

Annotated Bibliography

Global Study on the Aggregation of Water Supply and Sanitation Services

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Abbot and Cohen (2009), "Productivity and Efficiency in the Water Industry."	The article briefly reviews the various measures that have been used to gauge productivity and efficiency in the water sector. It summarizes the key structural findings that have been determined and considers potential areas for future research.	Literature review	International	The article discusses input and output data requirements for productivity and efficiency measures, findings related with scale and scope, public versus private ownership of assets and the impact of regulation, and roads for future environmental and other research.	http://www.sciencedirect.com/science/article/pii/S0957178709000241
ACIL Tasman Pty. Ltd (2007), <i>Size and Scope Economies in Water and Wastewater Services: An Investigation into Economies of Size and Scope Associated with Alternative Structures for the Water Corporation's Activities.</i>	The report seeks to investigate economies of size and scope associated with different configurations of the Water Corporation's operations (Australia).	Conceptual discussion Comparison with other infrastructure sectors that have been unbundled	Australia	The report supports the view that system size economies have been accessed with a much less aggregated system in electricity sector than in water sector. Different stages of water supply and sanitation (WSS) are analyzed in the search for economies of scale.	http://www.erawa.com.au/cproot/6227/2/ACIL%20Tasman%20-%20Size%20and%20Scope%20Economies%20in%20Water%20and%20Wastewater%20Services.pdf
Agrawal (2009), <i>Performance Improvement Planning: Enhancing Water Services through Performance Agreements.</i>	The article analyzes performance agreements that could help bring about a change in the way services are delivered in a sustainable manner, through a change in institutional arrangements and associated incentives. Such contractual arrangements are customer oriented and are based on financial viability.	Conceptual and applied discussion	India	This field note uses global experiences to explain some of the arrangements and brings out lessons learned in the Indian context.	http://documents.worldbank.org/curated/en/346331468337191655/pdf/715250BRI0Box370077B00PUBLIC00IP50Press.pdf

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Allers and Geertsema (2014), "The Effect of Local Government Amalgamation on Public Spending and Service Levels: Evidence from 15 Years of Municipal Boundary Reform."	The paper studies how municipal amalgamation affects local government spending and public services level.	Empirical investigation	The Netherlands	Although amalgamation reduces government budget spending, there is no corresponding spending increase in public services. Also, amalgamation does not increase house prices, as an approximate indicator of better services.	https://www.coelo.nl/images/artikelen/The_effects_of_local_government_amalgamation_on_public_spending_taxation_and_service_levels.pdf
Andrews, Pritchett, and Woolcock (2012), "Escaping Capability Traps through Problem-Driven Iterative Adaptation (PDIA)."	The document points out that many reform initiatives in developing countries fail because they are merely "isomorphic mimicry," pretending to reform policies by changing only the appearance, not the substance. This dynamic yields capability traps, in which state capacities deteriorate.	Analytical discussion	Worldwide	The report proposes an approach called Problem-Driver Iterative Adaptation to escape capability traps. It focuses on solving locally identified and defined problems of performance. The approach is flexible and iterative.	https://www.cgdev.org/publication/escaping-capability-traps-through-problem-driven-iterative-adaptation-pdia-working-paper
Antonioli and Filippini (2001), "The Use of a Variable Cost Function in the Regulation of the Italian Water Industry."	The paper estimates a multivariate variable cost function to analyze the cost structure of a sample of Italian water distribution companies to improve the tariff regulation process.	Econometric appraisal	Italy	The results underline the importance of explanatory variables such as cost of labor, water loss, and service area characteristics. Also, they indicate the existence of economies of output and customer density and the presence of small diseconomies of scale.	http://www.sciencedirect.com/science/article/pii/S0957178702000656
Ashton (1999), "Economies of Scale, Economies of Capital Utilisation and Capital Utilisation in the English and Welsh Water Industry."	The study estimates a variable cost model of the UK water industry. From this variable cost function, estimates of economies of scale and economies of capital utilization and capacity utilization are drawn.	Econometric appraisal of cost function for water supply and sanitation companies	England and Wales	The results indicate that if the water industry has not been in long-term equilibrium (in terms of capital), both merger and acquisition among water companies are not justified in terms of cost efficiency. A low level of capital utilization is indicated for the water industry.	https://www.researchgate.net/publication/4999428_Capital_Utilisation_and_Scale_in_the_English_and_Welsh_Water_Industry

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Aulich, Sansom, and McKinlay (2014), "A Fresh Look at Municipal Consolidation in Australia."	The article studies 15 cases of different forms of municipal consolidation, including amalgamation, together with a series of interviews of senior practitioners from the local government sector.	Case studies and interviews	Australia and New Zealand	The data reveal little evidence of consistent economies of scale from consolidation. However, both case studies and interviews show that consolidation generated economies of scope and some strategic capacity.	http://www.tandfonline.com/doi/abs/10.1080/03003930.2013.775124?src=recsys&journalCode=flgs20
Baietti and Curiel (2005), "Financing Water Supply and Sanitation Investments: Estimating Revenue Requirements and Financial Sustainability."	The paper examines the applicability of conventional formulas to determine revenue requirements for average tariffs. It discusses the impact of capitalization issues on revenue requirements and also highlights intangible impacts.	Conceptual discussion Policy paper	Worldwide	The paper develops the concept of appropriate costs to assess proper tariffs.	http://documents.worldbank.org/curated/en/505111468322452330/Financing-water-supply-and-sanitation-investments-estimating-revenue-requirements-and-financial-sustainability
Baietti, Kingdom, and van Ginneken (2006), "Characteristics of Well-Performing Public Water Utilities."	The study examines water supply and sanitation utilities and their sustainability. Changes occurred from old monolithic local monopolies and new complex services.	Case studies on commonalities of well-run public utilities	Mexico	The study identifies actions for management improvement of utilities that their owners could implement.	http://siteresources.worldbank.org/INTWSS/Resources/Workingnote9.pdf
Baranzini and Faust (2010), "The Cost Structure of Water Utilities in Switzerland."	The study estimates economies of product density, consumer density, and scale for the Swiss WSS. It contemplates environmental factors on costs beyond output and input prices.	Empirical investigation	Switzerland	The study finds moderate returns to production density, which decrease with the utility size.	https://hesso.tind.io/record/264/files/lm.pdf

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Barraqué (2003), "The Three Ages of Engineering for the Water Industry."	The study discusses the evolution of the sector of water and sanitation services along the time in developed countries.	Conceptual discussion	Developed countries	The study categorized the three stages in the evolution of WSS in developing countries—the first concentrated in coverage, the second in quality of service, and the third in environmental protection.	http://stanford.edu/dept/france-stanford/Conferences/Risk/Barraque.pdf
Batley and Harris (2014), "Analysing the Politics of Public Services: A Service Characteristics Approach."	The service characteristics approach, described here, was developed as a tool to explain the political dynamics of particular services. It has been tested and elaborated on through discussions, focusing on current debates in sector organizational reforms and policies.	Comparative analysis on the possibility of sharing experience and practices	International	The paper finds that specific clusters of characteristics may influence the incentives and accountability of the actors in service provision. Additional characteristics proposed by sector specialists include the feasibility of coproduction, opportunities for rent seeking, and the duration and durability of chronic conditions and services.	https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8913.pdf
Bel and Fageda (2006), "Between Privatization and Intermunicipal Cooperation: Small Municipalities, Scale Economies and Transaction Costs."	The study analyzes the use of intermunicipal cooperation to exploit scale economies as an alternative to privatization.	Theoretical review and data analysis, concerning solid waste and WSS	Spain	The study concludes that cooperation is more likely when production is public, whereas privatization is more frequent when municipalities provide the services. Production costs are lower when municipalities cooperate.	http://search.proquest.com/openview/446d90ec28c6d498ab060fa561354342/1?pq-origsite=gscholar&cbl=75984
Bel and Fageda (2008), "Local Privatization, Intermunicipal Cooperation, Transaction Costs and Political Interests: Evidence from Spain."	The paper examines the influence of transaction costs and political factors on local choices through new variables instead of those traditionally analyzed in the literature. It considers the role of intermunicipal cooperation instead of privatization to exploit economies of scale and scope.	Econometric appraisal	Spain	The paper finds that privatization is less common for water distribution than for solid waste collection because of higher transaction costs in the former.	http://www.ub.edu/irea/working_papers/2008/200804.pdf

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Berg (2013), "Best Practices in Regulating State-Owned and Municipal Water Utilities."	The article examines the key issue to design an institutional system that reduces the likelihood of capture, corruption, and low levels of utility performance in developing countries' WSS utilities.	Literature survey	Worldwide	Sector regulation has to be embedded in an adequate and consistent institutional framework to have a positive impact on performance. Sector regulation by itself is no guarantee of performance improvements. Case studies and empirical analyses suggest that without significant changes in the supporting institutions, the standard tools of regulation will not be effective.	http://repositorio.cepal.org/bitstream/handle/11362/4079/S2013252_en.pdf;jsessionid=0F0E1684CBA3C7DE53E2F67B45A2A3AB?sequence=1
Berg and Vargas (2008), "Bolivian Utility Regulation: Lessons for a Water Sector Agency."	The study explores the problems that political polarization poses for technical regulation of WSS.	Case study	Bolivia	The study reinforces the arguments for key performance indicators and the use of benchmarking and discusses the evolution of regulatory institutions.	http://warrington.ufl.edu/centers/purc/purcdocs/papers/0811_Berg_Bolivian_Utility_Regulation.pdf
Bhattacharyya, Harris, Narayanan, and Raffiee (1995), "Specification and Estimation of the Effect of Ownership on the Economic Efficiency of the Water Utilities."	In this article, a stochastic frontier cost function is used to specify the cost of inefficiency of publicly and privately owned urban water utilities in terms of their different ownership structures and firm-specific characteristics.	Econometric appraisal	United States	Results show that when the operation area is small, privately owned water utilities are comparatively more efficient. Public water utilities are comparatively more efficient when the scale of operation is large. There is evidence of firm-specific effects.	http://www.sciencedirect.com/science/article/pii/0166046295021078
Bhattacharya, Parker, and Raffiee (1994), "An Examination of the Effect of Ownership on the Relative Efficiency of Public and Private Water Utilities."	The paper analyzes the relative efficiency of WSS utilities in a cross section of private and public companies. It compares the effect of type of ownership on performance.	Econometric appraisal	United States	The paper finds evidence of significant economies of scale for both public and private companies. The empirical results provide evidence that public water utilities are more efficient than private utilities on average but are more widely dispersed between best and worst practice.	http://www.jstor.org/stable/pdf/3146322.pdf

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Bish (1996), <i>Amalgamation: Is It the Solution?</i>	The report summarizes key points of a study of the government reform of metropolitan areas.	Conceptual discussion	Canada (British Columbia)	The report proposes strategies for reforming local government organization of services and recognizing diversity, and it discusses the need of multiorganizational systems to deal with such diversity.	https://www.uvic.ca/hsd/publicadmin/assets/docs/BBish/amalgamation_solution.pdf
Bish (2002), "Accommodating Multiple Boundaries for Local Services: British Columbia's Local Governance System."	The paper studies how to determine institutional arrangements and boundaries for various public goods and services that are preferred by different audiences or that possess different production characteristics.	Descriptive and analytical discussion	Canada (British Columbia)	The paper describes British Columbia's system, how it resolves theoretical issues, problems that have arisen, and the evolution of those problems. It also provides suggestions for incremental modifications in a county- municipality system that could achieve similar results in many U.S. metropolitan areas.	https://www.uvic.ca/hsd/publicadmin/assets/docs/BBish/bish_indiana_u_2002.pdf
Blesse and Baskaran (2013), "Do Municipal Mergers Result in Scale Economies? Evidence from a German State."	The article studies the fiscal consequences of municipal mergers by making use of a large-scale merger reform in the German federal state of Brandenburg. It explores the fiscal consequences of both compulsory and (semi-) voluntary municipal mergers within the same institutional setting.	Econometric appraisal	Germany	The article finds substantial and immediate reductions in total, administrative, and current expenditures after compulsory mergers. Voluntary mergers have smaller and less robust effects.	http://ftp.zew.de/pub/zew-docs/dp/dp16041.pdf
Bottasso and Conti (2003), "Cost Inefficiency in the English and Welsh Water Industry: An Heteroskedastic Stochastic Cost Frontier Approach."	This study analyzes the evolution of operating cost inefficiency for the English and Welsh water industry over the period 1995-2001. The main aim is to provide an overall picture of the industry cost inefficiency, considering both water and sewerage companies and smaller water-only companies.	Econometric study	England and Wales	The main results of this study show that operating cost inefficiency has decreased over the sample period and that inefficiency differentials among firms have steadily narrowed. The likely reasons are the incentives provided by comparative and capital market competition, fully operative after the 1994 price review.	https://pdfs.semanticscholar.org/e856/234ddfb267a9962fbcd3eac6cab063b9a2b.pdf

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Bottasso and Conti (2009), "Scale Economies, Technology and Technical Change in the Water Industry: Evidence from the English Water Only Sector."	The article estimates a variable cost function to analyze cost economies and technical change in the English water-only sector over the period 1995–2005.	Econometric study	England	The estimates suggest the existence of unexploited economies of output and customer density and small-scale economies that appear to be increasing with population density. These findings suggest that moderate cost savings from prudent mergers could be expected.	http://www.sciencedirect.com/science/article/pii/S0166046208000707
Browder, Xie, Kim, Gu, Fan, and Ehrhardt (2007), <i>Stepping Up: Improving the Performance of China's Urban Water Utilities</i> .	The report presents a strategic framework and a set of recommendations for addressing the challenges faced by China's urban WSS utilities and accelerating improvements.	Policy paper with extensive experience collection through interviews	China	Addressing future challenges will require more investment and new approaches to enhance governance and regulation at national, provincial, and municipal levels; to boost utility operational and financial performance; to increase user fees; to ensure adequate fiscal support; and to explicitly recognize the constraints facing lower-capacity cities and towns.	http://documents.worldbank.org/curated/en/840621468016215926/pdf/409640P0704130Public.pdf

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Carvalho and Marques (2014), "Computing Economies of Vertical Integration, Economies of Scope and Economies of Scale Using Partial Frontier Nonparametric Methods."	Data envelopment analysis methods present some drawbacks that might lead to biased results when studying economies of scope and scale. This paper proposes a methodology based on more robust partial frontier nonparametric methods to look for scope and scale economies. Through this methodology, it is possible to assess the robustness of these economies, and in particular to assess the influence that extreme data or outliers might have on them.	Conceptual discussion and empirical application	Portugal	There is evidence of (a) economies of vertical integration and (b) economies of scale in drinking water supply utilities and in water and wastewater utilities operating mainly in the retail segment. Economies of scale were found in water and wastewater utilities operating exclusively in the wholesale segment, and diseconomies of scope were also found in some of these utilities. The proposed methodology also allowed the authors to conclude that the existence of some smaller utilities makes the minimum optimal scales go down.	https://www.researchgate.net/publication/259267536_Computing_economies_of_vertical_integration_economies_of_scope_and_economies_of_scale_using_partial_frontier_nonparametric_methods
Carvalho, Marques, and Berg (2012), "A Meta-Regression Analysis of Benchmarking Studies on Water Utilities Market Structure."	The paper updates the literature on water utility benchmarking studies developed worldwide, focusing on scale and scope economies. Using meta-regression analysis, the study investigates which variables from published studies influence those economies.	Literature survey Meta-regression analysis	Worldwide	The results indicate that there is a higher probability of finding diseconomies of scale and scope in large utilities. However, only the results for scale economies are significant. Diseconomies of scale and scope are more likely to be found in publicly owned utilities than in those that are privately owned. As would be expected, multiutilities are more likely to have scale and scope economies.	https://mpra.ub.uni-muenchen.de/32894/1/MPRA_paper_32894.pdf

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Chiplunkar, Seetharam, and Tan, eds. (2012), <i>Good Practices in Urban Water Management: Decoding Good Practices for a Successful Future</i> .	The report searches concrete strategies for utilities to translate good principles into practice.	Cases studies on good practices Objective and critical analyses of good practices at the utility level: what worked, what did not work, and challenges faced by utilities	Eight Asian cities in Thailand, Sri Lanka, India, Malaysia, the Philippines, Cambodia, China, and Singapore	Common elements exist for success in management, investment, human capital recruitment, and community engagement.	https://es.scribd.com/document/211472008/Good-Practices-Urban-Water-Management
Church and Ware (2000), <i>Industrial Organization: A Strategic Approach</i> .	Textbook of industrial organization with extensive sections devoted to utilities regulation and competition policy.	Textbook Theory and experience review	Worldwide	The book is a good state-of-the-art treatise. Good summary of recent theoretical and empirical developments in regulation of utilities.	
Corton (2011), "Sector Fragmentation and Aggregation of Service Provision in the Water Industry."	The study analyzes the structure of the water industry in Peru, the existence of economies of scale, and cost inefficiency.	Econometric appraisal	Peru	Findings indicate a cost rise of 0.10 percent for each 1 percent increase of joint production of both outputs: water lost and water produced.	https://www.jstor.org/stable/23883942?seq=1#page_scan_tab_contents
Danilenko, van den Berg, Macheve, and Moffitt (2014), <i>The IBNET Water Supply and Sanitation Blue Book 2014</i> .	The International Benchmarking Network (IBNET) seeks to expand access to comparative data among utilities globally, helping to promote best practice among water supply and sanitation providers and eventually providing consumers with access to high-quality and affordable water supply and sanitation services, by delivering access to technical and financial information on utility performance.	Global database IBNET tools such as data collection instruments and protocols, IBNET database, and IBNET tariff database enable enhanced sharing of information from more than 4,000 utilities from over 130 countries and territories	Worldwide	The IBNET <i>Blue Book</i> summarizes water sector development in 2006-11, describing trends and monitoring effects of recent crises. Municipal water performance has improved and withstood accelerated urbanization and the impacts of the triple crisis (fuel, food, and finance). IBNET data confirmed that coverage with water services increased and water became accessible to more people.	https://openknowledge.worldbank.org/bitstream/handle/10986/19811/9781464802768.pdf?sequence=5

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Danube Water Program (2013), "The Danube Water Program: Smart Policies, Strong Utilities, Sustainable Services."	The program's object is to promote an informed policy dialogue around the core challenges facing the sector and to strengthen the technical and managerial capacity of the sector's utilities and institutions.	Methodological and descriptive document	Focus on 11 countries: Albania; Bosnia and Herzegovina; Bulgaria; Croatia; Kosovo, Macedonia, FYR; Moldova; Montenegro; Romania; Serbia; and Ukraine Other countries in the region, such as Austria and Hungary	The brochure describes the program and its activities, shares some early results of collaboration, presents findings and lessons derived from those activities, and describes the program's longer-term vision.	http://www.danube-water-program.org/media/DWP_brochure-MAIL_0914.pdf
Danube Water Program (2015), <i>Utility Performance in the Danube Region: A Review of Trends and Drivers</i> .	The Water Utility Performance Index (WUPI) is an aggregate utility performance index based on 10 indicators. The index is calculated on the basis of the IBNET database.	Empirical study on utilities performance	IBNET subsample of 14 Central and Eastern European countries	Looking at the sub-components of WUPI, typically aggregations have a positive effect on management efficiency, which improves rather quickly after the aggregation. In contrast, coverage indicators seem to worsen a few years after aggregation.	http://www.danube-water-program.org/media/publications/SoS_Report.pdf
Dawson, Wyckmans, Heidrich, Köhler, Dobson, and Feliu (2014), <i>Understanding Cities: Advances in Integrated Assessment of Urban Sustainability</i> .	This report presents integrated thinking across a range of urban systems, topics, issues, and perspectives that are traditionally considered separately.	Case studies, theoretical approaches, and reporting experience	Europe	The report outlines priorities for future research and development and presents a generic framework for urban integrated assessment to analyze the potential benefits and trade-offs of sustainability policies and interventions.	http://www.ncl.ac.uk/media/wwwnclacuk/ceser/files/Understanding%20Cities.pdf
Diaz and Flores (2015), "Quick & Dirty Analysis: The Case for Aggregation-Water Supply and Sanitation Utilities."	A review of the evidence of economies of scale in Latin America, based on IBNET data.	Statistical study	Peru, Chile, and other Latin American countries	The study finds evidence of economies of scale in Latin America.	

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Destandau and Garcia (2014), "Service Quality, Scale Economies and Ownership: An Econometric Analysis of Water Supply Costs."	The article integrates the output multidimension in the cost function, considering delivered water volume and service quality as being endogenous. Network-related scale measures and private versus public ownership are investigated with the objective of evaluating how endogenous quality may affect their impact on costs.	Econometric study	United States	The article shows that including the quality level of the delivered services has a significant impact on scale economies and ownership effects. Significant economies of scope confirm the existence of trade-offs between water production and service quality.	https://www.researchgate.net/profile/Serge_Garcia/publication/264086779_Service_quality_scale_economies_and_ownership_An_econometric_analysis_of_water_supply_costs/links/5409dad20cf2d8daaabf99f0.pdf
De Witte and Dijkgraaf (2007). "Mean and Bold? On Separating Merger Economies from Structural Efficiency Gains in the Drinking Water Sector."	The Dutch drinking water sector experienced two drastic changes. In 1997, the sector association started with a voluntary benchmarking, and merger activity arose.	Tailored nonparametric model to distinguish efficiency effects of these two evolutions	Netherlands	Authors detect a significant efficiency-enhancing effect of benchmarking but insignificant merger economies because of the absence of scale economies and the absence of increased incentives to fight inefficiencies.	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1038441
Dollery (2012), <i>A Cautionary Tale from Tasmania: Report on Water and Wastewater Restructuring in Regional New South Wales</i> .	A previous report recommended aggregation of New South Wales (Australia) WSS utilities, merging 106 local into 32 regional utilities. This study debates the conclusion of the previous report.	Conceptual document	Australia (New South Wales and Tasmania)	The case for regionalization has lost rationale. Since the publication of the previous report, utilities gained financial sustainability, which was one argument for the consolidation process, but there is no evidence of economies of scale.	http://www.usu.org.au/attachments/article/381/Lessons_from_Tasmania_USU%20Report_Revised131112.pdf
Drapa (2009), "Access to EU Funds as an Incentive to Move Towards Regionalisation in Water Supply and Sanitation Sector of Romania."	The presentation illustrates how European Union funding incentivized aggregation in Romania.	Conceptual discussion on a case study	Romania	The presentation highlights the importance of accession to foreign finance to incentivize agglomeration in Romania.	http://www.oecd.org/env/outreach/42754000.pdf

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Duffy (2009), "Challenges in the Water Industry: Fragmented Water Systems."	The article argues the importance of consolidating U.S. WSS to increase the financial soundness of utilities.	Conceptual note	United States	The article concludes with the need for aggregating WSS in the United States as a way to increase efficiency and reduce costs.	http://nrri.org/wp-content/uploads/2015/06/American-Water-reference-documents.pdf
Economic Consulting Associates (2016), "Global Study on Institutional, Policy and Regulatory Incentives to Improve WSS Services."	The study seeks to establish the relationship between performance and institutions, policies, and regulatory incentives.	Literature review	International	The study points out the importance of issues addressed by the new institutional economy (importance of governance mechanisms, incentives, and the like) and formulates caveats with respect to purely technocratic (normative) policy recommendations.	http://www.eca-uk.com/2016/04/28/institutional-regulatory-policy-incentives-achieve-universal-access-water-supply-sanitation/
Ehrhardt, Gandhi, Mugabi, and Kingdom (2015), <i>Evaluation of Water Services Public Private Partnership Options for Mid-Sized Cities in India.</i>	The report draws on sector work undertaken in India to inform the design of a water and sanitation project, in view of the difficulties of encountered by middle-size cities to provide sustainable services.	Fieldwork and consultations on three representative cities	India	The report presents alternative public-private partnership models to meet the needs of infrastructure and management of WSS in middle-size cities in India.	https://openknowledge.worldbank.org/handle/10986/22042
Ehrhardt, Mugabi, and Kingdom (2015), <i>Professionalization Contracts for Small Municipal Water Service Providers in India: Business Model Development Final Report.</i>	The report discusses professionalization means beyond the traditional training and capacity-building approach to improve management in Indian WSS utilities.	Fieldwork and consultations on three representative cities	India	The report proposes professionalization contracts to improve WSS management, including corporatization and pecuniary incentives for both staff and contractors in charge of training and systems.	https://openknowledge.worldbank.org/handle/10986/22043
ERM in Association with Stephen Myers Associates and Hydroconseil, and Kingdom (2005), <i>Models of Aggregation for Water and Sanitation Provision.</i>	The report investigates issues related to aggregation of water and sanitation services' utilities and defines and classifies processes by scale, scope, and character of the aggregation process.	Conceptual discussion, case studies, and lessons learned	International, seven national case studies	The report detects economic opportunities and institutional obstacles to aggregation.	http://siteresources.worldbank.org/INTWSS/Resources/WSSWorkingNote1aggregation.pdf

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Farsi, Fetz and Filippini (2007), "Economies of Scale and Scope in the Swiss Multi-Utilities Sector."	The paper explores the economies of scale and scope in the electricity, gas, and water utilities and tests the convenience of unbundling.	Econometric study	Switzerland	The study finds considerable economies of scale, but at the same time great variations exist between utilities because of unobserved heterogeneity.	https://www.ethz.ch/content/dam/ethz/special-interest/mtec/cepe/cepe-dam/documents/research/cepe-wp/CEPE_WP59.pdf
Feigenbaum and Teeples (1983), "Public versus Private Water Delivery: A Hedonic Cost Approach."	The central concern is to explain the relative cost performance of publicly owned versus privately owned water utilities—in particular, explaining the impact of ownership form on the cost structure of firms.	Econometric Study	United States	All estimated models suggest that there is no difference in cost-of-service equations for government versus private companies.	http://www.jstor.org/stable/1935940
Ferro (2017), "América Latina y el Caribe hacia los objetivos de desarrollo sostenible en agua y saneamiento: reformas recientes de políticas sectoriales."	The study analyzes the institutional reforms in WSS in Latin America during the past 15 years since Millennium Development Goals were launched.	Policy paper	Latin America	The study identifies progress in the WSS institutionalization with regard to various issues in a subset of Latin American countries, analyzes them, and draws lessons for the achievement of Sustainable Development Goals in the coming years.	http://repositorio.cepal.org/handle/11362/41136
Ferro and Lentini (2010), "Economías de escala en los servicios de agua potable y alcantarillado."	The paper systematizes some concepts and experiences in Latin America and in the rest of the world with regard to economies of scale and scope in the WSS.	Conceptual discussion, case studies, and empirical results	Latin America mainly	Economies of scale and scope are present in WSS in different stages of the process, both for works and for service delivery. The empirical results show some case specificities.	http://repositorio.cepal.org/bitstream/handle/11362/3831/lcw369e.pdf?sequence=1
Ferro and Lentini (2012), "Infraestructura y equidad social: experiencias en agua potable, saneamiento y transporte urbano de pasajeros en América Latina."	The paper discusses how and why infrastructure services are subsidized, emphasizing water and sanitation services and public transportation. Cases in Latin American countries are studied.	Conceptual discussion and case studies	Latin America region	A typology of subsidies is applied. Reasons for subsidizing each infrastructure are identified and differentiated. Current subsidy programs in Latin American countries are compared.	http://www19.iadb.org/intal/intalcdi/PE/2012/12258.pdf

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Ferro, Lentini, and Mercadier (2011), "Economies of Scale in the Water Sector: a Survey of the Empirical Literature."	The survey synthesizes the abundant empirical work on economies of scale and scope in the WSS.	Survey of empirical studies	Worldwide	Some evidence is derived from empirical work on increasing economies of scale for smaller services, constant economies of scale in medium-size utilities, and diseconomies in very large ones. Some methodological issues are clarified concerning economies of scale measurement in WSS.	http://washdev.iwaponline.com/content/1/3/179
Ferro, Lentini, Mercadier, and Romero (2011), "Returns to Scale in Water and Sanitation: Estimates for Latin America."	The paper measures returns to scale in Latin America using a common regional database.	Econometric appraisal	Latin America	There is evidence of increasing returns to scale in Latin American water provision on the basis of a 2005 cross section of 90 providers in 14 countries.	http://inventi.in/journal/issue_articles/impact/75/30/service-sector
Filippini, Hrovatin, and Zorić (2008), "Cost Efficiency and Economies of Scale of Slovenian Water Distribution Utilities: An Application of Panel Data Stochastic Frontier Methods."	The study estimates cost inefficiency and economies of scale of Slovenian water distribution utilities over the period 1997-2003 by employing several different stochastic frontier methods.	Econometric study	Slovenia	Different models produce fairly robust results with respect to estimates of economies of output density, customer density, and economies of scale. The optimal size of a company is found to closely correspond to the sample median. Economies of scale are found in small utilities, whereas large companies exhibit diseconomies of scale.	https://link.springer.com/article/10.1007/s11123-007-0069-z
Foster (2005), "Ten Years of Water Service Reform in Latin America: Toward an Anglo-French Model."	The paper analyzes reforms in Latin America and discerns positive and negative experiences.	Conceptual discussion Case study discussion	Latin America, England and Wales, and France	The paper suggests some policies based on successful English and French experiences.	https://openknowledge.worldbank.org/handle/10986/17234
Fox and Gurley (2006), "Will Consolidation Improve Sub-National Governments?"	Countries explore municipalities consolidations to deliver more cost-efficient services.	Review of theoretical arguments and empirical findings on sub-national governments amalgamation	International	Success depends on many factors, including institutional ones, and is specific to each sector and its operating conditions.	http://www1.worldbank.org/publicsector/decentralization/decentralizationcorecourse2006/OtherReadings/FoxGurley.pdf

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Fraquelli, Piacenza, and Vannoni (2002), "Scope and Scale Economies in Multi-Utilities: Evidence From Gas, Water and Electricity Combinations."	The study investigates the cost properties of a sample of Italian public utilities providing gas, water, and electricity in combination.	Econometric study	Italy	The study accounts for the presence of global scale and scope economies only for multiutilities with output levels lower than those characterizing the median firm. Aggregation is recommended on the grounds of efficiency for small nonintegrated utilities, but it is not suggested for large multiutilities.	http://www.siepwweb.it/siepw/images/joomd/1399109899174.pdf
Fraquelli and Moiso (2005), "Cost Efficiency and Economies of Scale in the Italian Water Industry."	The paper analyzes the Italian water sector, with particular attention given to the industry cost efficiency and to the assessment of scale economies at optimal territorial level, by estimating a stochastic cost frontier.	Econometric Analysis	Italy	There is evidence of economies due to output density for all firm sizes (but higher for smaller firms than for larger ones). Evidence of economies of scale is found up to 90 million cubic meters or one million population served, and diseconomies are found thereafter. Scale economies suggest that the situation could be improved by reduced fragmentation at the local level.	http://www.siepwweb.it/siepw/oldDoc/wp/420.pdf
Fritz, Kaiser, and Levy (2009), <i>Problem-Driven Governance and Political Economy Analysis</i> .	The objective of this good-practice framework is to systematize approaches regarding governance and political economy analysis and to provide readily available orientation for World Bank task team leaders and teams.	Conceptual discussion	World Bank audience Worldwide	Politics and political economy influence whether and how reforms happen in developing and developed countries. The emphasis of the discussion is on diagnosis and problem-driven approaches. The latter comprises three layers: (a) identifying the problem, opportunity, or vulnerability to be addressed, (b) mapping out the institutional and governance arrangements and weaknesses, and (c) drilling down to the political economy drivers.	http://www.delog.org/cms/upload/pdf-pea/Problem-driven-governance-political-economy-analysis.pdf

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Frone (2008), "Factors and Challenges of Regionalization in the Water and Wastewater Sector."	The paper investigates issues related to regionalization of WSS in general and also in the particular context of Romania.	Conceptual discussion and application to Romanian case	Romania	This paper draws conclusions on the elements that should be present in regionalization of the services in Romania and elsewhere.	http://www.revecon.ro/articles/2008-2/2008-2-12.pdf
Frone and Frone, (2012), Factors and Trends of Economic Efficiency in the Water/Wastewater Sector.	The article discusses factors related to efficiency in WSS (regionalization, pricing, demand elasticity), applied to a Romanian context.	Conceptual discussion and application to Romanian case	Romania	The demand elasticity estimation yields a very high value. It works to avoid losses but jeopardizes access to consumption in relatively low coverage context.	http://ac.els-cdn.com/S221256712002675/1-s2.0-S2212567112002675-main.pdf?_tid=4ad6586a-49d5-11e7-8c3e-00000aab0f27&acdnat=1496656789_50dbe2629e72381e059aa18673d92f35
Garcia, Moreaux, and Reynaud (2007), "Measuring Economies of Vertical Integration in Network Industries: An Application to the Water Sector."	The document seeks to distinguish technological economies of vertical integration from the vertical economies resulting from market imperfections.	Econometric study	North America	The economies of vertical integration are important only in small utilities.	http://www.sciencedirect.com/science/article/pii/S0167718706001123
Garcia and Thomas (2001), "The Structure of Municipal Water Supply Costs: Application to a Panel of French Local Communities."	The study proposes a measure of economies of scope to assess the benefits associated with joint production of water for final customers and to assess water losses, and it proposes several measures of returns to evaluate potential gains in exploiting technological flexibility of water networks.	Econometric study	France	The results reveal a positive degree of economies of scope and no short-run economies of production density and customer density. Significant economies of scale indicate that local communities may benefit from merging into water districts.	https://link.springer.com/article/10.1023%2FA%3A1011142901799?LI=true
García-Valiñas (2007), "What Level of Decentralization Is Better in an Environmental Context? An Application to Water Policies."	The paper analyzes the optimal division of environmental policy-making functions among the different levels of government.	Theoretical discussion with empirical application to Spain	Spain	A decentralized scenario is preferred under strong differences among preferences.	

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Gibbons (2010), "Transaction-Cost Economics: Past, Present, and Future?"	The article summarizes Oliver Williamson's contributions to transaction cost economics.	Discussion on theoretical issues and application to real-world policy making	Worldwide	The article discusses well-known achievements of transaction cost economics and some possible future works on the topic.	http://onlinelibrary.wiley.com/doi/10.1111/j.1467-9442.2010.01609.x/pdf
Gjebrea and Zoto (2013), Regionalization of Water Supply and Sewerage Companies as a Solution for the Efficiency of Water Supply and Sewerage Sector: Case of Albania.	This document discusses regionalization in Albania to achieve efficiency gains.	Conceptual discussion and case study	Albania	Potential economies of scale exist in Albania.	https://www.researchgate.net/publication/287190833_Regionalization_of_Water_Supply_and_Sewerage_Companies_as_a_Solution_for_the_Efficiency_of_Water_Supply_and_Sewerage_Sector_Case_of_Albania
Grindle (2002), "Good Enough Governance: Poverty Reduction and Reform in Developing Countries."	In proposed governance reforms, there is little guidance about what is essential and what is not, what should come first and what should follow, what can be achieved in the short term and what can be achieved only over the longer term, and what is feasible and what is not.	Conceptual discussion	Worldwide Emphasis on developing countries	Working toward good-enough governance means accepting a more nuanced understanding of the evolution of institutions and government capabilities; being explicit about trade-offs and priorities; learning about what is working; taking the role of government in poverty alleviation seriously; and grounding action in the contextual realities of each country.	http://onlinelibrary.wiley.com/doi/10.1111/j.0952-1895.2004.00256.x/pdf
Grossman and Hart (1986), "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration."	The article develops a theory of aggregation within the firm based on the attempt of parties to write a contract to allocate efficiently the residual control rights among themselves.	Theoretical discussion	International	The article helps readers understand ownership and optimal level of vertical integration. Integration shifts the incentives for opportunistic and distorted behaviors, but it does not remove them.	https://dash.harvard.edu/bitstream/handle/1/3450060/hart_costsbenefits.pdf?sequence=4

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Haleblian, Devers, McNamara, Carpenter, and Davison (2009), "Taking Stock of What We Know about Mergers and Acquisitions: A Review and Research Agenda."	The article develops a framework to organize and review recent empirical findings, mainly from management, economics, and finance and related to mergers and acquisitions.	Literature review	International	The article identifies patterns and theoretical gaps, and it provides recommendations for future research aimed at developing a more integrated mergers-and-acquisitions research agenda for management scientists.	http://journals.sagepub.com/doi/abs/10.1177/0149206308330554
Hayes (1987), "Cost Structure of the Water Utility Industry."	The article provides an analysis of vertical integration between retail and wholesale water supply in the United States in order to assess economies of scope.	Econometric study	United States	The study suggests evidence of economies of scope in selected periods and shows that the degree of economies of scope tends to fall over time for the largest firms and increase for the smallest firms.	https://www.researchgate.net/publication/24072461_Cost_Structure_of_the_Water_Utility_Industry
Hempling (2009), "Multi-Utility Issues at a Glance."	Many regulatory challenges are in fact common to all infrastructure industries.	Conceptual discussion	International	Cross-fertilization of learning and experience yields consistency among regulatory approaches within a single agency.	https://studylib.net/doc/11840076/multi-utility-issues-at-a-glance--scott-hempling--esq.-ma
Hodgson (2010), "Limits of Transaction Cost Analysis."	This paper discusses unanswered questions related to transaction costs theory and its application.	Theoretical discussion	International	The paper points out the development of evolutionary approaches and the exploration of possible synthesis with competence-based theories.	https://www.researchgate.net/publication/253924731_Limits_of_transaction_cost_analysis
Holzer, Fry, Charbonneau, Riccucci, Henderson, Kwak, Schatteman, and Burnash (2009), "Literature Review and Analysis Related to Municipal Government Consolidation."	Consolidation of municipal government has been studied broadly and is a major area of interest to control the costs of local government.	Literature review	United States	Overall, the literature indicates that no compelling evidence exists for consolidation, except on a case-by-case basis. However, the interest in consolidation has often triggered a review of other mechanisms to provide government services efficiently and effectively.	http://www.newjersey.gov/dca/affiliates/luarcc/pdf/final_consolidation_report.pdf

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Houtsma (2003), "Water Supply in California: Economies of Scale, Water Charges, Efficiency, and Privatization."	The document considers whether there are significant economies of scale in California WSS and at which population-size levels.	Statistical analysis	United States (California)	There is evidence of significant economies of scale in California water supply industry. Average charge levels, as proxies of costs of production, drop with population size beyond 10,000 and again when population size exceeds 125,000.	https://www.jyu.fi/ers2003/cdrom/papers/379.pdf
Hunt and Lynk (1995), "Privatization and Economic Efficiency in the UK Water Industry."	The paper summarizes a study about regional water authority in England and Wales before privatization.	Econometric analysis	England and Wales	There is evidence of economies of scale between water and wastewater services, and between water supply activities and environmental ones.	http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0084.1995.mp57003006.x/pdf
limi (2008), "(UN)Bundling Public-Private Partnership Contracts in the Water Sector: Competition in Auctions and Economies of Scale in Operation."	The paper quantifies the optimal size of public-private partnership in the sector by estimating a cost function.	Econometric analysis	International database on public-private partnership transactions	Economies of scale exist but tend to diminish quickly as production increases, and no rationale exists to auction contracts beyond a certain size.	http://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-4459
IPART (Independent Pricing and Regulatory Tribunal) (2007), <i>Literature Review: Underlying Costs and Industry Structures of Metropolitan Water Industries</i> .	The report presents an analysis of cost structures and industrial organization of the WSS industry.	Literature review	International	Mixed evidence is presented on economies of scale, scope, and concentration.	https://www.ipart.nsw.gov.au/files/sharedassets/website/trimholding-bay/final_report_-_literature_review_-_underlying_costs_and_industry_structures_of_metropolitan_water_industries_-_september_2007.pdf
Janssens (2013), "Utility Aggregation and Economies of Scale."	The document is a comprehensive presentation on aggregation, including economic and institutional aspects.	Presentation	International	Pros and cons of aggregation are presented, including governance aspects.	http://www.amac.md/obrazovanie/IAWD/2013.09.23-27_Benchmarking_Bucuresti/prezentari/Policy_Workshop/3.Wednesday/5.%20Janssens_WB-IAWD%20Sep%2025%20Utilities%20Aggregation%20v2.pdf

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Juuti and Katko, eds. (2005), <i>Water, Time, and European Cities: History Matters for the Futures</i> .	The report explores the history of WSS services in many European cities and the configuration of the provision of these services.	Historical analysis	Europe	The report alerts readers to inertia in decision making, which limits options for future decisions.	http://www.watertime.net/docs/WP3/WTEC.pdf
Kayaga, Mugabi and Kingdom (2013), <i>Evaluating the Institutional Sustainability of an Urban Water Utility: A Conceptual Framework and Research Directions</i> .	The report examines institutional sustainability of urban water utilities and how its progress could be tracked.	Conceptual discussion, applied to two case studies in South Asia	International	The document finds inadequate conceptualizations and suggests a new evaluation tool (the water utility maturity model).	https://dspace.lboro.ac.uk/dspace-jspui/bitstream/2134/13393/3/JUIP-D-13-00014_revised_manuscript.pdf
Kerr and Kominers (2012), "Agglomerative Forces and Cluster Shapes."	The article models special clusters of similar firms.	Model design and empirical test in Silicon Valley	United States	The article identifies agglomerative forces in the shaping of industries' structures and size.	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2097819
Kim and Clark (1988), "Economies of Scale and Scope in Water Supply."	The paper seeks to estimate economies of scale and scope in the United States for a cross section of 1973.	Econometric analysis	United States	The paper finds evidence of constant returns to scale for the average firm producing water for both residential and nonresidential customers; diseconomies of scale in supplying water to residential customers; economies of scale in providing water for nonresidential customers; and economies of scope for the average utility supplying services for residential and nonresidential customers.	http://www.sciencedirect.com/science/article/pii/0166046288900221

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Kim and Lee (1998), "Spatial Integration of Urban Water Services and Economies of Scale."	The article estimates economies of scale in water supply for a panel of municipal WSS companies.	Econometric analysis	South Korea	The article finds economies of scale given the average size of the firms. But decomposing the results, there is evidence of diseconomies of scale in 4 cities, constant economies of scale in 12 cities, and economies of scale in another 12.	http://onlinelibrary.wiley.com/doi/10.1111/j.1467-940X.1998.tb00084.x/full
Kingdom, Baietti, and van Ginneken (2006), "Reforming Public Utilities."	The presentation explores the need for public utilities reforms.	Results from 11 case studies	International	The presentation identifies characteristics of well-performing water utilities.	http://siteresources.worldbank.org/INTWSS/Resources/utilities.pdf
Klien (2016), "Utility Governance and Why Consolidations May Not Deliver: Lessons from Central and Eastern Europe."	The paper analyzes the consolidation processes of the WSS in Eastern European countries.	Empirical study on 14 countries of Eastern Europe	Eastern Europe	The paper yields that merging utilities will not necessarily result in lower unit costs. Consolidation not only increases the water volume delivered or the number of customers but also implies adding areas (municipalities, systems, or scarce territories). The results show economies of scale but cost increases in actual consolidations.	https://extranet.sioe.org/uploads/sioe2016/klien.pdf
Komives, Foster, Halpern, Wodon, and Abdullah (2005), "Water, Electricity, and the Poor: Who Benefits from Utility Subsidies?"	The study analyzes subsidies for WSS and electricity, their rationale, and their efficiency and equity consequences, and it discusses relevant examples.	Conceptual discussion and case studies	International	Good practices are found, and policy recommendations derive from the conceptual and empirical discussion.	http://documents.worldbank.org/curated/en/606521468136796984/Water-electricity-and-the-poor-who-benefits-from-utility-subsidies

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Kommunalkredit Public Consulting (2009), <i>Report on Measures to Cope with Over-Fragmentation in the Water Supply and Sanitation Sector.</i>	The report analyzes the process of overfragmentation in WSS sectors in Eastern Europe after the 1990s.	Conceptual discussion and case studies	Eastern Europe (Poland, Romania, and Ukraine) Additionally, examples of case studies from Western Europe (France and Austria)	The report points out the undesirable consequences of the decentralization processes. It suggests taking advantage of the experience accumulated in inter-municipal cooperation in Western Europe.	https://www.publicconsulting.at/eng/annual-reports-and-publications.html
Locussol and Fall (2009), "Guiding Principles for Successful Reforms of Urban Water Supply and Sanitation Sectors."	The primary objective of the paper is to provide practical guidance to World Bank teams advising on the design and implementation of reforms of urban water supply and sanitation sectors.	Conceptual and applied discussion	International	The paper summarizes recommendations for designing and implementing reforms of WSS sectors.	http://documents.worldbank.org/curated/en/577041468336294886/Guiding-principles-for-successful-reforms-of-urban-water-supply-and-sanitation-sectors
Martins, Fortunato, and Coelho (2006), "Cost Structure of the Portuguese Water Industry: A Cubic Cost Function Application."	The paper focuses on the consequences of water-loss reduction and the management of water resources based on their availability at an integrated river-basin level.	Empirical study	Portugal	The paper states that it would be cost-efficient to leave a certain level of losses instead of repairing all leakages.	https://estudogeral.sib.uc.pt/handle/10316/11747
Martins, Coelho, and Fortunato (2008), "Water Losses and Hydrographical Regions Influence on the Cost Structure of the Portuguese Water Industry."	The paper concentrates on determining the optimal level of water-loss reduction in a context of efficient river basin management.	Econometric analysis	Portugal	Concentrating the Portuguese water and sanitation sector, the costs of water-loss control do not seem to be systematically influenced by the hydrographical region to which water utilities belong.	http://gemf.fe.uc.pt/workingpapers/pdf/2008/gemf_2008-06.pdf
Mbuvi (2012), "Utility Reforms and Performance of the Urban Water Sector in Africa."	Governance and reforms are analyzed for West African countries. Efficiency analysis is performed.	Doctoral dissertation Conceptual discussion and empirical work	Uganda and Zambia for institutional aspects Various African countries for the empirical studies	Private utilities seemed to be more efficient. An identification and analysis of key governance issues are developed.	https://www.merit.unu.edu/training/theses/MBUVI_Dorcas.pdf

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Mercadier, Cont, and Ferro (2016), "Economies of Scale in Peru's Water and Sanitation Sector."	The paper quantifies economies of scale in WSS sector in Peru.	Econometric study	Peru	No economies of scale are found in the Peruvian WSS sector as a whole. Nevertheless, there are economies of production density (volume) and customer density (connections), and some agglomerations are potentially cost saving.	https://link.springer.com/article/10.1007/s11123-016-0468-0
Mitchell and Campbell (2004), <i>Synergy in the City: Making the Sum of the Parts More Than the Whole</i> .	The report explores synergies between water, wastewater, and stormwater within a sustainability perspective.	Conceptual discussion	Australia and international	The report yields conceptual aids for analysis and policy intervention.	https://opus.lib.uts.edu.au/handle/10453/12404
Mitchell, Retamal, Fane, Willetts, and Davis (2008), "Decentralised Water Systems—Creating Conducive Institutional Arrangements."	The paper discusses the issue of decentralization and its drivers and enablers. It compares tendencies between the United States and Australia.	Conceptual discussion Case studies	Australia and United States	The paper makes recommendations on the next steps Australia might take concerning institutional arrangements for decentralization.	https://www.researchgate.net/publication/237450180_CREATING_CONDUCTIVE_INSTITUTIONAL_ARRANGEMENTS
Mizutani and Urakami (2001), "Identifying Network Density and Scale Economies for Japanese Water Supply Organizations."	The study estimates three different cost functions for the WSS in Japan.	Econometric study	Japan	The study finds diseconomies of scale for the sample mean. The study also determines the optimal size for a utility in terms of network length, volume of distributed water, and supplied population.	http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan043954.pdf
Monteiro (2009), "Water Tariffs: Methods for an Efficient Cost Recovery and for the Implementation of the Water Framework Directive in Portugal."	This work is a contribution to the study on how the Portuguese water industry can meet the goals of cost recovery and water use efficiency set out by the Water Framework Directive. It estimates a multioutput cost function for the Portuguese water industry at retail level.	Doctoral dissertation	Portugal	The study finds diseconomies of scale and scope for the average water utility. Both types of economies are more likely to happen for utilities with a large customer base.	http://www.repository.utl.pt/handle/10400.5/1541

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Nauges and van den Berg (2008), "Economies of Density, Scale and Scope in the Water Supply and Sewerage Sector: A Study of Four Developing and Transition Economies."	Using panel data, the paper seeks to detect the presence of economies of scale in four countries.	Econometric study	Moldova, Brazil, Vietnam, and Romania	The study finds economies of scale in Moldova, Vietnam, and Romania, and it cannot reject constant economies of scale in Brazil. Cost structures vary significantly between and within countries.	https://openknowledge.worldbank.org/handle/10986/4803
North (1990), <i>Institutions, Institutional Change and Economic Performance</i> .	The book develops an analytical framework to explain which institutions and institutional changes affect the performance of economies, both at a given time and over time.	Conceptual and theoretical discussion	Worldwide	The book maintains that institutions exist because of the uncertainties involved in human interactions. They are the constraints devised to structure that interaction. It explains the role of transaction and production costs in institutions' development. It also explains the implications of that analysis for economic theory and economic history, indicating how institutional analysis must be incorporated into neoclassical theory and exploring the potential for the construction of a dynamic theory of long-term economic changes.	https://books.google.com.ar/books/about/Institutions_Institutional_Change_and_Ec.html?id=oFnWbTqgNPYC&source=kp_cover&redir_esc=y
O'Meally (2013), "Mapping Context for Social Accountability: A Resource Paper."	The resource paper focuses on the issue of social accountability and context, arising from a growing recognition that context is critical in shaping and making social accountability interventions.	Literature review, case studies, and consultation with experts	Worldwide	The paper offers an initial tool to guide thinking, analysis, and programming.	http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/244362-1193949504055/Context_and_SAcc_RESOURCE_PAPER.pdf

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Perrin, Thorau and Associates Ltd. (2005), "Background Paper: Harmonization of Regulation, Service Delivery and Economic Development."	The paper provides background context to support a discussion about regulation, service delivery, and economic development as three key elements of the business friendliness in a community.	Conceptual discussion	Canada (British Columbia)	The paper discusses what regulation is and how it imposes costs and provides benefits, with particular emphasis on the costs of duplication and overlap as the rationale for regulatory harmonization. The paper also discusses how those concepts can apply to government services and economic development policy. It also describes and discusses a range of initiatives undertaken by local governments in several jurisdictions related to the harmonization of regulation, service delivery, and economic development.	http://www.cscd.gov.bc.ca/lgd/policy_research/library/Harmonization_of_Regulation_Paper.pdf
Pinto, Simões, and Marques (2016), "Water Services Performance: Do Operational Environment and Quality Factors Count?"	Despite several reforms, the Portuguese water sector still reveals significant levels of inefficiency, partially caused by an inappropriate operating scale.	Econometric analysis	Portugal	Concerning the operational environment, it was possible to observe a positive influence of private sector participation, economies of scope, and groundwater sources on efficiency.	http://tandfonline.com/doi/abs/10.1080/1573062X.2016.1254254?journalCode=nurw20
Pollitt and Steer (2012), "Economies of Scale and Scope in Network Industries: Lessons for the UK Water and Sewerage Sectors."	Many studies on water and sewerage industries place significant importance on the benefits of economies of scale and scope, and on how these relate to vertically integrated firms.	Literature review and conceptual discussion	England and Wales	A reexamination of the early literature on scale and scope economies finds that those studies do not implicitly preclude nonintegrated firms from making full use of assets for multiproduct activities. Nonintegrated firms can still reap scope economies through trading in the open market. The authors suggest that there are difficulties in separating these two types of economies when assessing firm performance.	http://www.sciencedirect.com/science/article/pii/S0957178711000865

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Prieto, Zofio, and Álvarez (2009), "Economías de escala, densidad and alcance en la provisión pública de infraestructura básica municipal."	The article estimates a cost function seeking economies of scale, density, and scope and seeking the optimal size for municipalities.	Econometric analysis	Spain	The article finds significant economies of scale and density, but there is no evidence of economies of scope. Only 10 percent of the municipalities from the analyzed region reach optimal size; thus, there is considerable room for aggregation to achieve economies of scale and density.	http://www.ief.es/documentos/recursos/publicaciones/revistas/hac_pub/190_ART_3.pdf
Puga (2009), "The Magnitude and Causes of Agglomeration Economies."	The paper reviews what is known about the magnitude and causes of the productive advantages of cities and also tries to identify the largest knowledge gaps on agglomeration economies.	Literature review	International	Despite the broad agreement on the magnitude of agglomeration economies at the urban level, the literature has been far less successful at distinguishing between possible sources. Doing so requires models that use micro-foundations to help identify and distinguish features, and it requires empirical work that carefully exploits those features for identification.	https://www.newyorkfed.org/medialibrary/media/research/conference/2009/jrs/Puga.pdf
Renzetti (1999), "Municipal Water Supply and Sewage Treatment: Costs, Prices, and Distortions."	Municipal water supply and sewage treatment utilities in Ontario, Canada, are studied to establish their supply costs and evaluate their pricing practices. The estimated cost parameters are combined with estimated residential and nonresidential demands functions to calculate approximate welfare losses that arise from overconsumption.	Econometric analysis	Canada (Ontario)	Prices charged to residential and commercial customers are found to be only one-third and one-sixth of the estimated marginal cost for water supply and sewage treatment, respectively.	https://www.researchgate.net/publication/4934570_Municipal_Water_Supply_and_Sewage_Treatment_Costs_Prices_and_Distortions

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Revollo-Fernández and Londoño (2010), "Análisis de las economías de escala y alcance en los servicios de acueducto y alcantarillado en Colombia" ["Analysis of economies of scale and scope in water supply and sanitation services in Colombia"].	The study tests the presence of economies of scale and scope in Colombia, where WSS is very atomized, through the estimation of Cobb-Douglas and translog cost functions.	Econometric analysis	Colombia	The study finds economies of scale and scope for water and sewerage services in Colombia, which can be used to design policies to improve efficiency in service provision and resources' conservation. Medium and small companies have greater economies of scale than large companies do.	https://economia.uniandes.edu.co/images/archivos/pdfs/Articulos_Revista_Desarrollo_y_Sociedad/Articulo66_5.pdf
Ringskog (2012), "The Evolution of Urban Sanitation in Latin America."	The evolution of WSS in Latin America has been tracked for at least the past one hundred years to identify and understand the drivers for urban sanitation and learn the pertinent lessons for application elsewhere.	Historical and statistical study	Five Latin American countries (Argentina, Brazil, Chile, Colombia, and Mexico)	Each of the five countries offers valuable lessons from the policies and implementation of its urban sanitation programs.	
Saal and Parker (2001), "Productivity and Price Performance in the Privatized Water and Sewerage Companies of England and Wales."	The paper analyzes the extent of economies of scale and scope as well as the impact of privatization and economic regulation on economic efficiency, over a sample of water and sewerage companies.	Econometric analysis	England and Wales	Evidence exists that the mean water and sanitation company is characterized by diseconomies of scale. Economies of scope between water and sanitation are not found.	https://link.springer.com/article/10.1023/A:1011162214995

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Saal, Arocena, Maziotis, and Triebs (2013), "Scale and Scope Economies and the Efficient Vertical and Horizontal Configuration of the Water Industry: A Survey of the Literature."	The paper surveys the literature on scale and scope economies in the water and sewerage industry.	Literature review	Worldwide	There is considerable evidence of vertical scope economies between upstream water production and distribution. There is only mixed evidence on the existence of (dis) economies of scope between water and sewerage activities. Economies of scale exist up to a certain output level, and diseconomies of scale arise if the company increases its size beyond this level. The optimal scale of utilities varies considerably among countries. Vertical unbundling is costly in comparison with providing water services with a fully integrated water company.	https://www.degruyter.com/view/j/rne.2013.12.issue-1/rne-2012-0004/rne-2012-0004.xml?format=INT
Saal, Parker, and Weyman-Jones (2007), "Determining the Contribution of Technical Change, Efficiency Change and Scale Change to Productivity Growth in the Privatized English and Welsh Water and Sewerage Industry: 1985-2000."	The study estimates the productivity performance of WSS in England and Wales before and after privatization using a quality-adjusted input distance function.	Econometric analysis	England and Wales	Evidence exists that the average water and sanitation company is characterized by diseconomies of scale.	https://www.jstor.org/stable/41770331?seq=1#page_scan_tab_contents

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Sauer (2005), "Economies of Scale and Firm Size Optimum in Rural Water Supply."	The article focuses on modeling and analyzing the cost structure of water supply companies.	Econometric analysis	Germany	The findings deliver evidence on the hypothesis that the legally set supplying areas, on the basis of public administrative criteria as well as local characteristics of water resources, are economically inefficient. Hence, structural inefficiency in the rural water sector is confirmed to be policy induced.	http://onlinelibrary.wiley.com/doi/10.1029/2005WR004127/pdf
SCL Econometrics (2009), "Cuantificación de las economías de escala en el sector sanitario."	The study seeks to analyze quantitatively the magnitude of economies of scale at various WSS stages in Chile. The cost information comes from the tariff determination processes.	Econometric analysis	Chile	In the production stage, there are economies of scale during the whole period analyzed, whereas there are none in water distribution and wastewater collection stages. There are economies of scale in wastewater treatment and in administrative stage during the whole period analyzed. Economies of density are found for the largest and medium-size providers but not for the small ones. Using a data panel, economies of scale are found at industry level.	https://es.scribd.com/document/142219667/Cuantificacion-de-Economias-de-Escala
Shih, Harrington, Pizer, and Gillingham (2006), "Economies of Scale in Community Water Systems."	Small water systems face increasingly stringent environmental regulations, and the question is whether the services' providers can afford the increasing costs due to those regulations, without amalgamation. Two data sets are examined to evaluate costs.	Econometric analysis	United States	Smaller systems tend to face higher unit production costs across the full range of production inputs. Size explains only a part of cost differences; inefficiency is the key to explaining the rest of cost differences.	https://www.awwa.org/publications/journal-awwa/abstract/articleid/15520.aspx

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Shirley, Xu, and Zuluaga (2000), "Reforming Urban Water Supply: The Case of Chile."	The paper studies the regulatory reforms affecting a Santiago WSS provider.	Conceptual discussion	Chile	The paper concludes that the particular Chilean political institutions enabled important restructuring and efficient reforms before privatization.	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=629141&rec=1&srcabs=630683&alg=7&pos=7
Stone and Webster Consultants (2004), "Investigation into Evidence for Economies of Scale in the Water and Sewerage Industry in England and Wales."	The report estimates models of WSS costs both for water and sewerage companies and for water-only companies after their privatization.	Econometric study	England and Wales	The report finds evidence of diseconomies of scale for the average-size water and sewerage company, declining over the period of analysis. It also finds small or negligible economies of scale for the average-size water-only companies.	https://www.researchgate.net/publication/42363732_Investigation_into_evidence_for_economies_of_scale_in_the_water_and_sewerage_industry_in_England_and_Wales
Strategic Management Consultants (2002), <i>Optimum Entity Size in the Water Industry of England and Wales: a Review of the Factors Which Influence the Size of Companies.</i>	The report discusses technical and organizational factors underlying economies of scale.	Conceptual discussion	England and Wales	The report concludes that technical economies of scale are exhausted at about 400,000 connections.	
Thiel (2009), "Europeanisation and the Rescaling of Water Services: Agency and State Spatial Strategies in the Algarve, Portugal."	The paper provides a theory-informed account of the way in which water service provision has been physically and institutionally restructured in the Algarve, Portugal over the years.	Conceptual discussion	Portugal	The case study shows the role of European policies in restructuring the spatiotemporal order in the Algarve and strengthening the influence of the national state within the region. A consequence has been that water quality, sewage treatment, and reliability of services have improved significantly in line with European requirements.	http://www.water-alternatives.org/index.php/alldoc/articles/vol2/v2issue2/53-a2-2-4/file

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Torres and Morrison-Paul (2006), "Driving Forces for Consolidation or Fragmentation of the US Water Utility Industry: A Cost Function Approach with Endogenous Output."	The paper empirically analyzes the structure of the U.S. water industry, using a multiproduct flexible cost function model with the amount of water delivered to final consumers recognized as endogenous. The cross-sectional econometric analysis focuses on measures of cost economies in water production and their variation with network characteristics.	Empirical analysis	United States	The estimates reveal considerable scale economies in terms of volume, particularly for small utilities that tend to have less output density. These economies are, however, counteracted by simultaneous increases in customer base and service area size, especially for large utilities. The results indicate that consolidation of small utilities might generate cost efficiencies, depending on the associated expansion of the network, but consolidation of already large utilities without corresponding increases in output density is not likely to be cost effective.	https://www.researchgate.net/publication/223849302_Driving_Forces_for_Consolidation_or_Fragmentation_of_the_US_Water_UTILITY_Industry_A_Cost_Function_Approach_with_Endogenous_Output
Trémolet and Binder (2010), "The Regulation of Water and Sanitation Services in DCs."	Water and sanitation services, which qualify as essential public services, need to be regulated from an economic, environmental, and public health point of view. Economic regulation of such services includes tariff regulation, service quality, competition, and, in some cases, consumer protection. Institutional models for carrying out such regulation include self-regulation, regulation by contract, and regulation by agency, as well as some hybrid models that combine regulation by contract and by agency and rely on external expert panels or user participation.	Conceptual document Literature review	Worldwide, with emphasis on developing countries	There is no single model; each of these systems has its advantages and limitations. The systems must be tailored to the specific circumstances to adapt to the institutional context and meet the needs of all consumers, including the poorest. This work reviews existing knowledge on these issues and identifies areas for research to improve current practices, particularly in developing countries.	http://www.tremolet.com/publications/regulation-water-and-sanitation-services-dcs

Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Tsegai, Linz, and Kloos (2009), "Economic Analysis of Water Supply Cost Structure in the Middle Olifants Sub-Basin of South Africa."	Using data gathered from the National Treasury of South Africa, the paper examines the structure of water supply costs and tariffs of Water Service Authorities (WSAs) in the Middle Olifants sub-basin of South Africa. Using the translog cost function method, the marginal cost of water supply and economies of scale are estimated.	Econometric analysis	South Africa	As evidenced by estimation results of returns to scale (greater than one), merger of WSAs would be economically advantageous. Hence, reversing the process of transferring water services' authority to "local" municipality level and thus upscaling WSAs into the "district" municipality level is an important policy option for improving water services efficiency in the Middle Olifants sub-basin of South Africa.	http://ageconsearch.umn.edu/record/49926
Tynan and Kingdom (2005), "Optimal Size for Utilities? Returns to Scale in Water: Evidence from Benchmarking."	The study estimates economies of scale in WSS of different countries.	Econometric analysis	International (African countries, Indonesia, Peru, United States, and Vietnam)	The study finds mixed results, but in general, economies of scale are present at least until a population of 125,000 inhabitants is served.	http://siteresources.worldbank.org/INTWSS/Resources/optimalsize.pdf
Urakami (2005), "Identifying Scale Economies for Different Types of Water Supply Organizations in Japan."	Utilities with different degrees of vertical integration are studied, and scale economies for each type of water supply organization are estimated using translog cost function. Water sources are considered because water sources differences might affect the cost structure of water supply systems.	Econometric analysis	Japan	The results suggest that economies of vertical integration exist between upstream water production activities and water delivery, meaning that water supply systems can achieve cost efficiency from vertical integration. This is particularly true for firms with a low purchased water ratio (purchased water relative to water delivered).	http://www-sre.wu-wien.ac.at/ersa/ersaconfs/ersa05/papers/370.pdf

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Urban Systems Ltd. (2005), "Background Paper: Best Practices for Moving Toward Change in the Delivery of Local Government Services."	The discussion paper examines two opportunities that are available to local government for increasing the effectiveness and efficiency of local government service provision. These include the delivery of local government services on a regional basis and the use of service delivery models other than direct provision and production of local government services by local government staff (called "alternative service delivery").	Conceptual discussion	Canada (British Columbia)	The discussion paper outlines some broad trends and factors that are prompting an increased emphasis on regional and alternative service delivery. It also identifies both the opportunities and the obstacles to the increased use of these service delivery models by local government. In addition, the paper discusses some best practices that should be considered by local government in the provision of services using the regional and alternative service delivery models.	http://www.cscd.gov.bc.ca/lgd/policy_research/library/Best_Practices_for_Moving_Toward_Change.pdf
van den Berg and Danilenko (2011), <i>Water Supply and Sanitation Performance Blue Book: The International Benchmarking Network for Water and Sanitation Utilities Databook</i> .	Utilities around the world look ever more urgently for ways to improve their performance and provide better services at the lowest possible cost. One effective means for accomplishing this is by comparing their performance with that of similar utilities elsewhere. As a result, water and wastewater utilities require a source of comprehensive, reliable data as a basis for meeting their constituents' demands for high-quality services.	Database and methodology for utilities benchmarking	Worldwide	IBNET serves as a global yardstick with which utilities and national policy makers—as well as the public, governments, municipalities, utilities, investors, and other users—can compare and evaluate the performance of water and wastewater utilities throughout the world.	https://openknowledge.worldbank.org/handle/10986/2545

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Van den Berg and Danilenko (2017), <i>Performance of Water Utilities in Africa:</i>	The report looks at how African utilities are performing. It uses a data panel of about 120 utilities in low- and middle-income countries in Africa, which represent about 53 percent of the urban population served by piped network services and covering 14 countries in different parts of Africa.	Statistical analysis	14 African countries	In general, utility performance in Africa is weak, although there are well-performing utilities. On the basis of the data panel, the performance of African utilities shows some improvements between 2010 and 2013. As water tariffs virtually everywhere are set on the basis of the operation expenses, controlling costs is a major element in making the service more affordable.	https://openknowledge.worldbank.org/bitstream/handle/10986/26186/113075-WP-P151799-PUBLIC-WeBook.pdf?sequence=6
Vergès (2010), <i>Experiencias relevantes de marcos institucionales y contratos en agua potable y alcantarillado.</i>	The report analyzes the administrative-territorial level of public authorities responsible for WSS, the legal nature of providers, and the type of contract or license regulating the conduct of the providers.	Conceptual discussion, case studies	International	The comparative analysis allows readers to identify lessons from national experiences intended for the institutional development of the WSS sector.	http://repositorio.cepal.org/handle/11362/3790
Villaverde Hernández and Cadillo La Torre (2014), "Economías de escala en la prestación de servicios de agua potable y alcantarillado en el Perú: El caso de las empresas prestadoras de servicios de saneamiento (EPS) municipales."	This study estimates economies of scale and minimum efficient scale from a sample of 49 Peruvian WSS utilities.	Econometric analysis	Peru	The study finds that only 20 percent of the utilities in the sample have output levels equal or superior to the minimum efficient scale.	http://www.academia.edu/7848366/Econom%C3%ADas_de_escal_a_en_la_prestaci%C3%B3n_de_servicios_de_agua_potable_y_alcantarillado_en_el_Per%C3%BA

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Van Ginneken and Kingdom (2008), "Key Topics in Public Water Utility Reform."	The report presents a framework of attributes of well-functioning utilities and how they have introduced key institutional changes. It aims to help water and sanitation sector practitioners choose and apply public utility reform approaches.	Conceptual discussion and case studies	Worldwide	Well-functioning utilities share common attributes: autonomy (being independent to manage professionally without arbitrary interference by others); accountability (being answerable to other parties for policy decisions, for the use of resources, and for performance); and being consumer oriented (reporting and listening to clients and working to better meet their needs).	http://documents.worldbank.org/curated/en/604331468138275645/Key-topics-in-public-water-utility-reform
Wenban-Smith (2009), "Economies of Scale, Distribution Costs and Density Effects in Urban Water Supply: A Spatial Analysis of the Role of Infrastructure in Urban Agglomeration."	The interaction between production costs and distribution costs at settlement level is investigated using data from England and Wales and from the United States. Plant-level economies of scale in water production are confirmed and quantified.	Doctoral dissertation	England and Wales, United States	Water distribution costs are analyzed using a new measure of water distribution output (which combines volume and distance) and modeling distribution areas as monocentric settlements. Unit distribution costs are shown to be characterized by scale economies with respect to volume but by diseconomies with respect to average distance to properties. It follows that higher settlement densities reduce unit distribution costs, whereas lower densities increase them.	http://etheses.lse.ac.uk/285/1/Wenban-Smith_Economies%20of%20scale%20distribution%20costs%20and%20density%20effects%20in%20urban%20water%20supply.pdf

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Publication	Object	Approach/Method	Scope	Main findings	Accessible at:
Williamson (1995), "The Institutions and Governance of Economic Development and Reform."	Institutions are important, yet they are persistently neglected in the planning process. The article takes a bottom-up, micro-analytic approach to economic development and reform. It examines the governance of contract, investment, and private ordering through the lens of transaction-cost economics.	Conceptual discussion	Worldwide	The article assesses the efficacy of the de facto (as against the de jure) institutional environment with respect to credible commitments.	http://documents.worldbank.org/curated/en/333731468739202982/The-institutions-and-governance-of-economic-development-and-reform
Williamson (1999), "Public and Private Bureaucracies: A Transaction Cost Economics Perspective."	The article examines public bureaucracy through the lens of transaction cost economics, according to which public bureaucracy, like other alternative modes of governance, is well suited for some transactions and poorly suited for others.	Conceptual discussion and case study on the U.S. State Department	Worldwide	There is an efficiency level for public bureaucracy, and every mode of governance should be kept in its efficient level, where it reveals comparative advantage.	http://carecon.org.uk/Chula/1999%20Williamson.pdf
Williamson (2009), "Transaction Cost Economics: The Natural Progression."	The lecture synthesizes the research programs described as the "economics of governance," the "economics of organization," or "transaction cost economics."	Conceptual discussion	Worldwide	Governance is the overarching concept, and transaction cost economics is the means by which operational content can be brought into governance and organization. Transaction cost economics entails examining economic organization through the lens of contract rather than the neoclassical lens of choice.	http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2009/williamson_lecture.pdf

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Williamson (2014), "The Transaction Cost Economics Project."	The article seeks to synthesize the approach of transaction cost economics.	Conceptual discussion	Worldwide	Transaction cost economics has many applications, not only within the field of industrial organization but also within most applied fields of economics, including labor, public finance, comparative economic systems, and economic development and reform. Applications to business are likewise numerous. Applications to the contiguous social sciences also have been made. Any problem that originates as or can be reformulated as a contracting problem can be examined in transaction cost-economizing terms.	http://www.mnje.com/sites/mnje.com/files/07-12_williamson.pdf
Wolters (2013), "Aggregation/ Regionalisation/ Consolidation of Water Utilities: Observations from the Netherlands."	The presentation analyzes the Dutch experience of cooperation and consolidation in the WSS services.	Case discussion	The Netherlands	The presentation recommends mergers as a way to achieve synergies and economies of scale in specific functions, to form coalitions for addressing specific challenges, and to make joint purchases.	http://www.amac.md/obrazovanie/EXPOAPA/2013.06.10-12_EPOAPA-2013/prezentari/WorkShops/Performance%20Measurement%20and%20Regionalization%20of%20Water%20Utilities/02.%20PresentationRomania-final(June%202013).pdf
Zschille (2012), "Consolidating the Water Industry: An Analysis of the Potential Gains from Horizontal Integration in a Conditional Efficiency Framework."	Focusing on a hypothetical restructuring of the industry, the study applies data envelopment analysis to analyze the potential efficiency gains from mergers between water utilities at the county level.	Empirical analysis	Germany	Highest efficiency improvement potentials turn out to result from reducing individual inefficiencies. The majority of the 84 merger cases analyzed are characterized by merger gains. The results suggest improving incentives for efficient operations in water supply and consolidating the industry structure.	http://cepr.org/active/publications/discussion_papers/dp.php?dpno=8737
Zschille and Walter (2010), "Cost Efficiency and Economies of Scale and Density in German Water Distribution"	This article uses data envelopment analysis and stochastic frontier analysis to determine the utilities' technical efficiency scores based on cross-sectional data from 373 public and private water utilities in 2006.	Empirical analysis	Germany	The study finds large differences in technical efficiency scores even after accounting for significant structural variables such as network density, share of groundwater usage, and water losses.	https://www.diw.de/documents/vortragsdokumente/220/diw_01.c.364475.de/v_2010_zschille_cost_napw.pdf



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