



**ANDREA BALLESTERO**

Rice University

# The ethics of a formula:

## Calculating a financial–humanitarian price for water

### ABSTRACT

When Costa Rican regulators set water rates, they effectively transform the human right to water into a price. I propose the notion of a “calculation grammar” to grasp the inventive patterns and vibrant social engagements that fuse the ethical investments, ontological assumptions, and quantified expressions involved in this process. This grammar governs the relative weights and proportions of the elements in numeric propositions, giving them distinct meanings and political valences. The liveliness of these propositions derives from the power of numeric techniques in their inevitably place-specific expressions as well as from the legal principles of sociality that enable them. I follow the mathematical formula regulators use to set water prices to reveal the inconspicuous financialization of human rights and the humanitarianization of finance as they currently unfold across technocratic centers of calculation. I also argue for an ethnographic approach that remains committed to the ontological indivisibility of the technical and the cultural in any quantification effort. [*human rights, prices, water, calculation, regulation, finance, Costa Rica*]

Rather than discuss “the economy” as a coherent entity unto itself, most Costa Ricans primarily talk about prices, routinely commenting on how expensive things are and how high *el costo de la vida* (the cost of life) is. Comparing prices against their available income, against each other, and against what they are willing to pay, people are often frustrated about their limited resources. But beyond the immediacy of everyday consumption, prices are also collective objects of concern. Newspapers, politicians, and activists refer to them as independent entities that lead active lives and affect the social relations that make up any common project. Through their intimate and public lives, prices draw attention to fundamental questions about the nature and role of the state, the meaning of an economic community, and the limits of financial tools for quantifying the value of substances as fundamental to life as water.

Their semiotic prominence conceals the fact that, despite their image as solid units, prices are constituted by myriad elements that, because of their diffuseness, tend to remain out of sight (Guyer 2009:205). The patterns by which those elements are brought together and put in relation with each other tell us a lot about the very questions we expect prices to shed light on: What is community, how does the state intervene in it, and what is a common resource? In this article, I show that the principles by which those elements are defined and connected operate like grammars more than like mechanical formulas. They enable a mesmerizing semiotic productivity while also allowing the mathematic and pragmatic workability of calculation to unfold as a social process. As compositional entities constructed through grammarlike processes, prices allow people to communicate the unsaid and open spaces for unexpected reinvention.

Also considered devices with the ability to construct markets (Beckert 2011; Fourcade 2011) and the ultimate representation of the fetishistic commodity form (Appadurai 1986; Taussig 1980), prices mediate many of the legal and economic relations necessary for capitalist activity (MacKenzie 2009; Maurer 2005; Muniesa and Callon 2007). They are far from being a streamlined outcome of the idealized encounter between abstract supply and demand functions (Marx 1976; Mirowski 2006). To the contrary, prices require wide-ranging technical maneuvers, including the exploitation of different measures of value (Miyazaki 2012), the sequenced production of

**INSTITUTO COSTARRICENSE DE ACUEDUCTOS Y ALCANTARILLADOS**  
**AYA** **NIS: 341-2125** [www.aya.go.cr](http://www.aya.go.cr) **MET9E**

**Nombre:** SALAVERRY PARDO, ARABILLA **Dirección de envío:** 015 - MONTES DE OCA  
150E D.I.A. LTDA

**Localización de envío:** 1-015-015-006-00202-01300-001 **Tarifa:** Metropolitana domiciliar

**Fecha de vencimiento:** 25/09/2009 **Tipo de envío:** A domicilio MET9E

**Fecha de Lectura:** 10/09/2009 **Unidades Habitacionales:**

INFORMACION DEL CONSUMO					INFORMACION FACTURACION DEL MES	
Tipo Consumo	Número Hidrómetro	Lectura Anterior	Lectura Actual	Consumo m3		
Agua	07523235	1071	1109	38	Consumo de Agua	10,680.00
		Desde: 12/08/2009	Hasta: 10/09/2009			

CLIENTE	HISTORICO DE CONSUMO		
	Mes	Año	Consumo m3
	ABRIL	2009	54
	MAYO	2009	51
	JUNIO	2009	59
	JULIO	2009	52
	AGOSTO	2009	45
	SEPTIEMBRE	2009	38

**TOTAL A PAGAR** \*\*10,680.00\*\*

**Observaciones:** Estimado cliente: Se le recuerda que después de la fecha de vencimiento AyA le otorga 3 días para cancelar el recibo, de lo contrario, se suspenderá el servicio. De mantener otros recibos pendientes, AyA iniciará el trámite de Cobro Judicial correspondiente. Al pagar a tiempo evita un recargo por mora del 2% mensual.

**Información Adicional:**

**INSTITUTO COSTARRICENSE DE ACUEDUCTOS Y ALCANTARILLADOS**  
**AYA** SALAVERRY PARDO, ARABILLA **F112009091179474**

**Nombre:** 1-015-015-006-00202-01300-001 **Factura No:** 0.3412125.01.10/09/2009.4-3

**Localización:** 25/09/2009 **NIR:** \*\*10,680.00\*\*

**Fecha de vencimiento:**

SECUENCIAL : 807  0034121250110092009000000010680004341

Figure 1. Monthly, paper-printed bill from AyA, Costa Rica's largest water utility.

intermediate and temporary valuations (Çalışkan 2007), and the historical coalescence of thought traditions and political and ecclesiastical authorities into quantitative orderings (Guyer 2004).

In Costa Rica, as is the case elsewhere, many of the prices people encounter in their daily lives are not negotiable. The formalization of large parts of the economy has reduced the wiggle room people have when they visit pharmacies (many of which are chains headquartered in other Latin American countries), buy from large grocery stores (most of which are now subsidiaries of Wal-Mart), or pay for public services (all of which are state regulated). (See Figure 1.) In these situations, prices work as sources of incitement and oppression. They tell families what they can and cannot afford. They travel as tools that are alive in their use, as technological devices that exist only while they act in the world.<sup>1</sup>

The specific price people in Costa Rica pay for water begins its life at the Autoridad Reguladora de los Servicios Públicos (ARESEP), the country's public service regulation authority.<sup>2</sup> While an active and powerful force that shapes daily economic transactions, ARESEP remains unnoticed by most people when they think about water. Despite the scant attention the water-concerned public allots them, ARESEP regulators constantly assess the relations between the citizens they must protect, the prices they produce, and water as a human necessity. In the early 2000s, Costa Rica's constitutional court recognized access to water for human consumption as a fundamental right and explicitly assigned responsibility to the state for securing its enjoyment in appropriate quantity and quality. In 2010, the United Nations General Assembly passed a resolution recognizing the right to safe and clean water for drinking and sanitation as essential for the full enjoyment of life and all other human rights. The culmination of more than three decades of international discussions, the recognition was reason enough for celebration by many activists and water professionals. Yet, while welcome, these legal developments did not significantly alter the thinking of most Costa Rican public servants and citizens.<sup>3</sup> In general, people already recognized the existence of a universal human right to water as something of a natural fact.<sup>4</sup> Nevertheless, the concrete coupling of this naturalized right and the calculation of prices has historically been far from self-evident. The price of the human right to water has anything but a stable and widely accepted form. While people do not reject the idea of paying for water altogether, not all prices are viewed as legitimate. To be considered so, the price of water has to reflect its humanitarian nature by precluding any profit making. I examine how ARESEP regulators produce just such prices. I show the ongoing calculation work they do to ethically assess the algebraic relations (Corsín Jiménez n.d.) between water, citizens, humanitarian injunctions, and economic ideologies of profit. I center attention on

$$X = O + A + D + R$$

**Figure 2.** Formula used by Costa Rica's public service regulation authority to set the price of water.

the formula they use and focus on one of the elements for which the definition of those relations is most turbulent: R, the development yield variable.

One Friday afternoon, I arrived at an auditorium in the remodeled apartment building that had housed ARESEP since its creation in the mid-1990s. With a capacity of about one hundred people, the auditorium that afternoon held no more than 40 ARESEP employees, public servants, and utility personnel who had convened for a public hearing. Imagined by progressive policy makers as a means to increase transparency and bring citizens closer to the state, the mandatory hearing was supposed to collect public feedback on the latest petition by the largest water utility in the country, AyA, to increase the price of water services by an alarming 40 percent.<sup>5</sup> From the stage, a young man in business attire formally guided the audience through a legal and administrative ritual whose high point was a presentation by Sofia, a member of what at the time was the Water and Environment Department (WED) of ARESEP.<sup>6</sup> Sofia informed the "public" how the agency analyzes the legal and technical propriety of the petitions that water utilities, all of which are state or municipal entities, regularly submit. Her presentation had been prerecorded, and, while she sat in the audience, we saw her enlarged image onscreen offer a 15-minute introduction to price regulation. Most of her talk, as one would expect, revolved around the regulatory methodologies WED follows. But in between analyses of demand elasticity, depreciation rates, and efficiency, Sofia insisted on the responsibility "all" people have to implement the human right to water. This was a call to her colleagues for an awareness of how each technical decision WED makes might affect the ability of the less privileged members of society to pay for water; it was a call to be cognizant that ultimately the enjoyment of a human right is shaped by its affordability. Toward the end of the hearing, Sofia projected a slide with the regulatory formula WED uses to calculate prices and assess any increase petitions. By explaining how these numeric parameters make their humanitarian commitments concrete, Sofia was affirming to her audience, most of them her ARESEP colleagues, the open possibilities in the elements that make up the prices they produce (see Figure 2). This was my first encounter with R.

Sofia's braiding of price regulation theories with human rights was neither romantic idealism nor superficial political correctness. She wholeheartedly embraces human rights as a powerful frame for directing public attention to political and economic inequalities.<sup>7</sup> Yet, by drawing attention to how human rights could infuse the

magnitudes of the variables in the formula and of the regulatory principles that connect them, she was implicitly revealing a tension between two logics of political and technical intervention: financial capitalism and humanitarian ethics. Her invocation of human rights was intended to remind the audience that a humanitarian ethics could, and should, affect numeric forms that otherwise remain tied to financial and regulatory theory exclusively. But this tension between humanitarianism and financial economics was not a mismatch between two abstract and universally incompatible philosophies of value. It was more a friction that challenged her to arrange her numbers appropriately. Her job was to develop and mobilize a calculation grammar to fuse regulatory finance and humanitarianism and generate prices that could stand a test of their ethicality.

Sofia's calculation grammar centers on a formula originally adopted in the 1990s following a recommendation from a Panamerican Health Organization consultant hired to modernize the methodologies ARESEP used. Far from an acquiescent numeric receptacle for human intentionality (Callon and Law 2005; Latour 1999), the formula is an active artifact of thick moral histories and numerical capabilities. It is a lively entity that engenders conflicts at the same time that it helps establish a regulatory regime. As an ethnographic object, the formula is interesting to think with because of what it prescribes, but even more so, because of what it unexpectedly allows regulators to do.

Recent anthropological works tell us that the logic of humanitarianism claims to put moral sentiments and ethical concerns for the other, framed in the idiom of human rights, at the center of governing regimes, particularly of those regimes designed to help the poor, the sick, or the disadvantaged (Fassin 2012:1; Redfield 2013). We also know that the logic of finance includes "all aspects of the management of money, or other assets ... as a means of raising capital" (Maurer 2012a:185) and that it goes beyond the limits of financial markets to all sorts of economic relations organized around credit, debt, and financial revenue (Graeber 2011; Miyazaki 2012). Yet these logics are not necessarily alternate possibilities among which people have to choose. In entities like ARESEP, they become an intertwined affective, epistemic, and technopolitical set of practices that help people act ethically, or, at least, as ethically as they can in a particular situation. Here I go beyond a diagnosis of whether human rights logics are colonizing capitalism's pricing norms or whether financial capitalism is colonizing humanitarian state-making impulses and pay attention to the means by which these two logics mutually constitute each other in Costa Rica's regulatory circles and how they create a distinctly technical space for ethics. For Sofia and the other regulators I worked with, the humanitarian ethics of their financial theories cannot be relegated to a posteriori evaluations of the social effects that their finished economic instruments might have. Humanitarian

ethics are evaluated continuously; they are processual points of reference against which regulators redefine the limits of appropriate action (Faubion 2010). Thus, worksheets, mathematical models, and legal resolutions are, on the one hand, means to reveal the humanitarian standing of water and, on the other, instruments that sharpen people's ethical awareness of their own decisions (Keane 2010:72). Focusing on that technical action helps us understand how people imagine and see themselves contributing to the individual and collective good (Robbins 2013:457).

To ethnographically grasp this processual and technical ethics, I develop the notion of a calculation grammar. A calculation grammar governs the relative weights and proportions of the elements that constitute a price, infusing those numeric propositions with distinct meanings.<sup>8</sup> In the case I analyze, that grammar prescribes the acceptable magnitude of the variable that stands for surplus (R) in relation to the magnitudes of other variables that stand for different types of costs. If that variable is to be ethical, it has to reflect a principle that deems immoral, and illegal, profiting from the provision of water services. The decisions and techniques by which regulators tweak and adapt each element of their pricing formula and the relations between them respond to a series of principles and rules that work like a grammar. In continuous replication through use, those principles and rules are constantly reinforced but also transgressed without their capacity for meaning and sense making being broken. To the contrary, the room that grammars always leave for unexpected arrangements is intrinsic to the liveliness of their meaning-making capacities.

Anthropological analyses of calculative operations often take mathematical expressions at face value, presuming they are ruled by rigid prescriptions that displace "social" or "cultural" concerns. They are taken as formulaic more than grammatical. I hope to show how the most technical of the mathematical operations performed in a regulatory agency are entwined with broader social values and hence never padlocked into a set of predictive rules. But this does not imply adopting a "culturalist" approach wherein all phenomena are analytically reduced to the social values behind them. My purpose is to keep in sight both the cultural and the technical character of calculative grammars to argue for a type of analysis that remains committed to their ontological indivisibility. We can then say that a calculation grammar consists of prescriptive principles and the inevitable transgressions those prescriptions undergo as people use calculation to transfigure moral values into economic artifacts and vice versa. It includes the mathematical and moral principles by which the magnitude of one element in a formula is judged appropriate or not. And it also refers to the broader principles by which the proportions, differences, and other relationally determined values between elements are defined and sanctioned. These grammars are jointly constituted by their

rulelike elements, with their aspirations of regimenting signification, and by their excesses, those vibrant social engagements that can never be reduced to rules and that bestow on all calculative routines the potential of unexpected transformation.

In what follows, I first theorize the notion of a calculation grammar and then briefly review the history of ARESEP's political place in Costa Rica. Next, I trace the legal principles that inform ARESEP's calculation grammar to show how, inspired by a technolegal metaphysics of harmony and equilibrium, regulators calibrate their formula to enact larger social imaginaries that go beyond water. I then trace the controversies, technical and political, over a recent attempt to shift from an accounting to an economic approach to regulation and show how this potential change, focused on the variable *R* in WED's price-setting formula, threatens historical ways of allocating financial and humanitarian responsibility among water providers. In the conclusion, I come back to the importance of the experiments and rationalizations of everyday calculation grammars and make the case for the utility of engaging with the technical means through which the ethics of collective life are being elucidated in settings such as ARESEP.

### Calculation grammars

As a social practice shot through with personal anxieties and reflecting different technical genealogies and sources of political and epistemic authority, calculation has received considerable attention in recent years. Calculation "refers not only to measurements and summations, but to their subsequent manipulation, application and capacity to inform inference" (Guyer et al. 2010:40) Quantification systems can function as oppressive structures whereby states regiment societies (Scott 1998), colonial powers categorize populations (Cohn 1996), and measurements sever dense social and material relations (Muehlmann 2012). Calculation regimes also hold the potential to be a flexible technology of truth (Merry and Coutin 2014), an inventive frontier (Verran 2010), and an instrument for ontological experimentation and expansive translations (Ballesteros 2012, 2014). To grasp this productivity, calculation in general, and economic calculation in particular, must be examined by attending to the embodied practices (Maurer 2010) and nuanced technicality of the knowledges that make it possible (Miller 2008) as well as to the historical conjunctures in which it unfolds (Appadurai 2012).

In ARESEP's case, this means attending to calls for humanitarian calculation as they relate to particular regulatory methods and economic theories. Doing so requires an ethnographic tactic that is as sensitive to the everyday practices of regulators as it is to the economic theories and methodologies that guide their work. This is a type of anthropology that refuses to reduce the technoeconomic

to lifeless mechanistics and that attends to "the angst, uncertainty, and the passion for the possible that life holds through and beyond technical assessments" (Biehl and Locke 2010:319). The calculative operations through which ARESEP engages the possibilities within the technical are not one-time occurrences. They repeat in time, accomplishing their results through an extended becoming (Deleuze 1995:170). Every year, almost without exception, regulators receive petitions from utilities to increase their prices. In response, cyclical patterns of recursive activity that are neither one-time events nor flat routines have come to guide regulators' work.

Grammars are not static systems of rules, as a "rigid literalist view of language" would have them (Basso 1990:74). They are patterns that emerge alongside the intuitions, attachments, and contested significance of the semiotic resources on which their existence in the world depends (Hymes 1996). As Anthony Webster (2010) has shown, the worldly significance of a grammar is not equally distributed among those sharing a language. Some individuals or groups "invest [grammars] with felt attachments" that accrue over time (Webster 2010:188) and give them particular emotional and political significance. While stabilizing some of a grammar's parts, these "felt attachments" create metapragmatic possibilities for strategic transgressions that can even become anti- or counternormative (Povinelli 2006). So, despite aspiring to continuity and regularity, linguistic grammars are always subject to counterhegemonic usage and, for that reason, virtually multiple. While enduring, and notwithstanding their prescriptive impetus, they are charged with potential for transformation.

A calculation grammar, on its part, consists of the contests, preoccupations, numeric artifacts, and improvisational practices that undergird the process of turning social relations and ontological assumptions into quantified expressions, as much as it consists of the patterns and prescriptions inscribed in those mathematical regimes of signification. A calculation grammar captures the broad values associated with calculative methods and draws its liveliness from the power of numeric techniques in their always place-specific expression. As rich arrangements of people, technical instruments, and semiotic signs, calculation grammars link microevents with socio-historical macroprocesses while holding the capacity to appear context free given their technicality. Sometimes, changes in calculation grammars mirror broad and slow structural transformations that, as Viviana Zelizer (2011) has shown, seem to be one with historical context. Sometimes, such changes are unleashed by edgy innovations and technical shifts in particular centers of calculation (Knorr-Cetina and Preda 2005; Poon 2009; Zaloom 2006) or in governmental agencies like ARESEP. But, regardless of their modality, these historically specific changes produce

new configurations mediated by financial figures such as risk, profit, and rent.

In Costa Rica, since the late 19th century, public officials have introduced significant changes into the calculation grammars by which they determine the prices of public services. Some of those changes have followed the material and infrastructural transformation of the service being paid for. In water provision, for example, an important shift occurred when utilities moved from charging fixed rates to a system of charges proportional to quantity of water consumed, following the installation of individual meters outside people's homes (for insightful studies of the everyday experiences of accessing and paying for water, see Anand 2011; Page 2005; von Schnitzler 2008). Other shifts in pricing logics do not correspond to infrastructural changes but respond to legal and economic shifts, such as the 1990s global impetus toward full cost recovery and the current emphasis on humanitarianism and universal rights. These historical shifts show the capacity of calculation grammars to effect diverse social worlds. Yet it would be a mistake to deposit that capacity exclusively on the political and social ideologies they embody. The power of a calculation grammar is highly dependent on its technical properties and mathematical implications.

In the case of popular algorithmic propositions, Paul Kockelman (2013) shows how Bayesian equations classify some items as desirable and other as undesirable, thereby functioning as ontological sieves that accept some entities, and not others, as active world-making agents. Vincent Lepinay (2011) argues that formulas used in global banks perform a type of work that is decoupled from external interests and social processes, and he proposes that their quantitative logics work as clear computational and linguistic devices in their own right. The calculation grammar I analyze presents a peculiar case. It numerically enacts a legally mandated notion of harmony and equilibrium that, while going beyond mathematical rules, cannot be disentangled from them. Harmony and equilibrium describe what, for regulators, are fundamental assumptions about the nature of their work and how society must be organized. Furthermore, these are assumptions about the kinds of relations that must exist between variables in an equation. As I show below, these assumptions constitute a technolegal metaphysics whose mathematical expression is a quest for a particular numeric proportionality and correspondence that mirrors an ethical social world that can be as harmonious and balanced as the elements in a formula are once the proper mathematical operations have been performed.<sup>9</sup> The possibility of achieving that concrete numeric expression of equilibrium is predicated on regulators' belief in the ontological continuity between their calculations and society more broadly, that is, in the capacity of a formula to create worlds resembling it. Thus, the capacity to enact harmony and equilibrium depends on the personal intention

and institutional histories of the people and organizations doing calculative work but also, and perhaps most significantly, on the technical world-making power of a formula and the calculation grammar that activates it.

### **Costa Rica as an object of economic and regulatory history**

ARESEP was created as an independent regulatory agency in 1996. It was born in the era of structural adjustment and regulatory capitalism (Levi-Faur and Jordana 2005), and it matured in connection with the privatizing trend that swept Latin America during the 1990s and 2000s. At the time, the state was reimagined as a regulatory entity responsible for setting clear "rules of the game" for private players and for promoting "markets" as preferred mechanisms for allocating resources. Agencies like ARESEP were assigned the responsibility of devising rules for market activity and mediating between private and public corporations, citizens and the state, when their interests conflicted. But Costa Rica's case is somewhat peculiar because no strategic utilities were privatized.

It would be misguided, however, to assume that because in Costa Rica all utilities continued to be public entities, the prices they request abide by principles of common economic welfare. Utilities have undergone a process of financialization due to the particular theories, accounting standards, and mathematical models that have become taken-for-granted knowledge among economically trained people in charge of their day-to-day operations. Hence, the public or private nature of a utility has lost traction as an index of distinct legal and economic logics. To understand the ideas of society and the values that undergird a utility, it is necessary to examine its detailed financial and administrative practices.<sup>10</sup>

Internationally known for its golden welfarist history (1950–80), Costa Rica's public sector was recognized for an activist state that strongly participated in economic production matters and for its past successes in elevating the living standards of most of its population through universal social policies (Martínez Franzoni and Sánchez-Ancochea 2013). The abolition of the army in the late 1940s, the nationalization of the banking system, and a constitutional reform making schooling through the ninth year mandatory, accompanied by strong labor protections and a payroll tax that funded the social security and the public health systems, made Costa Rica, before the 1980s oil crisis, the most universal and least stratified welfare regime in Latin America (Martínez Franzoni and Sánchez-Ancochea 2013).<sup>11</sup>

Yet, after its welfare heyday, Costa Rica was also caught by the "neoliberal" wave. Understood as a preference for private mechanisms to deal with collective issues and a push for opening the economy to foreign investment and for liberalizing currencies, a neoliberal mantle began to

wrap the well-grounded core of social institutions that the population continues to depend on (Vargas Solis 2011). Part neoliberal, part welfarist, Costa Rica's technocratic cadres and political elites advanced a hybrid agenda that, despite not following a radical program, introduced enough reforms to widen the gap between the richest and poorest citizens. By 2012, the formerly least stratified welfare regime of Latin America found its richest citizens with an income 14.5 times larger than its poorest citizens (Comisión Económica para la América Latina y el Caribe [CEPAL] 2013).

The neoliberal hype of the 1990s was not enough to transfer Costa Rica's strategic public utilities—electricity, water, or telecommunications—to private control, despite many attempts by different administrations to do so. Yet, to keep with the economic fashion of the 1990s, the country's Legislative Assembly created ARESEP as an autonomous regulatory agency largely to regulate the state itself through its public utilities.<sup>12</sup> This power quickly turned ARESEP into a key player in the structuring of Costa Rica's common resources and public sector.<sup>13</sup>

### Technolegal metaphysics

In their daily encounters with numerical formulas and legal instruments, regulators in ARESEP believe that, thanks to their formula, the prices they calculate will disseminate through society the values imbued in them in the process of their creation. A former director of WED, temporarily reassigned to lead the "future projects" team while the agency was "reengineered" in 2009, referred to this continuity by saying, "We have in our hands the most social of all public services, that is why any change in our methods will be a change in society, mostly for the poorest users." For him, a price is a performative encounter between citizens and utilities through acts of payment that bring them together.<sup>14</sup> The seemingly nonspectacular act of paying a monthly bill makes concrete what would otherwise remain abstract rights-bearing subjects and generic entities responsible for supplying citizens with what they have a right to (on payments, see Graeber 2011; Maurer 2012b; Mauss 1967). Thus, the prices in people's monthly bills are a way of summarizing people's relations with society at a given time (Hart 2007) and convey the values that organize the political and economic communities people live in. Regulators share this idea of prices as indexes of legal and economic sociality and reject any reductive definition that presents them as simplistic reflections of water's intrinsic value (cf. Kopytoff 1986). As one member of WED put it, prices never capture the real value of water, they only approximate as closely as possible the social relations that guarantee its access.

One afternoon, as I sat with Sofia in her cubicle, she consulted a booklet full of yellow Post-its marking the pages most heavily used. She was quickly going through the Ley de la Autoridad Reguladora de los Servicios Públicos Número

7593 (Law of the Public Service Regulation Authority Number 7593) with the confidence afforded by having done so many times. Passed in 1996, this law established ARESEP's purpose and to this day continues to be a source that most regulators consult or cite routinely, many of them from memory. When Sofia found the page she was searching for, and confirming I had located it in my own copy, she turned her booklet toward me, pointed to the middle of the page and said, "These are the reasons why we exist; this is what we have to do."

Sofia was introducing me to the fundamental principles guiding regulators' calculation grammar as they attempt to produce the most ethical price for a human right. Her explanation brought together an assortment of accounting theories, economic belief systems, and metaphysical assumptions about relationality. She proceeded to read Article 4 of the public service law and told me how ARESEP was responsible for harmonizing the interests of consumers, users, and providers of public services and for seeking equilibrium between the needs of users and the interests of providers. This fantastic image of a world in harmony and equilibrium had two implications. On the one hand, it specified the kinds of social relations that ARESEP was responsible for fostering, the ends of its work. And, on the other hand, it established harmony and equilibrium as properties that the agency's mathematical methods should also exhibit, as means to these ends. With this dual character, as means and ends, harmony and equilibrium constitute a technolegal metaphysics of sociality and instrumentality whose numeric meaning has to be determined for each particular case ARESEP studies. While, broadly, a legal metaphysics of harmony and equilibrium in society depends on legal artifacts such as checks and balances and the rule of law, in the particular regulatory work unfolding in ARESEP, harmony and equilibrium result from the proportions and relations between the price elements in a formula. Harmony and equilibrium have no foundational semiotic core that can be determined a priori; their numeric and ethical meaning only emerges after regulators use their formula to analyze a particular price increase request.

To deal with this technolegal metaphysics, Sofia routinely goes into elaborate financial mathematics. As we discussed that process, she scribbled in my notebook a new iteration of the formula she presented at the public hearing where I met her (see Figure 3). This time, Sofia disaggregated the equation to explain how the financial income and the expenses of a utility were the bottom-line concerns. While I supplemented her notes with my own to capture her explanation, she led me through histories that illustrated the variations, adjustments, and tweaking regulators do to each variable in their "real life" dealings with utilities. Her presentation of the formula was, from the beginning, rife with questions, contradictions, and proposed changes. For each element, she could tell me about long series of

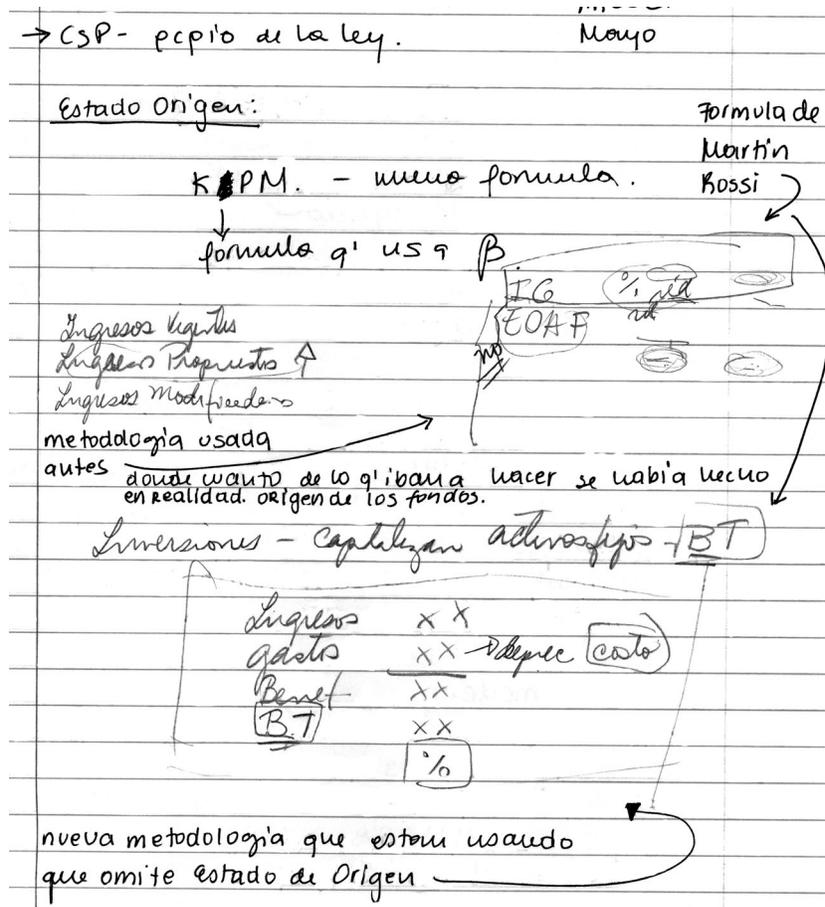


Figure 3. Simplified rendering of the Costa Rican public service regulation authority's pricing formula that emphasizes the legal principle of service provision without generating profit.

reformulations, waves of consultants recommending changes to computation methods, styles of exercising authority by new directors appointed to her department, and quibbles among coworkers about the role they played in society. The formula and the principles that rule it were not static objects; they were parameters within which regulators experimented with new technical and ethical possibilities.

One of the most important parameters this legal-financial formula sets relates to profits. In Costa Rica, all utilities providing water services are prohibited by law from profiting from their activities. This prohibition is shaped by the legal principle of *servicio al costo* (service not for profit), which states that water prices should be designed to only cover costs and cannot generate profits. But, at the same time, this principle allows utilities to produce a “competitive” remuneration beyond costs to raise enough resources to improve the quality of their service. Sofia and her colleagues assume that without their policing of the application of the principle of *servicio al costo*, utilities would seek opportunities to seize profit and accumulate

surplus, something that is not just legally prohibited but is viewed by most in the agency as unethical. Given the significance of *servicio al costo* for her formula, Sofia spends a lot of energy wrestling with the ethical meaning of the financial difference between income and expense, something that determines the “development yield” variable (R). When utilities request ARESEP’s authorization to collect more income via increased prices, regulators carefully assess whether the request will create any surplus. If a surplus is produced, regulators have to apply the principle of *servicio al costo* to judge whether it is an ethically acceptable development yield or a form of disguised and unacceptable profits. That conditional dependence precludes the difference between income and expenditures from having a definite ethical magnitude. For example, if, for one utility, a surplus of, say, 1,000,000 colones is ethical, for another utility, that same amount might represent scandalous and illegal profits.<sup>15</sup> That fluidity makes R an unwieldy numeric entity whose ethical character is pliable and, for that reason, has to be policed on a case-by-case basis. Surpluses, as a potential subterfuge for profits, are

a moving target for which a vigilant eye and a continuous implementation of the principles of harmony and equilibrium are necessary.

### Prices without profits

“Prices are signals,” Martin told me categorically one morning when we were chatting in his cubicle. Martin is, without a doubt, one of the most polemical economists on the WED team. Inspired by libertarian and neoliberal ideas, Martin’s economic opinions tend to incite strong reactions. He is prone to create controversies, and all agree, even he himself, that he enjoys doing so. He once told me with a smug look, “Because of my beliefs, I am not the most popular person here.” I could see the basis for his reputation when, after explaining why he was utterly convinced that water should be managed for profit and through markets, he gave me two documents, one from the Cato Institute and the other from the World Bank, to help me understand the problems the water sector faces. For Martin, there is no better communicative invention than prices. Paraphrasing Hayekian thought on the problem of information in planned economies (Elyachar 2006; O’Neill 2012; Riles 2011), Martin subscribes to a naturalized view in mainstream economic circles: Good prices come from markets. From that context, they are able to perform their communicative magic.

The association between prices and markets that Martin is so fond of is far from generally accepted in Costa Rica, so it is not surprising that his views often irritate others in ARESEP. In the case of water, especially given its status as a human right, citizens and many regulators tend to be suspicious of what market pricing can accomplish. But this mistrust is not a rejection of prices in general. In Costa Rica, people readily accept that they should pay for water. What they are suspicious of are prices produced by markets because, at least as they relate to water, markets usually conceal intentions to extract as much profit as possible. Here, *mercantilización*, a word I commonly heard from activists and water professionals, is relevant.

Mercantilización indexes markets, commodities, and profits at once. It refers to the exchange of a certain good through market transactions designed to extract questionable, and excessive, profits. Mercantilización goes beyond reciprocal exchanges of value to signal an intention to extract wealth with little consideration of how that might affect others’ well-being. For regulators, mercantilización is a technically obscure concept, yet, politically, its meaning is transparent. When activists and community organizations mobilize against the commodification or privatization of water and argue for its genuine treatment as a human right, they are in fact arguing against its mercantilización. The notion is so powerful that regulators fear any reference to

$$X = O + A + D + R$$

*X = Cost of service delivery*

*O = Operation costs*

*A = Administration costs*

*D = Devaluation*

*R = Development yield (or return on investment)*

Figure 4. Formal mathematical expression of the formula the Costa Rican public service regulation authority uses to set the price of water.

it in the media because of the social outcry it inevitably unleashes.

As a good Hayekian, Martin is not scared of mercantilización. He believes the market is equipped to correct for its own excesses. Yet, regardless of his heartfelt neoliberal proclivities, the prices Martin produces are far from the market-based semiotic wonders he admires. His prices, as regulated entities whose origin and humanitarian significance depend on their being not for profit, must preclude the mercantilización of water.

During another sparsely attended public hearing to request feedback on a utility’s price increase, Martin began his presentation with WED’s regulatory formula and a definition of each variable (see Figure 4). He then explained how the relations between variables had to reflect harmony and equilibrium if the relations between utilities and users were to also embody those qualities. Through the formula, the audience learned about the financial logic by which operation costs, administrative costs, and depreciation rates are kept in equilibrium with a justifiable surplus (development yield), represented in R.

The development yield (R), that tricky mathematical difference that Sofia scribbled on my field notebook, again occupied us. After Martin’s explanation, the financial manager of the utility requesting the price increase for which the hearing was organized took the stage. She showed a series of slides with the financial projections the utility had submitted for ARESEP’s evaluation. All of her tables had a red balance, showing how, with current prices, the utility would fall into serious deficit. From the utility’s perspective, those red figures made it only reasonable that ARESEP grant a noticeably larger development yield (R).

Although, as noted above, the development yield (R) allows utilities to collect resources to improve and develop their services, in its actual calculation, the ethical valence of this number is fluid and holds the potential to lead to the mercantilización of water. If R grows too much, or if it slips away from regulatory control, it becomes a channel for profit generation and mercantilización. This outcome is possible because, although it is nominally not profit, technically, the development yield is a form of income not offset by any immediate cost. In a sense, any income not spent

is, despite any euphemistic accounting characterization in ARESEP, a form of profit, even if that profit is not passed on to shareholders or capitalist owners. R's ambiguity, as something that can be profit without being called such, turns development yield into something of a nominalist trick that requires constant assessment to establish the propriety of its magnitude in relation to the other variables in the formula: operation costs (O), administrative costs (A), and devaluation (D). Devoid of a fixed ethical magnitude, R has a flexible capacity to work as an indicator of the virtuous efficiency of utilities or as an instrument to morally shame and discipline them.

### From accounting to economics

ARESEP employees have translated the metaphysics of harmony and equilibrium into a distinct calculative temperament. Sofia explained this affective dimension of their work by saying that they had historically behaved like *peseteros*. This expression derives from the term *pesetera*, which refers to the Costa Rican 25-cent coin removed from circulation in the 1980s because of inflation. A person is called "pesetera" when she or he obsessively chases and wants to account for every single penny and how it has been used. In English, such a person would be called a "penny pincher." The pesetera attitude is something Sofia confesses is a bit excessive, if also necessary when one is responsible for equilibrium and harmony. "The ethic of public service requires one to think in those terms and even more so since water access is a human right," she told me during one of our conversations. This pesetero temperament results from the historical particularities of the Costa Rican state as much as from the grip economic ideologies hold on WED's everyday activation of its calculation grammar. Two theoretical artifacts became exemplars of this ideological hold in 2009, when ARESEP began considering a potential change from an accounting to an economic approach to regulation.

The proposed economic approach would sync regulators' daily calculations of R with one of the basic assumptions behind Adam Smith's legendary invisible hand. As a popular icon of the modern economic imaginary, even if an inaccurate one, the invisible hand of the market is taken as an aggregate of moral and economic forces counterbalancing each other (Smith 1966). In this relational imaginary, one consumer and one producer trading with each other are not enough to constitute a market. Only the summation of multiple consumers and producers can be analytically abstracted into a geographic space, an extended network of relations, or a Cartesian graph. These market aggregates are brought into equilibrium through the metaphoric invisible hand of supply and demand dynamics. Thus, in the market imaginary, equilibrium results from an aggregation of individuals organized by the magical capacities of markets to

create equilibrium between the supposedly opposing positions of producers and consumers.

The second artifact that figured prominently in ARESEP's methodological discussions was the double-entry bookkeeping technology. This artifact represented the accounting approach that WED has historically used. When it was invented, the ledger offered insight into the virtue of a merchant's practices and had the capacity to combine legal, economic, and theological traditions into numeric forms to appraise a merchant's deference to godly harmony (Poovey 1998). As a means of showing the virtue of economic exchanges, the accounting balance between credits and debits in the ledger "conjured up both the scales of justice and the symmetry of God's world" (Poovey 1998:54–55). Here we see a theological analog to the metaphysics of equilibrium contained in ARESEP's law. In the ledger, the significance of the final numeric balance between credit and debit does not depend on the precise volume of income and expenses. Its ethical significance depends on whether credits and debits offset each other. If the final balance is zero, then the merchant's activities have been virtuous. This arithmetic equilibrium between credit and debit, and not any particular magnitude per se, reflected the morality of the merchant (Poovey 1998:55) and, in the 21st century, it reflects the ethics of a utility's price. These two precursors, Adam Smith's aggregate market and the merchant's ledger, underpinned WED's discussion of how a move from an accounting to an economic approach to regulation would affect its pesetero attitude.

After more than a decade of following the accounting approach by meticulously policing the balance between a utility's income and expenses and its associated R, ARESEP's directors asked all technical personnel to consider the possibility of dealing with R differently. The proponents of the change wanted to move toward aggregate analyses rather than focus on examination of individual utilities. The practical implication of this move would be a reorientation of the attention previously given to accounting reports and balance sheets. To keep R as development yield and preclude its conversion into profits, they would focus on the overall performance of utilities in comparison to an "industry-wide" benchmark. In this new approach, the focus on the harmony of accounting reports and balance sheets to determine an adequate R (development yield) according to each utility's particular conditions at a given point in time would be replaced by a standardized, long-term, and aggregate industry-wide R. Rather than regulators having the discretion to increase or decrease R, its magnitude would be automatically and universally set.

With this request to reconsider R came a wealth of rumors about major ideological changes in their calculation grammar. Sofia and some of her colleagues were especially concerned that the discretion to control utilities they had enjoyed in the past would not survive what they

anticipated would be a flurry of changes in the near future. Many regulators connected the rumors with their fear of losing control over the public nature of water. Stories about veiled mercantilización circulated through ARESEP, and activist groups, community aqueduct organizations, and users started voicing their apprehension in meetings, workshops, and public hearings. Publications in the media and discussions on social networking sites connected these possible changes with the demands of a recently ratified free trade agreement between the United States and Central America (CAFTA) that opponents argued intended to privatize water (Aistara 2012).

But the emotional and political turbulence in ARESEP, and outside it, did not diminish the enthusiasm of WED's interim director for transitioning from an accounting approach—following the aesthetic of the balanced ledger—to an economic form of regulation—guided by the logic of aggregation. One WED member conceptualized the shift as an attempt to move from accounting as evidence of prudence to aggregate measures as indications of economic and financial efficiency. Others spoke of the change as a “neoliberalizing” measure that would introduce disguised profits and fracture WED's long-standing commitment to *servicio al costo* and affordable water access consistent with human rights obligations. But regardless of personal ideologies, all regulators were intrigued by how this change would affect their everyday capacity to infuse harmony and equilibrium in society and whether their habit of policing the balance between costs and expenses would become moot.

### The cost of a human right

Rumors about this impending methodological change compounded an already crisp political environment. CAFTA, ratified in 2007 through a controversial referendum, had already opened the telecommunications sector to private investment (Pearson 2013). For the industry to be attractive to private corporations, telecommunications were legally decategorized as public services, exempting companies from being subject to the principle of *servicio al costo*.<sup>16</sup> This structural change implied that private, for-profit corporations could offer cell phone, fixed phone, and Internet services, all of which had previously been provided by a single state-owned utility. ARESEP remained in charge of regulating the newly born public-private industry, although, later, a semi-independent regulatory agency was created. But, at the time, and from the perspective of Sofia's team, it became impossible to ignore the telecom team's efforts to figure the appropriate mechanisms to regulate private and public entities simultaneously. The specter of all-encompassing economic liberalization intensified internal discussions about the role of regulation in society, about the complicated borders between public and private, and,

$$(a) X=O+A+D+R_{(\text{flexible between 3 and 7\%})}$$

$$(b) X=O+A+D+R_{(\text{fixed at 5\%})}$$

**Figure 5.** A harmonious and equilibrated water-pricing formula (a) and a formula in disharmony and lacking equilibrium (b). (Rendering by Andrea Ballesterio.)

more significantly, about the legitimacy of profits in the provision of public services.

A shift from an accounting to an economic approach to regulation was more than a mathematical shift; it was a change in the kind of society that, through their methods, regulators produced. To explain more precisely this ontological continuity between their calculation grammar and society, Sofia sent me an electronic copy of a manual she used for an e-learning course she took in 2008. The course was organized by the Asociación de Entes Reguladores de Agua Potable y Saneamiento de las Américas (Latin American Association of Water and Sanitation Regulatory Entities, or ADERASA), a group that is regularly invoked when people in ARESEP compare their accomplishments to regulatory innovations throughout Latin America. The first sentence of the manual, Sofia noted, stated that “the costs of a regulated company depend on the type of regulation established” (ADERASA 2007:3). In other words, the costs of any utility will always, and only, be those costs regulators count as such. She wanted to underline the fact that even something like a cost is never an external fact preexisting a calculation grammar; it is always brought into existence by the principles and rules that agencies like ARESEP work with and through.<sup>17</sup>

Thanks to Sofia and Martin's insistence on the relation between the principle that precludes profits (*servicio al costo*) and their overseeing of the development yield (R), it was easy to see how the rumored changes would affect the mathematical aesthetics of R (see Figure 5). In line with their *pesetero* attitude and with the accounting approach to regulation it represented, regulators historically controlled R and kept it somewhere between 3 and 7 percent. That fluctuation secured a harmonious and mathematical proportionality that kept the relations between variables equilibrated and the principle of *servicio al costo* alive, as illustrated by formula (a) in Figure 5. Having the discretion to adjust R in relation to other variables secured numeric proportionality and made equilibrium literally mathematical. But many at WED expected that, with the change to an economic approach to regulation, R would have a standardized value, probably an industry-wide benchmark of 5 percent, independent of the other variables, as shown in formula (b) in Figure 5.<sup>18</sup> This change would render the equilibrium-infusing effects of the *pesetero* attitude and the accounting approach impossible. In this scenario,

R would stand on its own, independent, uninterested, and in defiance of what the magnitude of other variables signaled. That independence could easily bring about a slippage of development yield into profits, as an automatic 5-percent R would be granted even when utilities had an already existing surplus. Until 2009, a flexible R had been the crucial improvisational space where regulators choreographed their intimate knowledge of a utility's accounting structures with a view toward the life of the price of water once it was unleashed in society. A flexible R had been critical for regulators' ethical and mathematical capacity to imbue their water prices with the ethical qualities—harmony, equilibrium, and non-mercantilización—necessary to mold relations among water users, utilities, and society. If the proposed change occurred, the contours of those ethical qualities would be radically transformed.

### **From inverse proportionality to standardized responsibility**

On another occasion when regulators were making sense of the ramifications of the possible change of approach, Sofia purified the steps in her calculation grammar to create a contrast between the two regulatory approaches under discussion. Following the accounting approach, she told me, centered their work on the relations between income and expenditure. A company showing efficient use of its resources, meaning it had no surplus at the end of a fiscal period, was taken as a company in equilibrium. On that basis, regulators assigned a higher R (development yield), allowing utilities to collect more resources through an increased price. If, on the contrary, a company did not offset income with expenses and showed a large balance in its accounts, they granted a smaller development yield to counterbalance the other variables (O, A, D). This form of inverse proportionality precluded the accumulation of profits. Something else that made this accounting approach particularly valuable was that, beyond assessing financial records, it created opportunities to investigate the practices behind inscriptions of income and expenses (the ledger). Regulators took it as their responsibility to talk to a utility's personnel about their reports, look for cues of dangerously creative accounting, and diligently make their regulation a more interpersonal affair. These avenues allowed them to gauge the virtue of a utility and its deference to its financial-humanitarian obligations through phone conversations, e-mail exchanges, and face-to-face meetings.

If the shift to an economic approach occurred, R would become a symbol of financial freedom for utilities, a standardized magnitude that would distribute responsibility over financial particulars to the utilities themselves. This R would leave no room for regulators' historical interpretation of the development yield as a function of the time-specific performance, and virtue, of each utility.

This standard would decouple development yield (R) from balance sheets, closing off possibilities for steering, correcting, and rewarding utilities in their dynamic search for harmony and equilibrium through R and thereby creating a form of standardized financial rent.

This change would radically transform the types of inferences regulators could make from the relations between variables in the formula, even though their calculation grammar would still be guided by harmony and equilibrium and the regulatory principle of *servicio al costo*. In this new economic approach, Sofia's *pesetero* attitude would be virtually out of place, and the WED team would have to reorient their attention to emphasize other financial aspects, develop new means to investigate them, and figure how the idea of water as a human right would numerically affect them. If, historically, a preoccupation with human rights was translated into the disciplined policing of any form of implicit or explicit profits, in the future WED would have to perform a new translation. The generic existence of the principle of *servicio al costo* would have to take a new calculative form.

While this shift from an accounting to an economic regulatory approach was not to the liking of many in WED, those who enthusiastically supported it justified its merits in terms of standardized responsibility. WED's director thought the shift would transfer to utilities the obligation to police financial sustainability, freeing regulators to focus on issues of service quality, another fundamental characteristic of the human right to water. This responsibility rationale was based on a financial habit they had discovered in utilities' accountings. Through the years, water companies had grown accustomed to operating very close to, or sometimes in, deficit as a way to justify their petitions to augment their development yield (R). Recall how, during the hearing that Martin led, the financial manager of the utility requesting the price increase showed a series of financial projections painting a dire future in which the company would fall into deficit. This perpetual proximity to deficit was, as Sofia's e-learning manual noted, the performative effect of the grammars regulators used to account for costs and police profits. Transcending the representational value of numbers and interlacing calculative pasts and futures, as well as personnel from utilities and ARESEP, this mutual entanglement had historically resulted in a choreography of equilibrium, harmony, and not-for-profit pricing that valued balanced financial statements and in some ways made deficit desirable for utilities. The promoters of the change argued that a standardized R would finally break this pattern and force utilities to adopt a more entrepreneurial attitude.

Martin agreed with this new way of assigning responsibility. He thought it was about time water utilities grew out of their habit of being policed and started being more responsible for their own actions. For him, utilities needed to become "financially smarter," catch up with their obligation

to manage themselves more efficiently, and stop relying on the regulatory state to guide their decisions. "It is a good idea to move towards a fixed development yield and let financial balance be something that companies worry about, not us," he said. Rather than state-making projects, for Martin, utilities had to be rethought as a class of entrepreneurial entities resembling subjects whose ingenuity, creativity, and market initiative have to be equally encouraged. His equality argument followed the rationale that, if all utilities are operating in roughly the same conditions, for some utilities to have certain things recognized as costs while others do not is unfair. The logic should be that all utilities are granted the same level of working capital. That move would include fixing R universally. Not doing so discriminates against some utilities, detracts from how efficient they seem in comparison to other utilities, and, further, results in bad press, low morale, and even more stringency in ARESEP's auditing of their accounts.

Sofia was not pleased with the implications of the change. She frequently explained that, within WED, she was known as a champion of users, especially the poorest segment of the population. Arguments of fairness, for her, were significant as long as they considered how "the poorest of the poor" were affected by technical decisions. She saw in the new approach a disguised pull away from regulators' substantive commitment to affordability and low prices as an expression of their ethical work. Their inability to adjust the development yield in each specific case would, Sofia contended, inevitably increase the price charged to users, something they had been very careful about, since high prices were deemed one of the biggest threats for securing universal access to the human right to water.

Resembling the 1990s atmosphere in which ARESEP was created, at the end of the first decade of the 2000s, a profit-friendly mantle was slowly enwrapping regulators' historical commitment to the prevention, at any cost, of implicit or explicit profits. Discussions on the nature of a fixed R deepened the ideological differences between WED members, exemplified by Martin and Sofia, especially when they addressed how households were going to be affected by the price increases, how companies would suffer if they did not have freedom to invest, and what this redefinition of equilibrium and harmony between elements in the formula would mean for human rights. But, most significantly, the proposed change highlighted the seriousness of the world-making potential of calculation grammars and the rich opportunities they open for new challenges to emerge and old attachments to solidify.

Not surprisingly, what in 2009 seemed like an imminent change never came to fruition. In 2013, the general public saw evidence in the media of the usual effects of the agency's calculation grammars on their relations with utilities. One day in April, for example, the front page of the largest newspaper reported that AyA had accumulated a staggering surplus of about \$415 million dollars. The head

of AyA explained that delays in an infrastructure renewal program were responsible for this surplus. Yet, on the basis of that surplus, ARESEP denied AyA's petition to increase water prices by 16 percent. ARESEP was still using the magnitude of R to steer utilities toward humanitarian and financial virtue by ensuring quantitative harmony and equilibrium between variables. Despite the impetus behind the proposed methodological change, a fixed R never materialized, and the accounting approach continued to guide WED's calculations of the human right to water. But it would be a mistake to disregard WED's turbulence over the rumored change in R as an exceptional occurrence. The density of preoccupations, calculative experiments, and reflexive assessments among regulators during that period was not unusual. On the contrary, that intensity constitutes the liveliness and unpredictability of calculation grammars as they routinely unfold in real time across centers of calculation. Despite the fixity of some of the elements that make up those grammars, such as the apparent stability of regulatory principles and mathematical equations, the lively arrangements of the ethical, financial, and legal limits of their instruments allow regulators to elucidate and reinvent the meanings of price, of profits, and of the financial humanitarianism that increasingly guide their decisions. Those lively arrangements make calculation grammars everyday patterns of activity always open for political and ethical reinvention.

## Conclusion

The question ARESEP regulators pose for anthropology is, what is at stake in the technical routes people with particular political and ethical purposes take to produce prices? How do people use pricing devices to approximate some collective good? Understood as everyday preoccupations, rules, and transgressions through which regulators engage with humanitarian and financial injunctions, ARESEP's calculation grammar allows regulators to generate prices that shape the relations between citizens, utilities, and the state. They help shape the form of the social collective. These calculation grammars, while regimented, are always open to transformation. They are subject to the economic ideologies and legal principles that circulate among public servants. They express broader questions about a financial humanitarianism that entangles what might otherwise have seemed distinct regimes of value: human rights and finance.

If, as Keith Hart notes, the prices in people's bills account for the relations between individuals and society at a given time, it is important to ask, how do those in charge of designing those figures make sense of those relations? And, more importantly, how do the instruments they use shape that process? My emphasis here on the formula that guides the calculation grammar of regulators, rather than on citizen's experiences and their efforts to pay or to

challenge those prices, highlights the technical and ethical labor regulators perform when they mobilize their methodologies. Unlike accounts of law and finance that black-box numeric decisions as obscure and complex procedures, I have shown how technicality is constituted by ethical, cultural, and mathematical sets of relations in a constant state of becoming.<sup>19</sup> Seen in this light, Sofia's and Martin's engagements with their calculation grammar require an ethnographic account that, despite its intensely specific explorations, cannot be reduced to the microlocal; they demand an ethnography of financial theory and everyday ethical practice that engages their ontological indivisibility.

To chart the making of prices in this case, I have taken a somewhat circuitous tour by way of legal principles, economic theory, and bureaucratic cubicles to argue for the importance of understanding how a mathematical formula is an active participant in the humanitarian–financial worlds we live in. Paying for water engenders moments of mathematical determination when the difference between a fixed R variable (5 percent) and a flexible one (3–7 percent) is the difference between a price that fulfills the moral and technical commitment to harmony and equilibrium in society and a price that does not. In ARESEP, philosophical, quantitative, legal, and affective contests unfold through competing ideas of how a variable should relate to its neighbors in a formula. The mathematical proportions, weights, and valences those relations embody are also the political, legal, and ethical relations that undergird the process of calculating the price of a human right.

Through their calculation grammars, regulators modulate metaphysical and material tensions, giving them the form of a bill that visits households every month. Anthropologists as well as other critical scholars interested in the value(s) of water, the financialization of social life, and the social life of human rights can find in unexpected locales, such as regulatory agencies, important insights into how contemporary humanitarian injunctions and financial logics are coshaping notions of what it means to live in community and what it means to recognize the existence of common goods and universal rights via prices.

In Costa Rica, the price of the human right to water is, in a sense, nothing more and nothing less than the calculation grammars that create it. Yet that seemingly unremarkable origin is a vortex where legal principles of equilibrium and harmony, calculative traditions, and political responsibilities are transformed into each other. Regulators take liberal humanitarianism, and its capitalist companion, to challenge the profit normativity that, were they not calculating regulated prices, they would also take for granted. These regulated prices are not, of course, safe humanitarian victories over the excesses of capitalism, but they resist any simplistic reduction to neoliberal teleologies.

In ARESEP, day after day, ethics and prices are one, and when each of us gets our water bill, or when we do

not, we are partaking in similar ethical projects unraveling in different national locations and economic histories. Thus, pricing a nonprofitable human right is not an addendum to an immaterial philosophy of universal rights; it is the calculative substance of liberalism's foundational assumption about what makes an individual a rights-bearing subject. This price speaks of the simultaneous financialization of human rights and the humanitarization of finance that characterize our times and is a calculative artifact that makes 1.7 million Costa Ricans pay a bill, every month, with a price that stands for their human right to water.

## Notes

*Acknowledgments.* Earlier versions of this article were presented at the Center for Research on Socio-Cultural Change, University of Manchester; Center for Risk and Regulation at the London School of Economics; the Eating Bodies research group at the University of Amsterdam; and the anthropology departments at the University of Chicago and University of Texas at Austin. I would like to thank Yasmine Chahed, Julia Elyachar, John Hartigan, Penelope Harvey, Matthew Hull, Gemma John, Anna Man, Anne Marie Mol, Keir Martin, Bill Maurer, John O'Neil, Martha Poon, and Kaushik Sunder Rajan for their generous feedback on previous versions of this article. Angelique Haugerud and four anonymous reviewers provided invaluable suggestions that improved my overall argument in important ways. Linda Forman helped make my language friendlier than it usually is. Finally, most special thanks to Robert Werth for the patient and multiple readings of drafts and incisive feedback. Research for this project was funded by the Law and Social Science and Cultural Anthropology programs of the National Science Foundation, the Wenner Gren Foundation, and several fellowships from the University of California-Irvine.

1. I consider the technical as a set of ideas, instruments, and materials organized around means–ends logics and following a specific set of epistemic orientations with rules and standards that are claimed as particular to a certain field.

2. The general principles of price regulation are not particular to Costa Rica—thus, my focus on economic regulation as a set of practices that are at once globalized and contextual. In this article, I follow an ethnographic approach that considers the contingencies of locality and the principles of technical abstraction together. For a discussion of the tension between particularity and technical generality in regard to calculation, see Miller 2008 and Appadurai 2012.

3. The existence of international standards determining how much water fulfills individual human need (and thus right) and quality standards determining what makes water “safe” for human consumption remain marginal for regulators when they calculate their prices. ARESEP's Water and Environment Department (WED) team expects utilities to consider those provisions in their daily water management operations while they engage with pricing issues. This focus on economic regulation is slowly changing, and, during an interview in 2013, the new WED director explained that his objective is to move from issues of pricing to issues of quality.

4. Ensuring the human right to water has gained traction around the world (South Africa, Bolivia, Ecuador, Costa Rica), posing questions about the relation between civil and economic human rights but also bringing into focus the ethical and moral underpinnings of all economic arrangements.

5. AyA, a public institute owned by the Costa Rican state, provides water access to close to 60 percent of the country's population. The rest of the population is covered by community aqueducts

under the legal supervision of AyA, municipal utilities, or municipalities directly.

6. After a reorganization of ARESEP, the WED was transformed into the Intendencia de Aguas. Since I conducted fieldwork while WED was in existence, I refer to the team with this acronym.

7. On framing as a device for ontological multiplication rather than reduction, see Hetherington 2014.

8. I thank one of this article's reviewers for helping me better word this essential dimension of calculation grammars.

9. Here I am using metaphysics as a general concern with fundamental assumptions of being.

10. An important example that brings the point home is the case of Wal-Mart (Petrovich and Hamilton 2006). As a large buyer of a variety of commodities, Wal-Mart often "imposes" on, or dare I say regulates, the accounting and management practices of its suppliers, very much in the way that regulators oversee utilities. If one classified ARESEP and Wal-Mart on the basis of their public or private nature, they would seem radically different entities. Yet, if one analyzes their price-setting methods and routines, they begin to look similar. This shift in perspective suggests the need to bracket our expectations of what public or private entities do and to ethnographically trace the specific practices that make up contemporary capitalist formations. I thank Matthew Hull for pointing out the parallel between regulatory and large-retail cost and profit calculation practices.

11. During this period, the share of public investment in the economy rose from 21 percent in the 1960s to 40 percent in the 1980s (Martínez Franconi and Diego Sánchez-Ancochea 2013:154). This regime provided benefits to citizens across economic classes, led to the rapid accumulation of capital, and transformed a mainly agricultural economy into one dominated by computer microchip exports and tourism (Vargas Solís 2011).

12. Electricity and water services had been regulated since the 1920s, but, until the creation of ARESEP, the regulatory function was performed by utilities themselves.

13. In addition to overseeing public utilities, ARESEP regulates the prices of public transportation services (bus and taxi) and oil commercialization, both provided by private companies.

14. Michel Callon proposes that economics is not a form of knowledge that depicts an already existing state of affairs but a set of instruments and practices that contribute to the construction of economic settings, actors, and institutions (MacKenzie et al. 2007). What economic knowledge claims to merely describe, it in fact helps bring into existence, formatting and shaping its particularities (Callon et al. 2002; Mitchell 2005). Economics performs the world.

15. The colón is the currency of Costa Rica.

16. The law that did so, however, framed the new market under the principles of solidarity and universality in service provision. The specific implications of these principles are still being elucidated.

17. See also Maurer 2012c.

18. This 5 percent resulted from input the head of ARESEP received from the Latin American Association of Water Regulators, the Latin American Commission on Economic Issues, and the World Bank.

19. For an analogous process in the realm of biomedicine see Olson (2010).

## References cited

Aistara, Guntra

2012 Privately public seeds: competing visions of property, personhood, and democracy in Costa Rica's entry into CAFTA and

the Union for Plant Variety Protection (UPOV). *Journal of Political Ecology* 19:127–144.

Anand, Nikhil

2011 PRESSURE: The PoliTechnics of Water Supply in Mumbai. *Cultural Anthropology* 26(4):542–564.

Appadurai, Arjun

1986 Introduction: Commodities and the Politics of Value. *In* *The Social Life of Things: Commodities in Cultural Perspective*. Arjun Appadurai, ed. Pp. 3–63. Cambridge: Cambridge University Press.

2012 The Spirit of Calculation. *Cambridge Anthropology* 30(1): 3–17.

Asociación de Entes Reguladores de Agua Potable y Saneamiento de las Américas (ADERASA)

2007 Esquemas tarifarios, regulación y estructura de las tarifas. Unidad 2. *In* Programa de teleformación en regulación de servicios públicos 2007. Asunción, Paraguay: ADERASA.

Ballesterio, Andrea

2012 Transparency Short-Circuited: Laughter and Numbers in Costa Rican Water Politics. *PoLAR: Political and Legal Anthropology Review* 35(2):223–241.

2014 What's in a Percentage? Calculation as the Poetic Translation of Human Rights. *Indiana Journal of Global Legal Studies* 21(1):27–53.

Basso, Keith

1990 *Western Apache Language and Culture*. Tucson: University of Arizona Press.

Beckert, Jens

2011 Where Do Prices Come From? Sociological Approaches to Price Formation. *Socio-Economic Review* 9(4):757–786.

Biehl, João, and Peter Locke

2010 Deleuze and the Anthropology of Becoming. *Current Anthropology* 51(3):317–351.

Çalışkan, Koray

2007 Price as a Market Device: Cotton Trading in Izmir Mercantile Exchange. *Sociological Review* 55(2):241–260.

Callon, Michel, and John Law

2005 On Qualculation, Agency, and Otherness. *Environment and Planning D: Society and Space* 23:717–733.

Callon, Michel, Cécile Méadel, and Vololona Rabeharisoa

2002 The Economy of Qualities. *Economy and Society* 31(2):194–217.

Cohn, Bernard

1996 *Colonialism and Its Forms of Knowledge: The British in India*. Princeton: Princeton University Press.

Comisión Económica para la América Latina y el Caribe (CEPAL)

2013 Anuario estadístico de América Latina y el Caribe. Santiago, Chile: CEPAL.

Corsín Jiménez, Alberto

N.d. The Form of the Relation, or Anthropology's Enchantment with the Algebraic Imagination. Unpublished MS, University of Manchester.

Deleuze, Gilles

1995 *Negotiations, 1972–1990*. New York: Columbia University Press.

Elyachar, Julia

2006 Best Practices: Research, Finance, and NGOs in Cairo. *American Ethnologist* 33(3):413–426.

Fassin, Didier

2012 *Humanitarian Reason: A Moral History of the Present*. Berkeley: University of California Press.

Faubion, James D.

2010 From the Ethical to the Thematic (and Back): Groundwork for an Anthropology of Ethics. *In* *Ordinary Ethics:*

- Anthropology, Language, and Action. Michael Lambek, ed. Pp. 84–101. New York: Fordham University Press.
- Fourcade, Marion  
2011 Price and Prejudice: On Economics and the Enchantment (and Disenchantment) of Nature. *In* *The Worth of Goods: Valuation and Pricing in the Economy*. Jens Beckert and Patrik Aspers, eds. Pp. 41–62. Oxford: Oxford University Press.
- Graeber, David  
2011 *Debt: The First 5,000 Years*. Brooklyn, NY: Melville House.
- Guyer, Jane I.  
2004 *Marginal Gains: Monetary Transactions in Atlantic Africa*. Chicago: University of Chicago Press.  
2009 Composites, Fictions, and Risk: Toward an Ethnography of Price. *In* *Market and Society: The Great Transformation Today*. Chris Hann and Keith Hart, eds. Pp. 203–220. New York: Cambridge University Press.
- Guyer, Jane I., Naveeda Khan, Juan Obarrio, Caroline Bledsoe, Julie Chu, Souleymane Bachir Diagne, Keith Hart, Paul Kockelman, Jean Lave, Caroline McLoughlin, Bill Maurer, Federico Neiburg, Diane Nelson, Charles Stafford, and Helen Verran  
2010 Introduction: Number as Inventive Frontier. *Anthropological Theory* 10(1–2):36–61.
- Hart, Keith  
2007 *Money: Towards a Pragmatic Economic Anthropology*. <http://www.thememorybank.co.uk/2007/07/15/127/>, accessed January 27, 2015.
- Hetherington, Gregg  
2014 Regular Soybeans: Translation and Framing in the Ontological Politics of a Coup. *Indiana Journal of Global Legal Studies* 21(1):55–78.
- Hymes, Dell  
1996 *Ethnography, Linguistics, Narrative Inequality: Toward an Understanding of Voice*. London: Taylor and Francis.
- Keane, Webb  
2010 Minds, Surfaces, and Reasons in the Anthropology of Ethics. *In* *Ordinary Ethics: Anthropology, Language, and Action*. Michael Lambek, ed. Pp. 64–83. New York: Fordham University Press.
- Knorr-Cetina, Karin, and Alex Preda, eds.  
2005 *The Sociology of Financial Markets*. Oxford: Oxford University Press.
- Kockelman, Paul  
2013 The Anthropology of an Equation: Sieves, Spam Filters, Agentive Algorithms, and Ontologies of Transformation. *HAU: Journal of Ethnographic Theory* 3(3):33–61.
- Kopytoff, Igor  
1986 The Cultural Biography of Things: Commoditization as a Process. *In* *The Social Life of Things: Commodities in Cultural Perspective*. Arjun Appadurai, ed. Pp. 64–91. Cambridge: Cambridge University Press.
- Latour, Bruno  
1999 Circulating Reference: Sampling the Soil in the Amazon Forest. *In* *Pandora's Hope: Essays on the Reality of Science Studies*. Bruno Latour, ed. Pp. 24–79. Cambridge, MA: Harvard University Press.
- Lepinay, Vincent  
2011 *Codes of Finance: Engineering Derivatives in a Global Bank*. Princeton: Princeton University Press.
- Levi-Faur, David, and Jacint Jordana, eds.  
2005 The Rise of Regulatory Capitalism: The Global Diffusion of a New Order. Special issue, *Annals of the American Academy of Political and Social Science* 598.
- MacKenzie, Donald A.  
2009 *Material Markets: How Economic Agents Are Constructed*. Oxford: Oxford University Press.
- MacKenzie, Donald A., Fabian Muniesa, and Lucia Siu  
2007 Do Economists Make Markets? On the Performativity of Economics. Princeton: Princeton University Press.
- Martínez Franzoni, Juliana, and Diego Sánchez-Ancochea  
2013 Can Latin American Production Regimes Complement Universalistic Welfare Regimes? Implications from the Costa Rican Case. *Latin American Research Review* 48(2):148–173.
- Marx, Karl  
1976 *Capital*, vol. 1. London: Penguin Classics.
- Maurer, Bill  
2005 *Mutual Life Limited: Islamic Banking, Alternative Currencies, Lateral Reason*. Princeton: Princeton University Press.  
2010 Finger Counting Money. *Anthropological Theory* 10(1–2):179–185.  
2012a Finance 2.0. *In* *A Handbook of Economic Anthropology*. James G. Carrier, ed. Pp. 183–201. Cheltenham, UK: Edward Elgar.  
2012b Payment: Forms and Functions of Value Transfer in Contemporary Society. *Cambridge Anthropology* 30(2):15–35.  
2012c Regulation as Retrospective Ethnography: Mobile Money and the Arts of Cash. *Banking and Finance Law Review* 27(2):299–314.
- Mauss, Marcel  
1967 *The Gift*. New York: W. W. Norton.
- Merry, Sally Engle, and Susan Bibler Coutin  
2014 Technologies of Truth in the Anthropology of Conflict. *American Ethnologist* 41(1):1–16.
- Miller, Peter  
2008 Calculating Economic Life. *Journal of Cultural Economy* 1(1):51–64.
- Mirowski, Philip  
2006 Twelve Theses concerning the History of Postwar Neoclassical Price Theory. *History of Political Economy* 38:343–379.
- Mitchell, Timothy  
2005 The Work of Economics: How a Discipline Makes Its World. *European Journal of Sociology* 45(2):297–320.
- Miyazaki, Hirokazu  
2012 Arbitrating Japan: Dreams of Capitalism at the End of Finance. Berkeley: University of California Press.
- Muehlmann, Shaylih  
2012 Rhizomes and Other Uncountables: The Malaise of Enumeration in Mexico's Colorado River Delta. *American Ethnologist* 39(2):339–353.
- Muniesa, Fabian, and Michel Callon  
2007 Economic Experiments and the Construction of Markets. *In* *Do Economists Make Markets? On the Performativity of Economics*. Donald Mackenzie, Fabian Muniesa, and Lucia Siu, eds. Pp. 311–357. Princeton: Princeton University Press.
- Olson, Valerie A.  
2010 The ecobiopolitics of space biomedicine. *Medical anthropology* 29(2):170–193.
- O'Neill, John  
2012 Austrian Economics and the Limits of Markets. *Cambridge Journal of Economics* 36(5):1073–1090.
- Page, Ben  
2005 Paying for Water and the Geography of Commodities. *Transactions of the Institute of British Geographers* 30(3):293–306.
- Pearson, Thomas W.  
2013 "Life Is Not for Sale!": Confronting Free Trade and Intellectual Property in Costa Rica. *American Anthropologist* 115(1):58–71.
- Petrovich, Misha, and Gary G. Hamilton  
2006 Making Global Markets: Wal-Mart and Its Suppliers. *In* *Wal-Mart: The Face of Twenty-First Century Capitalism*. Nelson Lichtenstein, ed. Pp. 107–141. New York: New Press.

Poon, Martha

2009 From New Deal Institutions to Capital Markets: Commercial Consumer Risk Scores and the Making of Subprime Mortgage Finance. *Accounting, Organizations and Society* 34:654–674.

Poovey, Mary

1998 *A History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society*. Chicago: University of Chicago Press.

Povinelli, Elizabeth A.

2006 *Intimate Grammars: Anthropological and Psychoanalytic Accounts of Language, Gender, and Desire*. In *Language, Culture, and Society*. C. Jourdan and K. Tuite, eds. Pp. 190–206. Cambridge: Cambridge University Press.

Redfield, Peter

2013 *Life in Crisis: The Ethical Journey of Doctors without Borders*. Berkeley: University of California Press.

Riles, Annelise

2011 *Collateral Knowledge: Legal Reasoning in the Global Financial Markets*. Chicago: University of Chicago Press.

Robbins, Joel

2013 *Beyond the Suffering Subject: Toward an Anthropology of the Good*. *Journal of the Royal Anthropological Institute* 19(3):447–462.

Scott, James A.

1998 *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven, CT: Yale University Press.

Smith, Adam

1966[1759] *The Theory of Moral Sentiments*. New York: A. M. Kelley.

Taussig, Michael

1980 *The Devil and Commodity Fetishism in South America*. Chapel Hill: University of North Carolina Press.

Vargas Solis, Luis Paulino

2011 *Costa Rica: Tercera fase de la estrategia neoliberal: Contradicciones y desafios (2005–2010)*. *Rupturas* 1(2):84–107.

Verran, Helen

2010 *Number as an Inventive Frontier in Knowing and Working Australia's Water Resources*. *Anthropological Theory* 10(1–2):171–178.

von Schnitzler, Antina

2008 *Citizenship Prepaid: Water, Calculability, and Techno-Politics in South Africa*. *Journal of Southern African Studies* 34(4):899–917.

Webster, Anthony

2010 *On Intimate Grammars, with Examples from Navajo English, Navlish, and Navajo*. *Journal of Anthropological Research* 66(2):187–208.

Zaloom, Caitlin

2006 *Out of the Pits: Traders and Technology from Chicago to London*. Chicago: University of Chicago Press.

Zelizer, Viviana A.

2011 *Economic Lives: How Culture Shapes the Economy*. Princeton: Princeton University Press.

Andrea Ballester

Rice University

P.O. Box 1892

Houston, TX 77251-1892

aballes@rice.edu