Protecting the Package Delivery Market and the Economy from Distortions Resulting from Fully Distributed Cost Pricing

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Forward

For over 50 years, economists have consistently opposed the use of arbitrary cost allocations in regulatory pricing. These efforts have been largely successful in eliminating the use of Fully Distributed Costing (FDC) in the regulation of network industries in the United States. Yet recent proposals to force the Postal Service to raise its package delivery prices based upon the application of FDC to postal ratemaking have attracted the attention of policy makers. At the request of the Package Coalition (packagecoalition.org), I was asked to prepare the attached paper "Protecting the Package Delivery Market and the Economy from Distortions Resulting from Fully Distributed Cost Pricing." I was encouraged to seek the advice of and counsel of other regulatory economists in developing this analysis. The following economists collaborated on this project:

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All of the participants subscribe to the paper in substance and specifically agree with the conclusions as set forth in the summary at the end of the paper.

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PROTECTING THE PACKAGE DELIVERY MARKET AND THE ECONOMY FROM DISTORTIONS RESULTING FROM FULLY DISTRIBUTED COST PRICING

I.   Executive Summary

The U.S. Postal Service (Postal Service) is experiencing serious financial difficulty, in part due to the decline in letter volumes caused by the shift to electronic communications. However, the increase in online ecommerce transactions has also led to substantial increases in package delivery volumes. The Postal Service has earned substantial profits serving this growing package business. It is able to do so because of the economies of scope between its letter and package delivery services that allow it to realize cost efficiencies in delivering mail and packages together. The Postal Service passes through the benefits of those efficiencies in the form of lower prices to businesses and consumers who use the Postal Service's nationwide delivery network.

Unfortunately, there is a major threat to this bright spot in the outlook for the Postal Service: proposals to force the Postal Service to raise its package delivery prices above competitive levels based upon the application of Fully Distributed Costing (FDC), a discredited approach to costing that has been rejected by mainstream economists in virtually every other regulated network industry in the United States.

Unlike other regulated network infrastructure industries, such as railroads, electric power, and telecommunications, the U.S. postal sector has been largely spared the distortions caused by FDC-based regulatory pricing policies. In adopting both the Postal Reorganization Act of 1970

(PRA or 1970 Act) and its successor, the Postal Accountability and Enhancement Act of 2006 (PAEA), Congress specifically rejected FDC as an appropriate ratemaking construct and emphasized that regulated prices must be based on the principle of *cost causality*. That is, only costs actually caused by a particular service can be attributed to that service and price floors must be based upon attributable costs. Because of this mandate, over a period of decades, the Postal Service has developed and implemented a rigorous costing system that is sophisticated enough to identify not only its total accounting costs but also economically relevant measures of the marginal cost and incremental costs of individual products and services. Cost attributions and prices based upon this cost system have been systematically embraced by postal regulators, i.e., the Postal Rate Commission and its successor agency, the Postal Regulatory Commission (PRC or the Commission) and by the courts.

Recent proposals to use Postal Service cost data to fully allocate *all* Postal Service costs to individual products, and to use fully distributed cost allocations to increase the price floors for its competitive products, should be rejected as economically unsound. FDC is a discredited relic of the past; it has no place in current postal ratemaking. The use of arbitrary FDC price floors would inefficiently reduce the ability of the Postal Service to earn profits from its package business. The policy would also (i) increase the prices paid by businesses and consumers that rely on delivery services, (ii) reduce the efficiency of the package sector, (iii) increase the profits of the Postal Service's rivals in the package delivery market, and (iv) inefficiently encourage investment by customers in duplicative delivery infrastructure.

II.   Overview of the Discussion

This paper has seven additional sections. Section III discusses the increasingly important role of packages in an otherwise declining mail sector. It also explains the threat posed to the Postal Service's package business by recent proposals to mandate the use of FDC in postal ratemaking.

Section IV briefly explains FDC methodology and presents economists' longstanding criticisms of its use in other network infrastructure industries. It also discusses how postal sector statutes and regulatory bodies have thus far largely prevented FDC from distorting postal ratemaking.

Section V discuss the importance of cost causality for economic policy decisions. The section also provides an intuitive explanation of the equivalence between statutory definitions of cost causality and the familiar economic concept of incremental cost. Section VI explains that economies of scale and scope result from the fact that many postal services are produced jointly and share increasing returns activities such as local delivery. It also discusses how data from such shared operations can nevertheless be used to accurately measure the incremental costs of individual services.

Section VII explains that incremental costs, along with market demand information, provide crucial information for determining prices in competitive markets that can be used to maximize the contribution earned from such markets. It also explains that in order to prevent cross-subsidization, prices must be set to yield revenues that are at least as large as incremental cost. However, incremental costs should be used only to determine price floors, not to set actual prices.

Section VIII explains in some detail why any of the infinite number of possible measures of the FDC of the Postal Service are not relevant to the determination of price floors for the competitive package services provided by the Postal Service. In particular, it is shown that such a policy would lead to (i) an increase in the prices paid by businesses and consumers for package delivery services, (ii) inefficiency in the package sector, (iii) a decrease in Postal Service profits, and (iv) an increase in the profits of competitive package operators.

Section IX offers some conclusions.

III.   The Current Predicament of the Postal Service

For the first time in its history, Postal Service mail volumes did not recover with the economy following a cyclical decline. They instead continued a steady decline during the economic recovery following the end of the Global Financial Crisis in 2009. Going forward, mail volumes may continue to experience a long secular decline as more and more business transactions and personal interactions move to electronic alternatives. This has added to the financial pressure facing the Postal Service.[1] Nevertheless, the Postal Service remains an important part of the country's transportation and communications infrastructure. The Postal Service is at the core of the crucial "mailing industry" involving millions of jobs and hundreds of billions of dollars of commerce. Because of its role as a universal service provider, the Postal Service serves a vital role in "bind[ing] the Nation together."[2] Its ubiquity of service has proved to be especially important in the wake of natural disasters such as Hurricane Katrina and COVID-19. Access to postal delivery services provides an economic lifeline to consumers and

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[1] *See* U.S. Treasury Report (2018).

[2] 39 U.S.C. § 101(a).

small businesses, especially those in rural and remote areas with limited and costly alternatives to engage in an increasingly digital economy.

Public policy decisions around postal pricing and costing can play an important role in ensuring the Postal Service can continue to serve as part of the nation's critical economic infrastructure in the future. For example, railroads play a vital role in the 21ˢᵗ century transportation sector, and the future of the industry looks bright. However, the railroads' current role in the U.S. economy and society is different today than it was a hundred years ago. The railroads' competitive standing was challenged by the development of automobiles, trucks, and *paved* highways (in the 1920s); air travel (in the 1950s); and the completion of the Interstate Highway System (in the 1960s and 1970s).

But the erosion of railroads' cost advantages due to technological innovations was severely aggravated by a half-century of policy failures in Washington. Antiquated and inefficient economic regulation by the Interstate Commerce Commission made it difficult or impossible for railroads to successfully compete in many markets in which they retained a cost advantage. Similar policy mistakes could be equally costly for the future evolution of the postal sector.[3]

Indeed, just such a threat has emerged in recent years as private competitors and some policymakers have urged the use of arbitrary, outmoded, and discredited cost allocation procedures for postal ratemaking. Adopting these policy changes would undermine the ability of the Postal Service to successfully compete in a highly competitive package delivery business. The package business is the silver lining of the Internet cloud that looms over the Postal Service.

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[3] *See* Levy and Field (2011) for a thorough discussion of the lessons that railroad deregulation may hold for the formation of policy towards the Postal Service.

Package shipments have increased dramatically as a byproduct of the explosion in online transactions over the past couple of decades, even as mail volumes have steadily declined.[4] The Postal Service, the United Parcel Service (UPS), and Federal Express have all shared in the robust growth in package volumes. The increased revenues from its package business have at least partially offset the lost revenues from letter mail.[5] More importantly, the revenues generated by the Postal Service's package business substantially exceed the Postal Service's package delivery costs. That is, packages make a positive contribution (profit) to the bottom line of the Postal Service. This is especially important given the current financial situation it faces.

A major reason for the success of the Postal Service's package business is the fact that its package business uses the same last-mile delivery network used for its letter mail delivery business. Because of the substantial economies of scale in delivery, the Postal Service's cost of package delivery is less than using a stand-alone delivery network. Similarly, the costs of the Postal Service's letter delivery operations are less on a per-piece basis when provided along with packages than would be the case if letter service were provided using a stand-alone delivery network. Thus, economies of scale in its delivery network enables the Postal Service to enjoy *economies of scope* between its letter mail and package operations. However, recent proposals to use FDC allocations to determine rate floors for the Postal Service's competitive package services would severely threaten the ability of the Postal Service to profit from its growing package business.

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[4] *See, e.g.*, U.S. Treasury Report (2018) at 19, Table 2.

[5] *Id.*

Economists have successfully battled against the use of FDC pricing policies in a variety of regulated network industries for well over 50 years. Yet, recent postal sector policy proposals have suggested reviving this discredited approach for the purposes of postal pricing policy:

- The 2018 report of the President's Task Force on the U.S. Postal System: *United States Postal Service: A Sustainable Path Forward*, which recommended, among other items, that the "USPS and the PRC develop a new cost allocation model with fully distributed costs to all products, services, and activities."[6]

- The 2018 proposal of UPS that the Commission set the "appropriate share" of institutional costs equal to competitive products' share of total attributable costs or competitive products' share of total revenues. The result of these proposals would be to increase the minimum contribution requirement for competitive package products by nearly 500% (from 5.5% to 29.4%).[7] The Commission rejected the proposal as tantamount to FDC and, thus, "inherently arbitrary."[8]

- The 2015 proposal of UPS to require the Postal Service to attribute to individual products costs above and beyond the product's incremental costs. The Commission rejected the proposal, in part, as inconsistent with the statutory directive to attribute only those costs with a "reliably identified causal relationship."[9] The Commission's

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[6] U.S. Treasury Report (2018) at 55.

[7] Docket No. RM2017-1, Initial Comments of United Parcel Service, Inc. on Notice of Proposed Rulemaking to Evaluate the Institutional Cost Contribution Requirement for Competitive Products (Jan. 23, 2019).

[8] *See* PRC Docket No. RM2017-1, Order No. 4742 (Aug. 7, 2018) at 40. The Commission rejected UPS's position and set the appropriate share at 8.8% using a newly adopted formula-based methodology. A reviewing court ordered the Commission provide further explanation of its conclusion, but it took no position as to whether a different minimum contribution was required and did not suggest in any way that UPS's FDC approach was proper. *See United Parcel Serv. v. Postal Regulatory Comm'n*, 955 F.3d 1038 (D.C. Cir. 2020).

[9] S*ee* PRC Docket No. RM2016-2, Order No. 3506 at 59 (Oct. 19, 2016); PRC Docket No. RM2016-13 (Dec. 1, 2016); *United Parcel Serv. v. Postal Regulatory Comm'n*, 890 F.3d 1053 (D.C. Cir. 2018), *cert. denied*, 139 S. Ct. 2614 (2019).

decision rejecting the proposal was upheld by a federal court of appeals on review. UPS's subsequent petition to the U.S. Supreme Court was also denied.

IV.   A Brief Introduction to Fully Distributed Costs

In simplest terms, FDC are the result of an accounting exercise, devoid of any economic content, in which *all* the costs of a multiproduct enterprise are assigned or *allocated* to the individual products or services produced by the firm.[10] The starting point for FDC is to determine the costs that are caused by (or, in postal parlance, *attributable to*) individual products or services. These are summed over all products and services and *subtracted* from the total costs of the enterprise. (In postal parlance, the residual costs that are not attributable to a specific product or service are referred to as *institutional costs*.) Under FDC, the total amount of these unattributable costs is (somehow) allocated to the individual products. There are many allocation rules that have been used to distribute these unattributable costs to individual services. The most commonly used were (i) relative quantities, (ii) relative revenues, and (iii) relative attributable costs. The relative quantity method was often applied when the firm's various products or services could be measured in the same units, e.g., call minutes or ton miles. Then, the unattributable costs were allocated to individual services based on the products' or services' shares of total quantity. Similarly, the unattributable costs of the enterprise could be allocated based on individual services' shares of revenues or attributable costs. Whatever the allocation method used, the FDC of a product or service are always equal to the sum of attributable costs plus its allocated share of the firm's unattributable costs. These different methods often produce

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[10] Such a process is also sometimes described as *cost allocation*, with the resulting assignment of costs referred to as one of Fully Allocated Costs. The current discussion is deliberately brief. The practice has a long history in regulated network industries. *See, e.g.*, Brown and Sibley (1987); Braeutigam (1980), (1989).

wildly different results for the costs allocated to individual products. There is no reason any particular allocation is better than any other because any FDC allocation is, by definition, untethered from causation and thus bereft of any economic meaning.

The relative attributable cost method of FDC is particularly relevant if FDC were to be applied to the Postal Service.[11] This is because the Postal Service uses a type of Activity Based Costing system to analyze its costs. Briefly, multiple products or services jointly use a variety of *cost components*, or activities. For each cost component, the Postal Service identifies *cost drivers* and models the relationship between the total costs of a component and the levels of its cost drivers.[12] For example, the cost driver for the *purchased highway transportation* cost component is the total cubic foot miles generated by all the mail and packages utilizing that component. The relationship between various mail and package volumes and the total cubic foot miles that they cause is then used to determine a *distribution key*. The distribution key is used to determine the portion of attributable component costs that are *caused* by a particular service so that they can be *attributed* to that service. Unfortunately, some seek to use these distribution keys to allocate *all* component costs, including institutional costs that, by definition, are not caused by any individual product or service.

Economists have long criticized the use of FDC in regulated network industries such as railroads, telecommunications, and electric power.[13] Baumol et al. (1962) provide a very early authoritative critique of the use of FDC in setting railroad rates almost 60 year ago:

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[11] Indeed, this was the allocation method proposed by UPS in PRC Docket No. RM2017-1.

[12] *See* Bradley, Colvin and Smith (1992); Bradley, Colvin and Panzar (1997), (1999); OIG (2012a), (2012b) and Panzar (2014) (discussing the relationship between Postal Service costing methodology and economic cost concepts).

[13] *See, e.g.*, Friedlaender (1969); Baumol, Koehn, and Willig (1987).

The relevant incremental costs constitute all the cost information pertinent to the

determination of floors in the pricing of particular railroad services. "Fully distributed"

cost, measured by some kind of arbitrary statistical apportionment of the unallocable

costs among the various units or classes of traffic, is an economically invalid criterion for

setting minimum rates, from both a managerial and a regulatory standpoint. No

particular category of traffic can be held economically responsible for any given share of

the unallocable costs. Whether any particular rate is above or below some fully

distributed cost is without real economic significance for minimum pricing.[14]

Braeutigam (1980) provided the first theoretical analysis of the economic effects of the use of

FDC for regulatory price setting. He observed that:

Regulatory proceedings involving FDC pricing focused on a number of potential

problems with the practice. Briefly, among the many criticisms of the practice are the

following:

(1) Fully distributed costs bear no direct relationship to marginal costs; hence, there is no

basis in economic efficiency for FDC pricing.

(2) There exists no uniquely acceptable allocation rule. . . .

(3) On grounds of economic efficiency, it may sometimes be desirable to set a price for

some service so that the revenues generated by a service do not cover its fully distributed

costs.

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[14] Baumol et al. (1962) at 363-64; *see also* Mayo and Willig (2019) (a more recent critique of the use of FDC in the railroad industry).

(4) Because the determination of fully distributed costs is somewhat arbitrary, there is no economic basis for concluding that a service is being subsidized by other services if its revenues are less than its fully distributed costs.

(5) FDC pricing is anticompetitive since it prevents a supplier from offering a service at a proposed tariff less than an FDC price, particularly if the proposed tariff exceeds the marginal cost of providing the service.

(6) There is circular reasoning behind the FDC practice. [Footnotes omitted.][15]

In their textbook on public utility regulation, Stephen Brown and David Sibley (1986) provide a detailed discussion of various forms of FDC pricing. They succinctly observed that:

> The distinguishing feature of FDC pricing is that the allocation of common costs is done without much reference to what one would regard as economically meaningful criteria.[16]

In the telecommunications industry, the use of FDC also created a great number of policy disputes and controversies. For example, David Parson (1994) writes:

> If service prices are set equal to fully distributed costs, . . . subscriber access prices will be higher and other service prices will be lower. *Fully distributed costs, however, have no theoretical foundation, are necessarily arbitrary, and cannot be used in any meaningful way to establish prices or set upper or lower bounds for pricing.* They are useless for establishing a standard for cross-subsidy or anticompetitive practices. Literatures contain very few favorable, rigorous analyses of FDC pricing. However, the fringe of the economics discipline that presents cost allocations in a positive light appears to use the term to mean relatively mechanical methods of constrained pricing, and the

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[15] Braeutigam (1980) at 184-85.

[16] Brown and Sibley (1986) at 45.

costs created by such calculations do not correspond to traditional concepts of economic costs. [Emphasis added.][17]

Commenting on the use of FDC in the electric power industry, Viscusi, Harrington and Vernon (2004) write that:

The particular method may appear quite reasonable, but the essential point is that it is necessarily arbitrary. And, more important, such cost allocations lead to prices that have no necessary relationship to marginal costs.[18]

It is not an accident that modern postal regulation has remained relatively free of FDC influence in the United States. Prior to the 1970 Act, the Postal Service relied on a costing system that allocated costs through arbitrary accounting conventions with no causal basis. A 1968 Presidential Commission on Postal Organization (Kappel Commission) was tasked with modernizing the then Post Office Department. The Kappel Commission was sharply critical of the cost allocation (FDC) approach used in postal ratemaking, concluding that it did "not believe *any* fully-allocated costing is appropriate for rate-making."[19] Following the lead of the Kappel Commission, Congress expressly moved away from ratemaking by cost allocation in the 1970 Act in favor of setting minimum price floors based on "attributable costs."[20]

A series of decisions by the then Postal Rate Commission implementing the new causation-based cost attribution standard followed the enactment of the 1970 Act. Those

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[17] Parson (1994) at 165-66.

[18] Viscusi et al. (2004) at 444.

[19] Kappel Commission Report at 39, 130-31, 133, 139 (1968).

[20] Pub. L. 91-375, 84 Stat. 719 (codified at former 39 U.S.C. 3622(b)(3)). Relevant to the current debate, Congress's intentional shift away from postal ratemaking by cost allocation in 1970 was made over the objections of private competitors who urged then, as now, the use of FDC to drive up minimum price floors on the Postal Service's package delivery services. *See* S. Rep. No. 91-912 at 17 (1970); PRC Docket No. R71-1 Op. & Rec. Decis. (June 5, 1972) at 44-46 (discussing legislative history of PRA), 198-99 (concluding that "Congress rejected the old costing system for parcel post rates linked to fully allocated costs.").

decisions reflected the Postal Rate Commission's view that causation was both the statutory and economically relevant basis for attribution.[21] Private competitors like UPS and others who favored raising the price floor on Postal Service products challenged the causation requirement and the new ratemaking system. Years of litigation ensued, culminating with the U.S. Supreme Court's decision in *National Ass'n of Greeting Card Publishers v. USPS*.[22] The U.S. Supreme Court upheld the Commission's causation-based cost attribution methodology, finding that the Commission "acted consistently with the statutory mandate and Congress' policy objectives in refusing to use distribution keys [for allocating institutional costs] or other accounting principles lacking an established causal basis."[23] In the decades that followed the Supreme Court's decision in *Greeting Card Publishers*, the Postal Rate Commission consistently rejected proposals by private competitors to artificially raise the attributable cost floor for postal rates with allocated costs, on the basis that such FDC proposals were arbitrary and inconsistent with the PRA.[24]

Congress reaffirmed its commitment to a causation-based cost attribution approach when it enacted the PAEA. The PAEA codified the Commission's cost attribution methodology by expressly requiring that cost attribution be based upon principles of cost causality.[25] As before,

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[21] *See e.g.*, PRC Docket No. R74-1 Op. & Rec. Decis. (Aug. 28, 1975) at 110-11.

[22] 462 U.S. 810 (1983).

[23] *Id.* at 826.

[24] *See e.g.*, PRC Docket No. R84-1, Op. & Rec. Decis. (Sept. 7, 1984) at 143 (finding that FDC "is condemned by the majority of economists because it allocates costs to classes of service by arbitrary criteria that do not reasonably reflect causation"); PRC Docket No. R94-1, Op. & Rec. Decis. (Nov. 30, 1994) app. F, at 7 ("FDC approaches generally allocate institutional costs to services based on their relative shares of either volume or attributable cost. FDC pricing approaches have been severely criticized by economists. They emphasize that different FDC allocation methods are essentially arbitrary, and can lead to widely different results (e.g., allocation by volume versus allocation by attributable cost). They also condemn the failure of FDC pricing to maximize economic efficiency.").

[25] 39 U.S.C. § 3631(b) (defining the attributable costs of a product as "the direct and indirect postal costs attributable to such product through reliably identified causal relationships").

Congress endorsed a causation-based cost attribution standard for postal ratemaking over the objection of private competitors who advocated in favor of FDC cost allocations to push up minimum price floors on Postal Service products.[26] The successor regulatory agency, the PRC, has consistently rejected FDC proposals as inconsistent with the language and purpose of the PAEA.[27]

Given this history, it is ironic that the current proponents of FDC characterize their position as support for "updating" postal costing methodologies. In reality, the adoption of FDC now would reverse 50 years of the development of regulatory policy and judicial precedent rejecting FDC as an arbitrary and discredited approach. FDC is the past, not the future. FDC was an arbitrary approach 50 years ago; it should be rejected as a retrograde and economically unsound approach today.

V. The Relevant Economic Principle for Policy Analysis is Cost Causality

A. Incremental analysis

Evaluating the economic impact of any policy change requires determining the changes in economic variables *caused* by that policy change. For example, measuring the effect of a price decrease on a firm's profits involves answering the basic question: Will the additional revenues (if any) *caused by* the price decrease be greater or less than the increase in costs *caused by* the increase in quantity produced? In the textbook case of a single product firm contemplating a (very) small price decrease, this becomes the familiar comparison between marginal revenue (MR) and marginal cost (MC): The price decrease is profitable whenever MR

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[26] *See* S. Rep. No. 108-318, at 9-10 (2004); H.R. Rep. No. 109-66, pt. 1 at 49 (2005).

[27] *See supra* note 7.

> MC. The textbook example is very simple. However, the basic principle of comparing

incremental benefits to incremental costs is quite generally valid.

Incremental analysis can also be readily applied to the policy issue: Does the Postal

Service obtain a positive profit contribution from offering its competitive package products and

services at current prices? The "benefit side" of the comparison is simply the total revenues

received by the Postal Service from its package products and services. This is the amount that

would be lost if the Postal Service ceased offering those products and services. These foregone

revenues must be weighed against the costs that the Postal Service would avoid if it no longer

offered its package products and services. Clearly, if the revenues that would be forgone are

greater than the costs that would be avoided by ceasing package service, the competitive package

services are making a positive contribution to the bottom line of the Postal Service. The avoided

costs in question are equal to the difference between the costs incurred by the Postal Service

when offering its full range of package products and services and the costs that would be

incurred if the Postal Service offered all its current services *except* the competitive package

products and services in question. As discussed below, this difference in costs is precisely the

economic definition of the incremental cost of the package products or services at issue.

      B.   Incremental costs are a precisely defined economic concept relevant
                    to the price and output decisions of any enterprise.

Merely stating the *precise* economic definition of the incremental cost of a product (or

group of products) produced by a multiproduct enterprise would require tedious mathematical

notation.[28] However, the nature of the construct can be made crystal clear in the context of a

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[28] *See* Willig (1979); Panzar and Willig (1981); Baumol, Panzar, and Willig (1982); Panzar (1989); Panzar (2014).

very simple two-service example. Consider a postal operator that produces two services: letters and packages. Let L denote the volume of letters handled by the carrier and P the volume of packages. Holding these volume levels constant, there are three levels of costs that we need to consider. Let $C(L,0)$ denote the total costs of a firm that handled a quantity of L letters and zero packages.[29] Next, let $C(0,P)$ denote the total costs of a firm that handled a quantity of P packages and zero letters.[30] Finally, let $C(L,P)$ denote the costs of a multiservice firm that carried both L letters and P packages.

With this notation in hand, it is quite easy to concisely state the incremental costs associated with each of our postal operator's services. The incremental cost of the firm's letter service is given by $IC_L = C(L,P) - C(0,P)$; i.e., the total costs of the firm when both products are produced less what its total costs would be if it provided all of its services *except* letters. Similarly, the incremental cost of the firm's package service is given by $IC_P = C(L,P) - C(L,0)$; the total costs of the firm when providing both services less what its total costs would be if it provided all of its services *except* packages. Thus, incremental costs reflect cost *causality*, i.e., they measure the costs that would be *avoided* if the product increment in question were *not* provided.

VI. The Postal Service Has Sophisticated Costing Systems that Are Used to Measure Incremental Costs

The Postal Service is a multiproduct network enterprise that enjoys significant economies of scale and economies of scope.[31] However, it is very different from other infrastructure

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[29] Economists refer to this quantity as the Stand-Alone Cost of the letter operation.

[30] Similarly, economists refer to this as the Stand-Alone Cost of the parcel operation.

[31] *See, e.g.*, Bradley, Colvin and Perkins (2007).

industries, such as telecommunications and electric power, that have large investments in fixed facilities. In contrast, most of the costs of the Postal Service are labor costs.[32] In a real sense, the Postal Service creates its collection and delivery network every day. The services provided over this network *jointly* utilize dozens of different, labor-intensive activities, referred to as *cost components*. Relatively few of these component costs are truly fixed, i.e., completely independent of volume. Rather, many vary less than proportionally with volume, e.g., a letter carrier will take longer to deliver 2,000 items than 1,000 items, but less than twice as long.

Both the economies of scale and economies of scope enjoyed by the Postal Service arise from the increasing returns associated with some of these cost components. Not only do component increasing returns mean lower costs per unit when product volumes expand proportionally (economies of scale), they also mean that it is less expensive to provide multiple services jointly, using an existing component, than separately (economies of scope), e.g., there are obviously cost savings from having the same carrier deliver both letters *and* packages. Given that the overwhelming majority of Postal Service costs involve components that are shared by many products or services, how does one go about attributing such costs to individual products or services?

The statutory definition of "attributable" expressly requires that there be a *causal relationship* between the product provided and the costs attributed to it.[33] Identifying the relevant economic cost condition is equally straightforward: the costs *caused* by a product (or group of products) are, by definition, the incremental costs of that product (or group of products).

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[32] Treasury Report (2018), p. 5 ("In FY 2018, labor costs accounted for 76% of the USPS's overall operating costs.").

[33] 39 U.S.C. § 3631(b)("Definition. — For purposes of this subchapter [Provisions Relating to Competitive Products], the term 'costs attributable,' as used with respect to a product, means the direct and indirect postal costs attributable to such product through reliably identified causal relationships.").

Therefore, statutory attributable costs should be interpreted as excluding any costs that are not caused by the increment being costed—or, stated otherwise, would not be avoided if the increment of output were discontinued. Given the structure of Postal Service costs, it is easiest to calculate the incremental cost of a product (or group of products) proceeding component by component.

The Postal Service has developed, and the PRC approved, sophisticated systems for measuring the costs of these activities and determining how these costs are related to individual products and services. This involves estimating and measuring how each component's costs vary with the quantities of its cost drivers and how the volumes of individual services, taken together, determine the quantities of the component cost drivers necessary to produce the service volumes in question.[34] These measurement systems involve hundreds of thousands of tests per year. The data obtained are subjected to rigorous statistical and econometric analysis. The system is sufficiently detailed not only to support managerial decision-making but also to allow estimation of marginal costs and incremental costs for individual services.[35]

Thus, the Postal Service's costing systems establish statistical relationships between total component costs and the quantities of its cost drivers, and its sampling systems measure the relationship between the volume of a particular service and the quantity of the component cost drivers *caused* by that service. Then, it is straightforward to determine the incremental

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[34] For example, consider the activity/cost component, *purchased highway transportation*. First, expenses for contract transportation are identified and assigned to relevant cost pools (long haul transportation, inter-facility transportation, etc.). Next, the cost driver is identified as cubic foot-miles of transportation. The relationship between activity cost and the cost driver is then measured by sophisticated econometric techniques. Statistical analysis of large data sets is used to determine the amount of cost to be attributed to products. Finally, a sophisticated product sampling system is used to distribute the costs to individual services. Adapted from Testimony of Michael Bradley (2003).

[35] For more detailed discussions, *see* OIG (2012a); Bradley (2003); Bradley, Colvin, and Smith (1992); Bradley, Colvin, and Panzar (1997), (1999).

component cost of any particular service, call it service i. This is just the difference between the total component costs observed when *all* services were provided and the statistical estimate of what component costs *would be* without the cost drivers caused by service i.[36]

In practice, the procedure is straightforward. Unfortunately, as a byproduct, it provides a simple way to misallocate *all* of the component's cost to individual products, including the non-attributable institutional costs of that component. That is, information on the level of cost drivers associated with each individual service can be used to fully distribute component costs. The allocation process is quite simple. Take each service's share of total driver activity and assign that service an equivalent share of total component costs, so that each service's FDC share of component costs is exactly equal to its share of component driver activity.[37] If marginal component costs are decreasing, or if there are fixed component costs and marginal component costs are not rising very much, it is easily shown that this amount will always be greater than the correctly determined incremental cost of service i.[38]

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[36] More precisely, let $C(D)$ denote the empirically estimated function that relates total component costs C to the level of driver activity D. Denote the total quantity of the cost driver when the mail volumes of *all* services are processed as D_{total}. Then, the resulting observed component costs would be $C(D_{total})$. Suppose that the cost driver quantity required to process the mail volumes of service i were observed to be D_i. Then, the amount of driver activity that would have occurred if service i had *not* utilized the component is $D_{total} - D_i$. Next, use knowledge of the function $C(D)$ to estimate the component cost level that would have occurred had service i not utilized the component, i.e., $C(D_{total} - D_i)$. The difference is the incremental cost of service i for that component: $IC_i = C(D_{total}) - C(D_{total} - D_i)$.

[37] That is, denote product i's share of component driver activity as $s_i = (D_i/D_{total})$. Then the fully distributed component costs allocated to service i would be simply, but arbitrarily, given by $FDC_i = s_i C(D_{total})$.

[38] *See* Panzar (2014). The difference between incremental component costs and fully distributed component costs can be illustrated using a very simple numerical example. Consider a hypothetical cost component, e.g., "local transportation," whose cost driver is cubic foot miles. It provides transportation for two products, "letters" and "packages." There are 2 cubic feet of letters and 1 cubic foot of packages, both of which must be transported one mile. Thus, letters generate 2 cubic foot miles of driver activity while packages generate only 1 cubic foot mile. The total amount of driver activity required is 3 cubic foot miles. Assume that the cost function for the local transportation component is as follows: It costs $100 to transport 1 cubic foot mile of mail composed of letters, packages or a mixture of the two. Because of increasing returns, it costs only $160 to transport 2 cubic foot miles of mail and only $210 to transport 3 cubic foot miles.

Thus, component costs of $210 are required to service the output levels of both products. If only letter service were provided, only 2 cubic foot miles of driver activity would be required, and component costs would be $160. Therefore,

VII. The Role of Incremental Costs for Postal Price Determination

As explained in Section IV, the rational pursuit of any economic policy objective requires an understanding of the costs and benefits that will be *caused* by the contemplated action. MC, the incremental cost of the last unit, is thus a key piece of information in fine tuning the level of price and output levels of an existing product or service. As any textbook will tell you, equating MC to MR will enable the firm to determine the particular price and output levels that maximize the profit contribution received from that product *assuming that the product is produced*. But are the resulting revenues enough to justify continuing to offer the service? Answering this question requires knowledge of the costs that would be avoided if the service were eliminated, i.e., knowing the incremental cost of the service.

Following the seminal paper of Faulhaber (1975), economists have developed a sophisticated theory of the multiproduct firm and the role of incremental costs in public utility pricing and cross subsidy analysis.[39] Yet one of the clearest and most intuitive statements of the underlying principles was written before these theories were developed. Baumol et al. (1962) were writing about the regulation of railroad rates before this theory was developed and before the railroad regulatory reforms of the 1970s and 1980s.

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the incremental cost of package service would be $50 = $210 - $160. The Postal Service would attribute $50 to its package business. Alternatively, providing only package service would require only 1 cubic foot mile of driver activity, resulting in component costs of $100. Thus, the incremental cost of the letter service is $110 = $210 - $100. The Postal Service would attribute $110 to its letter service. The remaining $50 = $210 – ($50 + $110) would be added to the institutional cost of the Postal Service.

The example also makes it clear how information on cost drivers could be easily (mis)used to allocate *all* of a component's cost to individual products. In this simple example, letters account for two-thirds of driver activity and packages for one-third. Using these shares to allocate the total component costs of $210 would lead to an FDC cost allocation for packages of $70 = ($210)(1/3) and an FDC allocation of $140 = ($210)(2/3) for letters. Notice that the FDC allocations for both products exceed their incremental costs.

[39] *See, e.g.*, Willig (1979); Panzar and Willig (1981); Baumol, Panzar, and Willig (1982); Sharkey (1982); Brown and Sibley (1986); Panzar (1989).

Nevertheless, with the change of only a few words, the discussion is highly relevant to the situation currently facing the Postal Service and its regulator:

> As a general rule, any rate below incremental costs is both unprofitable and socially wasteful of resources because the additional (incremental) revenue obtained is less than the additional cost incurred. However, this does not mean that the [Postal Service] should set rates *at* that cost level or that [it] should be required to do so. On the contrary, this cost reference is uniquely important as a guide in determining the specific rates which will provide the maximum contribution to the [institutional cost] burden and thus to net income. The margin above incremental costs that maximizes this contribution depends upon the price sensitivity of demand, determined primarily by the alternatives available to shippers. The judgment of management should be relied upon to make this determination, subject to limitations imposed by regulation of maximum rates and discrimination. Thus, while incremental costs should not *determine* prices or rates, they set the lower boundary (and demand conditions and regulation the upper boundary) within which pricing decisions should be made. [Emphasis in the original. Footnote omitted.][40,41]

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[40] Baumol et al. (1962) at 362.

[41] These points can be illustrated using the example in the previous section. To further simplify matters, assume the following: (i) local transportation costs are the *only* costs of the Postal Service; (ii) demands for letters and packages are completely price inelastic (i.e., letter and package volumes are fixed, respectively, at 2 and 1 cubic foot miles regardless of price); and (iii) p is the price (per cubic foot mile) that the Postal Service charges for packages. (Given that there is only one unit of packages, p is also the amount of package revenue received.)

In this example, when do packages make a positive contribution to the bottom line of the Postal Service? Let R_L denote the total revenues that the PRC allows the Postal Service to receive from its letter business. Then, if it offers package service at price p, the Postal Service receives total revenues of $R_L + p$. Since, from above, the costs of 3 cubic foot miles of mail is assumed to be \$210, the total profits of the Postal Service when it delivers both letters and packages is given by $\pi_w = R_L + p - \$210$. If the Postal Service were to abandon its package business, it would have

VIII. Fully Distributed Costs Must Not be Used to Determine Minimum Price Floors

In contrast to pricing based on incremental costs, FDC pricing would violate the requirements for economically sound cost determination and pricing in multiproduct enterprises. The logic is quite simple. According to economic theory, the cost *caused* by a service (or subset of services) equals the *incremental cost* of that service (or subset of services)—i.e., the extra costs that result from providing the increment of service or would be avoided by *not* providing it. And the remaining component costs that FDC seeks to allocate to individual services are *jointly caused* by *all* services using the component but are *not* caused by any particular service.

The adverse economic effects of FDC would result from its impact on the minimum prices the Postal Service would be allowed to charge for its competitive (i.e., non-market dominant) services. Economists generally agree that economic efficiency and the avoidance of cross-subsidization requires that the prices charged for products offered by multiproduct firms like the Postal Service satisfy three tests: (1) the price charged for an individual (or marginal) unit of output must cover its marginal cost,[42] (2) the revenue received for any larger increment of

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to transport only 2 cubic foot miles of mail (all letters) at a total cost of $160. In that case, it would receive no package revenue, but its revenue from letter mail would be unchanged at R_L. Therefore, Postal Service profits without its package business would be $\pi_{w/o} = R_L - \$160$. Clearly, the package business makes a positive contribution to Postal Service profits whenever $\pi_w > \pi_{w/o}$. That is, when $R_L + p - \$210 > R_L - \$160$, i.e., when $p > \$50$. But this is just the condition that package revenues exceed the incremental costs of the package service!

As Baumol et al. (1962) pointed out, this does not mean that the Postal Service should charge a price of p for its package service. Indeed, given the totally inelastic demand of the example, the Postal Service would maximize the contribution from its package operations by charging the highest price its competition (or its regulators) would allow. A profit seeking Postal Service would happily accept an opportunity to offer package service at any price yielding revenues greater than its incremental cost of $50 and abandon the service if the maximum it could receive were less than $50. There would be no need to instruct a profit maximizing enterprise on this point. If the regulator was concerned about anticompetitive behavior on the part of the Postal Service, it could set an incremental cost-based price floor of $50.

[42] There may be exceptions for the case of ancillary services, which are strong demand complements to primary services sold by the enterprise. It can be economically efficient to price these services below marginal cost (or even

output of a product must cover its incremental cost, and (3) the *total* revenue received from two or more products combined must cover the incremental costs of the those products combined. Above these price floors, a regulated firm like the Postal Service should be allowed to set markups that, in the judgment of Postal Service management, are responsive to the sensitivity of demands for the services and sensitive to competitors' reactions, constrained only by any maximum rate standards and restrictions on discrimination that legislators and regulators set. Regulators should not impose minimum price floors that include costs that are not caused by the increment of output being costed (in the sense of being avoided if the incremental output were not provided).

The use of FDC price floors would violate these economic standards by adding an amount of non-attributable institutional costs to the incremental costs of each service and by requiring that minimum Postal Service prices for individual competitive products cover this inflated measure of cost *even when the contribution-maximizing Postal Service price for the competitive product was below the resulting price floor.* Three undesirable effects are likely to result from this change. First, the Postal Service would lose volumes to rivals for which it was actually the most efficient provider. While this would make the *rivals* better off, it would make businesses and consumers worse off by diverting volume from the carrier with the lowest costs. It would also make the Postal Service (and, ultimately, businesses and consumers) worse off by depriving the Postal Service of contributions to institutional costs that the Postal Service could have earned when contribution-maximizing prices are below the FDC price floor. Second, competitors of the Postal Service would be able to increase their prices on the volumes they carry

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provide them gratis) in order to promote the gainful sales of the complements, e.g., the provision of pickup services for high-volume mailers.

because the threat of price competition from the Postal Service would be limited by the higher level of the price floor. Third, customers would be encouraged to invest in shipping capabilities even when shipping could be more efficiently performed by the Postal Service.

A simplified example can be used to clearly illustrate these effects. The analysis assumes that (i) the Postal Service has a single package rival that offers an identical service, and (ii) the total consumer demand for packages is insensitive to price. In this situation, the competitor charging the lowest price captures the entire market.

There are three relevant cases to consider. Which case pertains depends on the relationship between the unit cost of the rival carrier and the levels of the FDC and incremental cost-based alternative price floors.

Case 1: The rival's unit cost is greater than the FDC price floor. In this case, neither price floor would have any effect. The Postal Service would capture the package market at a price slightly below its rival's unit cost,[43] earning a profit contribution from its package operation equal to the difference between the rival's unit cost and the incremental cost of its package operation. The total cost to society of postal operations would be minimized because joint provision by the Postal Service is less expensive than the costs that would result if the Postal Service delivered letters and its rival took over the package business.

Case 2: The rival's unit cost is less than the incremental cost-based price floor. In this case, the rival would always capture the package market at a price (very) slightly below

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[43] This equilibrium pricing result follows from the example's assumptions that the package services of the Postal Service and its rival are perfect substitutes and that the market demand for packages is insensitive to price. If demand is elastic, the Postal Service might find it profitable to charge a substantially lower price.

the price floor imposed on the Postal Service. Thus, the profits of the rival, and the prices paid by businesses and consumers who purchase the service are higher under an FDC price floor than under one based upon incremental cost. Of course, either way, the Postal Service earns no contribution from packages. The total costs to society would again be minimized. In this case, it is because the package costs of the rival are less than the Postal Service's incremental cost of packages.

Case 3: The rival's unit cost is below the FDC price floor but above the incremental cost-based price floor. In this case, with an FDC price floor, the rival would capture the package market charging a price (very) slightly below the FDC price floor. The total cost to the society of postal operations would be inefficiently high because the rival captures the package market even though its cost of supplying packages is greater than the Postal Service's incremental cost of package delivery. Alternatively, with an incremental cost-based price floor, the Postal Service retains the package business by charging a price (very) slightly below the rival's unit cost. Thus, under an incremental cost-based price floor, social cost efficiency is achieved, consumers are offered lower prices, and the Postal Service earns a positive profit contribution from the package business.

To summarize, when the package costs of the rival are very high (Case 1), irrespective of which price floor the regulator chooses, the Postal Service always retains the package business and social cost efficiency is achieved. In Case 2, when the rival's package costs are very low, the rival efficiently captures the package market regardless of which price floor is implemented. However, use of the higher FDC price floor leads to higher profits for the rival and higher prices for businesses and consumers. Given package market competition, a price floor imposed on the Postal Service becomes a ceiling on the price the rival can charge when it captures the market.

Finally, where the rival and the Postal Service are relatively close competitors for the package delivery service, i.e., with intermediate values of the rival's package cost (Case 3), an FDC price floor would lead to the rival inefficiently capturing the market *and* businesses and consumers paying an unnecessarily high price. In contrast, implementing the incremental cost-based price would lead to the Postal Service efficiently serving the package market, with businesses and consumers paying a lower price for package delivery services. Put another way, for a given level of the rival's unit cost, the higher the FDC price floor is elevated, (i) the more likely it is that the rival will inefficiently capture the market, and (ii) the more profit the rival will make when it does capture the market. There is just no situation in which it is socially advantageous for the regulator to impose an FDC price floor rather than one based upon incremental cost.

IX.   Conclusions

The above analysis has explained how a misguided attempt to introduce FDC, an arbitrary and outdated cost allocation methodology, to postal ratemaking threatens to derail the increasing success of the Postal Service's package business and to harm the businesses and consumers who rely on affordable and efficient package delivery services. The conclusions of the analysis are as follows:

- The multiple products of the Postal Service share many cost-generating activities while being produced. This means that only a portion of the costs of these activities can be causally linked to individual products.

- The Postal Service has developed, the PRC has approved, and the courts have accepted causation-based cost attribution methodologies to accurately measure the incremental costs of individual postal products.

- The PRC appropriately utilizes this information to establish price floors for competitive products of the Postal Service in order to prevent cross-subsidization and protect rivals from unfair competition.

- Private competitors and some policymakers have proposed that the Postal Service use FDC to establish price floors for competitive products of the Postal Service.

- FDC cost allocations are a discredited approach to ratemaking. The use of FDC price floors would: (i) increase the prices paid by businesses and consumers, (ii) inefficiently reduce the ability of the Postal Service to earn profit contributions from its package business, (iii) reduce the efficiency of the package sector, and (iv) increase the profits of package rivals.

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