

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
PUBLIC UTILITIES COMMISSION

IN RE: PAWTUCKET WATER SUPPLY BOARD : DOCKET No. 4550
GENERAL RATE FILING :

**THE TOWN OF CUMBERLAND'S RESPONSES TO THE
2nd SET OF DATA REQUESTS FROM PAWTUCKET WATER SUPPLY BOARD**

Data Requests to David F. Russell, P.E.

2-1 Regarding Mr. Russell's testimony on Pgs. 8-17: Given Mr. Russell's testimony regarding the economic indicators cited in his testimony and their relationship to water sales, please provide a list of all treatises, technical books, periodicals, pamphlets or other writings relied upon by Mr. Russell in support of his testimony on the relationship of economic indicators to water sales.

RESPONSE:

To respond to this Information request I did a quick search on the internet for the types of publications sought in this information request. In about 10 minutes I came up with 3 articles/papers that directly address the relationship between water sales/demand and economic conditions/indicators. I have attached the first 2 pages for 2 of these, and for the third one listed, I have provided a quote. (Attachment PW-C 2-1.). The titles of each are listed below:

- Determinants of Residential Water Demand in Germany
- Declining Water Consumption, Part Two: The Big Picture
- Forecasting Urban Water Demand (AWWA publication, 2nd Edition, 2008)

The quote from the AWWA Publication is, "Business-cycle factors affect water use because fluctuations in industrial and commercial production translate into commensurate changes in water demand. Changes in personal income also influence water use because, in the jargon of economics, water is a "normal" good. Water consumption increases, other things being equal, when family income rises. Consumption is likely to drop if, for example, the primary breadwinner in the household is out of work." (Page 9 under the heading "Population, Employment, and Technology").

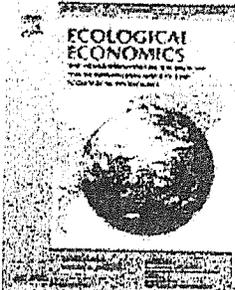
Also I refer you to any college textbook that contains sections or chapters on econometric forecasting. Also, see the responses to information request 1-6, 1-7 and 2-2 b. below relative to econometric forecasting. Lastly, I recently read an article in the AWWA Journal (February

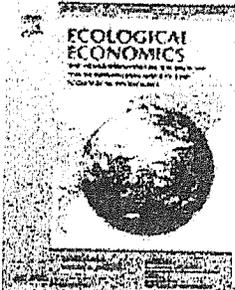
2015), whose authors are well respected in the water/utility industry, including Mary Ann Dickinson (CEO for the Alliance for Water Efficiency). One statement they made stood out in my mind relative to the issue of the relationship between economic conditions and water sales. To wit, “Even the slightest economic downturn can influence water use significantly. The recent recession affected many regions that had made financial planning decisions based on anticipated growth.” [emphasis added]

Prepared by David F. Russell, P.E.

Volume 68, Issue 6, 15 April 2009, Pages 1756–1769

Eco-efficiency: From technical optimisation to reflective sustainability analysis



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ANALYSIS

Determinants of residential water demand in Germany

- Joachim Schleich^{a,*,1}
- Thomas Hillenbrand^c

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Abstract

We econometrically analyze the impact of several economic, environmental and social determinants for the per capita demand for water in about 600 water supply areas in Germany. Besides prices, income and household size, we consider the effects of population age, the share of wells, housing patterns, precipitation and temperature. We also explore why current per capita residential water consumption in the new federal states is about 30% lower than in the old federal states. Since average cost pricing may cause an endogeneity problem, we apply instrumental-

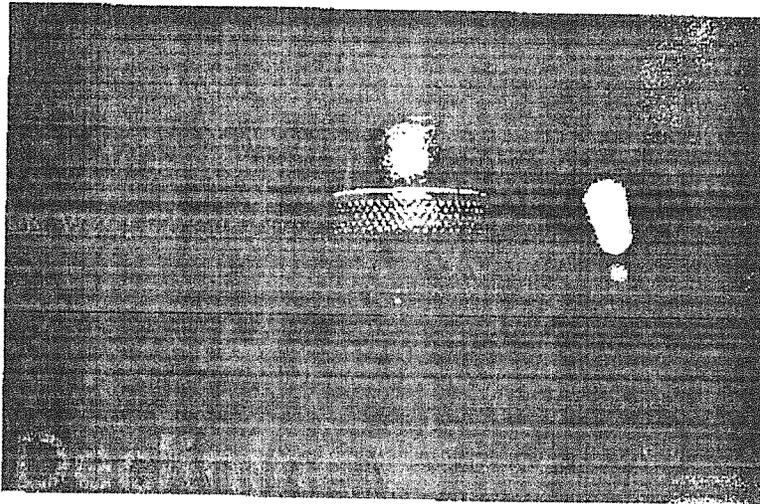
variable procedures in addition to single equation ordinary least squares, but find no evidence that prices are endogenous. Our estimation results suggest that the price elasticity of water demand in Germany is around -0.24 . The income elasticity is positive, decreases with higher income levels and is at least three times higher in the new federal states than in the old federal states. Current differences in prices and income levels explain about one third of the gap in residential water use between the two regions. Household size and the share of wells have a negative impact on per capita water demand, and water use increases with age. Finally, the findings provide some evidence that rainfall patterns rather than total rainfall affect water consumption, while temperature appears to have no impact at all. All outcomes are robust to a log-log and two types of semi-log specifications for the water demand function.

Keywords

- Residential water demand;
- Water resources management;
- Price elasticity;
- Income elasticity;
- Econometrics

Declining Water Consumption, Part Two: The Big Picture

MAY 25, 2012 / ERIN WEEKS / 2 COMMENTS



Guest author Peiffer Brandt is Chief Operating Officer at Raftelis Financial Consultants.

There is little doubt in the industry that per capita water consumption in the United States is declining. Many water utilities have faced financial challenges due to this national trend, which was highlighted in a 2011 analysis prepared by American Water Works Association. The most important question centers around whether the decline will continue, or whether usage will return to the levels of five or ten years ago. In order to answer that question it is necessary to identify the causes of the decline in consumption.

We believe there are four primary factors that are pushing down consumption:

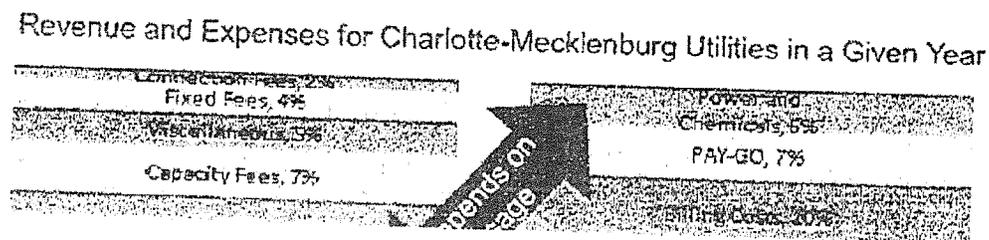
1. Acceptance of conservation ethos;

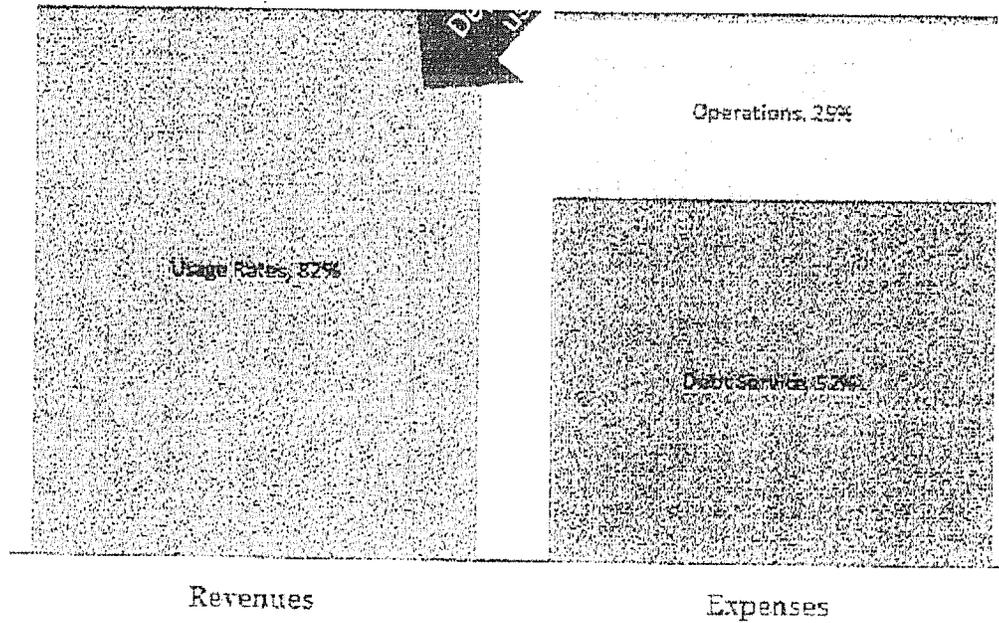
2. Prevalence of more water efficient fixtures and appliances;
3. Elasticity impact of increasing water rates; and
4. Economic downturn.

Conservation efforts are everywhere. Most cities collect recyclables. Children no longer leave the faucet running when brushing teeth. "Green" is viewed favorably by the majority of the population. This acceptance of conservation has evolved over the past 40 years.

Federal legislation (the Energy Policy Act of 1992, the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007) have led to requirements that mandate more and more efficient fixtures and appliances. Most homes have reached build-out with respect to fixtures and appliances, so there are not additional fixtures or appliances coming into homes, just replacements, which are likely more efficient than the devices they are replacing.

Water rates have been increasing faster than inflation, which is likely to continue (the 2010 AWWA/RFC Water and Wastewater Rate Survey found that between 1996 and 2010 rates had increased by 4.66%, while the CPI had increased by 2.49%). Regulatory requirements will continue to increase, necessitating additional expenditures by utilities. The federal government is likely to rely on regulation in the form of unfunded mandates, which will force utilities to address rising costs by raising rates. As demonstrated by the following graph, the vast majority of costs for a utility are fixed, so as consumption declines rates need to increase to ensure that enough revenue is recovered, which indicates that declining consumption is self-perpetuating.





Source: CMU Director Doug Bean's presentation to the Charlotte City Council on December 1, 2008.

The economy has also had an impact on water usage. As household budgets tighten, customers use less non-essential water. Commercial and industrial customers, particularly large water users, have aggressively identified opportunities to reduce usage to reduce costs. For example, Anheuser -Busch has set a goal of reducing worldwide water use by 30%. In Williamsburg, the company has reduced the volume of water needed to produce one barrel of beer from over 6 barrels to 2.3 barrels.

- 2-2 In Mr. Russell's resume he indicates he has "authored several papers published in professional journals, and has presented his work at many professional seminars and industry conferences."
- a. Please provide a list of all papers and seminar presentations.
 - b. Please state whether any of these papers and presentations addressed the relationship of economic indicators to water sales.
 - c. Please state whether any of these papers and presentations addressed the allocation of specific bond issues (or bond issues for "special benefit facilities") to fixed meter and service charges.

RESPONSE:

- a. See response to information request 1- 22 (and Attachment PW-C 1-22)
- b. Specifically with respect to water sales, I don't believe they do. However, a few, and one in particular does address the relationship or correlation between economic indicators and electricity sales. That one (top of page 2) is titled, "An Econometric Model and forecast of Jersey Central Power and Light Company's Residential Kwh sales, 1980 – 2000." My recollection of a paper I wrote nearly 35 years ago, is that there were very strong correlations between at least a few economic indicators and electric sales. This should not be surprising, since most goods and services that are relatively price elastic, do generally have significant correlations with income, employment and GDP to name a few. The one significant difference between water and most goods and services (and electricity to some degree), at least for residential water usage, is the fact that water is essential for health and sanitation. Thus, for many residential water customers a sizable portion of their usage is essential or non-discretionary, which makes that portion of their usage relatively insensitive to price (price inelastic) and relatively (not totally) insensitive to economic conditions. This does not mean that total water sales are not sensitive to economic conditions, because the discretionary portion of residential water use and most commercial and industrial water uses are sensitive to price and economic conditions. Furthermore, even the non-discretionary (essential) portion of residential water use has some sensitivity to price and economic conditions (it is not perfectly price inelastic).
- c. To the best of my recollection none. Again, I must point out that I am not proposing that any debt service costs be recovered through fixed charges added to fixed meter and service charges. See responses to information requests 1- 33 c. and 1-34.

Prepared by David F. Russell, P.E.

2-3 On page 17, lines 14-17, Mr. Russell's states that if "after the fact actual levels" of water sales are lower than the levels he forecasts, the "PWSB has the option of petitioning the Commission for additional relief." Please explain the basis for Mr. Russell's testimony and how the PWSB can petition the Commission for additional relief. Please include a reference to any and all sections of the Rhode Island General Laws and the Commission's Rules of Practice and Procedure that Mr. Russell relies on in support of his statement.

RESPONSE:

I assume PWSB could petition the Commission for interim rate relief, if net income was significantly lower than the level approved by the Commission, or if circumstances warrant they could petition for emergency rate relief. I believe that interim rate relief can be appropriate (subject to refund) in relatively moderate revenue shortfall situations. The reference for this type of rate relief is Rule 1.17 of the RIPUC. Emergency rate relief on the other hand, has a much higher threshold to satisfy, which essentially requires proof that the utility is in dire financial straits. The reference for this type of rate relief is R.I.G.L. Sec. 39-1-32. Additionally, as discussed in the response to PWSB/Cumb. 1- 36, as part of step increase reviews, subsequent to approval of a multi-year rate increase, PW could petition the Commission for modifications to the rate plan, if the projections envisioned with the initial approval are significantly different from realized results near the end of each year before the next step increase is put into effect.

Prepared by David F. Russell, P.E.

Town of Cumberland

2-4 Please provide a breakdown of the Town of Cumberland’s annual water sales to residential customers and annual water sales to non-residential customers from FY2010 to FY2015.

RESPONSE:

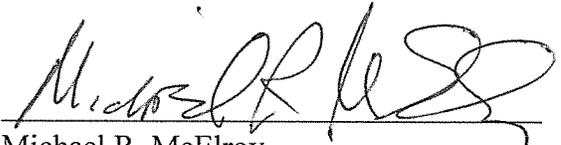
The table below illustrates the Cumberland Water Departments (CWD) consumption by residential and non-residential users. Data for FY-15 is not available at this time as the fourth quarter billing has not been closed out for the FY.

FY	Residential Consumption	Non-Residential Consumption
FY-10	527.44 MG	82.67 MG
FY-11	523 MG	110.53 MG
FY-12	526 MG	124.10 MG
FY-13	492 MG	113.34 MG
FY-14	509 MG	112.44 MG
FY-15	Not Available at this time	Not Available at this time

Prepared by Christopher Champi, Superintendent of Cumberland Water Department

CERTIFICATION

I hereby certify that on the 15th day of July, 2015, I sent a copy of the foregoing to the attached service list.


Michael R. McElroy

Cumberland/Pawtucket Water Supply Board 4550/Response 1