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Data and theory, both, support conclusion that utility bills do not effectively communicate “price signals” to low-income customers

NOTE TO READERS

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Fisher, Sheehan & Colton
Public Finance and General Economics
34 Warwick Road, Belmont, MA 02478
(voice) 617-484-0597 *** (fax) 617-484-0594
(e-mail) roger@fsconline.com

Low-income customers do not respond to substantial price discounts by increasing their energy usage.

One clear impact of a low-income bill affordability program is the extent to which such a program improves the “price signals” delivered to inability-to-pay customers through utility rates.

As a general rule, utility bills represent an ineffective means to send price signals to low-income customers. Low-income customers, particularly customers with bill burdens exceeding a prescribed level, pay less than their entire bill. As a result, a low-income customer's inability-to-pay for utility service substantially distorts the price signal that consumer receives. When customers cannot afford to pay their utility bill bills, in other words, price signals are not effective.

The Empirical Results over Time

Concerns are frequently expressed that basing utility bills on a percentage of income, where the bill does not increase as usage increases, will result in customers wastefully increasing their consumption. Over the past 30 years, a number of studies have examined whether this result occurs in fact. A comprehensive national evaluation of low-income affordability programs undertaken in

2007 reported that such usage increases do *not* occur. That multi-state study reported:

Some of the evaluations that were reviewed analyzed the impact of the affordability programs on energy usage. . Energy affordability programs reduce the cost of using energy, and therefore program managers are concerned that they may result in increased in energy usage. *However, evaluation results. . . show that this is not an issue. Program evaluations find small and insignificant increases in energy usage, or sometimes even declines in energy usage.* (emphasis added)¹

Particularly for percentage of income programs, while program participants tend generally to have higher consumption than do program nonparticipants –this makes eminent sense since the low-use customers are far more likely to have affordable bills without the program and thus be nonparticipants—program participants do not systematically increase their consumption upon entering the program.

Applying Price Theory

The viability of sending a price signal assumes that the customer has the ability to *receive and to act upon* the signal.² If a cus-

¹ APPRISE, Inc. and Fisher Sheehan & Colton (2007). Ratepayer-Funded Low-Income Energy Programs: Performance and Possibilities: Final Report.

² From an economic theory perspective, it is easy to understand this result. From a price theory perspective, price signals “work” only if there is adequate information about price and quality. The

tomers has an ability to pay \$50 per month, in other words, the price signal sent to a customer by receiving a bill of \$75 rather than \$65 is negligible, if any signal exists at all. In contrast, the price signal received through a bill for \$49 rather than a bill for \$55 is more significant. The closer that a utility can tailor bills to reflect affordability, the more efficacious any price signal will be. A low-income discount program that reduces bills to an affordable level actually *improves* the price signaling of utility rates.

Again, without an affordable bill, any price signal is impeded in two ways.

- First, the price signal provided through the price of current consumption is only effective if a customer has the ability to receive and respond to that price signal. When a customer can afford to pay only a fraction of the bill with which to begin, the impact of the per-unit price becomes less meaningful.
- Second, the impact that the price of current consumption has on the total bill is diluted to the extent that there are substantial arrears wrapped into the *total* bill. Prices only send a “price signal” if the *current* bill and

inability-to-pay, and the resulting arrears, impedes this information process. By improving this information process, while maintaining the task of reflecting increases and decreases in a bill, the bill affordability program improves rather than distorts the price signal. See generally, R.Colton (1990). "Customer Consumption Patterns within an Income-Based Energy Assistance Program." 24 *Journal of Economic Issues* 1079.

the total bill are reasonably the same.

Given these two fundamental truths set forth in any elementary price theory, the extent to which an affordable bill program improves price signals can be examined. The discussion below will focus on data from electric utilities offering bill affordability programs in Pennsylvania and Colorado.

Empirical Data from Colorado and Pennsylvania

The data below presents data from the seven electric utilities offering affordable bills in Pennsylvania.³ The Table below shows the average bill for current consumption under standard residential rates; the affordable bill; and the “CAP credit” (i.e., the difference between the affordable bill and the bill at standard residential rates).

Program Year: 2013	Bill at Standard Rate (actual bill)	Affordable Bill (price signal received)	Difference Between Actual Bill and Bill at which Price Signal Re- ceived
Duquesne Light	\$1,267	\$924	\$343
Met Ed	\$1,452	\$684	\$768
PECO Ener- gy	\$1,393	\$828	\$565
Penelec	\$1,205	\$552	\$653
Penn Power	\$1,123	\$468	\$655
PPL Utilities	\$1,982	\$948	\$1,034
West Penn Power	\$1,356	\$1,020	\$336

³ Duquesne Light, Metropolitan Edison, PECO Energy, Pennsylvania Electric Company (Penelec), Penn Power Company, Pennsylvania Power and Light (PPL), and West Penn Power Company.

As can be seen, a change in the bill at standard residential rates would have no impact on sending a “price signal” to these inability-to-pay customers. The annual bills at standard residential rates are already hundreds of dollars away from being at a level where a change would send any reasonable price information to the program participants. The bills at standard rates range between 30% and 140% greater than the bill level which delivers an effective price signal. In contrast, with 90% (or more) of the bill under CAP actually being paid, any change in price (or consumption) that may affect the bill under the affordability program will have an impact on whether the bill is paid, or whether the bill remains unpaid. As a result, effective price signals are enhanced.

Carrying substantial arrears also impedes the price signal delivered by the price for current service. One Colorado utility program illustrates this impact. The low-income population of Public Service Company of Colorado (PSCO) brought an average of nearly \$350 of pre-existing arrears⁴ to the low-income bill affordability program. The bulk of those arrears came from participants with large (e.g., greater than \$1,000) pre-existing arrears. A full 60% of the pre-existing arrears were associated with accounts owing more than \$1,000, with more than half of that brought by accounts owing more than \$2,500.

⁴ This average is the average arrears spread over all customers, not the average spread over only the customers having arrears.

Even at the lowest level of arrears, however, (>\$0 to \$300), the average arrears that would have been attached to total bills was \$132. Changes in prices for current service, therefore, would have sent no “price signal” given this expansion of the total bill charged to consumers. A one percent increase in price for current service, in other words, would not result in a one percent increase in the total bill for service. Each one percent increase in price would instead be diluted to the extent that the account carried arrears.

Level of Pre-existing Arrears	Pct of Accounts	Pct of Dollars	Average Arrears
\$0 or less	36%	0%	\$0
> \$0 - \$300	39%	15%	\$132
> \$300 - \$500	9%	10%	\$388
> \$500 - \$1,000	8%	16%	\$695
> \$1,000 - \$2,500	6%	28%	\$1,578
> \$2,500	3%	32%	\$4,250
Total	100%	100%	\$347

In sum, arguments about the adverse impact of affordable bills on the “price signals” sent by utility bills are not well-founded. Not one single evaluation of an affordable bill program prepared within the past 30 years has found a systematic increase in consumption resulting from a bill affordability program. Rather than impeding price signals, entirely consistent with elementary price theory, affordable bill programs have been found to

improve the price signals embedded in utility rates.

Compare Levelized Budget Billing.

Despite the theoretical concern expressed by some utilities about a low-income rate affordability program distorting price signals, the reality is that a low-income rate affordability program improves rather than distorts the price signaling function of utility bills.

Quite aside from the fact that neither economic theory nor empirical evaluations support the concern that some utilities have expressed about how low-income discounts would “distort” price signals, these utilities tend not to express similar concerns with respect to other billing programs that primarily benefit customers other than low-income customers.

An Equal Payment Plan program does not provide substantive affordability benefits to low-income customers with high energy burdens. High energy burdens are calculated on an annual basis. No matter how a home energy burden is spread over a year, a burden of more than 6% will still be unaffordable. Equal Payment Plans are designed to help customers whose bills may be affordable on an annual basis, but whose monthly variability in the billing pushes any particular month into an unaffordable range for that month.

Consider the concerns expressed by one Canadian utility about a low-income bill affordability program. In contrast to those

low-income concerns, Manitoba Hydro did not express concern about whether, or how, its Levelized Budget Billing program distorts price signals.

Roughly 20% of the total Manitoba Hydro residential customer base was in the levelized budget billing program in 2009. Participation ranged from 90,000 to 100,000 residential customers.⁵ By its nature, Manitoba Hydro’s levelized budget billing was intended to cost-shift utility bills so customers do not see the full impact of their consumption decisions in their monthly bills.

As a result, by design, the Manitoba Hydro Levelized Payment Plan (LPP) distorts the “price signals” to residential customers, especially in the high cost months when consumption decisions would have the biggest impact on usage and bills. As the Table below shows, in the high cost months of January through March, between 65% and 90% of residential customers participating in the levelized budget billing plan are not billed the full cost of their monthly consumption.

	No. of LPP Participants	No. with Debit Balance	Pct with Debit Balance
January	89,057	78,297	88%
February	90,043	57,587	64%
March	90,422	58,159	64%
April	90,557	44,197	49%
May	90,505	13,013	14%
June	90,421	11,858	13%
July	90,189	23,435	26%
August /a/	4,619	45,891	99%

⁵ For administrative reasons, customers are removed from budget billing in the settlement month (August) and re-enrolled the following month.

	No. of LPP Participants	No. with Debit Balance	Pct with Debit Balance
September	83,625	23,685	28%
October	97,904	22,481	23%
November	99,729	17,836	18%
December	101,064	46,166	46%

Indeed, given an average residential bill of more than \$80, the budget billing customers are being billed somewhere between 30% and 75% less than their actual usage in those high cost months. Nonetheless, Manitoba Hydro does not express concern about any resulting distortion of price signals for these budget billing customers.

Summary

Despite the concerns raised by some utilities about whether providing price discounts to low-income customers would result in those customers systematically increasing their consumption, neither empirical results from studies of such programs over the past thirty years, nor the application of basic price theory, supports the legitimacy of these concerns. In contrast, empirical results have found that low-income customers do not increase their consumption. These results are entirely consistent with what price theory postulates would happen.

For more information regarding low-income rate affordability assistance, please write:

roger [at] fsconline.com

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.
