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What matters to performance? Structural and institutional dimensions of water utility governance

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A prolific theoretical and empirical literature has examined the relevance of structures and institutions to public utility performance, with a particular emphasis on the discrete role of ownership. The empirical findings are inconsistent and mostly indeterminate. A narrow emphasis on ownership deflects attention from the inextricable role of governance. The impact of privatization may be marginal compared with alternative governance reforms. Offered here is an informal, practical, and parsimonious conceptual model that distinguishes between structural (endogenous) and institutional (exogenous) governance. Three structural dimensions (ownership form, practice standards, and enterprise autonomy) are juxtaposed against three institutional dimensions (market contestability, external review, and economic regulation). Each dimension may be complementary or substitutive. Given persistent monopoly, privatization may be unnecessary and will be insufficient for ensuring performance. Economic regulation is a prerequisite for privatization but privatization is not a prerequisite for reform. Focusing on the US water sector, this paper offers a descriptive analysis for understanding why this is the case. A pragmatic approach is to strengthen core governance capacities in relation to performance priorities, which ultimately matter most of all.

Keywords: institutions; privatization; regulation; reform; governance; utilities; water

JEL Classifications: K23, L32, L51, L95, L98

Introduction

For the most part, the dissatisfying answer to 'what matters to utility performance?' is 'it depends.'[1] A prolific literature has examined the relevance of structures and institutions to public utility performance, with a particular emphasis on the discrete role of ownership. The theoretical findings are largely contingent and the empirical findings are inconsistent and mostly indeterminate, as explained by the diversity of metrics used for both the independent and dependent variables. Performance is multi-dimensional and determinants are complex and synergistic. Performance, good or bad, might be spuriously attributed to a structural feature when an institutional force may be more relevant. Disentangling the many potential influences can be frustrating and fruitless. Practicality calls for conceptual clarity about what matters most. This paper draws from both the empirical literature and practical observation

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to offer a conceptual framework for understanding the synergistic influence of structures and institutions on utility performance.

Ownership is a 'distinction with a difference,' but the difference may be less inherent than institutional. The disproportionate focus on ownership rests on the theories of public choice and property rights (Bel and Warner 2008), which argue that the private sector yields superior results than does the public sector due to the discipline and incentives of markets or market-like mechanisms that similarly promote efficiency. The theory was behind 'reinventing government' in the US and the 'new public management' in Europe. Analysts have argued for private management to improve performance and private ownership 'to lock in performance gains' (Kikeri et al. 1992). The public-private dichotomy is a structural-functional device that relates to the fundamental typology of goods and services (public, private, common-pool, and toll), but it also reflects a latent ideology. Proponents of privatization (structural transfer of responsibility) *believe* in incentives. Proponents of liberalization (relaxation of institutional controls) *believe* in markets. Even imperfect markets, so the argument goes, can be a remedy to imperfections of governments or 'non-markets' (Wolf 1993).

In reality, of course, privatization is not competition. Workable competition is conditioned on more than the simple acts of divestiture or deregulation. Equating private control with competition fails to appreciate the persistence of monopoly. Transforming a monopolistic enterprise from public to private ownership may have little effect if opportunistic behaviors of the public sector are simply traded for opportunistic behaviors of the private sector.

Institutionalists, old and new, question the validity of market theory on both empirical and normative grounds. They argue for more attention to market failure, governance, and measures of well-being beyond efficiency, especially social equity. Only public-sector institutions can ensure that public values are respected. Ostrom (1990) directly challenged the need for private property rights and formal regulation to govern the commons. Although public utilities are more appropriately understood as toll goods, and are operated with considerable scale, similar concerns about the presumptive need for privatization pertain. The dissonance between markets and public values can be especially vexing for water utilities.

The public–private distinction has made for convenient heuristic and empirical analysis for decades. Vickers and Yarrow (1988) observed that the research in this area gravitates to the easily measurable, draws tenuous linkages among profitability, efficiency, and social welfare, and is less informative than anticipated, concluding that: 'even where sufficient data are available, statistical tests have rarely been sophisticated enough to take account of the interacting effects of ownership, competition, and regulation on incentive structures, and hence on the performance of firms.'

Based on an extensive review, Megginson and Netter (2001) asserted that privatization programs have reduced the role of state-owned enterprises and that private ownership improves efficiency, profitability, capital spending, financial health and asset value. Privatization also seems to encourage modernization of corporate governance, including securities regulation and disclosure rules. Their conclusions center on a construct of the 'optimal role of government' that is discoverable through conventional economic measures of success. Yet the authors concede 'there is little empirical evidence on how privatization affects consumers' (Megginson and Netter 2001).

More recent assessments are far less sanguine. Noting the selective nature of literature reviews, Kwoka (2005) refutes assertions about the efficiency and profitability advantages of privately-owned firms over state-owned firms. For the electricity sector, he finds both theoretical and empirical support for circumstantial advantages of public enterprise. For the water sector, cross-national evidence regarding performance has not been compelling (Renzetti and DuPont 2004) or mixed (Prasad 2006). Meta-analyses by Bel and Warner (2008) and Bel, Xavier, and Warner (2010) find little empirical support for cost savings from private production. In the development context, privatization has largely failed to produce a clear performance advantage (Budds and McGranahan 2003). Although no model is unequivocally proven in practice, a growing literature challenges the prevailing reform orthodoxy favoring market-based approaches and calls for sector-specific solutions (Florio 2007). In an historical critique of the reform movement, Clifton et al. (2011) further suggest that 'Downplaying – or ignoring – the lessons of history on the complexities of utility regulation came at a cost.'

Contemporary theory and analysis take a more moderate and nuanced view of what matters and why. Organizational structures seem less relevant alone than in context. Vickers and Yarrow (1991) observed that any form of ownership is imperfect and involves tradeoffs between government and market failures; thus the effects of privatization are 'highly dependent upon the wider market, regulatory and institutional environments...' Drawing on agency theory (to understand incentives) and transaction-cost economics (to understand tradeoffs), Menard (1996) explains why 'organization matters' and notes the extreme challenge of exploring the interaction of governance structures and institutional environments. In particular, institutions may close public–private performance gaps (Borghi, Del Bo, and Florio, 2010) and undermine the rationale for changing ownership. Analysts now see paths to performance other than privatization, in part to avoid deleterious social and economic effects (Sclar 2000). Bartel and Harrison (2005) found that public-sector efficiency can be improved through privatization, manipulation of the environment, or a combination of approaches. The lack of a 'systematic optimal choice' between public and private commends a pragmatic approach to the issue (Bel and Warner 2008).

Certainly, the empirical literature fails to demonstrate that privatization is *necessary* to overcome perceived deficiencies and improve utility performance. Oversimplifying the nature of structures and miscalculating the role of institutions have thwarted market-oriented reforms. A change in ownership may be practically infeasible or politically undesirable but, more importantly, it may simply be unnecessary. Other reforms could effectively pre-empt privatization. In sum, what matters to performance, both theoretically and pragmatically, is 'governance.'[2]

Conceptual framework

Offered here is an informal, practical, and parsimonious conceptual framework informed by both descriptive analysis and observational insight (Figure 1). It distinguishes between structural and institutional governance, to some extent echoing Menard (1996). The framework is also consistent with pragmatic findings about the relevance of both internal and external forms of performance accountability (Baietti et al. 2006).[3] Structural governance is considered endogenous or intra-organizational, and defined in terms of administrative functionality and managerial capacity. Institutional governance is considered exogenous or extra-organizational,

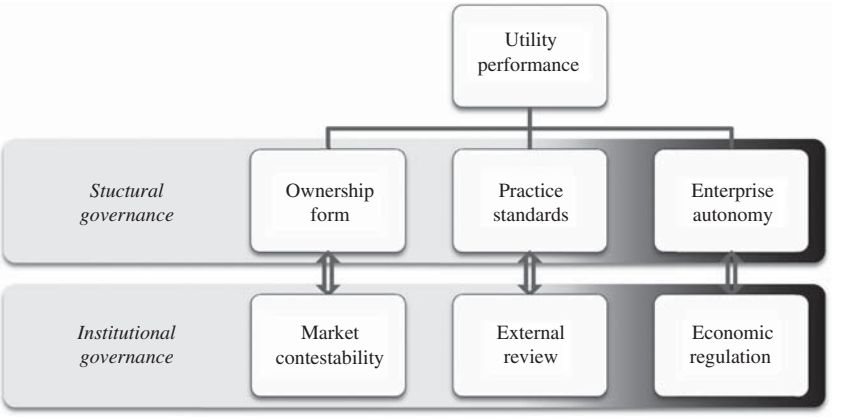


Figure 1. Structural and institutional dimensions of utility performance.

and defined in terms of established principles and authoritative rules. Institutional governance includes, but is not limited to, formal or authoritative modes. Three structural dimensions (ownership form, practice standards, and enterprise autonomy) are juxtaposed against three institutional dimensions (market contestability, external review, and economic regulation). Each dimension may be complementary or substitutive.

The governance dimensions considered here may relate to privatization and privatization may relate to performance, but ownership is only one structural dimension. By itself, ownership might actually be a distinction without much difference. A narrow emphasis on ownership deflects attention from the inextricable role of governance and obscures opportunities for enhancing performance by other structural and institutional means.

Vertically (bottom to top), the model suggests how institutions support and reinforce structures. Horizontally (left to right), the model also implies increasing formality that also adds to capacity requirements and transaction costs. It is hypothesized that performance by utilities may be attributable to the nature of these dimensions and the synergies among them, which may be intuitive but which often elude traditional methods of analysis (Table 1).

The framework focuses broadly on performance in terms of the effectiveness of utilities in meeting specified goals, including but not limited to efficiency (that is,

Table 1. Potential synergies in utility governance.

		Institutional governance	
Structural governance	Market contestability	External review	Economic regulation
Ownership form	Structural rivalry	Accountability systems	Market jurisdiction
Practice standards	Comparative competition	Compliance culture	Legitimate enforcement
Enterprise autonomy	Organizational change	Independent assessment	Authoritative approval

Source: Author's construct.

economic, financial, service, social, and procedural goals). It largely neglects potentially important technological influences, including scale. Production returns to scale for water systems can be significant although they are offset by distribution diseconomies (Strategic Management Consultants 2002 and Abbott and Cohen 2009). These diseconomies may be particularly pronounced for larger and older cities with aging distribution infrastructure. Economies of scale are thus not unlimited, but failure to realize optimal scale is a recognized problem for many U.S. water systems.[4] Scale relates directly to the 'attractiveness' of operations to private companies (Tynan and Kingdom, 2005). These and other findings suggest that governance might affect utility performance by affecting scale.

The following discussion draws from the US experience to consider the potential relevance of each governance dimension.

Ownership form

US institutions accommodate a wide variety of utility ownership structures. Early on, US private ownership was prevalent (Baker 1897). Case studies by Cutler and Miller (2005) found that cities first intervened in the water sector in the wake of performance failure by private providers but then flourished due to innovation in municipal finance (see also Wolff and Palaniappan 2004). In its 2006 inventory, the US Environmental Protection Agency (USEPA) counted about 50,000 community water systems, evenly bifurcated by ownership (Table 2). Closer examination reveals a more limited private presence accounting for only 9% of water delivered and 13% of industry revenues (mostly for-profit systems). Two percent of all systems are publicly owned with private (contractual) operations.

Despite the appearance of considerable fragmenation, the US water industry is actually more interconnected and concentrated than is obvious. Nearly 50% of all water delivered is sold on a wholesale basis, and nearly 20% of water systems rely primarily on purchased water (USEPA 2009). Some water utilities operate multiple community water systems; that is, systems are the smallest unit of analysis in the US environmental policy framework and less numerous than utility entities. Most water utilities in the US remain vertically integrated, providing supply, treatment, transmission, and distribution functions. Larger municipal systems and authorities often provide service on a regional basis. The largest private companies function as multi-system utilities and some also provide operational services.[5]

Table 2. Water systems in the US. (2006).

	Number	Systems (%)	Delivered water (%)	Revenues (%)
Publicly-owned systems	24,846	50.6%	91.4%	86.9%
Publicly-owned and operated	23,799	48.4%		
Private operation	1047	2.1%		
Privately-owned systems	24,287	49.4%		
Private for-profit	5406	11.0%	6.8%	8.0%
Not-for-profit	9327	19.0%	1.6%	4.9%
Ancillary	9554	19.4%	0.2%	0.1%

Source of data: USEPA (2009). Weighting and rounding affect estimates.

Scale permeates the industry, as is apparent in the very skewed distribution of water systems by size and ownership. Only 9% of the systems serve fully 88% of the US population served by community systems. More than half of the systems serve communities of fewer than 500 people (a few hundred connections). Many of these systems owe their origins to isolated or unmanaged real-estate development. Private ownership is concentrated at the lower end of the spectrum. Of the 4500 water systems serving 10,000 or more customers, about 400 are privately owned; of the 101 systems serving populations exceeding 500,000, 12 are privately owned, two are publicly owned with private operations, and two are managed on a not-for-profit basis. Consolidation between 2000 and 2006 reduced the inventory of water systems by about 3000 (a 2.6% decline in publicly-owned systems and a 9% decline in privately-owned systems and (US EPA, 2009).

Privately-owned utilities of scale in the US are known as 'investor-owned utilities' (IOUs) and state-regulated.[6] In the wake of corporate consolidation, only about 10 US water companies remain publicly traded. Foreign or private equity firms own a few of the larger utilities.

A principal rationale for private ownership is the potential to infuse public infrastructure with private capital and transfer associated risks; this perspective finds more appeal when the public sector is fiscally stressed, which gives the private sector an interest in government failure. The capital structure of a privately-owned utility is reviewed by regulators and typically is divided about equally between debt and equity; publicly-owned systems rely on debt instruments and reserve funds. Private companies must attract capital and meet shareholder expectations. Boards of directors add a layer of accountability, aimed ultimately at risk management and profitability. Ratebase regulation motivates investment and utility ratepayers are obligated to compensate investors at reasonable returns on equity that are authorized but not guaranteed by regulators. Whether limits to profit also limit the profit motive is largely unknown, but utilities must operate with reasonable efficiency in order to realize allowed returns. In addition to financing capacity, larger private systems may have additional planning, management, technical, and analytical capabilities, although these also add to overhead, and performance effects may be due as much to scale as to ownership.[7]

Private capital, of course, comes at a price. Publicly-owned water systems may be prone to investment deferral and underpricing (a 'willingness-to-charge' problem with respect to ratepayer–voters). But private systems, left to their own devices, may be prone to overinvestment (gold-plating and excess capacity) as well as over-pricing. Private systems are motivated by efficiency to the extent that such efficiency enhances profitability, but systems might be tempted to reduce costs by diminishing service. In the absence of competition, economic regulation is meant to check these tendencies by imposing performance standards; alternative regulatory mechanisms can strengthen or weaken performance incentives.

Research has shown that water system ownership does not appear to affect productivity (Renzetti and DuPont 2004) or compliance with drinking water standards (Wallsten and Kosec 2008). Although the literature fails to provide conclusive evidence as to the superiority of any ownership form, ownership is not irrelevant. Ownership matters at the margin in various ways, with both positive and negative implications. How it matters may have as much to do with associated governance, particularly the quality of economic regulation.

Market contestability

Behavioral discipline is not innate to ownership form. While privatization motivates profits, competition motivates efficiency. As Donahue (1989) points out, 'Half a market system – profit drive without meaningful specifications or competitive discipline – can be worse than none.' Aharoni (1991) observed that efficiency improvement is more likely to stem from market forces than ownership change, that privatization may not result in increased competition, and that competition can be introduced without privatization. Kunneke (1991) likewise found that competitive forces matter more to utility efficiency than ownership form. Although some reform models encourage utilities to compete for market share, service territory, or inset appointments, Sawkins (2011) concedes that performance in the Scottish experience may be more motivated by the 'threat' of competition than actual customer switching.

For utilities, then, 'monopolistic competition' or 'contestability' may matter (Baumol et al. 1982). The coexistence of public and private ownership suggests that structural rivalry might motivate performance. In the US, when the 'grass looks greener on the other side,' private companies can propose acquisitions and local governments can threaten to use powers of eminent domain to force municipalization or 'reverse privatization' (Beecher, Dresse, and Stanford 1995). In response, utilities might aspire toward 'the best of both worlds.' Indeed, a high-performing public-sector utility likely operates 'like a business,' while a high-performing private-sector utility likely operates in 'service to the public.' Thus, 'softer' determinants, such as organizational culture and leadership, may be key to performance as well as public image.

Institutional reforms can level the playing field for the contest by providing for meaningful performance comparison, and even lower the barriers to ownership transfers. Performance benchmarking by regulators facilitates 'comparative competition.' Researchers have found that the competitive pressure and benchmark competition decreased the overall number of regulatory violations (Wallsten and Kosec 2008).

No serious attempt to 'liberate' the US private water sector has been made. Utilities compete, however, on the basis of price. Private ownership is associated with higher prices (Beecher and Kalmbach 2013). Privately-owned systems must perform far more effectively and efficiently to rationalize the additional cost to ratepayers, particularly in a rising cost environment. Corporate income and property taxes play a large role (Renzetti and DuPont 2004); executive compensation, overheads, and profits are relevant to the comparison as well, although many publicly-owned systems pay property tax and return equivalents. Publicly-owned systems may benefit from subsidies, non-rate revenues, lower financing and insurance costs, and rights of way. Differences in costing, financing, and ratemaking practices also explain the rate disparity (Beecher 2009).

Local ratemaking can be 'politicized,' the acceptance of which is value-contingent. Whereas privately-owned water systems are motivated to try to inflate prices to ensure cost recovery and profitability, publicly-owned systems may be compelled to suppress prices for distributive purposes, such as social equity or economic development. Although price manipulation undermines efficiency in resource allocation, politics inevitably shape decisions about ownership and pricing. According to one market analysis,

> Based solely on the issue of efficiency, privatization seems a rational decision … [S]een through the prism of equity, water perhaps ought to remain under the

> purview of municipal systems, and reflect what the government, rather than the market, can bear. (S&P, 2012b)

Thus, the public–private contest can be judged in both efficiency and equity terms.

Practice standards

Practice standards in accounting, reporting, and ratemaking are aimed toward the economic performance of utilities in meeting their service mandates. Systems of scale and fiscally autonomous systems, regardless of ownership, are more likely to comply with generally accepted standards and practices. Financial and economic regulators can promulgate their own standards and compel compliance by jurisdictional utilities. Standards could be further developed for core utility obligations, including the provision of safe, adequate, and reliable service (see Rubin 2011). Standards supporting managerial competence for all water systems can help level the public–private playing field (Wolff and Palaniappan 2004).

For obvious reasons of public health and environmental protection, water supply is a standards-driven industry and mechanisms for enforcement are central to performance. In the US, stringent federal standards for community water systems and capacity-development programs are implemented by state environmental agencies. Water-quality regulation disregards ownership entirely and takes size into consideration, mainly for purposes of capacity assessment and assistance. In addition, the industry as a whole benefits from a professionalized workforce supported by the American Water Works Association (AWWA) and the Water Research Foundation (WRF). AWWA develops general technical and managerial standards for the industry, sometimes in concert with global partners such as the International Water Association.

Cost accounting is a vital practice area. Regulatory accounting varies from Generally Accepted Accounting Principles (GAAP) and tax accounting with regard to issues unique to regulatory policy (such as regulatory assets and liabilities, depreciation rates, and tax deferrals). To these ends, economic regulators establish uniform systems of accounts (USOA) for jurisdictional utilities that detail income statement and balance sheet schedules as well as requirements for supporting documentation. For the water sector, state commissions apply or adapt the system of accounts published by the National Association of Regulatory Utility Commissioners (NARUC 1996), specified by utility size. The system is designed to facilitate common regulatory and ratemaking processes. Many unregulated utilities actually follow an approach based on the NARUC system.

Taken together, GAAP and the USOA are the basis for cost knowledge, and provide for a relatively high degree of reporting consistency across systems within and, to a large extent, across ownership categories. Building on the accounting standards and the accrual method, most privately-owned and regulated water utilities follow the ‘utility basis’ for determining a utility’s revenue requirements (which includes recovery of depreciation expenses). Many publicly-owned utilities follow the ‘cash-needs basis,’ although many larger systems seem to be gravitating toward the utility basis.

Financial accounting and ‘segment reporting,’ have been recognized as relevant institutional tools, particularly in the context of ‘corporatization’ (Osculati, Nicolò, and Vermiglio 2011). Enterprise autonomy and reporting standards facilitate transparency and promote accountability. Annual and other financial reports for publicly

traded companies are readily available and accessible. Larger publicly-owned systems tend to follow similar practices. Reports provide not only financial data and risk disclosure, but contextual details on operations for use in performance evaluation. The information must be sufficiently comprehensive, specific, and accurate to earn a clean and unqualified opinion from an independent auditor (appearing in each report). Noncompliance with standards raises red flags to financial and regulatory auditors.

Rising infrastructure costs and resource costs, in the wake of considerable economic and fiscal stress, have brought more attention to ratemaking practices, particularly the concept of full-cost pricing. Increasingly, utilities are expected or mandated to be self-sustaining (Rehan et al. 2011). Ratemaking for US water utilities cannot be considered highly standardized; methods vary widely, particularly among unregulated utilities. However, certain core principles are widely accepted and practiced in regulatory economics. In essence, utility rates are expected to serve several purposes simultaneously: revenue recovery; fair cost allocation; efficient resource use; practicality and acceptance; interpretability; revenue stability; rate stability; discrimination avoidance; innovation; and consideration of externalities (Bonbright et al. 1988).

The general alignment of prices with costs and rational cost allocation are considered equitable, efficient, and consistent with sound resource management. Autonomous enterprises must rely on revenues from operations, primarily revenues from sales but also appropriate cost-based fees related to service provision. Importantly, publicly- and privately-owned systems may have different pricing priorities and goals with distributional implications for utilities and customers. Cost-based ratemaking can accommodate reasonable variation to satisfy social priorities, such as affordability and economic development, particularly when they can be reconciled with overall efficiency. Prevailing ratemaking theory, however, favors the use of tax instruments over 'social ratemaking' for these purposes regardless of system ownership.

The role of standards in performance and governance is also gaining attention. The principle of full-cost recovery has been adopted in the Water Framework of the European Union (Unnerstall 2007). Accounting, reporting, and ratemaking standards support performance accountability for utility enterprises and professionalization of the workforce. Professional networks shape and are shaped by practice standards and support a culture of compliance. Standards also improve the availability and comparability of data for empirical research and benchmarking (Paralez 2001). External reviewers and regulators can adopt or enhance standards as well as impose incentives and enforcement.

External review

Professional standards require technical knowledge and are largely self-regulatory, but they may be insufficient for public purposes and cannot substitute for independent review. Accountability is associated with outside auditors, financial markets, advisory boards, and independent regulators (Baietti et al. 2006). Ideally, widely respected practice standards will lay the foundation for industry-wide acceptance such that investors, creditors, insurers, and even the media consider compliance in their evaluations and noncompliance has material consequences (including but not limited to regulatory enforcement).

General US accounting standards are established by the twin boards of the not-for-profit Financial Accounting Foundation operating with parallel missions to establish and improve accounting and reporting: the Financial Accounting Standards Board (FASB) for private entities and the Government Accounting Standards Board (GASB) for public entities. FASB standards are recognized as authoritative by the federal Securities and Exchange Commission (SEC), which oversees financial reporting and securities issuances for publicly traded companies, including investor-owned utilities. GASB standards are recognized by government auditors and credit rating agencies.

FASB and GASB establish standards through rulemakings. Of note are FASB 71, which gives specific guidance to regulated private utilities, and GASB 34, which establishes reporting requirements for state and local governments, utilities included. One of the important effects of GASB 34, issued in 1999, was to require publicly-owned utilities either to report depreciation of infrastructure assets on their statements of activity or demonstrate how asset-management practices are used to maintain asset value.

Sound and transparent accounting and reporting are critical to utility financing and the cost of capital as determined by debt and equity markets. Cutler and Miller (2005) attribute the rapid expansion and improvement of the US municipal water sector throughout the nineteenth century – and the co-benefits of supply adequacy, disease control, fire protection, and economic development – to emergent municipal bond markets, which provided debt capacity for large-scale infrastructure. These developments, they note, served the public interest and improved public welfare, despite the rampant corruption of the era.

Although narrow in focus and lacking in formal authority and independence, credit ratings constitute a form of market-based performance review. The World Bank (2012) has recognized the role of credit ratings to improve water system access to capital markets in the development context. Credit worthiness is a determinant of the cost of capital, which is recoverable from utility ratepayers. Publicly and privately-owned water utilities in the US enjoy high and stable credit ratings (S&P 2012a, 2012b) and almost no defaults (Moody's 2009).

Publicly-owned and not-for-profit utilities rely on debt financing, although only 1500–2000 are large enough to issue their own bonds (Johnson Foundation 2012). For larger municipalities, capital projects are typically 35–70% debt-funded (S&P 2012b). Highly rated municipal water utilities tend to have strong enterprise and financial risk profiles as well as long-term planning and risk-management processes (S&P 2012b).[8] Privately-owned utilities rely on a capital structure that combines debt and equity and is subject to regulatory review. Comparing favorably to the industrial sector as a whole, the 16 major investor-owned utilities have earned an excellent business risk profile and an intermediate to aggressive financial risk profile; the latter is associated with corporate credit ratings ranging from A + to BBB + and stable (S&P 2012a).

Credit scores are based on compliance with rating standards that consider both internal and external dimensions of utilities, including whether the regulatory environment is 'credit supportive.' Moody's (2009) evaluates regulatory environment and asset ownership models, operational characteristics and asset risk, stability of business model and financial structure, and key credit metrics. According to S&P (2012b), 'The viability of the regulatory compact is becoming increasingly critical in enabling water utilities to access the public debt markets because all water

entities have large capital spending requirements and need a continual source of financing.' The increasing influence of credit ratings suggests the need to consider conscious and unconscious biases (Boylan 2012) as well as regulatory mechanisms to ensure the independence and accountability of rating agencies.

Enterprise autonomy

Autonomy insulates professional managers from 'arbitrary interference' (van Ginneken and Kingdom 2008) with regard to important decisions affecting performance results, 'such as responsibility for setting tariffs, determination of pay scales, procurement, financial policy, and the responsibility for the appointment of top management and board members' (Baietti et al. 2006). According to one observer,

> autonomy insulates the system from the need to depend on legislative bodies and their largesse ... It probably works as well as privatization, and it helps avoid a public perception that the municipality has lost ownership and control of their assets.[9]

In the US, the concept of 'enterprise' is favored over the term 'corporatization,' but both capture the concept of fiscal and organizational separation to break the codependence of local governments and utilities. Fiscal relationships between cities and utilities are considered by external rating agencies.

Enterprise autonomy may be gaining recognition as a structural performance driver apart from ownership (see Rehan et al. 2011). Autonomy has a direct bearing on incentives and efficiency. Privately-owned utilities are fiscally autonomous because they have no other pockets in which to reach other than those filled from the core enterprise.[10] Although publicly-owned utilities may be embedded in local governments, many are financially segregated and self-sufficient by design or by necessity in the face of rising costs and fiscal constraints. Autonomy matters not only to operational efficiency but also to efficiency in resource allocation through full-cost pricing. Autonomy thus supports sustainability by requiring water systems to live within their economic means, assuming they also comply with performance standards.

Central to the argument for privatization is the enticement of the 'bottom line' associated with net income or 'profits.' As employees or shareholders, private managers with a direct stake in profitability will be driven to perform in ways that serve their personal self-interest, including enrichment through salaries and ownership shares, which is why checks on performance are needed (namely, competition or regulation). Challenging the rationality or relevance of profit motive is beyond the present analysis. The thinking that can be challenged is that bottom-line incentives are the exclusive domain of the private sector when, in fact, most organizational managers are keenly aware of the consequences of budget balancing for themselves and their organizations. Personal accountability and fear of losses are powerful motivators. It is not necessary to be a shareholder to be a stakeholder in organizational success or failure. Neither public nor private managers can raise rates for service without scrutiny; despite institutional differences, aversion to budget and rate reviews is a shared behavior. A relevant question is whether and how *profit* adds incentives at the margin and to what effect. Indeed, managerial compensation may be more relevant (Kihm 1991; Wolff and Palaniappan 2004) and a fiscally autonomous organization may be better positioned to make use of managerial performance rewards.

Census data for local publicly-owned water systems in the US reveal a widening gap between operational revenues and expenses, including capital outlays (Figure 2).

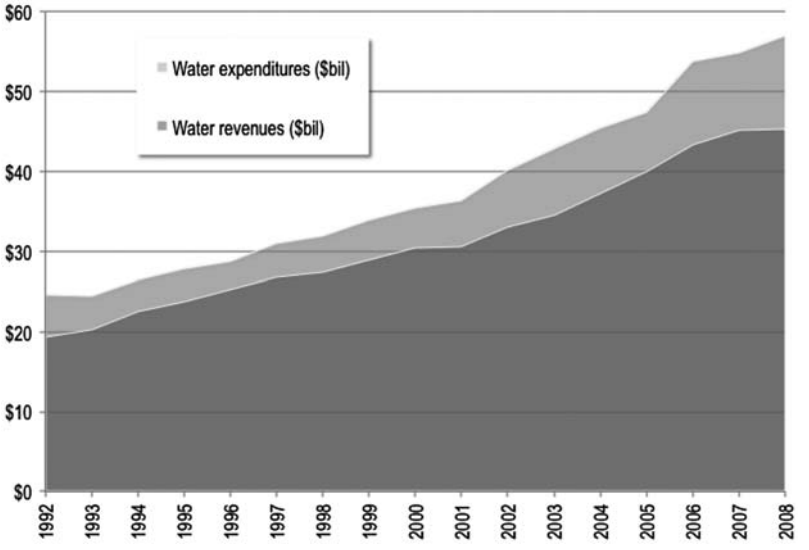


Figure 2. Revenue-expenditure gap for local publicly-owned water systems. Source of data: US Bureau of the Census (2011).

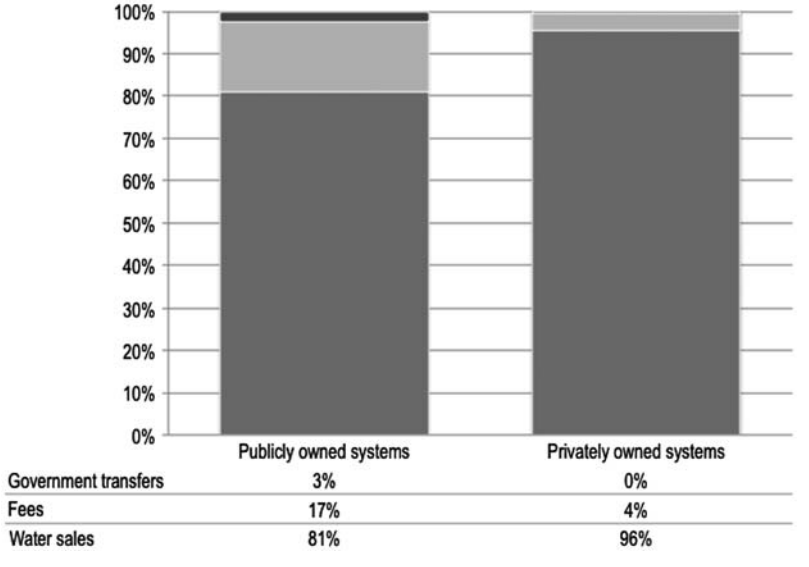


Figure 3. Allocation of water system revenues and expenses by ownership. Source of data: USEPA (2009). Excludes ancillary systems.

These findings are not conclusive, as they do not discern the extent to which the gap is filled by subsidization or leveraging. EPA data indicate that publicly-owned systems are more likely than privately-owned systems to rely on revenues from transfers and fees as compared to sales (Figure 3). Tariffs for both publicly- and privately-owned utilities include cost-based connection fees, but substantial 'system-development' charges by local governments to property developers is suggestive of taxation.

Enterprise autonomy can be accomplished structurally or functionally. Structural separation involves formation of a legally independent entity, which may be publicly or privately owned. In the US, regional water districts and public authorities operate as units of local government apart from municipalities with legal and fiscal accountability and independent authority, including the ability to set tariffs. Some privately-owned utilities operate on a not-for-profit basis.

Structural separation may be desirable but not essential. With functional separation, utility operations are segregated within the governmental entity and financial assets are 'ring fenced' administratively. Autonomy means that revenues from service support the cost of service, including operating and maintenance expenses, taxes and equivalents, and all capital-related costs (financing and depreciation). Revenues are held in restricted enterprise or proprietary funds that cannot be diverted to other purposes; normally, detailed enterprise financial reports are prepared and audited. An advantage of structural separation is the added measure of independence from local political control.

Although utilities such as the Chicago Department of Water Management operate as units within city government, most larger US water utilities operate according to an enterprise model (see the Appendix). Some, including New York City and Denver, have independent oversight boards. The enterprise orientation is especially apparent for governmental utilities, such as the Philadelphia Water Department, that engage explicitly in 'investor relations.'[11]

Two unique structural hybrids found in the middle US draw strength from the public and private models. The Louisville Water Company is organized as a wholly-owned municipal corporation and serves 850,000 people in and near Louisville, Kentucky. The mayor appoints a board, whose members come from both political parties and serve staggered terms. The company enjoys high-quality bond ratings and pays a healthy dividend annually to its single shareholder, the City of Louisville. Audited financial statements demonstrate enterprise autonomy and financial solvency. Canada's EPCOR, which also operates systems in the Southwest US, is similarly structured.

Another intriguing prototype is found in what was once the inveterate Indianapolis Water Company, which morphed from private ownership to municipal ownership with private operation and later to a charitable public trust. Benefits of the trust 'include cost and rate benefits relating to tax-exempt financing access and the absence of a need for shareholder returns in rates' in keeping with the vision of founders 'to provide utility services at cost to Indianapolis families and businesses and protect critical Indianapolis utility infrastructure from private monopoly.'[12] State law provides for governance of the trust.[13]

Enterprise autonomy may not eliminate all financial transfers, but it generally limits them based on justifiable cost and risk allocation. Social equity goals may call for a judicious use of subsidies, particularly in the development context: 'A utility cannot satisfy its consumers and serve the poor if it is not financially viable and sustainable. Tariffs, subsidies, [and] the ring-fencing of financing for the utility therefore needs to be part of the reform process' (World Bank 2004).

Economic regulation

Regulation is an authoritative, and thus more formal, governance institution. Empirical research lends support for the relevance of market structure and industrial

organization as well as government management, oversight, and regulation to performance (Bel and Warner 2008). Aubert and Reynaud (2005) found that the most efficient water utilities were those subject to an information-intensive rate-of-return regulatory regime.

In the US, private ownership of utilities almost invariably invites economic regulation.[14] For the energy and telecommunications sectors, jurisdiction is shared between the federal and state governments. For the water sector, economic regulation is the exclusive domain of the states. Although water systems in the US are prolific, economic regulation is not; most publicly-owned or not-for-profit systems are exempt (Table 3). Considering industry demographics, and the dominance of the public sector, regulation's reach is limited to numerous small water systems and a few large companies. Parsing the effects of regulation and ownership on performance is a conceptual and empirical challenge.

Lacking market discipline, utility monopolies must be held accountable through public ownership, economic regulation, or perhaps both. The regulatory paradigm rests on a 'social compact' from which institutional form and function are derived. Independent regulation 'in the public interest' provides an imperfect but essential surrogate for competition to ensure not just economic efficiency but also social equity. Regulation is vital when the private sector is involved in the provision of utility services. Unmitigated privatization can lead to service curtailment, degradation, or discrimination as monopolists seek to exploit market power and maximize profits. Privatization of public utilities is not always feasible or desirable, but privatization without regulation is economically undesirable and politically untenable.

Although regulation provides many institutional functions, price regulation is at the core. US commissions generally apply the long-standing ratebase/rate-of-return (RB/ROR) form of ratemaking, compared with the price-cap model practiced elsewhere. Price-cap regulation is often dubbed 'incentive regulation,' but the two models are essentially variations on a theme; underperformance thwarts profitability in either case. Utilities must control costs between rate adjustments in order to achieve allowed returns (a function of 'regulatory lag'). Because profits attach to the rate base under this model, utilities that anticipate reasonable returns are strongly motivated to make long-term capital investments. Regulators apply stringent standards of review to ensure that utility investments and expenditures are

Table 3. State economic regulatory jurisdiction for the water sector, 2011.

	Number of commissions regulating	
	Water	Wastewater
Investor-owned (private) utilities	45	33
Combination companies	31	31
District or authority	20	10
Associations, including homeowners	19	11
Municipal utilities	13	6
Cooperatives	9	4
Mobile home parks	4	3
Not-for-profit companies	4	1
Wholesale (resale) systems	2	1
Irrigation systems	2	-

Source of data: Survey by the Institute of Public Utilities (2011), available at ipu.msu.edu. Five states have no jurisdiction and essentially no private presence in the water sector.

prudent and that resulting profits and prices are just and reasonable. Practice standards and performance benchmarks can facilitate prudence reviews and the cost of imprudence is borne by shareholders.

Historically, state regulation was viewed as an alternative to municipal oversight of utilities because of perceptions that local control would suffer from inadequate information, limited competence, political influence, mismatched boundaries, and duplicative effort (Crow 1934). A salient governance question today is whether economic regulation should be extended to the public sector to motivate performance in the absence of profit (Beecher 2009; Beecher and Kalmbach 2013). Regulation can mitigate perceived biases and proclivities of the public sector as well as the private sector (Table 4). To an extent, regulation in the public interest reorients the private sector from profits and the public sector from politics. Utilities in both sectors embody the problem of monopoly and the need to balance the interests of ratepayers and investors is equally valid. Given public accountability and lesser concerns about abuse of market power, public-sector regulation can take a 'light-hand' approach.

Valid arguments have been made for local control and 'regulation' of water utilities. Regulation by the state may not be necessary for well-governed autonomous systems. Some cities may be well positioned to self-regulate local services and many municipal or regional utility boards are very effective. Profit motive is not a concern. Regulation may seem to present an unnecessary and expensive administrative process and price adjustments typically can be made more quickly outside of formal regulatory review. Regulators may be perceived as unresponsive to local concerns and communities may want discretion in managing and pricing utility services consistent with local goals and values.

The state, however, brings to regulation relatively greater capacity and technical expertise. Despite relatively limited jurisdiction, generally accepted regulatory practices are considered authoritative in the water sector. Regulators can recognize, establish, strengthen, codify, and enforce practice standards, imposing audits, fines, and penalties as necessary. Uniform rules and methods can provide continuity, transparency, and accountability in accounting, reporting, and ratemaking across differently structured systems. Administrative due process provides for consumer protection and dispute resolution. Regulation can help overcome cost allocation controversies within regional water systems. As a form of institutional governance, one of regulation's chief benefits is in depoliticizing rates (by at least one degree), which in turn builds public trust as well as investor and creditor confidence.

Table 4. Mitigating effects of economic regulation.

	Private sector	Public sector	Regulation
Orientation	Profits	Politics	Public interest
Goal	Maximizing returns	Controlling prices	Balancing interests
Investment	Overinvestment	Underinvestment	Prudent investment
Financing	Equity market	Bond market	Capital structure
Pricing	Overpricing	Underpricing	Efficient pricing
Risk	Socialization	Avoidance	Allocation
Governance	Shareholders	Councils	Commissions
Clientele	Customers	Voters	Ratepayers
Accountability	Boards	Elections	Due process

Source: Author's construct.

When extant, regulation of publicly-owned utilities in the US appears remarkably effective. Two state jurisdictions stand out. The Wisconsin Public Service Commission, well known in the progressive tradition of regulatory governance, is unique in having original, comprehensive, and mandatory regulatory jurisdiction for municipal water supply.[15] Authorizing legislation in 1907 was premised on the idea 'that the fundamental purposes of regulation could best be attained by state rather than local control' (Crow 1934). From its inception, the state called for uniform accounting and principled ratemaking (Hudnall 1907). Wisconsin regulators adopted the leading AWWA cost-allocation model in 1974, which remains in use today. Detailed service standards have been codified (Wisconsin Chapter PSC 185). Utility annual reports, tariffs, and billing data are accessible online, as are statistical and accounting benchmarks.[16]

In Indiana, publicly-owned systems can submit to state oversight voluntarily; many do, even though they must accept regulatory risk and support the cost of regulation through fees. Presumably, regulated cities view the process as beneficial both functionally and politically. Regulators oversee almost equal numbers of public, private, and not-for-profit systems (Figure 4). Data confirm that regulation does not overcome the significant rate disparity between publicly and privately-owned systems.[17] Although limited, these findings offer insight because they control generally for accounting, ratemaking, and regulatory practices.[18]

A survey of water utility rates in the US Great Lakes region illustrates potential structural and institutional influences (Beecher and Kalmbach 2013). The survey was limited to a non-random sample of the ten largest systems in eight states (controlling somewhat for scale). Although varying widely, average bills in the region are comparable to national estimates. Sample bills were calculated to include all recurring fixed and variable charges at different meter sizes and usage levels (Figure 5). Significant bill disparities are found across systems, converging somewhat for commercial and industrial users. Bills for private systems are about double

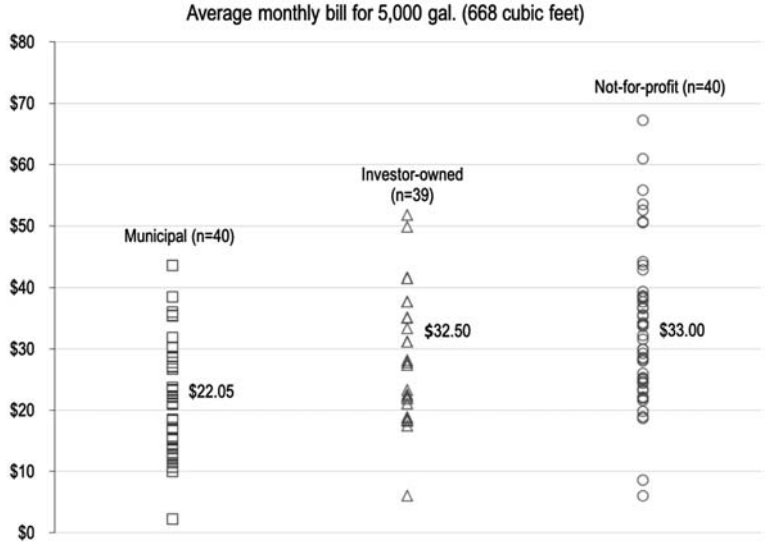
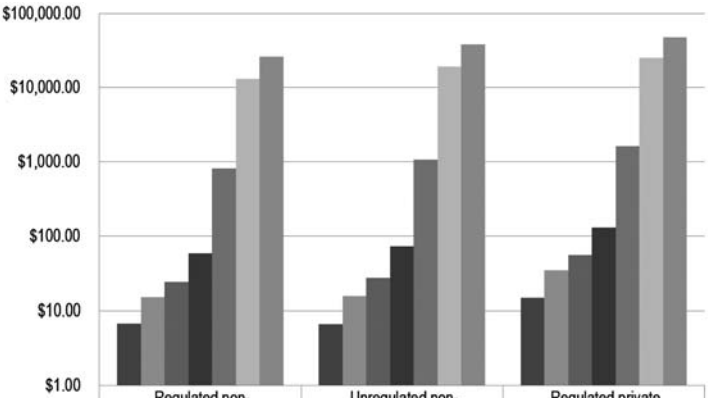


Figure 4. Average rates by type of regulated water system (Indiana).
Source of data: Indiana URC (2012).



	Regulated non-private (16)	Unregulated non-private (51)	Regulated private (13)
0 cf (min. bill)	$6.68	$6.61	$14.66
500 cf (3,740 gal.)	$14.92	$15.64	$34.71
1,000 cf (7,480 gal.)	$24.03	$27.29	$55.13
3,000 cf (22,440 gal.)	$58.51	$73.04	$128.93
50,000 cf (374,000 gal.)	$815	$1,079	$1,613
1,000,000 cf (7.5 mil. gal.)	$13,222	$19,193	$25,171
2,000,000 cf (15 mil. gal.)	$26,167	$38,071	$47,849

Figure 5. Charges for monthly water usage in the US Great Lakes Region.
Source: Beecher and Kalmbach (2013). The sample size is slightly smaller for the industrial class.

those for non-private systems. Bills are generally lower for municipal systems and more so for residential customers, consistent with the hypothesis that publicly-owned systems may be responsive to ratepayer-voters. However, bills for regulated non-private systems are generally lower than for unregulated non-private systems. Across all usage levels, bills in the 'all regulated' states of Wisconsin (public only) and Indiana (public and private) were comparatively lower, lending some support for the potential value of comprehensive economic regulation.

When operational responsibility is delegated by the public to the private sector, institutions that ensure accountability and guard against exploitation may be especially critical. In fact, given the nature of utility services, including but not limited to monopolization, regulatory institutions should be regarded as a necessary condition for privatization to any degree (see Kikeri et al. 1992; Archer 2007; Beecher 2009). Regulatory and other forms of governance are needed to ensure adequate oversight, specify performance criteria, and enforce compliance. In transitional political economies, building institutional capacity is a paramount need (Tan 2011). Regulation is protective of customers and cities but also private operators. Unsurprisingly, well-established regulatory independence is central to Moody's global water utility rating system, defined in terms of stability, predictability, transparency, and methodological consistency (Moody's 2009).

As a form of governance, economic regulation should not be idealized and is no panacea. Like markets, regulation can fail by design or in the course of implementation. Regulation is an independent but essentially nondemocratic institution that may not be adequately responsive to competing values and priorities. It might be viewed as a needless encroachment that imposes unwelcome transaction costs and decision lag. To work, regulation requires institutional legitimacy, stakeholder acceptance, and the public's trust. Regulation rests heavily on the commitment of regulators to

Table 5. Relating structures and institutions to utility performance.

	Structural governance			Institutional governance		
	Ownership form	Practice standards	Enterprise autonomy	Market contestability	External review	Economic regulation
Economic performance						
Efficiency & innovation	▪	▪	▪	▪	▪	▪
Risk management	▪	▪	▪	▪	▪	▪
Cost-based pricing	▪	▪	▪		▪	▪
Infrastructure investment	▪	▪				▪
Prudence review						▪
Financial performance						
Credit quality	▪	▪	▪	▪	▪	▪
Capital attraction	▪	▪	▪	▪	▪	▪
Capital structure	▪	▪	▪	▪	▪	▪
Revenue stability		▪	▪		▪	▪
Incentive returns	▪					▪
Service performance						
Workforce development	▪	▪	▪		▪	▪
Reliability, safety, quality		▪			▪	▪
Enforcement						▪
Sustainability		▪	▪		▪	▪
Rate equity		▪		▪		▪
Rate stability		▪			▪	▪
Consumer protection		▪				▪
Procedural performance						
Legitimacy & accountability		▪	▪		▪	▪
Transparency		▪	▪		▪	▪
Uniformity		▪			▪	▪
Due process						▪

Source: Author's construct.

public service and the public interest but the institution can suffer from opportunism, capture, and failure. Corrupt public regulation is obviously no better than corrupt public ownership; regulators must be free from political interference yet accountable for fair and ethical conduct. Effective regulation is contingent on reinforcing institutions that place checks on regulatory failure. Nonetheless, given potential consequences, imperfect regulation is generally preferable to imperfect markets.

Conclusions

Contemplating the relevance of ownership to utility performance is a perennial pursuit. The idea that governance matters, regulation in particular, is hardly original:

> It would be well if we recognized once and for all that some of the most vital business problems of utilities are not solved by changing form of ownership … There is no merit in private ownership and operation merely because the utilities are privately owned and operated … [T]here is no merit in public ownership and operation of utilities merely because they are publicly owned and operated … Any long-range,

> fair test of the merits of either is dependent upon competent, continuous regulation. (Ruggles 1937)

Still, water sector reforms continue to place a disproportionate emphasis on privatization and liberalization to the neglect of other dimensions of performance and the synergies among them. Paradoxically, some view privatization as a viable structural option not when prevailing institutions are strong (i.e., capable) but when they are weak (i.e., corrupt). Privatization is ideally considered from a position of institutional strength, particularly established regulatory capacity. While privatization can play a role in the sector, it may not be feasible or desirable and it may be unnecessary. Given water's intimate bearing on human subsistence and health, profits from its provision will always be controversial and should never come at the expense of the public interest. Even well-regulated returns may be politically unpalatable and the marginal benefits of changing ownership must be measured against both economic and political realities (see Prasad 2006).

Any potential performance advantages of private ownership may be contingent on other forms of governance and associated incentives. In the US, private systems of scale are managed as autonomous enterprises. They follow practice standards and are subject to external review. They face some degree of market contestability. Perhaps most importantly, almost all private systems are subject to economic regulation, whereas most (but not all) publicly-owned systems are exempt. Governance modes are connected to privatization, but not inexorably so. Privatization need not be a prerequisite for reform and, logically, these governance modes could be extended to variously structured utilities. Thus, economic regulation of public enterprise is a reasonable alternative to privatization.

The US now draws on more than 100 years of experience in public utility regulation. Regulation has always been imperfect, but it is well institutionalized. Building on the conceptual framework and the US experience, Table 5 hypothesizes about the influence of structural and institutional governance dimensions for specific areas of utility performance. Economic regulation is clearly favored in this subjective analysis because it covers a wide spectrum of criteria. A legitimate and authoritative system of independent regulation will complement the other dimensions while adding authoritative measures, including standards of review, mechanisms of enforcement, and procedural protections. Practice standards, enterprise autonomy, and external review are expected to have more meaningful linkages to performance than ownership form or market contestability. A pragmatic approach to reform is to strengthen core governance capacities in relation to performance priorities, which ultimately matter most of all.

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Notes

1. The author first asserted 'it depends' to much chagrin at a 1996 academic colloquium.
2. According to the Global Water Partnership (2002), 'The current water crisis is mainly a crisis of water governance.'

3. The Baietti, et al. (2006) framework emphasized managerial capacities related to six dimensions: external autonomy, external accountability, internal accountability for results, market orientation, customer orientation, and corporate culture.
4. Scale economies, as measured by operating expenses per gallon sold (excluding debt and other capital-related costs), are apparent for publicly- and privately-owned utilities; small privately-owned utilities are more efficient than small publicly-owned utilities, but large publicly-owned utilities are more efficient than large privately owned utilities (Renzetti and DuPont 2004; USEPA 2009).
5. In the US, environmental regulators count 'systems' and economic regulators count 'utilities.'
6. The largest of the IOUs are also known as 'public corporations' because ownership shares can be traded on the stock exchanges; some operate as multi-state holding companies.
7. Scale may be limited by geopolitical boundaries and regulations, including franchises and certificates of need.
8. A potential advantage of local governments in debt financing is that property owners can face liens if they fail to pay their water bills.
9. Private communication from a senior regulatory staff analyst in 2012.
10. Regulatory segregation of financial assets is assumed.
11. See www.phila.gov/water/invest_relations.html.
12. Citizens Energy Group 2011 Annual Report (available at www.citizensenergygroup.com).
13. Indiana Code 8–1-11.1–1 (2012).
14. A few states exclude very small private systems from regulation.
15. The private water sector has no presence in the state except for not-for-profit systems, which are not regulated.
16. Wisconsin Public Service Commission website at psc.wi.gov.
17. Higher rates for the not-for-profit systems are likely attributable to the comparatively small scale of operations.
18. Rates reveal little about efficiency due to cost-of-service differences, some of which are due to scale. Higher prices may be *more* efficient than lower prices if cost based.

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Appendix. Characteristics of the largest water systems in the United States

System	State	Water population served (000)	Operating revenues (000)	Ownership form	Credit ratings	Enterprise fund	Oversight board	Economic regulation
New York City Water & Sewer System	NY	8000	$3068,306	Municipal	AA+ (F)	Yes	Yes	No
Los Angeles Dept. of Water and Power	CA	4095	$757,000	Municipal	AA	Yes	Yes	No
San Diego County Water Authority	CA	3140	$383,500	County	AA+	Yes	Yes	No
Chicago Dept. of Water Management	IL	2896	$657,570	Municipal	AA	Yes	No	No
Massachusetts Water Resources Authority	MA	2360	$602,620	State govt.	AA+	Yes	Yes	No
Houston Department of Public Works	TX	2257	$892,064	Municipal	Aa2 (M)	Yes	No	No
Miami-Dade Water and Sewer Department	FL	2100	$545,660	County	A+	Yes	No	No
Washington Suburban Sanitary Commission	MD	1800	$583,600	Municipal	Aaa (M)	Yes	Yes	No
Baltimore Department of Public Works	MD	1600	$341,111	Municipal	AA	Yes	No	No
Philadelphia Water Department	PA	1600	$558,483	Municipal	A	Yes	No	No
Phoenix Water Service Department	AZ	1534	$621,661	Municipal	AAA	Yes	No	No
Cleveland Public Water System	OH	1500	$210,572	Municipal	AA	Yes	No	No
San Antonio Water System	TX	1343	$406,238	Municipal	AA	Yes	Yes	No
Metropolitano	PR	1339	n/a	Municipal	n/a	n/a	n/a	No
East Bay Municipal Utility District	CA	1300	$370,480	District	AAA	Yes	Yes	No
Dallas Water Utilities	TX	1281	$524,281	Municipal	AAA	Yes	No	No
Las Vegas Valley Water District	NV	1276	$333,105	District	AA+	Yes	Yes	No
San Diego Public Utilities	CA	1267	$729,246	Municipal	AA-	Yes	No	No

(*Continued*)

Appendix. (*Continued*).

System	State	Water population served (000)	Operating revenues (000)	Ownership form	Credit ratings	Enterprise fund	Oversight board	Economic regulation
Suffolk County Water Authority	NY	1100	$150,246	Authority	AA+	Yes	Yes	No
Missouri American St. Louis County	MO	1050	$243,100	Private	BBB+	n/a	Yes	Yes
Columbus Public Water System	OH	1018	$380,623	Municipal	AA+	Yes	Yes	No
Denver Water Board	CO	1000	$239,186	Municipal	AAA	Yes	Yes	No
San Jose Water Company	CA	998	$234,346	Private	A	n/a	Yes	Yes
Detroit Water and Sewerage Department	MI	899	$726,721	Municipal	A	Yes	Yes	No
Indianapolis Citizen's Energy Group	IN	870	n/a	Public Trust	A+	n/a	Yes	Yes

Sources of data: Population served (USEPA, 2012); credit ratings (Standard and Poor's or by Fitch (F) and Moody's (M), as indicated); financial data are from reports and budgets (fiscal year 2011 or 2012 for water-related operations); n/a = not available or not applicable. Operating revenues are for all water related services.