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Measuring the Impacts of Low-Income Bill Affordability Programs: Distinguishing Cost-Effectiveness from Cost-Benefit Analysis.

In assessing the economic viability of a low-income bill affordability program, stakeholders frequently confuse the question of whether a program is "cost-beneficial" with the question of whether a program is "cost-effective." These two economic inquiries present distinctly different questions. The appropriate approach to use in assessing a bill affordability program is a cost-effectiveness analysis.

The Nature of "Cost-Effectiveness."

Cost-effectiveness analysis is used to evaluate options for achieving a set of defined objectives. A cost-effectiveness analysis is used to ensure the efficient use of resources in instances where benefits are difficult to monetarily value; when the information required is difficult to determine; or in any other cases where an attempt to make a precise monetary measurement of benefits would be tricky or open to considerable dispute.

While cost-effectiveness is related to cost-benefit analysis in that it is one of the four mechanisms for economic appraisal,[1] it differs from cost-benefit analysis in that cost-benefit analysis is used *only* to address those types of

[1] There are four types of economic appraisal: cost-minimization analysis; cost-utility analysis; cost-benefit analysis; and cost-effectiveness analysis.

alternatives where the outcomes can be measured in monetary terms.[2]

The purpose of cost-effectiveness analysis is to assess whether an intervention provides value for money. Cost-effectiveness analysis is used to determine which of a set of alternative activities achieves the greatest outcome for the costs expended.[3]

The Use of Cost-Effectiveness Analysis in Utility Regulation.

There are two sides to cost-effectiveness analysis. On the one hand, cost-effectiveness is used to identify the alternative that, for a given output level, minimizes the cost of achieving the output. On the other hand, cost-effectiveness is used to identify the alternative that, for a given cost, maximizes the level of output. From each perspective, the purpose of cost-effectiveness analysis is to ascertain which intervention (or program or measure, etc.) can achieve particular objectives at the lowest cost.[4]

The two sides of the analysis are incorporated into what is termed the "cost-effectiveness plane." This cost-effectiveness plane consists of a two-dimensional assessment as follows:

Less effective / more expensive	More effective / more expensive
Less effective / less expensive	More effective / less expensive

Both components of the analysis –the extent to which the objectives are achieved (i.e., more/less effective), on the one hand, and the cost of achieving those objectives on the other hand (i.e., more/less expensive)—are considered. The underlying assumption is that different alternative actions are associated with different costs as well as different results. By choosing those options with the least cost *for a given outcome*, society can use its resources most effectively.[5]

All of these observations relate to utility regulation.

- One objective of utility regulation is to provide least-cost service, the precise

[2] "Cost effectiveness analysis evaluates the costs of different means of achieving a pre-determined goal." Driesen (2005). *Is Cost-Benefit Analysis Neutral*, Syracuse University College of Law. A significant body of literature exists distinguishing a "cost-effectiveness" analysis from a cost-benefit analysis. See generally, Diana Fuguitt and Shanton Wilcox. *Cost-Benefit Analysis for Public Sector Decision Makers*, Quorum Books: Westport (CT) (1999).

[3] See e.g., Laurent Dobuzinskis, et al. (ed.). *Policy Analysis in Canada: The State of the Art*, Institute of Public Administration of Canada, University of Toronto Press: Toronto (2007).

[4] Joseph Wholey, et al. (eds.) *Handbook of Practical Program Evaluation, 3d ed*. (New York: John Wiley & Sons, 2010); Henry Levin and Patrick McEwan (eds.), *Cost-Effectiveness Analysis: Methods and Applications, 2d ed.* (Thousand Oaks (CA): Sage Publications, 2001).

[5] Cost-effectiveness analysis has always entailed a very practical application. Cost-effectiveness analysis was developed in the 1950s by the United States Department of Defense for assessing the demands of the various branches of the armed services for increasingly costly weapons systems with different levels of performance and overlapping missions. By the 1960s, it had become widely used for analyzing the efficiency of alternative programs outside of the military. Hitch and McKean, Economic Choice in Military Planning, at 217, in Managerial Economics and Operations Research: A Non-Mathematical Introduction, Edward Mansfield, ed. (New York: W.W. Norton, 1966).

objective which cost-effectiveness is designed to measure.

- One objective of utility regulation is to achieve the efficient delivery of utility service, the precise objective which cost-effectiveness is designed to measure.

- One objective of utility regulation is to operate in the most cost-efficient manner to accomplish the desired objectives, the precise objective which cost-effectiveness is designed to measure.

Spending less money to fall short of generating the desired outcome has never been a utility regulatory objective.[6] Cost-effectiveness is explicitly designed to measure costs taking into account the extent to which desired outcomes are achieved.

The Notion of Dollars of Savings Exceeding Dollars of Costs.

A cost-effectiveness analysis does not seek to determine whether the dollars of savings generated by a program exceed the dollars of cost for that program. That analysis is a cost-benefit analysis, an analysis that is inappropriate to an evaluation of low-income bill affordability initiatives. To apply a cost-benefit analysis to a low-income bill affordability program is to make an inappropriate choice of economic appraisal mechanisms.

- First, a cost-benefit analysis does not specify the public policy decision that has been made that utility service should be preserved where feasible.

- Second, a cost-benefit analysis would need to identify the entire range of benefits over time, a task that would be difficult, if not impossible, to do. For example, the reduced financing costs arising from the increased stability in revenue would be difficult to determine.
- Third, a cost-benefit analysis assumes that all financial and economic benefits can be identified, dollarized and measured. That assumption would be wrong. For example, it is difficult, if not impossible, to dollarize (and then to measure) the benefit to the utility of increased sales to customers whose service has not been disconnected for nonpayment.

  It is also difficult, if not impossible, to dollarize (and measure) the benefit to the utility of re-directing collection efforts away from customers who ***cannot*** afford to pay so that the utility can instead redeploy those collection activities toward customers who ***can*** afford to pay.

- Fourth, preparing a cost-benefit analysis would require the utility to identify the ***incremental*** costs of the bill affordability program. The incremental costs are limited to the costs that would not be incurred in the absence of the program. It

[6] Consider the farmer who is assessing the "business case" for how to keep the grass in his back pasture short. He identifies three alternatives: (1) a push mower (with a low capital investment but high labor costs); (2) a power mower (with a high capital investment but low labor costs); and (3) a herd of sheep. The first question the farmer asks is ***not*** "what is the cost?" The first question must be: is the grass being kept short?

is not at all clear that that dollar amount is a positive number.

These are merely illustrations of why it is inappropriate to apply a cost-benefit test in an analysis of bill affordability initiatives.

The Relationship between Cost-Effectiveness, Efficiency and Productivity.

One way to assess the effectiveness of a low-income program in accomplishing desired business outcomes (relative to the alternatives) involves examining the productivity of the program (i.e., the efficient use of company resources) in accomplishing the desired outcomes. Assessing productivity supplements the assessment of "effectiveness" from two different perspectives.

Addressing the productivity of utility efforts helps the utility assess whether there is a proper match between the tool being employed and the type of payment problem that is sought to be remedied. On the one hand, in other words, evaluating the productivity of the program (relative to its alternatives) helps to identify when inappropriately extensive tools are being employed by the utility. An involuntary disconnection of service, for example, is not a collection tool that addresses temporary inability-to-pay. The bill would be paid whether or not the disconnection was employed. In these circumstances, the disconnection serves no business purpose. It is not "productive," in that it generates no additional revenue.

On the other hand, evaluating productivity will help the company evaluate whether it is using a tool that is insufficient given the types of problem extent on the utility's system. Considering productivity, in other words, helps identify when tools are being employed that have no hope for success. A deferred payment plan, for example, is not a tool that addresses chronic inability-to-pay. If a customer could not pay his or her full bill in the past because of a lack of money, it lacks good sense to use a tool that would require that customer to pay the full bill ***plus*** some increment to retire arrears in the future. In these circumstances, the tool is likely to be unsuccessful. It is not "productive," in that it generates no additional revenue.

Productivity implies not only some absolute level of output (i.e., "effectiveness") but some level of output given a designated level of input as well.[7] In order to evaluate productivity, both the input and the output data are needed.

In addition to considering the impact of a low-income affordability program on individual collection activities, a productivity analysis should look at the overall collection effort as well. The level of collection effort is an important constraint on any evaluation of revenue collection. Two groups of customers, each of which have paid 80% of their bills for current usage, present substantially different pictures of cost and risk to

[7] If one were to compare the effectiveness of two district offices in collecting bills, the absolute amount of revenue collected would not be the exclusive performance factor to use in the comparison. Even assuming that both offices faced identical numbers of payment-troubled customers with identical payment problems, it would be invalid to say *ipso facto* that one office was more "productive" if it collected 10% more revenue. If the office which collects more had twice the staff, but collected only 10% more revenue, the revenue collection per staff member would be much lower. If the office that collected more had a substantially greater investment in equipment (e.g., auto-dialers), but collected only 10% more revenue, the revenue collection per dollar of capital investment would be much lower.

the utility if one group makes payments with little or no collection effort while the other makes the same dollar payment, but only after the utility exerts considerable collection interventions directed toward the customers.

Improvements in the productivity of collection activities can occur in either of two ways:

- The need for collection interventions can be reduced thus allowing an increased payment per each collection intervention performed; in the first instance, improvement can be seen even if total dollars collected remains the same (but the interventions needed to generate those dollars decreases); or

- The customer response to the collection activity can improve thus allowing an increased payment per each collection intervention performed. In this second instance, improvement can be seen if the total number of collections activities remains the same but the dollars generated by those activities increase.[8]

In essence, this evaluation process considers the effectiveness and efficiency of collection activities from two different but related perspectives. On the one hand, it examines how much revenue is generated by each collection intervention. On the other hand, it examines how many collection activities are associated with the generation of the revenue. An illustration of the first perspective, for example, might be the dollars generated per each notice of disconnection issued. An illustration of the second perspective would be the number of disconnection notices issued per each $1,000 collected. They are flipsides of the same question, a question of efficiency or productivity.

[8] Productivity is measured by the ratio: DC / CE, where "DC" = dollars collected; and "CE" = collection effort. In the first illustration, "CE" (the denominator) is reduced. In the second illustration, "DC" (the numerator) is increased.

An Additional Illustration of Where Cost-Benefit Analysis is Inappropriate for a Public Utility.

The notion that cost-benefit analysis may be inappropriate is not unique to a low-income bill affordability program. Another example of a practice which a public utility would not subject to a cost-benefit analysis would be worker safety. Reasonable utility management would not accept worker injury or death based on an economic analysis concluding that preventing the injury or death would cost the utility more than the benefits returned to the utility by protecting the worker.

Instead, as with an affordability program, the proper test to employ would be cost-effectiveness. Such an analysis would assess how to minimize the cost per unit of output (worker safety) and/or how to maximize the output per dollar of input.

Acceptability of Cost-Effectiveness Analysis in Public Policymaking.

Cost-effectiveness analysis is not only an "accepted" technique in public policymaking, it is the frequently the ***preferred*** technique for circumstances such as those presented by low-income inability-to-pay. For example, as the Treasury Board of Canada stated in its "Canadian Cost-Benefit Analysis Guide: Regulatory Proposals" in 2007:

> When benefits cannot be expressed in monetary values in a meaningful way, *a cost-effectiveness analysis ("CEA") should be carried out* to assist in making effective decisions. A CEA calculates cost-effectiveness ratios so that the most efficient option is chosen. In a sense, a CEA ensures technical efficiency in the process of achieving a desired outcome.

(emphasis added).

The Relationship between a Cost-Effectiveness and a "Business Case" Analysis.

Cost-effectiveness is generally tied to an assessment of whether a particular program initiative is supported by a "business case." For example, consider Public Service Company of Colorado's Pilot Energy Assistance Program ("PEAP"). One objective of the PEAP initiative was to generate positive benefits for Public Service and its ratepayers. In seeking to determine whether such benefits exist, the question was not whether the PEAP initiative produced a benefit-cost ratio of 1.0 or more, but rather whether a "business case" could be constructed for the implementation of the programs.

A business case is built on a test of cost-effectiveness, not a benefit-cost ratio.[9] Consider, for example, that no other collection activity is subjected to a benefit-cost test.[10] For example, PSCO does not seek to determine whether the activities of disconnecting service, or of issuing shutoff notices, or of entering into deferred payment agreements, or of providing levelized monthly budget billing produced cost savings that more than offset the costs of those activities. The appropriate "business case" test was instead whether the extent to which the objectives underlying each activity were achieved merit the costs of pursuing or implementing those activities.

Effectiveness as one Element of Cost-Effectiveness Evaluation.

For purposes of a cost-effectiveness analysis for a low-income bill affordability program, the

[9] ". . .many opponents of [cost-benefit analysis], defined as a procedure that seeks to monetize benefits, do not oppose cost effectiveness analysis. . .Cost effectiveness analysis evaluates the costs of different means of achieving a pre-determined goal." Driesen (2005). *Is Cost-Benefit Analysis Neutral*, Syracuse University College of Law. A significant body of literature exists distinguishing a "cost-effectiveness" analysis from a cost-benefit analysis. See generally, Stewart, A New Generation of Environmental Regulation, 29 *Cap.U.L.Rev.* 21, 41 (contrasting cost effectiveness analysis with cost-benefit analysis); Hahn et al., Empirical Analysis: Assessing Regulatory Impact Analysis: The Failure of Agencies to Comply with Executive Order 12866, 23 *Harv.J.L. & Pub.Pol'y* 859, 872-74 (2000) (cost effectiveness analysis does not involve monetization of benefits); Anderson et al, Regulatory Improvement Legislation: Risk Assessment, Cost-Benefit Analysis, and Judicial Review, 11 *Duke Ent'l L. & Pol.* 89, 93 (2000 – 2001) (cost effectiveness analysis is used instead of cost-benefit analysis for many applications in public health and medicine); Posner, Transfer Regulations and Cost-Effectiveness Analysis, 53 *Duke L.J.* 1067, 1069 (2003) (cost effectiveness analysis compares different means of achieving the same regulatory end).

[10] If this were not the case, then a utility would never seek to include the costs of collections in rates since the costs of the collection activity would be more than offset by the savings generated by the collection activity.

"desired objectives" of the low-income affordability program are two-fold:[11]

- To provide an uninterrupted supply of the products and services the utility seeks to sell; and
- To collect the revenue from those sales in a full and timely fashion.[12]

A cost-effectiveness assessment for a low-income program affordability program must consider the effectiveness of the program in accomplishing these articulated outcomes relative to the alternatives.

Any cost-effectiveness analysis of a low-income program affordability program must consider the effectiveness of the program in accomplishing the articulated outcomes. No matter what level of cost is being incurred, by the program or by the alternatives against which the program is being compared, to the extent that the business objectives are not being accomplished, a "business case" cannot be made for that activity. With this in mind, assessing the business case of a low-income program must first consider the extent to which, if at all, the identified outcomes are being accomplished.

Summary

For more information regarding the use of cost-effectiveness analysis in evaluating a low-income bill affordability program, or to obtain a copy of various program evaluations in which Colton has applied such an analysis to a utility program, please write:

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[11] Focusing on these business objectives is not to deny the social objectives of affordable water service. Consider, for example, the objective of promoting diversity in the workplace and diversity in corporate governance. There is a considerable body of literature that has identified the business benefits of pursuing such diversity. Fairfax (2003). The bottom line on board diversity: A cost-benefit analysis of the business rationales for diversity on corporate boards, 2005 *Wisconsin Law Review* 795, 829 (2005); see also, Military Leadership Diversity Commission (2010). *Business-Case Arguments for Diversity and Diversity Programs and Their Impact in the Workplace*, 2, Issue Paper #14, Military Leadership Diversity Commission: Arlington (VA). Recognizing and addressing these "business benefits" is not to deny the social benefits of diversity. One does not support the pursuit of workplace diversity, or diversity in corporate governance, *only* if an appropriate business case can be built for it.

[12] For purposes here, the objectives of a low-income affordability program are limited to those objectives that are exclusively related to the utility as a utility. Without endorsing the notion that any social function is beyond the purview of ratepayer dollars –utilities certainly spend money on such "social" functions as workplace safety, environmental protection (including clean air and water), and workplace diversity—for the purposes of the instant analysis, the social function of providing affordable rates because of the social benefits generated by affordability (e.g., housing, public health and safety, nutrition, business competitiveness) is set aside for the moment.

Fisher, Sheehan and Colton, Public Finance and General Economics (FSC) provides economic, financial and regulatory consulting. The areas in which *FSC* has worked include energy law and economics, fair housing, affordable housing development, local planning and zoning, energy efficiency planning, community economic development, poverty and telecommunications policy, regulatory economics, and public welfare policy.