DOCKET SECTION

USPS-RT-7

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

POSTAL RATE AND FEE CHANGES, 1997

Docket No. R97-1

REBUTTAL TESTIMONY
OF
LAURITS R. CHRISTENSEN
ON BEHALF OF THE
UNITED STATES POSTAL SERVICE

Table of Contents

PAGE

Rebuttal Testimony
Of
Laurits R. Christensen

AUTOBIOGRAPHICAL SKETCH

My name is Laurits R. Christensen. I am a founder and the chairman of Christensen Associates, which is an economic research and consulting firm located in Madison, Wisconsin. My education includes a BA in economics from Cornell University, an MS in statistics and PhD in economics from the University of California-Berkeley. For twenty years I was on the economics faculty at the University of Wisconsin-Madison and was a visiting associate professor at the University of British Columbia (1973). I have also worked as a full-time consultant to the Bureau of Labor Statistics, Office of Prices (1972-1973) and the U. S. Treasury, Office of Tax Analysis (1971-1972).

My career as an economist has been devoted to the measurement of economic phenomena. In particular, I have done considerable research regarding the measurement of relationships between outputs and inputs. I was one of the developers of the translog functional form and many of my 66 published articles rely on it and its underlying principles. Regulatory commissions in the railroad, telecommunications, electricity, and cable television industries have relied on my work. I have also provided testimony to the United States Congress on regulatory matters.

In 1976 I co-founded Christensen Associates to do research and consulting in regulated industries. Since 1981, Christensen Associates has done

a substantial amount of work for the U. S. Postal Service. The Commission is, I am sure, very familiar with our development of the Postal Service's measure of Total Factor Productivity, a methodology the Commission has audited and accepted.

This is the first time I will be giving testimony before the Postal Rate Commission.

PURPOSE AND SCOPE OF TESTIMONY

The purpose of my testimony in this docket is to make clear that the new mail processing costing methodology being proposed by the Postal Service is an integrated system of variability and distribution that produces estimates of economic marginal costs. The underlying theory of the new method was set forth by Dr. Panzar in his direct testimony. Deviations from Dr. Panzar's approach will result in estimated product costs that are not necessarily marginal costs, and may not be appropriate for rate making. My testimony will also include rebuttal of several incorrect points made by intervenor witnesses.

I. The mail processing volume variability and cost distribution methods must be closely linked in order to produce economically meaningful costs by product category.

Since nearly a quarter of the Postal Service's Base Year 1996 costs are accrued in the mail processing cost component, it is highly desirable to use the best available technique to estimate marginal mail processing costs. The Postal Service has traditionally estimated "volume-variable cost" by mail subclass which, when expressed per unit of mail volume, provide estimates of economic marginal costs. The testimony of Postal Service witness Panzar (USPS-T-11) demonstrates the equivalence of unit volume-variable cost and the marginal cost of a subclass of mail or special service. In this docket, the Postal Service has presented an improved analysis of the costs associated with mail processing activities that is consistent with the econometric approach to volume variability applied to other cost components.

Historically, the Postal Service has assumed unit elasticities between most categories of mail processing costs and the corresponding "cost drivers," which are handlings of single pieces, containers, or other units of mail. This is the "100 percent variability" assumption from the old Postal Service methodology. As a consequence of this assumption, essentially all mail processing costs were distributed to the subclasses of mail and special services (USPS-LR-H-1, section 3.1). The cost distribution was performed by a series of computer programs known as LIOCATT, which used data from the In-Office Cost System (IOCS) to identify the small portion of mail processing cost classified as

non-volume-variable and distribute the remainder to subclasses of mail and special services (USPS-T-12 at 3-4).

Both the 100 percent variability assumption and the traditional distribution methodology have been controversial. In Docket No. R94-1, witness Stralberg argued that certain costs he alleged to be overstated in the Postal Service's cost methodology might be reclassified as "institutional" costs (Docket No. R94-1, Tr. 25/11845). In effect, Stralberg was suggesting that the Postal Service's old 100% variability assumption overstated the volume variability of mail processing costs. However, while the IOCS data can identify the proportion of mail processing workhours spent on various activities, it cannot identify the underlying causal relationships needed to establish volume variability. Given the available data, the Commission rightly declined to alter its variability assumptions in that docket.[1]

The LIOCATT cost distribution system was also the object of considerable criticism from intervenors in Docket No. R94-1. LIOCATT assumed that the costs associated with the handling of mail of specific subclasses ("direct" costs) could be assigned directly to those subclasses, and distributed the remaining costs in proportion to certain "direct" costs in a complicated way. LIOCATT was criticized for incorporating erroneous assumptions regarding the subclass composition of "mixed-mail" observations and, more generally, for distributing costs inconsistently with operational realities (Docket No. R94-1, TW-T-1 at

[1] Docket No. R94-1, Opinion and Recommended Decision (November 30, 1994), at III-13.

13-16).

In response to these criticisms, the Postal Service has developed a large set of operating data with which witness Bradley has estimated volume variability factors. Witness Bradley's results strongly indicate that past mail processing variability assumptions are incorrect. Witness Bradley's analysis identifies the pool of volume-variable cost, but requires a consistent distribution method to produce economically meaningful cost by subclass (USPS-LR-H-1, appendix H). Witness Degen has developed a new cost distribution system to accurately represent the subclass distributions of the cost drivers specified in witness Bradley's analytical framework. The old LIOCATT cost distribution method is not satisfactory for this purpose because it is inconsistent with the relationships between mail processing costs and cost drivers estimated by witness Bradley. The Postal Service's new distribution method developed by witness Degen generally distributes a cost pool's volume-variable costs based upon the subclass distribution of IOCS tallies associated with that cost pool in which the sampled employee was observed handling mail.[2]

Intervenor witnesses such as Stralberg who contend that the new cost distribution method ignores all cross-pool causality relationships (Tr. 26/13957) have, at a minimum, oversimplified the new cost distribution methodology. For a number of operations, witness Bradley specifies cross-pool relationships, and the

[2] The new Postal Service method employs alternate distribution procedures for certain cost pools, such as mail processing support operations, where the cost driver specified by witness Bradley is the workload in some specified group of (supported) operations (USPS-LR-H-146, pages II-11 to II-12). In these cases, the new cost distribution approach is effectively a hybrid of the "distribution key" method and the "piggyback" method (USPS-LR-H-1, Appendix H, page H-).

distribution method takes this into account (see Footnote 2). Witness Stralberg's criticism is, therefore, unfounded.

II. By recommending that the portions of the mail processing cost methodology presented by witnesses Bradley and Degen be divorced, intervenor witnesses advocate economically non-meaningful mail processing costs.

In this docket, several witnesses argue that the Commission should adopt part of the Postal Service's mail processing cost analysis and reject the other. Witnesses Cohen (MPA-T-2), Shew (DJ-T-1) and Stralberg (TW-T-1) argue that witness Bradley's analysis of mail processing variability improves on the past assumption of the Postal Service, but witnesses Buc (DMA-T-1), Cohen, and Stralberg favor a cost distribution method resembilng the old LIOCATT method.[3] Witness Sellick (UPS-T-2) argues that witness Degen's cost distribution method improves significantly on past Postal Service method, while witness Neels (UPS-T-1) argues in favor of retaining the past variability assumptions of the Postal Service.

The intervenor recommendations assume that the proposed variability analysis and the proposed distribution method can be easily separated. Witness Cohen states this explicitly, claiming that witnesses Bradley and Degen "undertake fundamentally different analyses" (Tr. 26/14039). Obviously, witnesses Bradley and Degen use different techniques for their respective

[3] Witness Buc describes Bradley's analysis as "sophisticated", but he does not otherwise address Bradley's analysis on its merits (Tr. 28/ 15367). Witness Buc recommends that the Commission continue to employ the LIOCATT cost distribution method without modification.

components of the Postal Service's mail processing cost analysis. However, the analytical framework of the variability analysis and the cost distribution method cannot be separated and still be expected to produce economically meaningful costs.

A. *If mail handlings within an operation are the cost driver for an operation, then the subclass distribution of mail handlings within that operation should be the distribution key.*

For cost pools related to piece sorting, witness Bradley specifies TPH, a measure of mail handling defined in MODS, as the cost driver.[4] *This approach is* consistent with long-standing treatment of mail processing, which has regarded handling of "piece[s] of mail, mail container[s], or unit[s] of mail volume" as the relevant cost drivers in mail processing and distribution operations (USPS-LR-H-1, section 3.1). Witness Bradley's regression models produce estimates of the elasticity of workhours with respect to TPH in each of these operations. The theoretically appropriate distribution key is, then, the subclass distribution of the recorded TPH. This is the component of the analysis described by witness Degen. However, the TPH data from MODS are not available by subclass of mail. Thus, to form a distribution key for each activity, witness Degen employs the IOCS data, which provide estimates of the proportion of time spent handling mail of various subclasses (and other characteristics). The subclass distribution

[4] *There are ten such cost pools, with associated costs of $4.75 billion (USPS-T-12, Table 4).*

of time spent handling mail is equal to the productivity-weighted subclass distribution of TPH.[5]

B. Witness Neels' criticism of witness Bradley's use of TPH instead of mail "volume" is unfounded because it fails to take into account the critical connection between Bradley and Degen.

UPS witness Neels criticizes witness Bradley for his use of TPH as cost driver. Witness Neels contends that mail volumes must be used as the cost driver in order to properly compute volume-variable costs. Witness Neels correctly observes that the elasticity of cost with respect to a cost driver such as TPH is not necessarily the same as the elasticity of cost with respect to mail volume. However, the premise of his critique, that the Postal Service ignores this distinction, is simply wrong. This is because application of the chain rule allows the elasticity of cost with respect to mail volume to be decomposed as:

$$d\ln C/d\ln M = (d\ln C/d\ln D)\cdot(d\ln D/d\ln M),$$

where C is cost, M is mail volume, and D is the cost driver. It is, therefore, sufficient for witness Bradley to estimate the elasticity of cost with respect to TPH, $d\ln C/d\ln D$, as long as someone else estimates the elasticities $d\ln D/d\ln M$. Witness Neels does not seem to realize that it is actually witness Degen, not witness Bradley, who provides estimates of the elasticities $d\ln D/d\ln M$. This is because witness Degen's distribution keys represent the proportions of mail handlings by subclass for each activity, and the proportions of

[5] If the average work content of a piece of mail does not vary by subclass, the time distribution is equal to the unweighted TPH distribution.

mail handlings themselves serve as estimates of $d\ln D/d\ln M$.[6] In other words, the elasticity of the cost driver with respect to volume is equal to the ratio of handlings of subclass *j* in cost pool *i* (D_{ij}) to the total handlings in cost pool *i* (D_i). It follows that the appropriate distribution key for a distribution cost pool is the subclass distribution of the mail handlings in that cost pool.

The requirement that the distribution keys provide estimates of the variabilities of mail volumes with respect to the cost drivers exposes the error witnesses Buc, Cohen and Stralberg make by adopting witness Bradley's elasticities while proposing unrelated cost distribution methods. A fundamental assumption of their alternative mail processing cost distribution proposals is that it is inappropriate to construct mail processing distribution keys at the cost pool level. This is contrary to the theory set forth by witness Panzar linking unit volume-variable costs and economic marginal costs.

---

[6] Consider a typical mailpiece of subclass i, that requires a_{ij} TPH in distribution activity j. Mathematically, this may be written as:

$$D_{ij} = a_{ij}V_j .$$

Total handlings in the activity are

$$D_i = \sum_j D_{ij} = \sum_j a_{ij}M_j .$$

So, for any subclass j,

$$\partial D_i/\partial M_j = a_{ij} .$$

Also note that we can write:

$$\partial \ln D_i/\partial \ln M_j = \left(M_j / D_i\right)\cdot\left(\partial D_i/\partial M_j\right).$$

Combining results,

$$\begin{aligned}\partial \ln D_i/\partial \ln M_j &= \left(M_j / D_i\right)\cdot\left(\partial D_i/\partial M_j\right)\\ &= \left(M_j / D_i\right)\cdot a_{ij}\\ &= a_{ij}M_j/D_i\\ &= D_{ij}/D_i .\end{aligned}$$

A conceptual problem also arises for witness Sellick's alternative. Witness Sellick's use of the Postal Service's proposed cost distribution methodology in conjunction with the old assumption of 100 percent volume variability factors assumes that witness Bradley's basic analytical framework—i.e., specification of cost drivers—is sound, but that Bradley's numerical results are not. However, witness Sellick relies on witness Neels for variability assumptions (Tr. 26/14162). Witness Neels argues not only that witness Bradley's results are wrong, but also that the analytical framework underlying those results is wrong as well. By disagreeing with witness Bradley's analytical framework, witness Neels undercuts the basis for witness Sellick's use of the new Postal Service cost distribution method.

C. The presence of multiple cost drivers and/or cross-operation cost relationships does not imply that LIOCATT or a similar distribution method is appropriate.

Witness Stralberg suggests that the costs of an activity could depend on the mail handlings not only in that activity, but also in other activities (Tr. 26/13956). Indeed, the original version of witness Stralberg's "automation refugee" hypothesis requires that workhours in manual distribution operations be causally related to volumes of mail handled in automated letter distribution operations. However, he offers no evidence to support this contention, and I am aware of no such evidence presented by anyone else.

Even if some of the interconnections between automated and manual distribution operations hypothesized by witness Stralberg were shown to exist, the LIOCATT and the Cohen/Stralberg cost distribution methods would still be wrong. Suppose that workhours in the manual flats operation did, in fact, depend on both the handlings in the operation and on handlings in letter automation operations. The correct procedure in this case would be to separately identify pools of volume-variable cost associated with each cost driver, and then to distribute each pool of volume-variable cost in proportion to the subclass distribution of the respective cost driver.[7] If, as one would expect, the "own workload" elasticity is large relative to workload elasticity with respect to other cost drivers, then the resulting cost distribution would be approximately equal to witness Degen's. In this light, the cost distribution method proposed by witnesses Stralberg and Cohen is fatally flawed. Their method assumes no cross-operation causality relationships for "direct" costs (such costs are assigned directly to the subclasses of the associated IOCS tallies), while it indiscriminately applies cross-operation distributions for "mixed-mail" and "not handling" costs. Their method has no provision at all to weight the cost distributions they apply for any actual cross-operation patterns of cost causality that may exist. To do so

---

[7] Then, the factor requirement equation for manual flats would have the form:

$$H_{manf} = f(D_{manf}, D_{auto}).$$

The total volume-variable cost, then, would be:

$$VVC_{manf} = (\varepsilon_{manf} + \varepsilon_{auto}) \cdot C_{manf}.$$

And the volume-variable cost of subclass j should be calculated as:

$$VVC_{manf,j} = (C_{manf} \cdot \varepsilon_{manf} \cdot (D_{manf,j} / D_{manf})) + (C_{manf} \cdot \varepsilon_{auto} \cdot (D_{auto,j} / D_{auto})).$$

Dividing $VVC_{manf,j}$ by the volume of subclass j yields economic marginal costs under the same conditions as the distribution key method under the single cost driver case.

would require that they compute subclass distributions of mail handlings by cost pool—exactly what witness Degen has already done.

For the LDC 17 "allied labor" operations, witness Bradley has specified an index of piece handlings in several distribution operations as a proxy cost driver.[8] It could be argued that the cost distribution method for the multiple cost driver case should be applied to these operations. To do so, however, would ignore the critical distinction between the proxy and the actual cost drivers. Witness Stralberg acknowledges that the "true" allied labor workload includes processing mail that bypasses piece sorting to some extent—that is, presorted mail—as well as support of sorting operations (Tr. 26/13916). Taking the proxy cost driver literally for distribution purposes would understate costs of presorted mail categories by ignoring their contribution to workload in allied operations.

The Postal Service's proposed allied labor distribution method recognizes that the cost drivers from the econometric allied labor equations are proxies. This proposal method basically takes the approach that regardless of whether the "ultimate" cause of a unit of allied labor workload is a distribution operation or not, the "immediate" cost drivers are still handlings of mail. As I understand it, in

[8] Note that witnesses Buc, Cohen and Stralberg have no complaints about the allied labor *variability analysis*.

allied operations these handlings will tend to be things like container movement rather than piece sorting, but they are handlings nonetheless. So, again, the general exercise is still to construct a subclass distribution for mail handlings. It is just the type of mail handling that has changed. The challenge, as Degen discusses in his direct and rebuttal testimonies, is simply to get an accurate subclass distribution of the mail handlings.

D. Witnesses Cohen and Stralberg have no economic basis for reclassifying any volume-variable costs as institutional costs.

Witnesses Cohen and Stralberg both suggest, witness Bradley's analysis notwithstanding, that the Postal Service overestimates volume-variable mail processing cost. While their underlying concerns regarding attribution principles are relevant, witness Bradley's analysis squarely addresses them. Witness Bradley's analysis demonstrates, and witness Degen's method implements, the result that some portion of each cost pool's cost is non-volume-variable. In this regard, I agree with witnesses Cohen and Stralberg that not all mail processing costs should be considered volume-variable. For non-volume-variable costs, it would be economically meaningless to distribute those costs to subclasses of mail. However, for volume-variable costs, economic theory, in conjunction with witness Bradley's empirical results, points clearly to the correct cost distribution approach.

As described above, volume-variable costs should be distributed to subclasses in proportion to the corresponding subclass distributions of mail handlings. Thus, the claims by witnesses Cohen and Stralberg that there is

insufficient evidence to causally link volume-variable costs to the subclasses of mail are wrong. The variability analysis, linking mail handlings to cost pool costs, and the distribution analysis together contain the relevant information on cost causality. In contrast, characteristics of particular IOCS tallies do not indicate whether the associated costs are volume-variable. To take a portion of the volume-variable cost and reclassify it as institutional cost is by definition inappropriate. Therefore, the Commission should reject the proposals to reclassify these costs.

III. Meaningful comparisons of Postal Service productivity to other industries do not indicate any inefficiency that would support the treatment of additional costs as institutional.

A major theme of the testimonies of witnesses Buc, Cohen, and Stralberg is the assertion that inefficiencies in certain postal operations lead to overstatement of costs for certain subclasses of mail. Witness Buc attempts to support this argument by comparing total factor productivity (TFP) growth for the Postal Service with manufacturing sector multifactor productivity[9] growth and with railroad total factor productivity growth (Tr. 28/15420-15423). Such comparisons are incorrect and misleading.

Witness Buc claims to have conducted an analysis "showing [that] the inefficiency and low levels of productivity of the Postal Service indicate that there is excess mail processing labor" (Tr. 28/15420). I find witness Buc's

[9] Multifactor productivity is conceptually the same as total factor productivity.

comparisons to be poorly motivated, but even if they were meaningful, none are specific to mail processing. Under cross-examination, witness Buc conceded that the Postal Service TFP statistics he presents cannot be used to determine mail processing productivity growth (Tr. 28/15459).

Comparisons of the entire Postal Service to the manufacturing sector or to the railroad industry are misleading. The Postal Service provides retail services, processes the mail, transports the mail, and delivers the mail. Of these functions, only the portion of mail processing that is performed in the Postal Service's large plants bears any resemblance to a manufacturing operation[10] and this portion of mail processing is responsible for only a fraction of Postal Service inputs. In 1997, only 34 percent of wages and salaries were booked to "Function 1" mail processing operations.[11] Transportation is also a relatively minor part of Postal Service resource usage. In 1997, transportation expense amounted to only 7 percent of the Postal Service's total operating expense.[12] Given the variety of activities that the Postal Service performs, it is more appropriate to compare it to a much broader sector of the economy, for example the private nonfarm business sector. The Bureau of Labor Statistics publishes a multifactor productivity index for the private nonfarm business sector.

Witness Buc implies that a comparison between Postal Service TFP and private nonfarm business multifactor productivity would liken the Postal Service

[10] For that matter, among manufacturing operations, it is hardly clear that mail processing plants resemble steel mills very much, as witness Buc suggests (Tr. 28/15460). They would be more likely to be comparable to printing and publishing, which have had very slow productivity growth.
[11] Source: National Workhours Reporting System, (Function 1 Dollars/Total Dollars).
[12] Source: United States Postal Service Annual Report, page 45.

to "law firms and consulting firms and accounting firms, and traditional services" (Tr. 28/15461). Buc's statement is inaccurate. The private nonfarm business sector is made up of a diverse collection of industries, of which manufacturing and transportation constitute a significant fraction. I believe the wide range of activities encompassed by the private nonfarm business sector makes it comparable to the Postal Service as a whole. Table 1 compares multifactor productivity for the private nonfarm business sector with Postal Service TFP. From the table, one can see that their rates of growth have been quite similar—indeed, Postal Service productivity growth has exceeded the productivity growth of the private nonfarm business sector on average.

It would also be incorrect to draw any conclusions regarding Postal Service productivity performance based upon labor productivity growth. Labor productivity growth is a partial measure of productivity. Labor productivity growth can be achieved by increases in non-labor inputs, relative to labor. To the extent that labor productivity growth is due to increases in non-labor inputs, it does not measure increases in efficiency. Total factor productivity growth measures the increase in outputs relative to all inputs, and therefore is a better measure of efficiency.

Table 1

Comparison of USPS and Private Non-Farm Business
Total Factor/Multifactor Productivity Indexes

Year	Total Factor/Multifactor Productivity	
	USPS (1972=1)	Private Non-Farm Business (1972=1)
1971	0.9883	0.9717
1972	1.0000	1.0000
1973	1.0420	1.0294
1974	1.0230	0.9937
1975	1.0141	0.9958
1976	1.0092	1.0325
1977	1.0299	1.0514
1978	1.0658	1.0609
1979	1.0440	1.0483
1980	1.0493	1.0252
1981	1.0557	1.0210
1982	1.0414	0.9874
1983	1.0355	1.0147
1984	1.0384	1.0410
1985	1.0369	1.0399
1986	1.0587	1.0493
1987	1.0630	1.0493
1988	1.0666	1.0546
1989	1.0600	1.0483
1990	1.0916	1.0430
1991	1.0736	1.0336
1992	1.0792	1.0451
1993	1.1200	1.0514
1994	1.1169	1.0567
1995	1.0995	N/A
1996	1.0838	N/A

IV. Witness Chown's "weighted attributable cost" is arbitrary and has no economic meaning

NAA witness Chown proposes that a new metric, "weighted attributable cost," be used in the determination of institutional cost assignments to subclasses of mail. The "weighting", according to witness Chown, accounts for the "different mix of functions used by each subclass of mail and the different amounts of institutional costs incurred to provide these functions" (Tr. 25/13274). The result of witness Chown's "accounting" is that "weighted attributable costs" correspond neither to volume-variable costs nor to incremental costs. So, although witness Chown's stated goal is to provide "better information" (Tr. 25/13422) for institutional cost assignment, "weighted attributable costs" are inconsistent with the economic basis for the Postal Service cost estimates on which it is based.

A. Past Commission analysis of institutional cost assignment is appropriate.

In its past decisions, the Postal Rate Commission has recognized that, consistent with economic principles, institutional costs cannot be causally attributed to individual subclasses or services. Instead, the Commission has emphasized that careful consideration and balancing of all of the nine statutory criteria from Section 3622(b) of the Postal Reorganization Act is important for determining institutional cost allocations and Postal Service rates.

Consistent with their conclusion that all nine statutory criteria are important for setting rates, the Commission also emphasized that noncost factors were important in determining institutional cost coverage in its Docket No. R90-1 Opinion and Recommended Decision (January 4, 1991):

> "The analysis of the statutory public policy factors in order to allocate institutional costs involves balancing many conflicting considerations. All categories of mailers can provide valid reasons why increases in their postage rates should be restrained." (para 4009)
>
> " ... we are not prepared to abandon our practice of basing rates on an evaluation of how noncost factors of the Act apply to the various subclasses of mail." (para 4029)

My understanding is that the Commission has allocated institutional costs according to its statutory obligations, not relying on any single factor for allocating institutional costs. In this respect, the Commission's position is consistent with economic principles. As described below, institutional costs are not causally related to any particular service or product. Given that they are not caused by any particular service or product, the determination of institutional cost coverage is not a question of what product or service is causally responsible for these costs. Rather, coverage of institutional costs depends on other noncost considerations, such as customers' willingness to pay, the value of service to customers, and fairness (USPS-T-30, at 2-3).

The institutional costs of the Postal Service are more generally referred to as "shared," or "joint and common" costs in the economics literature. For simplicity, I will generically refer to such costs as "shared costs." The

distinguishing feature of shared costs is that they are not causally related to any service produced by a multiproduct firm. Rather, they are incurred by the firm as a whole, and their levels do not vary with the level of production of any individual service.[13] Stated another way, shared costs are not avoidable with respect to individual products or services—i.e., reducing or eliminating the quantity produced of individual services does not allow the company to avoid incurring shared costs. Shared costs are only avoidable at the company-wide level-i.e, the firm must cease production of all of its services to completely avoid incurring shared costs.

Because shared costs are not causally attributable to individual services, there is no unique method for assigning these costs to individual services for the purpose of cost recovery. In economic terms, the allocation of shared costs to individual services is arbitrary. Given the arbitrary nature of shared cost allocations, there is no unique set of prices that will recover shared costs.

Baumol, Koehn, and Willig have succinctly stated the problem with shared cost allocations as it related to allocating shared investment to calculate rates of

[13] There may be various levels of shared costs incurred by a firm—ranging from those costs that are shared by all services produced by the firm (as discussed above), to costs that are shared by some subset of the firm's services. In this last instance, costs are said to be shared by a "service family." However, regardless of the level of shared costs, the distinguishing economic feature of shared costs is that they are not causally attributable to the provision of any particular product or service—i.e., the level of shared costs does not vary as the level of production of individual services changes.

return for individual activities. (These criticisms also apply to allocating shared costs for purposes of determining individual rates for services):[14]

> "Where the activities of a firm benefit from substantial common investments of substantial common outlays (or both), there is no way to calculate a rate of return for any or all of the company's individual activities, one by one. Indeed, the difficulty is not that we cannot determine these numbers, but that such numbers themselves are necessarily figments of the imagination."
>
> "If regulatory rules nevertheless require the undefinable to be defined, the only option open to those who must comply with the rules is to adopt some arbitrary device, usually dressed up to give it an appearance of reasonableness—an arbitrary rule that divides up indivisible investments and costs. This, of course, is what full allocation means."
>
> "But an arbitrary division criterion produces just the sort of results the term "arbitrary" implies. Depending upon the conventional criterion chosen for the division of investments and costs, one will obtain widely different results from the calculation. It is generally acknowledged that the result will be affected by this choice. But there seems to be an impression that any such calculation, if carried out with sufficient care, will yield a reasonable approximation to some underlying true figure. That impression is totally unfounded. ... changes in the basis of allocation can make an enormous difference to the results that emerge, ... In other words, one can have absolutely no confidence in the results obtained from any such calculation. Moreover, the numbers that emerge readily lend themselves to manipulation by any interested party through selective choice of basis of allocation."

Baumol, Koehn and Willig conclude that, because of their arbitrary nature, shared cost allocation methods produce economically meaningless results.

[14] William J. Baumol, Michael F. Koehn, and Robert D. Willig, "How Arbitrary is "Arbitrary?" – or, Toward the Deserved Demise of Full Cost Allocation, Public Utilities Fortnightly, September 3, 1987, p 17.

More than anything, cost allocation methods produce the desired outcomes of their advocates:[15]

> "Fully allocated cost figures and the corresponding rate of return numbers simply have zero economic content. They cannot pretend to constitute approximations to *anything*. The "reasonableness" of the basis of allocation selected makes absolutely no difference except to the success of the advocates of the figures in deluding others (and perhaps themselves) about the defensibility of the numbers. There just can be no excuse for continued use of such an essentially random or, rather, fully manipulable calculation process as a basis for vital economic decisions by *regulators*."

In this context, witness Chown's "weighted attributable cost" proposal for assigning institutional costs not only runs counter to the Commission's established rate making principles, but is also an arbitrary cost allocation procedure that has no economic basis.

B. Witness Chown's suggestion that institutional costs be assigned on the basis of cost factors is unfounded.

Witness Chown acknowledges that institutional costs of the Postal Service have the property that they are not causally attributable to any particular subclass of mail:

> "By definition, institutional costs are costs that are not causally related to any particular subclass" (Tr. 25/13263).

In the next sentence, however, she asserts that institutional costs can be "related" to particular functions of the Postal Service:

> "However, institutional costs can be related to the provision of a particular function of the Postal Service" (Id.).

[15] Id., p. 21.

Witness Chown then proceeds to use cost allocation methods employed by the Commission to determine how institutional costs can be "related" to particular functions of the Postal Service. As discussed above, the Postal Service properly recognizes that institutional costs are not directly incurred by any particular subclass or function of the Postal Service.[16] Institutional costs are allocated across subclasses based on the nine criteria of Section 3622(b). The *process of institutional cost allocation does not depend on cost causality.* However, witness Chown mistakes these allocations for a causal relationship; she infers causality where there is none. This is evident in some of the statements she makes in her direct testimony:

> "... even if the provision of these functions causes the Postal Service to incur substantial institutional costs." (Tr. 25/13265, underline added)

> "... the proportion of institutional costs incurred to provide each function" (Tr. 25/13272, underline added)

> "This method explicitly recognized the mix of functions used by each subclass of mail and the proportion of institutional costs incurred to provide each of the functions ..." (Tr. 25/13272, underline added)

> "... subclasses which use mostly the delivery function can receive a lower institutional cost assignment, even though a large share of institutional costs are incurred to provide the delivery function." (Tr. 25/13275, underline added)

[16] Even if there was a causal relationship between institutional costs and the Postal Service functions defined by Chown, the assignment of institutional costs to using those functions subclasses of mail would still require some type of allocation method that was not based on a causal relationship.

Witness Chown's cost allocation proposal is essentially the same as her proposal in Docket No. R90-1. In that docket, the Commission recognized that her proposal did not meet the statutory obligation of the Commission:

> "... *Chown suggests that the Commission separately apply cost* coverages to four functional categories of costs. We have chosen not to change our methodology for distributing institutional costs in this case." (para 4033)

> "Witness Chown offers her proposal in order to preserve, or improve, our ability to allocate institutional cost burdens fairly. She identifies "unbundling" of rates as a postal pricing trend which, while salutary in many respects, tends to make the equitable division of institutional costs more difficult." (para 4034)

> "We find a serious deficiency in the Chown method to be its mechanistic application of coverage factors to attributable cost pools. Such a method tends to eliminate the essential role judgement must play in assuring fair and equitable application of the statutory factors." (para 4047)

In her current testimony, witness Chown refers to her proposal in Docket R90-1 *and notes that the Commission acknowledged she focused attention on* the impact of unbundling costs and how worksharing discounts can affect the apportionment of institutional costs to categories of mailers (Tr. 25/13273). However, in the next paragraph of its decision in Docket No. R90-1, the Commission concluded:

> " we are convinced that the method we use for the allocation of institutional burdens among the classes and subclasses, as we described it in our Docket R87-1 Opinion, and further clarify it in this Section, is more fair in application and result than the method proposed by witness Chown." (para 4044)

The Commission went on to state that witness Chown's proposal did not address the criteria for the fair distribution of institutional costs:

> "We consider it unfortunate however, that witness Chown does not address whether her methodology is likely to meet the goals for fairly distributing institutional costs we set out in Docket R87-1, particularly the *benefits of predictable relationships between classes and subclasses.*" (para 4046)

In her current testimony, witness Chown also notes that in its R90-1 decision, the Commission agreed with her that total attributable costs are not a completely accurate measure of how much various subclasses benefit from institutional effort (Tr. 25/13273). However, in the same paragraph in its R90-1 decision referenced by witness Chown, the Commission stated:

> "... we cannot accept Chown's proposal, which is simply to break systemwide attributable costs into pieces, as a solution for the problem she describes." (para 4049)

> "Just as systemwide attributable cost is not a measure of responsibility for systemwide institutional cost, we do not consider attributable transportation cost a usable measure of responsibility for institutional transportation costs. ("Responsibility" is used here as shorthand for the appropriateness of the share of institutional costs we assign, and not in the causal sense.) For example, there is no reason why a subclass which is a heavy user of attributable ground transportation should be more responsible for recovery of institutional costs related to air transportation than a subclass which causes little attributable transportation cost of any kind." (para 4050)

> "Chown has tried to attack this problem with a more elaborate formula, but we think it calls not for more complex mechanical solutions but for the focused exercise of rational judgement." (para 4051)

In summary, witness Chown develops a concept, "identifiable" institutional costs, that purportedly identifies the institutional costs associated with each of her four functions. Moreover, she seems to claim that this identification is a causal relationship. She also defines a residual category of institutional costs that are not identified with any particular function as "system-wide" institutional

costs. However, Chown's identifiable institutional cost concept defies economic logic and is inconsistent with established Commission practices.

V. Witness Henderson's proposal is based on a misunderstanding of incremental costs, and is neither necessary nor sufficient to address his concerns regarding cost coverage.

UPS witness Henderson proposes that the estimates of incremental costs presented by the Postal Service be used as the basis for markups. He claims this is necessary to satisfy the Section 3622(b)(3) requirement that postal rates cover "attributable" costs plus a portion of non-attributable costs. Additionally, witness Henderson claims that markups over incremental cost are necessary to prevent inefficiencies related to cost measurement errors, as well as to reflect the correct economic cost concept. Witness Henderson's concern that the Section 3622(b)(3) requirement be satisfied is relevant, but any rates that pass an incremental cost test meet this criterion equally well. The type of inefficiencies resulting from measurement error that Henderson identifies would not be remedied by his proposal. Finally, witness Henderson's arguments in favor of long-run incremental cost as the appropriate cost concept for rate making are self-contradicting and involve fundamental misunderstanding of the economic content of Postal Service cost estimates. For these reasons, the Commission should reject witness Henderson's proposal.

A. Both the Postal Service and the Henderson proposals constitute a departure from past practice; both meet the section 3622(b)(3) cost floor requirements equally well in principle.

The main argument witness Henderson offers in support of his proposal to mark up incremental costs is that such a procedure is needed to meet the Section 3622(b)(3) requirement that postal rates cover "attributable" costs plus a portion of non-attributable costs. Witness Henderson notes that the Postal Service has provided incremental cost estimates for the subclasses of mail. He further argues that the incremental cost of a subclass of mail is, by definition, attributable to the subclass. Finally, he observes that the rates proposed by the Postal Service are based on markups over volume-variable costs, with incremental cost tests applied as a check against cross-subsidy (Tr. 25/13557-13558). This is a departure from prior Postal Service practice, in which the cost floor for rates was based on attributable costs (as defined in USPS-LR-H-1).

Witness Henderson then complains that the new Postal Service approach is "contrary to the Commission's prior application of the statute" (Tr. 25/13558). *Note that witness Henderson's own approach is subject to this critique, since* incremental costs and attributable costs are distinct cost concepts (see USPS-LR-H-1, Appendix H). However, witness Henderson's complaint is ultimately empty since both the Postal Service and witness Henderson employ the same cost floor—a floor based upon incremental costs. The methods differ only in the mechanism by which the cost floor is imposed. The Postal Service method imposes incremental cost floors via incremental cost tests. Witness Henderson

acknowledges that products that pass the incremental cost test will make a contribution to institutional costs (Tr. 25/13624). Thus, postal rates that pass incremental cost tests satisfy the cost floor requirement of Section 3622(b)(3).

Witness Henderson observes that some rates could be below actual (as opposed to estimated) average incremental cost if certain subclasses only just pass the incremental cost test. Postal Service witness O'Hara has already shown in his direct testimony (USPS-T-30) that the Postal Service's proposed rates generate estimated TYAR revenue strictly greater than TYAR incremental costs for every non-preferred subclass of mail. Witness Henderson's argument that cost measurement errors could lead to economic inefficiencies is unfounded. Rational competitors will take the uncertainty of the Postal Service's cost estimates into account in making entry decisions. Rational decisionmaking under uncertainty does not lead to inefficiencies except when measured against an unattainable ideal world in which every relevant datum is known without error.

B. Long-run incremental costs are unlikely to reflect the actual costs of either the Postal Service or its competitors, and are therefore an inappropriate basis for rate making.

Witness Henderson asserts that the relevant costs for determining postal rates are "longer-run" costs. He claims that "longer-run" costs correspond to the time span between postal rate cases.[17] There are three fundamental problems with witness Henderson's analysis. First, he is not consistent in his definition or

[17] Witness Henderson: "Accordingly, the relevant costs for pricing purposes are longer run, not short run costs. Most (if not all) of the specific fixed costs identified by the Postal Service are avoidable in the time span between postal rate cases" (Tr. 25/13560).

application of the economic concept of the "long-run." He equates the economic long-run with a calendar period of time (2 to 4 years) between postal rate cases. However, as he admits, and as any basic course in economics stresses, the long-run cannot be measured by a particular calendar period of time; it is measured with respect to factor variability.[18] As an example of factor variability, witness Henderson noted that advertising costs can be adjusted in his 2 to 4 year "long-run." However, he ignores other costs, largely associated with mail processing capacity, that are not completely variable in this 2 to 4 year period such as sorting equipment. Therefore, witness Henderson's concept of the "long-run" does not comport with the economic concept of the long-run.

Second, even if witness Henderson's discussion had accurately reflected the economic principles of the long-run, the long-run costs of economic theory are not likely to reflect the long-run costs of an actual firm. An on-going firm never finds itself in the "true" theoretical long-run with complete factor variability. Real firms are always dealing with some type of constraint. To assume that all inputs are totally variable in a 2 to 4 year period—or, indeed, any given period of calendar time—is not realistic, nor will it provide an adequate estimate of the costs the Postal Service will actually incur. This is equivalent to assuming that the entire postal network and all of its facilities can be built from scratch in this time period (an even more extreme interpretation is that this occurs instantaneously). Furthermore, this interpretation of the long-run assumes that all older technologies in use in the mail processing system will be completely

[18] Henderson acknowledges the economic long run permits all productive inputs to be varied.

replaced by the latest least-cost technologies. In reality, the most efficient actual firm will use a mix of technologies as it adopts to new technologies.

As witness Panzar has stated, the Postal Service is subject to a number of operating constraints that may not allow it to achieve the most efficient operation. Moreover, as witness Panzar demonstrates, it is not necessary to assume perfect cost efficiency to determine Postal Service marginal and incremental costs.[19] Therefore, long-run costs that assume instantaneous adoption of least-cost technologies and most efficient operation will not accurately reflect costs of the Postal Service operating under its various constraints.

The third fundamental problem with witness Henderson's analysis of long-run costs is his incorrect presumption that long-run costs are always greater than short-run costs because long-run costs are simply short-run variable costs plus

---

[19] "Clearly, the Postal Service cost function I have defined, C(M,w) will coincide with the *minimum* cost function of economic theory if the operating plan always specifies the most cost efficient possible way of providing service for the given mail volumes. However, it is important to emphasize that it is not necessary to assume perfect cost efficiency to apply the methodology being developed here to the calculation of Postal Service marginal costs. Nor is it necessary to assume that the Postal Service is perfectly cost efficient for the pricing analysis to be meaningful" (USPS-T-11, p. 16).

"...when performing an analysis of postal pricing it must be recognized that the analysis is subject to the institutional constraint that Postal Service is going to produce the mail service in question using its established practices and procedures: what I have dubbed its operating plan. How close these practices and procedures come to achieving economic cost minimization is undoubtedly an important determinant of the efficiency of the Postal Service. And, of course, the closer to the operating plan comes to true cost minimization, the greater will be the maximized level of social surplus resulting from optimal pricing. However, the efficiency of the Postal Service operating plan is not an issue for the analyst. *As long as it is given that postal services will be produced following Postal Service practices and procedures, the relevant marginal and incremental costs for pricing purposes are those calculated based on the Postal Service operating plan"* (USPS-T-11, p. 17).

some amount of fixed costs.[20] This problem is, again, due to the fact that Henderson makes the fundamental mistake of confusing the economic definition of the long-run (i.e., complete factor variability) with some calendar period of time. The fact is short-run costs can be less than, greater than, or equal to long-run costs. The true difference between short-run and long-run costs is that, in a short-run situation (which could be equivalent to any calendar period of time), not all options are available to the firm, while in the long-run, the firm faces fewer constraints on its decisions. Therefore, the key difference between the long-run and the short-run is the ability to have greater degrees of freedom in making decisions and deploying resources. In fact, it is often the case that it is more costly to expand output when a relatively greater number of inputs are fixed than when more inputs can be chosen optimally. Therefore, it is often true that short-run costs will be greater than long-run costs.

[20] In response to interrogatory USPS/UPS-T3-3, witness Henderson states that "As a general matter, in the absence of decreasing returns to scale long run incremental costs will always be at least as great as short run incremental costs. This is true because in the long run the Postal Service would be able to eliminate more costs than it would be able to eliminate in the short run." (Tr. 25/13626). Henderson's assertion is incorrect. Recall that the incremental cost for a service, which we can call IC, is the difference between the total costs of the Postal Service with the service, say C(w), and the total costs of the Postal Service without the service, say C(w/o). Thus, IC = C(w)-C(w/o). Witness Henderson's mistake is focusing on the fact that as the Postal Service avails itself of opportunities to optimize its operations, the "longer run" costs C(w/o)' should be less than the "shorter run" costs C(w/o). Henderson's assertion is that the "longer run" incremental costs are IC' = C(w)-C(w/o)' > IC. The flaw in Henderson's logic is that the Postal Service will have the same opportunities to reduce C(w) to C(w)' in the longer run as it did to reduce C(w/o) to C(w/o)'. So, the correct formula for the "longer run" incremental cost is IC' = C(w)'-C(w/o)'. There is no economic basis to assert a priori that IC' is greater than IC.

C. Long-run incremental costs may not satisfy statutory cost floor requirements.

Estimates of long-run incremental cost based on the assumption of a firm that instantaneously adopts all the latest technologies and operates most efficiently with these technologies will likely understate the costs of an actual firm that adapts its inputs over time and has a blend of new and old technologies. If, in fact, long-run incremental cost estimates are less than the actual costs incurred by the Postal Service, then long-run incremental cost would not be an appropriate cost concept to meet the cost floor requirement of Section 3622(b)(3). Witness Panzar is correct in stating that it is appropriate to use estimates of actual marginal and incremental costs in rate making.