a perfectly coordinated monopoly), the Post is implicitly soliciting FPS and UX to jointly monopolize last-mile parcel delivery by dividing it into the morning delivery period and the afternoon delivery period.¹⁸⁵ Panzar explains in a technical appendix to his white paper:

[T]he fact that the Post cannot deliver afternoon arriving parcels means that the parcel carriers always have an alternative to the simple undercut-

¹⁷⁸ *Monsanto Co. v. Spray-Rite Serv. Corp.*, 465 U.S. 752, 768 (1984).

¹⁷⁹ 743 F.2d 1114 (5th Cir. 1984). Such conduct also can violate section 5 of the FTC Act, which prohibits "unfair or deceptive acts or practices in or affecting commerce." 15 U.S.C. § 45(a)(1).

¹⁸⁰ 743 F.2d at 1116.

¹⁸¹ *Id.*

¹⁸² *Id.* at 1115.

¹⁸³ *Id.*

¹⁸⁴ *Id.* at 1122.

¹⁸⁵ In practice, the markets need not be defined temporally. The Post could simply propose to the private carriers that each carrier will be allowed to monopolize the types of parcels that it is more likely to ship, if such segregation of parcels is feasible.

ting strategy. They can respond to a Post rate offering by charging a significantly *higher* price, thereby focusing their attention on afternoon deliveries not threatened by the Post.¹⁸⁶

Panzar's model in essence urges FPS and UX to tag along while the Post deters Congo's entry into last-mile delivery, as those two private carriers (Panzar reasons) will benefit if Congo can be persuaded to forbear from deploying (or to limit in size or scope) its own rival delivery network, with which Congo could make deliveries in both the morning and the afternoon. Panzar concludes that, in the face of the Post's price reductions in the morning segment, "the parcel carriers will lose their morning market unless they undercut the Post rate," such that, "as the price that must be undercut decreases, the prospect of giving up the morning business and setting a higher price as an afternoon only coordinated monopoly becomes increasingly attractive."¹⁸⁷ He concludes that "it is optimal for [FPS and UX] to abandon the morning parcel delivery market to the Post."¹⁸⁸ "Instead," Panzar says, "FPS and UX respond by *drastically increasing their rates* in the afternoon, even though that induces Congo to purchase some vans."¹⁸⁹ He finds that, "after the Post has captured the morning arriving half of their business, the parcel carriers can *double* their profits merely by very slightly undercutting the Post rate."¹⁹⁰

Panzar's pricing and entry-deterrance scenario is certainly more nuanced than the naked price-fixing conspiracy that Robert Crandall proposed to the CEO of Braniff. But does Panzar's white paper outline a scenario of joint monopolization by solicitation every bit as much as Crandall's solicitation did in *American Airlines*? By conspicuously suggesting that the Post forbear from competing against the private carriers in the afternoon despite pricing morning parcel deliveries to Congo below the private-carrier rate, Panzar's model for the Post explicitly envisions (and therefore does more than merely tacitly invite) that the private carriers will jointly monopolize afternoon parcel delivery while the Post monopolizes morning parcel delivery after having deterred Congo's entry into last-mile delivery of parcels. Although Panzar certainly nowhere acknowledges the point, his envisioned monopolization of morning parcel delivery by the Post would result from its soliciting the private carriers not to disrupt its scheme of forcing taxpayers or consumers of letter mail (or some combination of the two groups) to bear the cost of

¹⁸⁶ Panzar, "Last-Mile" Parcel Competition, *supra* note 1, at 56 (emphasis in original) (Appendix 3).

¹⁸⁷ *Id.* at 57.

¹⁸⁸ *Id.* at 58.

¹⁸⁹ *Id.* (emphasis added).

¹⁹⁰ *Id.* at 33 (emphasis in original).

the Post's forgoing enough revenue from Congo to convince it to keep out of last-mile parcel delivery.¹⁹¹

C. Would Panzar's Equilibrium Outcome Be Evidence of at Least an Implicit Agreement in Restraint of Trade?

Panzar's model has communicated why the strategy—which the world's leading expert on postal economics has concluded would be a subgame perfect Nash equilibrium—would be a “win-win-win” for the Post, Congo, and the two private carriers. The Postal Service itself says that Panzar's white paper sheds light on *interaction* among market participants:

This theoretical work is not meant to provide the Postal Service with a specific pricing proposal. As with any theoretical model, it provides an abstract simplification of reality. However, it helps one to consider the implications of how players interact in an ever-changing parcel market.¹⁹²

Panzar's claim of the “win-win-win” implications of the Post's successful deterrence of Congo's entry into last-mile delivery means that no express agreement in restraint of trade—no smoking gun—is necessary among the four firms to effect that outcome. Panzar believes and reports to the Postal Service that noncooperative game theory predicts that independent action will tacitly generate the “win-win-win” outcome that he describes.

The Supreme Court has found that the exchange of price information among competing sellers can violate section 1 of the Sherman Act even when the existence of an agreement to fix prices has not been proven.¹⁹³ However, it has required more than mere evidence of parallel conduct. For example, in *Bell Atlantic Corp. v. Twombly*, the Supreme Court examined “whether a § 1 complaint can survive a [Rule 12(b)(6)] motion to dismiss when it alleges that [the defendants] engaged in certain parallel conduct unfavorable to competition, absent some factual context suggesting agreement, as distinct from identical, independent action.”¹⁹⁴ The plaintiffs alleged that incumbent local exchange carriers (ILECs) had conspired to lessen competition among themselves, and with competitive local exchange carriers

¹⁹¹ If the Post does not intend to recoup losses on its competitive products, then it is plausible that Congo would agree to forbear from entry into last-mile delivery conditional on the Post's offering a rate that is below Congo's unit variable cost of entry—which is likely to be lower than the Post's unit variable cost for that reasons that I have explained. The Post's offering of that below-cost price could support a claim for monopolization by UX and FPS.

¹⁹² OIG Executive Summary for Panzar White Paper, *supra* note 15, at 2.

¹⁹³ See *United States v. Container Corp.*, 393 U.S. 333, 335 (1969). For similar lower court decisions, see *United States v. Foley*, 598 F.2d 1323, 1335 (4th Cir. 1979); *United States v. Champion Int'l Corp.*, 557 F.2d 1270, 1273 (9th Cir. 1977); *Esco Corp. v. United States*, 340 F.2d 1000, 1007 (9th Cir. 1965).

¹⁹⁴ FED. R. CIV. P. 12(b)(6).

¹⁹⁵ 550 U.S. 544, 548–49 (2007).

(CLECs), by engaging in parallel conduct that precluded both the CLECs' entry into each ILEC's respective market and the ILECs' entry into each other's markets.¹⁹⁶ The district court dismissed the complaint for failing to allege facts that "provide any basis to infer that defendants' conduct was the result of anything but their individual economic interests."¹⁹⁷ The Second Circuit reversed.¹⁹⁸ In turn, the Supreme Court upheld the district court's initial ruling on the reasoning that "an allegation of parallel conduct and a bare assertion of conspiracy will not suffice" to enable a section 1 complaint to survive a motion to dismiss.¹⁹⁹ To withstand a motion to dismiss without evidence of an explicit agreement in restraint of trade, one must present evidence "that raises a suggestion of a preceding agreement, not merely parallel conduct that could just as well be independent action."²⁰⁰

Panzar emphasizes the scenario in which Congo, the Post, UX, and FPS each independently reacts to how it believes the other three will react to Panzar's identification of a pricing strategy to deter Congo's entry into last-mile delivery and to allocate segments of the parcel delivery market by time of day between the Post and private carriers. Consequently, Panzar supplies the answer for why this pricing, if challenged in an antitrust lawsuit, would survive the defendants' motion to dismiss under *Twombly*: Unless the Post forbears from competing for the private carriers' afternoon delivery customers—a management decision that would sacrifice revenue for the Post, but a decision nonetheless that Panzar assumes in his model of optimal pricing that the Post would make—the outcome is not a "win-win-win."

D. Economic Evidence Supporting an Agreement in Restraint of Trade

A court may infer the existence of an anticompetitive agreement among firms if certain economic evidence shows that the firms' parallel conduct plausibly manifested a "meeting of the minds" to coordinate actions over price.²⁰¹ In *United States v. Foley*, for example, one defendant (John Foley) announced to nine leading realtors in Montgomery County, Maryland, at a private banquet at Congressional Country Club, that his own realty firm was raising its commission rate.²⁰² "At the dinner Foley rose, made some prefatory remarks and then stated that his firm was in dire financial condition. Saying

¹⁹⁶ *Twombly v. Bell Atl. Corp.*, 313 F. Supp. 2d 174, 182 (S.D.N.Y. 2003), *vacated and remanded*, 425 F.3d 99 (2d Cir. 2005), *rev'd*, 550 U.S. 544 (2007).

¹⁹⁷ *Twombly*, 313 F. Supp. 2d at 184.

¹⁹⁸ *Twombly v. Bell Atl. Corp.*, 425 F.3d 99 (2d Cir. 2005), *rev'd*, 550 U.S. 544 (2007).

¹⁹⁹ *Twombly*, 550 U.S. at 556.

²⁰⁰ *Id.* at 556–57; *see also* *Aladdin Oil Co. v. Texaco, Inc.*, 603 F.2d 1107, 1117 (5th Cir. 1979) ("Rarely, if ever, can a plaintiff point to a 'smoking gun' in [conspiracy] cases such as this. Yet, a plaintiff must convince the court that it is reasonable to infer the existence of the gun from the facts shown.").

²⁰¹ *Bell Atl. Corp. v. Twombly*, 550 U.S. 544, 557 (2007); *see also* RICHARD A. POSNER, ANTITRUST LAW 94 (Univ. of Chicago Press 2d ed. 2001).

²⁰² 598 F.2d at 1327.

that he did not care what the others did, he then announced that his firm was changing its commission rate from six percent to seven percent.”²⁰³ In the following months, each of the other defendants adopted a seven-percent commission rate. The Fourth Circuit affirmed the district court’s decision finding that the defendants violated section 1.²⁰⁴

Economists widely recognize that an anticompetitive meeting of the minds can eventuate without evidence of the elaborate schemes, formal arrangements, and overt communication between competitors that courts typically associate with price collusion.²⁰⁵ If economic evidence indicates a tacit “mutual understanding” among competitors, then a court has sufficient justification to find that the firms have formed an agreement in restraint of trade.²⁰⁶ In antitrust parlance, these items of circumstantial evidence are “plus factors”²⁰⁷ that establish patterns of firm behavior that are “consistent with agreement” and “inconsistent with independent or merely interdependent conduct.”²⁰⁸ Such factors include, among others, structural characteristics of the relevant market that make collusion more attractive and more difficult to detect, and circumstantial economic evidence that tends to contradict a presumption of no agreement.²⁰⁹ In general, the more unlikely one is to observe certain economic evidence in the absence of a violation, the more weight such evidence will have in establishing the inference of a violation.²¹⁰

The economic literature on information sharing has acknowledged that consumers and producers typically have conflicting interests.²¹¹ For one to determine whether information sharing improves economic welfare as a whole, one must weigh producer benefits against the potential harm to consumers from a collusive arrangement that could emerge from information

²⁰³ *Id.* at 1332.

²⁰⁴ *Id.* at 1326.

²⁰⁵ See, e.g., GEORGE J. STIGLER, *A Theory of Oligopoly*, in THE ORGANIZATION OF INDUSTRY 39 (Univ. of Chicago Press 1983); Dennis Yao & Susan S. DeSanti, *Game Theory and the Legal Analysis of Tacit Collusion*, 38 ANTITRUST BULL. 113 (1993); Andrew Dick, *Cartels and Tacit Collusion*, in 1 THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE LAW 206 (Peter Newman ed., Macmillan 1998); POSNER, *supra* note 201, at 93–100.

²⁰⁶ POSNER, *supra* note 201, at 94.

²⁰⁷ Blomkest Fertilizer, Inc. v. Potash Corp. of Sask., 203 F.3d 1028, 1032–34 (8th Cir. 2000) (“An agreement is properly inferred from conscious parallelism only when certain ‘plus factors’ exist.” (citing *In re Baby Food Antitrust Litig.*, 166 F.3d 112, 122 (3d Cir. 1999); *Admiral Theatre Corp. v. Douglas Theatre Co.*, 585 F.2d 877, 884 (8th Cir. 1978)); *Modern Home Inst., Inc. v. Hartford Accident & Indem. Co.*, 513 F.2d 102, 110 (2d Cir. 1975) (“Additional facts or circumstances are needed to show that the decisions were interdependent and thus raise the inference of a tacit agreement.”).

²⁰⁸ William H. Page, *Twombly and Communication: The Emerging Definition of Concerted Action Under the New Pleading Standards*, 5 J. COMPETITION L. & ECON. 439, 444 (2009).

²⁰⁹ For a comprehensive survey of “plus factors” that courts recognize as informative, see William E. Kovacic, *The Identification and Proof of Horizontal Agreements Under the Antitrust Laws*, 38 ANTITRUST BULL. 5, 37–55 (1993); see also Joseph E. Harrington, Jr., *Posted Pricing as a Plus Factor*, 7 J. COMPETITION L. & ECON. 1 (2011).

²¹⁰ See Douglas A. Herman & Seth B. Sacher, *An Economic Analysis of Twombly/Iqbal with Applications to Antitrust*, 11 J. COMPETITION L. & ECON. 107 (2015).

²¹¹ See, e.g., Michael Raith, *A General Model of Information Sharing in Oligopoly*, 71 J. ECON. THEORY 260, 280–81 (1995).

sharing under oligopoly.²¹² It is doubtful that the Nash equilibrium outcome of Panzar's stylized model would benefit consumers. That outcome would be a result of firms' parallel conduct to block entry of an efficient competitor. Moreover, economic evidence indicates that the Post—the Postal Service's counterpart in Panzar's hypothetical world—likely sets prices below cost. If an outcome that results from information sharing comes at the expense of consumers, it is certainly not a “win-win-win.” It would be economic evidence that there exists an agreement in restraint of trade.

E. Summation

Panzar's white paper elicits the antitrust concern that it is the solicitation by the Post to its private competitors, FPS and UX, of an agreement to fix prices and to allocate markets as an attempt to jointly monopolize parcel delivery. Although charged with creating a model of the modern parcel delivery industry, Panzar instead describes an anticompetitive conspiracy between competitors in his hypothetical world.

The OIG expresses what it regards to be the concluding “highlight” of Panzar's white paper this way: “In his theoretical model, Professor Panzar shows that large parcel delivery companies are threatened by more than competition amongst each other—their real battle is over package volumes under the threat of self-delivery by large retailers.”²¹³ The pricing recommendations flowing from Panzar's theoretical analysis of that “threat,” however, would be legally perilous for the management of the Postal Service to pursue.

CONCLUSION

Panzar's stylized mathematical model rests on unreliable economic assumptions and offers no useful information about last-mile parcel delivery in the real world. His static model fails to account for Amazon's broader strategic goals, such as those motivating its acquisition of Whole Foods in August 2017. Panzar's normative conclusions emphasize benefits to the Postal Service and unsolicited benefits to Amazon (as well as UPS and FedEx) but neglect potential harm to consumers of postal products. Moreover, his recommendation that the Postal Service deter Amazon's entry into last-mile delivery would exceed the powers that Congress delegated to the Postal Service. If implemented, that recommendation would potentially violate antitrust law. In short, Panzar's analysis is not a reliable or useful guide for either the Postal Service's managerial decisions or its regulatory oversight.

²¹² *Id.* at 280–81.

²¹³ U.S. Postal Service, Office of Inspector General, *Play to Win*, *supra* note 1, at 1 (Executive Summary).