

Does the ownership of utilities matter for social outcomes?

A survey of the evidence for developing countries

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Abstract

This paper surveys the evidence on the relevance of the ownership choice for electricity and water and sanitation utilities with respect to access and affordability in developing countries. It shows that most of the widely quoted evidence is outdated and fails to reflect the long-term effects of choices made in the 1990s. The most recent data suggests that ownership affects social outcomes less than regulatory governance and market structure. The evidence is however not precise enough yet. More research is needed to determine how context and institutional constraints, including regulatory capacity, should influence ownership choices.

Keywords: privatization, regulation, utilities, access, affordability

Subject JEL classification codes: D02, D30, L33, L50, L98

Policy highlights:

- Ownership matters to social and distributional outcomes less than regulation
- The internalization of the institutional and fiscal context within ownership decisions drives social outcomes
- Ownership choices influence access and affordability differently

Introduction

Until the 1990s, in most developing countries, services such as electricity or water and sanitation (W&S) were the responsibility of public local, regional or nationally regulated monopolies. However, the privatization wave kick-started by Argentina in the early 1990s changed this practice (Chisari et al., 1999). Subsequently, developing countries began experimenting with various forms of public-private partnerships (PPPs) to deliver these services. These experiments allow robust performance comparisons between the new private firms and the old state-owned enterprises (SOEs) in similar contexts regarding the goals typically considered in policy discussions, including social concerns. Here, we focus on the accumulated evidence related to the impact of ownership choices on access and affordability and the distributional effects across different income classes. However, this evidence is subject to four main limitations.

First, the number of private-sector experiments is modest in the developing world. For electricity, for instance, based on data for 125 developing countries, Küfeoğlu et al. (2018) show that 75% relied on a public distribution utility, 18% on mixed ownership providers, and only 6% on fully private utilities. For W&S, Bertomeu-Sanchez and Estache (2019) find that, in most countries, large utilities have remained public, even though 108 out of 115 had signed at least one PPP contract since 1990. However, between 1990 and 2018, no more than 22% of the countries had managed to obtain private investment from these contracts. When investments did take place, they tended to be for small ring-fenced projects. In sum, in most developing countries, investment is still largely financed by the public sector for both types of utilities, and PPPs are the exception rather than the rule.¹

¹ See World Bank (2019) for details.

Second, the analytically robust recent evidence on the relevance of ownership for social outcomes is also modest. Bacon (2018) identifies only 26 econometric studies of the impacts of reforms in the electricity sector in developing countries. Only four considered social impact explicitly, leaving little room for analytical approaches such as meta-analyses to produce more precise assessments than ours. Those who tried to provide a statistical treatment of the results of earlier studies (e.g., Bensch, 2019) have relied on qualitative assessments to increase their sample size.²

Third, the evidence collected to date leads to unclear conclusions. For instance, in Birdsall and Nellis (2005), some authors find that more vulnerable households were better off since privatization, while others provide evidence of the contrary. These early disagreements have not been settled. However, more recent studies provide a better sense of when and how ownership matters socially, reconciling inconsistencies across diagnostics.

Fourth, many dimensions matter more to social outcomes than ownership and ignoring them biases the conclusions on the relevance of ownership. These include regulatory design, institutional capacity, fiscal capacity, the organization of policy and procurement processes, and the design of tariff structures and subsidies. However, to our knowledge, there is no empirical study that considers all of these dimensions jointly. Moreover, since 2010, very few empirical studies have focused on the social outcomes of the joint ownership and regulation decision. As for the other factors, most have been addressed theoretically rather than empirically (Auriol et al., 2021).

² We exclude qualitative studies from our survey as many leave excessive room for subjective assessments of outcomes and their drivers.

Once all these dimensions are considered jointly, the evidence suggests that, for access, the issue is often the speed at which access gaps are being closed relative to the speed of population growth. For affordability, the ownership performance assessment is driven by the extent to which the lowest quintiles of the income distribution need to spend much more than the higher-income classes on utilities. To explain these conclusions in detail, the paper is organized as follows. First, we summarize how the links between utility ownership and social outcome are assessed in the economic literature. The next two sections summarize the evidence and address the policy implications, respectively. We conclude with a suggested research agenda.

Methodological preliminaries

Despite its limitations, the economic literature has provided valuable methodological insights that should not be underestimated. First, the choice of the specific measures of access and affordability can explain the different conclusions on the impact of ownership. Second, many results are more sensitive to the methods used to conduct the assessment than often recognized in non-specialized discussions. These two observations are discussed in detail below.

On the choice of social indicators

Researchers have focused mainly on two types of social concerns: the impact on the poorest households and distributional effects. The usual poverty indicators are measures of access (i.e., the share of the population connected to a service) and measures of affordability (which are much less homogeneous across evaluations). The access indicator is primarily a technical one describing whether households have a connection at home (or close to home in the case of water). It says nothing on the extent to which such access is cheap or expensive. The affordability indicators pick up both the

connection and the usage charge since most tariffs in these sectors include a connection and a consumption component.

Access rates and affordability are usually reported as country averages. Only papers focusing specifically on the poverty or distributional effects of ownership report these measures at an income class level. Increasingly, due to the growing role of decentralization, some of these indicators are also computed at the regional or local level to allow for the assessment of inter-regional differences in the effects of reforms, including privatization (e.g., Herrera, 2019 in the case of water).

The data on national access is easily available from international organizations (for instance, the World Bank in its Development Indicators). For various reasons, the data on access per income class is less readily available in a strictly comparable way across countries. First, it is extracted from household surveys that are not always timed and structured in coordinated ways. Second, measures do not adjust for the quality of a given service. Third, the definition of access may include very different technologies, many of which do not correspond to home connections for some users. Finally, many authors focus on the existence of a connection from a specific utility rather than actual access by the population. Measuring increases in connection without correcting for increases in population is a common issue in the empirical literature. Indeed, even when a reform leads to an increase in the number of connections, the number of connections per capita or household may actually decline.³

The proxies used to assess affordability are even more confusing. First, there is little agreement on a general definition of affordability for utility services. For instance,

³ Some papers address this concern by adding a time trend but fail to interpret the results in terms of global social outcomes.

the debates on a reasonable definition of energy poverty are still very intensive as discussed by Culver (2017); Hutton (2012) presents similar discussions for W&S. Second, the evolution of the proxies used to assess affordability makes comparing the results of older and more recent papers quite challenging. Less than ten years ago, it was common to rely on the impact of privatization on average price to get a sense of the impact of a change in ownership on the affordability of a service. In practice, however, it is the tariff structure that drives the effective average price paid by each type of consumer in each income class. Third, it is often unclear whether papers look at the final prices inclusive or exclusive of taxes. Yet, the price of electricity, for instance, is often subject to national and sometimes sub-national taxes. Since these taxes are often adjusted after privatization to allow the state to recapture some of the rent expected to be created by private operators, even effective average prices can be misleading if the tax bias may not be accounted for. Finally, Bagnoli et al. (2018) show that comparing the commonly adopted international affordability threshold with actual spending across regions and income categories suggests that the poorest households rarely spend more than the affordability threshold on electricity and water. The most plausible explanation is that these households have no alternative but to ration their consumption. In sum, an affordability assessment can be sensitive to multiple dimensions built into assumptions that are not always explicit, making comparisons across papers quite challenging.

Some studies have produced estimations of the impact on social welfare rather than on access and affordability (see Bensch et al., 2015, 2016 for surveys). The most relevant ones are those unbundling consumer and producer welfare and those interested in comparing the payoff to consumers, workers, and (domestic and foreign) capital owners. Any of these approaches gives a sense of (re-)distribution among economic

actors resulting from ownership changes. Nevertheless, only a few have further unbundled consumers' welfare effects into income classes.

*On the methodological choices*⁴

To simplify the discussion, we divide the methods into three broad groups: econometric, index number based, and computable general equilibrium models (CGEs).⁵

The econometric approach is used most commonly, as shown by Bensch et al. (2015, 2016) for electricity and Herrera (2019) for W&S. It is particularly useful when the link between ownership and social outcomes needs to account for control variables reflecting the heterogeneity of the context in which the ownership decision takes place. Interactive terms between the ownership variables and the control variable often allow the identification of the factors strengthening or weakening the importance of ownership. These papers tend to rely on panel data. The fact that they can be global or region-specific is valuable since it informs on regional differences in the way public and private providers compare. Country-specific studies are a useful complement as they identify the role of local specificities.

One issue with the econometric approach is that the modeling of public and private options tends to be quite simple—maybe even simplistic—since most papers define it as a binary choice (i.e., model it as a single dummy). However, in practice, countries have developed multiple contractual forms to characterize the specific role of private providers in the delivery of public services. This feature is accounted for by a

⁴ Significant reporting or publication biases may lead to the underreporting of results unresponsive of a pre-conceived idea of the expected relevance or sign of a variable.

⁵ The survey does not cover case studies or narrative assessments without robust statistical tests as they do not provide reliable evidence of relative performance effectiveness.

few papers relying on a set of dummies to account for the various types of PPPs (i.e., management, greenfield, concessions, or full divestiture; Gassner et al., 2009). As Nagayama (2007, 2009) notes, ideally, the diagnostics should account for the investment level since access starts with investment. Furthermore, relative investment shares should be used when the two ownership options are used in the same country. This data is, however, generally not available (except for Latin America).

More recently, the availability of more detailed datasets has allowed for the use of more advanced econometric techniques to analyze the incidence of ownership changes and other institutional reforms across income classes (i.e., Jimenez and Yépez-García, 2017 and Bagnoli et al., 2020). While this research has not yet produced much more than interesting correlations of the impact of the ownership and regulatory choices across income classes, it offers a promising new diagnostic road.

A second approach is to rely on synthetic index numbers. It eases the coverage of the multiple dimensions that need to be considered jointly with ownership choices to assess their social outcomes (e.g., de Halleux et al., 2020; Foster and Anshul, 2020).⁶ Their main weakness is that they can only deliver correlations between ownership and social outcomes. One of their primary interest is that they are useful to conduct international benchmarking exercises, including for social outcomes.

The final approach is to rely on simulations models to track the social effects of ownership choices. The most popular method is the development of a CGE (e.g., Chisari et al., 2007b). These models are particularly effective for tracking the distributional effects of ownership choice. While they are often more demanding of

⁶ This category includes the use of non-parametric methods in assessments of the extent to which firms are efficient at meeting several goals jointly such as efficiency, access, and affordability targets (e.g., Grifell-Tatjé et al., 2018).

details than partial perspectives, they have the advantage of tracking both direct and indirect effects since they track effects across markets, including factor markets. They are particularly useful to track the effects of changes in ownership on the labor market where workers lose their jobs and hence income, for instance, and then face affordability constraints.

In addition to CGEs, other approaches can help track the distributional effects of ownership changes—for instance, decomposing changes in business profits and losses in a sector into the sum of price and quantity changes to be attributed to each key stakeholder in the sector and across income classes (e.g., Estache and Grifell-Tatjé, 2013 for the Malian water sector).

All methods have provided valuable insights into the social effects of ownership, but none have established clear causal relationships. The difficulty of addressing common endogeneity problems results from the fact that, in many cases, SOEs are in charge simply because the private sector was not interested, given the risks inherent to investment in some countries or regions. The allocation of mandates across public and private operators within and across countries has often been the explicit or implicit outcome of cream-skimming by private actors with the residual responsibility for the less profitable mandates assigned to the SOEs, as discussed in theoretical research (i.e., Laffont, 2004).⁷ However, the issue has not enjoyed any robust empirical testing despite its policy relevance, including for social outcomes.

⁷ Doll and Pachauri (2010) offer this explanation for the slow progress of obtaining access to certain services controlled by large utilities with some degree of monopoly power in Sub-Saharan Africa.

What does the latest evidence show?

This section is divided into three parts. First, it discusses the extensive literature on the access outcomes of ownership choice. Second, it reviews the much more modest evidence on affordability. The final section considers the even smaller evidence on distributional consequences.

Access

The nexus between access and ownership is well analyzed empirically. Raw access measures are common in panel regressions conducted at the country level, and proxies are even more common when the assessments are conducted at the firm level. The number of connections is useful when the focus is on the effectiveness of performance contracts when explicit connections targets are imposed on operators, for instance. However, it can also offer a partial and biased perspective when the analysis ignores the relevance of the extent to which connection growth matches, surpasses, or lags population growth. The timing and speed of connections matter, but only a few assessments consider these dynamic aspects (notably Gassner et al., 2009; Andres et al., 2008). Service quality also matters. Getting access 24 hours a day is not the same as less than eight hours of access per day. This is, however, a feature that can be controlled for when using the technical data available from engineering sources.

Ignoring the differences in access definitions, the main insight from the accumulated evidence is that ownership, defined broadly, is generally irrelevant but may be relevant in specific cases. For instance, concession contracts can perform better than SOEs when they include specific investment programs or connection targets (Gassner et al., 2009). Nevertheless, even this may overstate relative effectiveness if the context and some key constraints are ignored as discussed below.

Insights on electricity

For electricity, four recent surveys (Bacon, 2018; Bensch, 2019; Jasmab et al., 2017; Lee and Usman, 2018) cover the impact of privatization and PPPs (as well as other reforms) on access. Jasmab et al. (2017) is the most detailed. They find that electricity access rates are not significantly impacted by ownership choice—or at least, not as much as expected when the reforms were launched. The impact is particularly weak in rural areas. When differences across ownership types appear, they are primarily driven by differences in the match of ownership with local needs and constraints, or differences in the effectiveness of complementary reforms (regulation, institutions, subsidies, pricing, and market structure). For instance, Vagliasindi (2012) shows for a panel of 22 countries over 20 years (1989–2009) the much higher impact on the performance of a sound regulatory framework and the reduction in the degree of concentration of the sector than the change in ownership per se.

Bensch (2019) offers a few more technical details from his survey of quantitative and qualitative studies produced between 2002 and 2018.⁸ First, he notes that almost half of the studies were published before 2010 (i.e., with pre-2008 crisis data) and that very few were published after 2014. A lot of the evidence often quoted is thus outdated and only based on the initial short-term effects of ownership changes. Second, he highlights the relevance of the specific access measure. For papers focusing on the population access rate, access improvements at the country level are weak or insignificant. When the measure is in terms of connections at the firm level, improvements are, on average, modestly positive. Third, the transferability of the

⁸ The quantitative studies are assessed using meta-regressions. The qualitative studies are synthesized through an iterative logic model.

conclusion across regions is unclear given the significant cross-regional contextual and institutional differences. His sample is dominated by Latin America (LAC) and Asia. The LAC studies include both cross-country panels and country-specific papers (dominated by Argentina). The Asian sample is biased toward country-specific studies of large countries (e.g., China, India, and Pakistan, with India dominating the sample). Sub-Saharan Africa (SSA) is less well covered, and most results are qualitative. Finally, he shows that increases in financial resources for system expansion drive outcomes but also depend on regulatory improvements. Without these improvements, Erdogdu (2014) demonstrates that private investment drops, and so does the speed at which countries close their access gap.

Bayer et al. (2019) reinforce these diagnostics. They only find 31 out of 7,247 studies interested in “energy access” published between 2000 and 2018 conducted using formal statistical impact tests. Only seven rely on a design allowing causal inference. The standard econometric approaches most commonly quoted in policy discussions on ownership and access are more likely to lead to a positive impact than randomized experiments. In addition, the authors confirm that even when the cultural, country, and policy contexts are accounted for, there are good reasons to be cautious when considering exporting the policy implications from one country or one context to another. In short, simply because one form of ownership is better in one context does not mean that it will be better in another context.

Insights on the water and sanitation sectors

John et al. (2015) conduct the only relatively recent comparable technical synthesis of evidence, drawing upon 90 observations from 17 econometric studies on the impact of ownership changes on access or connections in infrastructure, including W&S. For the

water sector, they show that the ownership change had, on average, a negative impact, even if not significantly so, for their sample.

Even more so than for electricity, most of the evidence is outdated (Andres et al., 2008 or Clarke et al., 2009 on LAC; Bayliss, 2003a, 2003b or Kosec, 2014 on SSA; Gassner et al., 2009 cover a global sample).⁹ Bakker (2014) surveys various meta-analyses of this evidence and concludes that the choice of ownership is less important than the choice of governance to access improvements. She also argues that evaluations have evolved. While early research may have validated the initial enthusiasm for PPPs compared to SOEs (i.e., Kosec, 2014 for SSA and Clarke et al., 2009 for LAC), the most recent studies provide a weaker case for PPPs in terms of improvements in coverage. This finding is confirmed by Stutsman et al. (2016), who find no difference due to ownership (private, public, or decentralized) for a sample of 144 utilities across 33 countries.

Marson and Savin (2015) add that access to water depends non-linearly upon financial results based on their analysis of 25 SSA countries from 1996 to 2012. Important access increases can occur at relatively low levels of capital cost recovery while they can deteriorate beyond a certain threshold. Although the authors do not address ownership explicitly, their results highlight how regulation can influence social issues. For instance, improvements in cost recovery can be counterproductive in terms of access (without subsidies), implying a potential conflict between financial and social objectives.

⁹ Recently, research has focused instead on other policy options such as decentralization and the role of alternative smaller-scale providers (see Herrera, 2019).

Country-specific evidence leads to equally mixed results. Galiani et al.'s (2005) paper on the Argentinean privatization experience is still widely quoted as evidence that water utilities privatization paid off in terms of access and health outcomes. Yet, the paper has often been criticized by practitioners for not recognizing the selection biases (cream skimming) that characterized the design of the contracts. It forgets that contracts were designed to reduce the mandates that would increase the risks faced by private operators and investors. The risky and costly responsibilities were left to the residual SOEs. Some details matter when conducting diagnostics much more than many econometric treatments can reflect. Accounting for such details has allowed Borraz et al. (2013) to show for Uruguay that the privatization resulted in a deterioration of water quality, and the subsequent renationalization led to an improvement. For the case of Colombia, Granados and Sanchez (2014) also reject the conclusions reached by Galiani et al. (2004).

In sum, for W&S, as for electricity, the impact of ownership choice on access remains unsettled, but the most recent research leans toward the irrelevance of ownership alone. The main success factor is the effort to match the choice of regulation and governance with the context in which reforms occur. Increasingly, the matching effort is favoring more local modes of delivery as a substitute to utilities.

Affordability

The definition of affordability for regulated public services is subject to intensive debates, and the definitions adopted across papers are often not strictly comparable. Moreover, many papers omit to deal with the fact that low levels of expenditures may simply reflect rationing or low levels of consumption resulting from limited access during significant parts of the day.

Perhaps because of these measurement difficulties, the academic literature on the impact of ownership choice on affordability is surprisingly modest given its political and ethical relevance. Moreover, the little evidence available is just as dated as in the case of access. Most studies have been published before 2010 or with data collected prior to 2010 (e.g., Birdsall and Nellis, 2005; Coudouel and Paternostro, 2005; and Ugaz and Waddams-Price, 2003). The most encompassing in terms of country coverage is still Gassner et al. (2009); for SSA, Banerjee and Morella (2011) and Estache and Wodon (2014); for LAC, Andres et al. (2008); and for Asia, Sen et al. (2018) provide more regionally targeted evidence.

These papers tend to focus on tariff designs and subsidies rather than ownership, and many focus on the average change in price as the primary indicator of an impact on affordability. As in the case of access, the differences in the way the multiplicity of dimensions (i.e., control variables) are considered explain many of the differences in conclusions. Some emphasize that there are many reasons why prices will increase with ownership changes and the matching reforms (i.e., Nagayama, 2007, 2009). Others argue that this could be offset if prices fall due to changes in the degree of competition (Urpelainen and Yang, 2019).

Many emphasize that outcomes are driven by the end of subsidies tolerated under public ownership or due to increases in taxes resulting from the efforts made by governments to recapture some of the profits from the efficiency gains produced by reforms. This impact has seldom been discussed in enough detail because of significant data gaps on household expenditures. Despite these limitations, this literature illustrates how much regulation and tariff design may matter much more than ownership. The evidence analyzing various income classes hints at their regressivity, particularly in

cases of subsidies focusing on service use in countries where the poorest do not have access to the subsidized service (e.g., Boccanfuso et al., 2009a, 2009b).

This bias illustrates a common weakness of regulatory regimes ignored by reforms. Targeting the performance of connection subsidies depends heavily on the roll-out of new connections. In countries with low existing connection rates, a roll-out policy that mirrors the existing pattern of household connections would tend to be regressive since the areas with higher household connections tend to be wealthier. Moreover, roll-outs that concentrate on connecting households in areas where there is already access (densification) are likely to be considerably less expensive per connection than roll-outs that seek to expand the area covered. Unless this is spelled out in the service obligations of an operator, whether private or public, the rational choice for an operator concerned with minimizing costs will often exclude the poorest households. This failing is why, beyond utilities, many governments increasingly consider how to best support the non-network services since they are easier to match with social concerns.

Overall, the awareness of the importance of affordability has significantly grown in the last 10–12 years in the academic literature, as discussed next at the sector level.

Insights on electricity

As seen in the stylized facts collected by Foster and Witte (2020), many countries have formally addressed affordability through the design of tariffs, whether the operators were public or private. About three-quarters of countries adopt either increasing block tariffs (IBTs) or separate social tariff schedules to try to ensure affordability for low-income users. In practice, however, only one-third of countries manage to keep average electricity bills within five percent of household income. Foster and Witte (2020) also

argue that this low share of countries with affordable bills is related to the fact that in many countries, cost recovery rates have had to improve. The correlation coefficient between the affordability indicator and limited capital cost recovery is equal to 0.8. Ownership seems to play no role here, and this finding is confirmed by the more analytical treatment of the data.

The most obvious issue is the decision to rely on IBTs as a cross-subsidy mechanism to address social concerns. Conceptually, when fiscal constraints are not binding, an IBT is rarely much more socially effective than a straightforward, subsidized, linear volumetric tariff. This is because IBTs are only available to households connected to the grid network, which often excludes the poorest ones. There is also inequity across consumption levels, stemming from the prevalence of fixed charges or minimum consumption charges. These charges impact households that consume less than 30 kWh a month (about 30% of all households below the poverty line), as shown by Pargal and Banerjee (2014) for India. They find that the average household consuming less than 30 kWh a month paid more per unit of electricity than the average household consuming 30–100 kWh. Moreover, low-income customers are typically more likely to have a shared connection than wealthier customers and thus often face the highest price in IBTs, whether the service provider is public or private. The average unit tariff of multiple connected households is likely to be considerably higher than if each is individually metered since they appear in the billing process as a single household with high consumption. In Ethiopia, where the lowest connection fee represents 130% of monthly household income, the number of grid-connected households outnumbers utility clients by a factor of two and a half (Kojima and Trimble, 2016).

The more analytical studies on the nexus between affordability for low-income households and ownership have been summarized by Jasmab et al. (2014). As in the case of access, they point toward the irrelevance of ownership when all other governance variables are controlled for. This conclusion stands when the redesign of electricity rates to reflect a more efficient cost structure is considered (Burger et al., 2019) and when secondary effects such as rationing or market exclusions are analyzed (Estache and Wodon, 2014).¹⁰

The fact that regulation matters more than ownership for affordability is also well documented. According to Lin (2018), without a design of regulation precisely targeting the needs of the most vulnerable, affordability remains an issue under any type of ownership. Gugler et al. (2013) specify that if the reforms lead to higher prices, the additional resources generated could be used by either SOEs or private operators to reduce subsidy costs but also to finance network expansions into poorer areas since these are often out of service range prior to reforms. However, one of the reasons why this is not often done is that the regulatory mandate is not well designed or simply not enforced even when designed correctly.

Insights on the water and sanitation sectors

As for electricity, affordability is primarily driven by the design and the targeting of subsidies and regulation. According to the World Bank's International Benchmarking Network for Water and Sanitation Utilities (IBNET) database, in 2017, 86% of utilities

¹⁰ Secondary effects across income classes such as short-term labor reductions associated with privatization are usually ignored by econometric treatments of the data. Boccanfuso et al. (2009a, 2009b) and Chisari et al. (1999, 2007a, 2007b) find negative short-term effects on the lowest income classes associated with price increases and labor cuts.

relied on subsidies (only 35% were able to recover their operating expenditures).

Andres et al. (2019) suggest that, on average, 56% of subsidies are captured by the wealthiest 20% of the population. Only 6% finance the needs of the poorest.

Abramovsky et al. (2020) confirm this pattern across several case studies.

Similar to electricity, the price structure is part of the problem. Nauges and Whittington (2017) show conceptually that the most common pricing approach, IBTs in W&S, fails to target low-income households, regardless of the magnitude of financial subsidies granted to the utilities. The authors also demonstrate that when cost recovery is low, a common problem for SOEs, the distribution of subsidies under IBTs is even worse if the correlation between water use and household income is high. These conceptual concerns have not attracted much empirical validation. For example, Fuente (2019) finds that only ten out of 44 tariff studies explicitly address affordability, and out of these, only one considers a developing country since 2010 (Jordan). Unfortunately, these papers do not discuss the relevance of ownership.

The only post-2010 evidence on the role of ownership comes from two country-specific papers. For Malaysia, Lee (2011) finds no difference in affordability (or access) between public and private providers. He confirms, however, that active regulatory intervention in tariff regulation and universal service provision drive the results. In contrast, Barbosa and Brusca (2015) show that the W&S tariff levels were higher for privately managed corporations than for SOEs in Brazil. However, they do not address the role of regulation.

In sum, the emerging picture is that there is no detailed analytical monitoring of the relevance of ownership for affordability. However, there are enough results to conclude that unless regulation is designed correctly, there is no reason to expect price

cuts following privatization leading to improved affordability. Privatizations come with the desire to improve cost recovery and reduce the fiscal costs associated with subsidies.

Distributional effects

When ownership makes a difference to access or affordability, it is likely to have different impacts across income groups and sometimes across consumer types (i.e., rural vs. urban). The approach most commonly used to assess this effect is to rely on CGEs.¹¹ Chisari et al. (1999) have provided the first quantitative evidence based on a CGE on the relevance of the multiple interactions resulting from ownership changes in utilities for Argentina. More recently (although not that recently), Solaymani et al. (2014) for Malaysia across sectors, Boccanfuso et al. (2009a) for water privatization in Mali, and Boccanfuso et al. (2009b) for electricity reform in Senegal have provided equivalent results. CGEs have since been used less to assess the affordability effects of ownership changes.

Despite their somewhat outdated insights, these papers add up to a main message that should be familiar by now. It is not the ownership that drives the distributional impact, but various failures to design and implement tariffs and regulatory adjustments. Almost all of these papers point to the unpredictability of the distributional effects of common pricing designs. Tariffs and subsidies tend to be excessively standardized and underestimate the relevance of technical and informational constraints or financing capacity as well as constraints due to capital and labor market characteristics. For instance, the private ownership of utilities tends to be concentrated among foreign investors and upper-income classes' domestic households. Under this

¹¹ Chisari et al. (2007a) discuss the potential use of CGEs for evaluations of regulatory decisions.

type of ownership distribution, any profit would exclude a large segment of the population, who would instead benefit from the profits when ownership is public since they accrue to all taxpayers.

CGEs are also useful to show the welfare effects of failures to consider that when poorer households are not connected to the network, simply focusing on price as a proxy for affordability is misleading. Price increases have no impact on unconnected people and a wide range of subsidies types intended to offset the undesirable social effect of price increases are often mis-targeted. Moreover, when they reduce disparity across income classes, they can do so by making some connected users worse off.

Finally, these models show that distributional effects can appear through the repercussions of regulated service prices or the impact on jobs, particularly unskilled jobs. These effects can be different also for urban and rural households. Overall, these effects are not always comparable across case studies since some countries are more effective at partially offsetting them in the short term. For instance, redundancy and retraining packages can make a difference, in particular for the lower-income classes to which most low-skill workers belong.

Table 1 summarizes the central insights of this review of the evidence. In sum, the good news is that the social effects, including the distributional effects of the ownership choices, are easily trackable when there is a political will to do so. There are also enough methodological approaches to simulate ex-ante the possible effects of ownership choices. The bad news is that some dimensions are understudied, and most of the evidence available is outdated despite its ethical and policy relevance.

[Table 1 near here]

What are the main takeaways?

This section summarizes the main policy-oriented takeaways of the survey on ownership and other key dimensions to account for to obtain the desired social outcomes. It focuses on the (ir-)relevance of ownership for low-income households, the biases in the expectations from the ownership choices to address social goals, and the relevance of the institutional constraints for the social impact of ownership choice.

To help low-income households, worry less about ownership and more about regulation

There is little evidence that ownership matters to social goals, which public and private operators can be just as good or just as bad at addressing. However, after over 30 years of experience, we now have a better sense of the differences in context and political commitment to the necessary institutional and regulatory reforms that explain differences when they arise.

First, the clarity of the specification and the enforcement of service obligations assigned to an operator, whether public or private, is crucial. The availability of more precise household survey data should allow better targeting of investment obligations imposed on service providers and better-targeted pricing and subsidy designs. This has been addressed by theoretical academic publications for over 50 years at least (Laffont, 2004 for an early survey) and by empirical research on the social incidence of the failures for both public and private provision options for over 30 years now. This research shows that the needs of vulnerable households can be addressed by both public and private operators if the terms of engagement are clear for all parties, as was the case in Malaysia.

Second, social outcomes from ownership choices are sensitive to the definition of the mandate assigned by the reform teams to regulators and the strength of social commitments. Social concerns are likely to suffer from a low priority if the mandate fails to impose specific service obligations, pricing rules, and subsidy strategies to protect the most vulnerable. They are also likely to fail if they do not define the terms by which operators would deliver on the social goals, accounting for the limits on subsidies imposed by fiscal constraints.

It is quite puzzling to have to note that despite 30 years of academic evidence on the sources of failures and possible solutions, the continued inability of regulators to cause firms to deliver on social goals has still not been addressed in practice. Worse, the gap between what we could do on the ground and what we actually do collectively in tariff design, procurement, contract design, staffing skills, or quantitative tools adoption may be widening. The consequences of economic crises since 2008 have made social needs much more explicit, but the solutions are at best short-term bandaids rather than structural adjustments to address lasting institutional and technical capacity constraints.

Public operators are more likely than private ones to address social needs

All the evidence suggests that SOEs (and smaller alternative providers) are more likely than large private providers to be responsible for meeting the needs of the most vulnerable households. In short, they are expected to do what others are not willing to do. There are exceptions, of course, but the odds of finding a large private operator in charge when poverty is a concern are much lower than the opposite.

Cream skimming continues to be an issue underestimated by performance evaluations. When some of the poorest countries have managed to attract private financing, many have been forced to exclude from the mandate of the private operator

the need to cater to regions or neighborhoods with high concentrations of poverty because of a perceived risk that cost recovery will be more difficult. This problem can and should be addressed in the definition of contractual mandates and in the design of regulation.

Ownership need not matter to the speed at which the poorest households are catered for

There is no evidence that, under the right regulatory environment, ownership affects the speed of service improvements. Many people living in poverty in Africa, Central America, and parts of Asia are still not getting the access promised since the launch of the Millennium Development Goals (MDGs), whether the primary providers are public or private. The evidence reviewed here suggests three underused tools for improving efforts to address social needs relatively quickly, regardless of whether the providers are public or private.

First, the inclusion of timing in the definition of the mandate assigned to providers matters. The anecdotal evidence of the 1990s suggests that unclear mandates on the timing of coverage lower the odds that the poorest households will be served promptly.¹² The more formal evidence confirms the cost of omitting these mandates and the payoffs of making them explicit (e.g., Estache and Grifell-Tatjé, 2013 in the case of Mali).

Second, underestimating a role for alternative small-scale public and private providers as complements to SOEs can explain the slow progress in improving access

¹² This has been the experience of one of the authors when working on contract (re-)negotiations and audits in Asia, Latin America, and SSA during that period.

rates (e.g., Herrera, 2019). In contexts as different as the Northeast of Brazil and the North of Tanzania, for instance, relying on small solar plants was the right cost-effective solution to provide a faster service than any of the utilities could.

The social opportunity cost of doing nothing or delaying intervention in the hope of some form of PPP rather than relying on alternative solutions is too often ignored or underestimated in ex-ante and ex-post evaluations of policies. Relying on alternative technologies can not only help improve access faster under any type of ownership, but it can also help affordability. Since many of the alternatives also represent a cheaper investment, they can indeed provide more affordable services.

Sectoral institutional weaknesses matter more to low-income households than ownership

There is now enough evidence to firmly argue that addressing institutional and regulatory weaknesses explicitly largely drives the ability to meet social goals, whether the operator is public or private (e.g., Vagliasindi, 2011). Imam et al. (2019) provide two specific policy insights often quite relevant for the ownership debate in many developing countries. First, electricity access rates are equally well protected from corruption by the creation of autonomous regulatory agencies, whether the provider is public or private. Second, however, combining an autonomous regulator with a private operator is associated with lower access than combining it with an SOE. Institutions thus matter to social outcomes differently according to ownership.

While these results are important, they do not address the social relevance of the local nature of institutional weaknesses and their diversity. In any country, it would probably be best to produce a full diagnostic picture that includes a careful review of all stages of local project or policy implementation cycles, starting with the match between the procurement and contract designs with local institutional capacity constraints. One

approach to ownership or contract design does not fit all contexts, and when this is ignored, it is unlikely that the social goals will be met.

So where could academics go from here?

The answer to this basic question is that there is relatively strong and growing evidence on the irrelevance of ownership for social outcomes. However, the survey has also raised issues that could define a useful research agenda. This agenda should address at least the following three issues.

First, there is a case to conduct an up-to-date systematic analytical joint assessment of the relevance of ownership for each of the social dimensions discussed here (access, affordability, and distributional indicators). Most of the evidence is both outdated and partial. Many relevant dimensions have changed since the 1990s and early 2000s, when the bulk of the evidence on the social impact of ownership was produced. For instance, firms and market structures have changed, and so have the global financial and governance contexts in which they operate. There is no reason to assume that this is irrelevant to the choice of ownership and its social impact.

Second, the more technical literature largely ignores the social relevance of technological and quality choices as substitutes or complements to ownership choice. The social role of alternative providers, their technologies, and their impact on quality and affordability of access and service is mostly analyzed in detailed case studies. These are useful but analytically more challenging to interpret to guide policy decisions in other countries. For instance, whether there is a predictable bias according to ownership that could be addressed as part of reform packages is unknown. This is what an econometric treatment allowing an assessment of the causality between the policy choices and the social outcomes could clarify.

Third, we do not know the extent to which prices and subsidies should be designed more systematically in different ways according to ownership in order to reduce the risks of trade-offs or mismatches between the often excessive number of goals. This is particularly important in environments with limited financing and pricing tools. We now have enough evidence to argue that, too often, social goals are mistargeted by well-intended design choices irrespective of ownership preference. However, we still do not know whether ownership affects this mistargeting. The possibility of two-way causality should be tested formally.

Surely there are other dimensions to include in a research agenda on the social impact of ownership choices. However, addressing the three issues would already make a significant difference in the way countries can anticipate and eventually address the social effects of their reform choices, in particular when these have to address fiscal constraints.

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Table 1: Summary of insights provided by academic research on the relevance of ownership for utilities			
Social Performance Indicator	Issues identified by papers	Statistical significance of ownership	Solutions explicit or implicit in the discussion of issues
Access	Differences in measures of access across papers	Not significant	<ul style="list-style-type: none"> Address explicitly differences in quality of access in evaluation Clarify if access to firm connection is consistent with population access
	Increase in connections slower than population growth, in particular in rural areas, often linked to the cream skimming issue	Not significant	<ul style="list-style-type: none"> Impose investment and service obligations in mandates assigned to providers as needed Better access to financing, whether the operator is public or private
	Expensive technological solution leading to the exclusion of poor households	Not significant	<ul style="list-style-type: none"> More openness to hybrid market structures and smaller providers relying on alternative technologies
	Excessive freedom to pick timing and sequencing of investment plans, leading to low priority for low-income households	Concessions contracts PPPs can be more effective than SOEs with the right design	<ul style="list-style-type: none"> Explicit specification in contractual arrangements under all types of contracts to ensure fairness of network expansion
	Solutions are not exportable “off-the-shelf” across countries	Not significant	<ul style="list-style-type: none"> Account for context, institutional, regulatory, technical, and fiscal capacity to optimize the matching of ownership with constraints
Affordability	Differences in measures of affordability across papers	Not significant	<ul style="list-style-type: none"> Adopt standard definitions as suggested by independent watchdogs
	Incoherence between cost recovery efforts and efforts to maintain low prices	Not significant	<ul style="list-style-type: none"> Rely more on price discrimination options as a way to produce an average tariff consistent with cost recovery goals
	Poorly targeted roll-outs of connections, forcing poorest households to rely on more expensive alternatives	Not significant	<ul style="list-style-type: none"> Explicit specification in contractual arrangements of timing and targeting of roll-outs
	Underestimation of fiscal constraints to cover subsidies	Not significant	<ul style="list-style-type: none"> Rely on various types of cross-subsidies to finance consumption by poorer users or high-cost regions
	Regressive and poorly targeted tariff structures and subsidies	Not significant	<ul style="list-style-type: none"> Replace Increasing Block Tariff for poor households consuming in bundled purchases by subsidized linear volumetric tariffs
	Solutions are not exportable “off-the-shelf” across countries	Not significant	<ul style="list-style-type: none"> Account for context, institutional, regulatory, technical, and fiscal capacity to optimize the matching of ownership with constraints
Distributional effects	Unpredictability of distributional effects of tariffs as they depend on a wide range of factors that are often omitted by reformers and regulators	Not significant	<ul style="list-style-type: none"> Need to rely on better-targeted tariff structures and subsidies, but few regulators collect the data needed to do so Need to account explicitly for institutional and regulatory constraints as well as labor and capital market characteristics
	Indirect ownership effects, e.g., through labor markets, matter differently across income classes and rural and urban consumers	Private firms tend to have better labor productivity than SOEs, often cutting jobs for low-skilled workers	<ul style="list-style-type: none"> Indirect effects can generally only be partially offset in the short term In the case of labor, for instance, redundancy and retraining packages can make a difference, in particular for the lower-income classes to which most low-skilled workers belong
	Indirect ownership effects through differences in the distribution of profits from private utilities across different domestic income classes and foreign investors	For profitable utilities, PPPs move revenue from the public treasury to national and foreign private investors	<ul style="list-style-type: none"> The design of regulation and taxation can help ensure the fair distribution of profits across stakeholders, even if not enough to offset the transfer from public revenue to private investors associated with most PPPs

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