CHAPTER 2:
ASSESSING THE REVENUE RESILIENCE OF THE INDUSTRY’S
BUSINESS MODEL

TRENDS IN FINANCIAL PERFORMANCE

Introduction

The majority of water and wastewater utilities in North America are organized to be financially self-sufficient, such that revenues collected by the utility from its customers should cover all of the expenses incurred, without the need to obtain additional revenue from taxes, other enterprises, or other organizations. Utilities have significant control over setting rates, fees, penalties and various charges (sometimes pending regulatory approvals); in theory, they have financial autonomy. This rate setting autonomy does not directly translate to revenue autonomy. Financial performance is influenced by many more factors than rates and charges and is explored throughout various sections of this report. In fact, even before the United States experienced a major economic downturn, stories were beginning to appear on the fiscal challenges facing utilities. The term “gap” was often used in these accounts to describe the business status of the water utility industry with many policy analyses focusing on large aggregated estimations of capital needs or funding shortfalls (USEPA 2002).

This chapter analyzes how utilities across North America have fared financially over the last decade with a focus on the robustness of the utility business model in generating stable and adequate revenue streams. The analysis relies on multiple national, state, and individual utility-level data sets, compiled over a wide range of data sources. Almost all of the original data originated from the audited financial statements of utilities, and have been compiled by various agencies and organizations. Utilities self-reported financial data from their audited income statements in the biennial national American Water Works Association-Raftelis Financial Consultants, Inc. (AWWA-RFC) Water and Wastewater Rate Surveys since 2000.¹ Other national data was compiled from the Moody’s Municipal Financial Ratio Analysis database, which contains debt and other financial data, as well as credit rating and calculated financial metrics for utilities nationwide. These national data are analyzed to detect trends in utility revenues and expenses since 2000.

In order to analyze differences in trends across regions with differing regulatory, economic, and weather climates, separate historic data for hundreds of utilities from seven disparate states were also analyzed. The seven states are: California, Colorado, Georgia, North Carolina, Ohio, Texas, and Wisconsin. The original financial data were compiled by different agencies and organizations in slightly different ways and for different purposes in these states. Data sets were compiled and common measures identified that can be compared across states and

¹ The sample of utilities included in this national data set included a disproportionately greater percentage of larger water utilities than the actual national average. Therefore, trends detected from this national data set better represent trends observed by larger utilities than smaller ones.
across time to be analyzed in this chapter. The statewide data sets include a greater number of smaller water utilities than the national data sets.

Finally, annual audited financial statements for 26 partner utilities spread across the United States and Canada were collected and financial data extracted for ten years (FY2002 – FY2011) where available. A more thorough description of the data and methodologies used in analyses is included in the Background and Methodology section of this report.

Key Points

- The largest component of utility revenues comes from customer sales. Generally, variable revenues from a utility’s commodity charges comprise the largest portion of those sales.
- In the last 10 to 12 years, most utilities have experienced an overall growth in total operating revenues, with utilities generally collecting more revenues now than at any time in that period (not adjusting for inflation).
- On a national level and state level, the fastest rise in total operating revenues occurred in the years immediately preceding the 2008 economic downturn. After the economic downturn, revenues continued to rise for the majority of the utilities but at a much slower pace.

The Business Model Behind Utility Revenues

Utilities collect revenues from multiple sources, including charges to customers, fees, and grants (AWWA 2012). Water and wastewater utility revenues are divided into operating revenues and non-operating revenues. Operating revenues are revenues derived from the various operations of the water system, including revenues from the sale of water and discharge of wastewater for all customers; connection (tap) fees linked to actual installation costs (as opposed to system development charges to cover system capacity); customer fees and penalties assessed for account changes, disconnections and reconnections, late payments; ad valorem taxes; power generation sales; rents from water system property; and all other revenues that are incidental to water operations (AWWA 2012). Non-operating revenues are revenues that do not derive from the operations of the water system itself, including interest and dividends on investments; revenues from system development charges or capacity fees; rents from nonutility property; and provision of services to other organizations (AWWA 2012). Investor-owned utilities report their operating and non-operating revenues in annual reports to their shareholders, and local government-owned utilities typically report their financial performance in an audited Income Statement following guidance set by the Governmental Accounting Standards Board. All income statements contain data on utilities’ operating revenues, operating expenses (primarily expenses for operations and maintenance, plus depreciation and amortization), and non-operating revenues and expenses (capital expenditures and/or debt service payments).
In particular, sales to customers based on water use and wastewater discharge – revenues derived from the monthly water and wastewater charges including commodity (usage) charge revenues and revenues from the fixed monthly service charges – is the single most significant source of revenue for utilities. As shown in Figure 2.2, customer sales typically comprise over 90% of a utility’s total operating revenues, with the remainder being derived from fees, penalties, connection (tap) charges, rents, and power generation.
Customer sales can be divided into two general categories: fixed revenues that are not dependent on a customer’s water use or wastewater discharge, such as the revenues obtained from the monthly base charges, and variable revenues that are explicitly linked to the volume of water used or wastewater discharged by the customers, derived from the volumetric charges. The balance between fixed revenues and variable revenues is unique for each utility, based on rate structure design, pricing levels, and base charges, and on the water demand of the customer base.

Unfortunately, data on variable revenues and fixed revenues from customer sales are not included in most large sample datasets, but was available from data collected from individual utilities. However, many utilities on an individual level are just beginning to monitor this. These layers of utility revenues are illustrated in Figure 2.3 for two such utilities: Water District Number 1 of Johnson County, KS (WaterOne) and the Alameda County Water District, CA. Commodity charges accounted for 76% and 61% of total revenues for the two utilities, respectively.

**Figure 2.2 Revenues from customer sales as percent of total operating revenues in FY2011**
Table 2.1 shows a breakdown between variable and fixed revenue for a group of utilities from different regions of the country. In most cases, the majority of customer sales are obtained from the commodity charges. In fact, between 71% and 96% of the customer sales revenues collected by these nine utilities were obtained from the commodity charges. While these percentages are representative for many utilities in North America, particularly for large utilities, other utilities may have lower variable revenue percentages if they set high base charges and lower volumetric charges. The City of Durham, NC, demonstrates such a trend towards decreasing variability. At the beginning of Fiscal Year 2009, Durham nearly doubled its base charges and only slightly increased its volumetric rates. As a consequence, the proportion of single-family residential customer sales revenues that were obtained from the commodity charges fell from 82% to 71% between FY2008 and FY2009, as more of the revenue came from the base charges. The Charlotte-Mecklenburg Utilities Department (NC) also sought to increase the proportion of fixed revenues from customer sales by increasing the base charges for its customers in FY2012 and estimated in their budget projections that the variable revenues portion would drop from 95% to 84% in FY2012.
Table 2.1
Proportion of customer sales (base charges + commodity charges)
collected from commodity charges

<table>
<thead>
<tr>
<th>Utility</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012 budget estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda County Water District, CA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>88%</td>
</tr>
<tr>
<td>Charlotte-Mecklenburg Utilities, NC</td>
<td>95%</td>
<td>96%</td>
<td>95%</td>
<td></td>
<td></td>
<td>84%</td>
</tr>
<tr>
<td>Louisville, KY</td>
<td>80%</td>
<td>77%</td>
<td>78%</td>
<td>79%</td>
<td>77%</td>
<td></td>
</tr>
<tr>
<td>Mesa Consolidated Water District, CA</td>
<td>74%</td>
<td>76%</td>
<td>76%</td>
<td>75%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WaterOne (Johnson County), KS</td>
<td>80%</td>
<td>77%</td>
<td>73%</td>
<td>76%</td>
<td>78%</td>
<td></td>
</tr>
</tbody>
</table>

Utilities reporting proportions of revenues from single-family residential customers only**

| Cary, NC                                     | 91%  | 91%  | 90%  | 91%  | 92%  |                        |
| Durham, NC                                   | 82%  | 82%  | 71%  | 74%  | 72%  |                        |
| Raleigh, NC                                  | 76%  | 75%  | 75%  | 75%  | 78%  |                        |

Data Sources: * Reported by the utility. Revenues from all customers included. ** Billing records of all single-family residential customers analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill, and FY2011 results were estimated based on a partial year of records.

By nature, variable revenue is more vulnerable to fluctuations from year-to-year. For example, WaterOne reported “wetter than normal years” in FY2008 and FY2009 and lower than normal water use (14% and 18% less than in FY2007, respectively). During wet years, customers often use less water outdoors for lawn irrigation and other activities. For WaterOne, this resulted in a decline in variable revenue, despite the fact that volumetric rates increased. This illustrative example demonstrates the vulnerability of the largest component of customer sales (the commodity charges), which is the largest component of customer sales and operating revenues, which are the largest components of total revenues for the utility, to factors that may be beyond the control of the utility.

It is important to note two important factors that some utilities weigh heavily in recovering less operating revenue through the fixed charges. First, high fixed service charges can be regressive, as they result in higher unit costs for low-volume users, some of whom may be low-income customers. Second, higher fixed charges translate to lower commodity (usage) rates, which can reduce the conservation pricing signals associated with the commodity charges.

National Trends in Total Operating Revenues

As stated earlier, although a telling indicator of financial stability, this level of detail is not typically collected in financial surveys. As such, the following analysis looks at trends in operating revenues with the understanding that North American utilities have similar models to the previously highlighted examples. Moody’s rating agency evaluates thousands of utilities each year and has compiled financial and debt data for these utilities. Although the sample of rated utilities was much larger, a subset of these utilities (485) was analyzed to portray a “snapshot” of finance trends across all states over the last decade. The annual change in total operating revenues between years from 2004 to 2011 was computed for each utility.
Figure 2.4 shows these annual changes and serves to illustrate the “bumpiness” of the utility business model. Median operating revenues increased by 8% from 2005 to 2006 for the 485 utilities, a 2% increase from the previous year. Leading up to the 2008 economic downturn, however, the rate of increase to operating revenues dropped, with the median increase in operating revenues falling from 8% to 2% between 2005 and 2009. After the economic downturn, annual revenue increases continued to rise for the majority of the utilities but at a slightly slower pace. More telling is that 179 out of the 485 utilities (37%) witnessed a decrease in total operating revenues between 2008 and 2009.

Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Source: Moody’s Water and Sewer Municipal Financial Ratio Analysis. The cohort of 485 utilities is consistent across all years.

Figure 2.4 Annual change in total operating revenues among the same 485 utilities nationwide
Statewide Trends in Total Operating Revenues

Trends in total operation revenues were analyzed for larger samples of utilities over longer periods of time from data collected by state agencies. For this project, financial data for local government water and wastewater utilities were obtained from state agencies in California, Colorado, Georgia, North Carolina, Ohio, Texas, and Wisconsin. These seven states are geographically spread across the United States and reflect varied approaches to utility financial management, as explained in the Background and Methodology section. For example, unlike in the other states, local government utilities in the State of Wisconsin are financially regulated by a Public Service Commission and require state approval for rate increases. In other states, like North Carolina and Georgia, the majority of local government utilities only require the approval of a single local governing body to raise rates.

Figure 2.5 summarizes trends in revenues, particularly operating revenues, between Fiscal Years 2000 – 2012 for a cohort of 2,838 utilities in six states. Changes to the operating revenues from one year to the next were computed for the utilities with data in every single year of analysis for that state. For example, in California, the median change in total operating revenues among 946 special districts between FY2001 and FY2002 was + 4.5%. Between FY2009 and FY2010, the median change was an increase of 2.2% for the same cohort of 946 special districts.
Figure 2.5 Annual changes to revenues among 2,838 utilities in six states.

Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Revenues are: total operating revenues in CA, GA, NC, WI; gross revenues in OH; revenues that can pay for debt service in TX. The cohort of utilities in each state is consistent across all years. Data sources: California State Controller’s Office, Georgia Department of Community Affairs, North Carolina Local Government Commission (Office of the State Treasurer), Ohio Water Development Agency, Texas Water Development Board, Wisconsin Public Service Commission.
In all six states, the median change to operating revenues from one year to the next was greater than or equal to zero. This indicates that, from year-to-year in the past decade, operating revenues for at least half of the utilities increased, despite a downturn in the economy, severe weather fluctuations, and general declines to customer water use patterns. Since operating and capital costs increase for most utilities over time (see Trends in Utility Expenses following section on Trends in Utility Expenses), this trend is critical to utility financial health.

However, the rate of increase to utilities’ revenues has not been consistent over this time period. In particular, utilities’ revenue increases slowed down in the later years of the decade. Table 2.2 summarizes how the revenue increases changed over time by displaying the average of the median revenue increases for the cohorts of utilities for different periods of time in each state. Blocks of time are shaded to indicate the degree of revenue increases. (Time periods with no data are blacked-out in the table.) As shown in Table 2.2 and in Figure 2.5, the median rate of revenue increases at least halved after FY2008 for nearly all states. More than half of the utilities in California, Georgia, North Carolina, and Texas were enjoying at least a 4.5% annual growth to their revenues prior to FY2008, but saw their revenue increases slow down after FY2008.

### Table 2.2

<table>
<thead>
<tr>
<th>Fiscal Year:</th>
<th>‘01</th>
<th>‘02</th>
<th>‘03</th>
<th>‘04</th>
<th>‘05</th>
<th>‘06</th>
<th>‘07</th>
<th>‘08</th>
<th>‘09</th>
<th>‘10</th>
<th>‘11</th>
<th>‘12</th>
</tr>
</thead>
<tbody>
<tr>
<td>California (n=946)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.5%/year</td>
<td>2.2%/year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgia (n=333)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.2%</td>
<td>0.1%/year</td>
<td>3.9%/year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Carolina (n=306)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.6%/year</td>
<td>5.7%/year</td>
<td>2.8%/year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ohio (n=400)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.2%/year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Texas (n=286)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.7%/year</td>
<td>2.1%/year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wisconsin (n=567)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.1%/year</td>
<td>0.8%/year</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Examples of Utilities’ Trends in Total Operating Revenues

To bring the analysis down to an individual utility level, data from project utility partners was compiled and analyzed in Table 2.3. Nearly all of the 18 utilities, spread across the United States and Canada, had steadily increasing total operating revenues in the past ten years but there was a substantial variation in magnitude. For example, in FY2010, total operating revenues for Metro Water Service’s (in Nashville, Tennessee) were only 29% greater than they were in FY2002. On the other hand, Aqua America, Inc. and its subsidiaries nationwide managed to increase its annual operating revenues by 134% in the same time period. This resulted from a combination of steady rate increases in order to achieve an acceptable and Utilities Commission-approved rate of return for Aqua America’s shareholders, and increasing the number of customers by 60% in those ten years, which is a higher-than-normal growth rate for this past decade. By contrast, the Metro Water District’s customer base increased by only 7% between FY2006 and FY2011, and the utility raised rates only in the last two of those six years.
### Table 2.3
Trends in total operating revenues in 18 utilities, FY2002-FY2011

<table>
<thead>
<tr>
<th>Total Operating Revenues (FY2002 - FY2011)</th>
<th>Relative Gain or Loss in Total Operating Revenues from Previous Year (Fiscal Year)</th>
<th>Ratio of Total Operating Revenues in FY2011 to FY2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda County Water District, CA</td>
<td></td>
<td>1.46</td>
</tr>
<tr>
<td>Aqua America Inc.</td>
<td></td>
<td>2.34</td>
</tr>
<tr>
<td>Beaufort-Jasper Water &amp; Sewer Authority, SC</td>
<td></td>
<td>2.08</td>
</tr>
<tr>
<td>City of Calgary Water Services</td>
<td></td>
<td>1.59</td>
</tr>
<tr>
<td>Clayton County Water Authority, GA</td>
<td></td>
<td>1.28</td>
</tr>
<tr>
<td>Charlotte-Mecklenburg Utilities, NC</td>
<td></td>
<td>1.69</td>
</tr>
<tr>
<td>Davidson Water, Inc., NC</td>
<td></td>
<td>1.49</td>
</tr>
<tr>
<td>EPCOR Utilities Inc. (Edmonton)</td>
<td></td>
<td>1.29</td>
</tr>
<tr>
<td>Gwinnett County, GA</td>
<td></td>
<td>1.78</td>
</tr>
<tr>
<td>WaterOne (Johnson County), KS</td>
<td></td>
<td>1.96</td>
</tr>
<tr>
<td>Louisville, KY</td>
<td></td>
<td>1.31</td>
</tr>
<tr>
<td>Loveland, CO</td>
<td></td>
<td>1.04</td>
</tr>
<tr>
<td>Mesa Consolidated Water District, CA</td>
<td></td>
<td>1.36</td>
</tr>
<tr>
<td>Metropolitan Water District of Southern California</td>
<td></td>
<td>1.13</td>
</tr>
<tr>
<td>Nashville, TN</td>
<td></td>
<td>1.18</td>
</tr>
<tr>
<td>NEORSD, OH</td>
<td></td>
<td>1.23</td>
</tr>
<tr>
<td>San Antonio, TX</td>
<td></td>
<td>1.24</td>
</tr>
<tr>
<td>Yorba Linda, CA</td>
<td></td>
<td>1.38</td>
</tr>
</tbody>
</table>

Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Source: Income Statements and Comprehensive Annual Financial Reports. Bars reflect the percent change to total operating revenues from previous fiscal year. Dark bars are relative gains, light bars are relative losses. The y-axis scales are unique for each utility.

Many of the utilities witnessed at least one year of low or negative growth to their total operating revenues between FY2007 and FY2010. For example, Gwinnett County, GA’s total operating revenues decreased by 6% in FY2008, amidst otherwise steady increases between FY2002 and FY2011. In this case, Gwinnett County’s retail and wholesale customers used 18% less water in 2008 than they did in 2007, possibly as a result of a severe drought in combination with the economic downturn. However, this was not the only time that Gwinnett County’s customers used less water than in the previous year. Between 2002 and 2010, average daily demand dropped in four of the eight years, albeit at much smaller rates. Yet, Gwinnett County’s total operating revenues increased every year except in FY2008. Gwinnett County was able to achieve this result by steadily increasing its volumetric rates every year, more than compensating for the decreases in demand except in FY2008. In fact, Gwinnett County did not raise its base charges except in FY2010, demonstrating that a utility can overcome demand and customer declines by setting rates that take into account significant usage declines.

### Trends in Utility Expenses

Similar to revenues, all expenses of water and wastewater utilities are divided into operating expenses and non-operating expenses. Operating expenses are expenses that apply to
the provision of water utility services, including operation expenses (expenses incurred in operating and administering the water system and customer service), maintenance expenses for day-to-day repairs (excluding rehabilitation and replacement of current capital assets), depreciation expenses, and amortization expenses (AWWA 2012). Non-operating expenses are all other expenses that do not apply to the provision of water services, such as interest payments on debt, net loss on disposal of assets, lawsuit expenses, property taxes, etc. (AWWA 2012).

Key Points

- In general, operating expenses constitute the majority of all expenses for utilities, including the somewhat intangible cost of current asset depreciation and amortization.
- For most utilities, fixed costs by far exceed their variable costs for utilities, particularly when debt service payments and other capital expenditures are included in the calculation.
- Operation and maintenance expenses increased rapidly between 2004 and 2012, much like national trends in total operating revenues. The median annualized increase in operation and maintenance expenses dropped from +5.8% per year between 2004 and 2010 to +1.0% per year between 2010 and 2012.
- Prior to 2012, expenses were generally rising faster than operating revenues. Only recently (between 2010 and 2012) did the trend reverse.
- Sixteen percent of utilities had operating ratios less than 1.0 as reported in 2004, growing each subsequent survey year to 28% in 2010 before returning to 16% in 2012.
- The gap between revenues and expenses varies from state to state, painting a unique picture of trends in financial sufficiency in each state.

Utility Expenses Deconstructed

In general, operating expenses (which includes operating expenditures and depreciation and amortization of current assets) constitute the majority of all expenses for utilities, as shown in Figure 2.6. For the same utilities, the distribution of operating expenses to total expenses is more varied than the operating revenues to total revenues shown in Figure 2.1. Among 260 utilities in 45 states surveyed in the 2012 AWWA-RFC Water & Wastewater Rate Survey, operating expenses accounted for more than 80% of total expenses for 72% of utilities.
And although, they are the primary focus of this report, revenues only tell half of the business model’s story. Utilities, funding agencies, and credit rating agencies typically compare utilities’ revenues to expenses to assess the business strength of a utility. Different organizations use different metrics, but most are founded on the belief that utilities are a capital intensive business in which operating revenue is expected to cover both cash operating expenditures (labor, fuel, chemicals etc.) as well as capital related expenses (debt service or in some cases depreciation). For example, Fitch Ratings calculates the debt service coverage ratio as the division of “revenues available for debt service” by the debt service for the year (Fitch Ratings 2012). Revenues available for debt service include the operating revenues less cash expenditures (i.e.: operation expenses). This calculation is more intuitive and critical, since it tracks actual expenditures and assesses the utility’s ability to make its payments during the course of the year. However, not all utilities incur debt, and those that do may not be borrowing the full amount needed to rehabilitate or replace all of their assets. Instead, utilities usually employ a mix of borrowing and paying cash for capital infrastructure projects.

Just as it is important to understand the balance between stable “fixed” revenue streams and highly variable revenue streams, it is important to assess the same distinction on the expense side. Operation and maintenance expenses (operating expenses minus debt service payment and depreciation) include both short-term fixed and short-term variable costs. Short-term variable expenses are the costs that are directly related to the amount of water or wastewater processed, treated, delivered, and/or discharged. These include the costs for bulk water purchases, chemicals, power, and some other materials. Short-term fixed expenses are costs that do not vary in the short-term based on water demand. Fixed expenses include labor, billing and meter reading, transportation, insurance, rent, contracts, employee benefits, repair of equipment, and
most materials. Some of these costs may be variable in the long-term, but in the short-term, these
would not be immediately affected by daily, or even yearly, fluctuations to customer water use
demands.

For most utilities, fixed costs by far exceed their variable costs for utilities, particularly
when debt service payments and other capital expenditures are included in the calculation.
However it is difficult to quantitatively assess this trend because centralized data on variable and
fixed expenses are not readily available within large datasets and are difficult to readily extract
from Comprehensive Annual Financial Reports. Figure 2.7 displays the utility-calculated fixed
versus variable costs for two utilities in different regions of the country to demonstrate the
business challenge facing many utilities. Alameda County Water District’s costs are pulled from
their operating budget; no depreciation and capital expenses are included. Austin’s costs
represent their total anticipated expenses for FY2012, including capital costs. The costs and
expenses should not be compared between the utilities, but rather within. In both cases, more
than 87% of expenses were determined to be fixed. Conversely, fixed revenues from customer
sales account for only a small portion of total customer sales; less than 17% in these two
examples. The consequence of relying on variable revenues to pay what are primarily fixed
expenses at the utility, with customer demand fluctuations, are significant and are highlighted
and discussed throughout this report.

Figure 2.7 Fixed versus variable costs and revenues for two utilities
Figure 2.8 shows another representation of the nature of utility costs. As the figure shows, for the 126 utilities included in Moody’s database, a significant portion of utilities revenues are devoted to debt service payments each year; costs that are completely independent of the amount of water services provided to customers. Figure 2.8 highlights trends in a significant relatively fixed cost for many water utilities: debt. It is important to note that these trends are found in utilities rated by Moody’s, which are those that are issuing debt.

![Debt service as a percentage of total operating revenues for 126 water and combined utilities from 2003-2012](image)

**Figure 2.8 Debt service as a percentage of total operating revenues for 126 water and combined utilities from 2003-2012**

**National Trends in Operating Expenses, Relative to Operating Revenues**

Operation and maintenance expenses increased rapidly for the majority of utilities between 2006 and 2012, much like national trends in total operating revenues, according to the data collected by Moody’s rating agency. These expenses consistently rose for most of the utilities in the 517-utility sample throughout the decade, shown in Figure 2.9. However, the median annualized increase in operation and maintenance expenses fell from +4.2% per year between 2006 and 2012 to +2.8% per year between 2011 and 2012. Thus, while operation and maintenance expenses were increasing, the rate of increase fell after 2006. Conversely, average annual increases to total operating revenues remained generally higher than average annual increases to operation and maintenance expenses.
Figure 2.9 Total operating revenues and operation and maintenance expenses reported in 2012 compared to prior years among 517 utilities nationwide.

Figure 2.10 shows that the percentage of utilities with operation and maintenance expenses rising faster than operating revenues remained between 40 and 50 percent from 2004 to 2008. From 2009 to 2012, however, these percentages fell, indicating an overall increase in the number of utilities with operating revenues rising faster than operation and maintenance expenses. The percentage of utilities where operating revenues and operation and maintenance expenses rose at about the same rate remained fairly constant throughout the years--between 8% and 12%.
Comparing revenues to expenses by tracking an “operating ratio” provides additional insight into the robustness of a utilities business model. Different analysts and organizations may calculate operating ratio differently depending on available data and the purpose of the analysis. The most important and common variation in how this critical metric is calculated relates to whether depreciation is included as an operating expense in the calculation. When depreciation is included, this metric takes into consideration some aspect of a utility’s capital cost and the metric can be seen as cost recovery indicator. In other words, do operating charges generate enough revenue to cover both operation and maintenance expenses, as well as the cost of replacing current capital assets? When depreciation figures were readily available, they were incorporated into our operating ratio calculations. However, depreciation figures were not available in all of the data sets analyzed. If the ratio of total operating revenues divided by operation and maintenance expenses alone is used (not including depreciation and amortization), the metric is labeled as “non-capital operating ratio.”

The non-capital operating ratio shows whether a utility collected sufficient operating revenues (mostly customer sales charges) to pay for day-to-day operations and maintenance expenses alone. In other words, did the utility collect enough revenue from customer charges to pay its bills to run the system, excluding all considerations of capital costs? Of importance to note: neither of these ratios includes debt service or cash payments for capital projects. Figure 2.11 shows trends in non-operating ratios for a cohort of 383 utilities nationwide. Consistently over 90% of these utilities have been collecting enough revenues to cover their non-capital operating expenses.
Figure 2.11 Non-capital operating ratios for the same 383 utilities nationwide

Figure 2.12 displays the range of operating ratios (including capital expenses) for a national group of utilities that has some, but not complete, overlap with those included in Figure 2.11. Sixteen percent of utilities had operating ratios less than 1.0 as reported in 2004, growing each subsequent survey year to 28% in 2010 before returning to 16% in 2012. These utilities, while mostly able to recover their operation and maintenance expenses through operating revenues, did not collect sufficient operating revenues to also cover their depreciation expenses.

While the median ratios always remained above 1.0, they decreased every survey year between 2004 and 2010, before going up in 2012. In 2004, the median operating ratio was 1.17, indicating that half of the utilities collected enough operating revenues to pay for more than 117% of O&M and depreciation expenses. However, by 2010, the median operating ratio was 1.12. Additionally, all ranges of shifted downwards between 2006 and 2010. Trends in operating ratios began to shift upward between 2010 and 2012. In fact, more utilities had higher ratios in 2012 than in any of the other survey years.
Statewide Trends in Operating Expenses, Relative to Operating Revenues

Expanding the analysis to include larger samples of utilities using data from six states emphasizes the magnitude of the decline in financial stability towards the end of the decade and the partial recovery after 2010. The analysis for Ohio, Texas, and Wisconsin includes operation and maintenance expenses only (no depreciation), while the analysis for California, Georgia, and North Carolina include total operating expenses. Differences in the availability of certain expenses data in each state account for the two types of comparisons. The analysis focused on utilities common to every reporting year; the utility sample size for total operating revenue data is reported within each figure.

The utilities’ operating revenues are compared to their operating expenses or operation and maintenance expenses by computing their operating ratios or non-capital operating ratios, respectively. Figures 2.13 and 2.14 track the median and range of the sample of utilities with data in every single year of analysis for that state. For example, the same 946 utilities in California were analyzed for every fiscal year between 2001 and 2010, revealing trends of changing ratios over time throughout the state.

The differences in the two figures demonstrate some variability in financial performance of utilities in different states and may reflect differences in utility governance. As expected, non-capital operating ratios in OH, TX, and WI (Figure 2.14) are generally greater than operating ratios in CA, GA, and NC (Figure 2.13), since depreciation is not included in the analysis for non-capital operating ratios.
Figure 2.13 Trends in operating ratios among a cohort of 1,596 utilities in CA, GA, and NC

Figure 2.14 Trends in non-capital operating ratios among a cohort of 1,236 utilities in OH, TX, and WI
California had the lowest operating ratios, and is the only state where the median operating ratio was below 1.0. Between FY2001 – FY2010, more than half of the 946 California special districts in this analysis had greater operating expenses, including depreciation, than operating revenues, also shown in Figure 2.5. Ironically, California utilities also saw some of the largest increases in total operating revenues, as shown in Figure 2.5, Annual changes to revenues among 2,838 utilities in six states.

This confirms the earlier observation that operating expenses have grown at a faster rate than operating revenues in California. Georgia’s and North Carolina’s medians hovered just above 1.0.

The three states with data on non-capital operating ratios, in Figure 2.14, consistently had median ratios greater than 1.0. In fact, fewer than 10% of utilities in Ohio and Texas in any year of analysis had lower operating revenues than operation and maintenance expenses, shown in Figure 2.18. This may not be reflective of the utilities throughout those two states, however. The ratios computed in Ohio and Texas were for utilities that had outstanding loans with the Ohio Water Development Agency and the Texas Water Development Board, respectively. These utilities have their financial data reviewed, analyzed and monitored by these two agencies, who work to ensure that the utilities are in strong financial position to pay back their outstanding debts. Hence, there is potential for selection bias in this analysis for these two states, and the utilities included in this analysis may not be representative of all other utilities in Ohio and Texas that do not have this additional factor influencing their financial performance.

By contrast, the ratios computed in Wisconsin were for all public water utilities, which are regulated by the Wisconsin Public Service Commission. This agency, too, reviews, analyzes, and monitors the financial performance of utilities under its purview. The sample of utilities analyzed for Wisconsin is much larger in size than in Ohio and Texas, and better represent the conditions throughout the state. In Wisconsin, between 12% and 26% of utilities, in any given fiscal year, had lower operating revenues than operation and maintenance expenses, as shown in Figure 2.16. Under this type of situation, these utilities would have to use their reserves, transfers, and/or non-operating revenues to fill the gap between day-to-day operations and maintenance expenses and their operating revenues, leaving little to no revenue to cover capital expenses.

The trends in the values of ratios in Figures 2.13 and 2.14, and the percentages of utilities with ratios lower than 1.0 shown in Figures 2.15 and 2.16 indicate that utilities in several states across the country experienced financial difficulties from FY2008 to FY2010, with some continuing into FY2012. In those years, operating ratios and non-capital operating ratios declined in general in CA, NC, TX, and WI, and were low in some of these years for GA and OH. However, the financial performance of utilities in those years was not significantly worse than in prior years. In CA, NC, and WI – the three states with longer time series of data – the financial performance of utilities between FY2008 and FY2010 was similar to the financial performance of the same utilities between FY2002 and FY2004. Thus, although utilities in geographically disperse areas and under different governance structures across the country experienced lower operating ratios and additional strains on finances towards the end of the decade, these difficulties were similar to those experienced in the beginning of the decade.
Figure 2.15 Percent of utilities with operating expenses exceeding operating revenues.

Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. The cohort of utilities in each state is consistent across all years. Data sources: California State Controller’s Office, Georgia Department of Community Affairs, and North Carolina Local Government Commission (Office of the State Treasurer).

Figure 2.16 Percent of utilities with operation and maintenance expenses exceeding operating revenues.

Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. The cohort of utilities in each state is consistent across all years. Data sources: Ohio Water Development Agency, Texas Water Development Board, Wisconsin Public Service Commission.
Trends in Debt and Debt Service Coverage

Another approach to studying the balance between revenue and costs is to study debt and the amount of cushion utilities that debt-incurring utilities have for covering the repayment of that debt. Figures 2.17 and 2.18, below indicate that utilities are taking on more debt than they have in previous years. Figure 2.17 shows a fairly steady increase in the amount of long term debt per utility from 2003 to 2012 with a larger spread of debt within the middle fifty percent of utilities.

Contrary to trends in long-term debt, national trends in debt service coverage ratios have not risen in a linear fashion. Moody’s calculated the total annual debt service coverage by dividing net revenues by the total annual debt service, including senior and subordinate lien obligations. From 2003 to 2012, median debt service coverage ratios tended to fluctuate between 1.5 and 2.0 for 126 nationwide utilities (Figure 2.18). These ratios dipped significantly from 2008 to 2009, possibly due to the economic recession. While median debt service coverage ratios have been recovering since then, the spread of these ratios among the middle 50% of utilities has decreased.

Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.
Data source: Moody's rating agency. The same group of utilities is used each year, and only utilities with debt data for all ten years were used.

Figure 2.17 Long-term debt for 192 water and combined utilities from 2003-2012

Contrary to trends in long-term debt, national trends in debt service coverage ratios have not risen in a linear fashion. Moody’s calculated the total annual debt service coverage by dividing net revenues by the total annual debt service, including senior and subordinate lien obligations. From 2003 to 2012, median debt service coverage ratios tended to fluctuate between 1.5 and 2.0 for 126 nationwide utilities (Figure 2.18). These ratios dipped significantly from 2008 to 2009, possibly due to the economic recession. While median debt service coverage ratios have been recovering since then, the spread of these ratios among the middle 50% of utilities has decreased.
How does this influence utilities’ access to the debt market? Figure 2.19 shows a very clear trend of decreasing trend in ratios with credit rating. Out of 18 Aaa rated utilities, the median ratio was 3.6 (with the 80th percentile spanning from 1.3 to 7.3). Out of 50 Aa1 rated utilities, the median ratio dropped to 2.3. Median ratios for A1 rated utilities dropped further to 1.9.

Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data source: Moody’s rating agency. The same group of utilities is used each year, and only utilities with debt data available for all ten years were used.
Figure 2.19 Debt service coverage ratio for 673 water and combined utilities by most recent credit rating

References


PRICING TRENDS AND FINANCIAL RESILIENCE

Introduction

Selecting appropriate rates and rate structures to charge for water and wastewater service is a crucial step in helping a utility pursue not only financial health, but environmental and customer service goals as well. At the most basic level, rates and fees affect a utility’s ability to
generate the revenue necessary to cover its operating costs and capital needs. Rates determine the amount of income that will be generated for every unit of service provided but, by influencing customer demand, they are also used by utilities as a signal for customers to use water wisely. Rate levels and rate structures are frequently used as a tool to manage customer demand and delay the purchase of expensive capital assets (e.g.: a new water treatment plant) or encourage environmentally responsible use of valuable water resources. Rate structures influence the balance between the fixed and variable charges on a customer’s bill, which influences a utility’s revenue vulnerability to customer demand fluctuations over time. Water and wastewater rates also have important implications for the affordability of water service. High rates can be particularly problematic for low-income customers, whose water and wastewater bills represent a comparatively higher portion of their monthly expenditures.

The fact that utilities must alter rates over time to account for increasing costs of doing business and for changing capital needs further stresses the importance of well-informed rate setting decisions on utility performance. Rate increases can be politically challenging, and many utilities therefore face pressure to delay raising their charges for service for as long as possible. Nevertheless, many utilities have good reasons to increase rates on a regular basis to meet increased revenue needs. Bond rating agencies view a history of consistent rate increases as one criterion for determining a utility’s ability to repay its debts (Fitch Ratings 2011). No doubt, utilities balance many objectives when setting rates (as is reflected in this analysis).

The important role of rates and rate increases in affecting utility revenues makes analyses of rates data a valuable tool for discussing revenue resiliency. Using historic rates data from the biennial AWWA-RFC National Water and Wastewater Rates Surveys, and from annual and biennial rates surveys conducted in California, Georgia, North Carolina, Ohio, Texas, and Wisconsin, the following chapter highlights national and statewide trends in water and wastewater rates and rate adjustments, in the context of financial stability. These historic rates are also compared with the most recent utility credit rating data, obtained from Moody’s rating agency, to analyze the relationship between ratings and rates. The national and state surveys focused primarily on local government-owned utilities, which provide water service to more than 80% of the community water system-served population in each of those states (except for Ohio, where only 56% of the population is served by local government water systems) (USEPA 2011). Although investor-owned utilities were also partially sampled in the AWWA-RFC, North Carolina, and Georgia rates surveys, they represent a small number of the utilities in the analyzed samples. As such, the analyses discussed in this chapter should be considered to reflect pricing trends primarily among local government-owned utilities in the United States. The analysis focuses on trends in rate adjustment frequency and the extent of rate adjustments across regions, over time, and at different consumption levels. It analyzes the trends around fixed versus variable charges and explores what this means for revenue resiliency. The section concludes with a brief look into the relationship between rates and revenue.

Key Points

- Larger utilities across the country adjusted water rates fairly frequently over the last ten years at levels that outstripped inflation.
- Although most utilities have been frequently raising rates, the extent of the rate increases varies widely.
• Rate modification practices and trends varied significantly between some states. The largest outlier of the group was Wisconsin, a state where local government utilities are regulated by the Public Service Commission.
• Smaller and regular rate increases are associated with larger cumulative rate increases than larger, infrequent rate increases.
• Frequent rate increases are also associated with higher credit ratings.
• There are no clear indications that utilities that raised rates more or less frequently fared any better than the others when looking at trends in non-capital operating ratios. This indicates that there are a series of other factors influencing financial sufficiency than rates alone.
• Though the exact size of the cumulative rate increases over time varied from state to state, most utilities increased rates at a pace slightly faster than CPI inflation, particularly after the financial crisis. In some states, however, there were also many utilities whose rates failed to keep pace with inflation.
• There is significant variability of bill increases between the middle 50% of utilities for each state.
• Trends across the country, and in some states, show that water utilities are increasing charges for higher levels of consumption faster than at lower levels of consumption.
• One way to examine the balance between base charges and volumetric rates is to compare base charges as a percent of the total bill at various levels of consumption. As with other trends, these trends vary across states, reflecting regional differences in rate structure objectives between regions.
• Twice as many utilities (in NC, GA, and WI) decreased the base charge portion of their water bills than those that increased the base charge portion, although the extent of the adjustments varied widely.
• Many utilities have seen revenue generation track behind, in some cases significantly, the percentage they have increased their customers’ rates.

Frequency of Rate Changes

The frequency with which utilities choose to increase their rates can have important implications for affordability and financial health. Utilities that increase rates relatively infrequently may need to raise rates by a greater amount during those years when they do increase their rates. Moreover, those that raise rates on a consistent basis may have cumulative rate increases that are often higher over time than those that raise rates infrequently. Analyzing data from six states and across the United States sheds significant light on many of these trends.

Data for 320 utilities across all 50 states and the District of Columbia, plus two utilities in Canada, from the biennial AWWA-RFC Water and Wastewater Rates Surveys reveal that water utilities across the United States frequently adjusted rates between 2000 and 2012. Figure 2.20 shows that between consecutive biennial surveys, more than two-thirds of utilities adjusted their water rates, with that percentage increasing to approximately 80 percent of utilities between 2006 and 2012. The majority of rate adjustments at the 10 ccf/month level were increases. Water rate decreases are uncommon, but did occur. During the economic recession post-2008 when local-level political pressure to avoid rate increases may have intensified for many communities, rate increases actually became more frequent among the utilities.
Figure 2.20 Utilities changing water rates, 2000 – 2012 (n=318 utilities nationwide)

Figure 2.21 compares the frequency of rate increases for 58 utilities in 28 states that responded to the AWWA-RFC surveys every survey year between 2004 and 2012. Two-thirds of the 58 utilities adjusted their water rates between every survey period. In other words, these utilities adjusted their rates at least every other year from 2004 to 2012. The remaining 34% of the utilities adjusted their rates at least twice in those years. None of the utilities in this cohort kept their water rates unchanged (or even changed only once) between 2004 and 2012. The 58 utilities tend to be larger than most of water utilities across the country, with a median number of connections exceeding 65,000, and may not reflect the challenges facing smaller water utilities, both in terms of reduced resources to analyze rates every year and more direct political pressure from the local governing body and customers against raising rates.
In order to study the regional differences in rate increases, historic rates information collected in statewide rates surveys from 3,102 utilities in GA, OH, NC, TX, and WI were compared. These surveys include a large number of smaller utilities and they show wide regional disparities in how frequently utilities raised rates since 2000. The percent of utilities changing rates from the previous year, by state, is shown in Figure 2.22. The percentages remain fairly consistent across the years within each state except in Ohio, even following the economic downturn. In fact, just as seen in the national trends, the incidence of rate changes slightly increased between 2008 and 2011 before dropping in 2012. On the other hand, the percentages varied widely among the states. In Georgia, North Carolina, and Texas, approximately 50% to 65% of utilities changed rates in any given year. Alternatively, in Wisconsin, fewer than 30% of utilities changed rates in any given year between 2000 and 2012, much lower than in all of the other states. This may be explained by the fact that in Wisconsin, unlike in the other five states, government-owned water utilities are financially regulated by the state’s Public Service Commission and must request state approval for rate increases in addition to the approval of their governing boards. This approval process in many cases requires additional resources and time that most likely influences the willingness to make frequent adjustments (see Section on Economic Regulation in Chapter 3).
Figure 2.23 tracks how frequently a cohort of 1,966 utilities in the five states with rates data collected for every year of the study changed rates in five consecutive years towards the end of the decade. The vast majority of utilities in all states raised rates at least once in the five year period, with most utilities adjusting rates approximately every other year. The distribution of rate adjustments varied significantly by state. For example, 42% of 393 North Carolina utilities changed rates nearly every year, but only 5% of 574 Wisconsin utilities did the same. In fact, 29% of Wisconsin’s utilities did not change rates at all between 2008 and 2012, far exceeding equivalent proportions in the four other states. Differing regulatory environments with respect to rate increases likely explain some of this variation. While local governments in Wisconsin are regulated by the Public Service Commission, local government in North Carolina and the other states are only regulated by their governing boards.
Figure 2.23 Frequency of rate adjustments in 5 consecutive years among 1,966 utilities in five states

Similarly, Figure 2.24 shows the relationship between the frequency of annual rate increases from 2006 to 2010 and credit rating. While the sample size of utilities varies (and is relatively small) with each credit rating and should be taken into account when assessing this figure, some trends can be discerned from the data. Of the utilities with credit ratings A1 and A2, for example, around 20% of these never changed their rates in the four year timespan. Utilities with higher credit ratings (although a relatively small group) had much larger percentages of utilities that increased rates occasionally or annually.
Figure 2.24 Frequency of rate increases from 2006-2010 among 7 states

Degree of Rate Changes

Rate changes are crucial for a utility’s financial health in order to keep revenues consistent with rising costs, described in the “Trends in Utility Finance” section. And while there are a myriad of drivers behind rate increases, such as customer changes, cost increases, financial policy adjustments, the following analysis focuses on general trends. Analyses of historical rate adjustments in six states and in the nationwide AWWA-RFC rates dataset show great variation in trends across utilities between 2000 and 2012. In the following analyses, changes to the monthly-equivalent total (either water or water/wastewater for combined utilities) bill at one consumption point are computed between years to determine the rate change degree for each utility. Although utilities are frequently raising rates, the extent of the rate increases varies widely.
Figure 2.25 shows the median and interquartile range (middle 50%) of biennial rate modifications of subsamples of 326 utilities in 50 states, District of Columbia, and 3 utilities in Canada as percent increases in the total monthly bill for 10 ccf between survey years from 2000 to 2012. The median rate changes fluctuated between 5% and 15% rate increases between rate surveys during this time, with the interquartile ranging between 0% and 23% between surveys. This indicates that while some utilities did not raise rates (or, in fact, lowered them), some utilities were able to secure more than 20% rate increases in two years’ time. The values of rate increases were highest between 2006 and 2012, during the economic recession, coinciding also with a period of increased frequency of rate increases among utilities nationwide. Interestingly, during those years, water utilities raised rates more frequently and at greater levels than in previous years possibly to compensate for recession-driven sale decreases.

Figure 2.25 Biennial nationwide rate modifications, 2000–2012 (n=329 utilities)

Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Source: The national biennial AWWA-RFC Water and Wastewater Rate Surveys. The sample of utilities varies every two years and reflects only the utilities that were surveyed in both years.
Figure 2.26 shows the annualized increases to the total monthly bill for 10 ccf of consumption for the utilities nationwide that provided rates data in every biennial survey year between 2004 and 2012. “Annualized” rate increases are computed by dividing the two-year rate increase by 2 years. Tracking how rate increases varied over time for this cohort of utilities provides a more accurate idea of how utilities changed their rate increases between 2004 and 2012 because the same utilities are compared. The results match those shown in Figure 2.25. The utilities’ rate increases rose between 2006 and 2010, and then dropped in the final two years. The median annualized rate increases ranged from 3% to 7% per year for this cohort, although individual utility annualized rate changes were as high as 100%. The percentage of utilities in this cohort that lowered rates within 2-year periods declined steadily over time. Compared to the annualized inflation rate of the Consumer Price Index (CPI), the utilities’ rates rose much faster, on average, than the price of consumer goods in the United States.

Figure 2.26 Annualized increase to total monthly bill for 10 ccf for 72 utilities nationwide
Rate modifications varied geographically across the country. Figure 2.27 shows the median and interquartile ranges of percent changes in total monthly bills for utilities with rate modifications between consecutive years in five states: Georgia, North Carolina, Ohio, Texas, and Wisconsin. The median rate increase was 5% and 7% per year in North Carolina, Ohio, and Texas, while utilities in Georgia raised rates at much higher levels (medians between 10% and 15% per year) and utilities in Wisconsin that raised rates kept the increases low (medians below 5% per year).

While the median rate increase in each state remained relatively stable across the years – despite the economic recession and other changing conditions – the distribution of rate increases among utilities in each state was more varied as was the distributions between states. For example, the interquartile range of rate increases in North Carolina and Ohio were narrow and concentrated very close to the median, implying that utilities across those states were implementing rate increases that were relatively consistent with one another. In other states, such as in Wisconsin and Georgia, the interquartile range of rate increases was significantly larger, revealing a wider range of rate modifications statewide. In fact, data from Wisconsin show that while median increases for any particular year were low, a large portion of utilities that modified rates implemented very large rate increases, unlike in other states.

Similarly, in 2012, a quarter of the utilities that changed rates in Wisconsin raised rates by more than 30%. By comparison, the upper quartiles of rate increases in the other states usually began between 10% and 15%. The impact of Wisconsin’s financial regulation is evident when comparing the level of rate increases implemented by the local governments compared to those from the other states with no state oversight on local government rate increases.
Figure 2.27 Annual rate modifications of utilities that adjusted rates in five states

Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftels Financial Consultants, Inc. Data Sources: Annual rates surveys conducted by GEFA/EFC (2008-2012), NCLM/EFC (2006-2013), OH EPA (2000-2010), TML (2003-2012) and WI PSC (1996-2012). The sample of utilities varies across the years and includes only utilities with rates data in two consecutive years. Bars reflect the interquartile range of rate adjustments only for utilities that adjusted rates (utilities with no rate changes were excluded).
Utilities that increased rates less frequently tended to make larger rate increases than utilities that increase rates more often. This trend is illustrated in Figure 2.28 that compares average rate increases of utilities classified by their frequency of adjusting rates over a five-year period as determined in Figure 2.24. The average one-time rate adjustments are (sometimes drastically) higher for utilities that changed rates only once in five years compared to utilities that changed rates almost every year. In Ohio, for example, utilities that increased their rates only once in the five year period averaged a 19% rate increase, compared to an average annual increase of 7% for Ohio utilities that raised rates almost every year in the same time period. Figure 2.28 confirms the finding alluded to in Figure 2.27 regarding Wisconsin’s utilities tendency to either raise rates frequently at relatively low levels or raise rates infrequently at relatively high levels.

![Figure 2.28 Average rate adjustment by frequency of raising rates among 1,966 utilities in five states](image-url)
Cumulative Rate Changes

Although utilities that adjusted rates infrequently tended to have higher rate increases than the annual increases of utilities that adjust rates annually, the cumulative effect of more frequent, smaller rate increases generally outsize the larger, one-time rate increases. Figure 2.29 shows the average cumulative rate increase over five years for utilities within each state based on how frequently they adjust rates. The utilities that increased rates more frequently had larger cumulative rate increases during a five-year period than those that raised rates only once in the five years in four states. For example, although the utilities in Georgia that raised rates almost every year only raised rates by an average of 9% per year, the cumulative rate increases amounted to an average of 44% after five years. By comparison, the Georgia utilities that raised rates only once in five years had a rate increase of 20%. Hence, there may be financial benefits for utilities to raise rates frequently; the annual rate increases can be small in size, avoiding customer rate shock, while enabling the utilities to accumulate greater rate increases over time than if the utility maintains the same rates for several years and requires a very large one-time rate increase.

Figure 2.29 Average 5-year cumulative rate increase by frequency of rate adjustments

These trends held true in every state except Wisconsin. This result is consistent with prior observations that utilities in Wisconsin, more so than in the non-regulated states, that choose one-time rate increases tended to raise rates at much higher levels (more than five times on average) than the Wisconsin utilities that raises rates a lower-than-normal amount every year.
The graphs discussed within this section indicate that, while there is some variability of rate increases between states, more frequent rate increases generally are associated with smaller rate increases at one time, but a larger cumulative increase over a five year time period.

Whether a utility increases rates annually or only once every five years, ultimately, rate increases should reflect utility cost increases, which can depend on inflation of costs of materials and equipment, rising debt, and other factors. These cumulative rate increases over time (whether they come frequently or infrequently) should be sufficient to increase revenues at a rate commensurate with utility costs. As previously discussed, more frequent, small rate adjustments are associated with larger cumulative rate increases than larger, infrequent rate adjustments.

Historical data on the share of utilities changing rates in a particular year, and the degree of utilities rate increases, reveals overall historic trends in cumulative rate increases. Figure 2.30 shows how the monthly water or monthly water and wastewater bill for a specific consumption point rose each year for the same cohort of 1,961 utilities in six states, along with cumulative Consumer Price Index inflation in the corresponding region for comparison. For example, by 2012, half of 194 utilities in Texas had a monthly total bill for 5,000 gallons that, in nominal terms, was at least 45% higher than in 2003. The middle half of these utilities had bills that were 27% - 67% higher in 2012 than in 2003. In those ten years, the Consumer Price Index for the South region rose by a total of 26%, indicating that more than three-quarters of the 194 Texas utilities raised water and/or combined between 2003-2012 faster than inflation and the rise of other consumer goods. Though the exact size of the cumulative rate increases varied from state to state, water/combined rates rose faster than inflation in all states. Prior to 2007, the median rate increase in Ohio and Texas was on par with inflation, and was in fact below inflation in Wisconsin. After 2007, CPI stagnated in all regions during the recession (resulting in deflation in one year), but water/combined rates continued to rise at a steady rate, resulting in more utilities raising rates faster than cumulative inflation in their region during that time period in all three states. In North Carolina, Georgia, and California, the majority of utilities raised rates faster than regional CPI inflation in recent years.

In many states, however, there were also utilities in the middle 50% whose rate increases failed to keep pace with inflation, particularly prior to 2007. It is possible that these utilities were in a financial position that did not require them to generate additional revenue, were experiencing a level of growth that covered increasing costs, or that they were unable or unwilling to make rate increases necessary to support a solid financial position on an ongoing basis. Ohio, Wisconsin, and Texas, for example, all saw a roughly 40% median cumulative increase over a ten-year timespan, but had a large percentage of utilities that did not increase rates at a pace higher than CPI inflation through 2007. North Carolina and Georgia had a much lower portion of utilities that did not raise rates commensurately with regional CPI inflation. There is significant variability of bill increases between the middle 50% of utilities for each state. This could reflect differences in utility governance at the city or county level or in local economies.
Figure 2.30 Cumulative bill increases for 1,961 utilities in six states compared to CPI by region.
These regional trends match national trends observed from the AWWA-RFC rates survey data. **Figure 2.31** shows the monthly bill for 10 ccf relative to the monthly bill in 2004 for a cohort of utilities nationwide. Much like trends in individual states, water charges increased at a rate faster than the national CPI after 2006. The median increase in nominal monthly bills from 2004 to 2012 was 50%, compared to a cumulative increase in CPI of 22% in the same time period.

![Figure 2.31 Monthly charge for 10 ccf relative to 2004 charge for 72 nationwide utilities](image)

**Figure 2.31 Monthly charge for 10 ccf relative to 2004 charge for 72 nationwide utilities**

**Figure 2.32** shows the percent rate increase for 82 utilities nationwide by Moody’s most recent credit rating. Note that utility sample sizes for each credit rating vary (and are relatively low) and may have an impact on overall trends in rate increases. Utilities with slightly lower ratings (Aa2 and below) had smaller cumulative rate increases.
Figure 2.32 Credit rating vs. percent rate increase from 2006 to 2010 for 82 utilities nationwide

Rate Increases at Different Consumption Levels

Rate structures usually comprise two or more elements with unique prices or rates, such as a base charge and at least one volumetric rate (more if the utility uses a tiered rate structure). When adjusting rates, utilities can adjust some or all of these rate components, by the same or different percentage amounts. Based on how utilities adjust each element, the net financial effect of the rate adjustments on customers with different water use behavior can vary greatly. An obvious example is if a utility raises its non-residential rates but not its residential rates. Even rate adjustments for one customer class can affect those customers in different ways. For example, a utility might choose to raise the volumetric rates for higher levels of consumption for residential customers by 10% and avoid raising the base charge and lower block rates entirely. This would result in keeping the monthly charges unchanged for low water-using residential customers, such as one or two-person households, while raising them for high-water using residential customers, such as those who irrigate lawns during the summer. Sometimes, deciding on how to adjust different elements of the rate structure(s) is made deliberately to protect certain groups of customers from the brunt of the rate increases, or to send a price signal to specific customers to encourage water-using behavior that is consistent with utility objectives.

Given the myriad of ways a utility can adjust its rate structure(s), customers’ bills change by a range of values. Although it is common (and easiest) to analyze and discuss utility rate increases in terms of a single percentage or dollar value (calculated as the change of the bill at one consumption point), bills at different consumption points are most likely changing by different amounts. In reality, the actual customer out-of-pocket expenditures are changing based on their changing water usage.

Figure 2.33 shows the median residential monthly water bill for four different consumption levels for a cohort of 58 utilities across the nation between 2004 and 2012. The four levels of consumption can be considered as different “service levels.” At 0 ccf, customers are paying for access.
At a level of 500 cubic feet (5 ccf or 3,740 gallons), residential customers are paying for access and a basic level of water use. For most systems, consumption at 15 ccf (or 11,220 gallons) is discretionary in the sense that customers can live without it. The trends show that charges for higher levels of consumption (or discretionary service) have been going up at higher levels than for more basic levels. In other words, the general trend across this cohort of 58 utilities across the country is to increasingly shift revenue recovery to customers with higher levels of consumption.

Figure 2.33 Median monthly water bill by level of consumption for 58 nationwide utilities from 2004-2005
Figure 2.34 shows similar trends at the state level at slightly different levels of consumption. When compared to one another, rate increases in Georgia at all levels of consumption are less than in North Carolina and Wisconsin. In North Carolina, service at all levels are more expensive than in the other two states and are becoming increasingly so at higher levels of service.

![Figure 2.34 Median monthly water bill by level of consumption for 1,292 water utilities in North Carolina, Georgia, and Wisconsin](image)

**Changes to Base Charges and Volumetric Rates**

The analysis also looked at the changing balance between base charges and volumetric charges. Utilities projecting a specific revenue goal in their budget may adjust the base charges and/or volumetric rates in various ways to reach their revenue goal. In allocating costs to the base charge or the volumetric rate, utilities balance many objectives.

Pricing structures that build cost recovery into the base charge provide a relatively stable stream of revenue, regardless of the season or other conditions that drive water demand. For example, in some coastal communities where the service population drops significantly during the off-season,
base charges may be the primary source of revenue from the customers who leave town, and are necessary to continue to pay the utility’s fixed costs. Utilities with high fixed costs or a high degree of demand variability have an incentive to set high base charges in order to ensure sufficient revenue generation every month to pay for their fixed costs.

On the other hand, rate structures that put significant emphasis on base charges run into conflict with customer affordability and conservation goals. All customers pay the base charges, regardless of how little or how much water they use. The higher the utility sets its base charge, the more difficult it will be for low-income customers and the less financial impact a reduction in water use will have on a customer’s bill. Determining a balance between base and volumetric charges therefore represents a tradeoff between stable revenues and a fee structure that charges more to the customers with the most usage.

One way of examining the balance between base charges and volumetric rates is to compare base charges as a percent of the total bill at various levels of consumption. If a customer uses no water or wastewater service during a particular month, the base charge will represent 100% of their bill. The base charge will become a decreasing portion of a customer’s bill as consumption rises, but the exact ratio will depend upon the utility’s rate structure. Trends in this relationship can help illustrate revenue vulnerability trends across the industry.

An analysis of bills by their base charge percentages for 1,626 utilities in California, Georgia, North Carolina, and Wisconsin is shown in Figure 2.35. The graph shows the median portion of a customer’s bill at various levels of monthly consumption that is comprised of the base charge, by state. For example, among 443 Georgia utilities, half had designed their rate structures such that the monthly bill for 5,000 gallons is comprised at least 55% by the base charge and 45% by the volumetric charges. This means that a customer using less than 5,000 gallons/month at one of these utilities will contribute at least 55% of their bill towards fixed revenues for the utility. At higher consumption levels, the base charge comprises a decreasing portion of the monthly bill. The monthly bill at 10,000 gallons/month, for instance, was comprised of no more than 32% from the base charge for half of the 443 Georgia utilities.

The median lines in Figure 2.35 vary substantially across the four states, reflecting significant regional differences in rate structure objectives in the four regions. In general, utilities in the southeast (North Carolina and Georgia) tended to favor higher base charge portions in their rate structures compared to utilities in Wisconsin and California. In addition, the southeastern utilities more frequently included a consumption allowance with their base charges (as indicated by the flat median line in the left-hand corner of the graph). Wisconsin utilities relied the most heavily on variable revenues from their low consumption customers. By comparison, California utilities had the most variable rates at high consumption levels. More than half of the sampled California utilities had set up rate structures in which at least 90% of the bill for more than 10,000 gallons/month was comprised of volumetric rates. This could be the result of a strong, statewide initiative to encourage water conservation through pricing in the State of California (CUWCC 2012).
As with rate changes, the balance between base and volumetric charges changed over time. In some cases, utilities conduct an extensive study to compare the breakdown of revenues and costs in terms of fixed versus variable, as was the case with the Charlotte-Mecklenburg Utilities Department (CMUD). By 2011, CMUD had one of the most variable water rate structures in the southeast. Residential customers inside the city limits were paying $2.40/month in water base charges plus $1.45/100 cubic feet for the first 400 cubic feet. This rate structure had base charge proportions that were in the bottom 10th percentile among 650 Georgia and North Carolina water rate structures in 2011, as shown in Figure 2.35. As a result of its highly-volumetric rate structure, CMUD was collecting up to 95% of its water and wastewater revenues from the volumetric rates and 5% from the base charges (CMUD 2012). Yet, the majority of the utility’s costs were fixed, going towards debt service, pay-go capital expenditures, and short-term fixed operations and maintenance costs (CMUD 2011).

As a consequence of the imbalance between fixed costs and fixed revenues, in July 2012, the utility raised the monthly water base charge to $4.65, lowered the first tier water rate to $0.98/100 cubic feet, and raised the second and third tier rates. By raising the base charge and lowering the first tier rate, CMUD effectively raised the base charge portion of its water rate structure significantly, and aligned closer to most water rate structures in Georgia and North Carolina, shown in Figure 2.36. At the beginning of the fiscal year, CMUD projected that this adjustment would result in increasing the proportion of revenues from base charges from 5% to 16% in 2012 (CMUD 2012).
The majority of the utilities in Georgia, North Carolina, and Wisconsin did not follow the same path as Charlotte-Mecklenburg Utilities, as shown in Figure 2.37. In fact, in North Carolina, 22-38% of utilities decreased the fixed portion of the 5,000 gallons/month water bill and the majority of utilities made no change in the portion. The trends were similar in Georgia. In Wisconsin, utilities were less likely to change the balance at all than in either Georgia or North Carolina, but the 18%-30% that did change the balance were twice as likely to decrease the fixed portion after 2008 as they were to increase it. These results indicate that utilities in these three states are, in general, either maintaining the same fixed/variable balance in their rate structures or shifting the balance towards more variable rate structures. This places those utilities in a riskier position in which their revenues are more vulnerable to demand fluctuations, at a time when water use is decreasing.
Figure 2.37 Annual changes to the base (fixed) charge portion of 5,000 gallons/month residential water bills in Georgia, North Carolina, and Wisconsin.

The extent to which the balance between fixed and variable charges changed after five years, from 2007 to 2012, for 1,260 utilities in the three states is shown in Figure 2.38. Each point represents one utility, and displays the base charge portion of the residential water monthly bill at 5,000 gallons in 2007 along the y-axis and in 2012 along the x-axis. The one-to-one line is displayed for orientation. Utilities that either did not adjust rates at all or adjusted the base charge and the volumetric rates by an equal percentage between 2007 and 2012 will be located along the one-to-one line: 37% of the 1,260 utilities fell on this line. The remaining 63% shifted the balance between base and volumetric rates in the five year period. Twice as many utilities decreased the base charge portion of their water bills than those that increased the portion (42% versus 21%, respectively). The extent of the adjustments varied widely. Many utilities changed the fixed portions by less than 20 percentage points. In some extremes, however, the change can be drastic. For example, one utility went from 70% fixed charge portion in 2007 to 7.4% in 2012, and another from 8% to 49%.
The relationship between fixed and variable charges can be delicate, and can often impact more than just a utility’s revenues. Figure 2.39, for example, shows variation in the fixed portion of water and combined utility bills for 5,000 gallons by credit rating for 38 utilities nationwide. Median fixed bill portions consistently increased as credit ratings worsened. Sample sizes between utilities, however, varied significantly and may have an impact on the trends seen in this figure.
Utilities that increase reliance on volumetric charges also increase revenue vulnerability due to normal cyclic weather induced changes in use. Furthermore, raising the volumetric rates faster than the base charges may provide a price signal and a financial incentive for customers to curtail their demands since their water bills are more sensitive to their water use levels. Reducing demands will reduce the revenues for the utilities, which are more dependent on demand now that the base charge portions of the bills have been effectively lowered.

Relationship between Rate Structures, Rate Increases, and Revenues

As shown in the sections above, the complexity of rate structures provides utilities with many adjustment options, including the type of volumetric rate structure. The most common volume-based rate structures for water and wastewater utilities are uniform rate structures (in which the marginal price for each additional unit of water consumed remains constant) and blocked rate structures (in which the marginal price either increases or decreases as consumption increases).

The impacts of these rate structure types on utility revenues vary significantly. Compared to uniform rate structures, increasing block rate structures inflate the revenues generated from higher consumption levels. Thus, the “premium” customers who use large volumes of water pay a higher share of the utility’s total revenues under an increasing block rate structure than the “basic” customers. Yet, high water use is more likely to include discretionary uses of water that are more vulnerable to fluctuations than baseline, indoor uses of water. Setting high marginal prices for high volumes of water simultaneously increases the proportion of revenue expected to be generated from that demand while at the same time sending a price signal that might cause customers to curtail those discretionary water uses. Consequently, increasing the rate differential between blocks puts more of a utility’s revenue at risk in the face of declining demand (particularly at the higher tiers which are more sensitive to price increases) while simultaneously incentivizing customers to reduce those high demands.
In addition to different rate structures incentivizing different customer water use behavior and influencing the utilities’ revenues, rate increases alone impact water use. Water and wastewater price elasticity has been studied extensively by researchers for decades. Two meta-analyses on residential price elasticity found that the average estimated price elasticity for water (and wastewater) in over 300 research studies was between -0.41 and -0.51, and generally ranged between 0 and -0.75 (Dalhuisen et al. 2003; Espey et al. 1997). The authors of the two meta-analyses noted that in most of the research studies they reviewed, price elasticity was estimated to be statistically significant. In other words, extensive research has determined that residential customers, on average, respond to rate increases by lowering their consumption to some degree. The extent to which customers decrease their consumption for a given rate increase, however, is not clear from all of the studies, and varies depending on several factors including location, season, rate structure, income, weather, water use, and other factors (Dalhuisen et al. 2003; Espey et al. 1997).

At the utility level, this creates an important relationship between rate increases and revenues. What the studies agree on is that if a utility raises rates by, say, 10%, and nothing else changes for the next year (including weather, number of customers, income levels, policies, household appliances, etc.), the utility would most likely see their revenues increase by less than 10%. In reality, all of the other factors that affect water use and revenues will never be identical from one year to the next, and thus revenues may increase or decrease by more than 10% for some utilities, but not likely in sole response to price.

On a national level, more utilities (57%) had greater cumulative rate increases on their 10 ccf (7,480 gallons) monthly water and/or wastewater bill than the resulting percentage increase in their total operating revenues, as reported in the 2004 and 2012 AWWA-RFC Water and Wastewater Rates Surveys and shown in Figure 2.40. In fact, three utilities had lower revenues in 2012 than in 2004, despite raising their residential rates. The relationship between rate and operating revenue increases may also be dependent on the extent by which rates are raised.

For high rate increases (marks on the upper right side of the graph), increases in operating revenues were much more likely to be lower than the increases in the rates. All but one of the 19 utilities that doubled their rates between 2004 and 2012 had operating revenue increases that were substantially lower than the rate increase. At the other end of the spectrum, utilities that only raised rates $10 per month or less and by 40% or less had greater revenue increases than rate increases. As explained above, these may be because of increases to demands due to other non-price related factors. In fact, more than half of these utilities had greater average daily sales (total demand) in 2012 relative to 2004, compared to only 20% of the utilities that more than doubled their rates and by at least $20/month. Further, as explained above, it is perhaps because of the declining sales and lower revenue increases that those utilities applied such high rate increases, to generate sufficient revenues in future years.
Similar relationships between rate and revenue increases were evident among 566 utilities in Ohio, North Carolina, and Texas, as shown in Figure 2.41. Generally, utilities had a diverse range of rate and revenue changes over the three or four year period. In all three states, 61%-66% of the utilities had lower revenue increases than rate increases (points below the 1:1 line), and almost every utility that raised rates by more than 50% had relatively lower revenue increases. A handful of utilities were even in the unfortunate position of having decreasing revenues despite increasing rates. On the other hand, the utilities that had relatively small rate increases were more likely to have revenue increases commensurate with or greater than the rate increase.
These analyses suggest three important lessons for utilities. 1) Revenues usually increase when rates increase, despite a downward pressure on customer demand due to elasticity. In Figures 2.40 and 2.41, revenue and rate increases are positively correlated. 2) Generally, larger rate increases is associated with disproportionately lower revenue increases. This is most likely a result of underlying factors, as opposed to the rate increases – a topic worth further exploration. 3) The relationship between rate and revenue increases is complicated and differs from utility to utility. Two utilities with identical rate increases may have very different outcomes on revenue increases, even in the same state or region. There is no single rule-of-thumb equation that utilities can use to accurately predict the effect of a rate increase on revenues, given that many other factors beyond the control of the utility, will affect revenues. Furthermore, the relationship between rate increases and revenue increases works
in both directions: rate increases may drive down demand which will lower revenue increases, and lower revenue increases may necessitate higher rate increases. Utilities will probably find it difficult to raise their way out of a significant revenue shortfall; since higher rate increases tend to yield disproportionately lower revenue increases. Additional strategies, many of which are described in this report, should be considered in addition to raising rates when a utility experiences large revenue gaps.

**Relationship of Rate Increases and Utility Financial Performance**

As shown in Figures 2.27 and 2.28, utilities that raise rates more frequently usually do so with smaller annual rate increases that ultimately result in larger cumulative rate increases than utilities with infrequent rate increases. A higher cumulative rate increase, however, is not the goal of a well-run water utility. The ultimate financial goal of a utility is strong financial performance and self-sufficiency. Do utilities that raise rates more frequently using smaller annual increases fare better financially than utilities that raise rates infrequently with larger one-time rate increases? It was explained in the previous discussion; for instance, that utilities with larger rate increases may have disproportionately lower revenue increases. Does this put utilities with large one-time rate increases or the utilities with larger cumulative rate increases over time at a disadvantage financially?

Figure 2.42 displays the range of non-capital operating ratios (operating revenues divided by operating expenses less depreciation) for a cohort of 531 utilities in three states, categorized by whether the utility did not change rates in four years, occasionally changed rates, or changed rates almost every year (3 or 4 times in four years). The non-capital operating ratios for the four years were averaged to produce a mean non-capital operating ratio for each utility. The graph displays the middle 50% of the average ratios in each frequency category in each state.

The results are inconclusive. There are no clear indications that utilities that raised rates more or less frequently fared any better than the others using this financial metric. In Texas, for example, the interquartile range is narrower on the high end for utilities that raised rates almost every year versus utilities that only occasionally raised rates, implying that utilities that raised rates more frequently were more likely to have higher ratios than the others. On the other hand, in North Carolina, the reverse proved true. The utilities that did not raise rates at all in four years (a sample of 10 utilities) outperformed the utilities that raised rates. It may be that these ten utilities did not raise rates because their revenues were already sufficient to cover their expenditures.
If financial ratios drive rate increases for many utilities, a correlation would be expected between one year’s financial ratio and the next year’s rate increase. Figure 2.43 displays this relationship for the same cohort of 531 utilities in North Carolina, Ohio, and Texas. It is interesting to note that some of the largest rate increases occurred for utilities that had a non-capital operating ratio at or near the 1.0 threshold. In North Carolina, a large cluster of utilities that had ratios below 1.0 (higher O&M expenditures than operating revenues) attempted to rectify their financial condition by raising rates significantly the next year. In Texas and North Carolina, utilities that had some of the highest ratios, implying a surplus of revenues, had lower rate increases than the rest of the utilities, as expected. Yet, in Ohio, a significant portion of utilities with high ratios still raised rates by more than 10% in the subsequent year. While it appears that financial performance may be partially driving rate increases in these three states, it is not the only factor that utilities are considering when they decide on rate increases. There may be other financial performance indicators, such as debt service coverage ratio targets, that influence the decision. Furthermore, the financial outlook might be more influential on rate setting than a retrospective analysis of past and current financial performance, particularly when capital projects are planned to be implemented soon.

Figure 2.42 Range of four-year average non-capital operating ratios by utilities’ frequency of adjusting rates for 531 utilities in three states

Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raitelis Financial Consultants, Inc. Data sources: Audited financial statement data collected by NC Local Government Commission, OH Water Development Agency and Texas Water Development Board. Annual water and sewer rate surveys by NCLM/EFC (2008-2011), OH EPA (2007-2010), Texas Municipal League (2007-2010). Only utilities for which financial and rate data for all four consecutive years are known are included in this analysis. O&M expenditures are total operating expenses minus depreciation. Non-capital operating ratio was averaged over the four years.
**334 North Carolina Utilities**

Rate increase is the change in water, wastewater or combined residential bill for 5,000 gallons/month for the year after the fiscal year of reported non-capital operating ratio. Data Sources: NCLM/EFC annual water and wastewater rates surveys, and the NC Local Government Commission data from audited financial statements of water/wastewater utilities.

**164 Ohio Utilities**

Rate increase is the change in water, wastewater or combined residential bill for 7,756 gallons/month for the year after the fiscal year of reported non-capital operating ratio. Data Sources: OH EPA annual water and sewer rate surveys, and Ohio Water Development Authority data from audited financial statements of water/sewer utilities with outstanding loans. Gross revenues are revenues that can be used to pay for debt.

**103 Texas Utilities**

Rate increase is the change in water, wastewater or combined residential bill for 5,000 gallons/month for the year after the fiscal year of reported non-capital operating ratio. Data Sources: Texas Municipal League annual TX water and sewer rate surveys, and the Texas Water Development Board data from audited financial statements of utilities with outstanding loans. Total revenues are revenues that can be used to pay for debt.

Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. The cohort of utilities remained the same for all three years in each state.

Figure 2.43 Rate increases one year after the reported non-capital operating ratio for 531 utilities in three states, over three years
Figure 2.44 suggests that utilities follow many different pricing strategies when considering how to recover fixed revenue requirements (or many possibly do not follow any strategy?). The graph shows no strong correlation between the size of a base charge and the percent of operating revenue that is required to meet debt service.

Figure 2.44 Debt service payments as a percent of total operating revenues vs. base charge for water and combined utilities for years 2003-2012

Conclusions

Rate setting is probably the most important tool at the disposal of the utility for managing its financial performance and self-sufficiency. The equation between pricing and utility finance is not as simple as increased rates equals increased revenues. In fact, the analysis shows that the higher a utility raised its rates, the more likely revenues increased by a disproportionately lower amount.

Some trends are evident, such as utilities that raise rates more frequently usually do so with smaller annual increases that accumulate to larger cumulative increases over time than the infrequent rate increases of other utilities. Yet, the complexity of the relationships between pricing and utility finance create unique situations and circumstances for individual utilities, muddying national and regional trends. This research indicates that there are very few clear cut national or regional trends universally applicable to utilities. Thus, utilities should not seek simple, rule-of-thumb formulas when making decisions on pricing. Most importantly, utilities should consider alternative strategies and tools to improve financial performance and manage their finances in addition to rate setting. Examples of such strategies are described later in this report.
References


