Policy Diffusion and Drinking Water Services in Latin America, 1980-2014

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Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Graduate School of Arts and Sciences

COLUMBIA UNIVERSITY

2018
Understanding how domestic institutions and actors interplay with international and foreign influences is key not only to understand the politics of decision-making in the globalized world we live in, but also to understand why global policies – or policies promoted by transnational and international actors – may (or may not) be implemented and have the intended effects “on the ground.” This dissertation sets to disentangle the all too often conflated parts of these dynamics by separately addressing the domestic processes of adopting, enforcing, as well as, in certain cases, preparing policy change influenced from abroad. It does so through the lens of the politics of drinking water and sanitation in Latin America from 1980 to 2014 and consists in three independent papers.

The first paper addresses the diffusion of politicized policies, and more precisely the privatization of drinking water and sanitation services. This paper highlights one overlooked dimension of policy diffusion processes and more specifically of privatization processes: the preparatory measures adopted (or not) by governments prior to privatization. It suggests that the ability of governments to adopt gradual preparatory measures depends on the time horizon of privatization deciders and the political cost this preparatory gradual policy change may entail for the process. Theoretically, it contributes to the neo-institutionalist literature by adding a “preparatory” type of change to the existing framework of gradual institutional policy changes. Substantively, it underlines the redistributive consequences of privatization processes and the political dynamics behind the level of political risk these reforms may entail.
The second and third papers underline the multifaceted effects of state capacity on policy diffusion for non-politicized (or technical) policies through the empirical analysis of the domestic adoption and implementation of drinking-water quality standards following the promotion of the World Health Organization’s drinking-water quality guidelines. The second paper argues that strong state capacity tends to limit the adoption of a diffused policy that represents a strong domestic challenge. It contributes to the institutionalist literature by underlining the relevance to compare and measure state capacity on the basis of its resources (required to project its power), rather than on its ends or outcomes (which depend on the political choices that were made by the state).

The third paper presents the other side of the coin of the impact of state capacity on diffusion of non-politicized policies, at the implementation step. At this step, strong state capacity gives the capacity to extensively implement a diffused policy, but implementation will remain partial if there are no external pressures on the sector. In weak states, policy diffusion can be both window-dressing and frame-shaping, depending on political dynamics. To be frame-shaping, it needs a sustained foreign capacity support (that can compensate for the weakness of the state) and strong external pressures.

Overall, this thesis disentangles the policy diffusion process by highlighting that receiving states and actors are not only passive agents but also proactive ones, regarding the adoption, enforcement, and preparation of policy changes influenced from abroad. It also contributes to the understanding of two dimensions of water reforms in Latin America largely overlooked by the literature and policy studies: measures lessening the privatization shock and drinking-water quality standards. These issues, less salient than strongly politicized ones (like privatization itself), are as consequential in the life of states and their citizens, especially for their health and wellbeing.
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Acknowledgments

I would like to first thank my dissertation committee members, starting with my main advisor Maria Victoria Murillo, who encouraged strongly my research project at every step. She has supported me at all key moments and constantly pushed me to strengthen my theoretical and empirical work, while at the same time respected my own academic and life choices. I must admit the richness of her guidance (through not only her words but also her own actions) has sometimes unveiled over time, so I know it will keep accompanying my path. Overall, I would like to thank her for caring for my thesis, but also for me (namely when I was in the midst of a natural catastrophe), and for the region we both study.

I also thank very strongly my co-advisor Isabela Mares, who has been supportive throughout my PhD journey, literally from day 1. I wish to thank her especially for her diverse concrete suggestions at different steps of my thesis and for her inspiring enthusiasm for my research (especially in moments when I was in doubt).

I am also extremely grateful to Alison Post, for sharing her expertise on water politics in Latin America. She has been very generous with her fieldwork material and experience as I was developing the project. She has also shown constant interest in my work, did a thorough reading of my thesis, and shared precise and thoughtful comments during the defense and after. I feel privileged to have received her immensely rich feedback on my work throughout the process.

I would also like to thank Robert Kaufman and Timothy Frye, for their time and advices at different moments of my PhD journey and their helpful feedback at the defense.

At Columbia, I would also like to thank other faculty who have accompanied me in early steps of the project: Page Fortna, Greg Wawro, Dorian Warren, and (then GSAS Dean) Jan Allen. The staff
of the Political Science Department has also been very helpful throughout my PhD, especially Kay Achar, Lorianne Delahunt, Holly Grant, Michael Scott and Betty Howe. At Columbia, I also wish to thank Tom Tarduogno and Elizabeth Edwards (both from GSAS) and Bob Scott (from the Digital Humanities Center at Columbia Libraries), for their support and help, that went well beyond their administrative duty.

Different colleagues from the Political Science Department have accompanied me along the way, and the words of some of them have reverberated further than they can certainly imagine. I wish to thank (in no specific order and with my apologies in advance for the forgotten ones): Justine Guichard, Matias Mednik, Liya Yu, Hadas Aron, Sung Eun Kim, Xian Huang, Hannes Hemker, Lauren Young, Emily Holland, Albert Fang, Pavithra Suryanaraya, Alexandra Cirone, Elizabeth Sperber, Maria Paula Saffon, Viriginia Oliveros, Martin Ardanaz, Giancarlo Visconti and Sarah Berens.

My research project was greatly enriched by the generosity of the people I interviewed, most of which required to remain anonymous. Their contribution to this dissertation is withstanding and unique, and I wish to thank them very sincerely for their time and great disposition. I also wish to thank the dozens of people who responded to my requests for documentation (especially on past regulations needed for paper 2 but also other specific documents). These included many anonymous civil servants and librarians, but also a few (current or past) academics, namely: Andrea Marston, Sarah Hines, Rocio Bustamante, Rafael Bastos, Paula Bevilacqua, Antoine Maillet, Simon Mélançon, Bernard De Gouvello and Pierre-Louis Mayaux.

On a different note, I also would like to thank Josée St-Martin and Gabrielle Bardall (who I have met through the Pierre-Elliot Trudeau Foundation), who have been regular supporters of my thesis.
work, as well as Alain Noël, Marie-Joëlle Zahar and Denis Saint-Martin (from the Université de Montréal), without whom this doctoral journey would never have started.

I wish to acknowledge the financial support received for this project from Columbia University’s Graduate School of Arts and Sciences, Columbia University’s Institute for Social and Economic Research and Policy, the Social Sciences and Humanities Research Council of Canada, the Pierre-Elliot Trudeau Foundation, Columbia University’s Department of Political Science and the Office Québec-Amériques pour la Jeunesse.

Finally, I would like to thank my family and friends for their support in this venture as in all the ones I have undertaken. I dedicate this thesis to the (too numerous) ones among them who have faced serious health and personal issues while I was writing this thesis, as well as to Dominique and Freddy who have not only struggled with health issues but also left us too early. Their struggles and attitudes have constantly reminded me (if ever needed) that my doctoral project had to (also) be rooted out of the academic world and that I could never forget that “everybody has one (only) life”, as someone I interviewed for another research project had told me years ago…

« Il n’est coin de la terre
Où je ne vous entende »

Gilles Vigneault
Introduction

Domestic policies are today essentially developed by governments aware of, and potentially influenced by, international or foreign policies. Understanding how domestic institutions and actors interplay with these external influences is key not only to understand the politics of decision-making in the globalized world we live in, but also to understand why global policies – or policies promoted by transnational and international actors – may (or may not) be implemented and have the intended effects “on the ground.” This dissertation sets to disentangle the all too often conflated parts of these dynamics by separately addressing the domestic processes of adopting, enforcing, as well as, in certain cases, preparing policy change influenced from abroad. It does so through the lens of the politics of drinking water and sanitation in Latin America from 1980 to 2014, which have been developed under external pressures and influences, especially since the 1980 proclamation by the United Nations of the 1981-1990 era as the “International Drinking Water Supply and Sanitation Decade.” Needless to say, water is essential to life and to the well-being of populations, but remains an important source of challenge and conflict in our world.

This dissertation’s overarching argument is that global policy change always remains a domestic affair. Policy change rests on domestic political and institutional factors that influence the way in which governments anticipate, adopt or enforce a policy promoted by international or transnational organizations. These factors go beyond the influence of partisanship, and evidence the wider capacity constraints and political dynamics that interplay, sometimes under the partisan radar.

More specifically, this dissertation consists in three independent papers. The first analyzes the stage that precedes the formal adoption of a policy influenced from abroad through the lenses of the preparatory measures adopted (or not) by governments prior to the privatization of drinking
water and sanitation services in Bolivia and Chile. The second focuses on the adoption (and non-adoption) of a policy in response to similar diffusion pressures by analyzing the domestic adoption of drinking-water quality standards in 16 Latin American countries following the promotion of the World Health Organization’s (WHO) drinking-water quality guidelines. The third follows up on the second paper and explains the heterogeneous implementation of policies adopted following diffusion pressures, through the study of the implementation of domestic drinking-water quality standards (influenced by the WHO guidelines) in Bolivia and Chile over more than three decades.

This dissertation, as a whole, contributes to the literature on policy diffusion and policy transfer, of which the increasing growth since the early 2000s is another sign of the inevitable foreign and international influences on domestic policy-making in our globalized world. The originality of this dissertation first lies in the uniquely synoptic view of the policy diffusion process that the analysis provides, before, during, and after the national adoption of a norm, thus refining existing understandings of how diffusion takes place (see Figure 1). Second, it highlights that the politicization (or not) of a policy as well as the extent to which it entails a transboundary challenge influence the dynamics of policy diffusion. More substantially, the dissertation finally calls attention to a range of factors that domestically constrain policy choices, but have thus far been largely neglected, such as state capacity, which has multifaceted effects on the diffusion of non-politicized policies.

This introduction first briefly describes the context of the water reforms that took place in Latin America in the last decades. Second, it summarizes the three papers of this dissertation and their main contributions. Finally, it presents the overall contribution of this dissertation within the policy diffusion/transfer literature.
1. The Context of Water Reforms in Latin America

In Latin America the 1980s and 1990s decades were characterized by democratic transition and market-oriented economic reforms. It is in this broader context that various countries of the reforms undertook water reforms, including privatization from the early 1990s on. Water services were often the last utilities to be privatized nationally.

From the 1960s until the early 1980s, water services were largely managed at the national level in Latin America. According to the Pan-American Health Organization (2001: 50), this centralization “facilitated the development and execution of projects oriented to the expansion of the infrastructure and access to the services.” Trade surpluses and access to international finance helped these centralized services to expand their network (Herrera and Post, 2014: 622).

However, by the 1970s and 1980s, these services faced different problems: a lack of maintenance led to high rates of water losses, and economic resources available were insufficient to sustain the network (due to low consumers’ rates and governmental resources being less available due to the debt crisis) (Marin, 2009; Herrera and Post, 2014: 622-623). Savedoff and Spiller (1999: 2) characterized this situation of water services in the region as a “low-level equilibrium in which low prices are associated with low quality, limited pace of service expansion, operational inefficiency, and corruption, which further erode public support”. They argue that this low-level equilibrium was mainly caused by governmental opportunism.

As a response to the challenges facing the sector in the 1980s, organizations like the IMF, the Inter-American Development Bank and the World Bank promoted the modernization of water services through the insulation of providers from politics, and more directly the incorporation of private participation. The privatization of water services was strongly encouraged, for instance through
loans of these organizations, and indeed was largely implemented in Latin America. Almost half of the water privatizations that took place in developing countries took place in Latin America (Herrera and Post, 2014; Marin, 2009; Mayaux, 2012). As part or in parallel to these reforms, countries have developed a regulatory framework of the sector, including regulatory agencies and drinking-water quality standards (Andrés et al., 2013: 42-43).

The privatizations of water services have largely generated discontent in the population, and were often opposed, renegotiated and even reversed (Guasch et al., 2008; Post, 2014; Mayaux, 2012). The cases of Bolivia and Chile stand as contrasting cases in this regional panorama. In Bolivia, water services of La Paz/ El Alto (in 1997) and of Cochabamba (in 1999) were privatized but reverted. In Cochabamba, the concession lasted only a few months as massive protests irrupted little after it came into force and lasted for over three months, until the concession was cancelled (these protests consist in the so-called Cochabamba “Water War”). In La Paz/ El Alto, the concession was first relatively accepted by the population but protests against it raised a few years later, leading to its reversal in 2007 (Simmons, 2016; De Gouvello and Fournier, 2002; Mayaux, 2008; Nickson and Vargas, 2002). In Chile, the privatization of all urban water services faced little opposition and lasted until today: it is often considered the “success story” of water privatizations (Valenzuela and Jouravlev, 2007; Baer, 2014).

Besides, the impact of water privatizations extended beyond the water sector. “Water movements”, which largely developed in opposition to the privatization of water services, have had a political significance beyond their mere impact on water reforms. They were, arguably, “an integral part of […] Latin America’s left turn—the changes in the political landscape associated with the forced retreat of neoliberalism in the region.” (Terhorst et al., 2013: 55).
2. Three Papers on Policy Diffusion and Water Reforms in Latin America

This dissertation unfolds in three independent papers that address different aspects of water reforms in Latin America and, as such, of policy diffused in one single policy sector: drinking water and sanitation services.

The first paper addresses the diffusion of politicized policies, and more precisely the privatization of drinking water and sanitation services. These privatization reforms have been one of the most politicized changes in drinking water services over the last decades. Promoted by international organizations, they were implemented in many countries. They have nevertheless been highly debated, often strongly contested, and sometimes reverted. They have also been largely analyzed and studied. This paper highlights one overlooked dimension of policy diffusion processes and more specifically of privatization processes: the preparatory measures adopted (or not) by governments prior to privatization. It addresses the question: why governments sometimes (but not always) lessen the “privatization shock” when water services are privatized. It suggests that the ability of governments to adopt gradual preparatory measures depends on the time horizon of privatization deciders and the political cost this preparatory gradual policy change may entail for the process. Empirically, the paper analyzes the measures adopted by some (but not all) governments prior to the privatization of drinking water and sanitation services in Bolivia and Chile, through a process-tracing approach based on quantitative data, interviews, and an extensive review of government and providers’ reports, as well as governmental, non-governmental and press archives. The main contribution of this paper is to conceptualize and analyze “preparatory” policy changes. Theoretically, it contributes to the neo-institutionalist literature by adding a “preparatory” type of change to the existing framework of gradual institutional policy changes. Substantively, by analyzing the preparatory measures adopted prior to the privatization processes,
it allows to better understand the real redistributive consequences of these processes and the political dynamics behind the level of political risk they may entail.

The second and third papers highlight the multifaceted effects of state capacity on policy diffusion for non-politicized (or technical) policies through the empirical analysis of the domestic adoption and implementation of drinking-water quality standards following the promotion of the World Health Organization’s drinking-water quality guidelines. Whereas the privatization and expansion of access to water tend to be politicized issues, the adoption or change of regulations for the quality of drinking water is rather technical and not politicized per se. Indeed, the definition of national standards for drinking-water quality are essentially developed and defined by technical agencies. It can easily be understood, since drinking-water quality (except for a few exceptions) cannot be easily assessed at time of consumption, and many effects of bad drinking-water quality are only evidenced over time. The drinking-water quality guidelines promoted by the World Health Organization are also presented as health-based, scientifically-oriented documentation. Focusing on the diffusion of non-politicized policies promoted by international organizations to national jurisdictions, the second and third papers together disaggregate two steps of policy diffusion that are often conflated in the literature in order to address these two questions: first, why are policies diffused or not across countries submitted to similar diffusion mechanisms (paper 2); and, second, why are “similarly diffused policies” implemented or not (paper 3).

The second paper argues that strong state capacity tends to limit the adoption of a diffused policy that represents a strong domestic challenge. The study explores, first, the diffusion of the WHO guidelines in the regulations of 16 Latin American countries through a cross-country comparison of process-tracing clues. Second, it develops thorough process-tracing analyses evidencing the causal mechanisms in two case studies: Bolivia and Chile (based on systematic archival research
and interviews). Its main finding suggests that international influences weigh heavier where state capacity is weaker and may, in these cases, lead to the adoption of more ambitious policies than if the policy was only developed nationally (and therefore constrained by the weak capacity of the state). More generally, this paper contributes to the institutionalist literature by the definition of state capacity on which it rests. It underlines the relevance to compare and measure state capacity on the basis of its resources (required to project its power), rather than on its ends or outcomes (which depend on the political choices that were made by the state). This definition allows to conceptually and empirically dissociate state capacity from the political choices that are made to develop specific functional capacities.

In the third paper, the theory posits that strong state capacity gives the capacity to extensively implement diffused policies, but that implementation will remain partial if there are no external pressures on the sector. In countries with weak state capacity, it postulates that, when they can count on sustained foreign capacity support, implementation may also be extensive under external pressures. However, if this foreign capacity support is interrupted or absent, implementation will at most be partial (under external pressures). Empirically, this paper focuses on the implementation of national drinking-water quality regulations in Bolivia and Chile over more than three decades. The analysis was developed through a process-tracing approach and builds on extensive and systematic research in governmental and non-governmental archives conducted in both countries, as well as on over 50 interviews with actors involved in the sector in the last three decades. The main contributions of this paper is to show that policy diffusion in weak states can be both window-dressing and frame-shaping, depending on political dynamics. To be frame-shaping, it needs a sustained foreign capacity support (that can compensate for the weakness of the state) and strong external pressures. Otherwise, in weak states, the adoption of a diffused policy is likely to be mere
window-dressing. This paper also shows that, when state capacity is strong and there are not strong pressures from outside the implementing actors, implementation is partial. This drastically contrasts with the common view that partial implementation comes from a lack of resources.

3. Overall Contribution to the Policy Diffusion/ Transfer Literature

The literatures on policy diffusion and policy transfer emerged a few decades ago, initially independent from one another, but have started to crisscross at the end of the 1990s. Conjointly, they have been significantly burgeoning since the early 2000s. This dramatic surge led to the publication of numerous reviews of this literature (Dolowitz and Marsh, 1996; Dobbin, Simmons and Garrett, 2007; Karch, 2007; Marsh and Sharman, 2009; Benson and Jordan, 2011; Shipan and Volden, 2012; Stone, 2012; Graham et al., 2013). Most of these literature reviews, including the most recent ones, note the numerous avenues left to address the literature’s shortcomings, especially regarding the process of policy diffusion, its object and the empirical scope of research. This dissertation contributes to each of these three aspects in specific ways. It, first, provides a uniquely synoptic view of the policy diffusion process (before, during, and after the national adoption of a policy). Second, it highlights that the dynamics of policy diffusion are influenced by the type of policy diffused (especially its degree of politicization and the extent to which it represents a transboundary challenge). More substantially, the dissertation finally calls attention to a range of factors that domestically constrain policy choices, but have thus far been largely neglected in the policy diffusion literature, such as state capacity, which has multifaceted effects on the diffusion of non-politicized policies.
3.1. The Process of Policy Diffusion and Policy Transfer

This dissertation first contributes to the understanding of the process of policy diffusion/transfer. The literature has analyzed this process extensively in the last decades and has disaggregated it in at least three different ways: first by identifying its explanatory factors, second by defining the mechanisms through which it occurs, and third by distinguishing the different steps of the process.

Initially the policy diffusion literature focused on convergence and on the conditions allowing a policy to spread to another state (first in the US federal system). It focused on factors external to the state adopting the diffused policy, like geographical proximity, external pressures and communication networks, and put little emphasis on comparing the content of the policy diffused. As for the literature on policy transfer, emerging from the public policy subfield, it rapidly tended to balance the external factors with internal ones, like transfer agents, political interests and institutional features (Berry and Berry, 1999; Marsh and Sharman, 2009; Stone, 2012). As these literatures have developed and crossed over one another, external and internal factors are now generally acknowledged to be important in the process of policy diffusion and policy transfer. Yet, the focus has moved towards the mechanisms through which policy diffusion/transfer occurs.

Originally developed from a rational-choice perspective, the policy transfer literature first argued that policy transfer was the result of a learning, lesson-drawing mechanism. Policy emulation and harmonization were also identified as causal mechanisms in the 1980s and 1990s. As the literature expanded, particularly in the international relations subfield, other causal mechanisms highlighting the influence of power and interdependence relationships appeared as important: competition, coercion and imitation. Although the literature has identified dozens of causal mechanisms, they are typically summarized into four: learning (from own experiences and peers), competition (pressure to follow policies of direct competitors), coercion (sanctions and aid promised by
powerful states or international organizations), and socialization/constructivism (change of preferences and development of expert epistemic communities). But they are not necessarily independent from one another, and more than one may impact the diffusion of a same policy in different places (Dobbin, Simmons and Garrett, 2007; Graham et al., 2013; Stone, 2012).

These mechanisms have contributed to the understanding of how the process of policy diffusion/transfer unfolds. However, they are mostly orientated toward explaining why diffusion occurs and not why it does not when and where similar mechanisms are taking place. Moreover, they focus mostly on one specific step of the process: the spread of the policy. Yet, the literature has, more recently, emphasized that the policy diffusion process included but was not limited to the specific step of spread/diffusion. The policy diffusion process has consequently been disaggregated in different steps, and scholars have emphasized that different factors and mechanisms may be determinant for each step.

First, the literature progressively recognized the importance of analyzing the implementation of policies diffused or transferred (Dolowitz and Marsh, 1996: 354; Evans and Davies, 1999: 379; Dolowitz and Marsh, 2000: 6; True and Mintrom, 2001: 30; Karch, 2007: 191; Marsh and Sharman, 2009: 279; Shipan and Volden, 2012: 793). However, despite this reiterated recognition over the last two decades, some scholars still consider that, with adoption, diffusion is completed (Graham et al., 2013: 675). Others distinguish the implementation step of the process, but often to specify that their empirical study excludes this step (see, for instance: True and Mintrom, 2001; Karch, 2007). Finally, the few studies that analyze the post-adoption dynamics of diffused policies have mostly focused on highly politicized policies, like criminal justice or utility privatization, in which not implementing or partially implementing the policy translated into modifying the policy itself or its content (Karch and Cravens, 2014; Murillo, 2009; Post, 2014).
Second, another step that has been distinguished by the literature is the one of adoption. Adoption was not just separated from implementation, it was also singled out from diffusion itself (a step I label the “spread” to limit confusion with the whole process). Indeed, among others, Karch (2007) and Dunlop (2009) noted that adoption differed from learning and diffusion: it could differ a lot from what was diffused and, besides, what was diffused could also motivate receiving states not to follow the path called for by diffusion.

Third, the disaggregation of the policy diffusion also started to look at steps prior to the spread (diffusion) step and to note the importance of the step of standardization of local ideas and practices. Ancelovici and Jenson (2013) conceptualized this step “as the process through which local ideas and practices are turned into a ‘standard model’” and suggested that three mechanisms may intervene in this step: certification, decontextualization, and framing. Moreover, although the emergence, in first place, of a “new” policy or idea somewhere was always acknowledged as part of the process, the relevance of analyzing this process was put forward only recently in the literature. As Graham et al. (2013: 686) stated: “in order to uncover evidence that earlier adopting governments influenced the subsequent decisions of governments adopting later, it is often important to know what caused these early adopters to innovate.”

This dissertation contributes to the disaggregation of the policy diffusion process in two ways. On the one hand, it suggests the addition of one step to the ones already defined in the literature as part of the policy diffusion process: the step of preparation. This step consists in the elaboration by a receiving state of measures to lessen the impact of a policy adopted following diffusion influences. Although not necessary to the process of policy diffusion, this step is important to take into account in the analysis because if preparatory measures are put in place by receiving states, then assessing the impact of policy adoption may be misinterpreted. Moreover preparatory
measures may delay adoption, and therefore affect the interpretation one may make of the timing of adoption. On the other hand, this dissertation contributes to the understanding of the policy diffusion process by analyzing separately the adoption and the implementation steps of a diffused policy. These empirical analyses highlight how the dynamics of each of these steps is distinct, despite the fact that these steps are not totally independent from one another.

Figure 1 summarizes the different steps of the policy diffusion/transfer process, as conceptualized in the literature but also including this dissertation’s inputs (the step of preparation and the clear distinction between the steps of adoption and implementation).

**Figure 1. The Steps of the Policy Diffusion/Transfer Process**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergence</td>
<td>New Ideas/Policies Rise in Other States or Transnational/International Actors</td>
</tr>
<tr>
<td>Standardization</td>
<td>New Ideas/Policies Become a &quot;Standard Model&quot;</td>
</tr>
<tr>
<td>Spread/Diffusion</td>
<td>The &quot;Standard Model&quot; Travels to Other Contexts</td>
</tr>
<tr>
<td>Preparation (Optional Step)</td>
<td>Receiving State Puts in Place Preparatory Measures to Lessen the Impact of New Policy</td>
</tr>
<tr>
<td>Adoption</td>
<td>Receiving State Adopts New Policy (Possibly Adapted)</td>
</tr>
<tr>
<td>Implementation</td>
<td>Receiving State and Other Actors Involved Implement New Policy</td>
</tr>
</tbody>
</table>

Source: Own Elaboration.
3.2. The Object of Policy Diffusion

In comparison to the process of policy diffusion/transfer, the nature of what is transferred/diffused has been less analyzed theoretically and empirically. It has nevertheless been acknowledged as important for the analytical framework of the process, especially given the great and increasing scope of areas associated with this dynamic in the literature. This dissertation highlights two key characteristics of policies that may influence diffusion: its degree of politicization and the transboundary challenge it may entail.

Initially, the policy diffusion/transfer literature focused on program innovations, mostly of technological nature and in social policy (Walker, 1969; Collier and Messick, 1975; Leichter, 1983; Midgley, 1984; Tarr, 1985). From the 1990s, the diffusion framework was applied more broadly and in a great range of policy areas, especially economic policy (Wever and Allen, 1993; Radaelli, 1995), public management (Berry, 1994) and legal policy (Hays, 1996). In the 2000s, environmental policy (Tews et al., 2003), gender mainstreaming (True and Mintrom, 2001), as well as trade and enterprise standards (Cao and Prakash, 2011) were also analyzed from the diffusion perspective. As the policy diffusion framework was applied to any policy area, the policy area per se apparently did not seem to impact which causal mechanisms were determinant or the scope of policy diffusion. However, the impact of other characteristics of what is diffused has progressively stood out.

As the policy diffusion literature extended in the 1990s, it became clear that diffused policies varied in their “type of content”, and that this could impact their likeliness to be diffused. Dolowitz and Marsh (1996) identified seven categories of content transferred/diffused, which they later updated to eight. These eight categories were policy goals, policy content, policy instruments, policy programs, institutions, ideologies, ideas and attitudes and negative lessons (Dolowitz and
Marsh, 2000: 12). They reflect the clear diversity of what may be diffused/transferred. Although there is no unanimity on the matter, the literature tends to suggest that the diffusion/transfer of broad policy goals or general policy ideas are more likely to be diffused than specific policy programs (Majone, 1991; Dolowitz and Marsh, 1996; Stone, 2012).

Another characteristic of the content diffused/transferred that appeared early in the literature as analytically relevant is the complexity of the policy. It was first argued that more complexity disfavors diffusion/transfer (Bennett, 1991). However, scholars most recently noted that the impact of a policy’s complexity on diffusion had to be put in relation with the capacity of policy-makers: this capacity became particularly “crucial […] in the spread of highly complex policies, but largely inconsequential for diffusion of less complicated policies” (Graham et al., 2013: 701).

Although the policy diffusion literature has highlighted the diversity of policy areas and types of content, the nature of what is diffused remains a dimension to be better explored and understood, and especially to be put in relation with how, where and when diffusion takes place. In this respect, this dissertation considers that the type of policy that is intended to be diffused is key, and especially two specific characteristics of it: the degree of politicization of the policy, and the extent to which the expected impacts of the policy go (at least partly) beyond borders.

First, the impact the politicization of a policy may have on its diffusion, especially through the actors influencing its diffusion, is not totally new in the literature. Karch (2007: 71-72), for instance, noted that “interest groups might be especially influential on highly politicized policies, and variation in their strength across states might explain policy content variation across states. For more technical or administrative policies, content may vary due to variation in the efforts of executive branch officials and program administrators.” Weyland (2005: 277) also stated that policies where “decisions […] have concentrated winners, yet diffuse losers” are more “politically
attractive” than those “where decisions have broad categories of winners and losers.” This dissertation develops the idea further by arguing that the diffusion of politicized policies is likely to imply actors and be related to institutional capacity differently from non-politicized (technical/administrative) policies. I define the degree of politicization of a policy as the extent to which it is associated to a traditional conflict between the left and the right or between political parties in the country. This dissertation puts forward this argument by studying, in paper 1, a dimension of drinking-water policies that is highly politicized (the privatization of the services) and, in paper 2, an aspect of drinking-water policies that is not politicized per se (the adoption of drinking-water quality standards).

Second, this dissertation suggests that one dimension of policies that has been overlooked in the literature is also key to diffusion: the expected impacts a policy may have abroad. Indeed, policy diffusion is essentially analyzed as a relationship in which a receiving state, following foreign, transnational and international influences, adopts a new policy or idea within its domestic context. It is also commonly acknowledged that states may have “foreign influences” on other states (Graham et al., 2013: 686). However, what is missing from the equation is the extent to which a domestic policy adopted and implemented domestically (for instance following diffusion influences) may have impacts abroad by its own nature (i.e. independently of whether it is “diffused” abroad). The existence of such impacts is likely to have an effect on actors involved at the adoption and implementation stages of the policy that are mostly overlooked in the literature as of now. This dissertation analyzes this issue specifically in paper 2, studying why Latin American countries adopt (or not) national drinking-water standards complying with the World Health Organization’s guidelines. This paper argues that, indeed, the transboundary nature of a challenge associated with a specific policy impacts policy adoption by states.
3.3. The Empirical Scope

As it developed over the years, the policy diffusion/transfer literature largely extended its empirical scope. Nevertheless, its original focus on the USA and Europe as well as its dominant interest in “successful” diffusion cases still imprint its theoretical and its analytical frameworks. This dissertation contributes to the systematization of empirical analyses of diffusion outside of Western countries and to the identification of new explanatory factors, like state capacity.

Overall, an important empirical shortcoming of the policy diffusion/transfer literature has been the focus on positives cases. Stone (2012: 488-489) noted: “Poor, incomplete or partial transplantation is not as well documented as the ‘success stories’ of transfer. […] Empirical questions such as why and how a certain type of transfer occurs in one context and not elsewhere have not, as yet, been fully addressed in the policy transfer literatures.” Graham et al. (2013: 697) also called for “future work […] to discern systematic patterns in the conditional nature of diffusion.”

The second and third papers of this dissertation directly contribute to extending diffusion empirical studies to positive and negative cases. They analyze the adoption and implementation phases of policy diffusion in countries where the drinking-water standards adopted nationally followed the World Health Organization’s guidelines and in others where they did not.

Besides its focus on positive cases, the literature largely developed by analyzing policy diffusion in Western countries, especially between American states and European countries. This has recurrently been raised as an issue of concern in the 2000s (Marsh and Sharman, 2009). Progressively, and especially in the last decade, many diffusion studies of non-Western countries have emerged. Many of these analyzed a few countries where diffusion took place, which limited the generalizability of their findings. However, some systematically compared diffusion patterns
in developing countries which generated important theoretical contributions. For instance, different scholars (Croissant and Tosun, 2016; Milner, 2006; Richter and Wurster, 2016) suggested that regime type was a relevant explanatory variable of diffusion, at least for some policy areas.

This dissertation suggests that one key explanatory variable that previous studies have overlooked, possibly because of their original focus on Western countries, is state capacity. Papers 2 and 3 argue that state capacity interplays significantly in the adoption and implementation of non-politicized policies influenced from abroad.

Overall, by analyzing how water reforms promoted by transnational actors were put in place in Latin America between 1980 and 2014, this dissertation helps understanding why policies promoted by transnational and international actors may (or may not) be implemented and have the intended effects “on the ground.” It disentangles the policy diffusion process by highlighting that receiving states and actors are not only passive agents but also proactive ones, regarding the adoption, enforcement, and preparation of policy changes influenced from abroad. It also contributes to the knowledge on water reforms in Latin America, as it analyzed in details two dimensions largely overlooked by the literature and policy studies: measures lessening the privatization shock and drinking-water standards. These issues, less salient than strongly politicized ones (like privatization itself), are as consequential in the life of states and their citizens, especially for their health and wellbeing.
References


Privatization reforms of drinking water and sanitation services have been one of the most politicized changes in drinking water services over the last decades. Promoted by international organizations, they were implemented in many countries. They have nevertheless been highly debated, often strongly contested, and sometimes reverted. They have also been largely analyzed and studied.

The literature analyzing drinking water and sanitation services has largely focused on the effects of the participation of the private sector on services. For some, privatization came with efficiency gains that allowed to extend coverage, lower prices and improve the quality of services (Chong and López-de-Silanes, 2004; Estache and Trujillo, 2003; McKenzie and Mookherjee, 2003; Barja et al., 2002); for others, privatization did not yield the incentives to improve water services and indeed failed in doing so (Castro, 2007; Amakom, 2007; Azpiazu, 2010; Mulreany et al., 2006). For yet another group, privatization was not determinant in itself (Clarke et al., 2009; Budds and McGranahan, 2003; Sciandra, 2005). Progressively, the latter perspective has become dominant and scholars highlighted that the outcomes of privatization depended on other factors like regulation, governance, state capacity and investor portfolios (Lee and Floris, 2003; Delfino et al., 2007; Araral, 2009; De Gouvello, 2014; Baer, 2014; Post, 2014; Post and Murillo, 2016).

The latter and dominant perspective has acknowledged directly the possible heterogeneous outcomes of the privatization of water services. In doing so, some scholars have noted that reforms of the sector prior to privatization have important impacts on privatization. Water utilities that are in better economic and infrastructural shape at the time of privatization obviously attract more...
bidders (therefore facilitating the process of privatization), require less short-term investment (therefore easing the installation of private entities and lowering their risk to engage in an “obsolescing bargain”\(^1\)) and provide more accurate information about the state of their utility (therefore favoring a more stable post-privatization period) (Clarke et al., 2009: 336; Shirley, 2000: 147-152; Tecco, 2008: 135-138). Yet, the extent to which governments adopt measures to prepare water utilities for privatization varies strongly across countries and often between water utilities within a single country, and this has led to very different experiences with water privatization.

This paper specifically addresses the question of why governments sometimes (but not always) lessen the “privatization shock” when water services are privatized. Considering the high political visibility of water services and the fact that they have specific assets (Herrera, 2011; 2017; Clarke et al., 2009; Post, 2014), this paper argues that privatizing deciders favor gradual policy change that prepares to the “abrupt policy change” of privatization. However, the extent to which they may (or not) take this path of change depends on two factors: their time horizon and the political cost this preparatory gradual policy change may entail for the process. The time horizon of deciders limits the measures they may take and depends on the institutionalization and strength of political ties (materializing in political alliances and relationships) between deciders. The political cost of the gradual policy change influences which preparatory measures (if any) deciders actually put in place; this cost is determined by the extent to which a strong external challenge jeopardizes privatization.

\(^1\) It has been argued that foreign firms investing infrastructure may face an “obsolescing bargain” if they invest in fixed capital and national governments, afterwards, do not stand by their initial commitments (Kindleberger, 1969: 149-151; Vernon, 1971: 46-53).
By conceptualizing a “preparatory” type of gradual policy change, this argument contributes to the neo-institutionalist literature that has evidenced the possibility of institutional policy change to take place not only abruptly, at critical-juncture moments, but also gradually (Hacker, 2004; Mahoney and Thelen, 2010). It also directly contributes to the literature on economic and privatizing reforms by pinpointing a dimension that has generally been overlooked: the measures adopted prior and in preparation to privatizations.

The empirical analysis focuses on the concession-type privatization processes of drinking water and sanitation services that took place in two cities of Bolivia and eight regions in Chile. It analyzes measures adopted (or not) prior to concession on two aspects of water and sanitation services: consumers’ rates and drinking-water quality. Especially for the concession type of privatization, these two aspects are key, both for providers’ revenues and for the popular acceptance (or opposition) to privatization. The analysis is done through a process-tracing approach, on the basis of quantitative data, interviews and extensive research in governmental, providers’ and press archives.

The first section presents the theoretical framework, and the second details methodological aspects. The third and fourth sections present and analyze the results for the water concessions that occurred in Bolivia and Chile, respectively.

1. Theoretical Framework: Why Smoothening (or Not) the Big Bang

This paper develops a theory to explain why governments sometimes (but not always) smoothen the shock the adoption of a policy (like a privatization reform) is expected to provoke.
1.1. Gradual vs. Abrupt Policy Change

Policy change may take place gradually or abruptly, as the institutionalist literature has particularly highlighted. Historical institutionalism initially considered that institutions changed drastically at critical moments (as a response to exogenous shocks) and adjusted incrementally between these abrupt transformations, over a very long period of time (Pierson, 2000; see Capoccia and Kelemen, 2007 for a literature review). Other more recent institutionalist theories rather argue that institutional change may also be gradual as well as abrupt, and take multiple forms (Hacker, 2004; Mahoney and Thelen, 2010). Mahoney and Thelen (2010), for instance, define four types of institutional change (displacement, layering, drift and conversion). Whereas they associated abrupt patterns of change with displacement, all four types of change may correspond to patterns of gradual change. They argue that the type of institutional change depends on the strength of veto possibilities and the level of discretion in the targeted institution, two characteristics suggesting which type of “change agents” may lead the change.

Overall the (neo-) institutionalist literature offers explanations about what type of gradual changes is pursued but provides only limited insights into why change takes place gradually or abruptly. Nevertheless, it tends to assume that policy change is gradual rather than abrupt when change agents or advocates face constraints or incapacities to pursue abrupt change. Mahoney and Thelen state: “If displacement [a type of change likely to be abrupt] occurs gradually, it is likely because insurrectionaries are unable to make things change as quickly as they would like” (Mahoney and Thelen, 2010: 24). Hacker, on his side, suggests that “actors who wish to change popular and embedded institutions in political environments that militate against authoritative reform may find it prudent not to attack such institutions directly” (Hacker, 2004: 244). He argues that, when “the basic political structure and partisan context privilege[s] the status quo […], pragmatic advocates of
change may find it more attractive to adapt existing policies to their ends than to wage frontal assault” (Hacker, 2004: 247).

Gradual and abrupt policy changes are therefore perceived and analyzed as two distinct strategies for policy change, that are constrained by possibilities offered by the political context. This conceptualization does not suggest that (and less so explain why) change advocates and agents who are not constrained and thus have the ability to carry about abrupt changes could nevertheless choose to adopt gradual changes.

Another shortcoming of the (neo-) institutionalist literature is its lack of explanation for the succession of different institutional changes. Although scholars acknowledge that “all these forms of [institutional] change, if successful in undermining support coalitions or the ability of policies to achieve their goals, should increase the ability to convert, alter, or eliminate existing policies in the future” (Hacker, 2004: 248) and emphasize the “need to disentangle actors’ short-run behaviors from their long-run strategies” (Mahoney and Thelen, 2010: 22), they largely focus on one institutional change at a time. This focus may have been influenced by the fact that this literature largely developed in the context of strong institutions, which are expected to “be enforced and minimally stable” (Levitsky and Murillo, 2009), and for which the study of an institutional change per se is understandable.

This paper contributes to this literature by analyzing one path of successive and different institutional changes that directly relates to the framework developed by Mahoney and Thelen (2010) to explain institutional changes that may be abrupt or gradual. This path is one in which gradual policy change prepares the ground for an abrupt policy change, i.e. when gradual changes are pursued prior to abrupt changes to smoothen the shock the latter may provoke (particularly if it is likely to be unpopular) (see Figure 1).
The theory explains why governments sometimes (but not always) smoothen the shock a policy is expected to provoke. Given that change agents in favor of “abrupt policy change” may also be expected to prefer this change to be successful, I suggest that they may be more favorable to a path that first considers gradual policy change that prepares to abrupt policy change for certain types of policy. Indeed, when the abrupt policy change relates to a highly capital-intensive or asset-specific policy sector and is likely to be politicized and unpopular, first adopting gradual policy change that would lessen the possible negative impacts or drawbacks of abrupt policy change is an appealing option for deciders. Contrary to what the literature suggests, I argue that abrupt policy change is not automatically and necessarily the first preference of agents who have the ability to make that change abruptly. Change agents may sometimes prefer to prepare gradually to that abrupt policy change. The extent to which they may (or not) take this path of change depends on two factors: their time horizon and the political cost this preparatory policy change may entail for the (following) abrupt policy change.

I develop the details of my theory in the frame of the privatization of public utilities, but it is not limited to this sector. It encompasses all abrupt policy changes in sectors likely to be politicized.
and unpopular, as well as usually developed over the long term (for instance having specific assets). The privatization of public utilities, a sector that meets these criteria, highlights the importance and contribution of the theory.

1.2. Privatization as a “Critical-Juncture”

Privatization reforms (or their counterpart, nationalization policies) for public services and public utilities can clearly be categorized as abrupt changes: these reforms redefine formally and significantly rules and practices of the sector affected. And, especially in the developing world, the fact that they resulted (at least partly) from the influence of exogenous pressures is largely accepted.

Indeed, the literature on privatization of public utilities in the developing world largely analyzed privatization reforms of public utilities since the 1980s as “critical-juncture” moments. Many studies have compared the pre-privatization period to the post-privatization period; others analyses suggested explanations to why, when and where privatization reforms took place; and some other works have highlighted the importance of the regulatory framework developed at the time of privatization and the regulation dynamics in the post-privatization period (Azpiazu, 2010; Barja et al., 2002; Castro, 2007; Lee and Floris, 2003; McKenzie and Mookherjee, 2003; Murillo, 2009; Post, 2014).

Yet, these three trends of research have neglected one aspect that impacts each of them: the preparatory measures governments may have put in place to smoothen the privatization shock. First, these measures may directly impact the baseline of comparison of the pre-privatization period to the post-privatization one. Second, preparatory measures may be an important dimension to understand the timing of adoption: postponing privatization may entail putting in place gradual changes of the sector to ease privatization. Third, the regulatory framework at the time of
privatization and post-privatization may be influenced by the policies regulating the sector prior to privatization.

1.3. Dealing with the Privatization Shock

Governments that put in place privatization reforms may do so for different reasons; the most common ones mentioned are: ideology and beliefs (arguing that privatization will improve services and efficiency), economic resources expected to be given to the government in the privatization process, and political gains (from the voters or political actors in favor of the policy). Yet, no matter why the governments are privatizing, they certainly prefer the privatization process to succeed as there would be ideological, economic or political prices associated with its failure. This is true both if privatization is reverted and if it is negatively perceived. Privatizing governments have therefore strong incentives to prevent opposition to these reforms. Their best way to do so is to address the potential sources of discontent, by dissociating privatization from unpopular consequences (like higher prices or bad quality of services).

In policy sectors that developed over the long term and are highly visible, guaranteeing that privatization is not associated with unpopular consequences requires putting in place preparatory measures to smoothen the “privatization shock”. The extent to which governments do so depends on two factors: the time horizon of deciders and the political cost entailed by the preparatory measures.

Post (2009) already noted that time horizons of politicians and firms were determinant for the “introduction and successful implementation of revenue or reputation-enhancing measures” in the post-privatization period. This paper argues time horizon is also key in the pre-privatization period, as it may constrain whether measures can be implemented gradually or only abruptly. The time horizon of governments deciding over privatization depends on the political ties between deciders.
Deciders include all veto players of the privatization decision-making process. They typically include the executive members and the majority of the legislative body of the different levels of government deciding over privatization (the levels of government involved in privatization decision-making processes vary from a country to another; see Herrera and Post 2014 about water-services privatizations). The political ties between deciders are institutionalized when interparty competition is stable (at all levels of government involved in the privatization process) and when the parties are strongly institutionalized (stable in time and in their alliances). Under these conditions, privatization deciders have a longer time horizon and may put in place extended and gradual measures to prepare privatization. As detailed hereafter, these long-term preparatory measures also open possibilities for short-term adjusting measures, at the time of privatization, if needed. When non-institutionalized, political ties depend on temporary alliances, they are strong when such alliances are in place and weak otherwise. When (non-institutionalized) ties are strong, time horizon is short (limited to the time corresponding to the mandates of deciders) and only short-term measures may be taken. When ties are weak, time horizon is undefined and therefore preparatory measures are unlikely (see Figure 2).

**Figure 2. Relationships between Political Ties, Time Horizon and Preparatory Measures**

<table>
<thead>
<tr>
<th>Political Ties between Deciders</th>
<th>Time-Horizon</th>
<th>Preparatory Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutionalized (Strong and Stable)</td>
<td>Long</td>
<td>Long-Term</td>
</tr>
<tr>
<td>Not Institutionalized (Strong but Unstable)</td>
<td>Short</td>
<td>Short-Term</td>
</tr>
<tr>
<td>Not Institutionalized (Weak)</td>
<td>Undefined</td>
<td>None</td>
</tr>
</tbody>
</table>
Whereas the political ties between deciders constrain the type of preparatory measures that may be undertaken, the political cost these preparatory measures may entail determines what measures are actually put in place. Indeed, because these measures are preparatory, and not the main goal, deciders would not put in place preparatory measures that are likely to jeopardize privatization itself (which remains the objective). The political cost of these measures is higher when a strong external challenge is jeopardizing privatization and weak otherwise. An external challenge consists in external opposition voiced by non-deciders (which include the population, but also social and political actors not directly involved in the decision-making process) or in an exogenous (unpredictable) change in natural conditions. More specifically, the political non-deciders include the members of opposition parties, and politicians at levels of government that do not have a veto in the decision-making process. The external challenge is considered strong when the opposition of non-deciders or the change in natural conditions is publicly and repeatedly reported. The impact on preparatory measures of a strong external opposition depends on its propensity to jeopardize privatization. When ties between deciders are institutionalized and long-term measures could be taken over time, deciders have a space to manoeuvre closer to the moment of the privatization, which allows them to implement short-term adjusting measures prior to privatization in response to external opposition. The latter is therefore unlikely to impede privatization. When ties between privatization deciders are strong but not institutionalized, a strong external challenge to privatization is likely to jeopardize the whole process: deciders will therefore block the implementation of preparatory measures. Finally, when ties are weak, since no measures are expected to be taken prior to privatization, a strong external opposition does not have a significant impact. Table 1 summarizes the argument.
Table 1. Measures Taken Prior to Privatization to Smoothen Privatization Shock (Summary of Argument)

<table>
<thead>
<tr>
<th>External Challenge</th>
<th>Ties between Privatization Deciders</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Institutionalized</td>
<td>Not Institutionalized but Strong</td>
</tr>
<tr>
<td>Weak</td>
<td>Long-term preparatory measures</td>
<td>Short-term preparatory measures</td>
</tr>
<tr>
<td>Strong</td>
<td>Long-term preparatory &amp; short-term adjusting measures</td>
<td>No measures (prior to privatization)</td>
</tr>
</tbody>
</table>

The argument unfolds through the following hypotheses. Hypotheses 1.1, 1.2 and 1.3 relate to the impact of the institutionalization and strength of ties between privatization deciders on the measures they implement (or not) prior to privatization to lessen the shock that may come along with the process.

**Hypothesis 1.1.** When ties between privatization deciders are institutionalized, (revenue-enhancing and quality-improving) measures to lessen the privatization shock are implemented gradually over various years (more than a mandate), prior to privatization.

**Hypothesis 1.2.** When ties between privatization deciders are strong but not institutionalized, (revenue-enhancing and quality-improving) measures to lessen the privatization shock, if put in place prior to privatization, are implemented over a short period of time (less than a mandate).

**Hypothesis 1.3.** When ties between privatization deciders are weak (and not institutionalized), no measures are implemented prior to privatization to lessen the shock of the process.
Hypotheses 2.1 and 2.2 present the expected impact on pre-privatization measures when the decision-makers are facing an external challenge to the concession.

*Hypothesis 2.1. In a context in which ties between privatization deciders are institutionalized, if the privatization faces an external challenge, short-term adjusting measures are put in place prior to privatization (in addition to long-term revenue-enhancing and quality-benefiting measures).*

*Hypothesis 2.2. In a context in which ties between privatization deciders are strong but not institutionalized and the concession faces an external challenge, no measures are implemented prior to privatization to lessen the shock of the process.*

1.4. Alternative Explanations

The neo-institutionalist literature and the literature on privatization of water services proposed alternative explanations to our research question.

First, the neo-institutionalist literature on gradual change (Mahoney and Thelen, 2010; Hacker, 2004) would suggest that measures resulting in gradual change are put in place when change agents or advocates face constraints or incapacities to pursue abrupt change (as detailed in section 1.2 above). This contrasts directly with our argument.

Second, the literature specifically on Latin American water reforms suggests that different institutional characteristics may impact on the capacity of states to put in place preparatory measures in road toward privatization. Baer (2014) argues that strong state capacity is necessary for reforms of the water sector to take place prior to privatization. Herrera (2017) considers that the decentralization of the management of water services favors short-termism. Her argument therefore suggests that where decentralization reforms took place, preparatory measures put in
place prior to privatization are likely to be short-term ones. Both arguments (of Bauer and Herrera) are consistent with our argument. However, the factors they identify (strength of state capacity and decentralization) cannot explain the within-country variations (between subnational units and across time) in the preparatory measures put in place (or not) prior to privatization.

1.5. Why is the Path Leading to Privatization Important?
One may ask why it is important whether measures were adopted over the long or short term or not adopted at all prior to privatization. At least two important and concrete aspects underline the importance of taking into account the preparatory road toward privatization.

First, one important impact is certainly the redistributive consequences of such measures, which are furthermore somehow hidden when these are put in place over the long term. Indeed, neither the analysis of decisions made at the time of privatization (for instance regarding regulatory choices), nor the comparison of the periods prior and posterior to privatization are likely to take into account the redistributive effects of long-term gradual preparatory measures.

Second, the preparatory path toward privatization also influences directly the political risk and cost of the privatization process, which is a variable likely to influence both whether the privatization reform will be adopted and the sustainability of privatization over time after its enactment. On the one hand, preparatory measures influence the responsiveness of the privatization process prior to its conclusion. If an external challenge jeopardizes privatization prior to privatization, adjusting measures to respond to this challenge can only be adopted where long-term preparatory measures have been taken. The privatization process is therefore more adaptable to changing contexts when the path to privatization included long-term preparatory measures.
On the other hand, the path toward privatization also impacts on the political cost of adopting privatization reforms. This political cost is lower when long-term preparatory measures have paved the way to privatization, to the extent that privatization is not associated with unpopular measures. This political cost is stronger when no preparatory measures were adopted, since in these cases, if unpopular measures are required to reform the sector, they will tend to directly be associated with privatization. Finally, when only short-term preparatory measures have been adopted, the impact on the political cost can be characterized as average: because the preparatory measures were taken a short time before privatization, the population may still associate them with the process (especially if these measures are unpopular and include, for instance, increases of consumers’ rates). Figure 3 illustrates the impact of the preparatory path taken (or not) toward privatization on the political cost and risk of privatization.

**Figure 3. The Impact of the Preparation to Privatization on the Political Cost of Privatization**
2. Framework of Analysis, Methodology, Variables and Data

This paper tests the hypotheses by analyzing the measures adopted by some (but not all) governments prior to the privatization of drinking water and sanitation services (to lessen the “privatization shock”) in Bolivia and Chile. This section details the relevant characteristics of the sector, justifies the case selection and methodology, and presents the variables and data used for the empirical analysis.

2.1. The Potential Shock of Privatizing Water Services

Three main characteristics of the water and sanitation sector make its privatization likely to be unpopular and politicized.

First, water and sanitation services are developed over the long term, are highly capital-intensive and have specific assets. Indeed, this public utility demands high-capital investments, especially to expand the network at first, but also to maintain it over time. Because the supply network is “about two-thirds of the cost of water supply”, it makes it “too costly to duplicate” (Clarke et al., 2009: 329; referring to London Economics, 1998; see also Post, 2009). Privatizations of water and sanitation services that are not auto-financed are therefore likely to come with high increases of consumers’ rates, which may be expected to be unpopular.

Second, water is not only essential to life, it is also “the quintessential massively consumed product, and access to water is generally perceived to be more of a "social" and "basic" service than other utility services” (Savedoff and Spiller, 1999: 6). The UN General Assembly also recognized water and sanitation as a human right in July 2010 and it is largely acknowledged that water and sanitation services have direct effects on health and on the everyday life of citizens. Therefore, short-term changes affecting the access or accessibility of these services are likely to
be unpopular, highly visible and heavily opposed (Herrera, 2011). Simmons (2010) indeed argues that water threat can be associated to a subsistence threat (which is not only material but also a threat to community), which can foster mass mobilization around the issue; and Chng (2010) that there is a “moral economy” of subsistence rights to water upon which mobilization for water can take place.

Third, the privatization of water and sanitation services is likely to be politicized because it is a central issue of partisan divide and governmental intervention. On the partisan side, privatization (more generally) is at the basis of the opposition between right- and left-oriented parties. Besides, the water sector also has the peculiarity of being locally-based, even when it is governed and/ or regulated at other levels of government. Therefore information flows depend on local social networks, and investments in the sector is likely to be politicized between the different levels of government involved (Post, 2014; Herrera and Post, 2014).

The likely politicization and unpopularity of the privatization of water services may potentially be limited if the association of privatization with increases in consumers’ rates and worse quality of drinking water is impeded. Preventing this association is particularly key where services have low consumers’ rates and deficient drinking-water quality monitoring (features that were widespread in Latin American countries in the 1980s). Where privatization takes place through concession contracts (whose cost-effectiveness is critically tied to the preliminary conditions in place), good ways to ease the transition to privatization would therefore be to increase consumers’ rates incrementally and invest in drinking-water quality prior to the privatization process. Investments

---

2 The World Bank and other international organizations promoting the privatization of water and sanitation services, as well as governments, were aware of the risk of popular opposition to privatization (especially with increases of consumers’ rates) as early as in the mid-1980s, and increasing rates prior to privatization was indeed encouraged by
in drinking-water quality include not only investments for primary (microbiological) treatment of water, but also investments in wastewater treatment, treatment of chemicals in the water source (which tends to be expensive) and adequate maintenance of the distribution system (where treated water can be contaminated by non-treated wastewater or the pipes themselves).

2.2. Case Selection and Comparative Analysis

The study focuses on subnational cases from Latin America, a region that has experienced various water reforms in a relatively short period of time (the 1990s and 2000s), and which is the world region that experienced the most privatization of water and sanitation services during this period (Marin, 2009). Comparing within a region allows to control for other factors, such as the fact that similar multinationals may be involved in the countries, and that the same supranational or international organizations are potentially influencing the countries. More specific to this study, common features of Latin American countries in the early 1980s (i.e. years before the privatization wave) included low water consumers’ rates that were “well below the cost-recovery level” favored by private investors. Moreover, little or no control of drinking-water quality was in place (Marin, 2009: 109-112; Andrés et al., 2008; Herrera and Post, 2014: 622-623; Savedoff and Spiller, 1999: 2).

Despite these commonalities, there was also a significant degree of variation across Latin American countries and also within countries over measures adopted prior to privatization. The evolution of water consumers’ rates prior to privatization ranged from a relative statu quo on consumers’ rates to drastic hikes (as high as 80%) of rates in the last year prior to privatization to promoters of privatization, as a way to mitigate this risk (Loftus and McDonald, 2001: 19-20; Valenzuela and Jouravlev, 2007).
gradual but substantial increases in rates over a decade. As for drinking-water quality, there was also a great variety of situations associated with privatization: whereas in a few places issues with drinking-water quality occurred right after privatization, other privatizations have been associated with increasing drinking-water quality.

The subnational cases analyzed in this study are all concession-type privatization of water services that took place in two countries: Bolivia and Chile. Within each country, the time period analyzed for each subnational case goes from the first legislative or executive signal (at the national level) announcing an intention to privatize water and sanitation services up to the year of the concession. Controlling for the type of privatization (concession) is necessary to compare preparatory measures of the same nature: for instance, measures enhancing providers’ revenue are likely to take different forms depending on the type of privatization. Whereas the longitudinal analysis of subnational cases do analyze successful and unsuccessful bidding processes (for concession), cases that were not privatized by concession or not privatized at all are not included in the analysis because we cannot control for the type of privatization and for the intention to privatize (similarly to other cases).

These subnational cases are analyzed in a within-case framework, which by allowing to control for other factors, provides causal inference in small-N studies (Brady and Collier, 2010; Goertz and Mahoney, 2012). This within-case framework also controls for a factor that is key to our study: the political unit responsible for regulation and decision-making in water services. The latter varies from a country to another and even sometimes between subnational units within a same country (Herrera and Post, 2014). In our study, the subnational cases, within each country, are under the responsibility of the same political unit. In Bolivia, public providers of drinking water and sanitation services were decreed to be decentralized municipal companies in 1985 (Supreme
Decree 21021). It was then established that their board (decisive entity) was formed of representatives from the municipal and regional governments. However, as regard to consumers’ rates, it was clearly stated that these still had to be approved by the National Rates Council (*Consejo Nacional de Tarifas* – CONATA) as had been decreed by Hugo Banzer during his dictatorship in 1973 (Supreme Decree 11104). As for drinking-water regulations, they were set nationally but controls over their implementation were limited, since local public services determined to which extent they would implement them. In Chile, although operationalization and daily management of water services were regionalized, regulation and decision-making were centralized at the national level. As for rates specifically, they were decreed by the Ministry of Economy as established in the “Law of Rates” (D.F.L. MOP Nº70/1988), following a “rate-setting” process (*proceso tarifario*) in which the national regulator negotiated with the public or private companies and consulted other actors (including municipalities). As for drinking-water quality regulations, they were developed at the central level through a process led by the *Instituto Nacional de Normalización* (INN) and decreed by the Ministry of Health, which was officially responsible for regulating compliance to drinking-water standards. Starting in 1990, the *Superintendencia de Servicios Sanitarios* (SISS) was in charge of overlooking the self-controls made by water services and realized parallel controls.

Together with these different configurations of decision-making and regulatory actors, each of the two countries studied present different settings of ties between privatization deciders. In Bolivia, these ties were not institutionalized and their strength varied depending on temporary strategic alliances between deciders. In Chile, ties between privatization deciders have been strong for the whole period, but were only institutionalized after the transition (so a few years into the time period analyzed). These variations in ties within each country allow to test hypotheses 1.1, 1.2 and 1.3.
Because concession processes did not take place at the same time, even within a same country, and faced challenges of different levels, the longitudinal analysis of each subnational case allows to test for the impact of external challenges of different strengths (Hypothesis 2.1 and 2.2). We may expect the timing of the concession to have an impact on the emergence of external challenges, in different (not unidirectional) ways, given factors like the proximity of upcoming elections and the order the concessions take place within the country.

Figure 4 shows the classification of the different cases studied according to the variation of independent variables. Table 2 summarizes the nature of variations (between and/or within subnational cases) for each country and specifies the hypotheses tested by the comparison of subnational cases for each country.

**Figure 4. Subnational Cases and Variation of Independent Variables**

<table>
<thead>
<tr>
<th>Political Ties between Deciders</th>
<th>External Challenge</th>
<th>Cases Studied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutionalized</td>
<td>Strong</td>
<td>ESSAT 2001-2003; ESSAM 2001; ESSAR 2001</td>
</tr>
<tr>
<td></td>
<td>Weak</td>
<td>All Chilean regional services 1990-2004 (except the ones above for the years specified)</td>
</tr>
<tr>
<td>Strong (not institutionalized)</td>
<td>Strong</td>
<td>SEMAPA 1998-9</td>
</tr>
<tr>
<td></td>
<td>Weak</td>
<td>SAMAPA 1992-3, 1997; SEMAPA 1993-6, 1997-9; All Chilean regional services 1988-90</td>
</tr>
<tr>
<td>Weak (not institutionalized)</td>
<td>Strong</td>
<td>SAMAPA 1993-7</td>
</tr>
<tr>
<td></td>
<td>Weak</td>
<td>SEMAPA 1996-7</td>
</tr>
</tbody>
</table>
Table 2. Variation Between and Within Subnational Cases and Hypotheses Tested

<table>
<thead>
<tr>
<th>Country</th>
<th>Ties between Deciders</th>
<th>Strength of External Challenge</th>
<th>Hypotheses Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolivia</td>
<td>Not institutionalized but strength varies between and within subnational cases</td>
<td>Varies between and within subnational cases.</td>
<td>1.2 (non-institutionalized strong ties) 1.3 (weak ties) 2.2 (external challenge when strong but not-institutionalized ties)</td>
</tr>
<tr>
<td>Chile</td>
<td>Strong, but institutionalization varied within subnational cases.</td>
<td>Varies between and within subnational cases.</td>
<td>1.1 (institutionalized ties) 1.2 (non-institutionalized strong ties) 2.1 (external challenge when institutionalized ties)</td>
</tr>
</tbody>
</table>

2.3. Dependent Variables: Changes in Consumers’ Rates and Drinking-Water Quality Prior to Privatization

Data availability of both dependent variables is a challenge. Consumers’ rates and drinking-water quality were not compiled nor systematically reported by all public providers or (when existing) regulators prior to privatization. And analyzing only countries (or cases) for which data is systematically available would imply a major selection bias, as this data would most likely have been systematically compiled precisely because of the type of regulatory framework that was in place prior to privatization. Therefore, the methodology chosen is to prioritize systematic quantitative data when available, but also to rely on primary and secondary sources referring to changes or levels of consumer rates and drinking-water quality. Data for consumers’ rates considers water prices in real national devices (i.e. excluding inflation). For drinking-water quality the comparative unit of data is indicators of microbiological and chemical quality and of its controls.

In Bolivia, the report of the Superintendencia General del Sistema de Regulación Sectorial (SIRESE) released in 2004 on the evolution of the water and sanitation sector between 1990 and 2002 includes a table on consumers’ rates which specified that no data was available for average
consumers’ rates by m³ of water for SEMAPA (the Cochabamba provider) for the whole period (1990-2002) and, for La Paz/El Alto, that data was only available starting in 1997 (when the private company *Aguas del Illimani* started to be in charge) (SIRESE, 2004: 46). A proxy used was the prices of water services compiled monthly by the national statistics institute (computed on its own, as part of the consumer price index, starting in 1992). Moreover, a systematic review of all ministerial resolutions and municipal ordinances and resolutions between 1985 and 1999 (1997 for La Paz) was conducted in order to compile all changes in consumers’ rates approved in the period. A systematic review of newspaper articles on the water sector of the ten main Bolivian newspapers between 1992 and 1998³, of reports on water and sanitation services filed in the Public Works, Services and Housing Ministry archives and the virtual library archives of the CEPIS⁴, and university theses (on SEMAPA, SAMAPA and the Bolivian water sector) completed in three main Bolivian universities since 1985⁵, also contributed to the collection of data on consumers’ rates and drinking-water quality in the 1992-1998 period. Over 35 interviews were conducted with governmental officials, representatives of international, foreign and private organizations and academics, in both La Paz and Cochabamba, to inform and complement data collection.

In Chile, data of changes in consumers’ rates have been computed first on the basis of effective consumers’ rates per m³ of water (including fixed charges) in regional capital cities out of the data

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³ Over 8000 newspaper articles were classified under this subject/category for 1992-1998 by the *Centro de Documentación e Información Bolivia* (CEDIB) of the *Universidad Mayor de San Simón* and were reviewed (in paper format). The ten newspapers constituting the CEDIB archives are: *Los Tiempos, Presencia, Hoy, El Deber, Primera Plana, Opinión, La Razón, El Mundo, El Diario* and *Última Hora*.

⁴ CEPIS was the Sanitary Engineering and Environmental Science Center (its acronym comes from its Spanish name: *Centro Panamericano de Ingeniería Sanitaria y Ciencias del Ambiente*) of the Pan American Health Organization and the Regional Office of the World Health Organization.

⁵ *Universidad Mayor de San Andrés, Universidad Católica Boliviana* and *Universidad Mayor de San Simón*.  

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released by the Superintendencia de Servicios Sanitarios (SISS) in its 1995 report (Memoria) and the consumers’ rates journal (Boletín de Tarifas) released every month from September 2000 to 2005. Data on consumers’ rates per m$^3$ of water was unfortunately not available by year (nor less so by month) between December 1995 and September 2000. To compensate for this gap, and also to document consumers’ rates between 1990 and 1995, data from a proxy was compiled: changes in average consumers’ rates, which corresponds to average exploitation revenues per billed m$^3$. This data has been computed from data of SISS’ 1992, 1990-1993, 1995, 2000 reports (Memorias) and SISS’ annual management reports (Informes de gestión) from 1997 to 2005. Chilean data on drinking-water quality also came from SISS’ documentation, specifically the annual reports of drinking-water quality in urban services for years 1991-2004 and the monthly drinking-water quality journals (Boletín de Calidad de Agua potable) from 2000 on. Over 15 interviews were also conducted with governmental officials and representatives from different ministers and agencies, as well as with representatives of water providers and private organizations, to better inform data collection.

2.4. Main Independent Variables and Process-Tracing Analysis

The argument has two main independent variables: the political ties between privatization deciders and the strength of the external challenge jeopardizing the privatization process.

On one hand, political ties between privatization deciders consist in political alliances and relationships tying veto players (from all levels of government) of the decision-making process for the privatization of water services. These ties can be characterized as institutionalized (strong and stable), strong but not institutionalized (unstable) or weak (not institutionalized). Their institutionalization is based on two dimensions: the stability of interparty competition (or weakness of political opposition) and the institutionalization of the political parties (stable in time and in
in democratic settings, results of elections are considered to assess the stability of
the interparty competition and of parties over time. Sources of data include governmental
publications on electoral data, the Political Database of the Americas (2010) and Murillo et al.
(2010). In non-democratic settings, in the absence of elections, the interparty competition is
assessed on the basis of the opposition encountered by the dictatorial government: ties are
considered institutionalized if political opposition is not likely to turn down the dictatorial
government. For non-institutionalized ties, their strength is established on the basis of the alliances
between deciders at each moment in time: when deciders are from the same party, coalition or
political group, these are strong; otherwise they are weak. The strength of non-institutionalized
ties is particularly dynamic over time.

On the other hand, an external challenge consists in external opposition voiced by non-deciders
(which include the population, but also social and political actors not directly involved in the
decision-making process) or in an exogenous (unpredictable) change in natural conditions. It is
characterized as strong when the opposition of non-deciders or the change in natural conditions is
publicly and repeatedly reported. It is weak when there is no external challenge repeatedly reported
in the public arena or when the public opposition is coming from actors tied politically to the
deciders (in which case they may be controlled internally). The external challenges jeopardizing
the concessions are assessed through the primary and secondary sources documenting the decision-
making process and the different positions of actors.

The in-depth process-tracing analyses for Bolivian and Chilean cases included an extensive
compilation of various archival documents and interviews. For Bolivia, the following sources were
systematically reviewed: all ministerial resolutions and municipal ordinances and resolutions
between 1992 and 1999 (1997 for La Paz) related to the privatization process of drinking water
services, all articles related to the process of water services privatization of the ten main Bolivian newspapers between 1992 and 1998, published written accounts of the water war in Cochabamba by four actors (three members of the Coordinadora from different political allegiances, and one informed outsider), and the Coordinadora’s archives of the Cochabamba water war (1999-2000). Over 35 interviews with actors from different perspectives and roles in the privatization decision-making process were also conducted.


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6 These were selected from the review of the thematic press archives for CEDIB (see note 3 for details).

7 Omar Fernández (leader of the Federación Departamental de Cochabamba de Organizaciones de Regantes/FEDECOR, member of the Coordinadora, later senator for the MAS), Gonzalo Maldonado Rojas (representative of the Comité de Defensa del Agua y la Economía Familiar, member of the Coordinadora, later member of de Lozada’s government), Oscar Olivera (executive of the Federación de Fabriles, main speaker of the Coordinadora, later refused to be part of Morales’ government) and Roberto Vera Varela (Cochabamba native retired engineer, documenting and publishing on the Misicuni water project and other water issues in Cochabamba since 1987).

Over 15 interviews were also conducted with governmental officials and representatives, as well as with representatives of water providers and private organizations.

3. Bolivia: Concessions of SAMAPA (La Paz/El Alto) and SEMAPA (Cochabamba)

Neoliberal policies were adopted by Bolivian politicians starting in 1985, as a response to the economic crisis that was ongoing. In 1985, through Supreme Decree 21060, the *Nueva Política Económica* was enacted, but: “While privatization of state-run enterprises was a fundamental pillar of this policy, despite pressure from the World Bank and the IMF, Paz Estensorro [the Bolivian president from 1985 to 1989] did not initiate privatization during his administration” (Kohl, 2004: 896). Laws allowing the privatization of state-owned enterprises were adopted in the early 1990s: the *Ley de Privatización* in 1992 (when Jaime Paz Zamora was president), and the *Ley de Capitalización* in 1994 (when Gonzalo Sánchez de Lozada was president). The road toward privatization was embarked on with these laws and clearly accelerated starting in 1993, with the election of De Lozada as president. This road lead to the concessions of water and sanitation services in three of the main Bolivian cities: in La Paz and El Alto in 1997 (together in the same concession contract) and in Cochabamba in 1999. In Cochabamba, there have been three calls for bids (in 1996, 1998 and 1999) before the concession could be concreted and it finally lasted only a few months, as it was reverted following the emblematic Cochabamba Water War that took place in the first months of year 2000 (Salinas Gamarra *et al.*, 2007; de Gouvello and Fournier, 2002).

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3.1. The Setting: Non-institutionalized Ties between Privatization Deciders

Bolivia had its democratic transition in 1982. Starting in 1985, presidents elected governed with “pacted democracy” coalitions that were negotiated after each election to support the elected presidency, depending on vote shares. Coalitions were not based on programmatic alliances, but rather on practical ones.

Between 1985 to 2002, three traditional parties (the Movimiento Nacional Revolucionario – MNR, the Movimiento de Izquierda Revolucionaria – MIR and the Acción Democrática Nacionalista – ADN) alternated the presidency. From 1989 to 1993, Jaime Paz Zamora, from the MIR party, was president, thanks to a post-election coalition with ADN and parliamentary support from Conciencia de Patria (CONDEPA). From 1993 to 1997, a MNR president, Gonzalo Sánchez de Lozada, governed a coalition of the MNR with two smaller parties, the Movimiento Revolucionario Tupac Katari (MRTK) and the Movimiento Bolivia Libre (MBL), a “MIR spin-off.” The president had been elected with 33% of the votes. From 1997 to 2002, Hugo Bánzer from the ADN party was elected president with 22% of the votes, and supported by a coalition of the MIR, the Unión Cívica Solidaridad (UCS), Partido Demócrata Cristiano (PDC), CONDEPA, and the Nueva Fuerza Republicana (NFR) (Political Database of the Americas, 2010).

The party system was weakly institutionalized both in terms of party themselves and coalitions. Indeed, coalitions were negotiated essentially after elections, on the basis of who was elected president, after different presidential candidates from the to-be coalition had ran one against the other (Cyr, 2007). Interparty competition was relatively unstable, as shown in Table 3. Overall, given the instability of coalitions and vote shares at the national level, politicians from different parties were not institutionally tied to one another (Lazarte, 1991; Mayorga, 2003; 2005).
Table 3. Presidential Vote Share by Candidate of Party in Bolivia, 1989-1997

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MNR</td>
<td>25.6%</td>
<td>35.6%</td>
<td>18.2%</td>
</tr>
<tr>
<td>ADN</td>
<td>25.2%</td>
<td>21.1%</td>
<td>22.2%</td>
</tr>
<tr>
<td>MIR</td>
<td>21.8%</td>
<td>21.1%</td>
<td>16.8%</td>
</tr>
<tr>
<td>CONDEPA</td>
<td>12.2%</td>
<td>14.3%</td>
<td>16.8%</td>
</tr>
<tr>
<td>IU</td>
<td>-</td>
<td>8.0%</td>
<td>-</td>
</tr>
<tr>
<td>MBL</td>
<td>-</td>
<td>-</td>
<td>5.4%</td>
</tr>
<tr>
<td>UCS</td>
<td>-</td>
<td>13.8%</td>
<td>16.1%</td>
</tr>
</tbody>
</table>

*The ADN and MIR allied to form the Acuerdo Patriótico (AP) in the 1993 election.
Source: Murillo et al., 2010
Note: The results reported include only parties that received at least 5% of the vote.

As for the municipal level, elections took place in 1991, 1993, 1995 and 1999, and were of course key in determining who would be the local actors in power at a time when the privatization of water and sanitation services was on the agenda. The rules of municipal elections changed during this period. Up to 1994, the mayor was elected indirectly, by the councilmembers. In 1994, the Ley de Participación Popular and the reform of the constitution established new rules of the game: an absolute majority of popular votes guaranteed the party candidate to be mayor; if there wasn’t an absolute majority, the mayor was elected by the councilmembers (Velasco Aguilar et al., 2012; Pérez Mandieta, 2015).

In La Paz, because of the frequency of municipal elections, and the uprising of the CONDEPA party (in opposition to traditional parties) in the early 1990s, interparty competition was very unstable. Moreover, because of the electoral system, mayors could even be contested between elections by the councilmembers, as occurred in early 1997. Ronald MacLean was mayor by 1991 but lost the election to Julio Mantilla (from CONDEPA). Mantilla was mayor until 1993; but left (or was expelled from, depending on the perspective) CONDEPA in 1993, and then turned to the MNR party. As the MNR candidate in 1993, he lost to Mónica Medina de Palenque (from CONDEPA), who became mayor until 1995. Although she obtained more votes in the 1995 election than her main opponent Ronald MacLean (from ADN), the latter became mayor as a result
of his supports among the city council. But in early 1997, he lost supports in the council, and Gabriela Candia, from the MNR party, became mayor in early 1997. Gabriela Candia was not only from the same party than the president; she was also the sister of Fernando Candia, a trustworthy man of the president (and Finance Minister). Overall, during two time periods the national government had strong ties with the mayor of La Paz: between 1991 and 1993 (until the change of president), when the mayor was from a party supporting the president (and the AP alliance also supported CONDEPA’s mayor), and in 1997, when Gabriela Candia was mayor (Romero Ballivián, 1997; Velasco Aguilar et al., 2012; CEDIB, 1997).

In Cochabamba, after a competitive election in 1991, a municipal crisis irrupted in 1992, but the 1993, 1995 and 1999 elections were marked by stable interparty competition (and a winner with clear absolute majorities). Manfred Reyes Villa was elected mayor in 1993. He was already in power since early 1993: after the 1992 municipal crisis in Cochabamba (during which three mayors succeeded themselves), he was chosen to be mayor by the council, as he called the city councilmembers to leave their party affiliation aside. In 1992-1993 he left his party (ADN) and was the candidate for the MBL party in the 1993 and 1995 elections, which he won clearly. By 1995 he created a new party (*Nueva Fuerza Republicana* – NFR), to open possibilities of alliances with other parties; and to pursue his own political ambitions. He won the 1999 election as a NFR candidate, and his majority was so high that he did not need any ally (7 out of 11 councilmembers were from NFR). We therefore identify three periods of strong political ties between the national government and Cochabamba mayor: in 1992 (when Fernando Rivas from the UCS was supported by the ADN-MIR alliance of the Paz Zamora president and when Manfred Reyes Villa then affiliated with ADN became mayor), between 1993 and early 1996 (when Reyes Villa was affiliated with MBL, which supported the MNR president de Lozada, and when his newly created
party NFR had not yet allied with the ADN for the 1997 election), and from August 1997 to early 1999 (when the ADN president Hugo Bánzer took power, with support of Reyes Villa’s NFR party, and before the 1999 municipal electoral campaign, during which both were competitors) (Romero Ballivián, 1997; Velasco Aguilar et al., 2012; Achi Chritèle and Delgado, 2007: 153; CEDIB, 1997).

3.2. Changes in Consumers’ Rates Prior to the SAMAPA Concession

In La Paz/ El Alto, consumers’ rates of drinking water have significantly been increased over the 1980s and 1990s, prior to the concession of SAMAPA (which took place in July 1997). These increases can be classified in three types: first, the ones adopted in reaction to inflation and debt crises (which were, for the most part, adopted for all departmental capital cities and not only those where services were privatized); second, the ones required to obtain the 1990 World Bank loan; third, the increases adopted on the road to the privatization of SAMAPA.

First, increases implemented in response to high inflation, increase of wages and increase of debt services were frequent in the second half of the 1980s. In 1985, increases of consumers’ rates in La Paz (like those of water services of other departmental capital cities) were approved by the

Table 4. Presidents’ coalitions and Mayors’ Parties in La Paz and Cochabamba, 1990-1999

<table>
<thead>
<tr>
<th>Year</th>
<th>President coalition</th>
<th>La Paz Mayor</th>
<th>Cochabamba Mayor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>Jaime Paz Zamora (MIR, ADN, CONDEPA)</td>
<td>Ronald MacLean (ADN-MIR)</td>
<td>Germán Carmona (UCS)</td>
</tr>
<tr>
<td>1991</td>
<td></td>
<td>Humberto Coronel Rivas (ADN)</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td></td>
<td>Gerónimo Carmona (UCS)</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td></td>
<td>Fernando Rivas (UCS) (MIR-ADN)</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td></td>
<td>Manfred Reyes Villa (ADN)</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>Gonzalo Sánchez de Lozada (MNR, MRTK, MBL)</td>
<td>Mónica Medina (CONDEPA)</td>
<td>Manfred Reyes Villa (MBL)</td>
</tr>
<tr>
<td>1995</td>
<td></td>
<td>Ronald MacLean (ADN)</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td></td>
<td>Gabriela Candia (MNR)</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>Hugo Bánzer (ADN, MIR, UCS, PDC, CONDEPA, NFR)</td>
<td>…</td>
<td>Manfred Reyes Villa (NFR)</td>
</tr>
<tr>
<td>1999</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Own elaboration with information collected from various sources: Romero Ballivián et al., 1998a; 1998b; Velasco Aguilar et al., 2012; Pérez Mandieta, 2015; Achi Chritèle and Delgado, 2007: 153.
Minister of Urbanism and Housing (Ministro de Urbanismo y Vivienda) on the basis of the economic crisis that Bolivia was going through (inflationary crisis, increases of wages and increasing debt services) (Resolutions 039/85, 040/85, 125/85, 136/85, 137/85, 168/85 and 227/85). Between 1986 and 1990 other increases of SAMAPA’s consumers rates were also approved for motives of inflation and debt service (to the Inter-American Development Bank) by the Minister of Urbanism and Housing (Resolution 050/87), La Paz Municipality (Ordinance 15/86), and the Minister of Urban Affairs (Ministro de Asuntos Urbanos, resolutions 17/89).

Second, increases of consumers’ rates in La Paz were also required by the World Bank for Bolivia to obtain loan 2187-BO to rehabilitate water and sanitation services of its three metropolitan areas (La Paz, Cochabamba and Santa Cruz). A World Bank report specified that in order to negotiate the loan it was required that SAMAPA increased its tariffs by 29%, which was done through Ministerial Resolution 198/90 in April 1990 (World Bank, 1998: 5). Additionally, the World Bank reported that “[as] a condition for negotiating the Credit (in February 1990) IDA [the International Development Association] requested that a financial policy be established for the basic sanitation sector” (World Bank, 1998: 25). To comply with this requirement, a new consumers’ rates policy for metropolitan areas stating clearly that rates had to reflect “the real cost of water” was ratified by a resolution of the Minister of Urban Affairs (Resolution 120/90, in February) and by Supreme Decree 22627 (on October 24, 1990). Following these ratifications, the Minister of Urban Affairs approved increases of consumers’ rates that were differentiated for each departmental capital city (Resolution 070/91 in March 1991) and automatic indexation of water prices to the US dollar value (Resolution 177/91 in May 1991). In the meantime, on October 5, 1990, the municipal council of La Paz considered modifying SAMAPA’s board in order to exclude the national government from it, and to require all rates’ changes to be approved by the Municipality Council (Ordinance 73/90).
However, this ordinance later entered a process of “reconsideration”, and never took force. This suggests that there was disagreement with the national government on consumers’ rates, at a time when La Paz mayor (Ronald MacLean) was from the same coalition than the president (ADN-MIR) (Prada et al., 1995; Machicado Terán, 1997; Villegas López, 1998; Vargas Vucsanovich, 1994).

Third, from 1992 until the privatization of SAMAPA, increases of water prices took place, as shown by the real water prices in La Paz/ El Alto between 1992 and 1996 (see Graph 1; Candia Aliaga, 2002; CEDIB, 1997). Additionally to adjustments resulting from the indexation to the US dollar, four significant hikes took place, as illustrated by Graph 2 and explained in details hereafter.

**Graph 1. Real Water Prices in La Paz/ El Alto for 10 m³, 1992-1998**

Sources: Monthly average prices for 10 m³ of water for La Paz/ El Alto, Bolivian national statistics institute (Instituto Nacional de Estadísticas – INE). Data on water prices started to be compiled on its own in 1992.
Graph 2. Cumulative Changes of Real Water Prices for $10 \text{ m}^3$ in La Paz/ El Alto and of Bolivianos US Exchange Rate (in Percentage, since January 1992)

Sources: Percentages are computed from data of the INE (water prices in La Paz/ El Alto) and the Central Bank of Bolivia (US-BOL exchange rate).

As evidenced in Graph 1: two hikes of 22% and 26%\(^9\) took place, respectively, between May and July 1992 (right after the Law of Privatization was enacted on April 24, 1992, by the president Paz Zamora) and between January and March 1993 (following the adoption of a new regulation for water services by Ministerial Resolution 510/92 in October 1992). At that time, Julio Mantilla (from the CONDEPA party that supported the president) was mayor of La Paz and was involved in the approbation of these hikes, as the president of SAMAPA. There was no political conflict reported in the newspapers about these hikes (CEDIB, 1992; 1993), suggesting that when ties between the mayor and the president were strong, hikes were adopted smoothly.

Another rates increase, out of the indexation-to-the-US-dollar pattern, took place between August and October 1994, following the enactment of the Ley de Capitalización on March 21, 1994.

\(^9\) According to data from the INE on monthly average prices of water for $10 \text{ m}^3$. 

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However it was of 11%, therefore much smaller (half) than the previous ones. This was the result of a compromise between the mayor and national government that were not strongly tied. Indeed, in 1994 the mayor of La Paz was Monica Medina de Palenque, from CONDEPA, a party that was not supporting the president elected in 1993 (Sánchez de Lozada). After the resignation of SAMAPA’s general manager at the beginning of 1994 both authorities openly disagreed on the nomination of a new one for months (between March and July 1994). Diverging views on the “necessity” for SAMAPA to increase consumers’ rates were also expressed publicly in April 1994 by the interim general manager (saying there was no need for any increase) and the marketing manager. In July 1994 the interim general manager was finally confirmed in its position until the end of 1994, a compromise was apparently made between the national government and the Municipality about the management of SAMAPA, and its consumers’ rates, which were increased precisely the following month, but only of 11% (CEDIB, 1994). They were not further increased after October 1994 (besides the indexation to the US dollar) until April 1997 (see Graph 2). Between October 1994 and early 1997 Monica Medina and then Ronald MacLean (ADN) were mayors of La Paz, both from parties not supporting the MNR president (Sánchez de Lozada). These weak ties between the mayor and the president apparently discouraged the increase of consumers’ rates.

The increase of SAMAPA consumers’ rates between April and October 1997 (as shown in Graph 1) distinguished itself from other increases, given its approval process was delayed and contested over various months. Approved by SAMAPA’s board on October 7th, 1996 (Resolution 44/96) and the national government the same month (to be implemented in December 1996), this increase was not approved by La Paz Municipality until April 29th, 1997 (Resolution 32/97). Although it was first intended to be retroactively applied to March bills, its implementation was finally delayed
(Laurie and Crespo, 2007: 247; CEDIB, 1997). It was reported in newspapers that Ronald MacLean, who was destitute on January 6th, 1997 by his own coalition, was responsible for postponing the implementation of the increase. Once Gabriela Candia (from the ADN party, like the president) became mayor, the council approved the rates’ increase and intended to implement it retroactively to March but the retroactivity was contested legally by Guido Riveros (deputy of the MIR party, not part of the coalition of the president), who won his case. The increase was finally implemented but not retroactively (starting in April 1997). An interviewee involved in the privatization process of SAMAPA described: “there was support from La Paz mayor, who was then presiding SAMAPA’s board of directors. There was sufficient support from her. […] In the case of SAMAPA [where there was no opposition from the mayor, contrary to the case of SEMAPA], [consumers’ rates] were increased prior [to the concession]” (author’s translation, see Appendix 2). The mayor of El Alto, Alberto Jiménez, from CONDEPA, along with various local organizations, largely opposed the rates’ increase, which was also implemented in El Alto (although the municipality of El Alto had no control over SAMAPA)10. It made no doubt that the rates increase was associated with the concession process, as mentioned by different political and social actors publicly, like the president of the Citizen Committee Pro La Paz: “The president of the Comité Cívico pro La Paz, Jorge Nemer, pointed out that the aim of the new pricing regime was that SAMAPA be transferred to private owners with better profitability. This process is therefore more beneficial to private interests than to the peoples” (Última Hora, 1997; author’s translation). According to various national newspapers articles, a 1997 World Bank report would

10 SAMAPA provided water to La Paz and El Alto, but the Municipality of El Alto had no representative in SAMAPA’s board, as the latter was created when El Alto was part of the municipality of La Paz, and not changed when El Alto was created as an independent municipality (in 1985).
indeed state that Gabriela Candia had compromised to implement the rates’ increase prior to the concession of SAMAPA (to a World Bank mission visiting Bolivia in April) (CEDIB, 1997; 1998). SAMAPA’s concession was adjudicated to Aguas del Illimani in the last days of July 1997, about 10 days before the new elected president Hugo Bánzer took power (who did so on August 6). An interviewee involved in the privatization process described the pressure there was within the team to conclude by the end of de Lozada’s mandate, and that the process was adapted to this calendar: “We had considered the possibility of having a law for the water sector prior to the concession, but we had to manage with the secondary legal framework because there was no time to adopt a law. The capitalization process was coming to an end, the government would change in August 1997, […] and the mandate of the [Capitalization] Ministry was also coming to an end” (author’s translation, see Appendix 2).

In sum, the consumers’ rates were increased in road toward the privatization of SAMAPA when the municipal government of La Paz (and especially its mayor) was strongly tied politically to the national government.

3.3. Changes in Consumers’ Rates Prior to the SEMAPA Concession

Like for La Paz/ El Alto, drinking-water consumers’ rates in Cochabamba increased significantly at different moments prior to the concession. These increases resulted from four main forces: 1) inflation and rationalization, 2) foreign loans requirements, and 3) the preparation for privatization. First, in 1985, like for other departmental capital cities, ministerial resolutions of the Urbanism and Housing Minister approved increases for SEMAPA, given the inflationary crisis and constant increases of wages (Resolutions 040/1985, 110/85, 125/85, 168/85 and 227/85). SEMAPA, who was under the supervision of the Urbanism Minister in 1986, had also the rationalization of its
consumers’ rates approved in 1986 and 1988 (Resolutions 168/86, 1/88). An increase due to inflation was also approved in 1991 (Resolution 048/91).

Second, in the early 1990s, increases of SEMAPA consumers’ rates were also required for negotiating foreign loans. As detailed for the case of SAMAPA, the negotiation of loan 2187-BO of the World Bank also required an increase of consumers’ rates of SEMAPA by 25% (that was ratified by Ministerial Resolution 197/90 in April 1990) and the adoption of a financial policy defining that rates would reflect “the real cost of water” (which was done by Ministerial Resolution 120/90 and Supreme Decree 22627; see World Bank, 1998: 5, 25). This policy was followed by an increase of consumers’ rates in March 1991 (Ministerial Resolution 070/91) and an automatic indexation of water prices to the US dollar value starting in May 1991 (Resolution 177/91) (Prada et al., 1995; Vargas Vucsanovich, 1994). Moreover, in 1992, an additional increase of SEMAPA consumers’ rates took place (out of the trend of the indexation to the US dollar value). It was implemented between May and August 1992, in order for SEMAPA to “become creditworthy” (Resolution 273/92; author’s translation). It was ratified a few weeks after Fernando Rivas became the interim Cochabamba mayor in the midst of the municipal council crisis (Municipal Resolution 933 of June 9, 1992). Newspapers did not report any political or popular contestation or opposition to this increase (CEDIB, 1992). An ex-manager of SEMAPA stated that these increases were not approved to prepare the privatization of SEMAPA, which was not discussed locally before mid-1993 (Interview with ex-manager of SEMAPA).

Third, between 1994 and 1999, as SEMAPA had embarked on the road toward its privatization, consumers’ rates increased significantly at different specific moments, additionally to the clear trend of incremental increases relatively aligned with the indexation to the US dollar which,
according to the general manager of SEMAPA during this period, was applied every three months (Interview with Roberto Prada; CEDIB, 1993; 1994; see Graphs 3 and 4).

**Graph 3. Real Monthly Water Prices in Cochabamba, 1992-1999**

![Graph 3](image)


**Graph 4. Cumulative Changes of Real Monthly Water Prices in Cochabamba and of Bolivianos US Exchange Rate (in Percentage, since January 1992)**

![Graph 4](image)

Sources: Percentages are computed from data of the INE (water prices in Cochabamba) and the Central Bank of Bolivia (US-BOL Exchange Rate).
Between the 1992 hike and the 1994 one, consumers’ rates were increased incrementally, following the indexation to the US dollar. Interestingly, however, there was an intent to increase rates during this period that was initially blocked, later conditionally approved (but delayed) by the municipal council, and finally put in effect by the national government in March 1994. SEMAPA asked the municipal council to approve increases in March-April 1993, which it rejected until July (after De Lozada was elected president). At the end of August, the council approved the request of SEMAPA for an increase (about half of the one originally requested), but made it conditional on the popular acceptance of it; different councilmembers publicly stated that they did not want to take only upon themselves this important responsibility. Social organizations rejected the increase, which finally was not formally approved by the municipal council, although SEMAPA’s general manager declared to the press the increase could have taken place easily as the national government was supporting it and had also the jurisdiction to approve it (CEDIB, 1993).

In March 1994, the rates were finally increased, with formal approval of the national government. The city council did not then protest nor oppose publicly the decision of increasing rates of the national government, suggesting agreement (CEDIB, 1994). The varying position of the municipal council regarding this increase can be associated with the variation of the composition of the national government and the municipal council and, therefore, the ties between them. With the 1993 general election (held in early June), the MNR candidate Gonzalo Sánchez de Lozada became president, supported by the MBL and MRTK. In parallel to this, Manfred Reyes Villa left the ADN party and became a MBL mayor candidate for municipal elections (held in early December), which he won with a strong majority. The divided municipal council was replaced by one in which 8 out of 12 councilmembers were from the MBL party, a party that was part of the president’s coalition.
As local and national authorities were strongly tied, increases of consumers’ rates were not contested nor publicly opposed by authorities and, after the increase in early 1994, others followed in 1995 and 1996 (see Graphs 3 and 4). The mayor, who was also the president of SEMAPA, and therefore part of SEMAPA’s board of directors that approved all of these increases, defended the 1996 increase when complaints from the population and the Federación Departamental de Juntas Vecinales were raised in March 1996. Local and national authorities were then working together, to increase consumers’ rates and prepare the concession of SEMAPA (CEDIB, 1994; 1995; 1996; Maldonado Rojas, 2004: 57-59). According to one of SEMAPA’s general manager in the 1990s, it was clear that SEMAPA was then embarked on the road toward privatization: “at that moment [in 1993-1994] privatizing views appeared” (author’s translation, see Appendix 2).

These regular increases of consumers’ rates since 1994 stopped around mid-1996. From then until the first concession process of SEMAPA (that was expected to be concluded by August 6, 1997, prior to the change of president, in parallel to the SAMAPA concession), there was no further increases of consumers’ rates, nor indexation to the US dollar value (see Graphs 3 and 4). According to an IDB memo, the 1996 increase “was implemented to allow the company to cover its operating and maintenance costs and full depreciation of its fixed assets” (IADB, 1996: 24). Yet, consumers’ rates had to be further increased for the privatization process to proceed. An interviewee involved in the first bidding process of SEMAPA mentioned: “we considered increasing consumers’ rates prior to the concession, but there was then opposition from the mayor” (author’s translation, see Appendix 2). While the mayor was opposing the increase of consumers’ rates it was also evident that the national and municipal governments were disagreeing about SEMAPA’s concession process. This conflict was publicly evidenced when the national government (in May 1996) modified the composition of SEMAPA’s board (in May 1996) by
removing the mayor from the presidency and lowering the relative power of Cochabamba’s municipality (Supreme Decree 24298), and when the president of the municipal council publicly stated that the council had to see the details of the contract to approve it (in July 1996) (CEDIB, 1996). From then on until the end of the mandate of de Lozada, the president de Lozada and the mayor Reyes Villa have openly disagreed regarding SEMAPA’s future (including on SEMAPA’s board composition). Negotiations and discussions took place between both levels of government, but were not successful to reach and implement a common agreement\(^\text{11}\). The mayor lead the opposition to the national government’s (excluding) privatization process and appealed on the grounds of the unconstitutionality to the modification of SEMAPA’s board and of the invalidity of the international public bidding call for the capitalization of SEMAPA (CEDIB, 1996; 1997; Interview with Claudia Vargas). ADN deputy Tito Hoz de Vila took side with Cochabamba’s mayor, a position that confirmed that the broken alliance between the newly-created NFR and the party of the president (MNR) was determinant of the new trend of policies regarding consumers’ rates and the privatization of SEMAPA. This new trend included a concession contract that considered increasing consumers’ rates after the concession (CEDIB, 1996; 1997). The broken alliance was evidenced again on de Lozada’s last days as president, as he modified again SEMAPA’s board not designating Cochabamba’s mayor as the president and reaffirming that the Superintendencia was in charge of the bidding process (Supreme Decree 24767, July 31, 1997). By then, the 1997 bidding call for the privatization of SEMAPA had finally been suspended, but

\(^{11}\) An agreement was reported to have been reached in mid-March 1997 but one week after the mayor was complaining that the national government was not taking action: “The behavior of the central government is miserable. The honour commitments made are useless.” The national government replied saying they would take action, but postponed doing so and finally did not (quote from Los Tiempos, 1997, author’s translation; CEDIB, 1997).
not cancelled (concluding the bidding process within four months, with the new elected president, was publicly presented as a possibility) (CEDIB, 1997).

Small increases of consumers’ rates (corresponding approximately to adjustment of the indexation to the US dollar value of the past year) occurred between September and November 1997, little after the new ADN president (Hugo Bánzer) took power and changed the SEMAPA board back to its original composition, with Cochabamba’s mayor as its president (Supreme Decree 24828). The relationships between the Cochabamba mayor and the president were then relatively good (Oporto Castro, 2007: 22-23) and small increases (less than 3% in total) also took place during the first months of 1998 (see Graph 3). In November 1997, the Superintendent of Waters (Superintendente de Aguas) stated that SEMAPA’s consumers’ rates were not covering administrative, operational and maintenance costs, implying increases would be required for privatization (CEDIB, 1997). But these increases were not implemented right away. A few weeks later, the Superintendent stated that the privatization process encountered another pitfall: severe shortage of water supplies was expected for 1998. It was confirmed a few months later that low rains limited drastically sources of water of SEMAPA for 1998. Rationing measures were implemented starting in mid-March 1998. Nevertheless, in July shortage of water was already very severe (still months away from the rain season). Although some residents were billed despite not receiving water, this sustainable water shortage resulted in monthly average water prices in Cochabamba going down, as shown in Graph 3 (CEDIB, 1997; 1998). As this water crisis unfolded, opposition from irrigators to water policies organized itself and became increasingly important, including a massive demonstration in

12 Additionally, there were strong opposition to the perforation of deep and semi-deep wells in regions around of Cochabamba, complicating seriously the provision of water for SEMAPA. Water sources of SEMAPA and scarcity of water is a recurrent issue in Cochabamba’s history (see Hines, 2016).
August 1998 of 20,000 of them (Fernández, 2004). The second bidding call for the concession of SEMAPA (in 1998) was unsuccessful.

From then on, the national and municipal governments negotiated the conditions of the concession: the main point left to agree on (in July 1998) was water prices. The national government suggested an increase of 20% of rates prior to the concession to be implemented before the end of 1998. The public position of the mayor (reported in national newspapers) was ambivalent: first disagreeing (in July), then agreeing (in August), then disagreeing (in November, as the proposal was first rejected by SEMAPA’s board), then finally agreeing for the measure to be implemented by January 1999 (CEDIB, 1998). Finally, the measure was not implemented prior to the concession. It was agreed that rates would be increased by 35% at the time of concession (on January 1st, 2000)\(^{13}\), and by 20% after 1 or 2 years (Vera Varela, 2001; García Orellana et al., 2003). Essentially, the local and national governments authorized this increase, but decided not to proceed with it themselves, prior to privatization. As an interviewee who participated in the Water War reported: “In December the bills were sent. The municipal elections were over. This had also been politically very well planned” (author’s translation, see Appendix 2). By 1999 the ties between the mayor’s party (NFR) and the president’s party (ADN) were weaker than in 1997, since they were opponents in the 1999 Cochabamba municipal election and since the “megacoalition” of the president was more fragmented (Lozada Pereira and Saavedra Mogro, 1998). Moreover, from September 1998 on, the increases of rates and the concession were increasingly encountering opposition of local organizations in Cochabamba, which organized various protests; this opposition movement

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\(^{13}\) The level of the hike varied according to household category and consumption, from values between 10-17% and 106-120%, and even higher according to some social actors (Maldonado Rojas, 2004; Mélançon, 2005; Aguas del Tunari S.A., 2000; Oporto Castro, 2007; Olivera, 2004).

3.4. Changes in Drinking-Water Quality Prior to SAMAPA and SEMAPA Concessions

Across Bolivia in the 1980s and 1990s drinking-water quality remained self-controlled by water providers, and there were no obligations nor regulations about the methods and frequency of the control of drinking-water quality (Prada et al., 1995; Oficina Internacional del Agua, 1999; LRCCA, 1984). Unsurprisingly, there are therefore little data on drinking-water quality for this time period.

In 1979 SAMAPA was the only water service with SAGUAPAC (in Santa Cruz) to control the quality of water in Bolivia (PAHO/WHO and World Bank, 1979, quoted by LRCCA, 1984: 2). Nevertheless, the Programa de Control de la Calidad del Agua, Proyecto Etapa Inicial de La Paz implemented in 1985-1987 found bacteriological contamination in sampling points of the Achachicala and Pampahasi systems, and chemical contamination (of manganese) in sampling points of the Achachicala system (IIS, 1987; Villalba Asebey, 2006; Quiroga et al., 1999). The turbidity of the water and the high-cost treatment that had to be applied to water in the Achachicala treatment plant lead many to still consider drinking-water quality an issue in the early and mid-1990s, despite a 1994 study of ANESAPA and SAMAPA itself arguing SAMAPA waters were of good quality in 1994 (CEDIB, 1994; PAHO-Bolivia, 1989). A report from the Controlaría General de la República of 1996 concluded that the waters of the Achachicala treatment plant did not reach drinking-water standards, especially given the risk of (re)contamination in the distributive network. This risk of recontamination of drinking water in the network was indeed said by two interviewees who actively participated in SAMAPA’s concession to be the biggest challenge in La Paz, given the sewage system was left to be largely expanded. And, although the
concession contract included the construction of a (highly needed) treatment plant, it was planned only in the second five-year plan. Finally, despite official good self-control results, issues of turbidity and recontamination in the network were still part of the public discussion after 1997, since they could not be solved prior to the concession, nor early into it (CEDIB, 1996; 1997; 1998; Vargas García, 1998).

In Cochabamba, the first laboratory to control drinking-water quality was created in 1983 (LRCCA, 1984). The first analyses of drinking-water quality in 1983-1984 done by the laboratory showed high levels of bacteriological contamination and iron in the whole area tested, which included but was not limited to SEMAPA’s network. At least at some points of SEMAPA’s network, there was bacteriological contamination, despite the development of a sewage system in the early 1980s (including a wastewater treatment plant) (LRCCA, 1984; Sánchez, 1993). SEMAPA maintained publicly over the 1990s that the quality of the water they provided was of good quality, and specifically, not bacteriologically contaminated, although some cases of contamination were reported publicly and documented by the laboratories of the Universidad Mayor de San Simón (CEDIB, 1993; 1995; 1996; 1997; 1998). Control of drinking-water quality was originally (and until approximately 1997) done at the exit of the treatment plant, and not in the tanks nor the distribution network (Interview with SEMAPA worker). Indeed, a 1996 report of the Controlaría General de la República stated that the quality of the water at the exit of the Cala Cala treatment plant was respecting standards of quality, but that in pumping stations water had not enough chlorine left and was bacteriologically contaminated. This contamination came from leaks in the (deteriorating) distribution and wastewater network (Oficina Internacional del Agua, 1999; CEDIB, 1995; 1997; 1998; Interview with SEMAPA managers in the 1990s and independent expert). Although the creation of a Laboratory Unit around 1997 allowed to monitor
regularly the quality of water in tanks and the distribution network and the Cala Cala treatment plant was rehabilitated and expanded by March 1998, issues with the recontamination of water in the distribution systems were still not resolved by the end of 1999, when SEMAPA was conceded. Indeed the contract obligations of the licensee included the expansion of treatment plants, and the general manager of SEMAPA who took over when the concession contract was reverted mentioned: “We documented that drinking water was contaminated by wastewater because [their respective networks] were one next to the other” (author’s translation, quote from Interview with Jorge Alvarado, see Appendix 2; see also CEDIB, 1998).

3.5. Summary of Analysis for Bolivian Cases

Table 5 summarizes the values of the independent and dependent variables for the two Bolivian subnational cases.

<table>
<thead>
<tr>
<th>City (year of concession)</th>
<th>Independent Variables</th>
<th>Dependent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Institutionalized Ties between Deciders</td>
<td>External Challenge</td>
</tr>
</tbody>
</table>

Overall, Bolivian concessions of drinking-water services suggest that, in a setting in which ties between the privatization deciders are strong but not institutionalized, measures that may be adopted prior to privatization are limited to short-term revenue-enhancing and limited quality-improvement measures (Hypothesis 1.2). Indeed, increases of consumers’ rates that did take place
were implemented over short periods of time and rather drastically. As for drinking-water quality measures requiring a longer term perspective, like replacing large parts of the distribution network to prevent recontamination, they could not be implemented prior to concessions (given the non-institutionalized ties between deciders).

The adoption of these short-term revenue-enhancing and limited quality-improvement measures is not, however, always possible. Bolivian cases suggest it requires strong ties (although not institutionalized) ties between deciders and the absence of an external challenge to the privatization process (Hypothesis 2.2). These conditions were met for SAMAPA’s concession in 1992-1993 and 1997 and indeed lead to strong hikes of consumers’ rates in mid-1992, early 1993 and mid-1997. Improving drinking-water quality would have required replacing large parts of the distribution network, and these short periods of times when deciders were tied did not allow to progress significantly in that direction (which would have required a longer time horizon). In Cochabamba, ties between local and national authorities were strong for most of the period between 1993 and 1999, except for a short interlude of approximately a year (from mid-1996 until mid-1997). However, the privatization process was challenge by the outside, as Cochabamba population faced water shortage and opposed increases of consumers’ rates in 1998-1999. Between 1993 and 1996, as ties were strong and there was no external challenge, consumers’ rates were increased significantly and regularly and some measures to improve drinking-water quality were developed (for instance the expansion of the treatment plant and monitoring). These latter still did not solve the issues encountered with drinking-water quality, which would have required higher and longer-term investments. When Cochabamba population faced water shortage and opposed increases of consumers’ rates, no measures to increase rates were adopted, even when local authorities were strongly tied to the national government.

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Finally, when ties between privatization deciders are weak, Bolivian cases suggest that no measures will be implemented prior to privatization to lessen the shock of the process (neither long-term nor short-term) (Hypothesis 1.3). When the national and municipal governments were not part of the same alliance (in La Paz between mid-1993 and early 1997; in Cochabamba between mid-1996 and mid-1997), consumers’ rates were not increased prior to the concession of SAMAPA and SEMAPA, and there was no significant quality-improving measures adopted.

4. Chile: Eight Successive Regional Water Concessions

Like other neoliberal reforms in Chile, the process that led to the privatizations of water and sanitation services started under the dictatorship of Augusto Pinochet. The sector was restructured starting with the creation of a national coordinating entity, the SENDOS (Servicio Nacional de Obras Sanitarias) in 1977, but it was really with the promulgation, between 1988 and 1990, of a series of decrees and laws establishing a new regulatory framework that the road toward the privatization of drinking water and services was embarked on concretely (Valenzuela and Jouravlev, 2007: 17; Cariola and Alegría, 2004: 67-68).

It was however after the democratic transition and under governments of the Concertación (which privatized various state-owned enterprises between 1990 and 2010) that these privatizations took place (Maillet, 2013). Indeed water services in all regions of Chile were successively privatized between 1993 and 2004, but not all took the form of concessions. Besides the first small-scale “trials of different privatization type” in 1993 in Valdivia (region XIV) and in 1995 in Litoral Sur

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14 As previously mentioned, this paper analyzes only concessions and no other types of privatization although some others are part of the description of water privatizations in Chile in the first paragraphs of this section.
(region V)\textsuperscript{15}, the first privatizations were made through the progressive sale of actions of public water providers of the regions of Valparaíso (region V), Santiago (metropolitan region), Bío-Bío (region VIII), Los Lagos (region X), and O’Higgins (region VI). The sale of actions of all these water companies started under Eduardo Frei’s presidency (between 1998 and 2000) and continued in the 2000s.

Ricardo Lagos, who assumed presidency starting in 2001, followed up Frei’s privatization agenda of water and sanitation services for other regions, but through 30-year concession contracts. These concessions took place successively in the regions of the Maule (region VII) in 2001, in the region of Aysén (region XI) in 2002, in the four Northern regions of the Atacama Desert (regions I, II, III and IV, including region XIV with region I) in 2003-2004, and in the region of Araucanía (region IX) and Magallanes (region XII) in 2004 (Valenzuela and Jouravlev, 2007: 25; Cariola and Alegría, 2004: 76-77; Selman Biester et al., 2006; SISS, 2011).

4.1. 1988-1990: A Period of Transition and Uncertainty

At the end of the 1980s, there was strong political uncertainty. Although Pinochet was still in power, a coalition of Socialists and Social Democrats was emerging as a political force of opposition. On October 5, 1988, the plebiscite asking whether the population agreed for Pinochet to remain in power for ten more years took place. Since the later was lost by the dictatorship, negotiations took place between the dictatorship and the coalition to agree on amendments to the 1980 constitution. An agreement was reached and presented to the population in a second plebiscite which took place on July 30, 1989 and in which the amended constitution was approved.

\textsuperscript{15} These first privatizations are characterized this way by the representatives of the SISS themselves (Espinoza Sarria and Rodriguez Sandoval, 2008).
In December 1989 a new president (and Parliament) was elected and he took office on March 11, 1990. Candidates for the presidential election were only announced in July 1989, and the post-election outcome was uncertain.

While Pinochet and its junta were still in power in 1988-1990, and definitely controlling the decision-making process, the ties between privatization deciders cannot be considered as institutionalized because there was a lot of uncertainty around the follow-up of the 1989 elections and what the electoral results would be (indeed a shift of government took place). What were to become strongly institutionalized coalitions were at a stage of formation and consolidation. In this setting, we consider ties between deciders to be strong but not institutionalized: we would therefore expect the adoption of short-term revenue-enhancing measures (for instance quick and drastic increases of consumers’ rates) and short-term quality-enhancing measures following the first legislative step toward the privatization of water and sanitation services (in 1988-1989).

4.2. Post-1990: Institutionalized Ties between Privatization Deciders

It became quickly evident that the 1990 negotiated transition led to a relative stability of interparty competition. The constitution adopted under Augusto Pinochet’s dictatorship in 1980 and amended in 1989 maintained the binominal electoral system (at the national level), such that in each senatorial district and in each Chamber-of-Deputies electoral district, the two candidates with most votes got elected (or on the two most-voted lists; to have two candidates from the same list elected, the most successful list must double up the number of votes of the second list). This binominal electoral system was combined with two strongly institutionalized opposing coalitions (Concertación and Alianza), such that they usually each got one seat in each district (Huneeus, 2005).

The Chilean (post-transition) party system has traditionally been classified as institutionalized in the literature (Mainwaring and Scully, 1995; Kaufman, 2010), especially on the basis of its low
electoral volatility. While Luna and Altman (2011) recently argued that the Chilean system (in the 2000s) was not as institutionalized as portrayed in the literature and that important nuances had to be added, they still found that at the national level there was low electoral volatility. In the 1989, 1993 and 1999 presidential elections, the *Concertación* obtained respectively 55, 58 and 51% (2nd turn) of the vote, and the *Alianza* 29, 24 and 49% (2nd turn). For deputy elections, the *Concertación* also obtained clear majorities during all the period: nationally it got 51% in 1989, 55% in 1993, 51% in 1997 and 48% in 2001 (more than 3% over the *Alianza*, who got 34, 37, 36, and 44% of the vote in these elections). The repartition of votes for deputy elections by circumscriptions (there the *Concertación* was the first majority or the second one), given the binomial system, guaranteed a relative stability of the weight of the *Concertación* in the House of Representatives. In the Senate’s elections, the *Concertación* had nationally the first majority in all regions of Chile, and these regional majorities varied between 37 and 66% in 1989, between 45 and 57% in 1993, between 45 and 68% in 1997, and between 39 and 61% in 2001. Nevertheless, it was not majoritarian in the Senate, because the latter was constituted with 38 elected, 9 designated and up to 2 lifelong members between 1990 and 2006 (data from the *Servicio Electoral de Chile*).

In post-1990 Chile interparty competition and party coalitions were highly stable; the negotiated transition had taken place while smoothing uncertainties. The composition of the two chambers of Congress was relatively stable, and the president was always from the *Concertación* coalition (that had majority in the House of Commons but not the Senate). Overall, the privatization deciders had strong institutional ties between them.

Also noteworthy is the fact that other political actors that were not deciders for the privatization process were also often institutionally tied to the government. Regional authorities were nominated by the national government, therefore being directly dependent on this same system. At the
municipal level, elections were held every four years, and the mayors were usually affiliated with one of the two main national coalitions and the councillors were from parties and sub-coalitions of these main coalitions, with some rare exceptions. Table 6 lists mayors of the eight regional capital cities where urban water services were privatized by concession, with their political affiliation in the municipal elections of 1996, 2000, and 2004. It comes out clearly that all mayors (except two) who governed between 1996 and 2004 were affiliated with one of the two main coalitions. These two exceptions are Jorge Soria Quiroga in Iquique and Daniel Adaro Silva in Antofagasta, who both won the 2004 elections as independents. In Iquique, the mayor Jorge Soria had been elected in 2000 as an independent on the Concertación list but he and the Concertación broke their institutional tie between 2000 and 2004. During these years, public conflicts between the mayor and the Concertación president were frequent. In 2001, his wife (publicly supported by the mayor) postulated as an independent in senatorial elections. The mayor also created his own party in December 2003, and won the 2004 municipal election with this new party with more than 50% of the vote (El Mercurio de Antofagasta, 2001; El Mercurio, 2001; La Estrella de Iquique, 2003a; 2003b; Observatorio Político Electoral ICSO-UDP, 2011). In Antofagasta, Daniel Adaro became mayor in August 2003, prior to the election, since the mayor (from the Partido Demócrata Cristiano – PDC) in power died and he was the most-voted councilmember of the list. For the 2004 election, he was not chosen as the PDC candidate for mayor, and therefore decided to postulate as an independent. Nevertheless, the other parties of the Concertación (PRSD, PPD and PS) supported his candidacy from October 2003, so although he was independent, his ties with the Concertación made no doubt (Prensa Tocopilla, 2003).
Table 6. Elected Mayors of Capital Cities of Regions where Water Services were Privatized by Concession in Chile, Municipal Elections 1996-2004

<table>
<thead>
<tr>
<th>Municipal Election</th>
<th>1996</th>
<th>2000</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arica</td>
<td>Iván Paredes Fierro, PS (Concertación)</td>
<td>Carlos Valcarce Medina, RN (Alianza por Chile)</td>
<td>Carlos Valcarce Medina, RN (Alianza por Chile)</td>
</tr>
<tr>
<td>Iquique</td>
<td>Jorge Soria Quiroga, PPD (Concertación)</td>
<td>Jorge Soria Quiroga, Ind. (Concertación)</td>
<td>Jorge Soria Quiroga, Ind. (Nueva Fuerza Regional)</td>
</tr>
<tr>
<td>Antofagasta</td>
<td>Pedro Araya Ortiz, PDC (Concertación)</td>
<td>Pedro Araya Ortiz, PDC (Concertación) (July 24, 2003)</td>
<td>(August 6, 2003) Daniel Adaro Silva, Independiente</td>
</tr>
<tr>
<td>Copiapó</td>
<td>Marcos López Rivera, PS (Concertación)</td>
<td>Marcos López Rivera, PS (Concertación)</td>
<td>Marcos López Rivera, PS (Concertación)</td>
</tr>
<tr>
<td>La Serena</td>
<td>Adriana Peñafiel Villafaña, RN (Unión por Chile)</td>
<td>Adriana Peñafiel Villafaña, RN (Alianza por Chile)</td>
<td>Raúl Saldívar Auger, PS (Concertación)</td>
</tr>
<tr>
<td>Talca</td>
<td>Germán Verdugo Soto, Ind. (Unión por Chile)</td>
<td>Germán Verdugo Soto, Ind. (Alianza por Chile)</td>
<td>Patricio Herrera Blanco, PS (Concertación)</td>
</tr>
<tr>
<td>Temuco</td>
<td>René Saffirio Espinoza, PDC (Concertación)</td>
<td>René Saffirio Espinoza, PDC (Concertación)</td>
<td>Francisco Huenchumilla Jaramillo, PDC (Concertación)</td>
</tr>
<tr>
<td>Coyhaique</td>
<td>Carlos Balbontín Balbontín, PDC (Concertación)</td>
<td>David Sandoval Plaza, RN (Alianza por Chile)</td>
<td>David Sandoval Plaza, UDI (Alianza por Chile)</td>
</tr>
<tr>
<td>Puntas Arenas</td>
<td>Nelda Panicucci Bianchi, PS (Concertación)</td>
<td>Juan Morano Cornejo, PDC (Concertación)</td>
<td>Juan Morano Cornejo, PDC (Concertación)</td>
</tr>
</tbody>
</table>

Notes: **Name of mayor followed by the abbreviation of their party and, in parenthesis, their coalition pact.  
**“Ind.” stands for independent, i.e. not member of a party.

In the post-1990 setting in Chile, when there were strong institutionalized ties between privatization deciders, we would expect long-term revenue-enhancing and quality-improving measures to be put in place prior to privatization, including gradual increases of consumers’ rates rather than strong hikes at the moment of concession. Also, when the concession process faced an external challenge jeopardizing it, we would expect short-term adjusting measures to be adopted.

4.3. Changes in Consumers’ Rates Prior to Concessions
Between 1990 and the year of each concession contract (ranging between 2001 and 2004), rates have significantly increased in these eight regional water services in Chile. Graphs 5 and 6 illustrate the evolution of average regional rates and the regional capital city consumers’ rates.
Graphs 5 (-vii, -ix, -xi and –xii). Average Regional Rates and Capital City Consumers’ Rates of Drinking-Water in Chilean Regions VII, IX, XI and XII, from 1989 until Year of Concession

Sources: Data on regional average rates computed on the basis of data of rates in December of each year that were reported in SISS’ 1992, 1990-1993, 1995, 2000 reports (Memorias) and SISS’ annual management reports (Informes de gestión) from 1997 to 2004. Data on consumers’ rates for 15 m³ in regional capital cities compiled from SISS’ 1995 report (Memoria) and SISS’ consumers’ rates journal (Boletín de Tarifas) from September 2000 to 2006. The Consumer Price Index used for computation comes from data in real 2008 pesos from the Chilean national statistics institute (Instituto Nacional de Estadísticas).
Graphs 6 (i, ii, iii and iv). Average Regional and Capital City Consumers’ Rates of Drinking-Water in Chilean Regions I, II, III and IV, from 1989 until Year of Concession

Sources: Data on regional average rates computed on the basis of data of rates in December of each year that were reported in SISS’ 1992, 1990-1993, 1995, 2000 reports (Memorias) and SISS’ annual management reports (Informes de gestión) from 1997 to 2004. Data on consumers’ rates for 15 m³ in regional capital cities compiled from SISS’ 1995 report (Memoria) and SISS’ consumers’ rates journal (Boletín de Tarifas) from September 2000 to 2006. The Consumer Price Index used for computation comes from data in real 2008 pesos from the Chilean national statistics institute (Instituto Nacional de Estadísticas).

These increases showed some similar patterns between regions: a significant increase of real average rates between 1990 and 1992, followed by a few years of relative stability and further increases starting in the mid-1990s. Overall real average rates increased of at least 300% over a period of 12 to 15 years for all regional water services but EMSSAT (that had nevertheless
increases of over 200%). Average rates were not necessarily associated with consumers’ rates increases, as Graphs 5 and 6 also illustrate, since they also largely depended on cost, including investments (which could bring returns a posteriori, especially when leading to expansion of services).

Real consumers’ rates for 15 m$^3$ of water also increased significantly: between 70 to 135% starting in 1995, and they were not specially focused on the year of (or the year prior to) the concession. In only one case (Iquique, region I), this long-term increase was followed by a very significant decrease (over 20%) of consumers’ rates for 15 m$^3$ of water the year before concession.

All these changes in consumers’ rates were essentially the results of two types of dynamics: first, the rate-setting processes modifying rates (by considering parameters of a “model enterprise”) and defining their indexation formulas for the following years; and second, the timing of the effective expansion of the sewage system and sewage water treatment (where it occurred) which determined when new charges associated to the sewage system were included in consumers’ bills (at the rate determined by the rate-setting processes).

The significant increases of rates in 1990-1992 were the result of the first “rate-setting” processes following the 1988 decree Ley de Tarifas (Decreto con Fuerza de Ley 70). Parameters and methodology to determine the level of these increases were fixed in this decree and Decree 453/1989, both adopted when Pinochet was still in power. These regulations defined that rates would be fixed on the basis of those a “model company” would need to efficiently operate and invest. A consultant firm was mandated by the government to suggest rates that would tend to a “model company”. These new rates took effect when the (Concertación) government decreed them officially in 1990 and 1991 (Decrees 334/1990, 336/1990, 374/1990, 375/1990, 376/1990, 457/1990, 510/1990 and 511/1990 of the Ministerio de Economía, Fomento y Reconstrucción –
MEFR). The government also decided that the new rates would be implemented progressively, i.e. increased over five years, to limit the impact on the population and potential popular protests. The privatization of water and sanitation services was “suspended” but different actors directly involved in the sector at that moment sustained the president did not stop it. One actor said: “Aylwin decided that we would first see how it would operate and work, and then we would see whether we privatize or not.” Another stated: “[Aylwin] did not stop the privatization, he rather did everything to make it happen” (author’s translations, see Appendix 2). A SISS report of that era also suggests the idea of privatization had not been abandoned (SISS, 1993).

Only ESSAN (region II) had its rates modified (by decree) between the first and second rate-setting processes: in 1993, to add interconnection charges (Decree 567/1993 of the MEFR). This decree, as well as the significant expansion of ESSAN’s sewage system in 1993-1994 and the significant increase of ESSAT’s proportion of sewage water treated (over 40% of population served) in 1994 (with the construction of a submarine sewage pipe), generated the important increases in average rates noted in these two regions in 1994 (SISS’ reports).

For all eight regions, second rate-setting processes defined new increases of rates effective in 1996, and the “indexation” formulas for the following years (Decrees 801/1995, 230/1996, 231/1996, 456/1996, 458/1996, 666/1996, 780/1996 and 845/1996 of the MEFR). In regions XI (EMSSA), II (ESSAN) and XII (ESMAG) treatment of sewage water was also expanded (of over 50%) in (respectively) 1998, 1999 and 2004, which resulted in important increases of consumers’ rates (SISS’ reports). New rates were decreed at different moments in each region between 1998 and 2004, following the modification of the 1988 Ley de Tarifas (by the adoption in 1998 of law 19.549 modifying the legal regime applicable to water and sanitation services). In May 1995, the bill that led to law 19.549 (that, by modifying the legal regime of water and sanitation services, allowed
their privatization) had been presented to the senate (initiating the first constitutional procedure toward its adoption) (Historia de Ley 19.549). Without any doubt, privatization was concretely in the public and political agenda when the second rate-setting processes (in 1996) and the following changes of rates (from 1998 on) took place. Besides, when Law 19.549 (adopted in 1998) was debated, the possible levels of increases of consumers’ rates were discussed. The initial bill suggested to limit increases (from a rate-setting process to another) to 5%, a measure that was rejected in the first senatorial commission analyzing the bill (in 1995), where the Alianza coalition was majoritarian and voted against (Historia de Ley 19.549).

In April 2001, the government publicly announced that it would privatize by concessions the eight regional water services it still owned. The concession processes, although taking place at the national level, were distinct\(^{16}\) for each regional entity. The government decided to start with ESSAM and ESSAR (the latter was finally not adjudicated in this bidding process). State waterworks unions protested starting in June (especially the ones of ESSAM, ESSAR and ESSAT), until the National Federation of Waterworks Employees (Federación Nacional de Trabajadores de Obras Sanitarias – FENATRAOS) reached a labor protection agreement with the government in August (Business News Americas, 2001; Chile, 2001). The concession of ESSAM (in region VII) nevertheless proceeded at the end of 2001. During the bidding process (but before the deadline to present offers expired), an agreement was signed specifically with ESSAM’s unions including workers’ indemnities (the Convenio Colectivo Complementario de los Contratos Colectivos Vigente en ESSAM S.A.) and new rates were decreed (both in September

\(^{16}\) Concessions initially considered the concession of each regional water service by itself; in 2003 and 2004 concession of packages including 2 of 3 regional services were also made possible (and concluded) (Selman Biester et al., 2006).
The rates-setting process had faced disagreements between ESSAM and the SISS which could not be overcome by the two protagonists, and were decided upon by an Experts’ Commission on July 21. Despite the consumers’ rates increase of 2001, the operational results of ESSAM at the end of 2001 and beginning of 2002 were significantly lower compared to the previous year, because of workers' indemnity payments and infrastructure donations (Decree 335/2001 of the MEFR; Business News America, 2001; 2002; Selman Biester et al., 2006; SISS, 2001). ESSAM’s concession did not face other strong external challenge; newspapers did not report any politician opposing publicly ESSAM’s concession or the increases of consumers’ rates.

Starting in 2002 and until their concession, the seven regional water services left to be privatized had relatively stable consumers’ rates, except ESMAG (where, as previously mentioned, the increase of sewage water treated resulted in increases of rates) and ESSAT (where an important decrease of rates, of over 20%, took place in 2003 in Iquique but not in Arica). These rates were defined by rate-setting processes that concluded between 2000 and 2003. In all of these processes except the one for ESSAT, the SISS and the regional waterworks reached an agreement (Decrees 42/2000, 728/2000, 263/2001, 334/2001, 412/2001 and 430/2001 of the MEFR). As for ESSAT, it disagreed with the SISS on the rates, and therefore an Experts’ Commission fixed the rates (Decree 48/2003 of the MEFR).

Of these seven concession processes (adjudicated between 2002 and 2004), few faced strong external challenges (from national politicians, unions or local politicians). Indeed, there was no reported opposition from politicians to the concessions in regions IX, XI and XII, and the national politicians who publicly opposed concessions of the northern regions (I, II, III and IV) mostly did so for a very limited period: in the few months prior to the 2001 parliamentary elections. These included a few senate and congress candidates from the Concertación (but not from the socialist
party, which was the party of the president). The most active opposition apparently came from
Antonella Sciaraffia (candidate in the parliamentary elections of 2001, but who wasn’t elected)
who presented an anti-privatization bill (Business News Americas, 2001). After the parliamentary
elections, congressmen and senators (from the Concertación and the Alianza) did not oppose
privatization publicly. Some criticized it but focused on maximizing its profitability to the state
and its transparency: some legislators from the Concertación questioned which resources would
stay in the regions; some others from the Partido por la Democracia (also from the Concertación)
initiated the creation of a Congress committee to investigate the legitimacy and transparency of
water consumers’ rates; some legislators from the opposition coalition (from the Renovación
Nacional party) focused on possible government money losses attributed to an undervalued price
(Diario Financiero, 2003; El Mercurio, 2004; Business News Americas, 2002).

Besides, there was no major unions’ protests opposing these adjudication processes (from 2002
until 2004), except in the case of ESSAT. The agreement signed in 2001 with the FENATRAOS
had also been signed by representatives of regional waterworks’ unions and specific agreements
were signed with unions from each regional waterworks at the beginning of each bidding process
(Selman Biester et al., 2006; Business News Americas, 2001). The labor unions federation
“Central Unitaria de Trabajadores” argued against concessions in 2003 but stated that they
focused their actions on “lobbying politicians” rather than protesting publicly (Business News
Americas, 2003). Only in the case of ESSAT do newspapers reviewed reported local unions’
protests (in Iquique). These took place in 2001, 2002 and 2003, and other social organizations also
joined the opposition to the privatization (La Estrella de Arica, 2003; Aravena, 2003; Business
News Americas, 2001).
Additionally to these unions’ protests in ESSAT, the mayor of Iquique (supported by the one of Arica) publicly and vigorously opposed water concessions. Both mayors notoriously protested and organized a rally in Santiago to oppose the concession, especially focusing on the argument of possible increases of consumers’ rates, when the first bidding was opened in August 2003. This bidding closed inconclusively in December 2003, but a second one opened in 2004, putting out ESSAT together with ESSAR and ESMAG in one package, and was successful. Protests had faded by the end of 2003 (especially those of the unions and of the Arica mayor), and the privatization finally proceeded in 2004 (Business News Americas, 2003; Diario Financiero, 2003; La Estrella de Arica, 2003; Aravena, 2003).

It is noteworthy that an important decrease in consumers’ rates took place prior to the 2003 bidding process, in March 2003 in Iquique (the city of the mayor and unions leading the protests) but not in Arica, as shown in Graph 7. Consumers’ rates were then maintained relatively stable for the following years. It suggests that, considering the unions’ protests and the opposition of the Iquique mayor, short-term adjusting measures were adopted prior to the privatization.
Another concession process was also opposed by a local politician: the one of ESSAN. The mayor of Antofagasta (Daniel Adaro) had only come into power in August 2003, after the death of the elected mayor. He opposed the concession by striking protests and declarations but, after meeting with the President Ricardo Lagos on November 27, 2003, his opposition faded and he said that water prices would not raise, that there could be higher water subsidies for the region and that regional investments (like a regional hospital) would be possible with the funds generated from the concession (Business News Americas, 2003; Diario Financiero, 2003; El Mercurio, 2003). Its opposition was apparently “controlled” by the national government, given its institutionalized ties with the latter.
4.4. Changes in Drinking-Water Quality in Chilean Regional Water Services Prior to Concessions

As for drinking-water quality, this issue only became important for the government in the late 1970s and early 1980s. The main focus was first essentially on bacteriological quality, which started to be monitored by the Health Ministry with the implementation of a national program starting in 1980. At the end of the 1980s, the government also drew a (limited) picture of the remaining pitfalls of physical and chemical quality of drinking water provided by all regional water services (Interviews with Health Ministry’s and SISS’ civil servant; SISS, 1991). It did not, however, implement significant measures to improve drinking-water quality at that time, when the first legislative steps toward privatization were taken (in 1988-1990).

The reporting on the monitoring of bacteriological, physical and chemical quality of drinking water was systematized starting in 1991, by the SISS. SISS compiled the information reported by the main cities’ public water companies on drinking-water quality starting in 1991, on a yearly basis, and conducted some parallel controls of quality (Interviews with Magaly Espinosa and SISS’ civil servant; SISS, 1991). The reporting included compliance with microbiological, disinfection, physical and chemical requirements of the drinking-water quality regulation in-effect (Norma Chilena 409 of 1984). Whereas in the early 1990s various water services showed incompliance with bacteriological and disinfection standards, the issue was largely taken care of by 1998 (see Table 7). Nevertheless SISS parallel controls have found that bacteriological standards were still not always met until 2000: for instance, levels of coliforms higher than the national regulation were found in Iquique, Pisagua and Alto Hospicio (region I) in August 2000 and in Balmaceda, Coyhaique and Puerto Aysén (region XI) in November 2000. By 2001, however, bacteriological standards were apparently met in all eight waterworks that were to be privatized by concessions.
Table 7. Percentage of Compliance with Bacteriological/ Disinfection Requirements of Chilean Regional Water Providers, according to Reported Self-control Results, 1997-2004

<table>
<thead>
<tr>
<th>Region, Provider*</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>I, ESSAT</td>
<td>98.1/</td>
<td>100/</td>
<td>100/</td>
<td>100/</td>
<td>100/</td>
<td>100/</td>
<td>100/</td>
<td>100/</td>
</tr>
<tr>
<td></td>
<td>97.7</td>
<td>100</td>
<td>99.4</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>II, ESSAN</td>
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* Indicates the regional public provider prior to privatization.
Sources: SISS’ annual reports of drinking-water quality in urban services from 1991 to 2004.

As for chemical quality, chemicals for which the national drinking-water quality standards were not met were identified in SISS’ annual reports of drinking-water quality starting in 1991. The ones reported not complying the Chilean standard most recurrently were: arsenic, chloride, iron, manganese, nitrates and sulfates (according to SISS’ annual reports of drinking-water quality in urban services from 1991 to 2004). Of these, SISS focused mainly on nitrates and arsenic at the end of the 1990s, which were the two identified by the Health Ministry as “likely to affect users’ health” and by the WHO as part of the “few key chemicals [causing] largescale health effects through drinking-water exposure” (WHO, 2008). (Furthermore, for all other chemicals of the list, the 1984 national regulation stipulated that the Health Ministry could allow higher levels in drinking water than the ones fixed by the NCh409 of 1984.) Finally, both for nitrates and arsenic, the reported chemical quality of drinking waters reached standards in all eight regional water
services prior to their concession. For nitrates, by 1999 all services reported complying with the national standard (see Table 8).

Table 8. Chilean Drinking-water Services Not Complying with the NCh409 for Nitrates, 1991-2004

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<td>Iquique</td>
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<td>Alto Hospicio</td>
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<td>La Huayca</td>
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</table>

Sources: SISS’ annual reports of drinking-water quality in urban services from 1991 to 2004.

For arsenic, it was an issue in urban services in some localities of regions I and II. ESSAN and ESSAT reported compliance with the national regulation by 2001 and 2003 (respectively), at least one year prior to the adjudication of the concessions in these two regions (see Table 9). Parallel controls conducted by the SISS documented that the standard was not yet met in July 2002 in Alto Hospicio, La Huayca and Pisagua; and in March 2003 that they were in Iquique and Alto Hospicio, but not yet in La Huayca and Pisagua. The following parallel controls conducted by the SISS in this region (in 2007), found compliance for arsenic in Iquique, La Huayca, La Tirana, Pisagua and Pozo Almonte (SISS’ Parallel Controls 1998-2007).

Table 9. Arsenic Levels in Chilean Drinking Water Services with Levels Higher than 0.05 mg/L (NCh409) at Least Once Between 1990 and 2004, according to Waterworks’ Self-controls (in mg/L)

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<td><strong>ESSAT (Region I)</strong></td>
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<td>Iquique</td>
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<tr>
<td>Alto Hospicio</td>
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<td>0.06</td>
<td>0.07</td>
<td>0.05</td>
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<td>&gt;0.05</td>
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<td>0.05</td>
<td>0.05</td>
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<td>La Tirana</td>
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<td>&gt;0.05</td>
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<td>0.16</td>
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<td>0.04</td>
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<td>Pozo Almonte</td>
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C: indicates level reported to be complying, but level not given.
Sources: SISS’ annual reports of drinking-water quality in urban services from 1991 to 2004.
4.5. Summary of Analysis of Chilean Cases

Table 10 summarizes the values of the independent and dependent variables for the eight Chilean subnational cases.

Table 10. Summary of Values of Variables in Chilean Cases

<table>
<thead>
<tr>
<th>Region (year of concession)</th>
<th>Independent Variables</th>
<th>Dependent Variables</th>
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<tbody>
<tr>
<td></td>
<td>Ties between Deciders</td>
<td>External Challenge</td>
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</table>

* For all cases: no quality-improving measures in 1988-1990

Overall, Chilean concessions suggest that institutionalized ties between privatization deciders indeed lead to pre-privatization measures taken over time, gradually, which lessen the privatization shock (Hypothesis 1.1), and that, when these ties are not institutionalized (but strong), short-term measures are rather adopted (Hypothesis 1.2). Indeed, between 1988 and early 1990, when there was uncertainty about the transition process in Chile, measures adopted toward the privatization
of water and sanitation services focused on guaranteeing quick and drastic increases of consumers’ rates and did not significantly improve drinking-water quality. Yet, once in power with a comfortable majority and in a stable political setting, the Concertación rather opted for gradual increases of consumers’ rates, an increasing trend that was perpetrated over more than a decade, through different decision-making processes. Simultaneously, from 1991 on, drinking-water quality was monitored by the SISS, and incentivized progressive improvements, which led to the compliance with main quality standards by the regional water providers before they were conceded.

Moreover, the analysis of the Chilean cases seems to confirm that when an external challenge jeopardizes the concession in a setting with institutionalized ties, short-term adjustment measures are put in place (Hypothesis 2.1). Strong external opposition to concessions occurred in three concession processes in Chile: one that was successful (ESSAM in region VII in 2001) and two that were originally inconclusive (ESSAR in region IX in 2001 and ESSAT in region I in 2003). In the case of ESSAM, face to strong opposition of workers unions to the concession (as part also of a national movement of protest against privatization through concessions), an agreement involving indemnity payments was negotiated, despite the fact that it lowered significantly profitability of the public service just before the concession and for the first few months of it. In the case of ESSAR, unions’ protests took place during the first bidding process in 2001 that ended up being inconclusive. Then, starting in 2001, consumers’ rates were maintained relatively stable, there was no further strong opposition to the process, and the water services were finally conceded in 2004 (through another bidding process). In the case of ESSAT, the concession process was jeopardized by the opposition of local unions, social organizations and the mayor of Iquique (who, contrary to mayors of Arica and Antofagasta, was likely to foster opposition against the concession
since he had conflicts over regional policies with the president and had left the president’s coalition). In response to these challenges, consumers’ rates in Iquique were highly decreased prior to the call of bids; the protests persisted despite this decrease for some months but finally faded by the end of 2003. When a new bidding was opened in 2004, water services were conceded.

Conclusion

The results overall suggest that the extent to which privatization deciders implemented preparatory measures to ease the privatization of drinking-water services depended heavily on these deciders’ time horizon (determined by the political ties between them) and the strength of external challenges jeopardizing the processes. Indeed, where ties between deciders were institutionalized, and therefore their time horizon longer, preparatory measures were put in place progressively many years prior to privatization. Then, if the privatization process faced an external challenge, adjusting short-term measures (like consumers’ rates decreases or other revenue-enhancing measures not affecting directly the population) could be adopted to limit opposition to the process. When ties between deciders were not institutionalized but strong, only short-term preparatory measures could be adopted, and they were only put in place if there was no external challenge jeopardizing the process. Finally, when ties between deciders were weak (and not institutionalized), no preparatory measures were taken.

In the absence of preparatory measures put in place prior to the privatization process, the cost of privatizing has been higher and the privatization process more risky, especially when privatization was challenged externally. Interestingly, the cases analyzed suggest that this variation of cost and risk tended to impact the privatization process. The case of Cochabamba, in Bolivia, illustrates the situation where the privatization process went forward although very little preparatory measures
had been put in place and there was a strong external challenge jeopardizing the process. The result was that privatization was reverted a few months after the concession and, essentially, never really took effect. The cases of regions VII, IX and I in Chile suggest that where gradual preparatory measures have been taken gradually over time and the privatization process was challenged externally (for instance by unions’ protests), the privatization deciders had more options and indeed could put in place adjusting measures prior to proceeding with the privatization in order to prevent the expansion of the challenge. In region VII, indemnities were given to workers before the water services were finally conceded. In region IX, the first bidding process (challenged by unions’ protests) was finally inconclusive and the water services were only conceded three years later; in the meantime the consumers’ rates remained stable and the national federation of unions signed a labor protection agreement. In region I, although unions first challenged the privatization process, the external challenge extended beyond them when local actors and authorities also opposed publicly the privatization process. Consumers’ rates were significantly decreased before the concession of services finally proceeded.

On the whole, this paper fosters a better understanding of Latin American water reforms, by highlighting that, additionally to decentralization and state capacity (Herrera, 2017; Baer, 2014), political ties between deciders are a key explanatory variable for these reforms. Indeed, the ties between deciders better explained the variation in preparatory measures over time and between subnational units within a single country.

Moreover, this paper documents and underlines the importance of an overlooked aspect of privatization reforms: the preparatory measures a government may (or not) adopt prior to privatizing. Taking into account these measures is essential to understand privatization processes, and more specifically their real redistributive consequences and the political risk they entail.
Preparatory measures may delay the moment privatization is launched, but may also smoothen the privatization shock (therefore lowering the risk of privatization reversal and enhancing revenue for the firms).

The conceptualization of this preparation step of the privatization process is also a contribution to the policy diffusion literature, which considers the adoption of policies following international or foreign influences. Privatization reforms are a great example of policy diffusion, since they were highly promoted by transnational actors in the 1980s and 1990s, and largely spread around the world. This paper suggests that it is conceptually important to add the (optional) step of preparation to the steps of the policy diffusion process already identified in the literature (emergence, standardization, spread, adoption, and implementation).

More generally, the paper contributes to the neo-institutionalist literature by conceptualizing a “preparatory” type of gradual policy change that adds to the framework of gradual institutional policy change (Hacker, 2004; Mahoney and Thelen, 2010). This type of gradual change considers a path of successive and different institutional changes: (preparatory) gradual changes followed by abrupt changes.

Finally, on a different note, this paper makes an indirect contribution to the understanding of how policy-making interacted with a “negotiated” democratic transition, given the privatization process of water services in Chile was started under the Pinochet dictatorial government and finalized after the democratic transition. Interestingly, the sector’s reform was slowed down (once it became clear that it could not be adopted prior to the transition) as Chile underwent through its democratic transition, but continuity in the process was nevertheless a key characteristic of the privatization process.
References


Diario Financiero. 2002-2004. “Diario Financiero Archives”. In Factiva Database. New York: Dow Jones Reuters Business Interactive LLC.


Quiroga, Marco et al. 1999. *Programa de Control y Seguimiento de la Calidad del Agua.* La Paz: MVS/ DIGESBA.


Valenzuela, Soledad and Andrei Jouravlev. 2007. *Servicios urbanos de agua potable y alcantarillado en Chile: factores determinantes de desempeño*. Santiago de Chile: CEPAL.


Appendix 1. List of Interviewees

Most interviewees requested not to be identified when quoted and not to be named anywhere in the dissertation. This is what explains the format of the list of interviewees listed hereafter and the way references are made to interviews in the text.

Bolivia

Independent Experts and International Organizations

- Carlos Crespo, CESU, Universidad Mayor de San Simón, Cochabamba, 2014.
- Claudia Vargas Vucsanovich, expert on water and sanitation, videoconference interview, 2014.
- Gover Barja, profesor, Universidad Católica Boliviana, La Paz, 2014.
- Independent consultant on water and sanitation issues, worked on projects of the World Bank in Bolivia (among others), La Paz, 2014.
- Julián Pérez, CESU, Universidad Mayor de San Simón, Cochabamba, 2014.
- Patricia Venegas, principal adviser in policies, PERIAGUA (*Programa para Servicios Sostenibles de de Agua Potable y Saneamiento en Áreas Periurbanas*), GIZ (German Technical Cooperation), La Paz, 2013.
- Rocío Bustamante, Centro AGUA, Universidad Mayor de San Simón, Cochabamba, 2014.

Public Administration

- Civil servant from *Autoridad de Fiscalización y Control Social de Agua Potable y Saneamiento Básico* (AAPS), Cochabamba, 2014.
- Civil servant 1 from *Ministerio de Medio Ambiente y Agua (Dirección de Planificación)*, Cochabamba, 2013.
- Civil servant 2 from *Ministerio de Medio Ambiente y Agua (Dirección de Planificación)*, Cochabamba, 2013.
- Civil servant from *Ministerio de Medio Ambiente y Agua (Viceministro)*, Cochabamba, 2013.
- Civil servant 1 from *Ministerio de Obras públicas, Servicio y Vivienda*, La Paz, 2014.
- Civil servant 2 from *Ministerio de Obras públicas, Servicio y Vivienda*, La Paz, 2014.
- Civil servant 1 from *Ministerio de la Presidencia*, La Paz, 2014.
- Civil servant 2 from *Ministerio de la Presidencia*, La Paz, 2014.
- Civil servant 1 from *Instituto Nacional de Estadísticas*, La Paz, 2014.
- Civil servant 2 from *Instituto Nacional de Estadísticas*, La Paz, 2014.
- Civil servant 3 from *Instituto Nacional de Estadísticas*, La Paz, 2014.
Civil servant 1 from SENABSA, La Paz, 2013.
Civil servant 2 from SENABSA, La Paz, 2014.

Water Providers, Private and Social Organizations

- Edgar Varnoux, manager of customer service, SEMAPA, Cochabamba, 2014.
- Gonzalo Maldonado, SEMAPA manager in the 1990s, Cochabamba, 2014.
- Jorge Alvardo, SEMAPA manager in the 2000s, Cochabamba, 2014.
- Maria Eugenia Flores, Fundación Abril, Cochabamba, 2014.
- Michael Roca, Asociación Nacional de Empresas e Instituciones de Servicio de Agua Potable y Alcantarillado, La Paz, 2013.
- Oscar Arteaga, Asociación Nacional de Empresas e Instituciones de Servicio de Agua Potable y Alcantarillado, La Paz, 2013.
- Raul Flores Mejia, SEMAPA general manager, Cochabamba, 2014.
- Worker of EPSAS-La Paz in the 1990s-2000s, La Paz, 2014.
- Worker 1 of SEMAPA in the 1990s, Cochabamba, 2014.
- Worker 2 of SEMAPA in the 2000s, Cochabamba, 2014.

Chile

Public Administration & Political Representatives

- Jorge Ale Yarad, civil servant of the Ministerio de Economía in the 1980s (in charge of the development of the regulatory framework for the water and sanitation sector), Santiago, 2014.
- Magaly Espinosa, superintendent, Superintendencia de Servicios Sanitarios (SISS), Santiago, 2014.
- Civil servant of the Instituto Nacional de Estadísticas (INE), Santiago, 2014.
- Civil servant of the Instituto Nacional de Normalización (INN) in the 2000s, Santiago, 2015.
- Civil servant of the Ministerio de Economía in the 1980s, Santiago, 2014.
- Civil servant of the Servicio Nacional de Obras Sanitarias (SENDOS) in the 1980s, Santiago, 2015.
- Civil servant 1 of the Superintendencia de Servicios Sanitarios (SISS) in the 2000s, Santiago, 2014.
- Civil servant 2 of the Superintendencia de Servicios Sanitarios (SISS) in the 2000s, Santiago, 2015.
Water Providers, Private and International Organizations

- Alex Chechilnitzky, president, AIDIS (Asociación Interamericana de Ingeniería Sanitaria y Ambiental) - Capítulo de Chile, Santiago, 2015.
- Representative, CONADECUS, Santiago, 2014.
- Worker of water provider 2 in the 1990s-2000s, Santiago, 2015.
- Worker of water provider 3 in the 2000s, Santiago, 2014.
## Appendix 2. Record of Minutes of Interviews Quoted

### Table 11. Excerpts from Interviews Corresponding to Quotes in Text

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Quote in Text</th>
<th>Original Excerpts from Minutes of Interviews</th>
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<tbody>
<tr>
<td><strong>From Section 3.2</strong></td>
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<tr>
<td>Interviewee involved in the privatization process of SAMAPA</td>
<td>“there was support from La Paz mayor, who was then presiding SAMAPA’s board of directors. There was sufficient support from her. […] In the case of SAMAPA [where there was no opposition from the mayor, contrary to the case of SEMAPA], [consumers’ rates] were increased prior [to the concession]”</td>
<td>“había apoyo del alcalde de La Paz, alcaldesa era en ese momento, que era presidenta del directorio de SAMAPA. Había bastante apoyo de ella. […] En el caso de SAMAPA, por ejemplo [dónde no había oposición del alcalde como en SEMAPA], se aumentó [la tarifa] antes [de la concesión].”</td>
</tr>
<tr>
<td>Actor involved in the privatization process of SAMAPA</td>
<td>“We had considered the possibility of having a law for the water sector prior to the concession, but we had to manage with the secondary legal framework because there was no time to adopt a law. The capitalization process was coming to an end, the government would change in August 1997, and the mandate of the [Capitalization] Ministry was also coming to an end.”</td>
<td>“Habíamos discutido esa opción, tener una ley [del sector] antes [de la concesión], pero vimos que teníamos que hacer con un marco legal secundario, [porque] ya no había tiempo para hacer aprobar una ley. Ya se iba a terminar el proceso de capitalización. Iban a cambiar el gobierno en agosto de 1997. […] Ya se iba a cambiar el gobierno y también se terminaba el mandato del ministerio. Iba a desaparecer, sólo fue creado por la capitalización.”</td>
</tr>
<tr>
<td><strong>From section 3.3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actor involved in the first bidding process of SEMAPA</td>
<td>“we considered increasing consumers’ rates prior to the concession, but there was then opposition from the mayor”</td>
<td>“se consideró [aumentar la tarifa antes de dar la concesión], pero allí había oposición del alcalde.”</td>
</tr>
<tr>
<td>Participant in the Water War</td>
<td>“In December the bills were sent. The municipal elections were over. This had also been politically very well planned.”</td>
<td>“En diciembre ya salieron las facturas, ya habían pasado las elecciones municipales, eso también políticamente fue muy bien organizado”.</td>
</tr>
<tr>
<td><strong>From section 3.4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jorge Alvarado</td>
<td>“We documented that drinking water was contaminated by wastewater because [their respective networks] were one next to the other.”</td>
<td>“pudimos documentar que se contaminaba el agua potable con el agua del alcantarillado porque están una al lado de la otra”</td>
</tr>
<tr>
<td><strong>From section 4.3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actor involved in the sector in the early 1990s</td>
<td>“Aylwin decided that we would first see how it would operate and work, and then we would see whether we privatize or not.”</td>
<td>“Aylwin toma la decisión de que vamos a ver primero como eso opera, como funciona, y después se verá si se privatiza o no.”</td>
</tr>
<tr>
<td>Actor involved in the sector in the early 1990s</td>
<td>“[Aylwin] did not stop the privatization, he rather did everything to make it happen.”</td>
<td>“[Aylwin] no paró la privatización, más bien se hizo todo para hacerla.”</td>
</tr>
</tbody>
</table>
Paper 2: Who Follows WHO Drinking-Water Quality Guidelines in Latin America? The Overlooked Effects of State Capacity on Policy Diffusion

Although the literature on policy diffusion has been burgeoning in the last decades, it has largely focused on “successful” diffusion processes. This focus has highlighted the role of epistemic communities, communication networks, transfer agents, and international organizations’ sanction and aid policies. This abundant literature has however limited explanatory power regarding why policy diffusion is sometimes partial or inexistent when the policy spreads thanks to these factors. This paper addresses directly this question by analyzing cases of complete, partial and no national adoption of diffused policies under similar diffusion pressures.

The main argument is that stronger state capacity limits the adoption of diffused policies that represent a strong domestic challenge for the country. Correlatively, weak state capacity does not limit diffusion, and therefore leads to extended diffusion. Two causal mechanisms are at play. First, before adopting nationally a policy diffused from abroad, a state with strong state capacity has, thanks to its resources, a stronger ability than a weak state to assess whether (and to which extent) the implementation of the policy would entail a domestic challenge. It is therefore less permeable to policy entrepreneurs who would advocate for the adoption of a policy and, if the policy does represent a strong domestic challenge, diffusion is likely to be restrained. Second, since strong state capacity also enables the enforcement of a diffused policy by the state, stakeholders that would be directly affected (now or possibly later) by the adoption of the policy (because it represents a strong domestic challenge) are likely to put pressure on the state to prevent the adoption of more restrictive regulations. This may also limit the adoption of diffused policies when the domestic challenge is strong.
A complement to the main argument considers an additional factor: the arena in which the challenge plays. One of the main argument’s scope condition is that the challenge is domestic (i.e. the cost comes from its implementation within borders) and not transboundary (i.e. the cost comes from whether other countries will implement the policy). If the challenge is transboundary, the repertoire of actions a state with strong capacity may and would want to undertake varies. It then first tries to influence the standardization of the policy (at the international level). If the standardized policy is not modified, states where a strong transboundary challenge is associated to the diffused policy block the adoption of the policy (independently of the strength of their state capacity). If the standardization of the policy is successfully modified, then adopting the “diffused policy” is no longer an issue for states where a strong transboundary challenge would have been associated to the diffused policy, and they (both weak and strong states) adopt the diffused policy.

This paper studies policy diffusion through the case of the diffusion of the drinking-water quality guidelines of the World Health Organization (WHO) in Latin America. The WHO published the first edition of its “Drinking-Water Quality Guidelines” in 1984, in line with the concerns about the lack of access to safe and ample water for the populations expressed by the General Assembly of the United Nations as it proclaimed the 1981-1990 era the “International Drinking Water Supply and Sanitation Decade.” These guidelines have been revised once per decade since then. Because they emerged from a Western European and North American perspective, and because the changes from one version to another can be clearly identified, it allows to analyze the diffusion of an evolving policy defined abroad.

The first section of this paper presents the theoretical framework, the argument and the hypotheses. The second describes the WHO drinking-water quality guidelines as they evolved from the 1980s until 2011 and details the national regulations for drinking-water quality in force in Latin America
during this period. The third section presents the analytical framework, the methodology and data sources. The fourth section presents the results of the empirical analysis when challenges are domestic, and the fifth those for transboundary challenges.

1. Theoretical Framework, Argument and Hypotheses

The policy diffusion process has been extensively analyzed in the last decades (for literature reviews, see Dolowitz and Marsh, 1996; Dobbin, Simmons and Garrett, 2007; Karch, 2007; Marsh and Sharman, 2009; Shipan and Volden, 2012; Stone, 2012). More recently, these analyses have increasingly acknowledged the importance of disaggregating this process in different steps. However, the causal mechanisms of diffusion proposed in the literature do not address specifically the adoption step. This paper presents a theory to explain why policies diffused through similar mechanisms are adopted completely, partially or not adopted by countries. It focuses more precisely on non-politicized (technical/administrative) policies, i.e. not associated to a traditional conflict between the left and the right or to a known clash between political parties in the country.

1.1. Policy Adoption as a Distinct Step of the Diffusion Process

This paper highlights that adoption is one step of the policy diffusion process that needs to be distinguished from the step that follows it (implementation) and the ones that precede it (emergence, standardization, preparation, spread). Figure 1 sketches the policy diffusion process with its different steps, as conceptualized in the literature and in this dissertation.

The first step of the policy diffusion process that was noted as important to single out was the one posterior to adoption: implementation. On the one hand, there is the adoption of a diffused policy at the national level through a formal domestic instrument, like a regulation, a law, or a policy. On the other hand, there is the actual implementation of the “diffused policy” on the ground, which
entails change in practices, methods or other means to comply with (or at least work toward) the diffused norm or standard. It was quickly and generally acknowledged that different factors came into play at the implementation stage (Dolowitz and Marsh, 1996: 354; Evans and Davies, 1999: 379; Dolowitz and Marsh, 2000: 6; True and Mintrom, 2001: 30; Jordana and Levi-Faur, 2005: 118; Karch, 2007: 191; Marsh and Sharman, 2009: 279; Shipan and Volden, 2012: 793). This step is analyzed in the third paper of this dissertation.

**Figure 1. The Steps of the Policy Diffusion/Transfer Process**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergence</td>
<td>New Ideas/Policies Rise in Other States or Transnational/International Actors</td>
</tr>
<tr>
<td>Standardization</td>
<td>New Ideas/Policies Become a &quot;Standard Model&quot;</td>
</tr>
<tr>
<td>Spread/Diffusion</td>
<td>The &quot;Standard Model&quot; Travels to Other Contexts</td>
</tr>
<tr>
<td>Preparation (Optional Step)</td>
<td>Receiving State Puts in Place Preparatory Measures to Lessen the Impact of New Policy</td>
</tr>
<tr>
<td>Adoption</td>
<td>Receiving State Adopts New Policy (Possibly Adapted)</td>
</tr>
<tr>
<td>Implementation</td>
<td>Receiving State and Other Actors Involved Implement New Policy</td>
</tr>
</tbody>
</table>

Source: Own Elaboration.

It is also important to disaggregate the steps of the policy diffusion process that take place before the spread (diffusion) step: first, the emergence of a “new” policy or idea somewhere in first place (Graham *et al.*, 2013: 686); second, the standardization of local ideas and practices (Ancelovici
and Jenson, 2013); and third, the optional step of preparation (see paper 1 of this dissertation). The distinction between these steps and the adoption one appears evident.

The disaggregation of the spread/diffusion step and the adoption one is less commonly acknowledged, as many studies conflate them in what they label “diffusion”. Indeed, when what is diffused is an ideology, an idea or a norm, the step of adoption may not necessarily be a formal one, that can easily be identified. Yet, the adoption of a “diffused policy” differs from learning and diffusion, as different authors have noted. Karch (2007: 55-56) detailed: “Diffusion is about movement of a policy across jurisdictional boundaries. In contrast, adoption is the decision to establish a policy in an individual jurisdiction.” This distinction is not only conceptually but also substantively very important for at least two reasons. First, what is diffused and what is adopted may differ, as “policies or practices [may be] altered during processes of adoption” leading to “poor, incomplete or partial transplantation” (Stone, 2012: 484-488). Moreover, Dunlop (2009) stated that “decision-makers can learn ‘negative lessons’ where learning from the ideas that are diffused help crystallize what ideas and policy paths they do not wish to follow.” Guzman and Linos (2014: 605) also argued that the diffusion of international human rights standards (through international law or international norms) can “undermine efforts to adopt or maintain high levels of protection in countries that would otherwise offer protection above the international norm”. Second, as the object of diffusion and adoption differs, so do the factors influencing these two steps (Karch, 2007: 64-65).

This paper focuses on and is limited to the study of the adoption step of the policy diffusion process. It intends to disentangle dynamics behind the national adoption of a policy diffused from abroad. It addresses “[empirical] questions such as why and how a certain type of transfer occurs
in one context and not elsewhere [, questions that] have not, as yet, been fully addressed in the policy transfer literatures” (Stone, 2012: 488-489).

1.2. Mechanisms of Diffusion and Adoption

The mechanisms of the policy diffusion process developed in the literature essentially consider the spread step (or the steps preceding the spread; for instance, for standardization, see Ancelovici and Jenson, 2013). These mechanisms are typically summarized into four: learning (from own experiences and peers), competition (pressure to follow policies of direct competitors), coercion (sanctions and aid promised by powerful states and international organizations), and socialization/constructivism (change of preferences and development of expert epistemic communities) (Dobbin, Simmons and Garrett, 2007; Graham et al., 2013; Stone, 2012).

These mechanisms are tinted by the original focus of the literature on successful cases, where a diffused policy is adopted. They assume a positive reaction of “receiving states” to diffusion pressures: they learn, they adapt their policy when pressured, they obey to international organizations, they change their preferences as influenced by epistemic communities. They are reactive rather than proactive in the process. This paper questions this view and rather argues that, at the adoption step, it is necessary to consider that states and other domestic actors are not only “receiving”. This perspective is necessary to explain why a policy that was “diffused” in similar conditions or through similar mechanisms is adopted to different extents (fully, partially or not) by states.

1.3. Argument and Hypotheses

To explain why states opt for different (adoption) responses under similar diffusion pressures, the present argument suggests that two key explanatory factors interplay: the strength of state capacity and the strength of the challenge entailed by the policy if adopted.
State capacity is conceptualized and defined in different ways in the literature. It is often specified as a certain function, or a combination of two or three functions. The functions consist, for example, in the following ones: “fiscal or extractive capacity”, “legal capacity”, “military or coercive capacity”, “administrative capacity” (Akbar and Ostermann, 2015; Hanson and Sigman, 2013; Hendrix, 2010; Lindvall and Theorell, 2016; Soifer, 2015). Conceptualized this way, state capacity is oriented toward outcomes, and not means. This conceptualization of state capacity oriented towards outcomes is limitative, both theoretically and empirically. It first neglects that developing one specific functional capacity certainly requires for a state to make political choices. Theoretically, even a weak state can develop strongly one specific function if all its means are invested toward this outcome. Conversely, a weak functional capacity may result from a lack of state capacity to develop this specific function as much as from a non-prioritization of this function despite resources being sufficient to develop this function. Empirically, functional capacity is at least partly measured by outcomes and does not consider that the strength of state capacity also relates to the “range of government capacities” (Lindvall and Theorell, 2016).

State capacity is here conceptualized on the basis of the framework of Lindvall and Theorell (2016), as a “form of political power […] vis-à-vis a population within a restricted territory”. This corresponds to the “ability to coerce, cajole, and persuade in order to make members of society conform to laws and directives”. It differentiates between means and ends, as this power requires resources to be projected (through policy instruments, to reach policy outcomes). Resources consist in the dimension of state capacity that can be observed and from which state capacity can be inferred. These resources include three types: money, human capital and information. These three types of resources have also been recognized as important for or as defining state capacity by different authors (Lee and Zhang, 2017; Soifer, 2015; Kurtz and Schrank, 2012; Skocpol, 1985).
In the context of our study, state capacity corresponds to the ability to produce knowledge about the implications of policy adoption and to the expected ability to enforce the policy if adopted.

The challenge consists in the cost the implementation of the diffused policy would entail nationally, considering domestic conditions and constraints. The challenge is strong when the cost of implementation is high, for instance when it would require high investments or new infrastructures or when it would result in an important loss of resources. The challenge is weak when the cost of implementation is low, as no or few additional economic, material or human resources are needed to comply with the new policy and there is no or little loss of resources associated with the policy. It could be, for example, because the policy is already (or almost) implemented or because it is not relevant for the country. The challenge may be domestic (if the cost comes from its implementation within the borders of the country) or transboundary (if the cost comes from whether other countries will implement the policy).

The main argument is that stronger state capacity limits the adoption of diffused policies that represent a strong domestic challenge for the country. Correlatively, weak state capacity does not limit diffusion, and therefore leads to extended diffusion. Two causal mechanisms are at play. First, before adopting nationally a policy diffused from abroad, a state with strong state capacity has, thanks to its resources, a stronger ability than a weak state to assess whether (and to which extent) the implementation of the policy would entail a domestic challenge. It is therefore less permeable to policy entrepreneurs who would advocate for the adoption of a policy and, if the policy does represent a strong domestic challenge, diffusion is likely to be restrained. A second causal mechanism is also at play. Since strong state capacity additionally enables the enforcement of an (eventually) diffused policy by the state, stakeholders that would be directly affected (now or possibly later) by the adoption of the policy (because it represents a strong domestic challenge)
are likely to put pressure on the state to prevent the adoption of more restrictive regulations, which may also limit diffusion. Finally, when state capacity is strong and the domestic challenge is weak, the policy is adopted extensively under diffusion pressures (see Figure 2).

**Figure 2. Representation of the Argument on the Effect of State Capacity, Domestic Challenge, and Stakeholder on the Adoption of Diffused Policies**

![Diagram showing the relationship between state capacity, domestic challenge, and adoption outcomes]

The core hypotheses of this paper focus on the impact of the strength of state capacity and the strength of the domestic challenge associated with the diffused policy on its adoption (argument sketched in Figure 2). The three core hypotheses are the following:

*Hypothesis 1.1. When state capacity is strong, and the domestic challenge is strong, the adoption of a diffused policy is limited.*

*Hypothesis 1.2. When state capacity is strong and the domestic challenge is weak, the adoption of a diffused policy is extensive.*

*Hypothesis 1.3. When state capacity is weak, the strength of the domestic challenge does not influence the adoption of a diffused policy, which is extensive.*

A complement to the main argument considers an additional factor: the arena in which the challenge plays. One of the argument’s scope condition is that the challenge is domestic (i.e. the
cost comes from its implementation *within borders*) and not transboundary (i.e. the cost comes from whether other countries will implement the policy). If the challenge is transboundary, the repertoire of actions a state with strong capacity may and would want to undertake varies. It first tries to influence the standardization of the policy (at the international level) to weaken the transboundary challenge entailed by the policy. If it is successful in influencing the standardization of the policy, then adopting the “diffused policy” is less challenging and will likely take place. If the standardization step could not be influenced successfully, then the adoption of the diffused policy is likely to be blocked, regardless of state capacity. The mechanism behind this blocking effect is that stakeholders likely to be affected by a new international standard pressure countries (with weak or strong state capacity) not to adopt it, to limit its diffusion abroad. Additionally, for strong state capacity, another causal mechanism intervenes: since these states may expect the signal given by their national regulations to influence policies of other countries, they make sure not to adopt a policy representing a transboundary challenge for them (see Figure 3).

**Figure 3. Representation of the Effect of Transboundary Challenges on the Adoption of Diffused Policies**

* Only states with strong capacity may influence this international position, but all states (weak or strong) faced with a transboundary challenge may make decision consequently to it.

The complementary hypotheses address the effect of the strength of a transboundary challenge on the national adoption of a diffused policy.
Hypothesis 2.1. When a diffused policy entails a strong transboundary challenge, a state with strong capacity will first intend to influence the standardization at the international level.

Hypothesis 2.2. When a diffused policy that entails a strong transboundary challenge was successfully modified at the standardization step (in order to weaken the challenge), the national adoption of a diffused policy is extensive, regardless of state capacity.

Hypothesis 2.3. When a diffused policy that entails a strong transboundary challenge was not modified at the standardization step, the national adoption of a diffused policy is limited, regardless of state capacity.

1.4. Alternative Explanations
The diffusion literature proposes different explanations for the adoption of diffused policies. Four key ones suggest different expectations in relation to the argument of this paper.

First, one dominant explanation to explain diffusion is that ideas travel through transnational networks of actors, epistemic communities or advocate coalitions that update their knowledge, develop their expertise or learn with one another (James and Lodge, 2003: 186; Stone, 2012: 487-488). Jordana and Levi-Faur (2005: 118) argue that it is this “sociology of knowledge rather than interest politics that is best placed to explain the diffusion of regulatory authorities in Latin America”. This theory focuses mostly on the spread step of the diffusion process, more than on adoption. However, its main expectations would be that countries participating in the same transnational networks and from the same region would adopt similar diffused policies within a same sector. In this framework, learning and expertise could also explain divergence if countries
adapt diffused policies to their most pressing need (i.e. when domestic challenges are stronger), which would contradict the argument of this paper.

A second dominant explanation for the adoption of diffused policies is the pressures exerted by international organizations on countries. They may take the forms of sanctions or conditional aid, and are considered as a mechanism of leverage or coercion (Stallings, 1992; Henisz et al., 2005). Henisz et al. (2005) as well as Murillo (2009) found that external fiscal pressures were key determinants of the adoption of privatization reforms and the establishment of regulatory authorities in the electricity and telecommunication sectors. Armada et al. (2001) also argued that pressures from the World Health Organization, the World Bank and transnational corporations have favored the neoliberal reforms of the health and social security sectors in Latin America. The expectations of this theory is that states more dependent on aid and more sanctioned by these international organizations will be pushed to adopt specific diffused policies. This could suggest that weaker states adopt diffused policies, as our argument suggests. However, it would not explain the different levels of adoption in strong states that depend less on international organizations.

Third, some authors suggest national variations in policy diffusion may be explained by the ideology of domestic governments, political dynamics, the influence of partisan coalitions, political competition, and electoral incentives (Boix, 1998; Murillo, 2009; Linos, 2013; Orihuela, 2014). The expectations is that the nature of the policy diffused and the government ideology will influence whether or not it is adopted domestically.

Fourth, as to the role of state capacity, some authors have argued that weak state capacity may limit what is diffused (Dolowitz and Marsh, 1996: 354). Nicholson-Crotty and Carley (2016: 81) make the “argument that, for the same reasons they might prefer adoption information from states with which they share demographic and ideological characteristics, lawmakers may place greater
weight on effectiveness information from states that share similar implementation capacities or environments.” This argument contradicts the expectations of our argument for the adoption step, since we believe weak state capacity favors more extensive policy diffusion, and not the other way around.

2. The Diffusion of Drinking-Water Quality Guidelines

This paper tests these hypotheses through the case of the diffusion of drinking-water quality guidelines. This case allows to easily separate the two final steps of the policy diffusion process. The first of these is the adoption of “international norms” at the national level and, for our case study, consists in the adoption of national drinking-water quality regulations by countries. The second step is the implementation of diffused policies and, in our case study, refers to established policies to control drinking-water quality and the actual quality of drinking water. This paper intends to disentangle diffusion mechanisms at the adoption stage. In order to do so, it focuses on the one hand on the evolution of WHO drinking-water quality guidelines and, on the other hand, on the national regulations of Latin American countries for drinking water quality.

The study of the diffusion of the WHO drinking-water quality guidelines has another key advantage: it allows to consider partial, non- and (almost) complete adoption in different countries of a single policy diffused through essentially the same networks.

2.1. WHO Drinking-Water Quality Guidelines as a Source for Diffusion

The WHO Drinking-Water International Standards and Guidelines were from the outset developed outside of Latin America, more specifically from a European and a North American perspectives. In the words of the World Health Organization itself in 1958, it is “the great increase in travel, especially air travel, where common carriers must be watered at many points in the world, and the
traveller must be furnished with acceptable drinking-water that will not produce unfavourable effects on his health” that highlighted the importance and motivated the definition of international standards or criteria for drinking-water quality (WHO, 1958). The original standards published by the WHO in 1958 were revised in 1963 and 1971. In parallel to the revision of international standards, stricter European standards for drinking-water quality were defined in 1961 and 1970. From the outset, the international standards for drinking-water quality were influenced by European incentives. The regional office for Europe of the WHO indeed played an active role in the development of the first edition of the WHO Drinking-Water Quality Guidelines published in 1984 that pursued the clear objective to replace (and unify) European and International Standards.

According to Galal-Gorchev and others, “the philosophy and content of [the WHO 1984] Guidelines constituted a drastic departure from the old International standards” (Galal-Gorchev et al., 1993: 335). The change from “standards” to “guidelines” denoted the advisory nature of the document, through which the WHO intended to guide states in their definition of drinking-water quality standards adapted to their national contexts and cost-benefit considerations. The 1984 Guidelines included updated health-based quantitative guideline values according to the evolution of scientific research. Microbiological criteria remained important; and most physical-chemical standards were integrated in the 1984 guidelines. An important modification is that a number of substances and contaminants were also added to the list of guidelines. In terms of chemical substances which may affect health, we can note three main changes. First, among chemicals that were listed in previous standards, manganese and cadmium saw their guideline lowered (i.e. became more restrictive). Second, the 1984 Guidelines were marked by the introduction of some organic chemicals coming from industrial sources and human dwellings: benzene, carbon tetrachloride, 1,2-dichloroethane, 1,1-dichloroethene, edetic acid, tetrachloroethene, and
trichloroethene. Third, as for chemicals coming from agricultural activities, nitrite was added, as well as some pesticides: Aldrin and dieldrin, chlordane, 2,4-D, heptachlor and heptachlor epoxide, hexachlorobenzene, lindane, methoxychlor and pentachlorophenol.

The second edition of the WHO Guidelines was published starting in 1993 and amended in 1998, a little less than ten years after the first one. The list of coordinators and sponsors, all from Western Europe and North America, indicated from which perspective it was built, once again. This second edition updated and significantly added to the list of health-based guidelines set for chemicals in three main ways. First, as for naturally occurring chemicals, several were added to the list (barium, boron, molybdenum and uranium), and the guideline for arsenic was significantly lowered. Second, many chemicals from industrial sources and human dwellings saw their guideline lowered (cadmium, cyanide) or were added to the list. Third, a health-based guideline was introduced for more than 25 additional pesticides used in agricultural activities (WHO, 1993; 1998).

The third edition of the WHO Guidelines was again published about ten years after the preceding ones, in 2004-2005. In terms of guideline values, there were no major changes to the second edition. The main difference was certainly the priority given to some chemicals over others: “There has been increasing recognition that only a few key chemicals cause large-scale health effects through drinking-water exposure. These include fluoride and arsenic. Other chemicals, such as lead, selenium and uranium, may also be significant under certain conditions” (WHO, 2004: xvii). The 2008 addendum of these guidelines added nitrate among the chemicals that may “cause large-scale health effects through drinking-water exposure” (WHO, 2008). In 2011, the fourth edition of the WHO Guidelines was published, and it highlighted the same key chemicals, also adding to the significant list iron and manganese; not for their health effects but rather for “their effects on acceptability” (WHO, 2011: 29).
Over three decades, the WHO Drinking-Water Guidelines have developed by first expanding the scope of parameters listed and second targeting the most important ones for health concerns.

2.2. National Drinking-Water Quality Regulations in Latin America

Important reforms of drinking water services occurred in Latin American countries in the 1980s and 1990s. Probably the most visible of these reforms was the introduction of private participation in the sector, because it was heavily debated and protested against. Some epic reversals also took place in Cochabamba (Bolivia) and Tucumán (Argentina) (Simmons, 2016; De Gouvello and Fournier, 2002). Yet, these privatization processes were only one dimension (albeit important) of the water reforms adopted during these decades in Latin America. The water sector was also transformed by decentralization and “insulating reforms” more generally (which were not limited to privatization and also included corporatization and the establishment of independent regulatory agencies) (Herrera and Post, 2014). It is in this broader context of reforms that the drinking-water quality regulations were adopted by Latin American countries.

While over these decades (or earlier) the provision of water services was decentralized to the local or regional/ provincial level in most Latin American countries (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guatemala, Honduras, Mexico, Peru and Venezuela), the adoption of drinking-water standards remained a responsibility of the national tier of government. Some subnational units also adopted standards (for instance in federal Argentina), but the national regulation remained valid as the overarching framework. Therefore, while the sector was mostly under the responsibility of subnational units, drinking-water quality standards had the specificity of being defined at the national level. This was part of a more general characteristic of the adoption of drinking-water quality regulations: these essentially took place in governmental instances.
distinct from the ones responsible for the sector, so rather in the ministries of Health or International Affairs than in the ministry of Public Works.

As the water sector was mostly decentralized, it entered a wave of corporatization and privatization reforms, and was encouraged to establish regulatory agencies. Drinking-water quality standards were only one component among others that had to be regulated by these agencies, and were legally established through different instruments than other regulated dimensions like pressure, continuity, management of service claims, etc. Indeed, Foster (2005: 22) states that “the general tendency has been to define quality-of-service parameters in lower-level legal instruments (such as concession contracts) rather than in the general sector law.” Yet, drinking-water quality standards, probably because they were recognized as a health matter, were established independently from other service quality standards and in higher-level legal instruments (often through decrees), even when they were also part of concession contracts. Their development was influenced by the revision cycles of the WHO guidelines (and the diffusion of these), as almost all national regulations directly refer to the most recent available version of the WHO guidelines.

In this context, during the 1980s and 1990s, most Latin American countries adopted or updated their standards for drinking-water quality, often more than once. The national regulations in force between 1980 and 2011 in the 16 main Latin American countries are listed hereafter (with their respective year coming into force).

Paraguay is excluded from this analysis because it has a complex settings of regulations related to drinking-water quality, in which regulations are set by three different institutions and are not the same nation-wide.

These national regulations were identified (and further accessed) through extensive research in the Virtual Library of Sustainable Development and Environmental Health of the Pan-American Health Organization (PAHO), governmental online documentation, contacts with governmental agencies/ministers in charge of these regulations, PAHO officials and academics, as well as extensive review of references to other regulation in each regulation found
- Argentina: Código Alimentario (1994), modified in 2007 (Resolución Conjunta 68/2007 y 196/2007);
- Brazil: Portaria BSB Nº 56 (1977), updated in 1990 (Portaria 36-GM), 2001 (Portaria MS 1469), 2004 (Portaria 518) and 2011 (Portaria 2914);
- Colombia: Decreto 2105 del Ministerio de Salud (1983), updated in 1994 (Norma Técnica Colombiana 813), 1998 (Decreto 475) and in 2007 (Resolución 2117 del Ministerio de la Protección Social y del Ministerio de Ambiente, Vivienda y Desarrollo Territorial);
- Costa Rica: Decreto 25991-S (1997), revised in 2005 (Decreto N° 32324);
- Honduras: Norma Técnica Nacional para la calidad del Agua Potable/ Acuerdo No. 084 (1995), renewed in 2005 (Reglamento de calidad del servicio, ERSAPS);
- Nicaragua: Acuerdo Ministerial No.65-94 (1994);
- Peru: Reglamento de los requisitos oficiales físicos, químicos y bacteriológicos que deben reunir las aguas de bebida para ser consideradas potables (1946), updated in

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and of reports and literature listing some of these norms (Bastos et al., 2004; García and Iannacone, 2014; Mella, 2006; Pinto, 2006; Pinto et al., 2005; 2012; Solsona, 1999; Truque, 2005).

\(^{19}\) In Ecuador the national drinking-water regulations were twice changed within a year of their adoption (in 2006, following the 2005 regulation, and in 2011, following the 2010 regulation).
1969, and followed by the Reglamento de la Calidad del Agua para Consumo Humano/ DS N° 031-2010-SA (2010);


- Venezuela: Ley orgánica del ambiente sobre clasificación de las aguas (1978), modified in 1995 (Normas para la clasificación y el control de los cuerpos de agua y vertidos o efluentes líquidos); and more specifically, Normas sanitarias de calidad del agua potable (1992), updated in 1998.

As stands out from the above list, the only country that did not adopt or renew definitively its standards in the 1980s and 1990s was Peru. It did adopt a technical norm in 1987, but the latter was only mandatory until March 1991 when a Supreme Decree (Decreto Supremo N° 006-91-ICTI) established that all technical norms were no longer mandatory. Therefore in 1991, the valid regulation for drinking-water quality remained the one originally adopted in 1946, which had been updated in 1969 but then was not updated again until 2010 (CEPIS, 2004). In the 1990s and early 2000s updates of the national drinking-water quality regulation were proposed by the Dirección General de Salud Ambiental but were not approved.

3. Analytical Framework, Methodology and Data Sources

3.1. Challenges of Drinking-Water Quality Guidelines

The operationalization of the hypotheses to the case of the diffusion of the WHO drinking-water quality guidelines to national regulations requires a clear understanding of how the substances for which a guideline is set by the WHO may be encountered in drinking water.

This study focuses precisely on chemical substances for which the WHO set a health-based guideline for drinking-water quality. Chemicals are used for the analysis because, after microbiological substances (which guidelines mostly consist in no detectable presence in water),
these are the substances in drinking-water associated with the highest health risk because of “their ability to cause adverse health effects after prolonged periods of exposure” (WHO, 1993). Health-based guidelines for chemical substances in water have evolved over the years, especially starting in the 1990s, and the number of chemical substances has increased significantly with the development of scientific knowledge and research.

The list of chemicals for which the WHO has set a health-based guideline in drinking-water at least once since 1984 includes over 100 substances (see Appendix 1). Their presence in water may come from different sources: natural occurrence (in soil and groundwater), industrial sources and human dwellings, agricultural activities, drinking-water treatment by-products, water pipes (through corrosion). The main stakeholder that could be affected by a new drinking-water regulation of one chemical depends on the source of its presence in water, but also on the level of the challenge. Indeed, if the challenge is likely to be transboundary (for instance regarding exportation of drinking-water components or other water products), then stakeholders acting in this international arena are the main stakeholders potentially affected. Table 1 summarizes the interrelations between the level of challenge, the nature of the challenge, the source of presence in water and the main stakeholder likely to be affected.

**Table 1. Level of Challenge, Nature of Challenge, Source of Water Contamination and Stakeholder Involved**

<table>
<thead>
<tr>
<th>Level of Challenge</th>
<th>Nature of Challenge</th>
<th>Source of Presence in Drinking Water</th>
<th>Main Stakeholder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>Drinking-water treatment (contamination prior to treatment)</td>
<td>Natural</td>
<td>Water providers (producers)</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td></td>
<td>Farmers</td>
</tr>
<tr>
<td></td>
<td>Industrial</td>
<td></td>
<td>Industries</td>
</tr>
<tr>
<td></td>
<td>Drinking-water contamination in distributive network</td>
<td>Water pipes</td>
<td>Water providers (distributors)</td>
</tr>
<tr>
<td>Transboundary</td>
<td>Exportations associated to (foreign) water systems</td>
<td>Water pipes</td>
<td>Water-systems-related industry</td>
</tr>
</tbody>
</table>
3.2. Case Selection and Methodology

3.2.1. Choice of Parameters
The guidelines used for the main analyses include those for arsenic, lead and agricultural pesticides. These chemicals were chosen for the analysis because they have been officially recognized to be important for health by the WHO, were modified in the 1993 WHO Guidelines and, from then on, were not further modified until 2011. The domestic challenge associated with arsenic and lead could also be clearly identified, and varied in strength across Latin American countries studied. Moreover, the presence of these chemical substances in water came from three types of sources (respectively natural, pipes and agriculture), which diversifies the analysis.

For the complementary analysis (on the impact of the strength of a transboundary challenge), the guideline for copper is analyzed, which also meets the above criteria. Its presence in water comes from water pipes, like lead.

The guidelines for each type of chemicals are analyzed separately because they are from different sources and that each source is represented very unevenly. In this respect, whereas there are 26 agricultural pesticides for which a WHO health-based guideline was defined in 1993 and maintained until 2011, there is only one substance that corresponds to each of the two other sources retained for analysis: arsenic (for natural presence) and lead (for water pipe contamination). If studied together, the importance of these latter chemicals would risk to fade away, which would be substantially problematic as they are among the few most important chemicals for which presence in drinking water represents a health concern, according to the WHO (WHO, 2004).

3.2.2. Geographical Focus and Choice of Case Studies
The study explores, first, the diffusion of the WHO guidelines in the national regulations of 16 Latin American countries through a cross-country comparison of process-tracing clues. Second, it
develops thorough process-tracing analyses evidencing the causal mechanisms in two case studies: Bolivia and Chile.

The region under study, Latin America, has experienced various water reforms in a relatively short period of time (the 1990s and 2000s), and includes states with different state capacity levels, geographical realities and productive activities. Comparing countries within a region allows to control for other factors, such as the fact that similar multinationals may be involved in the countries, and that the same supranational or international organizations are potentially influencing them. More specifically for this study, the focus on countries from a same region limits differences of diffusion mechanisms that could entail differences of outcomes. Indeed, the WHO drinking-water quality guidelines were promoted over all Latin America by the Pan-American Health Organization (regional office of the WHO) in similar ways, especially through the same documentation and through events where representatives from all countries for the region were invited. Besides, this comparison across the region also includes positive and negative cases, which allows to test not only the mechanisms leading to adoption, but also those resulting in the non-adoption of diffused policies.

The two case studies were chosen in order to analyze the process in one country with weak state capacity (Bolivia) and one with strong state capacity (Chile). The introduction of new standards for the four types of chemicals (arsenic, lead, pesticides and copper) presents strong (or at least medium) levels of challenge in each country. In Bolivia, whereas the standards for arsenic, lead and pesticides represent strong (or medium-level) domestic challenges, copper does not consist in a strong transboundary challenge. In Chile, the standards for the analyzed chemicals may be classified as strong (or medium-level) domestic challenges for arsenic, lead and pesticides, and as
strong transboundary challenge for copper. Given these within-case differences, the process tracing in each of these two cases allows to explore different causal pathways (Seawright, 2016).

3.3. Data Sources

3.3.1. The Dependent Variable
The dependent variable is the compliance of national regulations with the 1993 WHO Guidelines (which remained stable until at least 2011, the end year of the period studied). It was computed for each chemical independently, by year and country. The limit value fixed in a national regulation complies with the WHO guideline for a specific parameter when it is equal or lower than the WHO guideline and when the limit value is mandatory. Otherwise, if the limit value is higher than the WHO guideline or qualified as recommended (rather than mandatory) or if there is no limit value for this parameter, it is noncomplying.

The data for this variable came from systematic analyses of official documents. The 1984, 1993, 2004 and 2011 WHO Guidelines for Drinking-Water Quality (and their complementary documents and addenda) were systematically reviewed and the health-based guideline values were compiled for all parameters. Second, a systematic analysis of national regulations for drinking-water quality was conducted and the national limit values for all chemical substances of the study were compiled for each national regulation. National documents systematically analyzed and compiled consist in all regulations for drinking-water quality that were in force in the 16 Latin American countries studied between 1980 and 2011 (listed in section 2.2).

3.3.2. Independent Variables
The main independent variables are the strength of state capacity, and the strength of challenge. The “source of challenge” variable is also a necessary variable influencing the categorization of substances.
State capacity considers the existing resources to support policy enforcement, including money, human capital and information (Lindvall and Theorell, 2016). Measures of GDP per capita (for availability of financial resources) and government effectiveness (for the strength of human capital and availability of information) are indicative of state resources. Bolivia and Chile, the two case studies, are respectively weak and strong on both measures of state capacity (World Bank, 2016; 2017). For the comparative insights presented for 16 Latin American countries, GDP per capita data is originally used; replications of the cross-country comparisons with alternative measures of state capacity (government effectiveness and adult literacy rate) are also presented in Appendix 4.

“Source of challenge” is a categorical variable coded on the basis of the description of chemicals done by the WHO (see for instance: WHO, 2004). The complete list of categories is: natural, mining, industrial, agricultural non-pesticide, agricultural pesticide, water pipes and others.

“Strength of challenge” is constructed on the basis of what is the source of the challenge for encountering a specific chemical in drinking water.

- If the (domestic) challenge comes from the natural presence of this chemical in groundwater, then domestic challenge is coded as strong when natural presence in groundwater is documented in a country and weak if not. The codification for arsenic is based on data compiled and reported by Bundschuh et al. (2008; 2011).

- If the (domestic) challenge comes from contamination through water pipes, then the domestic challenge is strong if it was reported that the chemical was used in the construction of water pipes in at least one city of the country (for pipes themselves or welding); and weak if not. The sources used to code the variable for lead are listed in Appendix 2.

- If the (domestic) challenge comes from the use of this chemical as an agricultural pesticide, then the domestic challenge is defined as the weight of this pesticide (active ingredient) used
by area of arable land and permanent crops. Data on pesticides use has been computed from annual data on pesticides and lands from the FAOSTAT database but was not available by pesticide.

- If the (transboundary) challenge comes from the exportation of a chemical (potential contaminant of drinking water abroad), the level of challenge is strong if the country is a producer and exporter of the chemical products; and weak if not. The codification for copper was based on USGS reports (see list in Appendix 2).

3.3.3. Causal Pathways in Bolivia and Chile
The process-tracing approach used to identify causal pathways in two countries (Bolivia and Chile) was based on qualitative sources. A systematic review of all archival documentation from national institutes developing technical standards (Instituto Boliviano de Normalización y Calidad—IBNORCA in Bolivia and Instituto Nacional de Normalización—INN in Chile) was realized. This process-tracing approach was also informed by over thirty interviews that were conducted in both countries (with representatives and officials of government institutions, international organizations and non-governmental organizations who participated or oversaw the process of adoption of drinking-water quality regulations) (see Appendix 3 for details on interviews).

4. When Facing a Domestic Challenge: the Blocking Effect of State Capacity on Diffusion

The analysis first focuses on the diffusion of WHO drinking-water guidelines for chemicals for which the adoption of a national drinking-water standard may be challenging domestically. Adopting a drinking-water standard may represent a domestic challenge for arsenic if it is naturally present in water sources, for lead if it has been used decades ago in the construction of water pipes;
and for agricultural pesticides if they are heavily used in agriculture and therefore likely to contaminate water sources.

4.1. Diffusion of the Arsenic Guideline to Latin American Drinking-Water Quality Regulations

This section analyzes the compliance of Latin American regulations with the WHO guideline for arsenic, whose significance for health and drinking-water treatment is uncontested and evident, and which is naturally present in many Latin American waters.

Arsenic is clearly one of the most important and significant change in WHO guidelines over the last decades. Originally, in 1958, it was one of the few chemicals for which a limit was recommended in the WHO International Standards for Drinking-Water, for health concerns (carcinogenicity). This maximum allowable concentration was of 0.2 mg/L. In 1963, the following WHO International Standards lowered this value to 0.05 mg/L, which was maintained in the 1971 International Standards and also in the 1984 WHO Guidelines (WHO, 1963; 1971; 1984; 2004).

In 1993, following a revealed crisis of arsenic poisoning in Bangladesh from drinking water (coming from ground waters), the WHO Guidelines suggested a provisional guideline of 0.01 mg/L. The guideline was provisional because the WHO acknowledged that health concerns would suggest a lower guideline (less than 0.001 mg/L) but that the limit for practical quantification was of 0.01 mg/L. Because of scientific uncertainties on arsenic carcinogenicity between 0.001 and 0.01 mg/L, and also considering practical quantification limit and practical removal difficulties, the guideline was maintained at 0.01 in the 2004, 2008 and 2011 Guidelines. Arsenic was also identified as one of the few priority chemicals for drinking-water quality by the WHO starting in 2004 (WHO, 1993; 2004; 2008).
Arsenic is a naturally occurring chemical whose health effects have been widely documented, including in Latin America. As early as in the 1950s and 1960s, research in Argentina and Chile were conducted on the impact of arsenic on health. The presence of arsenic in groundwater sources is not totally mapped yet in Latin America, but it is increasingly documented. Presence of arsenic has clearly been identified in waters of nine Latin American countries: Argentina, Bolivia, Chile, El Salvador, Guatemala, Mexico, Nicaragua, Peru and Uruguay (Bundschuh et al., 2008; 2011).

Table 2 summarizes the changes in Latin American regulations for the limit value of arsenic, since the change of the WHO guideline in 1993 from a limit value of 0.05 to 0.01 mg/L. It also includes information on whether there is a documented presence of arsenic in ground water sources in the national territory and a measure of the level of state capacity (namely GDP per capita, but this table is replicated in Appendix 4 with two alternative measures of state capacity).

Table 2. Natural Presence of Arsenic in Ground Waters, State Capacity and Drinking-Water Quality Regulations

<table>
<thead>
<tr>
<th>Country</th>
<th>Documented Natural Presence of Arsenic in Ground Waters</th>
<th>State Capacity*</th>
<th>Adoption of 0.01 mg/L Limit Value for Arsenic in Drinking Water (Year Regulation Adopted)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1: weak, 2: medium, 3: strong</td>
<td>Direct change of limit value</td>
</tr>
<tr>
<td>Argentina</td>
<td>X</td>
<td>3</td>
<td>X (2007)</td>
</tr>
<tr>
<td>Venezuela</td>
<td></td>
<td>3</td>
<td>X (1998)</td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td>3</td>
<td>X (2001)</td>
</tr>
<tr>
<td>Uruguay</td>
<td>X</td>
<td>3</td>
<td>X (2011)</td>
</tr>
<tr>
<td>Mexico</td>
<td>X</td>
<td>3</td>
<td>X (2000)</td>
</tr>
<tr>
<td>Chile</td>
<td>X</td>
<td>3</td>
<td>X (2007)</td>
</tr>
<tr>
<td>Costa Rica</td>
<td></td>
<td>2</td>
<td>X (2005)</td>
</tr>
<tr>
<td>Colombia</td>
<td></td>
<td>2</td>
<td>X (1998)</td>
</tr>
<tr>
<td>Panama</td>
<td></td>
<td>2</td>
<td>X (1999)</td>
</tr>
<tr>
<td>Ecuador</td>
<td></td>
<td>2</td>
<td>X (2005)</td>
</tr>
<tr>
<td>Peru</td>
<td>X</td>
<td>2</td>
<td>X (2010)**</td>
</tr>
<tr>
<td>El Salvador</td>
<td>X</td>
<td>1</td>
<td>X (1998)</td>
</tr>
<tr>
<td>Guatemala</td>
<td>X</td>
<td>1</td>
<td>X (2000)</td>
</tr>
<tr>
<td>Honduras</td>
<td>X</td>
<td>1</td>
<td>X (1995)</td>
</tr>
<tr>
<td>Bolivia</td>
<td>X</td>
<td>1</td>
<td>X (2005)</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>X</td>
<td>1</td>
<td>X (1994)</td>
</tr>
</tbody>
</table>
**Strong state capacity here defined as average GDP per capita in 1993 over 7000 US$, medium as between 2500 and 7000 US$ and weak as less than 2500 US$ (2010 constant US$). Countries are in order from strongest to weakest.**

**In Peru, the number of years of the postponing period was not clearly defined.**

Overall, Table 2 suggests that when arsenic was naturally occurring in the ground waters of a country, strong state capacity limited the diffusion of the 0.01 guideline (postponing it for at least 10 years when adopting it), but weak state capacity did not (incorporating it relatively quickly in national regulations).

More specifically, Table 2 shows that all countries where there is no documented natural presence of arsenic in groundwater sources have adopted the 0.01 mg/L value directly, at the latest in 2005, this is to say right after the 2004 WHO Guidelines confirmed the 0.01 limit value and identified arsenic as a priority chemical for drinking-water quality. The case of Ecuador is particularly worth noting, as the 2005 regulation was changed in 2006 and followed by various updates (in 2008, 2011 and 2012), but in all of these regulations, the limit value of 0.01 mg/L for arsenic was always maintained despite limit values for other substances were changed or included and removed from a regulation to another.

Table 2 also suggests strongly that where natural presence of arsenic in ground waters is documented, countries reacted differently according to their level of state capacity. Where state capacity was weak (Bolivia, El Salvador, Guatemala, Nicaragua), the limit value of 0.01 mg/L was adopted directly, at the latest in 2005. Where state capacity was strong or medium, the 0.01 mg/L put forward by the WHO since 1993 was included in national regulations only after arsenic had been identified as a priority by the WHO in 2004 but with a delay for entering into force of ten years (Argentina, Chile, Peru, Uruguay) or simply not adopted (Mexico). The 2000 drinking-water quality regulation in Mexico adopted 0.02 mg/L as a limit value, to be reached progressively over
five years, and further proposals to update the drinking-water quality regulation after 2000 have not been adopted.

4.2. **Diffusion of the Lead Guideline to Latin American Drinking-Water Quality Regulations**

This section analyzes the diffusion of the WHO drinking-water guideline for lead to Latin American national regulations. Levels of lead exceeding the WHO guideline have significant negative effects on health; its presence in drinking water comes mainly from pipes corrosion.

Lead is found in drinking water “primarily from household plumbing systems containing lead” (WHO, 1993) and is one of the “few key chemicals [that may] cause large-scale health effects through drinking-water exposure” (WHO, 2004). The WHO health-based guideline was fixed at 0.05 mg/L in 1984, which already represented an important decrease relative to the WHO drinking-water standards of 1971 (when the limit for lead was of 0.10 mg/L). In 1993 it was further lowered to 0.01 mg/L, and has been maintained at this level in the following editions of the WHO Guidelines (WHO, 1971; 1984; 1993; 2004).

In many Latin American countries, lead pipes have been used in the distribution system decades ago and have not been replaced or only partly been replaced. In some places, pipes are not made of lead themselves, but the welding to join them (for instance for pipes of galvanized iron) was made with lead. In both of these situations, the drinking water is likely, especially as pipes get older and increasingly corrode, to be contaminated by lead.

Table 3 documents the changes in Latin American regulations regarding the limit value of lead since the WHO guideline changed in 1993 from 0.05 to 0.01 mg/L. It also indicates whether it was documented that at least one of the main cities of the country had lead water pipes or lead welds
in water pipes (see Appendix 2 for sources) and a measure of state capacity (namely GDP per capita, but this paper is replicated with two alternative measures of state capacity in Appendix 4).

Table 3. Lead in Water Pipes, State Capacity and Drinking-Water Quality Regulations

<table>
<thead>
<tr>
<th>Country</th>
<th>Lead Water Pipes or Welds in at Least One Main City</th>
<th>State Capacity*</th>
<th>Adoption of 0.01 mg/L Limit Value for Lead in Drinking Water (Year Regulation In Force)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1: weak, 2: medium, 3: strong</td>
<td>Change of limit value</td>
</tr>
<tr>
<td>Argentina</td>
<td>X</td>
<td>3</td>
<td>X (1998)</td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td>3</td>
<td>X (2003)</td>
</tr>
<tr>
<td>Uruguay</td>
<td>X</td>
<td>3</td>
<td>X (2000)</td>
</tr>
<tr>
<td>Mexico</td>
<td></td>
<td>3</td>
<td>X (2000)</td>
</tr>
<tr>
<td>Chile</td>
<td>X</td>
<td>3</td>
<td>X (2000)</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>X</td>
<td>2</td>
<td>X (2005)</td>
</tr>
<tr>
<td>Colombia</td>
<td></td>
<td>2</td>
<td>X (1994)</td>
</tr>
<tr>
<td>Panama</td>
<td>X</td>
<td>2</td>
<td>X (1999)</td>
</tr>
<tr>
<td>Ecuador</td>
<td></td>
<td>2</td>
<td>X (2005)</td>
</tr>
<tr>
<td>Peru</td>
<td></td>
<td>2</td>
<td>X (2010)</td>
</tr>
<tr>
<td>El Salvador</td>
<td>X</td>
<td>1</td>
<td>X (1998)</td>
</tr>
<tr>
<td>Guatemala</td>
<td></td>
<td>1</td>
<td>X (2000)</td>
</tr>
<tr>
<td>Honduras</td>
<td></td>
<td>1</td>
<td>X (1995)</td>
</tr>
<tr>
<td>Bolivia</td>
<td>X</td>
<td>1</td>
<td>X (1997)</td>
</tr>
<tr>
<td>Nicaragua</td>
<td></td>
<td>1</td>
<td>X (1994)</td>
</tr>
</tbody>
</table>

* Strong state capacity here defined as average GDP per capita in 1993 over 7000 US$, medium as between 2500 and 7000 US$ and weak as less than 2500 US$ (2010 constant US$). Countries are in order from strongest to weakest.

Overall, Table 3 suggests that when there were lead water pipes or lead welds in water pipes in at least one main city, strong state capacity limited the diffusion of the 0.01 mg/L guideline in three out of four cases (in Argentina, Chile, Uruguay, but not Venezuela). Besides, in all cases where state capacity was medium or strong in strength, the 0.01 mg/L limit value was adopted domestically.
4.3. Diffusion of Pesticides Guidelines to Latin American Drinking-Water Quality Regulations

This section compares the drinking-water quality standards adopted for agricultural pesticides by Latin American countries, following the WHO guidelines for these substances. The use of these pesticides in agricultural activities may contaminate water sources.

The inclusion of health-based guidelines for pesticides used in agriculture has been one significant source of changes in WHO drinking-water guidelines over the years. The first edition of the WHO guidelines in 1984 only included guidelines for eight pesticides. Its second edition, in 1993, added more than 20, and its amendment in 1998 five more. The 1998 amendment as well as the following editions of the guidelines changed some limit values and did some minor changes to the list of pesticides included (as scientific knowledge evolved and mostly as data on the levels of possible contamination of drinking water by pesticides could be compared to health-risky levels).

The use of agricultural pesticides in Latin American countries has generally been increasing over the last decades. According to the limited data available from the FAOSTAT database, the average use of all pesticides use over the period vary from a country to another. Unfortunately, data on pesticide use available is not disaggregated by pesticide, so one cannot distinguish between which pesticide is a stronger domestic challenge for a country than another. Together with the available data, various studies, including from the early 1990s, documented that pesticide use was an important issue across Latin America, and that its prevalence was increasing (Bellotti et al., 1990; Schreinemachers and Tipraqsa, 2012). This suggests that the overall challenge associated with pesticides in Latin American countries is medium or strong in all countries.

Even if there is one WHO guideline for each pesticide (i.e. 26, considering all pesticides for which a guideline was set in 1993 and not modified in 2004), Latin American countries have adopted national drinking-water quality standards for pesticides almost always at a single time (for a few
Graph 1 evidences that countries adopted very different proportions of these pesticide guidelines. While some countries (like Bolivia, Peru and El Salvador) have almost adopted them all, some others (like Argentina) have barely adopted any.

Graph 2 explores the relationships between the strength of state capacity and the adoption of drinking-water quality standards for pesticides (in a context, as detailed above, where the strength...
of the domestic challenge for pesticides is average or high). It reports the proportion of the 1993 WHO pesticides guidelines included in Latin American national regulations by 2011.


Graph 2 suggests that, as state capacity increases, in a context where the domestic challenge is medium or strong, the adoption of diffused standards for pesticides weakens. However, the proportion of pesticide guidelines adopted nationally could be misleading, as it would be arguably redundant to monitor the quantity of a pesticide in drinking water if the pesticide is banned in the country. Moreover, strong states are perhaps more likely to have banned the most dangerous pesticides through other legislations, which would bias the data compiled. To explore this hypothesis, Graph 3 shows the percentage of pesticides that have been banned nationally or for
which there was a national standard complying with the WHO guideline, among all those for which the WHO had set a guideline, by country.

Graph 3. Proportion of the 1993 WHO Pesticides Guidelines Included in National Drinking-Water Quality Regulations or for which the Pesticide is Banned, 2011

Overall, Graph 3 suggests the same relationships as Graph 2, i.e. that stronger state capacity limits the diffusion of pesticide standards (in a context where the domestic challenge is average or strong).

Table 4 summarizes the main variations in variables noted through the comparative insights for the 16 Latin American countries under study regarding the diffusion of WHO guidelines for arsenic, lead and pesticides. The next two subsections trace the process of these changes in two countries (Bolivia and Chile) to identify the causal mechanisms at play.
4.4. Tracing the Process of the Changes in Arsenic, Lead and Pesticides Limit Values in Bolivia

The Bolivian regulation of drinking-water quality is the *Norma Boliviana* 512 (NB 512). It was originally established in 1985, and then revised in 1997 and 2005. Considered as a technical regulation, it was developed (and has been revised) by a technical instance\textsuperscript{20} but nevertheless was officialised through governmental approval.

The 1985 and 1997 versions of the NB 512 included few parameters, and no pesticides. In both of them the limit value for arsenic was set at 0.05 mg/L (WHO arsenic guideline of 1984). As for lead, whereas its limit value was of 0.10 mg/L in 1985 (corresponding to the 1971 WHO standards), it was lowered to 0.01 mg/L in 1997 (coherent with the WHO 1993 guideline).

In 2005 the revision of the NB 512 came with many changes, among which the lowering of the limit for arsenic to 0.01 and the inclusion of pesticides limit values (referring to the WHO). The 2005 NB 512 was reconfirmed in 2007 after the change of government.

4.4.1. The adoption of the NB 512 in 1985

The process of adoption of the NB 512 in 1985 could not be documented, as no archival documentation of the latter was available, and it wasn’t possible to identify (to eventually

\textsuperscript{20} In 1985, it was the *Dirección General de Normas y Tecnología* of the *Ministro de Industria, Comercio y Turismo*; from 1997 on it was the *Instituto Boliviano de Normalización y de Calidad*. 

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Table 4. Summary of Variables for the Diffusion of WHO Guidelines for Arsenic, Lead and Pesticides in Latin American Countries

<table>
<thead>
<tr>
<th>Domestic Challenge</th>
<th>State Capacity</th>
<th>Diffusion of WHO Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Arsenic</td>
</tr>
<tr>
<td>Strong</td>
<td>Strong</td>
<td>-</td>
</tr>
<tr>
<td>Strong</td>
<td>Weak</td>
<td>+</td>
</tr>
<tr>
<td>Weak</td>
<td>Strong</td>
<td>+</td>
</tr>
<tr>
<td>Weak</td>
<td>Weak</td>
<td>+</td>
</tr>
</tbody>
</table>
interview) participants in the process. Yet, the manager of a water provider in the 1980s was very straightforward about the setting of this regulation: “All these regulations [like the Norma Boliviana 512] were, in a certain way, a copy of those of the World Health Organization. Then, we worked, and we had advisers from the World Health Organization. When I was manager, I had a permanent adviser from the World Health Organization” (author’s translation, see Appendix 5).

4.4.2. The revision of the NB 512 in 1997
The 1997 revision of the NB 512 was developed by a technical committee, which included the Association of Enterprises of Drinking Water and Sanitation (Asociación de Empresas de Agua Potable y Saneamiento – ANESAPA), the Bolivian Association of Sanitary Engineering (Asociación Boliviana de Ingeniería Sanitaria – ABIS) and the Office for Basic Services (Dirección de Servicios Básicos). The process did not include much socialization and diffusion, as it was considered to address technical specifications. The more restrictive limit value for lead was not given particular attention, despite the fact that a higher limit value was allowed in the concession contract for drinking-water services and sanitation, which was enacted a few months prior to the NB 512, and in the regulation of the 1992 Environmental Law (Ley del Medio Ambiente) that defined quality parameters for water sources for human use (Superintendencia de Aguas, 1997; Bolivia, 1995; Interview with independent consultant).

4.4.3. The revision of the NB 512 in 2005
The revision of the NB 512 that led to the adoption of the regulation in 2005 included the work of a technical committee in 2002, in which participated academics, water providers and governmental instances related to the issue. Originally, the project of regulation included the integration of limit values for pesticides but not the lowering of the limit of arsenic. It maintained the lead limit value (which had been lowered in the past revision). Some of the observations made by participants to
this committee in January 2002 concerned pesticides: noting the limit values proposed may not be achievable in the country, that the most used pesticides should be mentioned explicitly, and that some pesticides should be further restricted. Yet it was apparently little discussed and definitively it was decided to maintain the pesticides limit values in the regulation. Similarly, for lead, two water providers noted they would prefer to increase the limit value, but it remained restrictive as in the 1997 revision (IBNORCA archives).

The proposed NB 512 was revised again by a smaller technical committee in 2004 before being published in 2005. It is at this step that it was decided that the arsenic limit value would be lowered and the pesticide limit values would refer to the WHO guidelines. According to an interviewee who participated actively in the revision of the regulation, the extent to which pesticides were likely to be encountered in drinking water was unknown (and was not planned to be studied further in a short-time perspective). As for arsenic, it was not reported that any discussion took place regarding whether it was an upcoming challenge. (IBNORCA archives)

It was further evidenced that the applicability of the new NB512 had not been studied prior to its adoption when, in 2010, some water providers wrote to the Ministry of Water to complain that they couldn’t comply with the NB512 (IBNORCA archives). A interviewee in charge of the laboratory of one of the main water providers in Bolivia mentioned that the first time the laboratories of water providers were consulted regarding the applicability of the limit values was in 2010, in preparation of the second edition of the Reglamento Nacional para el Control de la Calidad del Agua para Consumo Humano (implementing the NB512).

Overall, according to the information of the Bolivian processes that could be located, it seems that the domestic challenges were not documented during the process of revising regulations, and although a few actors did mention some of the limit values may not be achievable in the country,
neither the lack of information or these advices impeded the inclusion of these more restrictive limit values for arsenic, lead and pesticides. This is in line with hypothesis 1.3, according to which, the strength of the domestic challenge does not limit the adoption of a diffused policy when state capacity is weak. The analysis suggests that the causal mechanism is indeed that, as domestic challenges are not documented by governmental instances and stakeholders do not put pressure to prevent the adoption of more restrictive regulations, the diffused policy is adopted extensively without much preoccupation.

4.5. Tracing the Process of the Evolution of Pesticides, Arsenic and Lead Limit Values in Chile

The Chilean regulation of drinking-water quality is the Norma Chilena 409 (NCh409), which was originally established in 1970 and had revisions adopted in 1984 and 2007. The regulations were prepared by a technical institute (the Instituto Nacional de Investigaciones Tecnológicas y Normalización originally, then the Instituto Nacional de Normalización), and then officialised by the Ministerio de Obras Públicas (in 1970) and the Ministerio de Salud (in 1984 and 2007). The change of ministry officialising the regulation was not pointless. Indeed, a supreme decree of the Health Ministry adopted in 1969 (DS735/69) was competing with the Public Works Ministry regulation of 1970 until 1984, when both were harmonized and merged.

4.5.1. The contentious limit value for arsenic

One (apparently the most) contentious issue between the Norma Chilena 409 of 1970 and the Health Ministry’s Supreme Decree of 1969 was precisely the limit value of arsenic (Interview with civil servant from Health Ministry). Whereas the decree set this value at 0.05 mg/L (like the WHO standards of 1963) the NCh409/Of70 set it at 0.12. The revised version of the NCh409 in 1984 changed to a limit value of 0.05 for arsenic. In 2007, the last revision adopted a limit value of 0.01, to be effective 10 years after the promulgation of the regulation (i.e. in 2017).
During the revision process of the NCh409 in 1978-1983, the limit value for arsenic was highly discussed. SENDOS and EMOS (main water providers) wanted the limit value to, respectively, stay at 0.12 or be at 0.10 (INN Ruta Digital NCh409). An interviewee who participated in the process recalled: “I remember that SENDOS was the most preoccupied. It said: ‘How will I comply with this? Arsenic, how do I comply?’” (author’s translation, see Appendix 5). The Health Ministry insisted on the limit value to be at 0.05. The disagreement was so important that the Health Ministry stopped participating in the meetings and the revision process was interrupted in June 1983. The revision process was resumed in December 1983 following a letter from SENDOS which stated that it was finally agreeing for the limit value of arsenic to be 0.05, which was required for them to get project funding from the Inter-American Development Bank (INN Ruta Digital NCh409).

The revision process of the NCh409, which took place from 1998 until 2004, was also suspended because of a disagreement at least partly on the limit value for arsenic (in November 1999). The Health Ministry stood firm in the process. One civil servant from the Health Ministry narrated: “I would say that what influenced a lot the 2005 revision was that the Health Ministry had its own regulation [Reglamento] and it started to implement it and sanction […]. Then came a moment when we said: ‘OK, let’s find an agreement’… As well as there were other parameters that the Health Ministry wanted to integrate in the national standards [Norma]” (author’s translation, see Appendix 5). To resolve the disagreement, the Health Ministry and the Superintendencia de Servicios Sanitarios conducted bilateral discussions of which the results were later presented to the committee. The bilateral proposition they reach suggested a limit value of 0.01 for arsenic with a delay of 10 years to enter into force, which was the value then accepted by the committee and promulgated in the revised regulation (INN Ruta Digital NCh409).
4.5.2. Downplayed Limit Values for Pesticides

As for pesticides, none were included in the regulations up to 1984, in which nine were included but with recommended (not mandatory) limit values: aldrin and dieldrin, chlordane, 2,4-D, endrin, fenoprop, heptachlor (& heptachlor epoxide), hexachlorobenzene, lindane and methoxychlor; four of these were prohibited in the country in 1987, two later on (in 1998 and 2002). In the NCh409 of 2007, four pesticides had limit values: 2,4-D, lindane (prohibited in 1998), methoxychlor and pentachlorophenol (prohibited in 2004).

In the revision process of 1978-1983, the committee decided in June 1982 to remove the limit values for pesticides of the NCh409 to put it in an appendix and as recommended instead of mandatory. This was how pesticides ended in the revised NCh409 adopted in 1984.

In the 1998-2004 revision process, the inclusion of pesticides was discussed and apparently a contentious issue. At some point the CONAMA informed it considered inconvenient to add more pesticides to the NCh409, also mentioning that the technique for detection would imply costs to water providers. It suggested to better document the use and presence in water of pesticides before adding them to the NCh409. An interviewee who participated in the process recalled that a study indeed documented further the pesticide-removal capacity and the presence of pesticides in the country, to balance it with the cost these treatments would imply:

“As for the organic parameters, there were changes in the pesticides […]. Chile did not copy the guidelines of the World Health Organization (poor countries do so), but rather there was a real study that was conducted to assess what we would be able to accept. […] This study analyzed what treatments could achieve and the removal of parameters […] and there was also a study to know which organic parameters we have in our country. Why? Because the list of the World Health Organization is enormous. If you accept all of it, there is no purse that can afford the monitoring” (author’s translation, see Appendix 5).

The Health Ministry-SISS bilateral agreement mentioned here above proposed the inclusion of six agricultural pesticides: four that ended up in the revised NCh409 as well as aldicarb and
carbofurane. After consultation with the Servicio Agrícola y Ganadero, the committee excluded these latter two, as they were not considered persistent in water (INN Ruta Digital NCh409).

4.5.3. The Overlooked Limit Value for Lead
As for lead, the limit value in the NCh409 of 1984 was set to 0.05 mg/L and maintained at this level in the 2007 revision, despite the fact that WHO lowered its guideline to 0.01 mg/L in 1993. The limit value was decided to be set at 0.05 in 1984 following a specific analysis for this parameter. First, the draft regulations of 1978 and 1981 suggested to maintain the 0.10 mg/L limit value that was existing in the previous regulation. After observations were raised on this specific value, the technical committee resolved on May 31, 1983 to fix the limit value at 0.05 mg/L considering four points: 1) the guideline set by the WHO; 2) the absence of data on lead analyses in water (generally in Chile); 3) specific analyses of water did not find lead; and 4) in 1981 the national office in charge of drinking-water services (Servicio Nacional de Obras Sanitarias – SENDOS) had conducted lead analysis in all water services and did not find any (INN Ruta Digital NCh409).

In the process of revision of the NCh409 which concluded in 2007, lead was not reported to be parts of the contentious issues. However, the limit was maintained higher than the WHO guideline and a representative from a water provider mentioned it was well known that an upcoming issue in the sector would be to deal with lead, since in many city areas the distributive system was built of water pipes getting old with welds containing lead (INN Ruta Digital NCh409; Interview with a water provider’s representative).

Overall, both the limit value for arsenic and the inclusion of pesticides in the Chilean drinking-water-quality regulation were contentious. They were debated and the opinion of stakeholders (water providers and agricultural sector) weighted heavily in the decision. The WHO guidelines
were definitely giving a diffusion pressure, but that was dealt with nationally. Especially in the case of arsenic, the strength of the domestic challenge made no doubt to the deciders in Chile, and stakeholders did influence the regulations finally adopted. For pesticides, the potential cost that would have been required for the monitoring of the presence of pesticides in drinking water seemed the most determinant in explaining the adoption of only a very limited number of limit values. As for lead, indications of specific debates or direct pressures from water providers for its non-inclusion were not found, but it made no doubt to one of the participant of the process that the fact that it represented a challenge domestically influenced the non-diffusion of the most restrictive 1993 WHO guideline. In the 1984 process, when changing the standard wasn’t a domestic challenge (according to documentation), the 1984 WHO guideline was adopted. Therefore, the analysis of the adoption processes in Chile suggests that hypothesis 1.1, which states that a strong domestic challenge leads strong states to limit policy diffusion, is confirmed, as well as hypothesis 1.2, which states that if the domestic challenge is weak, than adoption is extensive.

The analysis highlights two causal mechanisms. First, the adoption of diffused policies is limited when state instances document that the standard would not be a challenge domestically, and extensive if documentation concludes it isn’t. Second, the adoption of diffused policies is limited when a stakeholder that would bear the cost of the new measures put pressure on the state to prevent the adoption of more restrictive regulations.

5. When Facing a Transboundary Challenge: Another Arena of Action for Strong States

This section intends to assess the impact of a transboundary challenge on diffusion. To do so, it traces, through qualitative insights, the processes of adoption of drinking-water regulations for copper in 16 Latin American countries following the change of the WHO guideline in 1993. Then,
through a within-case approach, it analyses the decision-making process and the causal pathways behind the adoption of national drinking-water standards for copper in two case studies where the strength of the transboundary challenge differs: Bolivia and Chile.

5.1. The Transboundary Nature of the Challenge Associated with a Drinking-Water Standard for Copper

Although both lead and copper have the same potential source of contamination of water (through corrosion of water pipes), the challenge associated with a drinking-water standard for copper is (contrary to lead, studied in section 4.2) not only domestic, but also transboundary. Indeed, lead is not used anymore to produce water pipes, although it has been used widely a few decades ago. Therefore drinking water of various (but not all) countries passes through lead water pipes, and the limit value for lead in drinking water represents a domestic-only challenge. However, water pipes sold on the international market over the last decades are mostly made of steel (including iron and nickel), copper and plastic (Lazich and Burton, 2007). The challenge associated with establishing a limit value for copper in drinking water has consequently a transboundary dimension that the lead one does not.

5.2. Comparative Insights on the Adoption of National Drinking-Water Standards for Copper in Latin America

The guideline for copper in the 1984 WHO Guideline was of 1.0 mg/L, based on laundry and staining properties, not specifically on health. In 1993, a health-based guideline was provisionally set at 2 mg/L and was further confirmed in the 2004 and 2011 WHO Guidelines. The 1993 guideline was less restrictive than the one of 1984, but at the same time directly associated with health (rather than only to laundry and other staining properties as in 1984). This modification contrasted with the others made in the 1993 WHO guidelines, which mostly integrated new
chemical health-based guidelines (like for pesticides) or modified existing guidelines to make them more restrictive (like for arsenic and lead) (WHO, 1984; 1993; 2004).

All Latin American countries adopted at least one drinking-water quality regulation post-1993 (after the change of the WHO guideline) and all of these regulations complied with the less restrictive guideline of 1993 for copper (2.0 mg/L). Interestingly however, some maintained a more restrictive guideline posterior to 1993, of 1.0 mg/L (the 1984 WHO guideline) or 1.5 mg/L (the 1971 WHO standard) (see Table 5).

### Table 5. Copper Production, State Capacity and Drinking-Water Quality Regulations

<table>
<thead>
<tr>
<th>Country</th>
<th>Copper Producers (1990 Mineral Rents as % of GDP)</th>
<th>State Capacity*</th>
<th>Adoption of Limit Value for Copper in Drinking Water post-1993 (Year in Force)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inferior to 1.5 mg/L maintained</td>
</tr>
<tr>
<td>Argentina</td>
<td></td>
<td>3</td>
<td>X (1994, 2007)</td>
</tr>
<tr>
<td>Venezuela</td>
<td></td>
<td>3</td>
<td>X (1998)</td>
</tr>
<tr>
<td>Brazil</td>
<td>X (0.65%)</td>
<td>3</td>
<td>X (1994, 2006)</td>
</tr>
<tr>
<td>Uruguay</td>
<td></td>
<td>3</td>
<td>X (1994, 2006)</td>
</tr>
<tr>
<td>Mexico</td>
<td>X (0.62%)</td>
<td>3</td>
<td>X (1994, 2006)</td>
</tr>
<tr>
<td>Chile</td>
<td>X (10.02%)</td>
<td>3</td>
<td>X (1994, 2006)</td>
</tr>
<tr>
<td>Panama</td>
<td></td>
<td>2</td>
<td>X (1999, 2003)</td>
</tr>
<tr>
<td>Peru</td>
<td>X (5.96%)</td>
<td>2</td>
<td>X (1999, 2003)</td>
</tr>
<tr>
<td>Guatemala</td>
<td></td>
<td>1</td>
<td>X (2000)</td>
</tr>
<tr>
<td>Honduras</td>
<td></td>
<td>1</td>
<td>X (1995)</td>
</tr>
<tr>
<td>Bolivia</td>
<td></td>
<td>1</td>
<td>X (1997, 2005)</td>
</tr>
<tr>
<td>Nicaragua</td>
<td></td>
<td>1</td>
<td>X (1994)</td>
</tr>
</tbody>
</table>

* Strong state capacity here defined as average GDP per capita in 1993 over 7000 US$, medium as between 2500 and 7000 US$ and weak as less than 2500 US$ (2010 constant US$). Countries are in order from strongest to weakest.

The qualitative analysis of the chronology of adoption of Latin American regulations suggests that the limit value they set for copper is largely determined by the year of the first adoption of a
national regulation and the extent to which copper is associated with a transboundary challenge for the country.

On the one hand, some Latin American countries have adopted drinking-water regulations prior to 1993, and some have only adopted their first drinking-water quality regulation after 1993. For the latter, the limit value of 2.0 mg/L was adopted, which was the most recent WHO guideline for copper at the time of adoption (see Table 5).

On the other hand, for countries that had a drinking-water quality guideline prior to 1993, the guideline for copper was not necessarily modified. All countries that were not copper producers, i.e. for which copper was not a transboundary challenge, have maintained in their post-1993 regulations a more restrictive limit value. Besides, all countries that were copper producers in 1993 have changed the limit value for copper in their first drinking-water quality regulation post-1993 (see Table 5).

5.3. Tracing Process of Drinking-Water Regulations for Copper in Bolivia and Chile
To analyze the causal pathways leading to the adoption (or not) of drinking-water quality regulations for chemical representing a transboundary challenge, this section traces the process of the adoption and revision of limit values for copper in national drinking-water regulations in two case studies: Bolivia and Chile. Generally the committees and processes were the same ones that developed drinking-water regulations for other parameters, including for lead (see sections 4.4 and 4.5 for the description of these committees and processes). Therefore this section only presents the specificities of the decisions made on the limit value for copper.

In Bolivia, the limit value for copper was set at 0.05 mg/L in 1997 (significantly lower than the WHO guideline) and then at 1.0 mg/L in 2005. The limit value in the NB 512 of 1997 took up the
value of the regulation of the 1992 Environmental Law (Ley del Medio Ambiente) that defined quality parameters for water sources for human use. As the NB 512 was considered to be a “technical regulation” the process was not much socialized nor diffused. The limit value for copper was not particularly discussed, although it was more restrictive than the concession contract for drinking-water services and sanitation in La Paz and El Alto, which was enacted a few months prior to the NB 512 (Superintendencia de Aguas, 1997; Bolivia, 1995; Interviews with civil servant from Health Ministry and worker from water provider).

In Chile, the limit value of 1.0 mg/L was included in the NCh409 of 1985 and was increased to 2.0 mg/L in the 2007 revision of the regulation. The limit value was fixed at 1.0 mg/L in the 1985 edition without major discussion. It was fixed early in the process, in the draft regulation of November 25, 1981, and was not reported to be contested. However the WHO fixed in 1993 and confirmed in 2004 a health-based guideline for copper in drinking water at 2.0 mg/L. Although lower, the 1984 WHO guideline was not a health-based guideline, and therefore did not link health to the presence of copper in drinking water. This association was however made by the WHO starting in 1993, and a technical commission was created in Chile specifically to assist the government in its negotiations with the WHO, foreign countries and other international organizations about the revision of the “WHO drinking-water quality guidelines” and specifically the negotiations regarding copper and drinking water (Chile, 1997; 2000; INN Ruta Digital NCh409).

In the Chilean process of revision of the NCh409 that started in 1998 and concluded in 2005 with its adoption, copper was one of the specific parameters on which there was disagreement between the Health Ministry and the INN technical committee, which led to a suspension of the process in November 1999. As the process resumed in 2000, the limit value considered for copper was of 1.0
mg/L, as a result of bilateral discussions between the Health Ministry and the Superintendencia de Servicios Sanitarios. But this value did not stand and was finally not adopted in the regulation. Indeed in July 2004 the Chilean Commission of Copper (Comisión chilena del Cobre – COCHILCO) objected it arguing that the limit value of 1.0 mg/L would give the signal that the scientific view previously expressed by Chile to the WHO had changed. It also stated that this change of view could influence changes for a more restrictive guideline (of 1.0 mg/L) to be adopted by the WHO and European Union and have economic consequences (on the pipes market and on the cost of reducing copper in drinking water worldwide). Following this representation and discussion within the committee, the limit value adopted was finally that of 2.0 mg/L (INN Ruta Digital NCh409).

Overall, the processes of decision-making for regulation for copper in drinking water in Bolivia and Chile suggest that whereas in a country where the policy diffused represents a weak transboundary challenge, a most restrictive policy may be adopted or maintained, the situation is completely different in a country where the policy diffused entails a strong transboundary challenge. Indeed, then only the less restrictive (modified) policy is likely to be adopted. Moreover, the Chilean case suggests that, when state capacity is strong, there can be pressure from stakeholders toward the state, in order to develop knowledge and try to influence the international standardization of the policy.

**Conclusion**

By analyzing positive and negative cases of diffusion, this paper sheds light on the varying adoption patterns of non-politicized policies diffused by international actors. Its main finding suggests that stronger state capacity limits the adoption of diffused policies that represent a strong
domestic challenge for the country. International influences weigh heavier where state capacity is weaker and may, in these cases, lead to the adoption of more ambitious policies than if the policy was only developed nationally (and therefore constrained by the weak capacity of the state). Conversely, when state capacity is strong, policy adoption is likely to be cautious and informed by national constraints, and therefore less likely to be influenced strongly by foreign entities or ideas.

This main result originally contributes to the diffusion literature by, first, comforting and complementing the argument that policy diffusion depends on the extent of pressures exerted by international organizations on countries. The results are coherent with the expectation that the adoption of diffused policies is more extended in weak states (likely to be more dependent on international organizations), but they also suggest that external pressures do not explain all variations. Indeed, strong states also adopt diffused policies, but they tend to do so when the domestic challenge is weak. Nevertheless, it remains that it is only in weak states that otherwise cautious policy development may be ambitious under international influences. Whether this “ambitious” policy development goes beyond mere window dressing then depends on the implementation process (which is analyzed in this dissertation’s third paper).

The main argument of this paper also suggests that it is important for the diffusion literature to distinguish the adoption step from the spread one. Indeed, actors that may be important for the spread (like policy entrepreneurs, expert networks, etc.) are not necessarily decisive at the time of adoption. Strong states appear less permeable to policy entrepreneurs than weak states, in this sense, given that they assess the strength of the domestic challenge entailed by a diffused policy before its adoption.

Additionally, this paper highlights the importance of a dimension of diffused policy that has been largely overlooked: the level of the challenge. A policy entailing a challenge that is essentially
domestic (i.e. that countries are only affected whenever it is implemented within their own borders) has very different implications than one where the challenge would be transboundary (i.e. countries care whether others implement the said policy). This distinction has not been made in the diffusion literature, yet this variable has consequences for the study of diffusion processes. Indeed, if the challenge that a diffused policy poses is transboundary (rather than domestic), then analyzing the spread and adoption steps of the diffusion process is not sufficient to understand key dynamics. Studying the standardization step of policy diffusion is then central to the analysis. This is because strong states also have the possibility to influence international policy if they have an interest in the impact international influences may have in other countries. In this case, and if they are successful in changing the international policy, diffused policies may be largely adopted. But the reason for this extensive adoption would be that the policy was modified prior to diffusion, to lessen the transboundary challenge it was embodying for some states.

More generally, this paper contributes to the institutionalist literature by the definition of state capacity it is based on. It underlines the relevance to compare and measure state capacity on the basis of its resources (required to project its power), rather than on its ends or outcomes (which depend on the political choices that were made by the state). This definition allows to conceptually and empirically dissociate state capacity from the political choices that are made to develop specific functional capacities.

Substantively, this paper also contributes to the understanding of the development of the water sector in Latin America, and more specifically of one dimension of water reforms (the adoption of drinking-water standards) that had been little documented. This study outlines that these standards are one piece of the regulatory framework that was influenced by unique dynamics, distinct from those of water reforms generally. For instance, their development involved actors from outside the
sector and was strongly influenced by the World Health Organization’s guidelines. This paper evidences that water reforms, like reforms in other policy sectors, are not a homogeneous whole. Their understanding therefore calls for the necessary disaggregation of dynamics and actors on an issue-per-issue basis, which is what this paper has done for the adoption of drinking-water standards. These issues, less salient than strongly politicized ones (like privatization reforms), are as consequential in the life of states and their citizens, especially for their health and wellbeing.
References


Chile, Ministerio de Minería. 2000. Decreto 125 – Renueva funcionamiento de la Comisión Técnica Asesora del Presidente de la República, en las negociaciones con la Organización
Mundial de la Salud (OMS), creada por Decreto n° 296 de 1993, y modifica números que indica. June 20.


## Appendix 1. List of Chemical Substances for which the WHO Set a Health-based Guideline at Least Once Since 1984

### Naturally occurring
- Arsenic
- Barium
- Boron
- Chromium
- Fluoride
- Manganese
- Molybdenum
- Selenium
- Uranium

### From industrial sources and human dwellings

**Inorganics**
- Cadmium
- Cyanide
- Mercury
- Sulfate

**Organics**
- Benzene
- Carbon tetrachloride
- Di(2-ethylhexyl)adipate
- Di(2-ethylhexyl)phthalate
- Dichlorobenzene, 1,2-
- Dichlorobenzene, 1,4-
- Dichloroethane, 1,2-
- Dichloroethene, 1,1-
- Dichloroethene, 1,2-
- Dichloromethane
- Edetic acid (EDTA)
- Ethylbenzene
- Hexachlorobutadiene
- Monochlorobenzene
- Nitritotriacetic acid (NTA)
- Pentachlorophenol
- Styrene
- Tetrachloroethene
- Toluene
- Trichlorobenzenes
- Trichloroethane, 1,1,1-
- Trichloroethene
- Xylenes

### From agricultural activities

**Non-pesticides (mg/L)**
- Nitrate (as NO3-)
- Nitrite (as NO2-)

**Pesticides used in agriculture (ug/L)**
- Alachlor
- Aldicarb
- Aldrin and dieldrin
- Atrazine
- Bentazon
- Carbofuran
- Chlordane
- Chlorotoluron
- Cyanazine
- 2,4-D (2,4-dichlorophenoxyacetic acid)
- 2,4-DB
- 1,2-Dibromo-3-chloropropene
- 1,2-Dibromoethane
- 1,2-Dichloropropene
- 1,3-Dichloropropene
- Dichlorprop
- Dimethoate
- Diquat
- Endrin
- Fenoprop
- Glyphosate
- Heptachlor & heptachlor epoxide
- Hexachlorobenzene
- Isoproturon
- Lindane
- MCPA [4-(2-methyl-4-chlorophenoxy)acetic acid]
- Mecoprop (MCPP; [2-(2-methyl-chlorophenoxy) propionic acid])
- Methoxychlor
- Metolachlor
- Molinate
- Pendimethalin
- Permethrin
- Propanil
- Simazine
- 2,4,5-T
- Terbuthylazine
- Trifluralin
**Used in water treatment or materials in contact with drinking-water**

*Disinfectants*
- Chlorine
- Monochloramine

*Disinfection by-products*
- Bromate
- Bromodichloromethane
- Bromoform
- Chloral hydrate (trichloroacetaldehyde)
- Chlorate
- Chlorite
- Chloroform
- Cyanogen chloride
- Dibromoacetonitrile
- Dibromochloromethane
- Dichloroacetate (Dichloroacetic acid)
- Dichloroacetonitrile
- Formaldehyde
- Monochloroacetate
- Trichloroacetate (Trichloroacetic acid)
- Trichloroacetonitrile
- Trichlorophenol, 2,4,6-
- Trihalomethanes

*Contaminants from treatment chemicals*
- Acrylamide
- Aluminium
- Epichlorohydrin
- Iron

*Contaminants from pipes and fittings*
- Antimony
- Benzo[a]pyrene (Polynuclear aromatic hydrocarbons (PAHs))
- Copper
- Lead
- Nickel
- Vinyl chloride
- Zinc

**Pesticides used in water for public health purposes**
- Chlorpyrifos
- DDT and metabolites
- Pyriproxyfen

**Cyanotoxins**
- Microcystine-LR
Appendix 2. Sources of Data on Water Pipes and Mineral Production

A2.1. Sources used for data collection on material of water pipes


Combariza Bayona, David Andrés. 2009. Contaminación por metales pesados en el embalse del Muña y su relación con los niveles en sangre de plomo, mercurio y cadmio y alteraciones de salud en los habitantes del Municipio de Sibaté (Cundinamarca) 2007. Master’s Thesis, Departamento de Toxicología, Facultad de Medicina, Universidad Nacional de Colombia.

EPMAS, Aguas de Quito. N.d. “Sistema de distribución”. URL: http://www.aguaquito.gob.ec/sistema-de-distribucion


Municipalidad de Bogotá. 1886. Acuerdo 23 por el cual se aprueba un contrato sobre provision de aguas a la ciudad por tubería de hierro. July 26. URL: http://www.alcaldiaobogota.gov.co/sisjur/normas/Norma1.jsp?i=8496


Serracán, Meredith. 2015. “Riesgos para la salud por uso de materiales contaminantes.” Panama América, December 18.


### A2.2. Sources for data on mineral production


Appendix 3. List of Interviewees

Most interviewees requested not to be identified when quoted and not to be named. This is what explains the format of the list of interviewees listed hereafter and the way references are made to interviews in the text.

Bolivia

Five of the interviewees directly participated in at least one process of revision of the NB512.


Ana María Romero, Centro Aguas y Saneamiento Ambiental, Cochabamba, 2014.

Claudia Vargas Vucsanovich, expert on water and sanitation, videoconference interview, 2014.

Civil servant 1 from Autoridad de Fiscalización y Control Social de Agua Potable y Saneamiento Básico (AAPS), Cochabamba, 2014.

Civil servant 2 from Autoridad de Fiscalización y Control Social de Agua Potable y Saneamiento Básico (AAPS), La Paz, 2014.

Civil servant 1 from Dirección de Planificación, Ministerio de Medio Ambiente y Agua, Cochabamba, 2013.

Civil servant 2 from Dirección de Planificación, Ministerio de Medio Ambiente y Agua, Cochabamba, 2013.

Civil servant from Viceministro, Ministerio de Medio Ambiente y Agua, Cochabamba, 2013.

Civil servant from Health Ministry, 1980s-1990s, phone interview, 2016.

Edwin Astorga, Instituto de Ingeniería Sanitaria, La Paz, 2014.

Independent consultant on water and sanitation issues, worked on projects of the World Bank in Bolivia (among others), La Paz, 2014.

Oscar Arteaga, Asociación Nacional de Empresas e Instituciones de Servicio de Agua Potable y Alcantarillado, La Paz, 2013.

Patricia Venegas, principal adviser in policies, PERIAGUA (Programa para Servicios Sostenibles de Agua Potable y Saneamiento en Áreas Periurbanas), GIZ (German Technical Cooperation), La Paz, 2013.


Worker of EPSAS-La Paz, La Paz, 2014.

Worker of IBNORCA in the 2000s, La Paz, 2014.

Worker 1 of SEMAPA in the 2000s, Cochabamba, 2014.

Worker 2 of SEMAPA in the 2000s, Cochabamba, 2014.

Worker 3 of SEMAPA in the 2000s, Cochabamba, 2014.

Chile

Three of the interviewees directly participated in at least one process of revision of the NCh409.

Jorge Ale Yarad, civil servant of the Ministerio de Economía in the 1980s (in charge of the development of the regulatory framework for the water and sanitation sector), Santiago, 2014.

Magaly Espinosa, Superintendenta, Superintendencia de Servicios Sanitarios (SISS), Santiago, 2014.

Civil servant of the Dirección de Obras Hidraúlicas in the 2000s, Santiago, 2014.

Civil servant of the Instituto Nacional de Normalización (INN) in the 2000s, Santiago, 2015.


Civil servant of the Health Ministry in the 2000s, Santiago, 2014.

Civil servant of the Servicio Nacional de Obras Sanitarias (SENDOS) in the 1980s, Santiago, 2015.

Civil servant 1 of the Superintendencia de Servicios Sanitarios (SISS) in the 2000s, Santiago, 2014.

Civil servant 2 of the Superintendencia de Servicios Sanitarios (SISS) in the 2000s, Santiago, 2015.

Worker of water provider 1 in the 1980s-2000s, Santiago, 2015.

Worker of water provider 2 in the 1990s-2000s, Santiago, 2015.
Appendix 4. Cross-country Comparisons with Alternative Measures of State Capacity

As there are many different ways to define and conceptualize state capacity in the literature, there are different indicators proposed to measure it. GDP per capita is one of them, has the advantages of being easily available over years and “highly correlated with a variety of measures of bureaucratic/administrative capacity”. However it may be endogenous to state capacity and could be associated to “causal channels other than bureaucratic/administrative capacity” (Hendrix, 2010: 277).

Considering these limitations of measuring state capacity with GDP per capita, this appendix replicates tables 2 and 3 with two alternative measures of state capacity: government effectiveness and adult literacy rate. Government effectiveness is from a scale of -2.5 (weakest) to 2.5 (strongest) and adult literacy rate consists in the percentage of the adult population that is literate.

These two alternative measures are used for the replications because they are available for all countries from the sample, for a year relatively close to 1993 (which is the year when the new guidelines for arsenic and lead were adopted and diffused) and because they allow to discriminate between the 16 Latin American countries compared. Most other measures for state capacity used in the literature do not meet these three criteria. For instance, the measure of “regular census administration” identifies 12 of the 16 Latin American countries of the sample as strong states in 1993 (Soifer, 2013). Other measures, like the “reach across territory”, the “infrastructural and coercive capacity index”, and the “national statistical capacity” were developed with data available from recent years only (Luna and Toro, 2014; Luna and Soifer, 2015; 2017; World Bank, 2017a; Dargent et al., 2018). Using these would imply assuming that state capacity is slow-moving over
time (following a path-dependent pattern), but this is not consensual in the literature, as some also argue that it may shift quickly (Luna and Soifer, 2017: 890).

Tables 6 and 7 present the cross-country comparison of the diffusion of the arsenic guideline in Latin American drinking-water quality regulations, using respectively government effectiveness and adult literacy rate as alternative measures of state capacity to the GDP per capita measure used in Table 2.

**Table 6. Natural Presence of Arsenic in Ground Waters, State Capacity (Government Effectiveness) and Drinking-Water Quality Regulations**

<table>
<thead>
<tr>
<th>Country</th>
<th>Documented Natural Presence of Arsenic in Ground Waters</th>
<th>State Capacity (Government Effectiveness in 1996)*</th>
<th>Adoption of 0.01 mg/L Limit Value for Arsenic in Drinking Water (Year Regulation Adopted)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Direct change of limit value</td>
</tr>
<tr>
<td>Chile</td>
<td>X</td>
<td>1.28</td>
<td>X (2007)</td>
</tr>
<tr>
<td>Uruguay</td>
<td>X</td>
<td>0.50</td>
<td>X (2011)</td>
</tr>
<tr>
<td>Argentina</td>
<td>X</td>
<td>0.27</td>
<td>X (2007)</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>X</td>
<td>0.26</td>
<td>X (2005)</td>
</tr>
<tr>
<td>Mexico</td>
<td></td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Panama</td>
<td></td>
<td>0.03</td>
<td>X (1999)</td>
</tr>
<tr>
<td>Peru</td>
<td>X</td>
<td>-0.04</td>
<td>X (2010)**</td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td>-0.15</td>
<td>X (2001)</td>
</tr>
<tr>
<td>Colombia</td>
<td></td>
<td>-0.19</td>
<td>X (1998)</td>
</tr>
<tr>
<td>Bolivia</td>
<td>X</td>
<td>-0.19</td>
<td>X (2005)</td>
</tr>
<tr>
<td>Guatemala</td>
<td>X</td>
<td>-0.50</td>
<td>X (2000)</td>
</tr>
<tr>
<td>Ecuador</td>
<td></td>
<td>-0.63</td>
<td>X (2005)</td>
</tr>
<tr>
<td>Venezuela</td>
<td></td>
<td>-0.72</td>
<td>X (1998)</td>
</tr>
<tr>
<td>El Salvador</td>
<td>X</td>
<td>-0.73</td>
<td>X (1998)</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>X</td>
<td>-0.82</td>
<td>X (1994)</td>
</tr>
<tr>
<td>Honduras</td>
<td></td>
<td>-0.86</td>
<td>X (1995)</td>
</tr>
</tbody>
</table>

* Countries are in order from strongest to weakest state capacity. As an indication, double lines separate countries with stronger state capacity (with government effectiveness over 0.10) from those with medium state capacity (government effectiveness between -0.10 and 0.10) and from those with weaker state capacity (government effectiveness below -0.10).

** In Peru, the number of years of the postponing period was not clearly defined

Sources: Own elaboration with data on presence of arsenic in ground waters from Bundschuh et al. (2008; 2011) and on government effectiveness from the World Bank (2017b).
Table 7. Natural Presence of Arsenic in Ground Waters, State Capacity (Adult Literacy Rate) and Drinking-Water Quality Regulations

<table>
<thead>
<tr>
<th>Country</th>
<th>Documented Natural Presence of Arsenic in Ground Waters</th>
<th>State Capacity (Adult Literacy Rate in 2000)*</th>
<th>Adoption of 0.01 mg/L Limit Value for Arsenic in Drinking Water (Year Regulation Adopted)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Direct change of limit value</td>
</tr>
<tr>
<td>Uruguay</td>
<td>X</td>
<td>97.6</td>
<td>X (2011)</td>
</tr>
<tr>
<td>Argentina</td>
<td>X</td>
<td>96.8</td>
<td>X (2007)</td>
</tr>
<tr>
<td>Chile</td>
<td>X</td>
<td>95.8</td>
<td>X (2007)</td>
</tr>
<tr>
<td>Costa Rica</td>
<td></td>
<td>95.6</td>
<td>X (2005)</td>
</tr>
<tr>
<td>Venezuela</td>
<td></td>
<td>92.5</td>
<td>X (1998)</td>
</tr>
<tr>
<td>Colombia</td>
<td></td>
<td>91.6</td>
<td>X (1998)</td>
</tr>
<tr>
<td>Panama</td>
<td></td>
<td>91.9</td>
<td>X (1999)</td>
</tr>
<tr>
<td>Ecuador</td>
<td></td>
<td>91.6</td>
<td>X (2005)</td>
</tr>
<tr>
<td>Mexico</td>
<td>X</td>
<td>91.2</td>
<td>X (2000)</td>
</tr>
<tr>
<td>Peru</td>
<td>X</td>
<td>89.9</td>
<td>X (2010)**</td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td>86.9</td>
<td>X (2001)</td>
</tr>
<tr>
<td>Bolivia</td>
<td>X</td>
<td>85.4</td>
<td>X (2005)</td>
</tr>
<tr>
<td>El Salvador</td>
<td>X</td>
<td>78.7</td>
<td>X (1998)</td>
</tr>
<tr>
<td>Honduras</td>
<td></td>
<td>75.0</td>
<td>X (1995)</td>
</tr>
<tr>
<td>Guatemala</td>
<td>X</td>
<td>68.5</td>
<td>X (2000)</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>X</td>
<td>66.5</td>
<td>X (1994)</td>
</tr>
</tbody>
</table>

* Countries are in order from strongest to weakest state capacity. As an indication, double lines separate countries with stronger state capacity (adult literacy rate over 94%) from those with medium state capacity (adult literacy rate between 88 and 94%) and those with weaker state capacity (adult literacy rate below 88%).

** In Peru, the number of years of the postponing period was not clearly defined.

Sources: Own elaboration with data on presence of arsenic in ground waters from Bundschuh et al. (2008; 2011) and on adult literacy rate from the UNESCO (2004).

Tables 6 and 7 show results that are very similar to those of Table 2: countries where state capacity was stronger and where it was documented that arsenic was present in ground waters limited the diffusion of the 0.01 mg/L limit value for arsenic in their national drinking-water quality regulations. Besides, where arsenic was present in ground waters but state capacity was weak, the guideline was largely diffused into national regulations.

Tables 8 and 9 present the cross-country comparison of the diffusion of the lead guideline in Latin American drinking-water quality regulations, using respectively government effectiveness and
adult literacy rate as alternative measures of state capacity to the GDP per capita measure used in Table 3. They both suggest that the countries with the strongest state capacity faced a challenge with the integration of a more restrictive lead limit value in their national drinking-water regulations and then tended to block the adoption of this guideline. When state capacity was weaker, countries adopted the most restrictive guideline no matter whether it represented a strong domestic challenge for them or not.

Table 8. Lead in Water Pipes, State Capacity (Government Effectiveness) and Drinking-Water Quality Regulations

<table>
<thead>
<tr>
<th>Country</th>
<th>Lead Water Pipes or Welds in at Least One Main City</th>
<th>State Capacity (Government Effectiveness in 1996)*</th>
<th>Adoption of 0.01 mg/L Limit Value for Lead in Drinking Water (Year Regulation In Force)</th>
<th>Change of limit value</th>
<th>Change postponed for 10 years</th>
<th>Higher limit value maintained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td>X</td>
<td>1.28</td>
<td>X (2011)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uruguay</td>
<td>X</td>
<td>0.50</td>
<td>X (2011)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argentina</td>
<td>X</td>
<td>0.27</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>X</td>
<td>0.26</td>
<td>X (2005)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>X</td>
<td>0.07</td>
<td>X (2000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panama</td>
<td>X</td>
<td>0.03</td>
<td>X (1999)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peru</td>
<td>-0.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>-0.15</td>
<td></td>
<td>X (2003)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colombia</td>
<td>-0.19</td>
<td></td>
<td>X (1994)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bolivia</td>
<td>-0.19</td>
<td></td>
<td>X (1997)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guatemala</td>
<td>-0.50</td>
<td></td>
<td>X (2000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecuador</td>
<td>-0.63</td>
<td></td>
<td>X (2005)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venezuela</td>
<td>-0.72</td>
<td></td>
<td>X (1998)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>El Salvador</td>
<td>-0.73</td>
<td></td>
<td>X (1998)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nicaragua</td>
<td>-0.82</td>
<td></td>
<td>X (1994)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Honduras</td>
<td>-0.86</td>
<td></td>
<td>X (1995)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Countries are in order from strongest to weakest state capacity. As an indication, double lines separate countries with stronger state capacity (government effectiveness over 0.10) from those with medium state capacity (government effectiveness between -0.10 and 0.10) and those with weaker state capacity (government effectiveness below -0.10).

Sources: Own elaboration with data on lead water pipes from sources listed in Appendix 2 and on government effectiveness from the World Bank (2017b).
Table 9. Lead in Water Pipes, State Capacity (Adult Literacy Rate) and Drinking-Water Quality Regulations

<table>
<thead>
<tr>
<th>Country</th>
<th>Lead Water Pipes or Welds in at Least One Main City</th>
<th>State Capacity (Adult Literacy Rate in 2000)*</th>
<th>Adoption of 0.01 mg/L Limit Value for Lead in Drinking Water (Year Regulation In Force)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Change of limit value</td>
</tr>
<tr>
<td>Uruguay</td>
<td>X</td>
<td>97.6</td>
<td>X (2011)</td>
</tr>
<tr>
<td>Argentina</td>
<td>X</td>
<td>96.8</td>
<td>X</td>
</tr>
<tr>
<td>Chile</td>
<td>X</td>
<td>95.8</td>
<td>X</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>X</td>
<td>95.6</td>
<td>X (2005)</td>
</tr>
<tr>
<td>Venezuela</td>
<td>X</td>
<td>92.5</td>
<td>X (1998)</td>
</tr>
<tr>
<td>Panama</td>
<td>X</td>
<td>91.9</td>
<td>X (1999)</td>
</tr>
<tr>
<td>Colombia</td>
<td></td>
<td>91.6</td>
<td>X (1994)</td>
</tr>
<tr>
<td>Ecuador</td>
<td></td>
<td>91.6</td>
<td>X (2005)</td>
</tr>
<tr>
<td>Mexico</td>
<td></td>
<td>91.2</td>
<td>X (2000)</td>
</tr>
<tr>
<td>Peru</td>
<td></td>
<td>89.9</td>
<td>X (2010)</td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td>86.9</td>
<td>X (2003)</td>
</tr>
<tr>
<td>Bolivia</td>
<td>X</td>
<td>85.4</td>
<td>X (1997)</td>
</tr>
<tr>
<td>El Salvador</td>
<td>X</td>
<td>78.7</td>
<td>X (1998)</td>
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<td>Honduras</td>
<td></td>
<td>75.0</td>
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<td>Guatemala</td>
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<td>X (2000)</td>
</tr>
<tr>
<td>Nicaragua</td>
<td></td>
<td>66.5</td>
<td>X (1994)</td>
</tr>
</tbody>
</table>

* Countries are in order from strongest to weakest state capacity. As an indication, double lines separate countries with stronger state capacity (with adult literacy rate over 94%) from those with medium state capacity (adult literacy rate between 88 and 94%) and from those with weaker state capacity (adult literacy rate below 88%).

Sources: Own elaboration with data on lead water pipes from sources listed in Appendix 2 and on adult literacy rate from the UNESCO (2004).
Appendix 5. Record of Minutes of Interviews Quoted

Table 10. Excerpts from Interviews Corresponding to Quotes in Text

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Quote in Text</th>
<th>Original Excerpts from Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>From Section 4.4.1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager of a water provider in the 1980s (Bolivia)</td>
<td>“All these regulations [like the <em>Norma Boliviana 512</em>] were, in a certain way, a copy of those of the World Health Organization. Then, we worked, and we had advisers from the World Health Organization. When I was manager, I had a permanent adviser from the World Health Organization”</td>
<td>“Todas esas normas [como la NB512] son, de alguna manera, una reproducción de las de la Organización Mundial de la Salud. Entonces, nosotros trabajábamos, teníamos asesores permanentes de la Organización mundial de la Salud. Cuando yo tenía la gerencia, tenía un asesor de la Organización Mundial de la Salud, asesor permanente mío.”</td>
</tr>
<tr>
<td><strong>From Section 4.5.1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participant in the committee for the 1984 revision (Chile)</td>
<td>“I remember that SENDOS was the most preoccupied. It said: ‘How will I comply with this? Arsenic, how do I comply?’”</td>
<td>“yo me acuerdo que SENDOS él que más preocupado estaba. Decía: ‘¿cómo voy a cumplir esto? El arsénico, ¿cómo lo cumpió?’”</td>
</tr>
<tr>
<td>Health Ministry’s civil servant (Chile)</td>
<td>“I would say that what influenced a lot the 2005 revision was that the Health Ministry had its own regulation [<em>Reglamento</em>] and it started to implement it and sanction […]. Then came a moment when we said: ‘OK, let’s find an agreement’… As well as there were other parameters that the Health Ministry wanted to integrate in the national standards [<em>Norma</em>].”</td>
<td>“Yo diría que influyó mucho en la revisión de 2005 él que Salud tenía su Reglamento y lo empezó a aplicar y empezó a sancionar […]. Entonces llegó un momento en qué se dijo: “ya bueno, tratemos de ponernos de acuerdo”… A parte que había otros parámetros que Salud le interesaba introducir en la norma.”</td>
</tr>
<tr>
<td><strong>From Section 4.5.2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participant in the committee for the 2005 revision (Chile)</td>
<td>“As for the organic parameters, there were changes in the pesticides […]. Chile did not copy the guidelines of the World Health Organization (poor countries do so), but rather there was a real study […] that was conducted to assess what we would be able to accept. […] This study analyzed what treatments could achieve and the removal of parameters […] and there was also a study to know which organic parameters we have in our country. Why? Because the list of the World Health Organization is enormous. If you accept all of it, there is no purse that can afford the monitoring.”</td>
<td>“Respecto a los parámetros orgánicos, bueno, hubieron cambio en los pesticidas […]. Cuando se hizo esta norma chilena no sólo se copió lo de la Organización Mundial de la Salud (los países pobres […] copian no más y punto), sino que aquí hubo un estudio real […] de que éramos capaz de acoger. […] Un estudio […] que vio los tratamientos hasta dónde estaban capaz de llegar y la remoción de los parámetros […]. Y además […] se hizo un estudio de saber qué parámetros orgánicos nosotros realmente teníamos dentro de nuestro país. ¿Por qué? Porque la lista de la Organización Mundial de la Salud es una cosa enorme. Si tu acoges todo esto, no hay bolsillo que aguante lo que es el monitoreo.”</td>
</tr>
</tbody>
</table>
Domestic policies are increasingly developed by governments aware of, and potentially influenced by, international or foreign policies. In this context, understanding why global policies – or policies promoted by transnational and international actors – may (or may not) be implemented and have the intended effects “on the ground” requires disentangling the implementation dynamics of policies adopted following diffusion.

The literature on policy diffusion and policy transfer has not yet fully disentangled these dynamics, as it originally conceptualized and empirically took for granted that the adoption of a policy was the final step of diffusion. The initial focus of the diffusion literature on the mechanisms of voluntary learning or lesson-drawing in American states and European countries (where institutions and the rule of law are strong) may have influenced this perspective. Yet, as numerous studies have increasingly pointed out, many formal institutions and rules, especially in the developing world, are neither regularly implemented nor enforced (Dobbin, Simmons and Garrett 2007; Levitsky and Murillo 2009). This paper rests on a clear distinction between the adoption of a policy diffused and its implementation, in order to analyze thoroughly the latter.

It argues that policy diffusion can be window-dressing as well as frame-shaping, depending on the interaction between three factors: state capacity, foreign capacity support and external pressures. External pressures are concrete actions and communications directed toward the implementing actors by outsiders (other departments, civil society, politicians, etc.), for the sake of raising awareness of a specific issue and demanding a response. In the face of these external pressures,
this paper argues that although strong state capacity favors implementation, it is not sufficient for the latter to be extensive. Only when external pressures (favoring implementation) are strong does a country with strong state capacity implement extensively a policy adopted following diffusion. Otherwise, implementation is only partial, even though its limitations may not be publicly apparent (implementation may be window-dressing). As for countries with weak state capacity, implementation may also be extensive under external pressures, but only when they can count on sustained foreign capacity support. In this case, policy diffusion is clearly frame-shaping. However, if there is no foreign capacity support or it is interrupted, implementation will at most (under external pressures) be partial and the adoption of a diffused policy will be mere window dressing.

The main contributions of this paper is to show that policy diffusion in weak states can be both window-dressing and frame-shaping, depending on political dynamics. To be frame-shaping, it needs a sustained foreign capacity support (that can compensate for the weakness of the state) and strong external pressures. This paper also shows that, when state capacity is strong and there are not strong pressures from outside the implementing actors, implementation is partial. This drastically contrasts with the common view that partial implementation comes from a lack of resources. Besides, this partial implementation may not be publicly apparent and rather hidden; the resources of the state allow a window-dressing implementation, suggesting diffused policies are extensively implemented even if they are only partially.

The empirical analysis focuses on the implementation of a diffused policy for which adoption and implementation are clearly separated: drinking-water quality standards derived from the World Health Organization’s (WHO) guidelines. The evidence was collected from two countries from
the South American region, one with weak state capacity (Bolivia) and the other with strong state capacity (Chile), and covers more than three decades for each of them. The analysis entails a process-tracing approach (as intended by Seawright’s causal pathways) and builds on extensive and systematic research in governmental and non-governmental archives conducted in both countries, as well as on over 50 interviews with actors involved in the sector in the last three decades. Although two countries are analyzed, the causal inference comes essentially from within-country analysis rather than from cross-country comparison. The empirical contribution of this paper also comes from its refinement and its justification of the measurement of drinking-water quality (Seawright, 2016).

The first section of this paper presents the theoretical framework, the argument and the hypotheses. The second describes the analytical framework, the variables and data. The third and fourth sections present the empirical results in Bolivia and Chile, respectively.

1. Theoretical Framework, Argument and Hypotheses

1.1. Policy Transfer and Implementation

The literature on policy diffusion and policy transfer is very extensive (for literature reviews, see Dolowitz and Marsh, 1996; Dobbin, Simmons and Garrett, 2007; Karch, 2007; Marsh and Sharman, 2009; Shipan and Volden, 2012; Stone, 2012). As this literature developed, it has progressively recognized that the implementation of diffused/transferred policies was a dimension that had to be considered in the analysis of diffusion (Dolowitz and Marsh, 1996: 354; Evans and Davies, 1999: 379; Dolowitz and Marsh, 2000: 6; True and Mintrom, 2001: 30; Karch, 2007: 191; Marsh and Sharman, 2009: 279). Despite this reiterated recognition, few policy diffusion studies
have started to clear the way. The few studies that analyze the post-adoption dynamics of diffused policies have mostly focused on highly politicized policies, like criminal justice or utility privatization, in which not implementing or partially implementing the policy translated into modifying the policy itself or its content (Karch and Cravens, 2014; Murillo, 2009; Post, 2014). The implementation of diffused policies has not yet been disentangled, as Shipan and Volden (2012: 793) recently stated: “implementation may present some of the most important opportunities for learning and imitation over time and across governments. Extending the policy diffusion literature beyond initial policy adoptions is warranted and long overdue.”

Whereas the importance of implementation has increasingly been recognized, differences articulated regarding its conceptualizations and its explanatory factors have been eclipsed. They are nevertheless significant. Conceptually, some considered that implementation was a determining part of what can be called a policy transfer. Evans and Devis (1999: 379) specified: “Even if a policy is a faithful programmatic copy of the original, it can ultimately only be said to have been transferred if it is carried out.” In a train of thought also amalgamating transfer and implementation, Dolowitz and Marsh (1996: 354), as well as Nicholson-Crotty and Carley (2016: 81) argued that implementation capacities of states may constrain policy transfer. Other scholars made the assumption that diffusion does not entail per se that policies be implemented: “even when countries sign on [international instruments] as window dressing, they are signaling acceptance of new global norms” (Dobbin, Simmons and Garrett 2007: 453).

Theoretically, the literature built on implementation studies (Hill and Varone, 2017) and identified cultural effects, resources and actors as possible factors explaining the implementation (or non-implementation) of “diffused policies.” Whereas cultural effects have only been briefly mentioned
(Evans and Davies, 1999: 380), political, bureaucratic and economic resources were identified as important to implement the transferred policy. First, empirical studies mostly highlighted that if such resources were lacking, transfer might not take place (Dolowitz and Marsh, 1996: 354; Nicholson-Crotty and Carley, 2016: 81). However, it was also recently argued that resources do not determine (by themselves) enforcement, but that they rather condition the dependence on state-society linkages for compensating a lack of internal resources by outside ones (Amengual, 2014).

As for actors, the literature highlighted that they may influence implementation negatively or positively. On one hand, the negative impact of actors has been illustrated in at least two concrete examples in the diffusion literature: 1) the non-involvement prior to the adoption of the policy of interest groups representing people potentially affected or interplaying once a policy is enacted could lead to implementation problems (Dolowitz and Marsh, 2000: 8; 2012: 340); and 2) policies diffused by coercion could be “sabotaged by embittered domestic actors during the implementation” (Marsh and Sharman, 2009: 282). On the other hand, actors may favor implementation of policies (no matter if they were diffused or not) in different ways: whereas community groups or civil society may push for a policy to be implemented (Amengual, 2014; Dargent and Urteaga, 2016; O’Rourke, 2003;), actors that play a positive role in the adoption stage of diffusion (like policy entrepreneurs, policy-network agents or foreign actors) could also be interested in the policy to be implemented (True and Mintrom, 2001; Dargent and Urteaga, 2016). Finally, political actors may be on either side: favoring or not the implementation of politicized policies, depending on whether they adopted (or supported the adoption) of the policy, their constituents’ interests and the salience of the issue (Holland, 2015; Murillo, 2009).
Overall, the literature suggests four main explanations for divergent implementation patterns. First, some authors have argued that a lack of resources may limit implementation. Second, others have argued that implementation could be limited when a policy was adopted without consulting actors that would be affected or by coercion. Third, some actors (like civil society, network agents, and policy entrepreneurs) can push for a policy to be implemented. Fourth, politicians may push or limit implementation, according to their interests. This paper argues that two factors are key to disentangle the divergent implementation of diffused policies: the strength of state capacity and the role of outsiders.

1.2. The Argument
Karch (2007) wrote: “Diffusion is about movement of a policy across jurisdictional boundaries. In contrast, adoption is the decision to establish a policy in an individual jurisdiction.” By extension, implementation is to put into effect a policy in an individual jurisdiction. But the fact that policy was adopted following diffusion may influence implementation dynamics. My argument aims at explaining the heterogeneous implementation of policies adopted following diffusion pressures.

My argument rests on the necessary distinction of the adoption of a policy following diffusion and its implementation. Whether the implementation is conceptually part of the policy diffusion process (as the last stage) or not (i.e grasped as a policy consequence of the policy diffusion) has no impact on the argument. Its cornerstone is only that adoption and implementation are distinct (but not necessarily independent) processes, which may be the result of different explanatory factors. The distinctiveness between policy formulation and implementation was largely highlighted in the public policy implementation literature, and is still considered important despite
the increasingly key recognition of “the interrelationship between policy formulation and the implementation process” (Hill and Varone, 2017).

The argument distinguishes three (ideal-type) degrees of implementation that are defined as followed:

1) No implementation: the policy is merely window dressing, it is not implemented nor are there concrete action plans to implement it;
2) Partial implementation: the policy is partly implemented, the implementation is incomplete in terms of regularity, precision, scope and/or independency;
3) Extensive implementation: the policy is largely implemented nationally, and there is regular, precise and independent reported evidence of implementation.

My argument states that the degree of implementation essentially results from the potential capacity of the sector and external pressures.

The potential capacity of the implementing sector is first (but not only) determined by state capacity. The conceptualization of state capacity here builds on the framework of Lindvall and Theorell (2016), which identifies “resources that are required to project [political] power” (through policy instruments to reach policy outcomes) as the dimension of state capacity that can be observed. State capacity is defined as resources that may support policy enforcement and include money, human capital and information. This definition differs from the ones that conceptualize state capacity as a certain function, or a combination of two or three functions. The functions consist, for example, in the following ones: “fiscal or extractive capacity”, “legal capacity”, “military or coercive capacity”, “administrative capacity” (Akbar and Ostermann, 2015; Hanson
and Sigman, 2013; Hendrix, 2010; Lindvall and Theorell, 2016; Soifer, 2015). These functional conceptualizations orientate state capacity toward outcomes, and not means, which is theoretically and empirically limitative. Besides, distinguishing between means and ends facilitates the comparison of the capacity of states pursuing different outcomes (Lindvall and Theorell, 2016).

A strong state capacity translates into a strong potential sector capacity. Similarly, a weak state capacity suggests a weak potential sector capacity, but this association is not automatic. Indeed, countries with weak state capacity may receive foreign support or aid for specific sectors (through international aid or cooperation for instance). If this foreign support is sustained and enhances institutional capacity, then the potential capacity of the sector is strengthened over time. If there is no or limited foreign capacity support, then the potential capacity of the sector remains weak.

As for external pressures, they are put forward on the implementing actors by outsiders, which include interest groups, the population, governmental departments and agencies from other policy sectors (especially health and economy) as well as politicians and local authorities not in charge of implementing the policy. By pressures, we refer to concrete actions and communications that raise the awareness on a specific issue, and ask for a response from the implementing actors.

The implementation of policies adopted following diffusion pressures takes place in a context in which the policies adopted differ from a country to another, partly depending on state capacity. As 21 It first neglects that developing one specific functional capacity for a state certainly requires political choices to be made. Theoretically, even a weak state can develop strongly one specific function if all its means are invested toward this outcome. Conversely, a weak functional capacity may result from a lack of state capacity to develop this specific function as much as from a non-prioritization of this function despite resources being sufficient to develop it. Moreover, functional capacity is at least partly measured by outcomes and does not consider that the strength of state capacity also relates to the “range of government capacities” (Lindvall and Theorell, 2016).
argued elsewhere (second paper of this dissertation), at the adoption phase, strong state capacity tends to limit diffusion when diffused policies represent a strong domestic challenge for the country or affect a strong stakeholder, whereas weak state capacity tends to lead to extended diffusion.

On the one hand, when state capacity is strong, the policy is likely to be immediately valid at the time of adoption. The adoption of policies in an environment with strong state capacity has likely taken into account the costs and constraints of implementation. Therefore, \textit{de facto} implementation is possible (see Figure 1). But it does not necessarily take place systematically, for everywhere and for everyone. Indeed, the policy is extensively implemented only if external pressures are strong. If external pressures are weak, implementation remains partial. This partial implementation may be more or less transparent about its limitation (and therefore, in the latter case, be window-dressing).

\textbf{Figure 1. Impact of State Capacity on the Adoption and Implementation Steps of Policy Diffusion}

<table>
<thead>
<tr>
<th>State Capacity</th>
<th>Adoption</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>Strong Ability to Consider Domestic Costs, Constraints and Impacts of Policy</td>
<td>Strong Sector Capacity: \textit{De Facto} Implementation Possible (but not Certain)</td>
</tr>
<tr>
<td>Weak</td>
<td>Limited Ability to Consider Domestic Costs, Constraints and Impacts of Policy</td>
<td>Weak Sector Capacity: Immediate Implementation Not Expected (but Possible)</td>
</tr>
</tbody>
</table>

On the other hand, when state capacity is weak, the policy is not necessarily intended to have immediate \textit{de facto} validity because resources are lacking at the time of adoption to previously generate knowledge about the challenges that the policy could entail for stakeholders and to
posteriorly enforce it despite these challenges (see Figure 1). With these limited resources, the policy may still be partially implemented, but only if external pressures are strong. Otherwise, the policy is likely to remain mere window dressing (i.e. not implemented). However, a weak state capacity may also be supported by foreign resources, given the globalization context in which countries evolve and the policy diffusion pressures that accompany such a context. If this foreign support is sustained over time and of a capacity-building nature, then implementation may follow a similar pattern to the one of states with strong capacity: be extensive if external pressures are strong (in which case policy diffusion would be frame-shaping) and, if external pressures are weak, be rather partial. Of course, the situation is nevertheless different from the one in strong state capacity contexts, because the sector then depends on foreign support, and if the latter is interrupted, the domestic sector capacity may not be sufficient to maintain the same levels of implementation. The argument unfolds into the following hypotheses.

**Hypothesis 1.1.** Implementation is extensive when state capacity and external pressures are strong.

**Hypothesis 1.2.** Implementation is extensive when state capacity is weak, but foreign capacity support is sustained and external pressures are strong.

**Hypothesis 2.1.** Implementation is partial when state capacity is strong, but external pressures are weak.

**Hypothesis 2.2.** Implementation is partial when state capacity and external pressures are weak, but foreign capacity support is sustained.
Hypothesis 2.3. Implementation is **partial** when state capacity is weak and not supplemented by sustained foreign capacity support, but external pressures are strong.

Hypothesis 3. There is **no implementation** when state capacity is weak and not supplemented by sustained foreign capacity support, and external pressures are weak.

Table 1 and Figure 2 summarize the argument and hypotheses.

Table 1. Summary of Hypotheses

<table>
<thead>
<tr>
<th>State Capacity</th>
<th>Foreign Capacity Support</th>
<th>External Pressures</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>+ / -</td>
<td>+</td>
<td>Extensive</td>
</tr>
<tr>
<td>-</td>
<td>+</td>
<td>+</td>
<td>Extensive</td>
</tr>
<tr>
<td>+</td>
<td>+ / -</td>
<td>-</td>
<td>Partial</td>
</tr>
<tr>
<td>-</td>
<td>+</td>
<td>-</td>
<td>Partial</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>+</td>
<td>Partial</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>None</td>
</tr>
</tbody>
</table>

Figure 2. The Implementation of Non-Politicized Policies Adopted Under Diffusion Pressures (Summary of Argument)
2. Analytical Framework, Methodology, Variables and Data

The hypotheses are tested with an empirical analysis of the implementation in Bolivia and Chile of their respective drinking-water quality standards derived from the WHO guidelines. The latter emerged from a Western Europe and a North American perspectives. They were first edited in 1984, and revised once per decade in the following years (in 1993, 2004 and 2011).

2.1. Policy Scope

Analyzing diffusion of the WHO drinking-water quality guidelines first allows to easily separate the adoption step from the implementation one (in a framework of policy diffusion) and therefore to study the implementation step in and of itself. The adoption step, in our analytical framework, consists in the adoption of national drinking-water quality regulations by countries. The implementation step refers to the control and monitoring of drinking-water quality in the countries.

Because of the nature of WHO guidelines and national standards for drinking-water quality, the object of transfer/diffusion is primarily policy content, according to the categories of Dolowitz and Marsh (1996: 349-350). The object of transfer is a constant in the empirical analysis of this paper, which also aims at limiting differences between cases. This policy content considers the drinking-water quality health-based guidelines the WHO set for a list of substances. Our analysis focuses on limit values set by the WHO for microbiological and chemical substances. These are considered because they are particularly important for health and because external pressures to control and monitor drinking-water quality may vary from one substance to another within a same country. By considering the diffusion of limit values for all these substances, and more precisely the implementation of the limit values adopted by countries, our analysis gains in depth and precision (Karch, 2007: 71-72; Marsh and Sharman, 2009: 278-279; Shipan and Volden, 2012: 794).
2.2. Case Selection

Testing our argument with Latin American countries first builds on an observation of Marsh and Sharman (2009: 280):

“Many of the mechanisms that are said to drive transfer and diffusion could be expected to exert a stronger influence in the developing world than anywhere else. [...] If policies are adopted for symbolic reasons, rather than to meet functional needs, this disjuncture should be most apparent and consequential outside the West. As such, the developing world again provides a powerful testing ground for examining the relationship between policy transfer and effectiveness.”

Second, the focus on countries from a same region and geographically close to one another limits differences of diffusion mechanisms and contexts that could entail differences of outcomes. Indeed, WHO facilitates the policy diffusion of its drinking-water quality guidelines for all countries in a similar way, especially within a region (Stone, 2012: 490-491). The WHO drinking-water quality guidelines were indeed promoted in Latin America by the Pan-American Health Organization (regional office of the WHO). Moreover, the two countries studied were chosen from a same sub-region of Latin America, the Andean region: Bolivia and Chile.

The two countries differ in their level of state capacity, which is relatively weak in Bolivia and strong in Chile. This allows to explore the causal dynamics in each of these two contexts. Yet, the causal inference does not build on the comparison of these two countries between themselves, but rather on a detailed and precise within-case analysis of each (Seawright, 2016). This within-case analysis considers the implementation of drinking-water standards nationally (including all main cities as well as rural areas) and covers over three decades for each country. The differences in external pressures and foreign capacity support within each country (over time and between subnational units) are key to the analysis. Table 2 summarizes the variations of variables between and within the two countries studied and identifies the hypotheses therefore tested.
Table 2. Variations of Variables Between and Within Countries and Hypotheses Tested

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td>Strong</td>
<td>Stable.</td>
<td>Vary over time, subnationally, and between substances.</td>
<td>1.1 (strong SC and strong EP) 2.1 (strong SC and weak EP)</td>
</tr>
</tbody>
</table>

2.3. Variables and Measurement

The main variables of the analysis include state capacity, foreign capacity support, external pressures, and degree of implementation. The extent of foreign capacity support, the strength of external pressures and the degree of implementation over time, following the adoption of each national drinking-water quality regulation, were measured qualitatively, as described hereafter.

State capacity considers existing resources to support policy enforcement, including money, human capital and information (Lindvall and Theorell, 2016). Measures of GDP per capita (for availability of financial resources) and government effectiveness (for the strength of human capital and availability of information) are indicative of state resources. Bolivia and Chile, the two case studies, are respectively weak and strong on both measures of state capacity (World Bank, 2016; 2017).

Foreign capacity support consists in international aid or cooperation given to the sector and focused on strengthening institutional capacity. This variable is measured qualitatively, by first identifying among the list of international aid and cooperation agreements and projects dedicated to the drinking-water sector the ones that intended to strengthen institutional capacity (on the basis...
of archival documentation). Each of these instances of foreign capacity support is then characterized: as “sustained” when it lasted at least five years (more than one term of government) and was economically substantive compared to the sector’s resources; and as “limited” otherwise.

External pressures are measured qualitatively. They are labelled as strong when there a public health alert related to drinking-water is reported, when governmental reports from other sectors (independent of the provision of water services) are made public and when public protests on drinking-water quality are reported in the media or officially supported by authorities (not in charge of providing the services). They are characterized as weak otherwise.

As for the degree of implementation, it is measured on the basis of precise criteria: the regularity, precision and extension of drinking-water quality controls, as well as the reporting and compliance of control results with national drinking-water quality standards. Table 3 details the criteria characterizing each degree of implementation.

Table 3. Measuring Implementation of Drinking-Water Quality Standards

<table>
<thead>
<tr>
<th>Degree of Implementation</th>
<th>Monitoring and Controls</th>
<th>Results of Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Partial</td>
<td>Irregular, unprecise and/or circumscribed</td>
<td>May or not be reported, uncertain or limited compliance with standards</td>
</tr>
<tr>
<td>Extensive</td>
<td>Regular, precise and widespread</td>
<td>Systematically reported, and extended compliance with standards</td>
</tr>
</tbody>
</table>

2.4. Process-Tracing Approach and Data Sources

Data availability of the dependent variable is particularly challenging. In various countries, at different moments in time, data on drinking-water quality controls and their results have not been compiled nor systematically reported or preserved over time. Therefore, analyzing only countries and time periods for which data is systematically available would imply a major selection bias, as
this data would most likely have been systematically compiled because of the implementation
decisions made by governments and could be systematically preserved over time (or not) given
the strength of state capacity. Therefore, the research strategy aimed, for data on implementation,
to prioritize systematic official reporting and documentation (when available), but also to rely on
primary and secondary sources to document the extent and changes in drinking-water quality
control and monitoring. To document and assess the impact of main independent variables, the
research approach was to trace the process of implementation through a variety of sources. This
approach refers to the definition of process tracing intended as the identification and exploration
of “causal pathways” (Seawright, 2016).

In Bolivia, a systematic localization of reports on water and sanitation services was conducted in
the archives of the Ministry of Water (Ministerio de Medio Ambiente y Agua), of the Drinking
Water and Sanitation Regulatory Agency (Autoridad de Fiscalización y Control Social de Agua
Potable y Saneamiento Básico) including archives of its predecessor, the Superintendencia de
Saneamiento Básico – SISAB), of the Ministry of Public Works, Services and Housing (Ministerio
de Obras Públicas, Servicios y Vivienda, including archives of its predecessors, the Ministerio de
Asuntos Urbanos and the Ministerio de Urbanismo y Vivienda), of the Bolivian Office of the Pan-
American Health Organization, of the National Institute of Standardization Norms (Instituto
Boliviano de Normalización y Calidad – IBNORCA), of water services of La Paz and Cochabamba
(SAMAPA and SEMAPA), as well as in the electronic library archives of the CEPIS,22 of the

22 CEPIS was the Sanitary Engineering and Environmental Science Center (its acronym comes from its Spanish name:
Centro Panamericano de Ingeniería Sanitaria y Ciencias del Ambiente) of the Pan American Health Organization and
the Regional Office of the World Health Organization.
World Bank and of the German Cooperation in Bolivia (BIVICA – Biblioteca Virtual de la Cooperación Alemana en Bolivia). A systematic review of university theses (on the Bolivian water sector) completed in three main Bolivian universities since 1985,\textsuperscript{23} and of documentation from two university centers specializing in water sanitation (Instituto de Ingeniería Sanitaria – Universidad Mayor de San Andrés and Centro de Aguas y Saneamiento Ambiental – Universidad Mayor de San Simón), as well as of newspaper articles on the water sector of the ten main Bolivian newspapers between 1992 and 1998\textsuperscript{24} also contributed to data collection. Additionally, over 30 interviews were conducted in La Paz and Cochabamba with governmental officials, representatives of international, foreign and private organizations and academics (who were actors or close observers of the development in the drinking-water sector at some moment between 1980 until today) to significantly and uniquely inform the process-tracing analysis.

In Chile, an important source was the Chilean Superintendencia de Servicios Sanitarios\textsuperscript{1} (SISS) documentation (including both public and internal archives), which has been systematically reviewed: specifically the annual reports of drinking-water quality in urban services for years 1991-2004, the monthly drinking-water quality journals and reports (Boletín de Calidad de Agua potable and Resultados de Control de Agua Potable) from 2000 to 2014, and other documentation on parallel controls of drinking-water quality. Archival documentation of the Instituto Nacional de Normalización (INN, Ruta Digital 409), of the Health Ministry, of the National Congress

\textsuperscript{23} Universidad Mayor de San Andrés, Universidad Católica Boliviana and Universidad Mayor de San Simón.

\textsuperscript{24} Over 8000 newspaper articles (in paper formats) were classified under this subject/category for 1992-1998 by the Centro de Documentación e Información Bolivia (CEDIB) of the Universidad Mayor de San Simón and were reviewed. The ten newspapers constituting the CEDIB archives are: Los Tiempos, Presencia, Hoy, El Deber, Primera Plana, Opinión, La Razón, El Mundo, El Diario and Última Hora.
Library, of the Chilean chapter of the Inter-American Association of Sanitary and Environmental Engineering (Agrupación interamericana de ingeniería sanitaria y ambiental – AIDIS), and at the Civil Engineering Library of the University of Chile have also been reviewed and resulted in providing significant original sources, especially useful to document the period prior to the existence of the SISS and aspects less covered in the SISS documentation. Additionally, water providers’ annual reports, as well as academic and newspapers articles were reviewed to supplement or document specific aspects. To complete data collection, over 15 interviews were conducted with governmental officials from different ministers and agencies, representatives of private companies and international organizations, as well as academics, who have been actors or close observers of the drinking-water sector at least for some period of time between the late 1970s until today.

3. Bolivia

Bolivia adopted drinking-water standards for the first time in 1985, through the Norma Boliviana 512 (NB 512). They were developed as part of the “International Drinking Water Supply and Sanitation Decade”, as had been proclaimed the 1981-1990 period by the UN on November 10, 1980 (a proposal that had emerged from international meetings in Canada, Argentina and the URSS in 1976-1978). These initial Bolivian standards have been revised periodically, in 1997, 2004 and 2010.

Prior to the establishment of the first Bolivian drinking-water quality standards, there was very little treatment of drinking water and control of its quality. In 1975, a report prepared for the International Bank for Reconstruction and Development (IBRD) stated that the “physical,
chemical and bacteriological quality [was] not adequate”. It specified for urban water supply: “Of
the 37 water supply systems, seven have surface water sources and of these, only two, La Paz and
Sucre, have water treatment plants in operation. With the exception of only three water supply
systems, La Paz, Sucre and Santa Cruz, the remaining 34 systems do not employ any system of
disinfection or bacteriological quality control”. And the situation of rural water supply was
reported to be even worse, with inconsistent control of water quality, and “in fact disinfection
[was] not practised by any of the agencies responsible for rural water supplies” (WHO/IBRD
Cooperative Program, 1975: 18-23). In 1979, a sector analysis conducted by the Bolivian
government and the WHO/PAHO determined that there was no national plan for monitoring and
controlling drinking-water quality, and that only SAMAPA (La Paz) and SAGUAPAC (Santa
Cruz) were auto-monitoring drinking-water quality (LRCCA, 1984: 2).

This section first describes the context of the water sector development in Bolivia from 1980 until
2014 from the lenses of independent variables (subsection 4.1), then reviews the implementation
of each edition of the Bolivian drinking-water quality standards between 1985 and 2014 (in
subsections 3.2, 3.3 and 3.4), and finally summarizes the variations in independent variables and
the dependent variable for the whole period in subsection 3.5.

3.1. Foreign Capacity Support and External Pressures for the Drinking-Water Sector in Bolivia
(1980-2014)

Bolivia has largely been classified for the whole period with weak state capacity, given its limited
financial and administrative resources. Supplementing this weak capacity, the development of the
drinking-water sector in Bolivia was regularly supported by foreign countries and international
organizations. There is a great number of water sector projects that foreign funds supported
between the early 1980s and 2014. Most of them were focused on specific, localized drinking-water services, and were limited in scope, time or resources. But others supported by foreign resources developed capacity of the sector over time, which resulted in three periods with sustained “foreign capacity support”. The first period corresponded to the early 1980s when, following the proclamation of the 1981-1990 decade as the “International Drinking Water Supply and Sanitation Decade” by the United Nations, Bolivia formulated an action plan (under an agreement with the German Cooperation Agency and the PAHO/WHO). The second period extended from 1990 until 1997. Projects of the World Bank and the Inter-American Development Bank sustained the development of capacity in the three metropolitan drinking-water services of La Paz/El Alto, Cochabamba and Santa Cruz. The third period started in 2010 and was still undergoing in 2014. Largely sustained by the German Cooperation Agency (through PROAPAC and PERIAGUA), it aimed precisely at strengthening the capacity of the sector nationally and the sector’s regulating institutions. It had started in 2001 but was interrupted between 2005 and 2009 (while awaiting the establishment of the new regulatory framework by the new government) (PAHO/WHO, 1987; World Bank, 1990; 1998; Bolivia, 2001; Sonntag, 2000; Interviews).

The development of the water sector in Bolivia was also marked by external pressures for better drinking-water quality. These pressures were identified (on the basis of interviews and systematic documentation) as strong for three short periods between 1980 and 2014. The first moment was the cholera crisis of the early 1990s, which put in evidence that microbiological treatment of drinking water was fundamental for public health. The second was between 1994 and 1997, when the national government embarked the road toward the privatization of two water services, in La Paz/El Alto and Cochabamba. The third came following the proclamation by the Bolivian
president and government elected in 2006 of a human right to water and of the obligation of the state to guarantee water access, which was incorporated in its “plurinational” constitution in 2009. Drinking-water services became a political priority and, starting in 2010, this priority encompassed drinking-water quality more specifically. Besides, there have also been population complaints about drinking-water quality that occurred sporadically in the 1990s and 2000s, but remained at a micro-local scale and did not lead to protests (on the issue of drinking-water quality). These latter pressures therefore remained overall weak; the consciousness of the population about the importance of drinking-water quality was perceived as weakly developed. Interestingly, although the Health Ministry was officially in charge of monitoring drinking-water quality before the regulatory agencies took over that faculty, it practically was not or very little equipped to ever do so (CEDIB, 1992; Bolivia, 2009; SIRESE, 2004; Interviews with two independent experts).

Table 4. Sustained Foreign Capacity Support and Strong External Pressures in Bolivia, 1980-2014

<table>
<thead>
<tr>
<th>Time period</th>
<th>Sustained Foreign Capacity Support</th>
<th>Strong External Pressures</th>
<th>Areas concerned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-1984</td>
<td>X</td>
<td></td>
<td>National</td>
</tr>
<tr>
<td>1990-1997</td>
<td>X</td>
<td></td>
<td>Metropolitan areas (La Paz/ El Alto, Cochabamba and Santa Cruz)</td>
</tr>
<tr>
<td>1991-1993</td>
<td></td>
<td>X (on microbiological parameters)</td>
<td>National</td>
</tr>
<tr>
<td>1994-1997</td>
<td></td>
<td>X</td>
<td>La Paz/El Alto and Cochabamba</td>
</tr>
<tr>
<td>2010-2014</td>
<td>X</td>
<td>X (on all parameters)</td>
<td>National</td>
</tr>
</tbody>
</table>

Table 4 summarizes the periods of sustained foreign capacity support and strong external pressures in Bolivia between 1980 and 2014. Given these values for the independent variables, we would expect, according to hypotheses 2.1, 2.2., 3.1 and 3.2, the implementation of drinking-water standards in Bolivia to be as shown in Table 5 between 1985 and 2014.
Table 5. Expectations for Implementation in Bolivia (according to hypotheses), 1985-2014

<table>
<thead>
<tr>
<th>Time period</th>
<th>Sustained Foreign Capacity Support</th>
<th>Parameters Under Strong External Pressures</th>
<th>Implementation Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985-1989</td>
<td>-</td>
<td>-</td>
<td>None</td>
</tr>
<tr>
<td>1997-2004</td>
<td>-</td>
<td>-</td>
<td>None</td>
</tr>
<tr>
<td>2005-2009</td>
<td>-</td>
<td>-</td>
<td>None</td>
</tr>
<tr>
<td>2010-2014</td>
<td>At national level</td>
<td>All</td>
<td>Extensive</td>
</tr>
</tbody>
</table>

3.2. First Steps during the International Water Decade (1981-1990)

The first edition of Bolivian drinking-water standards, the *Norma Boliviana 512* (NB 512) of 1985, was almost exactly identical to the WHO international standards of 1971 and therefore differed from the WHO guidelines of 1984-1985 (Bolivia, 1985; WHO 1971; 2004). The latter were not even referenced in the regulation, suggesting the process was completed before they could or were intended to be included. Nevertheless, the influences of the WHO international standards of 1963 and 1971 made no doubt.

Interestingly, the first stage of the implementation of the new standards was developed in parallel (rather than successively) to the process of defining and adopting these quality standards. Like the standards, it originated from the proclamation by the UN of the 1981-1990 period as the “International Drinking Water Supply and Sanitation Decade”. Under the agreement between the German Technical Cooperation Agency and the PAHO/WHO, the Bolivian government created a national committee dedicated to the International Water Decade, which developed an action plan for water and sanitation services (*Plan nacional de Saneamiento Básico, PLANASBA*) including a national program of control and monitoring of drinking-water quality to be developed in all nine regions (*departamentos*) of the country, starting with pilot programs (each including a laboratory) in three regions. Finally, the program was partially implemented, in two regions: in La Paz (where
the university laboratory was already working with SAMAPA) and in Cochabamba (where the university and regional authorities agreed to create the laboratory) (LRCCA, 1984; IIS, 1987; PAHO/WHO, 1987; Sánchez, 1993; Quiroga et al., 1999). An interviewee who participated in these initiatives mentioned that regional programs were developed in these two regions (and not others) because of “institutional initiatives”. Quiroga et al. (1999) also reported specifically that a lack of resources played a role: “the endeavors to realize similar programs in other departments were vain, since none of them materialized. The main challenges encountered were the lack of institutional leadership, the lack of resources and regional policies that allowed these works to be undertaken” (author’s translation).

The two pilot programs implemented found drinking water not complying to different extents with standards of chemical and bacteriological quality: in Cochabamba, over 40% of samples with high levels of iron, and over 50% with coliforms; in La Paz, over 20% of samples with at least one physical or chemical parameter too high and over 80% with coliforms (LRCCA, 1984; IIS, 1987). Following-up on these pilot programs, the laboratories that had been established conducted a few other confined studies of drinking-water quality in the 1980s and early 1990s in the regions of La Paz, Cochabamba and others, that also found high levels of deficiencies in bacteriological quality (in various communities, it was the case that a water service that had been constructed was not used anymore) (IIS, 1988; Quiroga et al., 1999). However, there was no mark left of longer-term regular monitoring of drinking-water quality. An analysis of the sector in 1995 reported that, up to 1991, the ministry of Urban Affairs, in charge of supervising service provision, did so very limitedly because of a “lack of means” and “the absence of defined mechanisms for control management” (Prada et al., 1995: 16). One interviewee who participated in analyses of drinking-
water quality in the 1980s and 1990s mentioned that the cost of conducting analyses and the lack of resources to expand the programs restrained further monitoring.

In 1987-1988, with funding from the Inter-American Development Bank, the PAHO and the Urban Affairs Ministry of Bolivia conducted a study of drinking-water services in the 10 main cities of the country (Sánchez, 1993). Its final reports highlighted that the quality of drinking water provided by urban services differed greatly between cities. Two cities had drinking water treated only through disinfection which was said to be sufficient given the initial good quality of the water sources (Montero and Santa Cruz); whereas others had treatment plants that presented deficiencies (La Paz, Cobija and Sucre), distribution networks with deficiencies (Cochabamba and Trinidad), or not any treatment of water (Huanuni and Potosí). And one city (Riberalta) did not have drinking water services (Ministerio de Asuntos Urbanos, 1989).

Overall, the different studies and analyses conducted in the 1980s and early 1990s suggested that the implementation of the 1985 drinking-water standards, by the early 1990s, had remained very partial. The initial move towards a national program of control and monitoring of drinking-water quality did not expand beyond the two original pilot programs. Some initiatives were taken in the two regional laboratories created, but they were constrained geographically and in time by resources.

3.3. Road toward the Modernization and Privatization of the Sector (1991-1998)

In the early 1990s, a new stage of the implementation of the NB 512 of 1985 started with the launch of the national plan “Programa Agua para todos” in 1992. The plan included the adoption of the Reglamento nacional de prestación de servicios de agua potable y alcantarillado para centros urbanos that established that the obligation of water providers for water quality was to
guarantee “drinking water” (Bolivia, 1992). This did not include the obligation to implement a monitoring strategy.

Whereas the government was developing the 1992 action plan, the country was facing a cholera crisis. Indeed, given the evolution of the cholera in Peru, the state for national emergency was decreed in February 1991 (*Decreto Supremo N° 22899*). The role (the lack of) water and sanitation systems could play in the propagation of the bacteria were evidenced and, among other measures, “the detection of the bacterium in drinking water and in wastewater networks was initiated to undertake measures for sanitary and epidemiological control” (author’s translation; Arévalo and Estévez, 2011). These measures were however temporary and specific, drinking-water quality monitoring more generally was not established in a longer-term perspective during the 1990s except in the three metropolitan areas (La Paz/El Alto, Santa Cruz and Cochabamba). Indeed, in the other regional capital cities (Potosí, Montero, Oruro, Tarija, Trinidad, Yacuiba), there was generally disinfection treatment but no regular monitoring of drinking-water quality that was reported. Issues with bacteriological drinking-water quality were sometimes encountered, for instance in Potosí. Besides, in most rural areas, there was generally no or irregular disinfection, less so treatment. Initial drinking-water quality controls tended to only be made at the installation phase, if ever (Oficina Internacional del Agua, 1999; Quiroga *et al*., 1999; CEDIB, 1993; 1994; 1995; 1996; 1997; 1998; Interviews with representative of an international organization and with an academic). As explained in a UNDP-World Bank report, in 1990 the development of the water and sanitation sector (especially in rural areas) faced various constraints, among which “a severe financial restriction [which] limited the extent and reach of the investments” (author’s translation; Sara *et al*., 1996: 7). Although the Health Ministry was in charge of monitoring during this period,
it did not actually have the material resources to do so. It couldn’t, therefore, pressure the sector: “Until the 1990s, the [water] companies were working out of the law. There was no quality control” (author’s translation, Interview with an independent expert, see Appendix 4). As a consequence, a national picture of drinking-water quality was still lacking at the end of the 1990s (SIRESE, 2004).

The water services of the three metropolitan areas (La Paz/El Alto, Cochabamba and Santa Cruz) distinguished themselves from this general pattern. Indeed in 1994 the survey of the laboratories across the country confirmed that the technical and human capacity to control water quality was nationally limited, but significantly better in water companies of the metropolitan areas and in some academic institutes. For bacteriological quality, the laboratories of water companies in La Paz and Santa Cruz, the institutes specialized in chemistry, sanitation and environment, and the academic institutes created in the pilot programs of the 1980s (IIS-USMA and LRCCA-UMSS) were complying with technical and human criteria at more than 75%. However, the regional offices for environmental health in Cochabamba and Oruro and the water companies outside of Santa Cruz and La Paz were only complying at up to 30%. For chemical quality, only the water companies of La Paz, Cochabamba and Santa Cruz had the equipment required for controls (Oficina Internacional del Agua, 1999: 52, 79). Around 1997, the Cochabamba water service further increased its capacity to monitor drinking-water quality regularly in the tanks and distribution network, with the creation of a Laboratory Unit (Interview with SEMAPA worker). Overall, by 1997-1998, the water provided by the metropolitan water services usually complied with bacteriological and chemical quality standards when exiting the treatment plants but remained at risk of (re)contamination in the distribution network. These metropolitan water services did control and monitor drinking-water quality at the treatment plants and in the distribution networks. Water
quality was an important issue for areas of the cities not connected to the metropolitan services (or connected but regularly not receiving water): their proportion diminished over the period, especially in Santa Cruz, but remained high in Cochabamba and El Alto (Prada et al., 1995; Quiroga et al., 1999; Vargas García, 1998; CEDIB, 1993; 1994; 1995; 1996; 1997; Interviews with Roberto Prada Ramírez, Gonzalo Maldonado, Jorge Alvarado and two independent experts). These improvements of drinking-water quality (and its monitoring) in the three metropolitan water services resulted from projects of the World Bank and the Inter-American Development from 1990 to 1998, that strengthened the institutional capacity of the water services, and from pressures put by privatization processes. One general manager of SEMAPA in the 1990s explained: “The credits [from the World Bank and the IDB] came to fund infrastructures but there were also components for technical cooperation, institutional strengthening. [Without these credits] I did not have money for my engineers to train in Brazil” (author’s translation; Interview with an ex-manager of SEMAPA, see Appendix 4). Additionally the water services of La Paz/El Alto (SAMAPA) and Cochabamba (SEMAPA) embarked on privatization processes from 1994 until, respectively, 1997 and 1999. These processes came with an extension of the main credit from the World Bank, which gave resources and a deadline to use them to implement major works, for instance the installation of the water main Pampahasi- Ovejuyo in La Paz and the rehabilitation and expansion of the Cala Cala treatment plant and distribution networks in Cochabamba (World Bank, 1998:10, 18-20).

Overall, by 1997 (the year a revised NB 512 was adopted), drinking-water quality standards had only been partially and heterogeneously implemented over the country, despite a progressive improvement, mostly in metropolitan areas. With the support of foreign sources to develop capacity in metropolitan areas, and under the pressures of the cholera crisis in the early 1990s and
privatization processes in La Paz and Cochabamba in 1994-1999, the implementation of drinking-water quality standards progressed largely in metropolitan areas: extensively for microbiological parameters and partially for chemical ones. However, outside the metropolitan areas, only microbiological standards (if any) were to some extent controlled and monitored.

3.4. Privatization, a Superintendencia and a (First) Regulatory Framework (1997-2004)

Following the second edition of the WHO drinking-water quality guidelines, a revision of the NB 512 was adopted in Bolivia in 1997. In that same year, the La Paz/ El Alto water company was adjudicated by concession to Aguas del Illimani and the Superintendencia de Aguas (that became the Superintendencia de Saneamiento Básico – SISAB – two years later) was created.

The revised drinking-water quality standards included a few more limit values than the first edition of 1985, but changes remained overall relatively minor. However, the La Paz/ El Alto concession had to comply with other standards, defined in the first appendix of the concession contract. These standards included many chemicals that were not included in the NB 512 of 1997, but these were not all relevant. For chemical substances concentrations up to 50% higher than limit values listed were also accepted. Besides, microbiological criteria were more detailed for bacteria and parasites but also more permissive for coliforms (see Appendix 1; Oficina Internacional del Agua, 1999: 59-66).

Starting in 1997 the Superintendencia developed and managed progressively a national regulatory framework, which included the monitoring of drinking-water quality. A credit of the World Bank was key in sustaining the establishment of the Superintendencia de Aguas in 1997, which was first mostly regulating Aguas del Illimani and eventually mostly the main water services of the country (World Bank, 2000). One interviewee who worked for the Superintendencia during its first years
mentioned: “It was a very intense moment of training. There were still funds from the World Bank. […] They lasted only during the first and the second years [after the creation of the Superintendencia]. […] They were the residual [resources] that remained from the capitalization” (author’s translation, see Appendix 4). In 2000, a World Bank report noted that the regulation of the sector had progressed significantly in Bolivia in the 1990s, but that these progresses were fragile and would require further foreign assistance to consolidate: “great strides [were made] since 1994 through the adoption of a Water Supply and Sanitation Law in October 1999 and the establishment of a national regulatory system under the Superintendencia de Saneamiento Básico. The rapid development could be further cemented through continued Bank financial assistance to the sector” (World Bank, 2000). Support from the German cooperation, starting in 2001, was intended to strengthen the strategies, instruments, and tools of the Superintendencia and to train the staff (program PROAPAC). This foreign capacity support was however interrupted in 2004, reportedly due to the uncertainty in the national context. As the German cooperation reported: “Between 2005 and 2008, there hasn’t been any advisory work specifically devoted to the regulatory entity because the Plurinational State authorities had announced their intention to modify the regulatory focus of the country” (author’s translation; GIZ/PROAPAC, N.d.: 20).

Once created, and as it expanded its reach further than Aguas del Illimani, the Superintendencia essentially relied on data provided by “regulated water providers”, once they had registered with the Superintendencia. Data was compiled and reported between 2002 and 2007 but was nevertheless incomplete: data was missing for some years for three of the nine biggest services (population of over 100,000) and for six of the nine medium-size services (population between 25,000 and 100,000). For smaller services (population less than 25,000), data was even sparser.
(SISAB, 2002-2007). An interviewee who worked at the SISAB mentioned that the SISAB did not have its own laboratory and its means were limited; it conducted an “oversight” type of regulation. There wasn’t either apparent pressure on the sector from the population: “The lack of sanitary information and education is noteworthy for a majority of the attended population, who does not demand quality for the water provided by the EPSAS” (author’s translation; Bolivia, 2001, vol. II: 32). With foreign support (as part of the “Convenio de Participación con el Proyecto de Asistencia Técnica para la reforma Regulatoria y la privatización AIF 3108-BO”) the SISAB conducted in 2004 a study to monitor drinking-water quality in the 27 “registered” waterworks. It analyzed 129 samples of water collected between June and August 2004. It concluded that drinking-water quality of these 27 waterworks met physical, chemical and bacteriological standards after treatment (SISAB, 2004). However, 2005 data reported by waterworks suggested that disinfection criteria was met at least at 90% in only seven of the nine biggest services, in four of the nine medium-size ones and in three of the nine smallest services (SISAB, 2006). Data on controls of chemical quality of drinking water did not appear regularly reported, if ever tested.

For rural services, no national portrait of the situation of drinking-water quality was depicted: some particular projects found good drinking-water quality, but some others found deficiencies. Yet, data from the 2005 Households Survey (Encuesta Continua de Hogares) conducted by the National Statistics Institute (Instituto Nacional de Estadística) suggested that an important proportion of the rural population did not drink treated water, since only 39% received water through water pipes, whereas more than a third accessed water through superficial sources, and 16% through a well without a pump (Bolivia, 2001; Machico Salcedo, 2004; WHO/UNICEF, 2015).
Overall, despite the development of a national regulation framework starting in 1997, the implementation of the standards for drinking-water quality showed little improvement. Monitoring of drinking-water quality was irregular or rare in most water services except the three metropolitan ones (of La Paz/El Alto, Cochabamba and Santa Cruz), and the results of controls (when conducted) were reported unsystematically or imprecisely. This very limited implementation was the result of foreign support that was only limitedly contributing to build capacity, as it was not sustained, and of a lack of resources (both technical and human).

3.5. A New Era, a Ministry for Water and New Targets (2005-2014)

A third edition of the NB 512 was adopted in Bolivia in 2005 (and reconfirmed in 2007 by the government of Evo Morales). Some microbiological and chemical criteria were added, including for pesticides, which largely integrated the second edition of the WHO guidelines of 1993 (and its 1998 addendum). However, the main change was that a Reglamento was also adopted to accompany the NB512, established four types of control (minimal, basic, supplementary and exceptional) and a precise frequency requirement for each of these controls for water exiting the water tank and in the distribution network, depending on the size of the water services. Yet, in 2010, providers requested a revision of the NB512 because they could not comply with it. A fourth edition of the NB 512 was adopted shortly after, at the end of 2010. It did not change limit values for the frequency of monitoring for smaller water providers (see Appendix 1; IBNORCA archives; Bolivia, 2005; 2007; 2010). This modification in 2010 was also indicative of the implementation of drinking-water quality standards in this period.

For the newly elected government of Evo Morales, which took power in 2006, the water sector was clearly a political priority. The creation of a Ministry of Water in 2006 and the recognition of
water as a human right in the Bolivian Constitution in 2009 undoubtedly signalized that water was a priority in the political agenda of the new government. However, the focus was first on expanding access, and not on the quality of water. Indicators of success for the sector that were compiled and reported measured access to water, and progress toward the Millennium Development Goals (Ministerio del Medio Ambiente y Agua’s Archives; Interview with civil servant from MMAyA). As water services were expanded (under political pressures), testing first the drinking-water quality of the sources before approving a new project was sidestepped, despite the fact that before 2006 it was a common practice (AAPS, 2011). An interviewee detailed:

“The problem is that […] the new government of Evo committed itself to increase [water] access and meet the Millennium Goals, which included water provision and reach almost 100%. Therefore, what did 100% meant? To give water. They started to receive a greater quantity of projects and to accept them all. But these projects did not consider water analysis. And many of these projects [of the Agua I and Agua II programs] provided water without doing an initial analysis. They built the water system and analyzed water [quality] after. And then, the problems appeared: this source is totally contaminated, this source requires more than a treatment plant, this water needs to be treated to be drinkable […] It is part of the enthusiasm, of wanting to meet the objective in a short time” (author’s translation; Interview with independent expert, see Appendix 4).

The national regulatory framework did not initially follow neither. By 2008 27 of the 28 water services registered with the SISAB (regulatory agency) reported complying with bacteriological quality standards, but no independent controls of drinking-water quality was reported by the SISAB and these registered water services were excluding hundreds of others (SISAB, 2006-2008; AAPS, 2011). In 2009, the SISAB was abolished and replaced by the Autoridad de Fiscalización y Control Social de Agua Potable y Saneamiento Básico (AAPS). This change was fundamental and aimed at restructuring the regulatory framework that had progressively been developed and improved by the SISAB. This process included the registration of hundreds of water services with
the AAPS (AAPS, 2009; Interviews with two independent experts and civil servant from the AAPS). The NB 512 of 2010, and especially its Reglamento, was also adopted as part of this process to rebuild a regulatory framework that would be adapted to actual capacities of water services, which took place in its revision. The revised regulation indeed limited greatly the requirements (number of parameters to be tested and frequency of controls) for smaller and medium-size water services (IBNORCA Archives; Interview with SEMAPA worker). An interviewee who participated in the revision of the regulation explained that all water services did not have the resources to control drinking-water quality to the same extent: “Water companies […] did not want to comply with all the values that were in the regulation. Before there was only one list of parameters […] and they said: we can’t do all these analyses and neither are there laboratories in Bolivia to do all these analyses” (author’s translation, see Appendix 4).

Despite the changes aimed at improving the applicability of the new regulatory framework, the latter developed slowly and a lack of human, technical and financial resources was noted in an official diagnostic in 2011. This same diagnostic also noted that registration of water services and regulation had to take more into account drinking-water quality (AAPS, 2011).

By 2014 significant steps in that direction had been taken, with parallel controls and laboratories’ accreditations being conducted by the AAPS. The support of the German cooperation was key in this development, through the PROAPAC (that had started in 2001, was interrupted in 2005-2008, but then followed up until 2013) and PERIAGUA programs (from 2013 to 2019). The first program worked “to institutionally strengthen the AAPS from an integral perspective, both technically and for organizational management”, the second “aims at optimizing the capacities of sectorial institutions […] [and] works specifically with 23 EPSAs from 13 municipalities located
in the departments of Santa Cruz (10) and Tarija (3)” (author’s translations; GIZ/ PROPAPAC, N.d.: 22; GIZ/ PERIAGUA, 2017).

By 2014 the number of water services regulated by the AAPS remained limited, although it increased (mostly in the region of Santa Cruz) (AAPS, 2013; 2015a; 2015b; AAPS Archives). A civil servant of the Water Ministry mentioned that the staff in charge of testing drinking-water quality (if so) did not necessarily had the resources (of time and material) to actually test it, and might therefore simply “make-up numbers” (quote from Interview with MMAyA civil servant, author’s translation). Various interviewees mentioned that the Health Ministry does not realize any drinking-water quality control, although it should (Interviews with a representative from an international organization and two independent experts).

Overall, pressures from the politicization of the issue were first not favoring better implementation of drinking-water quality standards, because the focus was on another aspect of drinking-water services (access). However, the expansion of access and the politicization of drinking water over time also finally encompassed drinking-water quality. With foreign capacity support, the regulation of drinking-water quality developed significantly; first by adapting the standards to make them reachable, and second by developing progressively a national capacity to monitor.


Table 6 summarizes the implementation processes in Bolivia from 1985 until 2014, with the corresponding changes in foreign capacity support and external pressures for each time period.
Table 6. Summary of Implementation Progresses in Bolivia, 1985-2014

<table>
<thead>
<tr>
<th>Time period</th>
<th>Foreign Capacity Support</th>
<th>Parameters Under Strong External Pressures</th>
<th>Implementation Progress by the End of the Time Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985-1989</td>
<td>Limited (interrupted in 1984)</td>
<td>-</td>
<td>Partial</td>
</tr>
<tr>
<td>1990-1997</td>
<td>Sustained (only for metropolitan areas)</td>
<td>Microbiological All (in La Paz/El Alto and Cochabamba)</td>
<td>In metropolitan areas: extensive for microbi., partial otherwise Outside metropolitan areas: partial for microbi., none otherwise</td>
</tr>
<tr>
<td>1997-2004</td>
<td>Limited (only from 2001 on)</td>
<td>-</td>
<td>Very partial</td>
</tr>
<tr>
<td>2005-2009</td>
<td>Limited (awaiting for new framework)</td>
<td>-</td>
<td>None</td>
</tr>
<tr>
<td>2010-2014</td>
<td>Sustained (at national level)</td>
<td>All (new regulation more circumscribed)</td>
<td>Significantly extended</td>
</tr>
</tbody>
</table>

Overall, in Bolivia (where state capacity was weak), the analysis over time of subnational variations and variations between parameters suggested that foreign capacity support could indeed be significantly important in increasing the capacity of the sector and its ability to implement drinking-water quality standards, and that its impact was further calibrated by external pressures. On one hand, when weak state capacity was supplemented by sustained foreign capacity support, implementation was partial when there was no external pressures (in metropolitan areas between 1990 and 1997, for parameters other than microbiological) and extensive when there was such pressures (in metropolitan areas between 1990 and 1997, for microbiological parameters and nationally between 2010 and 2014, for all parameters). These results suggest hypotheses 1.2 and 2.2 are confirmed. On the other hand, when foreign capacity support was limited, but external pressures were strong (like for microbiological parameters outside the metropolitan areas in the 1990-1997 period), implementation was partial, as suggested by hypothesis 2.3. And when there was no or limited foreign capacity support and weak external pressures, the implementation
progress was partial (for 1985-1989), very partial (for 1997-2004) or absent (for 2005-2009). These last results only partially confirm hypothesis 3 and suggest that foreign capacity support not sustained over time or that was interrupted recently could be followed by partial implementation progress even without external pressures, if policy entrepreneurs took over. Implementation would nevertheless remain partial, at most.

4. Chile

Chile was one of the first Latin American countries to adopt drinking-water standards. These standards were made official on February 22, 1952 as the Norma Oficial 61-11ch (later labelled 409ch.52) with the Decree 488 of the Ministry of Public Works and Means of Communication. Based on the 1946 US standards, from which all its limit values were taken, this regulation established limit values for chemicals in drinking-water sources (before treatment) and in drinking water (after treatment), as well as bacteriological requirements for drinking water (U.S. Public Health Service, 1946; Chile, 1958; INN Ruta Digital NCh409). A few months after the Ministry of Public Works’ decree, on June 26, 1952, the Health Ministry also defined drinking-water standards through Decree 1.132. This decree also highlighted the importance of the quality of drinking-water sources but did not specify limit values for any chemical. As for the bacteriological requirements, they were the same than in the Decree 488 of the Ministry of Public Works (Chile, 1952).

A revision process of the Norma Chilena 409 (NCh409) started in 1968 and concluded when it was made official with the Decree 354 of the Ministry of Public Works and Transportation on April 22, 1970 (Chile, 1970). In parallel with this process from the Public Works Ministry, new
drinking water standards were also decreed by the Health Ministry on December 19, 1969 (Decree 735) (Chile, 1969). Legally the Health Decree took precedence over the Public Works’ one (INN Ruta Digital NCh409). The 1969 and 1970 Chilean drinking-water quality regulations were developed years after the WHO defined its drinking-water standards (first edited in 1958 and then in 1963 and 1971). The process that led to the NCh409 of 1970 directly referred to the 1962 WHO international standards and the 1962 American standards, as well as to a Seminar of the Pan-American Health Organization and the WHO held in Buenos Aires on September 20-29 of 1962 (INN Ruta Digital NCh409). As such, it differed from the 1952 regulations, which were developed when no international standards had been defined (and even less so promoted).

The 1969-1970 regulations were revised in the following decades, and new regulations were adopted in 1984 and 2007 (Chile, 1984; 2007). The 1984 revision considered not only the WHO Guidelines but a great number of national drinking-water quality regulations. The pressure from the Inter-American Development Bank also played a role for the adoption of the limit value for arsenic. The 2007 revision also considered other countries’ regulations and the 1993 and 2004 WHO guidelines (INN Ruta Digital NCh409). The diffusion of WHO guidelines in drinking-water quality standards in Chile was overall limited, since the national regulations did not adopt all the limit values of the WHO guidelines and also did not include limit values for all substances for which the WHO had a health-based guideline (Chile, 1984; 2007; WHO, 1984; 1993; 2004) (see Appendix 2).

This section first describes the external pressures that were put on the water sector development in Chile from 1960 until 2014 (subsection 4.1), then reviews in details the implementation of Chilean
drinking-water quality regulations between 1969 and 2014 (subsections 4.2, 4.3 and 4.4), and finally briefly presents the variations in all main variables for the whole period (subsection 4.5).

4.1. External Pressures on Drinking-Water Quality (1960-2014)

The development of the water sector in Chile was marked by different pressures, at different periods of time. Interviews and systematic documentation led to the identification of four main moments of external pressures between 1960 and 2014.

First, in the 1960s there was a public health alert in Antofagasta and its surroundings (region II), following many cases of sickness and death attributed to the intoxication by arsenic, which contaminated the population through drinking water. In the early 1960s, the first cases of children intoxicated with arsenic were detected and some were treated in Santiago. In 1968, the National Health Service (Servicio Nacional de Salud) established a commission to investigate and confirm the source of intoxication (the Toconce and Holajar Rivers, for instance). No other regions of Chile faced a similar health alert because of cases of arsenicism (Bruning, 1968; Puga et al., 1973; Zaldivar, 1974; Borgoño et al., 1977; Ferreccio and Sancha, 2006; Marshall et al., 2007; Ferreccio and Steinmaus, 2016).

Second, in the mid- and late 1970s, the Health Ministry evidenced the large non-compliance of drinking-water standards for microbiological quality in Chile, by compiling and publicly presenting data on drinking-water quality of water providers nationally. The data had been collected for years, but had not been compiled nationally and was largely unknown or ignored. The Chilean chapter of the Agrupación interamericana de ingeniería sanitaria y ambiental (AIDIS) also contributed to the diffusion of this information, for instance in its 1977 biannual congress. This was a key period in which the Health Ministry, and the Chilean AIDIS organization,
put pressure on (then public) water providers to improve microbiological quality of drinking water (Monreal, 1977; Interviews with civil servant from Health Ministry and from representative of water provider).

Third, starting in the early 1990s, and following the adoption of a new regulation regime for the water sector, in road toward the privatization of drinking-water services, different pressures were put on the water providers, following reforms of the Ministries of Finance and Economy. Given Law 18.778 by which the government paid subsidies for drinking-water for poorer families, the Health Ministry pressured the water sector to comply with drinking-water standards, especially microbiological ones as well as ones for arsenic and nitrates. The Ministry of Economy also established the Superintendencia de Servicios Sanitarios (SISS), which was given the power to impose sanctions on water providers (by Law 18.902) and monitored drinking-water quality essentially of urban water services starting in 1991. This monitoring was public and detailed until 2004 (SISS, 1995; 1997-2002; Interviews with Magaly Espinosa and with civil servant of the Health Ministry).

Fourth, especially in 2011-2014, public protests and governmental instances raised issues with the quality of water in some places of Chile. On one hand, in Copiapó and its region (Atacama), popular protests, the senators Isabel Allende and Baldo Prokurica, the councilmember Christian Guzmán and a medical study of Mario Navarro denounced the lack of quality of water in the region of Copiapó (Diario de Atacama, 2011; Leal, 2011; Ponze, 2012; Scheuch, 2012; Vera, 2014). On the other hand, in different communities, small environmental groups and some academics denounced levels of arsenic in drinking water higher than the one allowed starting in 2012 and until 2017 (0.03 mg/L, lowered to 0.01 mg/L in 2017). Popular and local authorities’ protests and
complaints took place in one community of the metropolitan region of Santiago (Lampa), in one city of the northern region of Tarapacá (Alto Hospicio), and in two communities of the region of Atacama (Diego de Almagro and El Salado). The Health Ministry also stood firm by the drinking-water quality requirements for arsenic, putting pressure for the compliance with this requirement according to the delay defined in the 2007 regulation (Health Ministry Archives; Interview with civil servant from Health Ministry).

Besides, the cholera crisis of the early 1990s affected many Latin American countries, including neighboring countries (Bolivia and Peru), but not Chile (SISS, 1996). Although Chile adopted some preventive measures, there was no health alert in Chile at that moment.

**Table 7. Strong External Pressures on Drinking-Water Quality in Chile**

<table>
<thead>
<tr>
<th>Time period</th>
<th>Areas concerned by pressures</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962-1970s</td>
<td>Antofagasta and its surroundings (region II)</td>
<td>Arsenic</td>
</tr>
<tr>
<td>1977-1983</td>
<td>All regions, national scope</td>
<td>Microbiological</td>
</tr>
<tr>
<td>1991-2004</td>
<td>All areas covered by companies (“urban areas”), prior to their privatization</td>
<td>Microbiological, nitrates, arsenic</td>
</tr>
<tr>
<td>2011-2013</td>
<td>Region of Atacama (Copiapó)</td>
<td>Various (dissolved solids, sulfates, chloride and nitrates)</td>
</tr>
<tr>
<td></td>
<td>Communities in 3 regions (Lampa, Alto Hospicio, Diego de Almagro and El Salado)</td>
<td>Arsenic</td>
</tr>
</tbody>
</table>

Overall, the parameters of strong external pressures on drinking-water quality in Chile are summarized in Table 7. Given these values for the independent variables, we would expect,

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25 The details and references of the external pressures for each of these communities are presented in section 4.4.
according to hypotheses 1.1 and 1.2, the resulting implementation of drinking-water standards in Chile, for the period between 1969 and 2014, to be as shown in Table 8.

Table 8. Expectations for Implementation in Chile (according to hypotheses), 1969-2014

<table>
<thead>
<tr>
<th>Time Period</th>
<th>External Pressures</th>
<th>Implementation Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969-1976</td>
<td>Strong (arsenic in region of Antofagasta) Weak otherwise</td>
<td>Extensive for arsenic in region of Antofagasta Partial otherwise</td>
</tr>
<tr>
<td>1977-1983</td>
<td>Strong (microbiological) Weak otherwise</td>
<td>Extensive for microbiological Partial otherwise</td>
</tr>
<tr>
<td>1984-1990</td>
<td>Weak</td>
<td>Partial</td>
</tr>
<tr>
<td>1991-2004</td>
<td>Strong (microbiological, nitrates, arsenic in urban areas) Weak otherwise</td>
<td>Extensive for microbiological, nitrates, arsenic in urban areas Partial otherwise</td>
</tr>
<tr>
<td>2005-2010</td>
<td>Weak</td>
<td>Partial</td>
</tr>
<tr>
<td>2011-2014</td>
<td>Strong (arsenic in four communities*) Strong (various in region of Atacama) Weak otherwise</td>
<td>Extensive for arsenic in four communities Extensive in region of Atacama Partial otherwise</td>
</tr>
</tbody>
</table>

* These four communities are: Lampa, Alto Hospicio, Diego de Almagro and El Salado.


The regulations of drinking-water standards established in Chile in 1969 (by the Health Ministry) and in 1970 (by the Public Works Ministry) were the first to be adopted after the WHO had defined “international standards”. Both Chilean regulations were influenced by the latter, but nevertheless differed in some parameters. Both adopted a less restrictive value for lead, and the Public Works Decree also less restrictive values for arsenic and nitrate (see Appendix 2). Legally, the Health Decree superseded the Public Works one (INN Ruta Digital 409). The analysis of their implementation can be separated in three categories: microbiological parameters, arsenic, and other chemicals.
For microbiological parameters, standards were partially implemented. Compiled data from the Dirección de Obras Sanitarias for the years 1971-1976 revealed that between 20 and 30 % of water services (each year) were not systematically monitoring bacteriological quality of water. Among the services systematically monitoring bacteriological quality of water, between 43 and 66 % (each year) were providing water of bad bacteriological quality at least during one month of the year (Monreal, 1975; 1977). Data on these important shortcomings in term of drinking water quality had been collected for years both by the Health Ministry and the SENDOS but had not been put together, and had largely been nationally unknown or ignored until the second half of the 1970s. The Health Ministry compiled and publicly presented this data, for instance at the biannual congress of the Chilean chapter of the Agrupación interamericana de ingeniería sanitaria y ambiental (AIDIS) in 1977, and this had a public resonance. A civil servant from the Health Ministry recalled: “The results were presented in the Biannual Congress of Sanitary Engineering […] at the end of the 1970s […]. It provoked a lot of commotion because even if the data existed, the truth is it was not specified… No, no, essentially it was not used” (author’s translation; Interview with civil servant from Health Ministry, see Appendix 4). The publication and diffusion of this data led to the development of a national program for monitoring drinking-water bacteriological quality in 1980, at the initiative of the Health Ministry. This program included controls and monitoring of drinking-water quality by the Health Ministry, that could count back then on a network of inspectors, with sufficient staff, that could be properly trained. This program also directly put pressure on water providers and the Ministry in charge of the water sector: “every year […] a consolidated report was prepared and sent to water services and to the Public Works Ministry […]. This resulted in a general preoccupation for water quality” (author’s translation; Interview with civil servant from Health Ministry, see Appendix 4). This pressure resulted in
significant improvements of the microbiological quality of drinking water (Chile, 1980; Monreal, 1987).

For arsenic, the limit value from the Public Works Decree in force was more permissive (0.12 mg/L) than the one from the Health Decree in force (0.05 mg/L). Although no national data was available for this period, it is generally acknowledged that in most Chile complying with the most restrictive limit value did not require specific water treatment. However, the situation was different in the northern regions, because of the natural presence of arsenic in some of its water sources. Data from water providers and the Health Ministry for towns of northern regions (as reported by various scholars), showed that the strictest limit was more or less complied with in the cities the most North in the 1970s and the early 1980s, as the levels were lower than 0.05 mg/L in Arica and slightly higher than 0.05 mg/L in Iquique and Taltal (Ferreccio and Stainmaus, 2016: 371; Smith et al., 1998: 663). However, in the region of Antofagasta, the situation was different. Since 1958, when the Toconce and Holajar Rivers became important sources of drinking water for the city (despite known levels of arsenic in their waters of over 0.8 mg/L), the levels had been significantly above 0.12 mg/L. These high levels engendered intoxication of children that was detected from the early 1960s. Only in 1968 did the National Health Service established a commission that investigated and confirmed that drinking water was the source of intoxication. And only after that commission did the water provider installed arsenic-removal treatment plants: the first started operating starting in May 1970 and the second one in 1979. The establishments of these plants correspond to the changes in levels of arsenic measured by water providers and the Health Ministry (and reported by scholars). In Antofagasta, Mejillones and Chuquicamata, levels were lowered under 0.12 mg/L in the early 1970s, but remained higher than 0.05 mg/L for this period. In Calama,
Tocopilla and Maria Elena, the levels were higher than 0.12 mg/L until the late 1970s, when they were lowered to approximately 0.11 mg/L, a level they maintained for the following years of the period. In San Pedro, levels remained approximately at 0.6 mg/L for the whole period (Ferreccio and Stainmaus, 2016; Smith et al., 1998; Ferreccio and Sancha, 2006; Bruning, 1968; Puga et al., 1973; Zaldivar, 1974; Borgoño et al., 1977; Marshall et al., 2007). Despite levels of arsenic in water were known to be very high from the end of the 1950s, the treatment plants were built only after the health alert raised, especially in Antofagasta, over the course of the 1960s and the Health Service put pressure on the sector in charge of providing water.

For chemicals other than arsenic, their levels in drinking-water were said to be largely unknown in 1977. Water providers and Health Ministry’s agencies could only test for lead and chromium in the main cities (Santiago, Antofagasta, Concepción and Valparaiso), and only the water provider in Santiago could for other chemicals (cadmium, cyanide and selenium). Even for chemicals for which monitoring could take place, no data was published or reported, so whether drinking-water quality standards were met remained uncertain (Sancha, 1977). As there was no pressure for the compliance with drinking-water standards for these chemicals, these standards were only (at most) partially implemented.

Overall, national drinking-water standards in the 1970s and early 1980s were mostly monitored and reported, but they were only partly complied with, until external pressures, essentially from the health sector, were directed toward the implementing actors to demand compliance for arsenic and microbiological parameters. The sector developed responses to pressures over the years, progressively, to finally comply with the standards for arsenic and microbiological parameters, but not necessarily for other parameters.
4.3. In Road to the Privatization of Urban Drinking-Water Services (1984-2006)

In early 1984, the Public Works Ministry adopted revised drinking-water standards (NCh409). The compliance requirements for microbiological quality were defined more restrictively. The changes in chemical parameters included a limit value for arsenic at 0.05 mg/L (as had established the Health Ministry in 1969 but not the Public Works Ministry in 1970) and stricter limit values for ten other chemicals (ammonia, chloride, copper, iron, lead, manganese, mercury, nitrate, phenolic compounds and sulfate), largely (but not exclusively) following the WHO guidelines. For eight chemical parameters (chloride, copper, iron, manganese, nitrate, sulfate, total dissolved solids and zinc), the NCh409 specified that the Health Ministry could accept values higher than the limit values defined in the regulation. Its implementation was characterized verydistinctively in urban and rural areas.

On one side, drinking-water quality in urban water services significantly improved during this period, both for microbiological parameters and for chemicals considered of most interest by the Health Ministry, but not for other chemical parameters.

For microbiological quality standards, the monitoring program initiated by the Health Ministry in 1980 significantly improved their compliance, to the extent that in 1985, the water provided by distribution was for 94.6 % of the population complying with bacteriological standards (Monreal, 1987). Microbiological quality continued to improve progressively, and was systematically reported by the SISS starting in 1991 (for urban water services). Until 1997 annual reports detailed the urban services where monitoring was lacking or where results were not complying with microbiological standards. From 1998 on, SISS’ annual reports were less precise and detailed, and systematically reported only the “levels of compliance” by company (often including many
localities and services) as a percentage for each category of parameters.\textsuperscript{26} Both for bacteriological quality and disinfection standards, these percentages of compliance reported for urban companies reached between 99 and 100\% nationally by 1998 and maintained these compliance levels in the following years. SISS’s parallel controls have found that bacteriological standards were still not met everywhere until 2000 but were from 2001 onward\textsuperscript{27} and that disinfection standards were usually met but with some exceptions in small communities, mostly in water services of smaller companies\textsuperscript{28} (SISS’ \textit{Informes de calidad} 1991-2006; SISS’ \textit{Controles paralelos} 1998-2006; Interviews).

As for chemical parameters, there was no national monitoring reported nationally before 1991, i.e. before the creation of the SISS. In its 1991 report, the SISS identified the chemical parameters exceeding limit values over the recent years in each locality/service and informed the status of actions taken or planned to resolve the issue. Chemical quality of water was monitored from then on. Until 1997, for each service/locality, SISS reported the parameters exceeding standards that

\textsuperscript{26} These levels of compliance considered the frequency and results of autocontrols conducted by the company, but the exact computing of the level of compliance (including how results of different localities served by the same company were weighted) was not made public. Moreover, the national drinking-water quality regulation then in effect (\textit{NCh409/1.Of.84}) tolerated for each month a proportion of samples not complying with microbiological standards: 10\% could contain coliforms, 5\% coliforms at levels over 5 UFC or NMP/100 mL, 20\% could contain less chlorine residual than the minimum allowed and 5\% could contain no chlorine residual (Chile, 1984; Interviews).

\textsuperscript{27} SISS’s parallel controls found levels of coliforms higher than the national regulation in Iquique, Pisagua and Alto Hospicio (region I, ESSAT) in August 2000; in Santo Domingo (region V, Coop. Santo Domingo) in January 1998; in Pichidegua (region VI, ESSBIO) in February 1998; in Bulnes, Quillón and Florida (region VIII, ESSBIO) in April 1998; in Puerto Varas and Frutillar (region X, ESSAL) in January 1998; in Balmaceda, Coyhaique and Puerto Aysén (region XI, ESSAR) in November 2000.

\textsuperscript{28} SISS’s parallel controls found levels of residual chlorine uncompliant with national standards in Hijuela (region V, ESVAL) in March 2000; in Pichidangui (region IV, ESSSI) in August 2002; in Quellón (region X, ESSAL) in July 2003; in Pichilemu (region VI, ESSBIO) in November 2003; in Chacabuco (region XI, ESSAR) in February 2004; in Totoralillo (region IV, ESSETO) in February 2004; in Santa Rosa del Peral (region XIII, Santa Rosa del Peral) in October 2004.
were identified annually by water providers. The reporting, as for microbiological quality, was less detailed from 1998 on. Along the years, improvements in chemical drinking-water quality were observed, but unevenly for all chemical parameters. For the two chemicals identified by the Health Ministry as “likely to affect users’ health” (nitrates and arsenic), and monitored more closely by the SISS, levels in drinking-water were reported to be complying with national standards in all services by 2004. For chemicals for which the Health Ministry could allow higher limit values (chloride, copper, iron, manganese, nitrate, sulfate, total dissolved solids and zinc) or had agreed to raise the limit value in the next revision of the national regulation (ammonia, chloride, copper, sulfate and total dissolved solids), complete compliance was not reached by 2006 in most of the services which had issues with these chemicals in the early 1990s (especially in smaller communities). Other chemicals (cadmium, chromium, lead, mercury and phenolic compounds) were only occasionally reported to be higher than their limit values, suggesting their presence in drinking water was exceptional or their monitoring less regular (data on chemicals in drinking water were only reported when said to be noncompliant). SISS’ parallel controls of chemical quality only started in 2002, and were limited in scope (both considering frequency and coverage). Nevertheless, results from these controls appear to confirm the general trends of compliance observed in data reported by water providers (SISS’ Informes de calidad 1991-2004; SISS’ Controles paralelos 1998-2006; Interview with civil servant from SISS).

29 Interestingly, for arsenic, in the region of Antofagasta (where a public health alert for arsenic contamination took place in the 1960s-1970s), the more restrictive limit value of 0.01 mg/L was met by 2004; but in other places where arsenic was naturally present in water (especially the region of Tarapacá) the level was lowered under 0.05 (but not below 0.01) by 2004.
The evolution of drinking-water quality in urban services between 1984 until 2004 took place in the context of urban services being embarked on the road towards privatization. This lead to the development of a new regulatory framework for the sector (and the creation of the SISS), that was effective from 1990 on and to the transformation (also in 1990) of water services into water (public) companies. In this context, the Health Ministry pressured the new water companies to improve the quality of water. Conjointly, the SISS was also putting pressure for the compliance of drinking-water quality before the services would be privatized. A civil servant from the Health Ministry in the 1990s mentioned:

“The standpoint that took the Health Ministry […], and that it pretended it would implement, was that if the company did not comply with quality, it couldn’t charge the water. […] In light of this, the companies were concerned, and the Superintendencia was also concerned about doing more controls, etc. It was never implemented. But it was the standpoint of the Health Ministry. If it is not drinking water, it can’t be charged as drinking water. Therefore, together with the Superintendencia, that also strengthened its controls, and the Health Ministry, that also strengthened its controls of companies, it resulted in effective improvement of water quality” (author’s translation, see Appendix 4).

In rural areas, the quality of drinking water followed a different trajectory. The microbiological quality of water also improved between 1990 and 1997, but not at levels as high as in urban areas: half of rural water services were still not complying standards by the end of 1997. In 2004, an inquiry conducted by the Public Works Ministry found that 81.9% of rural services (providing water to more than 150 people and with a density higher than 15 houses per kilometer) reported doing bimonthly controls of bacteriological quality of water, and 83.9% did not report fecal coliforms in the last year. As for chemical parameters, they were excluded from SISS’ reporting: no results nor evidence of controls of chemical parameters were reported (SISS’ Informes de calidad 1991-2006; Ministerio de Obras Públicas, 2004; 2007). Indeed, the SISS, in practice,
essentially monitored drinking-water quality in urban water services. Moreover, the rural services lacked economic resources to control and monitor drinking-water quality (Interviews with representative of water provider and with civil servant from Minsal).

Overall, the implementation of national drinking-water standards improved significantly from 1984 until 2006, but unevenly. The implementation was significantly extended in urban areas for microbiological parameters between 1991 and 1999 and for arsenic and nitrates between 1998 and 2004 (in response to strong pressures from the SISS and the Health Ministry), but otherwise remained essentially partial. The improvements were mostly focused in urban water services prior to their privatization processes (which have taken place between 1997 and 2004). Policies of the Ministry of Economy and positions of the Health Ministry clearly influenced where and how the standards for drinking-water quality have been implemented. Besides, in rural areas, implementation was limited by a lack of resources and also as a result of little (if any) external pressures on the services.


The revision of the 1984 national regulation for drinking-water quality standards has been postponed from the late 1990s and finally was only adopted and effective in 2007. The new regulation was more permissive for a few parameters that were regularly exceeding their respective limit values: ammonia, chloride, copper, sulfates and total dissolved solids. However, it lowered the tolerance level of incompliance for disinfection parameters (minimal chlorine residual) and was more restrictive for arsenic, bringing its limit value at 0.01 mg/L (with a delay of a maximum of 5 years to reach 0.03 mg/L and 10 years for 0.01, provided the obtaining of a specific
authorization from the Health Ministry) and zinc. It also added limit values to a few other parameters, mostly pesticides. Besides, it additionally created the concept of “critical parameters”, which are specific to each water service. These consist in substances superseding the allowed concentration in the water source of a service without treatment. For these parameters, more frequent controls were required, but there was also an accepted tolerance for incompliance of 10% and limit values had to be reached as a monthly average of all samples (Chile, 2007; Interviews; INN Archives; see Appendix 2). In general, from 2007 on, for most urban water services (that had all been privatized by 2004), the changes in the regulation, the new indicators of the SISS and the limitations of SISS’ parallel controls resulted in weak pressures on the sector. There was however some specific cases where strong pressures emerged, at some moments in time.

The changes in the 2007 regulation favored higher rates of compliance, at least until the transitory new guideline for arsenic came into force, in 2012 at the latest (representing a challenge to be met for northern regions where levels of arsenic were close to the 0.05 limit value). Consequently, levels of compliance (for bacteriological, disinfection, critical and non-critical parameters) reported by most urban services from 2008 on were higher than 90%. Although very limited in scope, SISS parallel controls (that were however not publicly reported) did not show results significantly refuting the levels of compliance of the providers’ autocontrols. There was one main exception to this general complying picture, as shown by levels of compliance reported by providers and SISS’ parallel controls: in the III region, Aguas Chañar recurrently did not comply with standards for its “critical parameters”, essentially total dissolved solids, sulfates and chloride (and sometimes nitrates). The region was facing the issue not only of water quality but also of water quantity. Indeed, when the Coordinadora de Defensa del Agua y del Medio Ambiente was
created in 2009 (with the participation of social organizations, trade unions, professionals, religious and local instances) water scarcity was one of the main issue it dedicates itself to. From 2011 its protestations were also claiming for improvement of water quality and politicians (the senator Isabel Allende and the municipal council member Christian Guzmán) also participated in pressuring the water provider. In March 2012, social organizations presented a writ of protection denouncing the water shortage. A week later, the minister of Public Works, Laurence Golborne, after meeting with social actors and local instances, announced measures to secure drinking water of better quality in a short time and a desalinating plant (to definitely solve the issue) by 2017. The SISs initiated in 2013 a sanctioning process for the exceeding levels of nitrates, sulfates and dissolved solids in water. Yet, by the end of 2014, the reported quality of drinking water still showed little improvement with respect to these parameters. The installation of treatment plants that had been planned in 2011 and launched in 2012, following pressures from social organizations, did not result in effectively meeting standards by 2014. Following the 2014 rates’ fixing process concluded with the SISs, that defined new rates’ increases associated with additional effective treatment plants, the existing treatment plant was expanded and a desalinating plant to definitively solve the water-quality issue was planned to be effective by the end of 2017 (SIS’s Informes de resultados de la calidad del agua potable 2007-2016; SIS’s Controles paralelos 2008-2014; Decrees 42/2014 and 58/2010 of the Ministerio de Economia, Fomento y Turismo; Aguas Chañar, 2010-2016; Argandoña, 2012; El Ciudadano, 2009; Diario de Atacama, 2011; Leal, 2011; Ponze, 2012; Scheuch, 2012; SIS, 2012; The Clinic Online, 2012; Vera, 2014; Interview with civil servant of SISs).
As for arsenic, where restricting limit values of 0.03 mg/L and 0.01 mg/L represented a significant challenge (as reported publicly by water providers), compliance was only reached following external pressures from the population, from the Health Ministry and, in ultimate instance, the SISS. This occurred in communities of at least three regions: Lampa (in the metropolitan region), Alto Hospicio (in the region of Tarapacá), and Diego de Almagro and El Salado (in the region of Atacama). In Lampa, levels of arsenic higher than 0.03 mg/L were found in water provided by BCC (locality of Santo Tomás) and Novaguas (locality of Valle Grande) in 2011 (despite no specific authorization had been given by the Health Ministry for this delay), and also in 2012 (when the more restrictive maximal limit value of 0.03 was in effect everywhere). It’s only after the SISS initiated a sanctioning process against them in 2012 that the providers asked the Health Ministry an extension to comply with the regulation – and it is upon the request of the Health Ministry that an action plan to solve the issue was developed and presented by the providers on March 12, 2013. In parallel and preceding SISS’ and Health Ministry’s processes\(^3\), civic organizations have constituted themselves and mobilized to denounce and document the high levels of arsenic in drinking water in Lampa, starting in April 2012 (as they became aware of an academic study by María Angélica Rubio and Marcelo Rocco finalized and published two years ago on drinking-water quality in Lampa). In March 2013 these organizations also presented a writ of protection (Recurso de protección N°14.710) against Novaguas for incompliance with the arsenic limit value. The senator Guido Girardi, the deputy Gabriel Silber and the mayor Graciela Ortúzar publicly supported legal actions, and the Health Commission of the House of

\(^3\) The Contraloría General de la República conducted an investigation on the responses of the Health Ministry (regional office) and the SISS to the high levels of arsenic encountered in drinking water of Lampa.
Representatives also analyzed the issue of water quality in Lampa on March 20, 2013. In May 2013, water providers put in place the first step of their action plan (under SISS’ control), with the addition of a filtration process in the treatment of water, and by August the second step, to guarantee water with levels of arsenic below 0.01 mg/L. By mid-2013, SISS’ parallel controls and water providers’ autocontrols reported levels below 0.01 mg/L. The deputy Gabriel Silber stated in May 2013: “without these protests and public claims, the authority would not have launched the changes that took place in the commune for the security of its inhabitants” (author’s translation, quote from La Segunda, 2013; SISS’ Informes de resultados de la calidad del agua potable 2007-2014; SISS’ Controles paralelos 2008-2014; Health Ministry Archives; Contraloria General de la República, 2013; Cámara de Diputados, 2013; Universidad Santa María, 2010; Agencia UPI, 2013; Cooperativa.cl, 2013a; 2013b; Revista Punta Final, 2013; Correa, 2013). In the desert region of Tarapacá water services were provided to all communities by Aguas del Altiplano. Arsenic, there, was known to be present in the natural groundwater supplies. Treatment plants had indeed been installed prior to 2004 to meet the 0.05 mg/L limit value. Reaching lower levels of arsenic in drinking water required expanding and building new treatment plants. In 2012 levels of arsenic reported by Aguas del Altiplano to SISS were frequently over 0.03 mg/L in Alto Hospicio. The construction of a new treatment plant had been planned in 2011, but had not yet been launched. Starting in February 2013 (following the publication of December 2012 autocontrols), mobilization for lower arsenic levels in water emerged in Alto Hospicio and also other smaller communities of the region (with arsenic levels lower than 0.03 mg/L but higher than 0.01 mg/L): citizens’ protests and claims reached national newspapers, and a writ of protection was presented by the deputy Hugo Gutierrez about drinking water quality in Alto Hospicio. In March, April and May 2013, the regional research center CIDERH and national representatives of the Colegio
Médico also documented the levels of arsenic in Alto Hospicio. In November 2013, the first step of a new plant dedicated to lowering arsenic levels in water was launched in Alto Hospicio (on that occasion the mayor of Alto Hospicio denounced the absence of “the ‘terrorists’ [who scared] people [regarding the levels of arsenic in water]”, therefore indirectly acknowledging the impact these external pressures had on the sector). Moreover, in 2015 treatment plants of Huara, La Huayca and La Tirana were incorporated to the system, investments in the second step of the Alto Hospicio plant started and the environmental process of approval for the expansion of the Iquique plant was started. Apparently, works to comply with the 0.01 mg/L (to be effective in 2017) were accelerated following pressures (author’s translation, quote from El Boyaldía, 2013; SISS’ Informes de resultados de la calidad del agua potable 2007-2016; SISS’ Controles paralelos 2008-2014; Health Ministry Archives; Aguas del Altiplano, 2009-2015; Decrees 13/2013 and 8/2008 of the Ministerio de Economía, Fomento y Turismo; Núñez, 2013; Soto, 2013; Sanhueza, 2016). In the region of Atacama, a region facing extensive issues with scarcity and quality of water (as seen hereabove), two communities also encountered drinking water with high levels of arsenic: Diego de Almagro and El Salado. Aguas Chañar (the provider) acknowledged a short episode of high levels of arsenic (over 0.08 mg/L) at the end of 2011, but reported levels below 0.03 mg/L in 2012 and 2013 (but recurrently over 0.01 mg/L). Specifically on the issue of arsenic, a writ of protection was presented in May 2012 by a councilmember of Diego de Almagro. The Health Ministry in 2012-2013 also pressured the provider for the 0.01 mg/L limit value to be met, including by imposing a fine in 2012 and initiating a proceeding on December 6, 2013. Following these pressures, investments to improve pre-treatment in the plant of Diego de Almagro (providing water to both communities) were made in 2014 and 2015 and autocontrols of the provider, as well as SISS’ parallel controls, showed compliance with the 0.01 mg/L limit value for arsenic in 2014
(including at the critical period of the “Bolivian winter” at the end of the calendar year) (SISS’ Informes de resultados de la calidad del agua potable 2007-2016; SISS’ Controles paralelos 2008-2014; Aguas Chañar, 2010-2016; Araya, 2012; Centro Regional Atacama, 2012; Adaos, 2012; Ambler, 2012; TVN, 2012). Overall, as regard to arsenic, the pressures from the population as well as from the Health Ministry were key for the compliance with the new limit values. The Superintendent of the SISS recognized explicitly the important role of the Health Ministry in pressuring the sector:

“The signal that gave the Health Ministry, that it wouldn’t authorize the extended deadlines, forced us to give the instructions that investments had to be moved forward. And all the small companies are doing it, as well as the big one of the North, that of Iquique, for 2014 or 2015 it will comply. It moved its plan forward. All of them will comply” (author’s translation; Interview with Magaly Espinosa, see Appendix 4).

Finally, as for rural services, information of drinking-water quality in each of them is not reported publicly, but different documents evidence shortcomings for both microbiological and chemical quality of water in these systems. First, standards of microbiological quality were still not met in all of them. In 2015 a governmental report on rural water services nationally (of the APR program, i.e. mostly of rural services for population over 150) stated that 84.2% of them had monitored bacteriological quality in the last five years (without specifying frequency), that 9.3% did not and that for 6.5% there was no information. It also reported that the Health Ministry knew 5% of services did not meet the standards of drinking-water quality (without specifying which standards were not met). For instance, documents from the Health Ministry showed that many systems of the regions of Tarapacá and Aysén were not practicing chlorination by 2013 (and data was not available for all regions). As for chemical quality more specifically, the Health Ministry has been trying to compile information of all rural services but data was not available for all regions nor
with the same precision for all services by 2014. Nevertheless, it is documented that there were issues with the chemical quality of water in different rural services across the country. For instance, during the 2006-2014 period, nitrates exceeded the national standard in various services of the metropolitan region and the regions of Coquimbo, Maule and Los Ríos; and levels of iron and manganese also did not comply with limit values in services of the region of Arica-Parinacota, Los Ríos and Bío Bío. Moreover, in the region of Tarapacá (and possibly in other northern regions, but data is largely lacking), levels of arsenic in water of rural services in 2013 exceeded by far the limit, sometimes by more than 30 times the limit value. Precise data for the region of Tarapacá showed that in 2013 65% of the rural population receiving water from an APR service and 56% of the rural population receiving water from a non-APR program service were provided with water of bad chemical quality (Donoso et al., 2015; Health Ministry Archives; Kapples, 2011; Amuri et al., 2006; Valenzuela et al., 2012; Carrillo Urra, 2009).

The poor drinking-water quality in rural areas resulted from the absence of pressures, and also a lack of resources, according to interviewees from the Health Ministry. As one of them detailed:

“I would say that we don’t even really know what is the quality of the water people are drinking in many parts of the North of Chile, in rural water services. The microbiological quality is also quite… dubious. There is little control. There are no resources to control. In general there is no budget for […] sanitizing water. Sometimes for example there are chlorination systems but there is no budget to… buy chlorine” (author’s translation, see Appendix 4).

Overall, between 2007 and 2014, the implementation of drinking-water quality standards in Chile did not extend significantly, unless pressures were put on the sector from outside, as was the case for arsenic levels in a few urban communities from 2012 on. In these cases, it was only when pressures were strong that measures were undertaken to lower the arsenic level in drinking water.

Table 9 summarizes the implementation progresses in Chile from 1969 to 2014, with the corresponding external pressures for each time period.

Table 9. Summary of Implementation Progresses in Chile, 1969-2014

<table>
<thead>
<tr>
<th>Time Period</th>
<th>External Pressures</th>
<th>Implementation Progress by the End of the Time Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969-1976</td>
<td>Strong (arsenic in region of Antofagasta), Weak otherwise</td>
<td>Extensive for arsenic in region of Antofagasta, Partial otherwise</td>
</tr>
<tr>
<td>1977-1983</td>
<td>Strong (microbiological), Weak otherwise</td>
<td>Extensive for microbiological, Partial otherwise</td>
</tr>
<tr>
<td>1984-1990</td>
<td>Weak</td>
<td>Partial</td>
</tr>
<tr>
<td>1991-2004</td>
<td>Strong (microbiological, nitrates, arsenic) in urban areas, Weak otherwise</td>
<td>Extensive for microbiological, nitrates, arsenic in urban areas, Partial otherwise</td>
</tr>
<tr>
<td>2005-2010</td>
<td>Weak</td>
<td>Partial</td>
</tr>
<tr>
<td>2011-2014</td>
<td>Strong (arsenic in 4 urban communities*, other chemicals in region of Atacama), Weak otherwise</td>
<td>Extensive for arsenic in urban communities, Partial otherwise (including in region of Atacama)</td>
</tr>
</tbody>
</table>

* These four communities are: Lampa, Alto Hospicio, Diego de Almagro and El Salado.

Overall, in Chile (where state capacity was strong), the analysis over time of subnational variations and variations between parameters suggested that, when there was no external pressures, implementation remained partial. These results confirm hypothesis 2.1. However, when there were external pressures on the sector (because of a public health alert, governmental reports and sanctions, or popular protests supported by local authorities or representatives), then implementation generally became extensive in reaction to these pressures, as hypothesis 1.1 originally stated. There is only one exception to this general pattern: the case of the region of Atacama, where pressures was put on the sector in favor of increasing water quality (especially from 2011 on). In this case, by 2014, implementation was still not extensive. However, some actions had started to be taken in order to solve the issue: but the complexity of the latter, which
was coupled with the problem of water scarcity in the region, have apparently delayed extensive implementation of drinking-water standards, despite external pressures.

Besides, the case of the public alert for arsenicism in Antofagasta interestingly points out that effects of a public health alert of a very significant scale may last through time: among all regions where levels of arsenic were high it is only in the region of Antofagasta that the limit value of arsenic of 0.01 mg/L was met before it was required by national regulations (more than a decade prior to requirements).

Conclusion

Overall, this paper contends that the capacity of a policy sector and the external pressures put on the implementing actors are determinant for the degree of implementation of a policy adopted following diffusion pressures. A sector’s capacity depends on state capacity, but can also be supplemented by foreign capacity support. Foreign capacity support can thus represent an opportunity for weak states to implement more largely policies they adopt: however, it also renders this implementation dependent on foreign (re)sources, and therefore conditional on foreign will. Moreover, a sector’s capacity does not explain it all. Even when state capacity is strong, implementation of a non-politicized policy influenced from abroad is not as automatic as one could expect. Indeed, if there are no pressures from outside on the implementing actors, implementation remains partial. This partial implementation considers the (economic, political and/or social) cost of implementation. External pressures also increase the degree of implementation in weak state capacity environments.
This paper, by disentangling the implementation dynamics of policies adopted following diffusion, highlights the importance of distinguishing the adoption of a policy diffused from its implementation, a distinction sometimes overlooked in the diffusion literature. Yet, this distinction is essential to assess the potential impact policy diffusion may have in national non-politicized policy processes.

This impact of policy diffusion may vary from mere window-dressing to frame-shaping. It is not uniform and depends on the strength of state capacity and the strength of external pressures, as shown in Figure 3.

The main contributions of this paper is to show that policy diffusion in weak states can be both window-dressing and frame-shaping, depending on political dynamics. To be frame-shaping, it needs a sustained foreign capacity support (that can compensate for the weakness of the state) and strong external pressures. Otherwise, in weak states, the adoption of a diffused policy is likely to be mere window-dressing, and therefore the real impact of policy diffusion to be low or average.

This paper also shows that, when state capacity is strong and there are not strong pressures from outside the implementing actors, implementation is partial. This drastically contrasts with the common view that partial implementation comes from a lack of resources.
Besides, this paper also contributes more specifically to the implementation literature by highlighting that the resources of strong states generate the possibility of a “window-dressing implementation”. This consists in a policy that is partially implemented, but for which the state generates indicators suggesting an extensive implementation.

Globally, this paper contributes to the neo-institutionalist literature, by presenting an argument on why formal institutions and rules are (or not) implemented, especially when they are adopted as a result of policy diffusion. It is an important step toward understanding policy-making in our globalized world and, especially, the effects “on the ground” of global or transnational influences.
References


Araya, Mario. 2012. “Comunicado de prensa: Interponen recurso de protección por presencia de arsénico en agua potable de Diego de Almagro.” *BiobioChile*, May 12. URL: http://www.biobiochile.cl/noticias/2012/05/12/interponen-recurso-de-proteccion-por-presencia-de-arsenico-en-agua-potable-en-diego-de-almagro.shtml


Appendix 1. Drinking-Water Standards in Bolivia, 1985-2010

Table 10. Standards for Microbiological and Chemical Drinking-Water Quality in Bolivia, 1985-2010

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Microbiological</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Coliforms</td>
<td>10 /mL</td>
<td>&lt; 2.2</td>
<td>&lt; 2</td>
<td>&lt; 2</td>
<td>&lt; 2</td>
</tr>
<tr>
<td>E. Coli or Fecal coliforms</td>
<td>0 /mL</td>
<td>&lt; 2.2</td>
<td>&lt; 2</td>
<td>&lt; 2</td>
<td>&lt; 2</td>
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<tr>
<td>Thermoresistant Coliforms</td>
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<td>&lt; 2</td>
<td>&lt; 2</td>
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<tr>
<td>Aerobic/ Heterotrophic Bacteria (total)</td>
<td>-</td>
<td>-</td>
<td>100/mL</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>- Pseudomonas aeruginosas</td>
<td>-</td>
<td>-</td>
<td>0 /50mL</td>
<td>0</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>- Clostridium Perfringens</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>&lt; 1</td>
<td></td>
</tr>
<tr>
<td>Parasites (Amebas, Giardia or Cryptosporidium)</td>
<td>-</td>
<td>-</td>
<td>0 /380L</td>
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<td>0</td>
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<tr>
<td>Fitoplancton/ zooplancton</td>
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<td>-</td>
<td>0 /L</td>
<td>-</td>
<td>-</td>
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<tr>
<td><strong>Chemical</strong> (in mg/L)</td>
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<td>0.0005</td>
<td></td>
</tr>
<tr>
<td>Aldrin &amp; Dieldrin</td>
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<td>-</td>
<td>0.00003</td>
<td>-</td>
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</tr>
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<td>Aluminium</td>
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<td>0.2</td>
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<td>0.1</td>
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<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
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<td>Antimony</td>
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<td>0.01</td>
<td>0.005</td>
<td>0.005</td>
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<td>Arsenic</td>
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<td>0.05</td>
<td>0.1</td>
<td>0.01</td>
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<td>Calcium</td>
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<td>250</td>
<td>200</td>
<td>200</td>
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<td>-</td>
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<td>-</td>
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<td>-</td>
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<td>-</td>
<td>-</td>
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<td>400</td>
<td>250</td>
<td>250</td>
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<td>DDT</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
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<td>1,2 dichlorobenzene</td>
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<td>Value</td>
<td>Unit</td>
<td>Value</td>
<td>Unit</td>
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<td>------</td>
<td>---------</td>
<td>------</td>
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<tr>
<td>Heptachlor &amp; heptachlor</td>
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<td>epoxide</td>
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<td>Magnesium</td>
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<td>Nitrate (as NO₃⁻)</td>
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<td>Nitrite (as NO₂⁻)</td>
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<td>Pesticides (total)</td>
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<td>Pesticides (individual)</td>
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<td>Potassium (permanganate)</td>
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<td>2,4,6 Trichlorophenol</td>
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<td>Vinyl chloride</td>
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<td>Xylenes</td>
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Table 11. Initial Drinking-Water Standards in Chile, 1952-1970

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<tr>
<td></td>
<td>Decree 488, Public Works Ministry</td>
<td>Decree 1.132, Health Ministry</td>
<td>Decree 735, Health Ministry</td>
<td>Decree 354, Public Works Ministry</td>
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<tr>
<td><strong>Microbiological</strong> (% accepted of non-complying samples for a month)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bacilo coliforms</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Chemical</strong> (in mg/L, ppm)</td>
<td></td>
<td></td>
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<tr>
<td>Alquil-benceno-sulfonato</td>
<td>-</td>
<td>-</td>
<td>0.5-</td>
<td>0.5</td>
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<tr>
<td>Arsenic</td>
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<td>-</td>
<td>0.05</td>
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<td>-</td>
<td>-</td>
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<td>1.0</td>
<td>1.0</td>
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<tr>
<td>Cadmium</td>
<td>-</td>
<td>-</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Chromium</td>
<td>0.05</td>
<td>-</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Chloride</td>
<td>250</td>
<td>-</td>
<td>350</td>
<td>350</td>
<td>600</td>
</tr>
<tr>
<td>Phenolic Compounds</td>
<td>0.001</td>
<td>-</td>
<td>0.001</td>
<td>-</td>
<td>0.002</td>
</tr>
<tr>
<td>Copper</td>
<td>3</td>
<td>-</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Cyanide</td>
<td>-</td>
<td>-</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Fluoride</td>
<td>1.5</td>
<td>-</td>
<td>1.4</td>
<td>1.2</td>
<td>1.5</td>
</tr>
<tr>
<td>Iron</td>
<td>0.3*1</td>
<td>-</td>
<td>0.5</td>
<td>0.5*2</td>
<td>1.0</td>
</tr>
<tr>
<td>Lead</td>
<td>0.1</td>
<td>-</td>
<td>0.1</td>
<td>0.1</td>
<td>0.05</td>
</tr>
<tr>
<td>Magnesium</td>
<td>125</td>
<td>-</td>
<td>-</td>
<td>125</td>
<td>150</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.3*1</td>
<td>-</td>
<td>0.2</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Nitrate (in N)</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>15</td>
<td>10 (45 in NO₃)</td>
</tr>
<tr>
<td>Nitrite (in N)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.004</td>
<td>-</td>
</tr>
<tr>
<td>Selenium</td>
<td>0.05</td>
<td>-</td>
<td>0.10</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Silver</td>
<td>-</td>
<td>-</td>
<td>0.05</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>Sulfate</td>
<td>250</td>
<td>-</td>
<td>350</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>Total dissolved solids</td>
<td>-</td>
<td>-</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>Zinc</td>
<td>15</td>
<td>-</td>
<td>5</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

*1: Iron and manganese together
*2: Limit for group of peoples of less than 1000 (for others: 0.3)
Table 12. Microbiological and Chemical Drinking-Water Standards in Chile, *Norma Chilena 409* of 1984 and 2007

<table>
<thead>
<tr>
<th>Parameters</th>
<th>1984 Norma Chilena 409/1</th>
<th>2007 Norma Chilena 409-1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Microbiological</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coliforms (% accepted of non-complying samples for a month)</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Coliforms &gt; 5 UFC or NMP/ 100 mL</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Minimal Chlorine Residual</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td>No Chlorine Residual</td>
<td>5%</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Chemical</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(in mg/L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ammonia</td>
<td>0.25</td>
<td>1.5</td>
</tr>
<tr>
<td>Arsenic</td>
<td>0.05</td>
<td>0.03 (2012)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.01 (2017)</td>
</tr>
<tr>
<td>Benzene</td>
<td>-</td>
<td>0.01</td>
</tr>
<tr>
<td>Bromodichloromethane</td>
<td>-</td>
<td>0.06</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Chloride</td>
<td>250*¹</td>
<td>400</td>
</tr>
<tr>
<td>Chromium</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Copper</td>
<td>1.0*¹</td>
<td>2.0</td>
</tr>
<tr>
<td>Cyanide</td>
<td>0.20</td>
<td>0.05</td>
</tr>
<tr>
<td>DDT+DDD+DDE</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Dibromochloromethane</td>
<td>-</td>
<td>0.1</td>
</tr>
<tr>
<td>2,4-D</td>
<td>-</td>
<td>0.03</td>
</tr>
<tr>
<td>Fluoride</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Iron</td>
<td>0.3*¹</td>
<td>0.3</td>
</tr>
<tr>
<td>Lead</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Lindane</td>
<td>-</td>
<td>0.002</td>
</tr>
<tr>
<td>Magnesium</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.10*¹</td>
<td>0.1</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Methoxychlor</td>
<td>-</td>
<td>0.02</td>
</tr>
<tr>
<td>Monochloramine</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Nitrate</td>
<td>10*¹</td>
<td>11 (50 in NO₃⁻)</td>
</tr>
<tr>
<td>Nitrite</td>
<td>1.0</td>
<td>1 (3 in NO₂⁻)</td>
</tr>
<tr>
<td>Pentachlorophenol</td>
<td>-</td>
<td>0.009</td>
</tr>
<tr>
<td>Phenolic Compounds</td>
<td>0.002</td>
<td>0.002</td>
</tr>
<tr>
<td>Selenium</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Sulfate</td>
<td>250*¹</td>
<td>500</td>
</tr>
<tr>
<td>Tetrachloroethene</td>
<td>-</td>
<td>0.04</td>
</tr>
<tr>
<td>Toluene</td>
<td>-</td>
<td>0.7</td>
</tr>
<tr>
<td>Tribromomethane</td>
<td>-</td>
<td>0.1</td>
</tr>
<tr>
<td>Trichloromethane</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Trihalomethanes</td>
<td>-</td>
<td>1 (sum of ratios)</td>
</tr>
<tr>
<td>Xylenes</td>
<td>-</td>
<td>0.5</td>
</tr>
<tr>
<td>Zinc</td>
<td>5.0*¹</td>
<td>3</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total dissolved solids</td>
<td>1000*¹</td>
<td>1500</td>
</tr>
</tbody>
</table>

*¹: The Health Ministry may accept higher values.
Appendix 3. List of Interviewees

Most interviewees requested not to be identified when quoted and not to be named anywhere in the dissertation. This is what explains the format of the list of interviewees listed hereafter and the way references are made to interviews in the text.

Bolivia

Independent Experts and International Organizations

- Ana María Romero, Centro Aguas y Saneamiento Ambiental, Cochabamba, 2014.
- Carmen Ledo, CEPLAG, Universidad Mayor de San Simón, Cochabamba, 2014.
- Claudia Vargas Vucsanovich, expert on water and sanitation, videoconference interview, 2014.
- Edwin Astorga, Instituto de Ingeniería Sanitaria, La Paz, 2014.
- Gover Barja, profesor, Universidad Católica Boliviana, La Paz, 2014.
- Independent consultant on water and sanitation issues, worked on projects of the World Bank in Bolivia (among others), La Paz, 2014.
- Patricia Venegas, principal adviser in policies, PERIAGUA (Programa para Servicios Sostenibles de Agua Potable y Saneamiento en Áreas Periurbanas), GIZ (German Technical Cooperation), La Paz, 2013.
- Rocío Bustamante, Centro AGUA, Universidad Mayor de San Simón, Cochabamba, 2014.

Public Administration

- Civil servant 1 from Autoridad de Fiscalización y Control Social de Agua Potable y Saneamiento Básico (AAPS), Cochabamba, 2014.
- Civil servant 2 from Autoridad de Fiscalización y Control Social de Agua Potable y Saneamiento Básico (AAPS), La Paz, 2014.
- Civil servant 1 from Ministerio de Medio Ambiente y Agua (Dirección de Planificación), Cochabamba, 2013.
- Civil servant 2 from Ministerio de Medio Ambiente y Agua (Dirección de Planificación), Cochabamba, 2013.
- Civil servant from Ministerio de Medio Ambiente y Agua (Viceministro), Cochabamba, 2013.
- Civil servant 1 from Ministerio de Obras públicas, Servicio y Vivienda, La Paz, 2014.
- Civil servant 2 from Ministerio de Obras públicas, Servicio y Vivienda, La Paz, 2014.
Civil servant from Health Ministry, 1980s-1990s, phone interview, 2016.
Civil servant 1 from SENABSA, La Paz, 2013.
Civil servant 2 from SENABSA, La Paz, 2014.

Water Providers and Private Organizations

- Edgar Varnoux, manager of customer service, SEMAPA, Cochabamba, 2014.
- Gonzalo Maldonado, SEMAPA manager in the 1990s, Cochabamba, 2014.
- Jorge Alvarado, SEMAPA manager in the 2000s, Cochabamba, 2014.
- Michael Roca, Asociación Nacional de Empresas e Instituciones de Servicio de Agua Potable y Alcantarillado, La Paz, 2013.
- Oscar Arteaga, Asociación Nacional de Empresas e Instituciones de Servicio de Agua Potable y Alcantarillado, La Paz, 2013.
- Raul Flores Mejia, SEMAPA general manager, Cochabamba, 2014.
- Worker of EPSAS-La Paz, La Paz, 2014.
- Worker of IBNORCA in the 2000s, La Paz, 2014.
- Worker 1 of SEMAPA in the 2000s, Cochabamba, 2014.
- Worker 2 of SEMAPA in the 2000s, Cochabamba, 2014.
- Worker 3 of SEMAPA in the 2000s, Cochabamba, 2014.

Chile

Public Administration

- Jorge Ale Yarad, civil servant of the Ministerio de Economía in the 1980s (in charge of the development of the regulatory framework for the water and sanitation sector), Santiago, 2014.
- Magaly Espinosa, superintendent, Superintendencia de Servicios Sanitarios (SISS), Santiago, 2014.
- Civil servant of the Dirección de Obras Hidráulicas in the 2000s, Santiago, 2014.
- Civil servant of the Instituto Nacional de Estadísticas (INE), Santiago, 2014.
- Civil servant of the Instituto Nacional de Normalización (INN) in the 2000s, Santiago, 2015.
- Civil servant 2 of the Health Ministry in the 2000s, Santiago, 2014.
- Civil servant 3 of the Health Ministry in the 2000s, Santiago, 2014.
- Civil servant of the Ministerio de Economía in the 1980s, Santiago, 2014.
- Civil servant of the Servicio Nacional de Obras Sanitarias (SENDOS) in the 1980s, Santiago, 2015.
Civil servant 1 of the Superintendencia de Servicios Sanitarios (SISS) in the 2000s, Santiago, 2014.

Civil servant 2 of the Superintendencia de Servicios Sanitarios (SISS) in the 2000s, Santiago, 2015.

Water Providers and Private Organizations

Alex Chechilnitzky, president, AIDIS (Asociación Interamericana de Ingeniería Sanitaria y Ambiental) - Capítulo de Chile, Santiago, 2015.

Andrei Tchernitchin, president of Colegio Médico, professor at the Universidad de Chile, Santiago, 2014.

Representative, CONADECUS, Santiago, 2014.


Worker of water provider 1 in the 1980s-2000s, Santiago, 2015.

Worker of water provider 2 in the 1990s-2000s, Santiago, 2015.
### Appendix 4. Record of Minutes of Interviews Quoted

**Table 13. Excerpts from Interviews Corresponding to Quotes in Text**

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Quote in Text</th>
<th>Original Excerpts from Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>From Section 3.3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent expert</td>
<td>“Until the 1990s, the [water] companies were working out of the law. There was no quality control.”</td>
<td>“hasta fines de los 90, las empresas [de agua] estaban trabajando fuera de la ley, no había control de calidad”</td>
</tr>
<tr>
<td>Ex-manager of SEMAPA</td>
<td>“The credits [from the World Bank and the IDB] came to fund infrastructures but there were also components for technical cooperation, institutional strengthening. [Without these credits] I did not have money for my engineers to train in Brazil”</td>
<td>“Los créditos [del Banco Mundial y del BID] venían a financiar obras pero también había componentes de cooperación técnica, de fortalecimiento institucional. [Si no fuera por esos créditos] yo no tenía recursos para [por ejemplo] enviar a mis ingenieros que se capaciten en Brasil”</td>
</tr>
<tr>
<td><strong>From Section 3.4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker at Superintendencia</td>
<td>“It was a very intense moment of training. There were still funds from the World Bank. […] They lasted only during the first and the second years [after the creation of the Superintendencia], […] They were the residual [resources] that remained from the capitalization.”</td>
<td>“Era una etapa muy intensa de capacitación. Todavía había fondos del Banco Mundial. […] Solamente fue durante el primero y segundo año [de la Superintendencia]. […] Eran los [recursos] remanentes de lo que quedó de la capitalización”.</td>
</tr>
<tr>
<td><strong>From Section 3.5</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent expert</td>
<td>“The problem is that […] the new government of Evo committed itself to increase [water] access and meet the Millennium Goals, which included water provision and reach almost 100%. Therefore, what did 100% meant? To give water. They started to receive a greater quantity of projects and to accept them all. But these projects did not consider water analysis. And many of these projects [of the Agua I and Agua II programs] provided water without doing an initial analysis. They built the water system and analyzed water [quality] after. And then, the problems appeared: this source is totally contaminated, this source requires more than a treatment plant, this water needs to be treated to be drinkable […] It is part of the enthusiasm, of wanting to meet the objective in a short time.”</td>
<td>“El problema es que [el] nuevo gobierno de Evo, se comprometió con […] aumentar el acceso [al agua], y cumplir con los objetivos del milenio, que era [el] abastecimiento del agua y llegar hasta casi el 100%. Entonces, ¿qué significaba el 100%? Era dar agua. Empezaron a tener mayor cantidad de proyectos y aceptar todos los proyectos. Pero esos proyectos no tenían análisis del agua. Y muchos de los proyectos [agua I y agua II] han dado agua sin hacer los análisis iniciales, construyeron el sistema de agua, y después de esto hicieron los análisis del agua. Y allí se vieron los problemas: esta fuente está totalmente contaminada, esta fuente no necesita solo una planta de tratamiento, esta agua necesita un tratamiento para ser potable. […] Es la parte del entusiasmo, de querer cumplir con las metas en pocos tiempos.”</td>
</tr>
<tr>
<td>Participant in the 2010 revision</td>
<td>“Water companies […] did not want to comply with all the values that were in the regulation. Before there was only one list of parameters […] and they said: we can’t do all these analyses and neither are there laboratories in Bolivia to do all these analyses.”</td>
<td>“Las empresas de aguas […] no quisieron cumplir con todos los valores que estaban en la norma. Antes había solamente una lista de parámetros […] y dijeron no podemos hacer los análisis y tampoco hay laboratorios en Bolivia para poder hacer todos los análisis.”</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Civil servant from Health Ministry</td>
<td>“The results were presented in the Biannual Congress of Sanitary Engineering […] at the end of the 1970s […]. It provoked a lot of commotion because even if the data existed, the truth is it was not specified… No, no, essentially it was not used.”</td>
<td>“Los resultados [fueron presentados] en el Congreso bianual de Ingeniería Sanitaria […] de fines de los 70 […]. Causó mucho revuelo porque si bien los datos estaban, la verdad es que no se precisaban, no no, en el fondo no se utilizaban”</td>
</tr>
<tr>
<td>Civil servant from Health Ministry</td>
<td>“every year […] a consolidated report was prepared and sent to water services and to the Public Works Ministry […]. This resulted in a general preoccupation for water quality.”</td>
<td>“se hacia todos los años […] un consolidado de información y se mandaba a los servicios de agua, se mandaba al Ministerio de obras públicas […], lo cual hizo entonces que hubiera una preocupación general por la calidad del agua”</td>
</tr>
<tr>
<td>Civil servant from Health Ministry</td>
<td>“The standpoint that took the Health Ministry […] and that it pretended it would implement, was that if the company did not comply with quality, it couldn’t charge the water. […] In light of this, the companies were concerned, and the Superintendencia was also concerned about doing more controls, etc. It was never implemented. But it was the standpoint of the Health Ministry. If it is not drinking water, it can’t be charged as drinking water. Therefore, together with the Superintendencia, that also strengthened its controls, and the Health Ministry, that also strengthened its controls of companies, it resulted in effective improvement of water quality.”</td>
<td>“un planteamiento que hizo el Ministerio de Salud, […] que se amenazó con que se iba a aplicar, que si la empresa no cumplía con la calidad, no podía cobrar el agua. […] Entonces, frente a eso, en realidad, las empresas se preocuparon, y la Superintendencia también se preocupó de hacer mayor fiscalización, y etc. Nunca pasó eso, nunca se aplicó. Pero fue el planteamiento de Salud, del Minsal. Si no es agua potable, no puede cobrar agua potable. Entonces, junto con la Superintendencia, que también reforzó su fiscalización, y junto con Salud, que también reforzó su fiscalización a las empresas, lo que se logró fue que efectivamente la calidad del agua [se mejorara].”</td>
</tr>
</tbody>
</table>
| Magaly Espinosa | “The signal that gave the Health Ministry, that it wouldn’t authorize the extended deadlines, forced us to give the instructions that investments had to | “La señal que dio el Ministerio de Salud de que no iba a autorizar los plazos obligó a que nosotros instruyéramos que adelantarían las inversiones. Y todas las
be moved forward. And all the small companies are doing it, as well as the big one of the North, that of Iquique, for 2014 or 2015 it will comply. It moved its plan forward. All of them will comply.”

**Civil servant from Health Ministry**

“I would say that we don’t even really know what is the quality of the water people are drinking in many parts of the North of Chile, in rural water services. The microbiological quality is also quite… dubious. There is little control. There are no resources to control. In general there is no budget for […] sanitizing water. Sometimes for example there are chlorination systems but there is no budget to… buy chlorine.”

“Yo diría que ni siquiera sabemos bien cuál es la calidad del agua potable que están tomando en muchas partes del norte de Chile en servicios de agua potable rural. La calidad microbiológica también es muy… dudosa. Se fiscaliza poco. No hay recursos para fiscalizar. En general no tienen presupuesto para […] desinfectar el agua. A veces por ejemplo tienen sistemas de cloración pero no tienen presupuesto para… comprar cloro.”