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Reality versus propaganda in the formation of beliefs about privatization[☆]

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ABSTRACT

Argentina privatized most public utilities during the 1990s but re-nationalized the main water company in 2006. We study beliefs about the benefits of the privatization of water services measured immediately after the 2006 nationalization. Negative opinions about privatization prevail. We find that “reality” can change beliefs: people who had first-hand experience observing the investments made by the privatized company have a better opinion of water privatization (relative to other privatizations) than people who did not gain access to water. The effect, while statistically significant, seems small adding only 0.8 points on a 1–10 scale. Moreover, the effect of priming subjects with government propaganda against privatization has an effect that almost offsets the effect of gaining water. However, our evidence suggests that the presence of firm investments makes beliefs about the benefits of privatization less susceptible to be affected by propaganda.

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1. Introduction

A growing literature in political science, sociology and economics has emphasized the connection between beliefs and economic organization. For example, the amount of redistribution observed in the US and Europe, or the amount of market reform that we can expect in developing countries, appears to be connected to voter's beliefs about actors or elements of the economic system, such as whether “effort pays” or if the rich are corrupt. Two dimensions of these beliefs are particularly important: their variability and their accuracy. Indeed, if these beliefs were fixed, perhaps because they were historically determined, then the possibility of changing economic systems or of implementing long lasting market reforms might be limited. And if these beliefs can diverge from reality there is of course the possibility of large welfare losses. Indeed, one question that has confronted this research is the extent to which beliefs can be maintained in the face of available evidence to

the contrary.¹ A natural question, dealing with both dimensions, asks the extent to which an agent (perhaps an “ideological entrepreneur”) can persuade others of a particular point of view using old or fabricated data. And if this were possible, how do such effects of “propaganda” compare with the effects of objective changes in “reality” on the formation of beliefs (assuming these exist).

To attempt an answer to these questions, we study the formation of beliefs about the benefits of privatizing the main water company in Argentina during a period where the government made several attempts to persuade the public of its negative views on the private company, an effort that was viewed as a propaganda campaign. Specifically, in June 2006, three months after the government re-nationalized the company, we implemented a survey to elicit views about the 1990's market reforms in general and the water privatization in particular. It covered households living in middle and low income neighborhoods in the outskirts of Buenos Aires, Argentina. Two “treatments” were studied: the presence or not of firm investment and the priming or not of propaganda. Using detailed historical maps indicating which households had access to water services, we ensured that about half the addresses in our sample had gained

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¹ See, for example, Lipset and Bendix (1959), as well as Denzau and North (1994), Piketty (1995, 1998), Ben-Ner and Putterman (1998), Bowles (1998), Bisin and Verdier (2000), Benabou and Ok (2001), Alesina et al. (2001), Hall and Soskice (2001), Johnson (2002), Rotemberg (2002), Dobbin (2004), Benabou and Tirole (2006), Benabou (2008), and Di Tella and MacCulloch (2009).

water during the privatization period while the other half remained without access at the time of the survey. We then reminded a (random) sub-group of our sample of some negative statements made by the country's president (Mr. Kirchner) concerning the lack of investment of the water company around the time of the nationalization (exactly as it was reported in the press). The statement made by the President referred to a fact that was untrue, and this was particularly evident to the sub-sample that had gained water as a result of the company's investment after privatization. As controls, a statement that was made by the water company defending their record on investment was read to another sub-sample, while a third sub-group was not read any statement.

Our approach exploits a key feature of this episode: it produced a group that benefited substantially from privatization. Indeed, the privatized water company's investment during the 1990s brought water services to a large group of people (see Galiani et al., 2005). These households benefited greatly from the enormous convenience of having direct connection to the water service. Since the ensuing water charges were lower than what these households were paying for substitute services, we have a group that is unambiguously better off in material terms after privatization. Moreover, four years into the contract this group experienced a large drop (of 74%) in their connection charges, so these material gains were particularly salient to newly connected users. This group can be compared to the group that remained unconnected to the water network.

Several other features of this episode are helpful in our empirical design. First, the policy in question (privatization) is salient to voters. Privatization of most state owned companies was a key component of the market reforms of the 1990s in Argentina. They have been widely discussed in the media and political debates. The incumbent Kirchner government, appointed in 2003, had repeatedly discussed the problems of the privatizations in their appearances in the media and the March 2006 nationalization of the water company made the specific issue we focus on particularly salient to the public. Second, the firm that was the target of the attack was foreign owned, which increased the receptiveness of the public to the President's attacks. Third, during this episode the President gathered support for the nationalization by personally attacking the water company on repeated opportunities in the media and in political rallies for lack of investment. Thus, we have one concrete example of a political agent trying to affect people's beliefs about the privatized water service. This is helpful because, rather than designing a piece of information that we think might work as propaganda, and devising a setting in which there is a presumption that propaganda might be useful, we obtained the content and setting of our piece of propaganda from the real political "market". The repeated nature of the president's public statements against the water company matches the episode with one theoretical dimension of propaganda campaigns.² It should be noted, however, that it is conceivable that priming in fact overstates the effect of propaganda in real markets, both because of the proximity between the stimulus and the elicitation of views in our survey and because of the lack of contextual cues. In brief, our empirical exercise studies propaganda using a priming setting, with a message that originated in an actual situation where propaganda was deemed useful (privatization) by an agent who has been successful in the political market, and employs one set of statements that were actually used as propaganda.

² De Marzo et al. (2003) show that the repeated nature of the attacks may help persuasion. A foreign investor that arguably did well economically in the privatizations of the 1990s, which were often perceived to be quite corrupt, has several of the features that Glaeser (2005) identifies as facilitating the acceptance of hate-creating stories by the public. The first in a series of pamphlets produced under Josef Goebbels' *Reichspropaganda-Abteilung*, the propaganda section of the Nazi Party, included a text (by G. Stark) explaining the connection between propaganda and beliefs: "Propaganda is by no means simply commercial advertising applied to the political, or spiritual arena. They seek only momentary effect, whereas political propaganda seeks the systematic enlightenment necessary to win supporters to a worldview" (from the German Propaganda Archive, accessed online on July 1st, 2008).

We find that the 1990's market reforms are unpopular, receiving relatively low scores. The average score for the privatizations is 3.07, out of a maximum possible 10. As a mild anchor to these numbers, we note that 7 or more is a passing grade in the Argentine schooling system (while 4 is a passing grade in make-up exams). The average score given to the water privatization is 3.59, very similar to the score for privatizations in general. Interestingly, the score for water privatization is significantly higher for those that received connection to the water service and for those that were not reminded of the government's propaganda against the water company.

A potential problem with relying on a simple cross-sectional approach is the presence of unobservables that might confound the estimation of the effects of interest. Indeed, it is possible that favorable opinions about privatization are correlated with income or the ideological inclination of the respondents (see, for example, Shirley, 2004). Since the group that gained water is closer in income to the middle-class (which historically has tended to favor State intervention in Argentina), than those that remained unconnected, the estimate of the difference in scores without a good control for income or ideology would provide a biased estimator of the causal effect of receiving access to water on the beliefs that individuals hold about the privatization. Even if data were available to pursue that strategy, we find that the group that gained water is different from the group that remained unconnected along other dimensions for which we do have data, such as age or skill. In order to deal with this statistical nuisance we define *Water Score Gap* as the score for the water privatization minus the score for all the privatizations given by the same respondent and then use it as the dependent variable in order to control for differences in unobservables in our sample.

We find that *Water Score Gap* is positively correlated with having gained water. The effect is statistically significant, but small in absolute value: 0.8 points on a 1–10 scale. Even those that have gained water are rating the water privatization in the low fours out of a possible 10. The effect is however large relative to the average score given to the water privatization: a gain of almost 23%. The effect of priming subjects with propaganda is statistically significant and seems quite large when compared to the effects of firm investment: those that were reminded of the statements made by the President against the water company score it approximately 0.5 points lower, or a drop of almost 14%. There is no discernible effect of reading the statement made by the company. The effects of "reality" and "propaganda" appear similar in this context (equality of the main effects cannot be rejected). Comparing them is informative because they refer to the same thing: "propaganda" focuses on a particular activity (firm investment) and our measure of "reality" concerns changes in that particular activity. Our approach, however, does not allow us to discern the relative duration of these effects.³

Our paper is connected to prior work on the formation of beliefs.⁴ Within psychology, individuals can be viewed as "lay empiricists" or "lay scientists". Lay empiricists use empirical observations to update their view of the world, much as in Bayesian inference. In contrast, lay scientists have a "scientific" theory of the world that determines the beliefs (much as in classical inference).⁵ The possibility of

³ Indeed, the investment stimulus is separated from the elicitation of beliefs by a longer period (the minimum is 5 years) than the propaganda stimulus (which is immediate). Thus, our results are specific to this particular setting as there is no reason to expect the results to hold once we move away from immediate priming.

⁴ See, inter alia, Bowles and Gintis (1976), Hochschild (1981), Inglehart (1990), Shiller et al. (1991), Ladd and Bowman (1998), Schotter (1998), Alesina et al. (2001), Luttmer (2001), Fong (2001), Corneo and Gruner (2002), Alesina and La Ferrara (2005), Di Tella et al. (2007), Alesina and Giuliano (2007), Landier et al. (2008), Aghion et al. (2010) and Giuliano and Antonio (2010). See also Roland and Verdier (1994), Earle et al. (1997), Lora and Panizza (2002), Frye (2006), Bonnet et al. (2009) and Denisova, et al. (2009) for work on support for privatization, and Giuliano (2007) for work on the persistence of culture.

⁵ See Nisbett and Ross (1980), and Nisbett and Wilson (1977) for a discussion of these perspectives. Classical inference is less common in economics (but see Rotemberg, 2008).

persuasion was the focus of earlier work in political science, although the effects found were often described as “minimal” (see, for example, Klapper, 1960).⁶ As described in an influential paper by Iyengar et al. (1982), “Four decades ago, spurred by the cancer of fascism abroad and the wide reach of radio at home, American social scientists inaugurated the study of what was expected to be the sinister workings of propaganda in a free society. What they found surprised them. Instead of a people easily led astray, they discovered a people that seemed quite immune to political persuasion. ... later research on persuasion drove home the point repeatedly: propaganda reinforces the public's preferences; seldom does it alter them (e.g., Katz and Feldman, 1962; Patterson and McClure, 1976; Sears and Chaffee, 1979).” Accordingly, research moved away from persuasion and towards the possibility of other effects of the media.⁷ Our paper is also related to a large body of work in psychology using priming, for example to investigate the possibility that messages received at one point affect beliefs at a later stage (see Schacter, 1996, for an overview of work on memory). One class of experiments finds that subjects are more likely to believe statements when they heard them before, even when they were explicitly told they were false. This is sometimes called the “illusion of truth effect” (see, for example, Hasher et al., 1977, and Beggs et al., 1992) and is seen as an expression of implicit memory (where previous experiences affect later tasks, even with amnesiac subjects who claimed to be unaware of the first experience).

Work in economics on the subject focuses on the possibility of using information, perhaps strategically, to affect people's beliefs.⁸ Recent work takes a broader perspective. For example, Glaeser (2005) provides a model where citizens are persuaded to hold a negative point of view about particular groups. Citizens' willingness to be persuaded by hate-creating stories depends on the costs and benefits of acquiring information and on the existence of an out-group that is perceived to be influential politically but socially segregated. There is also previous work on the possibility that persuasion is easier to attain using categorical thinking and metaphors (as in Mullainathan et al., 2008; Lakoff, 1996) or when social networks are important (see, for example, De Marzo et al., 2003; Murphy and Shleifer, 2004). Note that if we detect persuasion when using a simple untrue fact, it is likely that less extreme forms of persuasion (for example involving fewer untrue statements) can be employed to affect people's beliefs.

Two recent papers present convincing evidence of how certain types of coverage affect voting behavior. Such a connection can arise

because a particular coverage convinces viewers that some problems are more important than others, favoring candidates that emphasize those issues (agenda setting). Or it can affect voting because coverage convinces a viewer to change his or her mind (persuasion). For example, Della Vigna and Kaplan (2007) show that areas in the US where the cable operator offered Fox News Channel observed voter turnout increases relative to other areas where Fox did not enter, as well as increases in the Republican party vote share in Presidential elections. Gerber et al. (2009) designed a field experiment to measure the effect of exposure to newspapers on political behavior in Washington DC. They randomly assigned households (that were not receiving newspapers up to then) to receive copies of either a left or a right leaning newspaper and later surveyed them. They found that those treated with the left-leaning newspaper were up to 8 percentage points more likely to report voting Democrat than the control group (although no significant difference was found with the group receiving the right leaning newspaper). The paper by Gerber et al. is particularly interesting because it is able to provide evidence of persuasion versus agenda setting by looking at a battery of questions on specific issues.⁹ Our paper is also an attempt to isolate the effect of persuasion as it links misinformation on a specific issue with an opinion about that issue.

Section 2 provides a brief historical description of the privatization and subsequent nationalization of the main water company in Argentina. It also describes our data and empirical strategy. Section 3 presents our main results, while Section 4 concludes.

2. Historical description, data and empirical strategy

2.1. The privatization and re-nationalization of the water service in Buenos Aires

The original expansion of the water service in Buenos Aires was managed by a state owned enterprise. The expansion ended during the 1970s, a decade of severe political and economic instability. These problems deepened in the 1980s, as extreme fiscal weaknesses resulted in Argentina's first hyperinflation and a total halt to infrastructure investment. Even as a proportion of internal gross investment, total investment in the sanitation system, which included the water and sewage system, went from 1.5% in the 1970s to 0.56% during the period 1981–93. In fact, during the 1980s, water coverage as a share of population actually contracted (see Artana et al., 2000). During the 1990s, Argentina undertook a comprehensive set of fiscal reforms that included a monetary program that pegged the exchange rate and dramatically reduced inflation. It also featured a broad privatization program which included the transfer of, amongst others, the national telephone company, the post, the national airline, and the main companies in the oil, water and sanitation, electricity, and gas sectors.

The largest water company privatization was the concession in 1993 of the public company Obras Sanitarias de la Nación (OSN), which provided service in the Buenos Aires metropolitan area, to be awarded on the basis of the highest offered reduction in the prices paid by consumers. The winner was *Agua Argentina*, a private consortium led by the French company Lyonnaise des Eaux-Dumez,

⁶ Political scientists have been interested in propaganda at least since Lasswell (1927). See Nisbett and Ross (1980) for a classic account of how circumstances affect judgment and Goffman (1974) for work on the organization of experience. There is, of course, important work on persuasion and mass media in political psychology (see, for example, Milburn, 1991; Zaller, 1992; McGuire, 1985, and Cialdini, 2001). For a discussion and the relationship to the rest of political psychology, see Jost and Sidanius (2004), who cite work by Mullen et al. (1986) showing a positive correlation between the frequency of smiles by a TV news anchor when reporting on one of two presidential candidates (Reagan) and favorable viewer attitude towards Reagan. See, in particular, the review by Petty and Wegener (1998), who remind us of a long experimental tradition to the study of attitude change in social psychology going back to the 1930s, which points out that the effects depend in large part to situational factors (they cite the work of Knower, 1935).

⁷ For example, towards the possibility that the media has an impact on directing attention (through framing, priming or agenda setting; see for example, the work reviewed by Kinder, 2003 and Bennett and Iyengar, 2008. For example, Iyengar et al. (1982) studied persuasion using random assignment in the lab. They presented one set of volunteers with a standard news program while another was shown an edited version (using older material from the same station). They found that news coverage can affect evaluations of the importance of different issues (agenda setting).

⁸ See for example, Milgrom and Roberts (1986), Glazer and Rubinstein (2004), inter alia. Theoretical work on the media, for example, describes which pieces of news will be more persuasive. Mullainathan and Shleifer (2005) argue that it will be those that agree with viewers' prior beliefs, while Gentzkow and Shapiro (2006) argue that reputation is important because messages emitted by media outlets that share the viewer's political inclination will be judged to be more reliable.

⁹ These include three questions on which the newspapers might be expected to differ in their coverage: one that is factual (how many troops died in Iraq?), one that informs them of a fact and asks them for an evaluation (was it wrong or not for members of the Bush administration to disclose the identity of a CIA agent?) and one that was normative (should the Senate confirm Bush's nominee – Judge Alito – to the Supreme Court?). They find a significant shift in reported opinions in the third question (the Alito case), with the expected sign. The question was “As you may know, President Bush recently nominated Samuel Alito to the Supreme Court. Based on what you have heard or read, do you think the U.S. Senate should confirm Alito; not enough is known about Alito and the Senate should gather more information; or the Senate should not confirm Alito?”

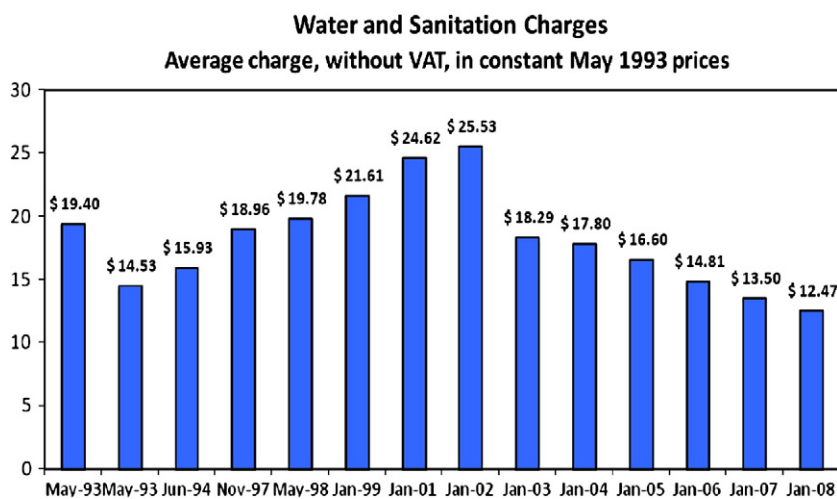


Fig. 1. Evolution of water charges. The two entries for May 1993 correspond to before and after the privatization. Source: ETOSS and INDEC.

which offered a tariff reduction of 26.9% (the second highest offer was 26.1% by Thames Water). The Buenos Aires water privatization did not imply significant price increases (Fig. 1 shows the evolution of prices). There was however an increase in the rate of collection of water bills and an eventual renegotiation that cut the price reductions for already connected users.¹⁰ Regarding investments, the terms of the concession stipulated construction plans to expand the water network in the Buenos Aires metropolitan area to 100% of the households and the sewage network to 95% of the households by the end of the 35-year concession. They also established service quality and waste treatment standards. This expansion would allow households to substitute away from low quality and/or high cost alternatives such as pumped wells, bottled water, public faucets, cesspools, and septic tanks (Abdala and Spiller, 2000).¹¹

A large number of studies suggest that the privatization of the Buenos Aires water company increased investment in the sector improving efficiency and productivity (see Artana et al., 2000; Alcazar et al., 2002). Investments following privatization were particularly important in terms of increased access to the network. More than 2,000,000 people gained access to the water service (and about 1,240,000 people obtained connections to the sewage network). Fig. 2 reveals the metropolitan Buenos Aires areas where the water network was expanded during the privatization. Case studies present evidence consistent with large increases in water and sewage access, reductions in spillage, and significant service enhancements (summer water shortages almost disappeared, repair delays shortened, and water pressure and cleanliness improved).¹²

While average prices did not increase in general, as stated above and suggested by Fig. 1, the gains differed by groups. Indeed, the network expansion resulted in, at least, three distinct groups within the population: one where people were already connected to the network before privatization (but enjoyed service quality improvements and increased collections of bills), a second group with people that gained access during the privatization period, and a third group that remained without access throughout. Of particular interest for our

study are groups two and three. Group two, the newly connected, made the largest material gains because their monthly expenditures on water fell significantly, besides the considerable convenience of the water connection. This became particularly salient to groups one and two after the 1997 renegotiation of the contract which prorated the cost of new expansions among all customers: the average bi-monthly bill for already connected residential consumers increased by 19% from US\$37.26 to US\$ 44.52, while the connection fee for new residential consumers decreased by 74%, from US\$60.69 to US\$15.92 (see, for example, Alcazar, et al., 2002). This translated into significant household savings in money and time as newly connected families were able to substitute piped water for more expensive, lower quality and more distant sources of water provision, as documented by Galiani et al. (2009). These authors demonstrate that water-related expenditures fell between 82 and 95%, for a saving of approximately 4.5% of average total family income. This monetary saving would have to be added to the increased convenience of having water supply readily available in the house (for example, regardless of the time and weather). The average reduction in the distance traveled by household members to the nearest hand-pumped well in order to bring water to the house was 50 m (or 80% of the baseline level). There were also large health effects. Galiani et al. (2009) illustrate these effects demonstrating that, controlling for changes in household income, diarrhea episodes decrease by as much as 74% of the baseline incidence following water access. This includes the frequency, duration and severity (measured by weather the episodes included blood and/or parasites). Additionally, Galiani et al. (2005) show significant decreases in child mortality for water-related diseases (but not for other causes of death) in districts following water privatization. Thus, given the large quality improvements extensively documented by these and other authors, the value of being connected also increased with privatization.

Our empirical approach relies heavily on the existence of this group because we believe that, while other groups might have doubts about the benefits of water privatization, this group was the one that received the main gains. Group three, which remained unconnected, is of interest as they clearly did not benefit from privatization.

A crucial aspect, for our purposes, is the investments made by the company. We confirmed such investment, and the corresponding expansion in the network, by asking our survey respondents about their water and sewage connection status and if they obtained this connection before 1993 or afterwards. We also used other sources, including the company internal reports, the company reports to investors, the reports made to the regulatory agency (ETOSS) and their subsequent statements to several legal entities (including Congress), the changes

¹⁰ For a general discussion on the evolution of tariffs under privatization in Latin America see McKenzie and Mookherjee (2003), and for the Argentine case see Alcazar et al. (2002), Gerchunoff et al. (2003), Clarke et al. (2004), and Galiani et al. (2005).

¹¹ The 2000 Millennium Summit of the United Nations included cutting in half the number of households in the world that do not have access to safe water as one of the eight key goals of mankind to reduce poverty by 2015.

¹² Dividends paid to the shareholders of *Agua Argentina* up to the economic crisis of 2002 amounted to 5% of equity. In that year no dividends were announced. There are obviously indirect ways of extracting surplus (e.g., transfer prices), but explicit accusations on this issue have not appeared in the press.

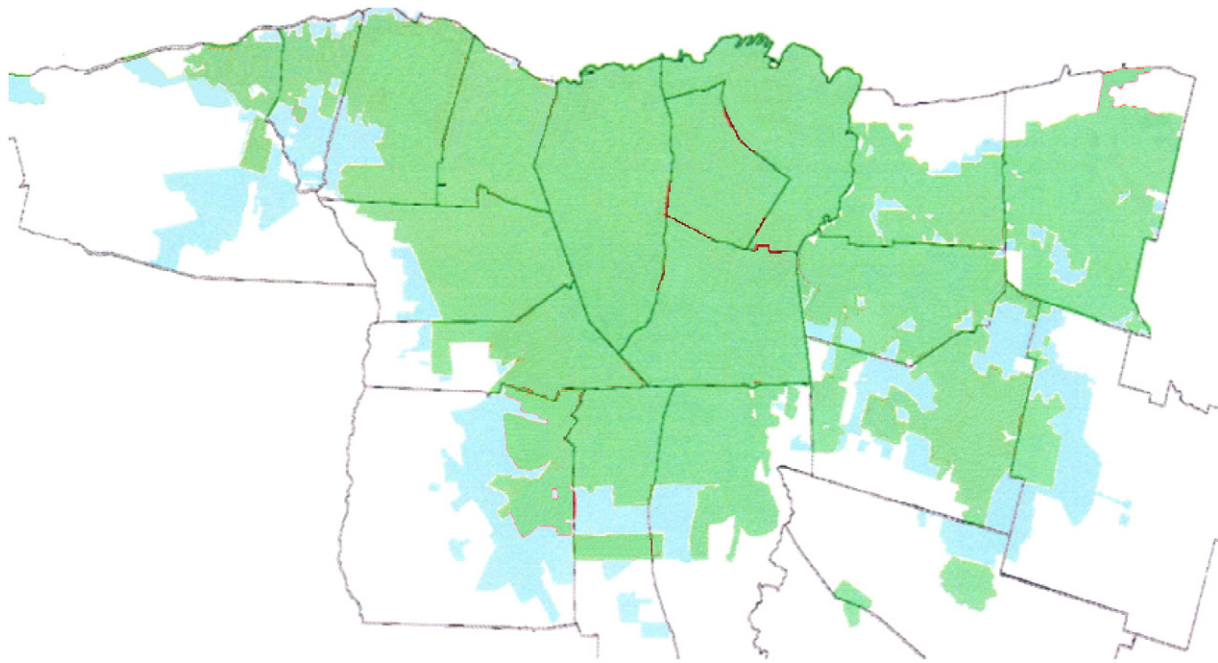


Fig. 2. Evolution of water coverage after privatization in the Buenos Aires metropolitan area. Green represents coverage as of 1992. Light blue corresponds to areas added to the water network since the 1993 privatization up to 2002. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.) Source: Aguas Argentinas.

in access to service reported in census data, and other surveys (see Galiani et al., 2005). We take this as evidence that in reality the company made significant investments. This notwithstanding, at the time of the crisis in 2002, more than 15% of the metropolitan population remained unconnected to the water network, while 40% still lacked access to the sewage network. A large fraction of the population that lacks access is located in the poorest suburbs of the Buenos Aires metropolitan area.

Interestingly, according to public opinion polls, water privatization was not popular in 2006. This was neither a particular characteristic of the water privatization nor particular of Argentina. Opinion polls and press articles report widespread discontent with privatizations in Latin America (IDB, 2002; McKenzie and Mookherjee, 2003).¹³ This was accentuated by the full blown macroeconomic crisis of 2001–02, which led to a large devaluation of the exchange rate and a default on the government debt. Evidence from Latinobarometer, for example, suggests that the percentage of respondents that disagreed with the idea that privatizations had been beneficial for the country increased from close to 49% in 1998, to approximately 68% in 2000, while in 2002 this number stood at 85% (see, for example, Shirley, 2004). An interesting empirical pattern uncovered in these surveys is that privatization is often more popular amongst low income groups. In fact the evidence reported in Shirley (2004) suggests disapproval of privatization is increasing in income – at least for the levels of income typically included in these surveys.

Until 2001, water charges were pegged to the dollar. Under the law of economic emergency of 2002 (Law 25.561), water charges were frozen in pesos in spite of the large exchange rate devaluation. Tensions between *Aguas Argentinas* and the new government soon arose when the company requested an increase of the water charge in proportion to the increase in the peso cost of the dollar, as stipulated in the contracts, while it suspended its investments (like most privatized companies in Argentina). Eventually the company sued the Argentine Government (in the International Centre for Settlement of Investment Disputes – ICSID) for a total of US\$1.7 billion. When

¹³ Stokes (2001) and Lora and Olivera (2005) document very low support for market reforms in general in Latin America.

some interruptions to the water services were reported in the media during the summer of 2003–04, the government responded by applying a US\$1.3 million fine. This was followed by a public attack on the water company by Argentina's President, Nestor Kirchner, on January 23, 2004, citing lack of investment and non-compliance with the terms of the concession contract. These events were widely reported in most newspapers as well as in radio and TV programs. Later that year, however, on May 11, it was publicly announced that the government and the company had reached a deal where a) the company would suspend the complains to the international arbitration tribunal, b) the government would suspend the application of fines, c) the company announced investments for a total close to U\$80 million for 2004, and d) there would be tariff increases after 2004 (which eventually were never allowed). This led President Kirchner to publicly praise the company that same day, citing it as “an example” to other privatized company “who seem to be deaf”. The President also “thanked France” for help during the negotiations. The context for this relationship is one of economic expansion (since 2003) and increasing levels of popularity for the president.

Less than one month after the 2004 agreement had expired, the President attacked the company for requesting a “60% increase in prices”. During 2005, President Kirchner and the Minister for Public Works carried out a series of verbal attacks on the company that were again widely reported in the media. On March 22, 2006 the water concession to *Aguas Argentinas* was finally canceled.¹⁴ See Figs. 3 and 4 for a graph of the frequency of newspaper articles on the Water Company and summary of some of the statements made by the President against the water company. This helps put into context our propaganda intervention: it is a marginal message within a large campaign (that is likely stored in the memory of our subjects). It involved messages on the government's point of view using many types of media (newspapers, radio, TV, as well as speeches in political gatherings) and involving top political officials (the President and key

¹⁴ Besides *Aguas Argentinas*, a few other companies privatized during the 1990s returned to public hands after the collapse of the convertibility plan. Examples include the mail service, the national airline company, a natural gas distributor, and the creation of a new public energy company.

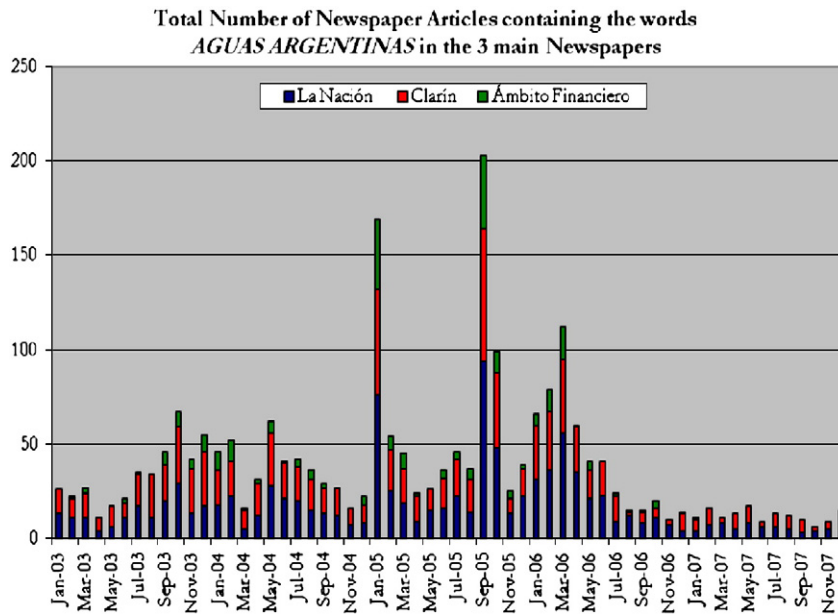


Fig. 3. Number of articles including the words *Aguas Argentinas* in the 3 main newspapers.

Source: own calculation from www.clarin.com, www.lanacion.com.ar, and www.ambito.com.

ministers), lasting many months. The communication of these messages was facilitated by the fact that there was a dramatic increase in discretionary government advertising in the country's 4 main newspapers that lasted throughout the Kirchner presidency.¹⁵

2.2. Data description

We administered a survey in June 2006 to 560 heads of household that had been living in the same house (i.e., not apartment buildings) since before 1993. After an introduction that explained that the investigation was carried by university professors for academic purposes and was not financed by any government organization or private company, individuals were helped in remembering the privatization year of 1993 (by explaining that it was the year Argentina lost 5–0 against Colombia at home at a traumatic qualifier match for the soccer 1994 World Cup). The survey used random replacement and covered households in middle-low and low income neighborhoods in the outskirts of Buenos Aires, Argentina. An important feature of our design is that, using detailed historical maps of water service access, we ensured that about half the sample gained water during the privatization period while the other half remained without access throughout the 1990s until the 2006 nationalization and up until our survey (i.e., by design, we do not include households that had water service before the 1993 privatization). The questionnaire confirmed water access status.

The survey then elicited beliefs about the benefits of several market reforms that took place during the 1990s. Table 1a presents a simple description of the data. Out of ten, the overall score assigned to the market reforms is 3.75, and to the water privatization is 3.59. Although these numbers should be treated with care, we interpret these opinions as quite negative. For example, as a mild institutional anchor, we note that 4 is an undistinguished grade in the educational system in Argentina.¹⁶ As a practical anchor to this scale, we note that people often use

¹⁵ Such spending was correlated with a decrease in newspaper's coverage of pieces of news that were unfavorable to the government, and led to several public complaints (see Di Tella and Franceschelli, 2011).

¹⁶ In high school, a grade above 7 will allow students to pass the year without further exams. A grade below 7 (but above 4) during the school year means that the student has to face a make-up exam at the end of the school year. A grade below 4 during the year means that the student has to face a make-up exam after the summer. Passing these exams requires a grade 4 or above.

numbers close to 4 to express disapproval. For example, newspapers routinely give numbers below 4 to the worst player in a soccer match.¹⁷ In coincidence with these negative views, a survey question reveals that 82% of the sample agrees with the re-nationalization.

Table 1a also provides the scores for the sub-sample that gained water and the sub-sample that remained without water. Although the differences are not statistically significant the patterns are suggestive of the presence of unobservables. It reveals that the *No Water* sub-sample gives a higher score to the reforms of the 1990s (4.06 versus 3.44) and the privatizations (3.35 versus 2.79), but a *lower* score to the water privatization (3.35 versus 3.82), relative to the *Gained Water* group. We interpret these scores as particularly low for the group that gained water given the large welfare, health, and economic gains from water network access.

In order to present our study of the effect of propaganda, we constructed two "treatments" with statements by the president and by the company regarding firm investments. Three groups equal in size were randomly defined: the sub-sample being read a "President Vignette", the sub-sample being read a "Firm Vignette", and a control group. These statements were read during the interviews by members of the survey company. Specifically, after a small set of questions on overall reforms and privatizations, the interviewer told the treated interviewees: "Before continuing I would like to let you know of a piece of information recently appeared in the newspapers", and then proceeded to read and immediately hand over the corresponding vignette. The "President's Vignette" read:

"Information that recently appeared in the newspapers reflects serious problems in the quality of water in Lomas de Zamora. On March 9, 2006, President Kirchner canceled by decree the contract of Aguas Argentinas. In its decision the government alleged problems with the quality of service as the main reason to re-

¹⁷ Each week players in the first division soccer matches in the country are given an individual score in the newspapers. We obtained data on the scores given to all players from all matches played by all teams in the last official season in the main newspaper (www.clarin.com). This involved at least 4180 scores (20 teams, 19 matches and a minimum of 11 players, as up to 3 substitutes are allowed who also receive scores if they play a minimum amount of time). From each match played, we calculated the worst player (lowest score) and the best player (highest score) per team. The average score obtained by the worst (best) player is 3.99 (6.89).

January 28, 2005: La Nación newspaper.

The President said: “I find it hard to believe how spoiled these companies have become, who sit and negotiate asking 60% increases in water. ‘No way, Jose’, we will allow them a raise! (*Minga que les vamos a aumentar!*). First, let them provide water to the people”, Kirchner said. “Come to work, to invest and to generate jobs, don’t just come seeking profits”

July 28, 2005: Clarin newspaper

During a speech at the Government House, the President said: “When one goes visiting different places, even though we have made lot of progress, how many people do not have access to water?”. “To tell the truth”, he added, “one is moved that so close to the Obelisk and the General Paz we can still find so many people that still cannot access drinkable water”. Kirchner then added that “the water concession companies should keep this type of thing very present”. And he then moved to a more menacing tone “We are not interested in having concession companies that do not fulfill services to the people. We want them to fulfill the services to the people and they will have to fulfill because we are going to take all the actions that are necessary and the roads that are necessary”.

September 16, 2005: La Nación newspaper

The President even wants the Minister of Federal Planning, Julio De Vido, to invite the executives from Suez to make their announcement and leave the country, his collaborators explained. “If they want to leave, let them leave. They run a business that many other firms are interested”.

October 13, 2005: Clarin newspaper.

Kirchner, on Tuesday, during a political rally in Mar de Ajo, attacked hard the water concession company, whose European shareholders (Suez, Aguas de Barcelona, Anglian and Vivendi) announced their intention to cancel the concession contract. “There are companies, like Aguas Argentinas, that should acknowledge that what they did to us is shameful, because they have taken five thousand million dollars and did not even build two pipes” said the president.

February 22, 2006: La Nación newspaper

During an act in Ezeiza, Kirchner questioned the work of the company, controlled by the French group Suez, which at present is looking for a buyer that would take over the water concession contract, “How could it be that there are districts in Argentina, such as the case of La Matanza, where only 20 percent of the population has water?”, the president asked himself. “That is what that company did, Aguas Argentinas, that is beating around the bush so much”, he added in reference to Suez’s unresolved exit.

March 22, 2006: La Nación newspaper

Minister De Vido accused Aguas Argentinas of not having fulfilled with the agreed plan for works on the expansion and improvement of the service, and of “endangering the health of the population”. Kirchner rated the service that was provided by the company as “terrible”, and assured that the cancellation of the contract brought an end to “an insult and an injustice” and that “water will once again be a social good”. He also attacked the executives directly. “They have been in Argentina for 15 years, they took away hundreds of millions of dollars in profits and we have to beg to get a drop of water. Enough, now, we the Argentines, we will construct destiny as it should be done”, he proclaimed. “Those that exploited the company earned, but water did not reach the Argentines of the outskirts”.

March 23, 2006: La Nación newspaper

“I have a lot of respect for the people of France, for the French nation and for President Chirac, but let it be clear that I am not willing, in order to get the visit of a President or so that the Foreign Ministry is happy, to lower my eyes and allow the contamination of the water that the Argentines drink, under no circumstance. I think the health of the Argentines is central and fundamental”, said Kirchner during the presentation of the National Book Plan in Martinez.

March 23, 2006: La Nación newspaper

Prosecutor Guillermo Daneri requested that the federal justice grant the “prohibition to exit the country of Jean Bernard Lemire, Alain Chaigneau, Carlos de Royere and Conrado Bianchi” in the context of the charges made by the mayor of Lomas de Zamora against Suez on account of the “extremely high levels of nitrates” in the water provided by the company to the inhabitants of that district of Buenos Aires. ... The Planning Minister was put in charge of announcing the cancellation of the concession contract last Tuesday and the creation of a new water company. ... Meanwhile the Interior Minister, Aníbal Fernández, requested “explanations from those responsible” in the French group Suez because “in the area of Lomas de Zamora more than 73 milligrams of nitrate per liter in the water network and almost 145 milligrams in the perforations”, while “in France, from where this company is originally, there cannot be more than 45 milligrams per liter”. “The naive always pay so as to resolve the profits of the companies and in Argentina the time has come to say things by their own name”, said Fernandez to Radio Rivadavia, about the government’s decision to cancel the water concession contract in the Buenos Aires area.

Fig. 4. Sample of government statements against the water company (our translations).

Table 1a
Average score for the reforms across samples with and without water.

	All	Gained water	No water
Score reforms 90s	3.75 (2.28) [530]	3.44 (2.10) [264]	4.06 (2.41) [266]
Score privatizations	3.07 (2.29) [542]	2.79 (2.22) [269]	3.35 (2.33) [273]
Score water privatization	3.59 (2.44) [549]	3.82 (2.63) [277]	3.35 (2.21) [272]

Note: Each cell presents the average value of the variables listed in each row, for the sample indicated in each column. Standard deviations in parenthesis, the number of observations in brackets, and variable definitions in the Appendix.

nationalize the company. On repeated occasions, President Kirchner has criticized the company for lack of compliance of the terms of the concession contract and, more generally, for their performance since privatization. Recently, in a political rally in Mar de Ajo, he stated: “There are companies, like Aguas Argentinas, that should acknowledge that what they did to us is shameful, because they have taken five thousand million dollars and did not even built two pipes.”

We then constructed *President Vignette*, a dummy equal to 1 if the respondent was read this statement and zero otherwise. For the “Firm Vignette”, another third of the sample was handed over the company’s response to the attacks of the president (which led to the corresponding dummy variable *Firm Vignette*). A large portion describes benefits that were generally accrued to society as whole and that were thus not likely to be known by the individuals exposed to the vignette. The exact message is provided in the appendix together with all data definitions. The survey then continued with the question about the opinion on the water privatization. Fig. 5 describes the treatment roadmap.

While the construction of the variable *Gained Water* was relatively straightforward once we obtained the maps of the city detailing the areas where there had been expansions in the water network, the empirical approach designed to capture the effect of propaganda was somewhat more challenging. We selected one of the statements made by the President, and constructed a vignette which added a short introduction explaining the circumstance in which the statement was made. Given that it is debatable what constitutes propaganda and what does not, we used an actual statement made by President Kirchner in his attempt to affect people’s beliefs about the benefits of having privatized the water service. One characteristic of the statement is that it is obviously inaccurate (the facts reported are demonstrably untrue). A second characteristic is that it is set in the real political “market”, an actual situation where propaganda was deemed useful (by an agent who has been successful in that market). Although the firm’s message looks a bit complex, again, we note that we are not designing these messages but rather taking them from a real setting where they were used.¹⁸

In Table 1b the sample is split into a group that received the government propaganda treatment, a second group that received the information provided by the company, and a control group. The group that was read the government statement about the water company gives a somewhat lower score to the water privatization (3.33) than the group that was read the company statement (3.68) or the control group (3.75). Note that obtaining access to the water network for a family living in a certain location is not under its control. As explained above, the concession terms stipulated a set of construction plans that were needed in order to expand the water network to 100% of the households, one of the objectives of the 35-year concession. These

¹⁸ The context of this message is the brief, initial public reaction of the company, where the firm wanted to communicate its side of the story in the main newspapers. One reason it was brief is that such actions kept the topic in the media and we are told that all parties involved were fully aware that no negotiations could take place (and certainly no concessions could be made by the government) while the conflict was salient for the public. Thus, our impression is that there is no sustained propaganda campaign by the firm comparable to that of the government, although no data could be obtained on this to make a formal comparison.

expansion plans explicitly pre-defined the timing of arrival of the water network to each area (see *Aguas Argentinas, 2001*). Although exogenous, failure to receive water is correlated with location and, thus, potentially with income and other factors that might be connected to the ideological position of the individuals. Therefore, simply contrasting the score given to the water privatization by those that gained water with the score given by those that did not, will give us a biased estimate of the causal effect of gaining access on water scores.¹⁹ It is therefore of interest to compare the distribution of household characteristics amongst our respondents. Tables 2a and 2b present the raw data.

Table 2a focuses on the characteristics of households that gained water during the privatization. In our sample, the data suggests that 84% of head of households without access to water are classified as unskilled, while 77% of those with access to water are unskilled. The difference is statistically significant. The head of households without water also appear to be younger (5 years on average), poorer (or at least with lower scores on the Socioeconomic Index), and are more likely to be the respondents to the survey, possibly because more of them do not have steady jobs.²⁰ All of these differences are statistically significant. In brief, Table 2a suggests that the two groups (those that gained water and those that remained without water) are different on several dimensions that we could measure. There is no reason to believe that all the dimensions over which these two groups differ are measurable, so even comparing conditional means across the two groups will remain unconvincing as a way to identifying the effect of gaining water on beliefs about water privatization. Fortunately, one approach that does allow us to get around the problem of unobserved heterogeneity is to differentiate the data by subtracting the score for other privatizations from the score given to the privatization of water (*Water Score Gap*). These differentiated scores are uncorrelated to the observable variables that we measured, as will become clear later on (from the insignificant coefficients on these observables in a *Water Score Gap* regression in Table 3). Accordingly, a reasonable assumption is that other dimensions that we did not measure are also uncorrelated with the *Water Score Gap* (see Section 2c for a discussion of our identification strategy).

Note that our approach to studying the effects of propaganda involves priming. Indeed, one extreme way of understanding the role of propaganda is to see it as repeated priming of a particular worldview. After all, a propaganda campaign is simply a succession of brief messages (in only one direction: from the ideological source to the subject) that take place within a limited timeframe. Our approach mimics one of the messages in such a propaganda campaign, by incorporating it as a vignette read to the respondents during the interview. In other words, we implement a test of the role of propaganda by priming some subjects with statements taken from an actual campaign that affected all subjects. And we test if short, priming propaganda shocks interfere with individuals’ assessment of benefits they have been observing for years.²¹ Under the (admittedly extreme)

¹⁹ The simple comparison of means of water privatization score for the middle-income and the poor will underestimate the effect of investment on support for privatizations because the former are typically more negative on all privatizations (this is a common finding in Latin America; see Shirley, 2004).

²⁰ Naturally, our sample is poorer than the overall population of Greater Buenos Aires (this is the area that is both geographically closer to our sample area and which is also available in the Population Household Survey – EPH). Using data for 2006, we estimate that only 63% of the head of households are unskilled. They are comparable in terms of age, which is estimated at 51. Unfortunately, using the household survey we cannot reproduce the details of the Socioeconomic Index used in our analysis.

²¹ There are two ways of interpreting the magnitude of the treatment as compared to the true effect of propaganda. On the one hand, it can be argued that the approach leads to what is likely an underestimate of the true effect of the overall campaign, and serves our purpose of obtaining a lower bound that can be compared with the effect of firm investment on beliefs. On the other hand, one could of course also question other parts of the design and reach the opposite conclusion. For example, our approach of propaganda as priming means that the statements are read to the respondents immediately before they are asked to evaluate the water privatization, which may mimic only one type of propaganda individuals would receive in a real-world setting (presumably that which takes place at the end of electoral campaigns).

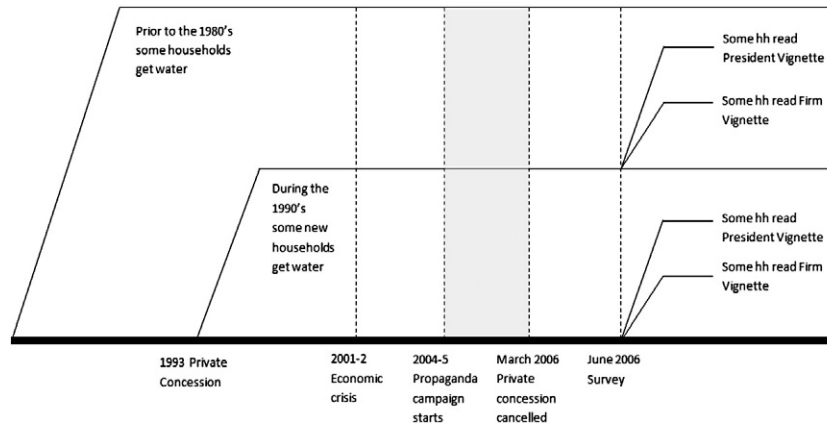


Fig. 5. Treatment roadmap.

Table 1b
Average score for the reforms across samples with vignettes.

	President vignette	Firm vignette	Control group
Score Reforms 90s	3.89 (2.32) [180]	3.63 (2.18) [180]	3.71 (2.34) [170]
Score Privatizations	3.20 (2.35) [182]	2.96 (2.21) [181]	3.06 (2.32) [179]
Score Water Privatization	3.33 (2.45) [182]	3.68 (2.46) [183]	3.75 (2.41) [184]

Note: Each cell presents the average value of the variables listed in each row, for the sample indicated in each column. Standard deviations in parenthesis, the number of observations in brackets, and variable definitions in the Appendix.

Table 2a
Sample characteristics: Water vs No Water samples.

	No Water mean (Std. dev.)	Gained Water minus No Water mean (Std. error)	t-test
Unskilled (=1)	0.84 (0.36)	-0.07 (0.033)	-2.12**
Semi-Skilled (=1)	0.15 (0.35)	0.06 (0.032)	1.85*
Age	48.3 (15.2)	5.18 (1.237)	4.19***
Socioeconomic Index Score	32.9 (10.5)	1.95 (0.926)	2.11**
HH is Respondent (=1)	0.77 (0.42)	-0.14 (0.038)	-3.58***

Note: Gained (No) Water is the sub-sample that did (did not) gain water during the privatization.

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level.

view that propaganda is priming, a test of propaganda involves three groups: a) one which has never been subject to propaganda/priming, b) one that has received prior propaganda/priming but not recently, and c) one group which received it in the past and has recently received the message again. Our test focuses only on groups b) and c). The brevity of the intervention would also presumably bias the results against finding an effect of propaganda.²² In order to select the vignette we collected all newspaper reports that referred to the nationalization of the water company. The main argument for nationalization, as stated by the government, was the firm's failure to invest to expand the coverage and improve water quality. This was repeated in several occasions.²³

²² Iyengar et al. (1982) administered tests one day after broadcasts and find that their estimated effects survive for at least 24 h. They note that the dissemination of television news is periodic, typically following cycles of 24 h.

²³ Nazi leader Joseph Goebbels emphasized the repeated aspect of successful propaganda campaigns even when they contained lies. One of the examples is his insistence on the proximity of a German victory: in April 1945 he explains that the Allies are close to collapsing and that "A happy outcome for us depends wholly and exclusively on ourselves." The article was called "Kämpfer für das ewige Reich", and it was published in *Das Reich*, 8 April 1945 (from the German Propaganda Archive, accessed on July 1st, 2008). See Petty and Cacioppo (1981) and Petty and Wegener (1998) for a formal discussion and review of the effect of repetition on target evaluation. Malaviya (2007) discusses the role of context in determining the impact of repetition, whereas Anand and Shachar (2004) study the role played by informational content. For a recent model by economists, see De Marzo et al. (2003).

Accordingly, we selected a statement related to the firm's investment from the main speech by the main actor in the pro nationalization camp (the President). For the firm vignette, we simply collected the firm's statement reacting to this accusation.

Table 2b presents the raw data for the three relevant groups. The first column presents the means for the group that was not read any of the two vignettes. It first shows that 83% of the control group was classified as unskilled. The second column shows the difference with the group read the President vignette and the third column shows that the result of a *t*-test suggests that the difference is not statistically significant. Column (4) presents the difference between the mean for the control group and the mean for the sub-sample being read the firm vignette. The last column in Table 2b shows that a *t*-test of this difference is also not significant. The only variable where there is a statistically significant difference between the control group and one of the treatment groups was age, where those reminded of the firm propaganda were five years younger than the control group. Given that it is in only one attribute, and that the absolute size of the difference is not very large, we conclude that the randomization of the "propaganda" treatment was reasonably successful.

2.3. Empirical strategy

We estimate a regression of the form:

$$WaterScoreGap_i = a GainedWater_i + b PresidentVignette_i + c FirmVignette_i + d PersonalControls_i + \mu_i$$

where *WaterScoreGap_i* is the difference between the score given to the water privatization minus the score given to all privatizations by person *i*, *GainedWater_i* is a dummy equal to 1 if person *i* gained water, *PresidentVignette_i* is a dummy equal to 1 if person *i* was read the vignette with the statements made by the President about the water company, *FirmVignette_i* is a dummy equal to 1 if person *i* was read the piece of information released by the company during these attacks (they are defined in the appendix; note that these vignettes are read to different sub-samples), and μ_i is an error term. The inclusion of the company vignette is helpful in providing a benchmark of how information is affecting beliefs.²⁴

As discussed in the previous section, in order to identify the effect of access to water (measured by *GainedWater*) on the individual beliefs about the water privatization, we need to control for the individual 'ideology' effect, since it is likely to be correlated with the dummy variable *GainedWater*. Ideally, we would like to condition the analysis on an individual fixed effect, which would be achieved by differencing the data over time. Since this is not possible in our case, to eliminate this

²⁴ It also allows us to measure the potential tendency to agree with the interviewer.

Table 2b
Sample characteristics: Vignette vs No Vignette samples.

	No Vignette mean (Std. dev.)	President Vignette minus No Vignette mean (Std. error)	t-test	Firm Vignette minus No Vignette mean (Std. error)	t-test
Unskilled (=1)	0.83 (0.38)	−0.031 (0.041)	−0.77	−0.019 (0.040)	−0.49
Semi-Skilled (=1)	0.16 (0.36)	0.037 (0.039)	0.93	0.025 (0.039)	0.64
Age	53.3 (15.8)	−2.213 (1.549)	−1.43	−5.009 (1.554)	−3.2***
Socioeconomic Index Score	33.3 (9.96)	1.234 (1.155)	1.07	0.556 (1.088)	0.51
HH is Respondent (=1)	0.71 (0.46)	−0.028 (0.048)	−0.59	0.016 (0.047)	0.34

Note: No Vignette is the sub-sample that was not read any of the two vignettes.

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level.

individual effect we differentiate the data with respect to the score given to all privatizations, a variable that also incorporates the individual ‘ideology’ as well as the effect of other personal control variables. In brief, our identification assumption is that there is nothing particularly ideological in water over and above the ideological content of any privatization. Note that if our identification assumption is valid, personal control variables in the model should not be statistically significant at conventional levels. This is indeed the case (see Table 3 below). Moreover, the results should be robust to including municipality fixed effects, which it is also the case (again see Table 3). Finally, if we estimate similar regressions using score gaps for other privatizations, we should not find any correlation between Gained Water and those scores, which we also show to be the case in our study (see Table 6 below).

One advantage of the approach is that both the “propaganda” effort and the changes in “reality” refer to the same issue, so it is also of interest to compare the two effects. Indeed, the propaganda campaign is centered on the existence or not of the firm’s investment. And the differences in reality are captured by lumpy differences on access to water (people cannot be half-connected to the water services) which are the result of such investment by the firm. A difficulty with this empirical strategy, on the other hand, is that while one could potentially derive the cost to the company of affecting reality (by dividing the total investment costs to the company by the number of households connected to the water service), it is harder to put a price tag on the propaganda campaign. This means that we do not provide a precise comparative analysis of the costs of changing beliefs through a propaganda campaign versus an investment campaign (reality). Instead, we focus on whether a political entrepreneur can change people’s beliefs through a large propaganda campaign (containing what appear to be patently untrue statements), and on comparing these propaganda effects with an estimate of the extent to which differences in “reality” affect the same set of beliefs.

3. Results

Table 3 presents the basic estimates for the effect of firm investment on views about privatization. The left hand side variable is Water Score

Table 3
Water privatization score and reality (firm investment).

	(1)	(2)	(3)
Gained Water	0.91*** (0.23)	0.87*** (0.24)	0.81** (0.37)
Unskilled		0.42 (1.17)	−0.87 (1.10)
Semi-Skilled		0.51 (1.15)	−0.95 (1.08)
Age		0.002 (0.008)	−0.006 (0.008)
Socioeconomic Index Score		−0.007 (0.013)	−0.006 (0.013)
HH is Respondent (=1)		−0.15 (0.26)	0.21 (0.25)
Municipality fixed effects	No	No	Yes
Sample size	535	535	535

Note: Each column is a separate OLS regression (standard errors in parenthesis). The dependent variable is Water Score Gap, the score given to the water privatization minus the score given to all privatizations. Gained Water is a dummy equal to 1 if the household gained access to water during the privatization. In Columns (2) and (3) we impute a zero when there is a missing value for the personal controls and then include a dummy variable to indicate this.

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level.

Gap, the difference between the score given to the water privatizations and the score given to all the privatizations, while the main right hand side variable is Gained Water, a dummy equal to 1 if the household gained water during the privatization. Columns (2) and (3) in Table 3 include personal characteristics and municipality dummies, obtaining very similar results.²⁵ The coefficients on personal characteristics are insignificant, confirming the benefit of employing the difference between scores as our dependent variable instead of just the score for the water privatization (see also Table 2a).²⁶ The effect of gaining access to the water service under privatization on the support for privatization appears low. For example using column (3), the estimated effect is 0.81 in a 1–10 scale.²⁷ However, as the average score given to privatizations in general and water privatization in particular are also low, the relative effects seem larger. For example, relative to the overall privatization score, having received the benefits from water privatization (gained water) improves its score by almost 26% (0.81/3.07), and almost 23% (0.81/3.59) relative to the average score given to the water privatization.

The results of these regressions are qualitatively similar if we use Score Water Privatization as the dependent variable (instead of Water Score Gap). The differences are that, not surprisingly, some of the coefficients on the personal characteristics for which we have data are significant; and that the absolute size of the coefficient on the variable Gained Water changes across specifications.²⁸

Table 4 introduces the effect of propaganda. While the coefficient on Gained Water is unchanged, the coefficient on President Vignette is negative and significant at the 10% level in columns (1) and (2) and at the 5% level in column (3). The size of the effect is almost 0.5 on a 1–10 scale, or 5%, which also seems small. It appears larger, however, relative to the score that the water privatization receives (14% or 0.52/3.59). It also appears large (62% or 0.52/0.83) relative to the effect of reality (Gained Water). Indeed, we cannot reject equality of the absolute value of the coefficients on President Vignette and Gained

²⁵ Only half the municipalities present within-municipality variability in Gained Water. Note that in such municipalities we can expect “jealousy-spillovers” to be largest because those that gain water are relatively close to those that did not. The relative stability of the coefficients in Table 3 suggests that this is not particularly serious.

²⁶ For 5.6% of the observations, data on some control is missing. In those cases, following a standard procedure, we impute a zero and then use dummy variables to indicate this.

²⁷ To complement our estimate of the size of the effect, we also used a survey question asking subjects about the degree to which they agreed with the nationalization. If we run an OLS regression of these answers on the water privatization scores, we find that a 0.81 increase in the score given to the water privatization only reduces the proportion of people predicted to agree with the nationalization by 4 percentage points. This is only a suggestive result: there is insufficient variability in the renationalization variable for compelling statistical analysis as more than 80% of the sample agrees with nationalization (81% for the households that gained water, and 84% for those with no access).

²⁸ For example, the main coefficient jumps from 0.47 (std error = 0.21) in the baseline specification (i.e., similar to Column (1)) to 1.04 (0.31) in a specification similar to the one in Column (3) of Table 3. If we use Score Water Privatization as the dependent variable and include the score of all privatizations as a control variable (instead of differencing the data), the results are also qualitatively similar. Once again, however, the absolute size of the coefficient on the variable Gained Water fluctuates across specifications (i.e., the estimated coefficient jumps from 0.56 (std error = 0.19) in the baseline specification (similar to the one in Column (1) in Table 3) to 0.98 (0.29) in a specification similar to the one in Column (3) of Table 3.

Table 4
Water privatization score: reality and propaganda.

	(1)	(2)	(3)
<i>Gained Water</i>	0.90*** (0.23)	0.85*** (0.24)	0.83** (0.37)
<i>President Vignette</i>	−0.49* (0.28)	−0.50* (0.28)	−0.52** (0.26)
<i>Firm Vignette</i>	0.09 (0.28)	0.14 (0.28)	0.04 (0.26)
<i>Unskilled</i>		0.47 (1.16)	−0.83 (1.10)
<i>Semi-Skilled</i>		0.55 (1.14)	−0.90 (1.07)
<i>Age</i>		0.003 (0.008)	−0.005 (0.008)
<i>Socioeconomic Index Score</i>		−0.006 (0.013)	−0.004 (0.013)
<i>HH is Respondent (=1)</i>		−0.17 (0.26)	0.19 (0.25)
Municipality fixed effects	No	No	Yes
Sample size	535	535	535

Note: Each column is a separate OLS regression (standard errors in parenthesis). The dependent variable is *Water Score Gap*, the score given to the water privatization minus the score given to all privatizations. *Gained Water* is a dummy equal to 1 if the household gained access to water during the privatization. *Government (Firm) Vignette* is a dummy equal to 1 if the household was read the government (firm) vignette. Individual controls include skill, age, a socioeconomic score index, and a dummy equal to 1 when the survey respondent was the head of the household. In Columns (2) and (3) we impute a zero when there is a missing value for the personal controls and then include a dummy variable to indicate this.

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level.

Water in all specifications in Table 4. In other words, this table allows for a direct comparison of the roles of reality versus propaganda in the formation of beliefs (in one particular setting) and finds them to be broadly similar. Given our empirical design, we are unable to provide an estimate of how long lasting is this effect of exposure to propaganda.²⁹

The effect of *Firm Vignette* is close to zero and statistically insignificant. This suggests that the channel through which *President Vignette* affects beliefs is persuasion rather than simply the provision of information.³⁰ The difference in the absolute size of these two coefficients also suggests that respondents are not just trying to agree with the interviewer.³¹

Table 5 reports the effect of propaganda at different levels of firm investment. First, note that the coefficient on the interaction term between *No Water* and *President Vignette* is significant at the 10% level. It is close in size (79%), but with the opposite sign, to the coefficient on *Gained Water*. The results suggest the intriguing possibility that a firm that invests to provide water access to a household gains almost as much support by this action as it gains from ensuring that a household without water is not exposed to the propaganda of the political entrepreneur (we cannot reject that the sum of the coefficients on *President Vignette* × *No Water* and *Gained Water* is zero). In making these calculations, note, again, that the propaganda effects could be short lasting (while investments by the firm were made on average several years before our survey).

A second comparison that can be made using the coefficients in Table 5 concerns the hypothesis that heterogeneity in individual experiences (under privatization) affects the ability of political entrepreneurs to influence beliefs through propaganda. Although there are differences in the point estimates, given the size of the standard errors we cannot reject the hypothesis that the coefficient on the interaction term *President Vignette* × *No Water* and that on the term *President Vignette* × *Gained Water* are equal at standard significance levels. The sample size is small, so there is not enough power for such tests (but we get close to rejection of equality of the coefficients at conventional levels of statistical significance if we lump together

²⁹ The effect of getting access to the water network seems long-lasting, as these households had obtained it at least five years before the survey.

³⁰ At least, if the source is considered credible (for a discussion of exposure effects, see Zajonc, 1968).

³¹ Naturally, given the experimental design of the vignette interventions, the estimated effects are robust to using *Score Water Privatization* as the dependent variable instead of *Water Score Gap* (both controlling and not controlling by the score of other privatizations). For example, without including any control variable, the coefficient (std. error) for *President Vignette* is −0.41 (0.25) (significant at the 10%) while the coefficient associated to *Firm Vignette* is −0.06 (0.25).

Table 5
Water privatization score: reality-propaganda interactions.

	(1)	(2)	(3)
<i>Gained Water</i>	0.90** (0.40)	0.87** (0.40)	0.92* (0.48)
<i>President Vignette</i> × <i>Gained Water</i>	−0.26 (0.39)	−0.28 (0.40)	−0.39 (0.37)
<i>Firm Vignette</i> × <i>Gained Water</i>	−0.12 (0.39)	−0.11 (0.40)	−0.22 (0.37)
<i>President Vignette</i> × <i>No Water</i>	−0.71* (0.39)	−0.71* (0.40)	−0.66* (0.37)
<i>Firm Vignette</i> × <i>No Water</i>	0.31 (0.39)	0.39 (0.40)	0.31 (0.37)
Individual controls	No	Yes	Yes
Municipality fixed effects	No	No	Yes
Sample size	535	535	535

Note: Each column is a separate OLS regression (standard errors in parenthesis). The dependent variable is *Water Score Gap*, the score given to the water privatization minus the score given to all privatizations. *Gained Water* is a dummy equal to 1 if the household gained access to water during the privatization. *President (Firm) Vignette* is a dummy equal to 1 if the household was read the government (firm) vignette. Individual controls include skill, age, a socioeconomic score index, and a dummy equal to 1 when the survey respondent was the head of the household. In Columns (2) and (3) we impute a zero when there is a missing value for the personal controls and then include a dummy variable to indicate this.

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level.

the *Firm Vignette* and the control respondents: we reject the null at the 16% level). This is unfortunate because it is related to an important idea: that propaganda is more effective when it has some basis in reality, a hypothesis that is made in models of persuasion where individuals who have cheaper access to facts are harder to persuade.

Finally, Table 5 provides weak evidence of differential effects of the firm vignette according to whether or not individuals had gained access to water. The difference is not significant statistically, but we note that the firm was not engaged in a continuous campaign to defend its position, in part presumably because remaining in the public spotlight would make it difficult to reach a negotiated settlement with the government.³² We note, however, that there is some support for a related hypothesis: reality appears to reduce the variance of beliefs. Using column (1) in Table 5, the difference between the point estimates for the sample that *Gained Water* (with the firm's vs with the president's vignette) is 0.14 (−0.26 + 0.12), whereas the difference for the *No Water* sub-sample is 1.02 (−0.71−0.31). The difference (between these two differences) is statistically significant at the 11% (at the 10% and 12% for columns 2 and 3 of Table 5, respectively). In other words, the presence of firm investment makes beliefs about the benefits of privatization less volatile, or less susceptible to be affected by different forms of propaganda.

Table 6 performs falsification tests by replacing the dependent variable by the score differences given to other privatizations. Thus, in columns (1a), (2a) and (3a) we run the same regressions but use the difference between the score given to the privatization of the telephone company and the score given to all privatizations as the dependent variables (*Telephone Score Gap*). The results are insignificant and the patterns in the coefficients appear different to those previously obtained. A similar picture emerges if we use the gap in the score given to the privatization of the oil company (*Oil Company Score Gap*) minus the score to all the privatizations in columns (1b), (2b) and (3b). These results suggest that a reasonable interpretation of the estimated effects on beliefs associated to having *Gained Water* in previous tables is causal.³³

³² Unfortunately, we did not include a treatment group where subjects were read both vignettes, as this would have given us another (realistic) benchmark for the effects of (contested) propaganda.

³³ Of course, in principle, there is still the possibility that the rollout of the water privatization might be correlated with other time-varying factors. However, our results show that for a factor to be a confounder of the estimated effect of investment, it needs to affect only the beliefs on water privatization (but not the beliefs on any other privatization). This seems possible but unlikely. We note that the firm propaganda does not seem to have any effect in our sample; and that the obvious confounds (such as income) have been taken care of by our approach — as demonstrated by a comparison of Table 2a and the insignificant coefficients on the personal characteristics once the gap is used as the dependent variable in columns (2) and (3) in Table 3.

Table 6
Other privatization scores, with water investment and propaganda.

Dependent variable	Telephone Score Gap			Oil Company Score Gap		
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
<i>Gained Water</i>	0.04 (0.26)	0.04 (0.26)	−0.15 (0.34)	0.34 (0.27)	0.34 (0.27)	0.10 (0.36)
<i>President Vignette</i>		−0.26 (0.18)			−0.02 (0.19)	
<i>Firm Vignette</i>		0.02 (0.19)			0.18 (0.20)	
<i>President Vignette * Gained Water</i>			−0.19 (0.26)			0.21 (0.28)
<i>Firm Vignette * Gained Water</i>			0.23 (0.26)			0.32 (0.28)
<i>President Vignette * No Water</i>			−0.32 (0.26)			−0.23 (0.27)
<i>Firm Vignette * No Water</i>			−0.19 (0.26)			0.04 (0.28)
Sample size	532	532	532	532	532	532

Note: Each column is a separate OLS regression (standard errors in parenthesis), which includes individual controls and municipality fixed effects. The dependent variable in columns (1a–3a) is *Telephone Score Gap*, the score given to the telephone privatization minus the score given to all privatizations, while in columns (1b–3b) it is *Oil Company Score Gap*, the score given to the privatization of the national oil company minus the score given to all privatizations. *Gained Water* is a dummy equal to 1 if the household gained access to water during the privatization. *President (Firm) Vignette* is a dummy equal to 1 if the household was read the government (firm) vignette. Individual controls include skill, age, a socioeconomic score index, and a dummy equal to 1 when the survey respondent was the head of the household. We impute a zero when there is a missing value for the personal controls and then include a dummy variable to indicate this.

Table 7
Propaganda at different levels of income, prior beliefs and voting.

	(1)	(2)	(3)
<i>Gained Water</i>	0.80** (0.37)	0.85** (0.38)	0.77** (0.38)
<i>President Vignette</i>	−0.29 (0.35)	−0.49 (0.33)	−0.25 (0.35)
<i>Firm Vignette</i>	−0.02 (0.34)	0.21 (0.34)	−0.15 (0.35)
<i>President Vignette * High Income</i>	−0.48 (0.47)		
<i>Firm Vignette * High Income</i>	0.16 (0.45)		
<i>President Vignette * Effort Pays</i>		0.04 (0.40)	
<i>Firm Vignette * Effort Pays</i>		−0.41 (0.40)	
<i>President Vignette * Voted Menem</i>			−0.43 (0.39)
<i>Firm Vignette * Voted Menem</i>			0.45 (0.40)
Sample size	508	516	484

Note: Each column is a separate OLS regression (standard errors in parenthesis). All include municipality fixed effects and individual controls (skill, age, a socioeconomic score index, and a dummy equal to 1 when the survey respondent was the head of the household). The dependent variable is *Water Score Gap*, the score given to the water privatization minus the score given to all privatizations. *Gained Water* is a dummy equal to 1 if the household gained access to water during the privatization. *President (Firm) Vignette* is a dummy equal to 1 if the household was read the government (firm) vignette. *High Income* is a dummy equal to 1 if the respondent's socioeconomic score index was over the median. *Effort Pays* is a dummy equal to 1 if the respondent thinks that those that put in effort end up much better or considerably better than those who do not put in effort (and zero if they think slightly better or the same). *Voted Menem* is a dummy equal to 1 if the respondent voted for Carlos Menem in the 1989 presidential election. We impute a zero when there is a missing value for the personal controls and then include a dummy variable to indicate this.

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level.

Finally, we explore whether the estimated effects of propaganda (Table 7) and water access (Table 8) depend on ideological position, as suggested in the theoretical literature where prior beliefs affect the amount of updating. We use three indicators that might proxy for ideological predisposition to update beliefs following the disclosure of evidence (in the form of firm investment) and to accept persuasion efforts (in the form of government propaganda): income, extent of agreement with the idea that those that put in effort end up significantly better than those that do not (“American Dream”), and vote in the last presidential election before privatization. There do not seem to be strong patterns (although we note that several respondents did not report a vote in the 1989 election, perhaps because it took place more than 16 years earlier and such data is noisy or they were too young to vote). We conclude that, if such interactions between predisposition and propaganda exist, we are unable to detect them with our approach.³⁴

³⁴ To the extent that there is sufficient data, the fact that there is little differential effect depending on ideology strengthens the ‘lay empiricist’ interpretation.

4. Conclusions

In this paper we study the formation of beliefs during the reversal of market reforms in Argentina during the 2000s. Specifically we focus on beliefs about the benefits of privatizing the water company. We are concerned with two broad questions: Can a political entrepreneur persuade others of his/her views? And, are beliefs affected by reality (i.e., data learned through direct observation)? If the answer to each of these questions is yes, can these two influences on beliefs be approximately compared?

We approach these questions by conducting a survey after the Argentine government nationalized the water company in 2006 following a propaganda campaign in the media where it repeatedly pointed out the shortcomings of privatizing public utilities as well as criticized other market oriented policies taken during the 1990s by a previous government. We implement our test of “propaganda” by reading to a sub-sample of subjects a negative statement about the water company made by the President as part of its campaign rallying support for the nationalization. The statement alleged a total lack of investment on the part of the company and was ostensibly untrue, particularly to those who had received water connections. We then asked respondents their views about the benefits of privatizations. In order to get variation in “reality” we used city maps of water access to ensure that our sample

Table 8
Investment at different levels of income, prior beliefs and voting.

	(1)	(2)	(3)
<i>Gained Water</i>	0.66 (0.42)	0.67 (0.42)	0.78* (0.42)
<i>President Vignette</i>	−0.53* (0.27)	−0.47* (0.27)	−0.49* (0.28)
<i>Firm Vignette</i>	0.06 (0.27)	−0.01 (0.27)	0.07 (0.28)
<i>Gained Water * High Income</i>	0.29 (0.40)		
<i>Gained Water * Effort Pays</i>		0.36 (0.37)	
<i>Gained Water * Voted Menem</i>			0.01 (0.34)
Sample size	508	516	484

Note: Each column is a separate OLS regression (standard errors in parenthesis). All include municipality fixed effects and individual controls (skill, age, a socioeconomic score index, and a dummy equal to 1 when the survey respondent was the head of the household). The dependent variable is *Water Score Gap*, the score given to the water privatization minus the score given to all privatizations. *Gained Water* is a dummy equal to 1 if the household gained access to water during the privatization. *President (Firm) Vignette* is a dummy equal to 1 if the household was read the government (firm) vignette. *High Income* is a dummy equal to 1 if the respondent's socioeconomic score index was over the median. *Effort Pays* is a dummy equal to 1 if the respondent thinks that those that put in effort end up much better or considerably better than those who do not put in effort (and zero if they report slightly better or the same). *Voted Menem* is a dummy equal to 1 if the respondent voted for Carlos Menem in the 1989 presidential election. We impute a zero when there is a missing value for the personal controls and then include a dummy variable to indicate this.

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level.

contained two groups: one that gained access to water after the water company was privatized in 1993, and another group that never received access.

A summary of the results is as follows: negative opinions about all privatizations prevail. The average score is less than 4 (on a 1–10 scale), which is the passing grade in the Argentine school system. Similar results are obtained for the water privatization. They are even more negative amongst households that did not gain access to the water system following the privatization, and amongst households that were reminded of the government's negative views about it. In terms of size, gaining access is associated with a 0.8 (on a 1–10 scale) increase in the score given to water privatization, while being primed with the government's propaganda campaign is associated with a 0.5 lower score.

The interpretation of our findings is straightforward. First, we find that reality can change beliefs: people who had first-hand experience observing the investments made by the privatized company have a better opinion of the water privatization (relative to other privatizations) than people who did not gain access to water. By controlling for people's opinion about other privatizations we can control for a substantial part of the likely confounds, such as income (although, of course, this does not eliminate all the plausible objections to our identification strategy). Second, while statistically significant, the size of the effect appears small if we take into account the large welfare gains derived from access to water. The interpretation that rejection to privatization originates in the low performance of privatized companies does not seem consistent with the available evidence, given the acceleration in water network expansion under privatization, and the large advantages enjoyed by households from water connection. Third, propaganda can change beliefs: there is a change in the verbalized beliefs post stimulus (priming with propaganda) that is indicative of the likely presence of propaganda effects. Our immediate elicitation (priming) does not allow us to evaluate the duration of such effects (propaganda campaigns intensify close to elections, but typically cease one or two days before voting). Fourth, the effect of priming subjects with propaganda has an effect that is, broadly, of the same order of magnitude, even though it most likely represents an underestimate of the true effect of propaganda on beliefs (as all groups had been exposed to the government's campaign). The comparison of the two estimates (the effect of gaining water thanks to firm investment versus being exposed to propaganda claiming there were no firm investments) is reasonably meaningful as they refer to essentially the same phenomenon. Fifth, the beliefs of the group that benefited from firm investments seem less vulnerable to exposure to propaganda. By design, our estimates reflect the role of persuasion rather than other influences (like agenda setting) because the piece of propaganda and the respondent's beliefs concern the same specific issue (whereas in studies focusing on how propaganda changes voting the estimates could reflect either channel). Note one limitation of the propaganda results: we do not know how long these effects last.

In brief, opinions about the water privatization are quite negative. They are somewhat more positive, but still very low, amongst a group of middle-low and low income households that have gained access to water and pay less for these services than prior to privatization. It is extremely unlikely that these households would have gained access had the privatization not occurred (judging from the performance of the water company before the privatization). Thus, either people care about other aspects of the privatization beyond the purely material benefits emphasized by economists, or their views are only partially affected by their experiences. For example, the collapse of the macroeconomic program (which pegged the exchange rate) that was implemented together with the privatizations may be weighing on respondents' minds, although such bundling of opinions does not occur naturally in standard rational models of belief formation where agents only care about their material payoffs.

Appendix A. Description of the variables

Score Reforms 90s: The answer to the question “On a scale from 1 to 10, what score would you give to the market reforms implemented during the 1990s?”

Score Privatizations: The answer to the question “On a scale from 1 to 10, what score would you give to the privatization of state-owned companies?”

Score Water Privatization: The answer to the question “On a scale from 1 to 10, what score would you give to the privatization of the water company?”. This question was asked after the vignettes were read (when household were randomly assigned to vignettes).

Water Score Gap: *Score Water Privatization* minus *Score Privatizations*.

Gained Water: A dummy equal to 1 if the household gained connection to the water service after the 1993 privatization (and zero otherwise).

No Vignette: A dummy equal to 1 if the respondent was not read any statements (and zero otherwise).

President Vignette: A dummy equal to 1 if the respondent was read the statement below (and zero otherwise):

Information that recently appeared in the newspapers discusses serious problems in the quality of water in Lomas de Zamora.

On March 9, 2006, President Kirchner canceled by decree the contract of Aguas Argentinas. In its decision the government alleged problems with the quality of service as the main reason to re-nationalize the company. On repeated occasions, President Kirchner has criticized the company for lack of compliance of the terms of the concession contract and, more generally, for their performance since privatization.

Recently, in a political rally in Mar de Ajo, he stated:

“There are companies, like Aguas Argentinas, that should acknowledge that what they did to us is shameful, because they have taken five thousand million dollars and did not even build two pipes”

Firm Vignette: A dummy equal to 1 if the respondent was read the statement below (and zero otherwise):

The company Aguas Argentinas, which was responsible for water services in the Greater Buenos Aires area, has published information regarding the amount of investment made since privatization in 1993. These investments have allowed the company to:

- Increase the population with access to drinkable water by 2 million people (from 5.5 million to 7.5 million between 1993 and 2004)
- Increase the population with access to sewage and sanitation services by 1.2 million people (from 4.7 million to 5.9 million between 1993 and 2004)
- Increase the pressure in the water network, reduce shortage cuts during summer and improve water muddiness.
- Improve other aspects of water quality, although recently in some areas served by Aguas Argentinas high levels of nitrates have been found – for example in Lomas de Zamora

The company also explained that the average water charge for residential customers of 25.81 pesos bimonthly, equivalent to 43 cents per day, is one of the lowest in Latin America. However, since the devaluation of the peso and the end of Convertibility in January 2002, the company has been requesting an increase in the tariff. The lack of agreement with the government over this issue has led to the re-nationalization of the company.

Unskilled (=1): A dummy variable taking the value 1 if the household head is unskilled (and zero otherwise). The unskilled are those reporting an education level below completed high school.

Semi-Skilled (=1): A dummy variable taking the value 1 if the household head is semi-skilled (and zero otherwise). The semi-skilled are those reporting completed high school, completed tertiary and incomplete tertiary-university education.

Age: The age (in years) of the household head.

Socioeconomic Index Score: The score for the socioeconomic index of the household, as described in *Argentine Marketing Association (1998)*.

HH is Respondent (= 1): A dummy variable taking the value 1 if the household head is the person responding the survey (and zero otherwise).

Score Telephone Privatization: The answer to the question “On a scale from 1 to 10, what score would you give to the privatization of the telephone company?”

Telephone Score Gap: *Score Telephone Privatization* minus *Score Privatizations*.

Score Oil Company Privatization: The answer to the question “On a scale from 1 to 10, what score would you give to the privatization of the national oil company YPF?”

Oil Company Score Gap: *Score Oil Company Privatization* minus *Score Privatizations*.

High Income is a dummy equal to 1 if the respondent's socioeconomic score index was over the median (and zero otherwise).

Effort Pays is a dummy equal to 1 if the answer to the question “In general, do you believe that people who make an effort working end up, 1) much better than those who did not put in effort, 2) quite a bit better off, 3) a bit better off or 4) just about the same as those that did not put in an effort?”, was either 1) or 2) and zero if the answer was 3) or 4).

Voted Menem is a dummy equal to 1 if the respondent says that s/ he voted for Carlos Menem, the president who implemented the market reforms of the 1990s, in the 1989 presidential election (and zero otherwise).

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