BEFORE THE
POSTAL REGULATORY COMMISSION
WASHINGTON, D.C. 20268-0001

INSTITUTIONAL COST CONTRIBUTION	)	Docket No. RM2017-1
REQUIREMENT FOR COMPETITIVE PRODUCTS	)	

DECLARATION OF JOHN C. PANZAR
FOR AMAZON FULFILLMENT SERVICES, INC.

(JANUARY 23, 2017)

I.   INTRODUCTORY MATERIAL

My name is John C. Panzar. I am Professor of Economics in the Business School of the University of Auckland and Louis W. Menk Professor of Economics, Emeritus, at Northwestern University. My professional work has included analysis of economic pricing and costing principles for the United States Postal Service and other multiproduct firms. Since 1984, I have sponsored testimony to the Postal Regulatory Commission ("PRC" or "the Commission") and its predecessor, the Postal Rate Commission, for several parties (and the Commission itself). In 2014, the Commission contracted with me to prepare a report on the proper role of costs for postal regulation.[1] My curriculum vitae is attached as Exhibit 1 to this Declaration.

The purpose of this Declaration is to comment on the economic issues raised by requiring that the contribution from competitive products offered by the Postal Service cover a specified minimum share of the Postal Service's total institutional costs. I can state my

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[1] Panzar (2014).

conclusions succinctly: the Commission should eliminate the minimum contribution requirement. My reasons are as follows. First, as explained in Section II, the minimum contribution requirement is contrary to the light-handed regulatory approach of the Postal Accountability and Enhancement Act of 2006 ("PAEA"). The minimum contribution requirement harkens back to the era when the Commission was responsible for approving contribution levels for all of the Postal Service's products. Because the prices of individual products are not regulated under PAEA, competition determines the contributions that competitive products make toward the coverage of the institutional costs of the Postal Service. Second, for the standard economic reasons reviewed in Section III, like any firm operating both competitive and regulated businesses, the Postal Service should have the authority to set competitive product prices with the only constraint being the incremental cost price floor. This is sufficient to prevent cross-subsidization. A positive minimum contribution requirement would unnecessarily raise this floor, likely reducing the efficiency of the postal sector.

Section IV reviews the economic arguments against imposing an artificially high regulatory floor under the prices charged by the Postal Service for its competitive products. As is well known, if the constraint is binding, it provides a "pricing umbrella" permitting the competitors of the Postal Service to both raise their prices and inefficiently capture volume from the Postal Service. Rivals of the Postal Service are the only possible beneficiaries: American consumers, the Postal Service, all customers of the Postal Service and its rivals, and the productive efficiency of the postal sector cannot gain, and can only lose, from a non-zero minimum contribution requirement. The efforts of private competitors to persuade the Commission to raise the price floor for competitive postal products are a classic example of

regulatory rent-seeking, which the Commission should not accommodate.[2] Section V illustrates these effects using a simple numerical example. In Section VI, I urge the Commission to eliminate the minimum contribution requirement entirely, rather than just leave it at its current nonbinding level. Circumstances may change, and the Commission should not take the risk that the minimum contribution requirement will become binding in the future and damage the Postal Service and its customers.

II.   THE MINIMUM CONTRIBUTION REQUIREMENT IS CONTRARY TO THE GENERAL RELIANCE OF PAEA ON COMPETITION, NOT REGULATION, TO SET PRICES.

The Postal Accountability and Enhancement Act of 2006 directed the Commission to "promulgate a regulation to ensure that competitive products, collectively, bear an 'appropriate share' of the Postal Service's institutional costs." Order No. 1449 in Docket No. RM2012-3 (August 23, 2012), p. 1. Importantly, however, PAEA (39 U.S.C. § 3633(b)) also gave the Commission the responsibility to

> "…review its appropriate share regulation at least every 5 years to determine if the contribution requirement should be 'retained in its current form, modified, or eliminated.'"

Order No. 1449, p. 13. Thus, Congress recognized from the outset that the minimum contribution requirement might well turn out to be a temporary measure, to be discontinued if it proved to be unnecessary or undesirable.

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[2] "Rent-seeking" is the "socially costly pursuit of wealth transfers," often by manipulating the regulatory process to exclude rival suppliers or drive up their prices or costs. *See* McChesney (1998); Tollison (1998).

In my view, the minimum contribution requirement is best viewed as a deliberately transitional measure between the traditional cost-of-service regulatory approach of the Postal Reorganization Act ("PRA") and the more light-handed approach of PAEA. The PRA effectively required the Commission to apportion a specific share of institutional costs to *every* class, subclass and category of mail in *every* rate case. This requirement followed from: (i) the Commission's responsibility to approve rates that covered the total costs of the Postal Service; and (ii) the necessity that *any* set of break-even prices by definition determines how the firm's joint and common costs (institutional costs) are shared by individual products and groups of products. Thus, under the PRA, the Commission had to determine the share of institutional costs covered by *each* product. In contrast, PAEA largely removed this responsibility from the Commission and, for competitive products, transferred the responsibility to competition.

PAEA (and the antitrust statutes) still limit the Postal Service's pricing flexibility in two respects. First, all competitive products (and groups of competitive products) must make contributions of at least zero: that is, the revenue generated by each competitive product must cover its incremental costs. Second, PAEA went a step further by giving the Commission the authority to require that competitive products, as a group, also cover a specified positive share of the Postal Service's total institutional costs. Thus, the minimum contribution requirement creates a limited exception to overall thrust of PAEA by allowing the Commission to *attempt*[3]

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[3] As this Declaration will repeatedly emphasize, the Commission can only approve or disapprove the Postal Service's *rates* for competitive products. Competition and demand will determine how much contribution actually results from any approved set of rates. The contribution that the Postal Service can earn from its competitive products is determined by market forces, not the Commission. As explained below, setting a minimum contribution requirement that exceeded that permitted by competition and demand would be counterproductive and futile.

to substitute its judgment for that of the marketplace. Fortunately, PAEA also makes it clear that the Commission is under no obligation to interfere with market forces in this way. The remainder of my statement explains the economic reasons why the Commission should eliminate the minimum contribution requirement.

III. THE POSTAL SERVICE SHOULD BE ALLOWED TO PRICE COMPETITIVE PRODUCTS DOWN TO INCREMENTAL COST.

The overall thrust of PAEA has been to give the Postal Service pricing freedom over competitive products while (i) protecting mailers and receivers of market-dominant products from excessive prices and (ii) protecting the Postal Service's competitors from anticompetitive or predatory behavior. PAEA's price cap provisions for market-dominant products are designed to achieve the first objective; setting a price floor for competitive products equal to incremental costs achieves the second.

A price floor equal to incremental costs ensures that competitive products are not being subsidized by other products, thereby promoting competition and benefiting consumers.[4] The CPI cap on rate increases for market-dominant products provides a second and independent safeguard against cross subsidy by preventing the Postal Service from recovering losses on competitive products through higher prices on market-dominant products. Therefore, the

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[4] This has been the standard conclusion of economists since the seminal work of Faulhaber (1975). *See also* Baumol, Panzar and Willig (1988), Braeutigam (1989), and Viscusi, Vernon and Harrington (2005), among many other authors. This argument was recently presented before the Commission in some detail in Panzar (2016), at 11-15 & n. 13, and is reflected in the Commission's analysis in Order 3507 in Docket No. RM2016-2 (September 9, 2016) at pp. 10, 13- 17-18, 57-58, and App. A at 17-22.

traditional regulatory concern about cross-subsidization leading to predatory behavior is not relevant.[5]

A positive minimum contribution requirement is also unnecessary to protect against predatory pricing of competitive products. This is true for several reasons:[6]

(i) Prices that cover incremental costs are not predatory.

(ii) Predatory pricing cannot succeed unless the alleged predator has the financial resources to drive its rivals out of business by outlasting them in a price war. There is no evidence that the Postal Service could outlast private competitors in a price war.

(iii) Successful predatory pricing also requires that the would-be predator have a realistic prospect of being able to raise its prices enough after the exit of its competitors to recoup the losses of the price war without prompting renewed competitive entry. There is no evidence that the Postal Service could do this.

As a result, there is no particular incentive for the Postal Service to engage in anticompetitive behavior nor is there a reasonable prospect of it doing so successfully.

Equally unsound is the notion that a positive minimum contribution requirement provides a "margin of safety" against potential errors in the available estimates of the incremental costs of the competitive products of the Postal Service. First, the rapid rise in the contribution from competitive products since 2006 has rendered the current minimum

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[5] Thus the concerns raised by Sappington and Sidak (2003) about the potential for cross-subsidy or cost-shifting by firms that are subject to cost of service price regulation do not apply.

[6] See any standard antitrust economics text such as Viscusi, *et al*. (2005).

contribution requirement essentially irrelevant. At current levels, the revenue earned by competitive products would cover their incremental costs by a wide margin even if those costs were massively understated. Second, while no estimate of incremental costs is perfectly precise, the Commission's long-standing and ongoing review of the Postal Service's cost attribution methods provides reasonable assurance that those methods are reasonably accurate. Finally, one could just as easily argue for a downward margin of safety to prevent an artificially high price floor to the potential detriment of consumers, the Postal Service, mailers, and the public. The rational response to uncertainties in the available information on incremental costs is to base prices on the best evaluable estimates, not to put a regulatory thumb on the scales in either direction.

An alternative argument for maintaining a minimum contribution requirement is that it is necessary to "level the playing field." The Commission indicated its support for this rationale in the Docket No. RM2012-3, the Commission's previous rulemaking on the minimum contribution requirement. There are several formulations of this argument. One is the claim that the Private Express Statutes and mailbox monopoly enable the Postal Service to unfairly exploit economies of scope between letters and parcels that private competitors are not allowed to attempt to match.[7] A related argument is that the tax exemption and other legal preferences enjoyed by the Postal Service give it an unfair competitive advantage over private competitors.[8] Both of these arguments suggest that the Commission should set a positive minimum contribution requirement to offset the advantages (allegedly) conferred on

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[7] Order No. 1449, pp. 13 and 15.

[8] Order No. 1449, pp. 14-15 (citing Federal Trade Commission (2007)).

the Postal Service by other branches of the government. This suggestion makes no economic sense whatever.

Leaving aside the issue of the size of the benefits (and, conversely, disadvantages) to the Postal Service provided by government policies, the Commission has no duty or responsibility to "offset them." The minimum contribution requirement cannot reduce or eliminate such advantages. The Commission can only determine whether they are shared between the Postal Service and the customers of its competitive products—or are transferred to its competitors. This is because any positive minimum contribution requirement will have the effect of raising the price floor faced by the Postal Service for its competitive products. As was established in Docket RM2016-2,[9] raising the competitive product price floor above that required by the incremental cost test can, at best, have no effect on the competitive outcome (i.e., when the higher price floor remains below Postal Service rates). Otherwise, consumers will end up paying higher prices because Postal Service volume is inefficiently captured by rival carriers, the increased floor enables rival carriers to charge higher prices, or both.

The Commission's contrary reasoning on this issue in Order No. 1449 appears to reflect some confusion over the role of stand-alone costs. In Order 1449 (at p. 13), the Commission stated:

> A primary function of the appropriate share requirement is to ensure a level playing field in the competitive marketplace. The Postal Service's competitors incur certain fixed operating costs. If the Postal Service's competitive products were not required to contribute an appropriate share towards the institutional costs of the enterprise, this could result in the market-

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[9] See Panzar Declaration in Docket No. RM2016-2 (Jan. 27, 2016), and Order No. 3507. See also the numerical example in Section VII, below.

dominant products cross-subsidizing the fixed costs of the stand-alone competitive enterprise. For this reason, the appropriate share requirement is an important safeguard to ensure fair competition on the part of the Postal Service. The appropriate share requirement could be said to reflect the ways in which institutional resources are spent on the competitive enterprise. If the Postal Service's competitive products were not required to contribute an appropriate share towards the institutional costs of the enterprise, this could result in the market dominant products cross-subsidizing the fixed costs of the stand-alone competitive enterprise. For this reason, the appropriate share requirement is an important safeguard to ensure fair competition on the part of the Postal Service.

The fixed costs of private parcel and express carriers, and the "stand alone" costs of a hypothetical Postal Service entity that offered only competitive products, have no relevance to the issue at hand. The Commission seems to have in mind the Stand Alone Cost ("SAC") test developed by some of my academic colleagues in the 1970s and 1980s and adopted by the Interstate Commerce Commission ("ICC") and its successor, the Surface Transportation Board ("STB"), to regulate maximum rates for market-dominant railroad transportation services in the mid-1980s.[10] The SAC test *is* relevant to concerns about cross-subsidization, but not in the way apparently assumed in the above quotation. The SAC test is used to set *price ceilings*, not price floors.

To explain briefly, in a fully competitive/contestable industry, a multiservice firm could not charge prices to one group of customers so high that those customers ended up paying more than the cost of serving them alone. If the firm were to attempt to do so, specialty firms providing only that service (or a limited group of services) could enter the industry and profitably undercut the price of the incumbent multiservice firm. This threat of competitive entry would prevent the incumbent from collecting revenues from any one service (or group

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[10] Baumol, Panzar and Willig (1988); Interstate Commerce Commission (1985).

of services) that exceeded the SAC of providing that service (or group of services). However, in industries characterized by substantial sunk costs,[11] strategic considerations may limit the ability of the threat of entry to enforce this limit on the pricing behavior of the multiservice incumbent. In such cases, regulators have chosen to intervene by using an SAC test to establish a *maximum rate* that the multiservice incumbent can charge for the service in question. The goal is to prevent consumers of that service from being forced to provide a subsidy to the remainder of the incumbent's customers. If the prices paid by the putatively exploited captive customers equal or are less than SAC, those customers are not subsidizing other, more competitive services.

In the present context, this means that the SAC of actual or hypothetical parcel providers might be relevant to establishing a price ceiling for the competitive products of the Postal Service in order to prevent them from subsidizing the Postal Service's market-dominant products. SAC, however, plays no role in establishing a subsidy free price *floor*. That is the role of the incremental cost test required by PAEA and implemented by the Commission.

Finally—and to put all of these arguments in perspective—the Commission should take note of the current price and contribution levels of competitive products. As AFSI shows in its accompanying comments, the Postal Service has been increasing the prices of competitive products faster than inflation in recent years. As a result of these increases, the revenue from competitive products now equals about 150 percent of incremental costs, and competitive products in the aggregate contribute about $7 billion annually to the Postal

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[11] Typical examples of such industries are railroads, telecommunications, and electric power. Postal and delivery operations involve little in the way of sunk costs.

Service's total institutional costs. These developments render essentially moot any concerns at the dawn of PAEA that a minimum contribution requirement might be needed to protect against cross-subsidy, predatory pricing, or errors in the estimation of incremental costs, or offset the competitive advantage supposedly gained by the Postal Service from its letter and mailbox monopolies and its legal status as an establishment of the federal government.

IV. ONE PERSON'S FLOOR IS ANOTHER PERSON'S CEILING: A POSITIVE MINIMUM CONTRIBUTION REQUIREMENT BENEFITS COMPETITORS AT THE EXPENSE OF CONSUMERS AND THE POSTAL SERVICE

A balanced analysis of the minimum contribution requirement must consider its potential harms as well as its alleged benefits. Setting regulatory price floors above incremental cost suppresses competition rather than promotes it, and harms ratepayers and consumers rather than helps them. If the Commission were to raise the minimum contribution requirement high enough to force the Postal Service to raise its actual competitive product prices (or prevent the Postal Service from lowering them), the result would be to (i) reduce the Postal Service's competitive volumes and total contribution from competitive products, (ii) increase the prices paid by mailers of competitive products and downstream consumers, or (iii) a combination of both effects.

Clearly, requiring the Postal Service to raise its competitive prices materially above existing levels would cause a net loss in total contribution to the Postal Service if its competitors did not also raise their prices. This potential for harm is great: as noted above, competitive products are projected to contribute about $7 billion toward covering the Postal Service's institutional costs in FY 2017. A reduction in the Postal Service's contribution from competitive products would also harm mailers of market-dominant products (and

downstream consumers) by impairing the Postal Service's ability to maintain its existing quality of service—or operate at all. Increasing the minimum contribution requirement enough to affect actual prices for competitive postal products would erect a regulatory pricing umbrella for competing private carriers, by removing perhaps the most effective safeguard today against further price increases by the major private carriers.[12]

The biggest losers would likely be rural consumers and small businesses.[13] It is not the Commission's job to guarantee the Postal Service's private competitors a minimum share of total package volume or a minimum return on investment at the expense of higher prices for consumers—especially competitors that already have been able to raise their prices faster than inflation since the enactment of PAEA. Indeed, doing so would be anti-consumer and anti-competitive.

Given that a rate floor based on incremental costs achieves the objective of ensuring that the competitive offerings of the Postal Service are not being subsidized by either the customers of its monopoly services or the enterprise itself, what would be the effects of *raising*

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[12] These concerns are not merely theoretical. There is evidence that UPS and FedEx, if freed from the competitive discipline provided by the Postal Service, would possess significant pricing power. These carriers have been raising their own rates at a much faster pace than inflation, and often in lockstep. *See DCVelocity*, August 23, 2016: "According to the data, FedEx and rival carriers each increased their list rates by a total of 91.5 percent on shipments weighing between one and 10 pounds; parcels weighing within that range account for a large share of the companies' ground traffic. For parcels weighing between one and 25 pounds, the increases were an identical 81.5 percent, the data show. For all ground parcel shipments, the increases were lower at 38.5 percent, but still identical, according to the data." Retrieved at http://www.dcvelocity.com/articles/20160823-fedex-rival   carriers-moved-in-unison-to-hike-ground-delivery-rates-since-06-firm-says/:

[13] See comments filed by AFSI in this case on January 23, 2017 at pp. 47-51.

that floor? Answering this question requires a brief review of the competitive effects of a price or rate floor. Consider the simple case in which the products of the Postal Service and its competitors are essentially perfect substitutes. There are two basic situations to consider:

(i)   The initial, incremental cost-based price floor is higher than the unit cost of the competing private carriers. Shippers and consumers are more efficiently served by the competing private carriers and the result of price competition is that they capture the business at a price (very, very) slightly below the level of the rate floor.

(ii)   The initial, incremental cost-based price floor is lower than the unit cost of the private carriers. Shippers and consumers more efficiently served by the Postal Service and the result of price competition is that the Postal Service captures the business at a price (very, very) slightly below the level of the most efficient private carrier's unit cost.

Now consider the impact of raising the price floor above incremental cost. In situation (i), the private carriers would keep their volume but at a *higher* price: i.e., one (very, very) slightly below the new price floor. Consumers lose, private carriers win, and the Postal Service is unaffected by the change. In situation (ii), there are two possibilities. In the first, the higher rate floor remains below the private carriers' unit costs, and there is no effect. The Postal Service continues to efficiently serve shippers and consumers at the same price. The price remains the same because the "ceiling" on the Postal Service's competitive price is determined by its competitor's (unchanged) unit cost. Alternatively, the increase in the rate floor is such that it is now *above* the private carriers' unit costs. Then, the private carriers would *inefficiently* capture business from the Postal Service *and* consumers would end up paying a higher price (very, very) slightly below the higher rate floor.

As noted above, the latter circumstance would be harmful to consumers in another way: if the volume captured by the private carriers from the Postal Service as a result of the inflated price floor had made a positive contribution to the Postal Service, the Postal Service would suffer losses as a result. The result would be either higher prices on market-dominant services (if the regulatory scheme allows this) or, more likely, a deterioration in the Postal Service's finances and quality of service.

Thus far, the discussion has emphasized the adverse effects of a positive minimum contribution requirement from those businesses in which the Postal Service competes aggressively with its private rivals. However, since the Postal Service tends to have only a few major competitors for its competitive products, it is also important to point out that the imposition of an artificially high price floor may reduce the effectiveness of the competition that now exists. Let me explain. In any small group oligopoly such as the carriage and delivery of parcels, firms interact repeatedly and are continually trying to anticipate their rivals' actions and their rivals' responses to their actions.[14] Imposing an unnecessarily high price floor on one firm signals to its rivals that its competitive responses will be less aggressive. This, in turn, may encourage rivals to be more willing to increase prices. This effect seemed to be reflected in UPS's Proposal Three in RM2016-2.[15] There, UPS proposed that the minimum contribution requirement be continuously adjusted and linked to the actual

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[14] *See* Tirole (1988), chapters 5-6; Viscusi, Harrington and Vernon (2005), chapter 5.

[15] *See* Docket No. RM2016-12, UPS Proposal Three—A Proposal To Adjust the "Appropriate Share" of Institutional Costs That Must Be Covered By Competitive Product Revenue (filed by UPS on October 8, 2016) (proposing requirement that the minimum price floor for each competitive Postal Service product cover fully allocated costs, with institutional costs allocated in proportion to attributable costs).

contribution earned by the competitive products of the Postal Service. What better way to undermine the effectiveness of Postal Service competition as a deterrent to price increases by the two major private carriers!

V. AN ILLUSTRATIVE EXAMPLE

A very simple numeric example can be used to illustrate the issues at hand. The characteristics of the example are assumed to be as follows:

1. There are two products: a "monopoly" service with volume given by Q_1; and a "competitive" service with volume given by Q_2.

2. Total cost is given by the formula $C(Q_1, Q_2) = 720\sqrt{Q_1 + Q_2}$. (This cost function exhibits declining marginal costs, since $MC_1 = MC_2 = 360/\sqrt{Q_1 + Q_2}$ are decreasing functions of both output levels.)

3. Service level incremental and attributable costs: The incremental costs of a service are the costs that would be avoided if that service's volumes were removed.[16] In the present example these are given by:

$$IC_1 = C(Q_1, Q_2) - C(0, Q_2) = 720\sqrt{Q_1 + Q_2} - 720\sqrt{Q_2}$$

$$IC_2 = C(Q_1, Q_2) - C(Q_1, 0) = 720\sqrt{Q_1 + Q_2} - 720\sqrt{Q_1}$$

4. Institutional costs are the difference between total cost and the sum of the incremental/attributable costs of all the services. In this example, these are given by:

$$Inst = C(Q_1, Q_2) - IC_1 - IC_2 = 720[\sqrt{Q_1} + \sqrt{Q_2} - \sqrt{Q_1 + Q_2}]$$

The specification of this example is consistent with the diagrams used in OIG (2012), Panzar (2014), and Order 3507 in Docket No. RM2016-2.

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[16] See Panzar (2014), definition E3.

It is now straightforward to analyze the impact of a minimum contribution requirement in the context of the example. For concreteness, assume that $Q_1 = 16$ and $Q_2 = 9$. Then, total costs are $C = 3600$. The incremental (and attributable) costs of each service are given by $IC_1 = 3600 - 2160 = 1440$ and $IC_2 = 3600 - 2880 = 720$. Institutional costs are given by $Inst = 3600 - 1440 - 720 = 1440$. Next, I use this example to explain the competitive impact of a minimum contribution pricing restriction, as currently imposed by PAEA.

As noted above, under 39 U.S.C. 3633(a), PAEA would require the Commission to use its powers to: (1) prohibit the subsidization of competitive products by market-dominant products; and (2) ensure that each competitive products covers its costs attributable. As explained above, economists generally agree that condition (1) comes down to the condition that each competitive service (or subset of services) passes the incremental cost test (i.e., the requirement that each increment of output generate enough additional revenue to cover the incremental costs of that output). Let p_2 denote the price that the Postal Service receives for each unit of the competitive product. Then, in the present example, the incremental cost test comes down to the condition that $p_2Q_2 \geq IC_2$, or $9p_2 \geq 720$ or $p_2 \geq 80 = p_{Inc}$. If this condition is satisfied, it is clear that the Postal Service is better off providing the competitive service than abandoning it. To see this, let R_1 denote the revenues that PAEA price cap regulation allows the Postal Service to receive from its monopoly service. Then, when offering the competitive service, the Postal Service earns profits of $\pi\{1,2\} = R_1 + 9p_2 - 3600$. If forced to abandon the competitive service, it would earn profits of $\pi\{1\} = R_1 - 2880$. Thus, the addition of service 2 results in a change in Postal Service profits of $\pi\{1,2\} - \pi\{1\} = 9p_2 - 720 = 9(p_2 - 80)$, Therefore, satisfying the incremental cost test for service 2 (i.e., by setting $p_2 \geq 80$),

guarantees that the profits of the Postal Service increase (or at least do not decrease) when service 2 is offered.

Next, consider the price floor that would result from imposing a competitive product contribution requirement greater than incremental costs by establishing an institutional cost recovery contribution requirement of, say, $100k$ percent. In terms of the present example, the competitive product makes a contribution toward Postal Service profits of

$$N_2 = p_2 Q_2 - IC_2 = p_2 Q_2 - 720\left(\sqrt{Q_1 + Q_2} - \sqrt{Q_1}\right) = 9p_2 - 720(5 - 4) = 9(p_2 - 80)$$

As expected, the contribution of competitive products toward Postal Service profits will be positive as long as $p_2 > 80 = p_{Inc}$, the average incremental cost price floor. A $100k$ percent contribution threshold would require that the price charged by the Postal Service must satisfy

$$N_2 = 9(p_2 - 80) \geq kInst = 720k\left[\sqrt{Q_1} + \sqrt{Q_2} - \sqrt{Q_1 + Q_2}\right] = 720k(4 + 3 - 5) = 1440k.$$

Simplifying this expression, we see that requiring that the contribution from the competitive service covering $100k$ percent of institutional costs requires a price floor of $p_{min} \geq 80 + 16k$.

The above analysis has resulted in two price floors for the competitive product. It has revealed that the incremental cost test yields a price floor (80) which exactly implements the requirement that Postal Service profits must decrease if the competitive service is dropped. And, it was shown that the price floor ($80 + 16k$) resulting from the implementation of a minimum competitive contribution requirement of $100k$ percent would always exceed the incremental cost price floor: i.e., it would be more than sufficient to prevent cross-subsidization. Put another way, *both* the incremental cost test and a minimum contribution requirement lead to price floors that are sufficiently high to *always* prevent cross-subsidization

of competitive products. What, then, is the problem with implementing a minimum contribution requirement with $k > 0$?

To see the difficulty, one must consider the competitive environment in which the price floor is to be implemented. Therefore, suppose that consumers view the Postal Service's competitive offering to be a perfect substitute for a similar service provided by rival carriers and that rival carriers' costs of providing the service are constant at f per unit. Continue to assume that consumers' demands for service 1 and service 2 are inelastic at 16 units and 9 units, respectively. In the context of this example, it is easy to determine the relative efficiency of two possible industry configurations: (i) a configuration in which the Postal Service is the provider of both services; and (ii) a "mixed" configuration in which the Postal Service continues to be the sole provider of service 1 while rival carriers replace the Postal Service as the providers of service 2.

Total postal sector costs under industry configuration (i) are, as above, equal to $TC_i = C(16,9) = 3600$. Total postal sector costs under the mixed configuration are given by $TC_{ii} = C(16,0) + 9f = 2880 + 9f$. Clearly, the choice of the most efficient industry configuration depends on the value of rival carriers' unit costs; i.e., on how efficient the competitor is relative to the incumbent. In this example, industry configuration (i) is most efficient whenever $f > 80$. If the allocation of business were determined by an *omniscient, benevolent* Planner, the optimal outcome could result from the following simple process: private carriers could apply for the right to supply service 2; if private carriers' costs were low enough (i.e., $f < 80$) the Planner would award private carriers the sole right to supply product 2, thereby implementing the mixed configuration. If private carriers' costs were too high (i.e., $f > 80$), the Planner would deny the entry request and retain the monopoly industry configuration.

Given the short supply of omniscient planners, modern regulatory policy tries to leave the determination of the efficient industry configuration to market forces. *If* the industry in question were perfectly competitive/contestable, the efficient outcome would emerge naturally, as a condition of equilibrium.[17] However, *price floors* have long been used as a tool of antitrust and regulatory policy to help limit the effects of any "market power" that a dominant firm might possess.[18] This "decentralization strategy" relies on choosing the price floor that supports an efficient outcome.

It is straightforward to determine the efficient competitive outcomes in this simple example. Let p_2 denote the price floor that the PRC imposes on the Postal Service. Consider two cases:[19]

Case 1: $f > p_2$. The Postal Service would capture the entire volume of service 2 at a price (very, very) slightly below f, the unit cost of rival carriers.

Case 2: $f < p_2$. Rival carriers would capture the entire volume at a price (very, very) slightly below p_2, the lowest price that the Postal Service is permitted to charge.

When Case 1 pertains, the market equilibrium result is that the Postal Service provides service 2, which yields total postal sector costs of $C(16,9) = 3600$. It was shown above that this will be the least cost industry configuration whenever $f > 80$. Thus, the outcome will be efficient whenever $p_2 = 80$. Similarly, when Case 2 pertains, the efficient result is the mixed

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[17] See Baumol, Panzar, and Willig (1982). Proposition 11B.2, at p. 314 shows that only cost efficient industry configurations can be equilibria in perfectly contestable markets.

[18] See, for example, Viscusi *et al*. (2005).

[19] For brevity, I omit the discussion of the (surprisingly complicated) unlikely case in which the price floor of the Postal Service *exactly* equals the unit cost of its competitor.

industry configuration, which yields total postal sector costs of $C(16,0) + 9f = 2880 + 9f$. Again, it was shown above, that this will be the least cost configuration whenever $f < 80$. Thus, the competitive outcome will always be efficient as long as $p_2 = 80 = p_{INC}$. This result is quite striking: *regardless of the value of the entrant's unit cost*, the competitive process will lead to the *efficient* outcome as long as the price floor is set using the incremental cost test.

What would happen if the PRC imposed the higher price floor of $p_{min} = 80 + 16k$, as with a minimum percentage contribution requirement? There are 3 relevant ranges of rival carriers' unit costs to consider: (a) $f > 80 + 16k = p_{min} > 80 = p_{INC}$; (b) $p_{INC} = 80 < f < 80 + 16k = p_{min}$; and (c) $f < 80 = p_{INC}$. When rival carriers' costs are in range (a), competition continues to lead to the efficient outcome. The Postal Service would supply both services, with the price of service 2 set (very, very) slightly below f. As derived above, total postal sector costs would be 3600. When the unit costs of rival carriers are in range (b), i.e., greater than the incremental cost price floor of 80, but less than the minimum contribution price floor of $80 + 16k$, rival carriers would *inefficiently* capture all the volume, at a price (very, very) slightly below the price floor of $80 + 16k$. Total postal sector costs would be $2880 + 9f$, which is clearly greater than the 3600 that would result if both services were provided by the Postal Service: i.e., $2880 + 9f > 2880 + 9(80) = 3600 = C(16,9)$. Not only do rival carriers inefficiently capture the business, consumers end up paying a higher price (i.e., $80 + 16k > f$) for the service! Finally, when rival carriers' unit costs are actually below the Postal Service's average incremental costs (i.e., $f < 80$), rival carriers *efficiently* capture the business, but at a price (very, very) slightly below $80 + 16k$. While total postal sector costs would be at the efficient level of $2880 + 9f < 3600$, customers of service 2 would pay a price of $80 + 16k$ instead of 80. The extra revenues translate directly into a windfall profit gain for rival carriers of $144k = (80 + 16k - 80)9$.

Table 1 summarizes the results of this example. The column headings refer to the three relevant ranges of rival carriers' unit costs. The row headings refer to the competitive outcome of interest. In each square, the first entry is the outcome level that results using the incremental cost standard and the second entry is the outcome level that results under a minimum contribution requirement. Thus one sees that replacing the theoretically correct price floor based on incremental costs with a higher one based on a minimum contribution requirement *cannot* improve the competitive outcome. At best, the higher price floor will have no effect on postal sector efficiency or the price paid by consumers. At worst, it will lead to the rival *inefficiently* capturing the volume and serving it at an artificially high price. Even in those cases in which it is efficient for the rival to supply the service, the higher price floor imposed on the Postal Service lets the successful rival extract higher prices from consumers.

Table 1

Rival Carriers' Cost (f) Outcome	$f < 80$	$80 < f < 80 + 16k$	$80 + 16k < f$
Total Costs	2880+9f, 2880+9f	3600, 2880+9f	3600, 3600
Postal Service Profits	R_1–2880, R_1–2880	R_1+9f–3600, R_1–2880	R_1+9f–3600, R_1+9f–3600
Rival Carriers' Profits	9(80 – f), 9(80+16k–f)	0, 9(80+16k–f)	0,0
Service 2 Customer Payments	720, 720+144k	9f, 720+144k	9f, 9f
USPS Contribution from Service 2	0,0	9f– 80, 0	9f– 80, 9f– 80

Thus far, the example has assumed that consumers of service 2 will willingly pay whatever price the firms happen to charge. That is, it is assumed that the Commission can choose the required minimum contribution from the competitive services to be any value it wishes, up to and including 100 percent. In reality, competition and demand place an upper bound on the amount. Obviously, if the institutional costs of the Postal Service turned out to be 1 trillion dollars, PAEA might *allow* the Commission to require that competitive services make a contribution of 50 percent, but that "requirement" would be impossible for the Postal Service to satisfy.

The term "market forces" reflects all the factors that influence firm costs and consumer demand; in general the list of relevant factors may be very long. However, the potential

impact of market forces can be seen by adding one parameter to the current example: the value v that consumers are willing to pay for service 2. That is, consumers are assumed to be willing to buy exactly 9 units of service 2 as long as the market price charged is less than or equal to v. If the market price is greater than v, demand for service 2 falls to zero. Clearly, for the example to make sense, it is necessary that $v \geq \min\{80,f\}$. If consumers of service 2 are not willing to pay the unit cost of the efficient provider, no transactions will take place. This is true whether the efficient provider is the Postal Service (i.e., $f > 80$) or its rivals (i.e., $f < 80$).

The limiting effects of market forces can be most easily seen in the situation corresponding to column 3 of Table 1, in which rival carriers' costs are above the $p_{min} = 80 + 16k$ price floor. In this case, the Commission mandated *price floor* is not binding and the Postal Service would like to set $p_2 = f$. However, the *price ceiling* imposed by market forces, $p_2 \leq v$, remains binding. Thus, the profit (and contribution) maximizing choice of the Postal Service is to set $p_2 = \min\{f,v\}$. If $f < v$, (as implicitly assumed in the example) the outcomes in column 3 of Table 1 continue to apply. However, suppose that $f > v$. Then, it is quite possible that charging the contribution maximizing price may cause the Postal Service to violate the Commission's mandate! All that is required for this to happen is for $v < 80 + 16k = p_{min} < f$. Even more disturbing is the fact that, in this situation, it is impossible to satisfy an ill chosen minimum coverage standard![20] Fortunately, there is a simple solution to this conundrum, both in this example and more generally. All the Commission need do is set $k = 0$.

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[20] Obviously, any price less than v will result in an even smaller contribution coverage ratio. On the other hand, any price greater than v will choke off demand and drive Service 2's contribution to zero.

VI. THE COMMISSION SHOULD NOT KEEP A LOW-LEVEL MINIMUM CONTRIBUTION REQUIREMENT IN PLACE AS A "BACK-UP" REGULATION.

The Commission should eliminate the minimum contribution requirement outright, not just maintain or reduce it. As discussed above, the minimum contribution requirement is currently low enough that it does not constrain Postal Service prices, is economically irrelevant, and thus is not distorting the outcome of competition between the Postal Service and its private rivals. This condition has held since the minimum contribution requirement was first imposed in 2007. Conversely (as discussed above), raising the minimum high enough to constrain prices would harm the USPS, ratepayers and consumers.

The Commission should not retain a non-binding (and therefore illusory) price constraint in the Commission's regulations on the theory that leaving a vestigial regulation in place is harmless. A dormant regulation of this kind imposes costs on the Commission, the Postal Service, and the public: the transaction costs of periodically litigation rulemaking proceedings like this one. Even more important, such regulations create the opportunity for distortion of competition by rent-seeking firms. Finally, circumstances may change so that the current low level minimum contribution requirement becomes binding, leading to all of the adverse competitive outcomes detailed above in Sections V and VI.

VII. CONCLUSION

The Commission should eliminate the minimum contribution requirement entirely. A positive minimum contribution requirement has the effect of raising the rate floor for the Postal Service's competitive offerings above the incremental cost standard. The only possible beneficiaries would be the Postal Service's rival carriers. Consumers, the Postal Service and

postal sector efficiency could only lose, never gain. The "least bad" possible result would be that the constraint would remain redundant and non-binding, and have no effect on competitive outcomes.

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EXHIBIT 1

CURRICULUM VITAE OF
JOHN C. PANZAR

<table>
<tr><td>University of Auckland
Standard
ACADEMIC CV</td></tr>
</table>

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND

NAME: John C. Panzar

CURRENT POSITION: Professor

DEPARTMENT: Economics

FACULTY: Commerce

EDUCATIONAL QUALIFICATIONS:

1975 Stanford University, PhD., Economics
1973 Stanford University, A.M., Economics
1969 Carleton College, B.A., *cum laude* with Distinction in Economics

PREVIOUS APPOINTMENTS:

Louis W. Menk Professor, Emeritus; Northwestern University 2008-present
Professor of Economics, Northwestern University 1983-2008:
    Louis W. Menk Professor of Economics, 1988-2005
    Chairperson, Department of Economics, 1988-92
    Director of Graduate Studies, 1984-88; 1993-98
    William A. Patterson Distinguished Professor of Transportation 2000-01
    Acting Director, Northwestern University Transportation Center, 2000–01

Visiting positions:

    University of Auckland, 1998, 1999, 2004.
    Wissenschaftzentrum, Berlin: Summers 1995, 1996.
    Department of Economics, University of Pennsylvania: Spring 1983
    Department of Economics, UC Berkeley: Autumn, 1977
    San Francisco State University, Fall 1972

Research and Teaching Assistant, Stanford University 1970-74

SIGNIFICANT DISTINCTIONS / AWARDS:

Alumni Distinguished Achievement Award, Carleton College, June 1994.

PROFESSIONAL SOCIETIES / SERVICE / OTHER ACTIVITIES:

Memberships:
American Economic Association
European Association for Research in Industrial Economics (E.A.R.I.E.)
Econometric Society
International Industrial Organization Society
AEA Commission on Graduate Education in Economics, 1988-92
Board of Directors, Telecommunications Policy Research Conference: 1991-95, Chair 1994-95
     .

Editorial Boards:

Review of Network Economics, Co-Editor 2002-
Journal of Regulatory Economics, Associate Editor 1988-
Journal of Economic Literature 1983-85
Journal of Information Economics and Policy 1982-
New Zealand Economic Papers 2007-

Program Committees:

8th Annual Telecommunications Policy Research Conference, 1979
Econometric Society, 1980 North American Winter Meetings.
E.A.R.I.E. Annual Conference 1984
Econometric Society. 1985 World Congress.
American Economic Association, Annual Meetings 1987.
Econometric Society, 1991 North American Summer Meetings
Chair, 20th Annual Telecommunications Policy Research Conference, 1992

Referee for, inter alia:

National Science Foundation, *American Economic Review,*
Econometrica, Journal of Political Economy, Quarterly
Journal of Economics, Bell Journal of Economics, Rand
Journal of Economics, Journal of Economic Theory,
International Economic Review, Journal of Industrial
Economics, Journal of Economic Literature.

TEACHING:

1998-2004	Co-Taught 782 – Special Topics: Regulation
2004	Co-Taught 381 – Foundations of Economic Analysis
2005	Co-Taught 201 – Microeconomic Analysis
2006	Co-Taught 701 – Graduate Microeconomic Analysis
	Taught 782 – Regulation and Competition Policy
2007	Co-Taught 782 – Regulation and Competition Policy
2008	Co-Taught 782 – Regulation and Competition Policy
2009	Co-Taught: 782 – Regulation and Competition Policy and 783 – Energy Economics
2010	Co-Taught: 782 – Regulation and Competition Policy, 702 – Industrial Organization and 783 – Energy Economics
2011-13	Taught: 782 – Regulation and Competition Policy
	Co-Taught: 701 – Graduate Microeconomic Analysis

RESEARCH SPECIALTIES / CAREER:

Summary Statement:

My research has focused on public policy toward network industries such as airlines, telecommunications, and postal service.

I have taught graduate and undergraduate courses in Industrial and Regulatory Economics for nearly 25 years. Many of my former graduate students have gone on to staff positions at the U. S. Department of Justice, the Federal Trade Commission, the Federal Communications Commission, the Illinois Commerce Commission, the New Zealand Commerce Commission and the Australian.

From 1974 to 1983 I was a Member of Technical Staff at Bell Telephone Laboratories (BTL). I was the Head of the Economic Analysis Research Department at BTL from 1980 to 1983. My duties at BTL involved conducting original research on the fundamental economic principles of regulatory pricing and costing analysis as well as consulting on regulatory and antitrust issues involving the Bell System. Along with my colleagues and co-authors, I helped to develop the economic concepts of economies of scope, multi-output economies of scale, monopoly sustainability, and contestable markets.

My published research includes books and numerous articles in major professional journals. Most of my publications are focused on pricing and costing issues facing multi-product network industries. The following are perhaps most notable. My co-authored monograph, *Contestable Markets and the Theory of Industry Structure*, provides the conceptual foundations for regulation of privatized network utilities. My chapter in the 1989 *Handbook of Industrial Organization*, "Theoretical Determinants of Firm and Industry Structure," provides the basis for cost analysis of multi-product enterprises such as telephone companies and other network operators.

Research Publications:

Books

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Book Review

Panzar, J. C. *Nonlinear Pricing.* Robert Wilson. *Journal of Economic Literature, XXXIII 4* pp. 1339-41, September 1995.

Research Grants / Funding:

National Science Foundation, "Efficient Regulatory Pricing under Competition," SES-8409171, Principal Investigator, 1984-87.

U.S. Department of Transportation, "Transportation Deregulation and Safety," Co-Principal Investigator, 1987.

Northwestern University Annenberg Faculty Research Fellowship, 1987.

Northwestern University Ameritech Faculty Research Fellowship, 1990.

FAA, Center for Aviation Systems Reliability, Northwestern University Transportation Center, 1991-93.

Ameritech Foundation, "Consortium for Research on Telecommunications Policy." 1994-96.

Andrew Mellon Foundation, "Economics of the Scholarly Publishing Industry." Co-Principal Investigator, 1995-97.

Consultancy Projects:

Corporations:	Ameritech, AT&T, Bell Atlantic, Bell South, British Telecom, Commonwealth Edison, GT&E, Niagara Mohawk Power Company, Nynex, Pacific Telesis, Pitney Bowes, Inc., Southern California Gas, Southwestern Bell, Telephone and Data Systems, Telstra, Union Pacific RR, and U.S. West.
Industry Groups	American Newspaper Publishers Association, Electric Power Research Institute
Governmental	Canada Post, Deutsche Post AG, Deutsche Telekom AG, New Zealand Commerce Commission, U. S. Department of Transportation, U. S. Federal Trade Commission, U. S. Postal Rate Commission, U. S. Postal Service, Senate of the Commonwealth of Puerto Rico, OECD, World Bank, European Parliament.

Previous Industrial/Commercial/Public Sector Experience:

Bell Telephone Laboratories
    Member of Technical Staff, 1974-1983.
    Head, Economic Analysis Research Department, 1980-1983.

Invited Lectures were presented at the following universities:

ANU	Arizona	Auckland	Barcelona
Bonn	Boston College	Cal Tech	Canterbury
Chalmers	Chicago	Cornell	Dartmouth
Duke	East Anglia	Hitsotubashi	Illinois
Indiana	INSEAD	Louvain	Lucca
Massey	Michigan	Michigan State	Montreal
Munich	Northern Illinois	Northwestern	NYU
Otago	Ohio State	Penn	Queens
Rice	Stanford	SUNY Binghampton	SUNY Stoneybrook
Texas	Texas A&M	Torino	Toronto
Toulouse	UC Berkeley	UCLA	UNSW
Vanderbilt	Virginia	Warwick	Wisconsin
Wyoming			

VERIFICATION

I, John C. Panzar, declare under penalty of perjury that the foregoing is true and correct. Executed on January 20 , 2017.

John C. Panzar