Before the
POSTAL REGULATORY COMMISSION
WASHINGTON, DC 20268-0001

Annual Compliance Report, 2011   Docket No. ACR2011

PUBLIC REPRESENTATIVE REPLY COMMENTS
(February 17, 2012)

The Public Representative hereby files Reply Comments in response to
Comments on the Postal Service's FY 2011 Annual Compliance Report (ACR) required
by 39 U.S.C. § 3652.[1]

The Public Representative responds to three of the themes asserted in the Initial
Comments:

(1)   The Commission should examine passthroughs below 100 percent of
        avoided costs to ensure they will not result in *exclusionary* access to
        Postal Service's facilities for worksharing mailers;

(2)   The Commission's worksharing models are inaccurate. The accepted
        methods of measuring costs for Flats mail are inaccurate and should not
        form the basis for conclusions about corresponding rates; and

(3)   The Commission should not use cost coverage to determine whether
        prices are equitable and whether products are being subsidized.
        Developing a cost index, proposed by the American Catalog Mailers
        Association (ACMA), using available data would provide the Commission
        with a means of monitoring the efforts undertaken by the Postal Service to
        reduce processing costs.

The Public Representative supports, in principle, a study of the impact of
passthroughs below avoided costs, if undertaken in a future Commission rulemaking.
The Public Representative disagrees with the other two themes asserted by
commenters for the reasons stated below.

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[1] United States Postal Service FY 2011 Annual Compliance Report (FY 2011 ACR), December
29, 2011. *See also*, Notice of Postal Service's Filing of Annual Compliance Report and Request for
Public Comments, January 3, 2012.

I.   WORKSHARING DISCOUNTS BELOW AVOIDED COSTS

A.   Comments of Dr. Panzer on Behalf of Pitney Bowes, Inc.

Dr. John C. Panzar provides economic arguments in favor of Efficient Component Pricing (ECP).[2] Dr. Panzar asserts that the spirit of ECP is violated by passthroughs that exceed 100 percent of avoided costs in addition to those below 100 percent.[3] However, Dr. Panzar recognizes (and the Commission has found) that the language of the PAEA only explicitly prevents excess passthroughs.[4] In spite of this, Dr. Panzar provides an economic rationale supporting similar comments about ECP made by parties that intervened in Docket RM2009-3. Dr. Panzar takes this sentiment one step further by emphasizing the anticompetitive effects of discounts below avoided costs.

The Public Representative agrees with the analysis provided by Dr. Panzar. A price cap regime gives the Postal Service an incentive to price discounts below the costs worksharing mailers can avoid. This would prevent competitors who are at least as efficient as the Postal Service from participating in the upstream mail processing market. In spite of agreement with Dr. Panzar, the Public Representative feels that this issue is currently of second order importance, given the short-run financial crisis facing the Postal Service. Moreover, adopting a proposal even to phase-in 100 percent passthroughs for products that currently receive passthroughs less than 100 percent would involve many discounts, and a substantial amount of time. In fact, there are 74 discounts other than the 75 percent 3-digit Automation letter passthrough of most

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[2] Comments of John C. Panzar on Behalf of Pitney Bowes Inc., February 3, 2012.

[3] Similarly, the Commission has recognized that if "the discount is less than the cost avoided by worksharing, it will likewise encourage a less efficient producer (in this case, the Postal Service) to do the work." Docket No. RM2009-3, Order Adopting Analytical Principles Regarding Workshare Discount Methodology, September 14, 2010, Order No. 536 at 37-38.

[4] "The Commission finds that of these two aspects of the ECP rule, only the former [discounts above 100%] is reflected in section 3622(e). While the Commission considers ECP an economically beneficial pricing practice, Congress acted to prevent workshare discounts that are too large, but did not include language specifically to, prevent discounts that do not pass through the full measure of costs avoided." *Id.* at 37-38.

concern to Pitney Bowes, which will probably be less than 100 percent after the Commission's ACD is published, and many of them are below 50 percent. Table 1 shows how many discounts less than 100 percent would exist if the Commission were to adopt all of the Postal Service's methodologies proposed in Docket Nos. RM2012-1 and RM2012-2 ("Carwash" Proposals).[5]

Table 1	
Class of Mail	Passthroughs under 100 percent after Carwash
First Class	5
Periodicals	20
Standard	38
Media	2
Library	2
Bound Printed Matter	8
Total	75

Sources: USPS-FY11-11 PER OC flats.xls

For now, the Commission and the Postal Service should work together to develop strategies and initiatives that will return the Postal Service to a state of fiscal solvency.

In spite of these caveats, the Public Representative believes that an inefficient upstream mail processing market can have long run effects which may be particularly harmful to consumers. If mail processing is inefficient, these costs are inevitably passed on to consumers in the form of higher postage rates. Given the size and scope of the market for postal products and the number of passthroughs under 100 percent, even slightly elevated postage rates can have significantly negative welfare effects over a long period of time.

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[5] Docket No. RM2012-2, Petition of the United States Postal Service Requesting Initiation of a Proceeding to Consider Proposed Changes in Analytical Principles (Proposals Sixteen through Twenty), November 30, 2011; Docket No. RM2012-1, Petition of the United States Postal Service Requesting Initiation of a Proceeding to Consider Proposed Changes in Analytical Principles (Proposals Nine - Fifteen), November 1, 2011.

B.   Commission Authority to Remedy Worksharing Discount Inefficiencies

In the event passthroughs below 100 percent are found exclusionary and have anticompetitive effects, the Commission is not without authority to order a remedy. The Commission's analysis of the annual comprehensive report is the primary forum for reviewing worksharing discounts.[6]

The Commission has found the purpose of section 3622(e) is to limit workshare discounts to the amount of costs avoided. *Id.* at 14, 38. The Commission has also found section 3622 does not specifically prevent workshare discounts that do not pass through all costs avoided. *Id.* at 38. On the other hand, Congress neither provided nor suggested in section 3622, or any other provision of title 39, that the Commission is without authority to review the consequences of workshare prices that do not pass through all avoided costs.

At least one portion of section 3652 directly suggests Commission authority to review rates that do not pass through all avoided costs. Section 3652(b) requires the Postal Service to report workshare information, including "the per-item contribution made to institutional costs." This indicates Congressional concern about such contributions. The separate provision in section 3652(b) to provide the Commission information about per-item contributions to institutional costs ensures the Commission an opportunity to review the contributions to institutional costs and to determine whether they are consistent with title 39.

Dr. Panzar points out the modern system of regulating rates as provided for by section 3622 includes an objective to establish and maintain a just and reasonable rate schedule for rates and classifications. 39 U.S.C. § 3622(b). He contends the just and reasonable provision warrants Commission consideration of the exclusionary impact of workshare discounts below avoided costs.[7] Panzar Comments at 14-15.

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[6] "Consequently, reviewing market dominant rates for consistency with the PAEA's many qualitative pricing standards is largely deferred by the Commission until after-rates are implemented, in its Annual Compliance Determination. *See* 39 U.S.C. § 3653." Order No. 536 at 17.

[7] The just and reasonable provisions of section 3622 were not specifically addressed by the Commission in Order No. 536 when discussing worksharing under section 3622.

In addition to Dr. Panzar's approach, provisions in the PAEA other than section 3622 would allow the Commission to review and remedy workshare discounts below avoided costs that exclude worksharing mailers and thereby increase postal costs. That is, Congress left to Commission discretion the authority to weigh and rectify unfair competitive advantages or undue discrimination or preferences. Specifically, section 404(a) bars regulations that give the Postal Service an unfair competitive advantage. *See* Order No. 536 at 33. Similarly, section 403(c) prescribes that Postal Service classifications, rates and fees shall not make any undue or unreasonable discrimination or preferences among, or to, users of the mails.

Annual compliance reports under section 3652 are required to demonstrate all products complied with all applicable requirements of title 39. 39 U.S.C. § 3652(a)(1). Compliance reports are reviewed by the Commission pursuant to section 3653. Upon determination under section 3653(c) of *non*compliance with the provisions of title 39,[8] the Commission shall take appropriate action as would be appropriate under section 3662(c) to achieve compliance with the requirements of title 39, including, among others, sections 404(a) and 403(c) and to remedy the effects of noncompliance. 39 U.S.C. § 3662(a). One such remedy may be ordering rates to be adjusted to lawful levels. 39 U.S.C. § 3662(c).[9] In other words, the Commission may, upon appropriate determination, remedy workshare discounts below avoided costs that are anticompetitive and order appropriate adjustments in rates and fees.

Thus, the Commission's authority to consider competitive advantages and discrimination by workshare discounts below avoided costs is not inconsistent with the Commission's finding in Order No. 536 that section 3622(e) reflects a specific Congressional intent to limit the magnitude of workshare discounts above avoided costs. Despite any directive in section 3622 regarding worksharing discounts above avoided costs, the Commission remains obligated to consider compliance with title 39,

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[8] While section 3653 requires a Commission determination of whether rates were not in compliance with applicable provisions of Chapter 36 (39 U.S.C. § 3653(b)(1)), section 3652 requires the Postal Service to demonstrate all products "complied with all applicable requirements of this title [39]." 39 U.S.C. § 3652(a)(1), *see also*, 39 U.S.C. § 3662.

[9] The Commission "shall take appropriate action in accordance with subsection (c) and (e) of section 3662 (as if a complaint averring such noncompliance had been duly filed and found under such section to be justified)." 39 U.S.C. § 3653(c).

and, if appropriate, to remedy, unfair, discriminatory, or preferential exclusionary workshare discounts that are below avoided costs as explained in the Dr. Panzar's Comments.

C. Proposed Strategic Rulemaking on Passthroughs Less Than Avoided Costs

While recognizing the legal limitations afforded to the Commission on this issue by sections 3622(e) and 3653, the Public Representative echoes Dr. Panzar's concern about passthroughs below 100 percent of avoided costs. Once the Postal Service has safely weathered the financial storm, the Commission should initiate a strategic rulemaking to better understand (1) whether the theoretical anticompetitive effects of passthroughs below 100 percent actually occur in the mail processing industry, and (2) what the welfare ramifications of these inefficiencies are for the general public.

II. ACCURACY OF THE COMMISSION'S WORKSHARING COST MODELS

A complaint about the accuracy of the Periodical and Standard Flats worksharing models has been developed by comparing the gap between modeled worksharing costs and accrued costs for different products. Time Inc. repeats this argument in its Comments. Similarly, Pitney Bowes calculates different CRA Adjustment factors for Incoming Secondary (IS) operations and non-Incoming Secondary operations in First Class and Standard worksharing letter models. Pitney Bowes notes that its estimated CRA adjustment factor for IS operations has been substantially lower than its estimated adjustment factor for non-IS operations. *Pitney Bowes Comments at 10*. It recommends separate CRA adjustment factors for IS and non-IS operations for First Class and Standard Letters. If accepted, this recommendation would reduce the costs of IS worksharing operations and increase the costs of non-IS worksharing operations.

The Postal Service has criticized the practice of judging the accuracy of a worksharing model by measuring the difference between modeled worksharing costs and accrued costs, arguing that many accrued costs are not included in the worksharing cost models.[10] Neither Time Inc. nor Pitney Bowes has addressed these arguments in its Comments. The Postal Service's point seems reasonable. Consequently, until and

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[10] Docket No. ACR2010, USPS Reply Comments, at 27.

unless parties successfully respond to the Postal Service's argument on this issue, the Public Representative does not support using the size of the CRA adjustment factor for different categories of worksharing activities as evidence that the worksharing cost models are flawed.

III.   THE COMMISSION SHOULD CONTINUE TO USE COST COVERAGE TO EVALUATE PRICING AND POTENTIAL CROSS-SUBSIDIZATION

L.L. Bean maintains that the cost coverage of catalogs is not as low as shown in the Postal Services' ACR FY2011. ACMA criticizes the practice of using cost coverage as an indicator of cross subsidy since the incremental cost test can involve groups of products as well as including the spillover net cost/benefit from products related to the one being tested for subsidization.

A.   Cost Coverage of Catalogs

L.L. Bean begins its Comments by repeating its previous arguments that catalog mailers use both Standard Flats and Carrier Route Flat Mail, and when the positive contribution of carrier route (and high density and saturation) mail is combined with the negative contribution from Standard Flats, catalogs recover their marginal costs and contribute revenue towards the recovery of institutional costs. *L.L. Bean Comments at 2.* This year, L.L. Bean has modified its argument. It states that carrier route, high density, and saturation flats have cost coverages far above 100 percent, and have seen greater price increases over the last few years than Standard Flats, while Standard Flats' coverage is less than 100 percent. L.L. Bean concludes that "the time has come for the Postal Service to reverse its pricing of Carrier Route and Standard Flats." *Id. at 4.* The Public Representative agrees with L.L. Bean, but disagrees with the ACMA argument discussed below.

B.   Appropriateness of Using Cost Coverage to Analyze Prices

ACMA describes Standard Mail products as "non-homogeneous agglomerations." *ACMA Comments at 26.* Therefore, ACMA believes the unit of analysis should be the products typically used by a mailer which could include more than one product. "[A] commercial mailer of flats would, as allowed by the size of his

mailing, qualify some pieces as Commercial HD Flats, others as Commercial CR Flats, and the remainder as Commercial Standard Flats." *Id.*

Later in its Comments, ACMA criticizes the Commission's determination that Standard Flats are not in compliance with Section 101(d), which requires costs to be apportioned on a fair and equitable basis. *Id.* at 28. ACMA maintains that regulators view the failure of a product to contribute to the recovery of institutional costs as evidence that the product is being subsidized by other products. ACMA attempts to refute the notion that subsidizing a product is inequitable, or necessarily results in sub-optimal prices when it states that "Ramsey optimal … prices need not be free of cross-subsidy. *ACMA Comments at 29-30 n. 28.* According to ACMA, it is possible that prices of products that lead to revenues less than costs may be optimal prices. Consequently, preventing or correcting cross-subsidization should not be a regulatory policy goal.

ACMA's discussion hinges on defining the occurrence of a product, or group of products, being cross-subsidized when their incremental costs are greater than their revenues. A test for whether this has occurred would examine whether eliminating the provision of a product, or group of products, would increase the firm's net revenues.[11] ACMA then discuses several reasons why it is not appropriate to treat the issue of cross-subsidization at the product level. For example, removing one product will affect costs and revenues of other products, and these effects need to be included in the incremental cost test of each product. *Id.* at 31. Moreover, proper use of the incremental cost test would be very time consuming. For example, ACMA states that, "In full regalia, incremental cost tests should test each product individually, then each pair, then each triad, and so on until all product combinations are covered. The testing of groups has not been an issue before the Commission." *Id.* n.30. It would be fair to conclude that the full use of the incremental cost test is too time-consuming to become a feature of the Postal Service's Annual Compliance Review or the Commission's Annual Compliance Determination.

However, the previously mentioned incremental cost tests are not the only cross subsidy test. The Commission's concern with products that do not contribute to the

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[11] The Commission has referred to this as the "But For Test."

recovery of institutional costs is based on its practice of comparing product unit prices to their long-run unit marginal costs—which are below incremental costs. It is possible to determine the marginal cost of Standard Flats using the Commission's current costing methods. If the revenue from a product does not recover its marginal costs, it is very likely being subsidized, for a greater share of institutional costs must be assigned to all products whose revenues are greater than their marginal costs, yet the product in question is not even recovering its marginal costs. Failure to recover marginal costs may not be an anti-competitive action that benefits the Postal Service, but it does distort the prices of mailers who compete using different products, where the different products make different contributions. Moreover, subsidization of some products may not be a stable market situation for the Postal Service, for it may engender entry to the extent that the market is free of entry barriers.[12] For these reasons, the Commission is right to recommend remediation when the cost coverage of a product falls below 100 percent.

C.   ACMA's Use of Rate and Cost Indices

ACMA makes several different arguments that the Commission's costing of Standard Flats is flawed. In support of these arguments, ACMA develops and then compares the trends of three different indices (rate, cost, and factor price indices) applied to Standard Letters and Standard Flats. These Reply Comments discuss the rate index and proposed cost index.

1.   ACMA's rate index

First, the rate index of the product is measured by the percentage increase in rates from the previous year:[13]

$$RI_t = \left(\frac{P_t}{P_{t-1}} - 1 \right)$$

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[12] "[C]ontestable prices cannot be below the associated marginal costs of production. Otherwise the last units produced would not be compensatory and a competitor could enter profitably by scaling back production of the underpriced good, provided he could still replicate the rest of the incumbents operations. Thus, our analysis is consistent in spirit with the standard conclusion that prices below marginal costs indicated the presence of some cross subsidization." See, Baumol, W., Panzar, J., and Willig, R., *Contestable Markets and the Theory of Industry Structure*, Harcourt, New York (1982) at 351-352.

[13] ACMA_graph_2011ACR.xlsx, rate index column in worksheets: Std letters, Std flats, Carrier-Route Std, Periodicals

Where RI$_t$ is the price index in period t, and (P$_t$/P$_{t-1}$ -1) is the annual percentage change in price. ACMA's measurement of the rate index is flawed however. The proper formula for a continuous rate index is:

$$\ln \left(\frac{P_t}{P_{t-1}} \right)$$

This formula avoids calculating different percentage changes depending on which year is the base year. However, the error is small. This is not necessarily the case with the cost index ACMA develops in its Comments–the unit cost index.

2.   ACMA's proposed cost index

ACMA proposed creating a new cost index using data available to the Commission to measure the Postal Service's increase in mail processing costs across fiscal years.[14]   The purpose of this index is to develop a measure of costs by cost pool, that are unaffected by volume mix changes brought about by price or worksharing changes. The Public Representative appreciates this effort but believes the index offered, even with modification, could not accomplish its purpose to identify a constant volume growth rate for the Postal Service having multiple input processing steps.

The AMCA has undertaken an innovate approach in analyzing historic cost trends for the various Postal Service mail products. In particular, AMCA has rightly suggested that just as it is common to employ an index for the purpose of comparing changes in price levels, likewise any product analysis should consider implementing an index of processing cost. Implementing a price index has allowed the Postal Service to compare how prices have changed for a particular mix of mail. A cost index would allow the Postal Service to compare changes in cost that are attributed only to increases in processing costs, here unit attributable costs.

The ideal Laspeyres cost index would be derived from the following formula:

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[14] Initial Comments of the American Catalog Mailers Association (ACMA), February 3, 2012 at 3, Appendix.A.

$$CI_2 = \frac{\sum_{i=1}^{I} V_{i,1} \times UC_{i,2}}{\sum_{i=1}^{I} V_{i,1} \times UC_{i,1}} \times 100$$

(1)

Where $V_{i,t}$ is the volume of mail passing through cost center i in period t. In this sense, CI_2 measures how the unit costs of processing a particular bundle of mail have changed. If CI_2=102 and CI_1=100 then it can be said that the price level of unit costs has increased by 2 percent from period 1 to period 2. Such a measure would provide the Commission, the Postal Service, and interested parties with a better understanding of the evolution of the costs of processing mail for the different products over time, and the Public Representative appreciates ACMA's effort to develop this measure.

It is important to recognize that the data requirements for calculating this cost index are nontrivial. The Postal Service would need to identify the cost centers, $i=1,…,I$ and associated volumes *by product* and the relevant per-unit attributable costs for each of the processing steps. This would be further complicated by the need to define the base year processing step volumes. For example, the postal price cap calculation defines base year volumes to be the previous year's volumes by product. However, given product and classification changes, defining this baseline may be a burdensome undertaking. Finally, the data used to measure volume at different mail functions differ from RPW volumes, so the sum of unit attributable costs across postal functions, by product, will not necessarily equal unit attributable product costs. If this is desired, a method of adjusting unit attributable product costs so their sum across cost functions is equal to total unit product attributable costs would need to be developed.

In recognition of the previously mentioned data difficulties, Dr. Robert W. Mitchell, on behalf of the ACMA, undertook a creative attempt to define a cost index by using measures already available from the Postal Service: the rate index and cost coverage. In particular, Dr. Mitchell proposes using an index of the ratio of a price index in period 2 over the cost coverage index of period 2, divided by the ratio of a price index in period 1 over the cost coverage index of period 1. The rate indices are built from the volume and price of each rate element of a product. The cost coverage indices are built from the volume and unit cost of mail for each major cost function for each rate element in a product. Dr. Mitchell derives the following formula:

$$\frac{\sum_{i=1}^{I} V_{i,1} \times R_{i,2}}{\sum_{i=1}^{I} V_{i,2} \times R_{i,2}} \times \frac{\sum V_{j,2} \times C_{j,2}}{\sum V_{j,1} \times C_{j,1}} \qquad\qquad (2)$$

This is the product of two terms. The second is the ratio of the total cost of producing in period two to the total cost of producing in period one. The first term is the inverse of a "volume index." This volume index, however, is a measure which holds the rate constant in period two, not the unit cost, and allows the volume to vary.

Dr. Mitchell incorrectly asserts that Eqn (2) represents a cost index. *Id. at 37.* In this argument, Dr. Mitchell refers to the following example where total costs increase 15 percent and the volume-index increases 5 percent. According to this method, the inherent cost of a product has then increased by 9.5 percent.[15] In essence, Dr. Mitchell claims to have identified the parameter of interest, the constant volume growth rate of unit costs, by dividing the growth rate of total costs by the growth rate of volume.

The Public Representative demonstrates in the Appendix, attached, that the proposed process does not identify a constant volume growth rate of unit costs. A modification of Dr. Mitchell's procedure would allow for the identification of the mail processing unit-cost growth rate for a firm with a single processing step. Unfortunately, it is not possible to use this methodology to identify a constant volume growth rate of unit costs for a firm with multiple input processing steps like the Postal Service. Because of these flaws, the Public Representative cautions the Commission against interpretation of the Graphs 1 through 8 provided in the ACMA comments. *Id.* at 5-18.

The Public Representative commends Dr. Mitchell and ACMA for considering the creation of a unit-cost index. The availability of a cost index would allow the Commission to better monitor the efforts undertaken by the Postal Service to reduce processing costs in the style of the analysis presented in the ACMA comments. The Commission, together with the Postal Service, should determine the feasibility of directly developing such an index, defined by Eqn (1). Just as a price index can provide insight into price changes keeping the volume mix, or demand conditions, constant, a cost

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[15] ACMA Comments at 37, (1.15/1.05=1.095).

coverage index would also keep volumes constant from period to period, and allow a comparison of changes in cost coverage only due to the cost changes of the functions the product passes through.   This would provide a comparison of cost coverage changes unaffected by changes in mail processing passthroughs.[16]

IV.   CONCLUSION

The Public Representative respectfully submits the foregoing Reply Comments.

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[16]   A change in a mail processing passthrough will alter mailer incentives to prepare mail in different combinations of presort level, entry level, and container level, which would change the mix of volume.

Appendix: ACMA's Proposed Cost Index (Section III.C.2, herein)

The AMCA is interested in identifying the growth rate of unit mail processing costs, a cost-index. Dr. Mitchell has claimed to identify the unit cost index from the following relationship

$$\frac{\left(\frac{RI}{CC}\right)_2}{\left(\frac{RI}{CC}\right)_1} = \frac{\frac{TC_2}{TC_1}}{\frac{VI_2}{VI_1}} \tag{3}$$

In words, that the ratio of the rate index to the cost coverage (the left-hand side) is equal to the ratio of total costs to the volume index (the right-hand side).

In providing an example to demonstrate how the calculation of this index would work, Dr. Mitchell provides a growth for total costs of 1.15 (15 percent growth rate) and a volume growth, or a volume index, of 1.05 (5 percent growth rate). Proceeding from the provided working example, Dr. Mitchell asserts that in dividing the growth of total cost ($1+g_{TC}$) by the growth of volume ($1+g_V$) then this yields the growth in unit mail processing costs ($1+g_{UC}$):

$$\frac{(1 + g_{TC})}{(1 + g_V)} = (1 + g_{UC}) \tag{4}$$

Unfortunately, Eqn (4) is incorrect. Consider the definition of total mail processing cost for a firm with only one processing input:

$$TC = V \times UC \tag{5}$$

For any continuous variable Y, the growth rate in Y is equivalent to[17]

$$g_Y = \frac{dY}{dt}\frac{1}{Y} \tag{6}$$

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[17] *Mathematics for Economists,* Carl P. Simon & Lawrence Blume, 1994, Chap. 25.

Taking the natural log of both sides of the total cost identity:

$$\ln(TC) = \ln(V) + \ln(UC) \tag{7}$$

Taking the derivative of both sides of this identity with respect to time:

$$\frac{d \ln(TC)}{dt} = \frac{d \ln(V)}{dt} + \frac{d \ln(UC)}{dt}$$

$$\frac{d \ln(TC)}{dt}\frac{1}{TC} = \frac{d \ln(V)}{dt}\frac{1}{V} + \frac{d \ln(UC)}{dt}\frac{1}{UC}$$

$$g_{TC} = g_V + g_{UC} \tag{8}$$

This is the correct relationship between the growth rate of total cost, volume, and unit costs.

Interestingly, although the ACMA derivation does not lead to the identification of the growth rate in unit costs in the manner suggested, identification is still possible. For notational ease, define $\frac{\left(\frac{RI}{CC}\right)_2}{\left(\frac{RI}{CC}\right)_1} = \alpha$. Recall that this is the left-hand side of Eqn (3), and note that α and g_{TC} are measurable from data already available from the Postal Service. Then, Eqn (3) still provides the ACMA with a way to identify the growth rate in volume, or the volume index as follows:

$$(1 + g_V) = \frac{(1 + g_{TC})}{\alpha}$$

In this formulation, the Public Representative emphasizes that the growth rate of volume is now identified. Then, in combination with Eqn (8), Dr. Mitchell has still provided a method to identify the growth rate of mail processing unit costs:

$$g_{UC} = g_{TC} - g_V \tag{9}$$

Ultimately, the above proof has only demonstrated the possibility of identification for a firm with only one processing step. Consider total cost identity with the introduction of several processing steps, using the notation of Dr. Mitchell:

$$TC_t = \sum_{j=1}^{J} V_{j,t} \times UC_{j,t} \tag{10}$$

Then, taking the natural log of both sides followed by the time derivative:

$$\ln(TC_t) = \ln \left(\sum_{j=1}^{J} V_{j,t} \times UC_{j,t} \right)$$

$$\frac{\ln(TC_t)}{dt} = \frac{\ln\left(\sum_{j=1}^{J} V_{j,t} \times UC_{j,t}\right)}{dt}$$

$$\frac{d\,TC_t}{dt}\frac{1}{TC_t} = \frac{d\sum_{j=1}^{J} V_{j,t} \times UC_{j,t}}{dt}\frac{1}{\sum_{j=1}^{J} V_{j,t} \times UC_{j,t}}$$

$$g_{TC} = g_{\sum_{j=1}^{J} V_{j,t} \times UC_{j,t}} \tag{11}$$

In other words, Eqn (11) says that the growth rate of total costs is equal to the growth rate of the entire sum $\sum_{j=1}^{J} V_{j,t} \times UC_{j,t}$. Here, the growth in unit costs cannot be separated from the growth in volume, so identification of a volume-constant unit-cost index is not possible.