MAPPING POLITICS

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Letter from the Editors

Welcome to Volume 10 of *Mapping Politics*!

We are pleased to present the work of authors from Memorial University and Dalhousie University. Topics for this issue ranged from desalination technology in Israel to the role of national institutions in structuring Brazil's biofuel sector to understanding mining regulations through a constructivist lens to the role of the dollar in the global economy. Our authors tackle their topics with nuanced, fine-tuned arguments, showcasing their scholarship as both relevant and informative. As such, *Mapping Politics* enters the new decade posing questions and exploring answers to matters of great importance; we could not have hoped for better.

With great delight and honor, we worked with the authors, volunteers, and academic faculty to present this issue of the journal. We applaud the hard work, dedication, and scholarship of our authors as well as that of the review panel members who aided the process of producing cogent, well-structured, papers. Without their constructive and critical feedback, the journal would not have made it this far. We also celebrate the legacy of past authors and faculty and encourage readers to review the insightful arguments found in previous volumes.

The first volume of *Mapping Politics,* established in 2009, was published under the leadership and guidance of Jillian Terry and volunteer reviewers. Dr. Amanda Bittner, the founding faculty advisor, provided students with the opportunity to grow as scholars of political science, and engage their work by enhancing their critical thinking skills and gaining a wider audience for their ideas. As such, the journal has, throughout these years, maintained true to its fundamental goal: helping students improve the quality of their writing.

We thank Dr. Valerie Vezina, who assisted us with the French translations of our marketing and promotional materials, and Juanita Lawrence from Memorial University's Department of Political Science, who continuously helps the editors with promoting the journal. Furthermore, we are grateful to the faculty members at Memorial University and at other universities who encouraged their students to submit their work to Mapping Politics. We also thank Dr. Russell Williams, the journal's faculty advisor, who champions helping students grow as scholars and whose sound advice assists the growth of the future political scientists of Canada and beyond.

As Editors, we have gained invaluable experience at *Mapping Politics*, and are grateful for the opportunity to examine arguments from different viewpoints. We extend our thanks to all who submitted papers and to Memorial University for the opportunity to grow as leaders and fellow scholars of our peers across Canada. Finally, to our readers, we express our appreciation for the time taken to consider this issue of *Mapping Politics* and encourage future and current students to submit their work in the volumes to come.

Best regards,

ELLA ADRIANA CHIRINOS & JASON D. WATERS

About the Journal

Mapping Politics, a student-led journal, is hosted by the Department of Political Science at Memorial University of Newfoundland in St. John's, Newfoundland & Labrador. We currently accept submissions in all areas of political science and related fields from undergraduate and master's students at universities throughout Canada.

Volume 10

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Extended Book Review On Exorbitant Privilege: The Rise And Fall Of The Dollar And The Future Of The International Monetary System

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Abstract. As the world's only international currency, the US dollar continues to solidify the United States' position in world finance and trade despite no longer contributing to the majority of industrial production as it once did. This has been referred to as the United States' exorbitant privilege and plays into US exceptionalism. Evaluating Barry Eichengreen's: *Exorbitant Privilege: The Rise and Fall of the Dollar and the future of the International Monetary System* an argument is made for a future with multiple international currencies or at least regional currencies. Such currencies would be able to counter the supremacy of the US dollar in international trade and affairs, resulting in a safer international financial system less susceptible to external critical conjunctures, which could bring world markets into a tizzy. The prospects for the internationalization of the Euro and the Renminbi are explored in keeping with Eichengreen's postulations.

Introduction

The economy of the United States has, for decades, been the world's largest. While many factors have aided this, one may be less obvious than the rest – the pervasiveness of the US dollar in world trade and finance. It could very well explain why the United States has kept its spot as the largest economy in an ever-changing and competitive economic landscape. According to Eichengreen (2011: 2-4), The United States holds an exorbitant privilege due to the universality of its US dollar. As the world's monetary lingua franca, the United States maintains a significant advantage in world trade. It can engage in trade without worrying about losses due to exchange rate fluctuations; American tourists can travel the world without fear of whether their currency is accepted or not, and most importantly, other countries have to forego real resources to obtain US dollars (Eichengreen, 2011: 2-4). This privilege is a geopolitical tool as the US does not rely on any other country's currency, while a majority of world trade is conducted using its currency. Over 50 years have passed, and the hegemony of the US dollar has had no real challengers; it remains the international reserve currency. This hegemony is one of the United States greatest tools for continued ease of access in world economies and control of the international system

To present an accurate yet succinct review and adequately place this discourse within the context of the book, a brief, non-exhaustive summary of *Exorbitant Privilege: The Rise and Fall of the Dollar and the Future of the International Monetary System* by Barry Eichengreen is presented. This summary will chronicle the rise of the US dollar and go on to highlight potential alternatives to this currency, as proposed by Eichengreen. The paper then proceeds to examine and highlight the hegemony of the US dollar in keeping with the postulations of the author. This will show how advantageous the US dollar is to the continued propagation of US influence not only in

international trade but the global sphere as a whole. Moreover, an argument will be made for the need for various reserve currencies alongside the US dollar, and their faults will be highlighted. Then, the conclusion will be made.

Barry Eichengreen is a Political Science and Economics professor at the University of California, Berkley, who has written extensively about the financial system (Yale School of Management, 2014). He is a research associate at the National Bureau of Economic Research and a Research Fellow for the Centre for Economic Policy Research (Yale School of Management, 2014). In *Exorbitant Privilege: The Rise and Fall of the Dollar and the future of the International Monetary System*, Eichengreen (2011) presents a comprehensive history of the US dollar's rise to prominence. He states that conventional knowledge on the international use of one's currency has cause and effect wrong. The use of a country's currency internationally does not contribute significantly to the military and economic power of that country, but instead, it is the great power status of the country that results in its currency becoming an international currency.

Eichengreen presents a history of the world's monetary system. Within this system, the UK's sterling remained quite competitive even after the United States had surpassed the British economic might. At the time of the sterling, other currencies ranked higher than the US dollars internationally despite the United States having the largest economy. The United States was able to assert the US dollar at the forefront of international trade and finance. This was done through policy changes to its monetary system, which stabilized the dollar. The devastation of Europe after both world wars also significantly aided the rise of the US dollar. The reconstruction efforts of the Marshall Plan had a significant role to play in the internationalization of the dollar. It fortified the United States' hegemonic status by the end of the Second World War. The period of the gold exchange standard was said to have destabilized the Bretton Woods system and led to various attempts to change the configuration of the international monetary system. This culminated in the Nixon government's delinking of the US dollar from gold and the continued prominence of the US dollar, even after the exchange rates were allowed to float. By the late 1990s, the US dollar dominated international transactions.

Eichengreen (2011) goes on to speak of currencies that could rival the US dollar soon. All these currencies (which include Europe's euro, China's renminbi, and the International Monetary Fund's Special Drawing Rights artificial currency) have issues severely hampering their ability to become formidable rivals to the hegemonic US dollar. As a result, Eichengreen (2011) sees the US dollar keeping its status as an international reserve currency due to advantages such as its superior liquidity. He also projects catastrophic outcomes were the US dollar to collapse entirely. The international monetary system would be better served by other currencies countering the US dollar as opposed to its collapse, as the US dollar is still very much a powerful currency. The resilience of the US dollar is seen during the 2007-2008 financial crisis. Despite assertions for the need to move away from the dollar and scrutiny of the US financial system, which allowed the recession to occur in the first place, the US dollar remained competitive throughout the recession. The US dollar was a haven for investors around the world, with central banks the world over stockpiling US treasury and agency securities.

The Internationalization of The US Dollar

The hegemonic power of the United States has kept the US dollar at the forefront of world finance despite issues such as the 2008 recession. Eichengreen (2011: 122) speaks of a particular logic whereby after World War II, when the United States had stationed troops in Europe and Asia, allies saw supporting the US dollar as quid pro quo. Later on, due to extensive meddling on the part of the United States, there was a diminution of the American security umbrella in these countries, and it was not as welcomed as it once was. Cox (2004: 311) speaks of the decline in US influence. He states that while the influence of the United States was welcomed in the decades following World War II, it is now regarded with great suspicion. Nonetheless, during the period when the United States was able to assert it is hard and soft power effectively and with a little suspicion, it was able to institute what Susan Strange (as cited in Cox, 2004: 312) referred to as the 'structural power' of the United States. Due to its strategic power and military capacity, it shaped both international relations and institutions to support the dollar (Eichengreen, 2011: 135).

The shaping of international relations and institutions around the dollar aided the United States in its efforts to internationalize the US dollar and gave it the salience it now has in international trade and finance. The dollar has given the United States leverage, in that it is "able to borrow from foreigners its currency, which means that any depreciation of that currency will both reduce the value of the US debt and increase the competitiveness of US exports" (Cox, 2004: 312). This flagrant example of American exceptionalism has allowed the United States to do as it pleases in the international arena. The United States' hegemony has also given it the ability to move in seditious ways. Green Revolution rice in the Philippines and elsewhere is an example of this. There the United States attempted (with varying success) to replace and change the practices of indigenous farmers by introducing rice that would result in higher yields. It required US seeds, US fertilizers, and of course, US dollars. This practice redirected capital towards the US and was a strategic counter to the spread of communism (Stone & Glover, 2016: 90-92). The American Empire has turned terms such as 'democracy' and 'liberation' into buzzwords for open markets and military occupation (Cox, 2004: 312). This structural power is somewhat synonymous with the United States' exorbitant privilege highlighted throughout Eichengreen's book. This power is so embedded in the international financial system that a collapse of the US dollar is believed to have the potential to result in catastrophe.

Alternatives to The US Dollar

Given the proposed catastrophic impacts that the collapse of the US dollar could have, an argument will now be made for an international monetary system that includes the US dollar but sees the prominence of other currencies as well. While the US dollar itself did not lose its status as the leading international currency even after the recession, it does not mean that a single international currency is best for our current global configuration. As such, it is felt that there is a

need for multiple relevant, which would not only lessen potential crises but also affect the United States' hegemonic potential. The lessons from the Asian financial crisis show that a system less reliant on the United States can insulate itself from the ravages of crises. An international currency to go along which such a system, already embedded in a highly regulated financial environment, could change the current financial situation — moving away from a system that is very volatile and US-dominated.

The United States, during the East Asian crisis of 1997 to 1998, rejected a Japanese initiative that attempted to create a regional solution to the crisis (Cox, 2004: 313). The US did this to allow for both European and American firms to buy out cheap Asian assets, totally disregarding the dire conditions of the populations of these countries due to this financial disaster (Cox, 2004: 313). Not only did this reduce confidence in the hegemonic power of the United States, but it inspired the creation of a regional economy in Asia fitted with protections against reliance on US financial dominance (Cox, 2004: 313). This has been done through a diversification of capital flows and trade, which now includes heavy flows towards other Asian countries and in 2000, the creation of a virtual Asian monetary fund aimed at guarding these countries against a plight akin to the crisis of 1997-1998 (Cox, 2004: 313). The only thing missing has been a regional currency. The structural issues meant to insulate Asian countries and by extension, their currencies from critical financial shocks may actually be the factor reducing the mass appeal of the renminbi as a regional currency there. The stockpiling of US dollar reserves to insulate the economy has also been a factor.

Eichengreen makes little mention of recovery in Asia during the 2008 recession. However, as a result of these measures, many Asian markets were immune from the devastating effects of the recession on the rest of the world. While Asian countries, particularly China, remained quite reliant on US dollar assets (Eichengreen, 2011: 135), what they have been able to do is institute systems that have reduced the impact of the United States on their fiscal policies. Since US hegemony has not allowed other countries to be as immune from the influence of the United States on their fiscal policies, there is a need for other reserve currencies to counter the influence of the United States economically. These currencies would not only be a way of reducing potential crises due to a reduced reliance on one currency but also a way to counter the hegemony of the United States and, by extension, its exorbitant privilege.

Helleiner (2011: 76) saw the pre-crisis lowering of regulations as a US-driven process resulting from its fundamental importance in world finance. This allowed the US to veto international initiatives they did not like and implement unilateral deregulatory moves, which had no significant impact in averting the 2007-2008 Global Financial Crisis (and arguably exacerbated it) (Helleiner, 2011: 76). It can be argued that were there other international reserve currencies, the United States, despite its superpower status, would not have had the wide-scale impact that it did on the world financial system. A crisis that started in the United States would not have spread to virtually all corners of the world. Due to the high profile status of the US dollar in international trade and finance, during times of crisis, central banks felt their only hope would be to stockpile dollars to pay off short term foreign liabilities. This stockpiling of US dollars invariably benefitted

the dollar during the crisis (Eichengreen, 2011: 114). Other reserve currencies would limit this advantage, forcing the US to be more fiscally responsible. There would be a lessening of foreign capital denominated in US dollars, helping to fund current accounts and fiscal deficits in the United States (Helleiner, 2011: 77).

A move from the status quo, which has maintained the US dollar as the only reserve currency, is necessary. The post-crisis environment has made such movements away from the status quo more likely as many countries have moved away from principles of synchronization and homogenization in their fiscal policies for more regulatory competition and difference (Nesvetailova, 2014: 562). History and theory both point to the possibility of a 'tipping point effect,' which might delay the potential of a currency such as the renminbi or the euro becoming international currencies, but when it does, it could happen quite rapidly (Agnès, 2015: 11). There has also been more serious recognition of seemingly minute factors such as complexity, diversity and fragility of global finance (Nesvetailova, 2014: 563). This is fundamental as there is no reason why the US dollar "the currency of an economy that no longer accounts for a majority of the worlds industrial production, should be used to invoice and settle a majority of the worlds international transactions" (Eichengreen, 2011: 121), despite the structural power of the United States.

An international system with multiple currencies is not impossible, and the supremacy of one currency is more of an anomaly than anything else. History points to various international currencies. At one point, the French Franc, British Sterling, and German Mark all played an active part in world finance (Eichengreen, 2011: 14). While the United States had prohibited its banks from having branches internationally and, in some cases even along state lines (Eichengreen, 2011: 17). France, Germany and the UK through foreign branches of their banks, were able to concurrently have international currencies, although the UK comparatively had the most extensive empire (Eichengreen, 2011: 17). This was dismantled not only through a weakening of these countries but also the United States' emergence as the only superpower and a very successful internationalization of the dollar. It is important to note that France and the UK were colonial powers and were able to distort the economies of the colonized forcing them to produce commodities, thus advancing the status of their economies and their currency (Helleiner, 2016: 81). The post-World War II recovery of Western Europe and Japan, the contemporary rise of China and the emergence of Brazil and India have reduced the economic domination of the United States but have not yet destabilized the US dollar's current status in world finance and trade (Eichengreen, 2011: 121).

The Chinese renminbi is poised for international status if it can remedy its inconvertibility issues and develop liquid securities markets (Eichengreen, 2011: 144-145). A lot of structural measures would need to be put in place for such a currency to garner international status. Eichengreen (2011: 145) felt that China's inability to reconcile financial stability with full freedom to buy and sell domestic assets would significantly diminish the likelihood of the renminbi becoming an international currency by 2020, as set out by the China Banking Regulatory Commission in 2008. Nonetheless, since 2009 Chinese authorities have gradually removed

restrictions to the use of the renminbi in current account transactions (He, 2014: 3). A pilot scheme to use the currency in trade settlement began in July 2009 (He, 2014: 4). In 2011 administrative rules were drafted for Chinese enterprises to conduct overseas direct investment in renminbi and for foreign firms to conduct foreign direct investment in China in renminbi (He, 2014: 4-5). China has also begun following the path of the United States, using its economic might to create and potentially manipulate markets abroad. China has had an increasing role in resource extraction in Africa, along with other developing nations such as Brazil and India (Power, et al., 2016: 12).

This increased role of the renminbi has resulted in it added to a basket of currencies accepted as legal tender in Zimbabwe after an episode of hyperinflation, which resulted in the collapse of the Zimbabwean dollar (Mukeredzi, 2014). The Bank of Ghana has begun using the renminbi as a settlement and reserve currency (Mukeredzi, 2014). There have been talks of adopting the renminbi as a reserve currency in more African countries (Tham, 2018). The spokesperson for the Macroeconomic and Financial Management Institute of Eastern and Southern Africa (MEFMI), Gladys Siwela-Jadagu (as cited in Tham, 2018) made her case for the adoption of the renminbi as a reserve currency by African central banks, saying that "most countries in the MEFMI region have loans or grants from China and it would only make economic sense to repay in renminbi." Visibly the renminbi has a long way to go; its issues with liquidity and convertibility will invariably affect its international position. To increase the adoption of the currency, it could first focus on becoming a regional reserve currency within Asia. This would be aided by the fact that China already permits neighbors such as Mongolia and Hong Kong (to name a few) to use the renminbi in cross border trade, albeit through select trustworthy companies allowed to settle transactions in renminbi (Eichengreen, 2011: 144). If Eichengreen's (2011: 6) postulations that a country's great power status and the fact that it is large, rich and growing results in the mass appeal of its currency, then the renminbi should in the coming decades garner more importance internationally.

The euro is currently the closest rival to the US dollar. While it ticks most of the boxes for a first-class international currency, it is plagued by the fact that the Eurozone has no single government (Eichengreen, 2011: 130). The lack of a single government controlling the institutions of the currency is believed to be the sole reason preventing the euro from matching the US dollar's international significance (Eichengreen, 2011: 130). When financial issues arise, solutions require cooperation from member countries (Eichengreen, 2011: 130-131), which can make the process a cumbersome and lengthy one. When budgetary issues requiring international assistance arises in one country, Eurozone members must negotiate burden-sharing agreements, which must then be ratified domestically (Eichengreen, 2011: 131). These are the issues that arise when a supranational organization creates a currency.

The Greek crisis exemplifies the struggles the Euro faces. When the austerity measures advanced by the Greek government riled the Greek public, there was no European authority to lend money to the Greek government. This task was left to the national governments of the EU states (Eichengreen, 2011: 131). Germany refused to participate in a bailout, and after much back and forth, national leaders agreed to a $1 trillion fund to guaranty national debts (Eichengreen,

2011: 132). This lack of fiscal authority on the part of the European Union is said to be what has hindered it from developing a financial market that could rival the US treasury bills market as the "key fulcrum of global financial markets" (Helleiner, 2011: 81). As a result, Eichengreen (2011: 132) believes that there is a need for a proper emergency financing mechanism, an institution that would be run by technocrats, which would pool together resources to loan money to countries with strong policies experiencing financial issues. This is especially important, as some countries in the EU use the euro as a common currency, yet have diverging fiscal policies (Helleiner, 2011: 81). Other countries are members of the EU yet do not use the common currency, and this diversity further complicates the complex. This did not allow European regulators to rein in European banks and restrict them from creating structured investment vehicles (Helleiner, 2011: 72). Nonetheless, despite a lack of central political authority, the euro area and Asian economic regionalism are sustained and propelled forward by experiences of US unilateralism (Cox, 2004: 314). Both of these regional integration projects perfectly fit into a potentially new post-crisis order of cooperative decentralization with "greater national and regional autonomy within the context of still-integrated global markets" (Nesvetailova, 2014: 563).

Reflection

The US dollar, despite all the postulations above, remains the currency which commands the most clout in the international system. This has not only given the US a primordial position in the world economy but has enabled it to extend its power far beyond its territory. An increase in the number of international currencies would not only force the United States to remedy its fiscal issues but also present a check and balance to the hegemony of the United States. Could this increase the number of countries with a hegemonic status? Especially since the internationalization of the renminbi and euro can be seen to take on neocolonial forms. This is a question that will be clarified when more currencies begin to attain prominence vis-à-vis the US dollar. History though points to the vast empires and colonial might of the countries whose currency commanded international status. So much so, that the Pound sterling was able to temporarily regain its lead as an international currency in the 1930s due to practice by commonwealth members of holding their reserves in Britain, more as a sign of political solidarity than anything else (Eichengreen, 2011: 37). The colonies, on the other hand, did not have a choice in this regard (Eichengreen, 2011: 37).

Whether an increase in international currencies could result in more actors engaging in neocolonial relationships to extend the reach of their currency is beyond the scope of this paper and is something to consider. The reality of more currencies attaining international status in the near future is hard to foresee, given the current advantage of the US dollar and the structural hurdles other currencies currently face. If the rise of the euro and the renminbi have had issues, then the hope of other 'alternative currencies' from the developing world gaining international status too could be stifled. Especially since both the Brazilian real and the Indian rupee have similar issues of inconvertibility as the renminbi (Eichengreen, 2011: 151). Both countries also do not have investment portfolios as extensive as China. China has also been cautious in the

internationalization of the renminbi. This has been due to 70% - 80% of its over 1.5 trillion reserves being denominated in US dollars (pre-crisis) (Helleiner, 2011: 79). While this has protected China from volatile capital flow, reliance on the IMF and allowed it to undervalue its currency, an undermined dollar would push down the value of China's US dollar assets (Eichengreen, 2011: 159). It would inflict financial damage on China and given the international reach of the US dollar, and this would cause markets to go in a frenzy (Eichengreen, 2011: 159).

Conclusion

Eichengreen presents a compelling narrative. It is believed though that his discourse revolved too much around the infallibility of the dollar, and the devastation that could occur were the dollar to lose its influence as an international currency. This sort of doom and gloom discourse prompted me to attach more importance to the dollar than I should have. Nonetheless, it allowed me to present a discourse where the balance of power was not drastically altered but shared amongst various actors for the propagation of the international financial system and a reduction of the hegemonic power of the United States. This conception of multiple international/reserve currencies was seen to be severely limited by several issues highlighted throughout the paper's analysis. Issues plague the US dollar as well, but its universal role seemingly understates these issues. The 2007-2008 financial crisis bought these issues to the fore. Realizing that the US dollar itself is flawed may be the conjuncture needed to realize that more than one international currency might do the global financial system good. Despite the previous critique of Eichengreen, he presented a concise narrative on a very complex issue.

Since the US dollar is so entangled in world finance, its influence seems unending. If history presents a prescription for the future, then multiple currencies will one day enjoy international status. As of now, despite a belief that multiple international currencies or more feasibly, regional currencies could counter US hegemony and insulate countries from the spread of crisis, the odds of the US dollar losing its influence internationally in the near future seems grim. Nevertheless, Helleiner, Eichengreen, and Nesvetailova see a post-crisis movement away from harmonization of financial policies around the world. Countries attempting to have their currencies enjoy the mass appeal that the US dollar has may have to institute policies which could alter the stability of their currency. This would especially be the case of the renminbi, where its highly structured nature would have to be dismantled if Eichengreen's postulations that such changes need to be done are correct.

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From Sugarcane To Ethanol: The Historical Process That Transformed Brazil Into A Biofuel Superpower

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Abstract. Brazil is a biofuel superpower and a pioneer in the large-scale production and use of sugarcane ethanol. The country has plans to replace 10 percent of the world's fossil fuels by 2025 with biofuels (Novo et al., 2010). Brazil is also part of a multilateral agreement signed at the Paris Climate Conference (COP-21) in 2015 and has committed to reducing its greenhouse gas (GHG) emissions by 43% until 2030 compared to 2005 levels (Brazilian Government, 2015). The proposal for GHG reductions is mostly based on the increase of biofuels in the Brazilian energy mix. With historical institutionalism as its theoretical framework, this paper looks at how Brazil grew from a sugar exporter into a global ethanol powerhouse. This research's main question looks at the key historical processes and national actors behind ethanol development in Brazil. Analyzing how sugarcane-based fuels evolved is central to understand how past energy transformations have occurred and will offer insights into future energy transformations concerning Brazil's increasing reliance on ethanol.

Introduction

Brazil is a biofuel superpower and a pioneer in the production and use of ethanol on a large scale. Brazil has developed know-how and technological expertise in biofuels that few countries in the world have (Goldemberg, 2009). The country is a major producer, consumer and exporter of sugarcane ethanol (or 'alcohol') and has plans to replace 10 percent of the world's fossil fuels by 2025 with biofuels (Novo et al., 2010). The contemporary development of ethanol in Brazil is connected to a historical context in which sugarcane was the most important export commodity during the colonization period. This paper asks: what are the key historical institutional processes behind ethanol development in Brazil? This paper argues that national institutions have structured the biofuel sector in Brazil through systematic interventions in the sugarcane sector since the nineteenth century. These interventions include policies to provide credit, subsidies for the construction of mills and new refineries, mandatory mixing targets in gasoline, investments in research, and creation of national demand for ethanol. Analyzing this historical process is critical to understand how sugarcane-based fuels evolved and continue to be developed in Brazil.

Biofuel is not a new phenomenon in Brazil. The country is the second-largest bioethanol producer after the United States, and they collectively account for almost 90% of global production (Marin, 2016: 75). What is new is the increasing worldwide interest in renewable energy to replace fossil fuels and reduce greenhouse gas emissions (Demirbas, 2009; Kopetz, 2013). The recent global interest in biofuels has a direct impact on sugarcane production and consumption in Brazil. Despite the recent trend, the biofuel production in Brazil needs to be understood with a historical perspective (Novo et al., 2010). This study uses historical institutionalism as its theoretical framework to analyze how governmental interventions shaped processes and political outcomes that determined the historical trajectory of the biofuel industry in Brazil.

Theoretical Framework

Some authors define institutions simply as rules that frame or condition action (Hall and Taylor, 1996; North, 1990; Ostrom, 1990). This paper understands institutions as a "regularized

pattern of interaction" that is accepted by the actors involved who interact under formal or informal rules sanctioned and backed by that pattern (O'Donnell, 1996). For Thelen and Steinmo, it is necessary to look at the institutional landscape to answers questions regarding policy outcomes across time and space (1992: 5). In the case of Brazil, with almost 500 years of sugarcane history, looking into the past becomes imperative to analyze its transformation into ethanol. Furthermore, institutions exist in a context; they influence and are influenced by it (Steinmo, 1989). According to a report from the Inter-American Development Bank (IADB), "institutions help explain why reforms endure in some countries, why some countries can easily change policies that are not working well or why some can adjust better when circumstances demand it" (2005: V). The enforcing institutions of a society affect its economic performance and become the forum for interest-led politics and policymaking (Schamis, 1999: 267).

Moreover, institutions define who can participate in a specific political arena, and shape the actors by modifying their political strategies, and can influence what these actors' preferences are (Steinmo, 2001). The central point is that institutions set the context in which actors make policy choices (Hall and Taylor, 1996). Nonetheless, focusing the study on formal institutions does not imply denying the influence of other structural variables that can directly influence social policies and political outcomes. History, beliefs, and attitudes of citizens, culture, and leadership also have influence (ibid.: V).

In this paper, historical institutionalism is used as the theoretical framework. According to this view, human beings are 'norm abiding rule-followers' that will behave depending on the individual, on the institutional context, and the rule (Steinmo, 2008: 163). For historical institutionalists, institutions bestow power or authority upon some actors, and in the same way, they reduce the power of others. It focuses on empirical questions with a historical orientation and is mainly concerned with how institutions structure and shape political behavior and outcomes over time (ibid: 150). This framework helps to analyze choices and outcomes: why were they made, which actors influenced them and what were the consequences. Institutions are not neutral battlegrounds; they are essential because they are the center of political activity and structure this activity over time. As Steinmo argues, the institutional context is so crucial that interests and values do not have any substantive meaning if abstracted from it (1989: 502).

Historical institutionalism is a useful tool to develop a better understanding of how processes affected political outcomes in the ethanol industry in Brazil throughout time. According to Pierson and Skocpol, historical institutionalists ask "big, substantive questions" using macro contexts to analyze the combined effects of institutions in a period, rather than looking one institution or process each time (2002: 695-696). For Peter Hall, historical institutionalists "seek to locate institutions in a causal chain that accommodates a role for other factors, notably socioeconomic development and the diffusion of ideas" (1996: 942). Other authors have used historical institutionalism to look at the biofuels industry in the world (see Daugbjerg and Swinbank, 2015; Yang, 2015). It is not a simple look into the past of sugarcane and the transition to biofuel, but rather how this process developed over time through the influence of different national institutions. The main advantages are the possibility to look at processes continuity over time and space and see how policy outcomes develop in different institutional landscapes. Social and economic developments do not happen overnight; instead, they take time and a series of events in a determined context to exist. Thus, it is important to look at the combined effects of distinct institutions to analyze how institutions have structured the biofuel industry in Brazil.

Importance of Biofuel

Biofuel is any renewable fuel that is obtained through a biological process, such as

agriculture or animal waste, rather than a geological process, and the refined products are combusted for energy (Guo et al., 2015). Some projections indicate that up to one-fifth of the world's agricultural land could be used in biofuels production by 2050 (White and Dasgupta, 2010: 593). Currently, less than two percent of the world's arable land is dedicated to biofuels, and this is expected to increase to four percent by 2030 and 20 percent by 2050 (ibid.: 594). Other projections show that bioenergy will provide almost one-third of the world's demand for energy by 2050 (Guo et al., 2015). In addition, Brazil is part of a multilateral agreement signed at the Paris Climate Conference in 2015 and has committed to reducing its greenhouse gas (GHG) emissions by 43% by 2030 compared to 2005 levels (Brazilian Government, 2015). The proposal for GHG reductions includes an increase of biofuels in the Brazilian energy mix to 18% by 2030. The strength of the ethanol industry in Brazil is a result of a long and complex trajectory in which government support for biofuel production was decisive for it to succeed.

During the 2000s, several studies were published with a focus on the positive impacts of biofuel production (Kojima and Johnson 2005; La Rovere et al., 2014; Smeets et al., 2005). These studies focused on production costs, technological requirements, and land availability and indicated biofuels as a possible sustainable solution to reduce CO2 emissions. At the same time, biofuels were labeled as a "silver bullet" with the potential to supplant petroleum and support rural development (Neville, 2015). When defending Brazilian investment in biofuels in Mozambique, former Brazilian President Luiz Inácio Lula da Silva called bioethanol a "clean source of energy" (Power et al., 2016: 14). Nevertheless, this narrative has been challenged by scholars (Neville, 2015: 25). The fast expansion of biofuels has a social, environmental, economic, and political impact on agrarian relations and despite an institutional discourse framing biofuel as positive for all involved (Borras et al., 2010: 582). The increasing demand for biofuels, Brazil's push for more production, and the concerns surrounding its use as an alternative to fossil fuels make its analysis even more important

The Rise of Biofuels in Brazil

In 1979, José Goldemberg published a pioneering article about the possibilities of supplying the energy needs of the world and particularly of the developing countries based on hydropower and biofuel (1979: 733). It was a follow-up to an article he co-authored in the previous year on the energy requirements to produce biofuel from three different crops in Brazil (Da Silva et al., 1978). The research showed that for Brazil, it was both possible and profitable to invest in ethanol as a renewable fuel from sugarcane (ibid.). At the time, the world was passing through a dramatic oil crisis, and the notion that a plant could help solve the crisis was well-received (Nastari, 1983). In the same context, as we will see later in this paper, the Brazilian government was implementing a program to increase the production and consumption of ethanol (ibid.). A few years later, Barzelay and Pearson used the concept of social profitability to criticize the efficiency of alcohol production in Brazil (1982: 144). According to them, at that time, alcohol was a high-cost substitute for petroleum, and this figure would only change if the price of oil had a significant increase (ibid.). Furthermore, the price had a significant increase in the 2000s.

The biofuel resurgence during the 2000s was an answer to high oil prices and an attempt to reduce dependence on Middle Eastern oil embedded with a discourse of energy security and sustainability (Ragauskas et al., 2006). As concerns over climate change, oil prices, and energy security became a topic of intense interest, biofuels were seen as a possible clean solution to energy concerns and to develop underused lands (Neville, 2015: 25-26). It also gained momentum with mandatory international targets for the use of renewable energy and reduction of carbon dioxide emission (Borras et al., 2010). This increase means that more land is needed to produce more fuel

crops to meet this new demand. The biofuel industry in the world is directly linked to the "ethanol superpower Brazil" (ibid.: 578). Moreover, to understand how institutions influence the biofuel industry in Brazil across time, it is paramount to analyze the historical institutional context in which Brazil developed its ethanol industry and became a leading country in biofuels.

From Sugarcane to Ethanol

In 1532, long before the existence of mass biofuel production, sugarcane was brought to Brazil when the country was a colony of Portugal. At that time, it had almost the same value as gold and was the most important product of the Brazilian economy (Naritomi et al., 2012). Sugarcane is so crucial to Brazilian history that some authors argue that it not only provided the economic incentive to make Portugal heavily invest in the colony, but it also influenced the ethnic composition of the country seen today, as slaves were brutally taken from Africa to work in the sugarcane plantations and mills (Nastari, 1983). The value of sugar exports during the colonial period was twice the value of all gold and diamonds mined in Brazil during the same period (ibid: 2). In the nineteenth century, due to a decrease in the price of sugar and aggressive competition from other countries, coffee became the number one product on the Brazilian export balance (ibid.).

The development and massive investments Portuguese institutions made in the sugar industry in Brazil is an early indication that the biofuel industry in Brazil could not be what it is today without the colonial support of sugar. In 1875, the Brazilian government – no longer a colony from Portugal – established a decree to provide loans with low rates for the construction of modern central sugar factories (Meira, 2009). In a few years, Brazil built several central sugar factories using imported machinery. These new factories started to produce large quantities of residual molasses that were, in turn, used in the production of ethanol. Even though coffee became the main product in Brazil's export list in the nineteenth century onwards, Brazilian production of sugar continued to grow at the beginning of the twentieth century as the old mills were modernized (Nastari, 1983). According to Nastari, "the wide availability of ethanol [in the world] made its use as [a] transportation fuel as old as the automobile" (1983: 4). Later developments of sugarcane been used as a biofuel would not have been possible if Brazil did not have an agricultural complex focused on sugar. The colonial investments and a series of institutional interventions in sugar led to a future necessity to find other uses for surplus production, which led to the early adoption of ethanol and biodiesel.

The growth in the production of sugar was not matched by internal demand. At the same time, the world market price of sugar had a decline despite an increase in worldwide sugar consumption (Herold, 2009). According to Herold, the decrease in the price of sugar affected the Brazilian producers, but the loss of traditional export markets (e.g., the North American market to Cuba and Europe to European beet producers) was another critical factor that led to a crisis in the sector at the beginning of the twentieth century (ibid.). This crisis led to institutional interventions by the Brazilian state – a republican government formed after the end of the empire. In 1931, the Brazilian government published a decree (a mandate known as Decree 19.717), which established that all imported gasoline used in Brazil would have to be mixed with 5% of ethanol. Two years later, Brazilian president Getúlio Vargas created the Institute of Sugar and Alcohol (IAA, Instituto do Açúcar e do Álcool in Portuguese), and gave this newly created agency a monopoly over international sugar trading from Brazil (Szmrecsányi and Moreira, 1991).

The creation of an institutional actor to overview the sugar market and the ethanol production in Brazil had the objective to set prices, regulate, and act as a buyer of last resort after the great depression. The main goal was to achieve a balance between internal production and consumption of sugar and ethanol. According to IAA's first president, Leonardo Truda, "the

defense of sugar [...] is seen to be indissolubly linked to the large-scale production of alcohol as fuel (as) the stable and definitive solution to the sugar problem in Brazil" (Nastari, 1983: 78). His speech is a clear indication of an institutional agenda to shape and influence the biofuel industry in Brazil. During the time of the existence of the IAA, the production of sugar in Brazil increased from 1 million metric tons in 1933, reaching almost 8.5 million metric tons in 1981 (ibid.: 79-81).

In 1938, another decree from the Brazilian government established that 5% of ethanol would have to be mixed with the gasoline produced in the country. During the Second World War, the IAA provided financial incentives and issued administrative acts to develop the sugarcane production and increased the percentage of ethanol mixed with the gasoline to 42%, leading to "an impressive expansion of sugarcane production" in the Southeast of Brazil (Novo et al., 2010: 771-772). After the war, the mandatory percentage of ethanol went down, reaching 2.9% in the next decades. It is important to note that some authors connect the centralized control of markets given to the IAA as a broader reflection of the political values of Getúlio Vargas government, as Brazil was living under a dictatorship after only a few decades of democratic government (Ackrill and Kay, 2014: 30).

The government was not the only institutional actor involved in the development and structuring of the sugar industry in Brazil. In 1959, farmers, mills, and refiners of São Paulo, Brazil's largest state, created the Cooperative of Sugar, Alcohol, and Sugarcane Producers, to unite, support, and finance the sector (Hira and Guilherme de Oliveira, 2009). The international context also influenced the industry. When the US closed its markets to Cuban sugar in the wake of the Cuban Revolution in 1960, the IAA began to promote the expansion of sugar production to take advantage of the new market opportunities for exports. Sugar exports increased by 250% from 1965 to 1974 (ibid.). The institutional decision to promote sugar amid low oil prices did not help ethanol at that time. It was only after the price of oil imports skyrocketed that sugarcane ethanol once again was seen as a solution to a much broader problem.

Creation of ProÁlcool

After a few decades of decline, sugarcane ethanol regained momentum in the 1970s during the oil crisis. At that time, the cost of oil imports in Brazil increased from $606 million in 1973 to $2.6 billion in 1974 (Ackrill and Kay, 2014). Brazil was living a dictatorship, and the military government was having trouble investing in its 1974-1978 National Development Plan as the oil import expenditure was almost half the total exports in 1973 (ibid.: 32). In the meanwhile, the price of sugar also fell in the international market, creating an opportunity for biofuels. Producers of sugar asked for financial assistance, and the military government decided for a broader approach.

The Brazilian government intervened by creating the National Program of Alcohol (ProÁlcool, in Portuguese) to promote the use of sugarcane as a biofuel (Borras et al., 2010). ProÁlcool was created by the military government in 1975 to develop the production and consumption of ethanol further and reduce Brazil's dependence on imported oil, which amounted to almost 85% of all oil used in the country in that period (Ackrill and Kay, 2014). Sugarcane ethanol was not the only biofuel the Brazilian government had in mind. The government also established the National Biodiesel Program (ProÓleo, in Portuguese). Both national programs were a response to the Organization of the Petroleum Exporting Countries oil embargo of 1973 (De Oliveira and Coelho, 2017: 170). The government also created the National Alcohol Commission (CAN) that started controlling prices and setting parity between ethanol and raw sugar; it was a way to orient producers to shift from sugar to ethanol. The result was immediate. Ethanol production increased from 580 million liters in 1975 to 3.676 billion liters in 1979, surpassing the target established for that year by 15 percent (Goldemberg and Nogueira, 2014).

These new institutional policies promoted the use of ethanol for vehicles specially adapted for it. The program objective was to make sure that ethanol was going to be adopted by the automotive industry, as it involved price controls, compulsory supply at gas stations, and a range of subsidies. The government made agreements with manufacturers to develop a market for vehicles made or modified in Brazil to run only on alcohol. Institutional policies were subsidizing the production of sugarcane and, at the same time, creating a market for the ethanol that was produced in Brazil. According to Sorda et al., the commercialization of biofuels proved successful, and 96% of automobiles sold in Brazil in 1985 were ethanol-powered (2010). The creation of ProÁlcool, ProÓleo, IAA, and CNA connects to our argument that national institutions shaped the biofuel sector by creating policies that shaped the outcome of the sector.

According to data from the Ministry of Agriculture, Livestock, and Supply (abbreviated MAPA, in English), Figure 1 shows that in the years that followed the creation of the IAA, Brazil saw a rapid increase in the production of sugarcane, sugar, and ethanol. The institutional impact of the ProÁlcool was such that "by 1986 some 12 billion liters of ethanol was being produced and ethanol-run cars represented some 90 percent of new car sales" (Wilkison and Herrera, 2010: 750). However, the decline in oil prices in the late 1980s combined with the removal of government subsidies after the end of the dictatorship and the rising cost of the policies slowed the ethanol in Brazil (Moreira et al., 2005: 28–30). Goldemberg and Nogueira make a connection between the absence of specific policies and government support to ethanol production as a consequence of the sporadic supply shortages that Brazil endured in 1989 when it had to import ethanol from South Africa (2014).

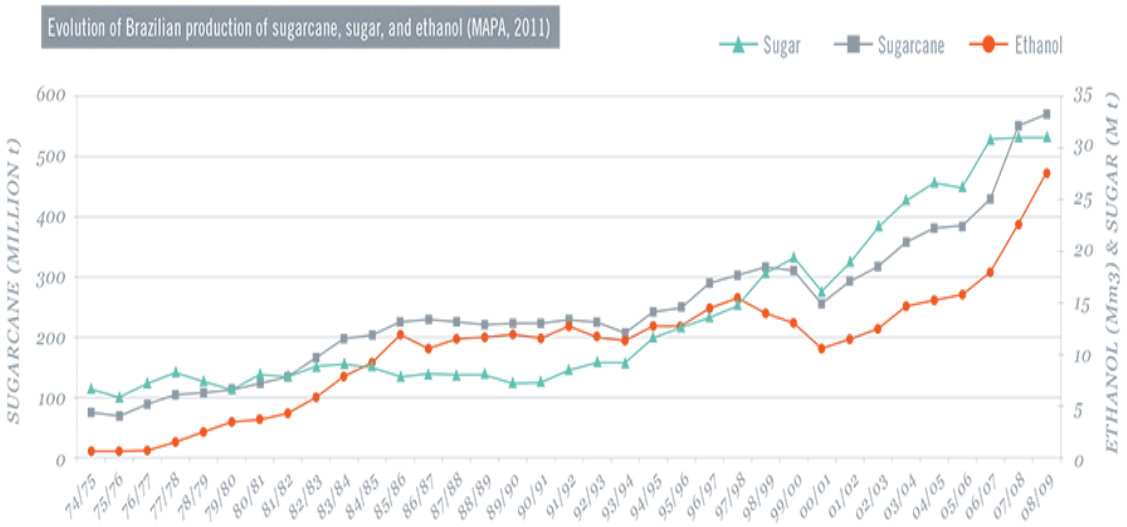

Figure 1 – Evolution of Brazilian production of sugarcane, sugar, and ethanol 1974-2009 (source: Goldemberg and Nogueira, 2014)

Brazil was experiencing a moment of transition from the military dictatorship towards democracy in the mid-1980s. The country had trouble paying its external debt, and the oil continued to dominate imports. In 1983, oil represented 57 percent of all imports (Ackrill and Kay, 2014: 35). Having accounted for 85 percent of new car sales in 1985, sales of ethanol-powered vehicles declined to only 11.4 percent in 1990, showing that the Brazilian experiment with ethanol was coming to an end (Goldemberg and Nogueira, 2014). Ethanol was then relegated and in 1990, in an institutional context of drastic state reduction after the end of the military dictatorship, the IAA was extinguished, and sugar production stopped receiving subsidies (Moreira et al., 2005). Almost 60 years of IAA helped to shape the sugar and ethanol industry. The development of the

sector was not without criticism. Some sugar producers believe that IAA was the reason for Brazilian sugar to be sold at a lower price in the internal market, reducing their profit (Netto, 2007). It was the end of one of the most prolonged state interventions in the Brazilian economy.

Reemergence of Biofuels

Almost thirty years after ProÁlcool was created, Brazil reemerged as a global leader in the biofuel sector in the early 2000s (Dauvergne and Neville, 2010: 635-636). After a sharp decline in the 1990s, ethanol production started to grow again in 2002-2003 (Figure 1). As it happened in the past, the institutional influence was responsible for the reemergence of bioethanol. In 2003, the Brazilian government increased the mandatory percentage of ethanol to be added to gasoline to 25% (Sorda et al., 2010). At the same time, the government pushed for the introduction of Flex-Fuel Vehicles (FFVs), capable of running on any mix of (blended) petrol and ethanol. Brazil had a distribution infrastructure capable of supplying the demand for gasoline and ethanol at petrol stations, and drivers were now free to decide which fuel they would fill their cars with, most of the time, based on the price (Ackrill and Kay, 2014: 38). Consumers were fast in adopting FFVs, and in 2008 almost 92% of all cars sold in Brazil were bi-fuel (can use gasoline, ethanol, or both).

Despite its reemergence, the industry is still heavily dependent on institutional interventions from the Brazilian government to thrive. In the late 2000s, the expansion of Brazilian ethanol agroindustry stalled after a government decision to artificially lower the price of gasoline, making ethanol much less competitive in comparison (Goldemberg and Nogueira, 2014). Nonetheless, sugarcane and ethanol are one of the largest industries in Brazil. After soybean and corn, sugarcane is the third most important crop in Brazil in terms of land use (Marin, 2016: 75). Over a million jobs in Brazil depend on ethanol and sugar production, and biofuel manufacture produces around 1,350 gigawatt-hours per year of electricity (Moreira et al., 2005). The outcomes seen after policy changes and state interventions demonstrate that government institutions play an important role in structuring the biofuel industry in Brazil since colonial times. Institutional interventions in the sugarcane sector and later in the ethanol industry shaped the outcomes that resulted in Brazil been a biofuel superpower.

Conclusion

Brazil is a leading producer and consumer of biofuels in the world. The country's relationship with sugarcane is almost 500 years old, and it has defined the first centuries of Portugal colonization. This paper has demonstrated that the historical background as a worldwide leader in sugar production for almost two centuries was the foundation that led Brazil to become a leading power in biofuels. Brazilian government institutions in the middle of the nineteenth century and at the beginning of the twentieth century created policies to push forward the consumption of sugar and later ethanol. In the case of ethanol, the Brazilian government incurred financial losses to support an industry that was not capable of dealing with excess in production and the international price decrease. The capability and excess in production also led some players in the industry to use the residue of sugar production towards biofuel. A few decades later, under the dictatorship, Brazil developed the first National Program to promote biofuels, which highly regulated the consumption and production of sugarcane ethanol. The military government also created a similar program to promote biodiesel, although not as successful.

This work has asked how institutions have structured and shaped the current biofuels industry in Brazil since colonial times. The historical development analysis presented in this paper shows that formal institutions played a fundamental role in structuring the biofuel industry in

Brazil. The early institutional investment in sugar led to a future necessity to find other uses for surplus production, which led to early adoption and investment in ethanol and biodiesel. This paper has argued that this was only possible due to systematic institutional interventions in the sugarcane sector since the nineteenth century.

In each step of the Brazilian ethanol history, state institutional interventions can be identified as a key factor that contributed to the transformation of massive sugarcane plantations into a fully-fledged ethanol industry. It is a direct result of centuries of institutional policies that promoted sugarcane, structured a biofuel industry, and ultimately shaped the sector. There is a clear correlation between institutional policies and the sugarcane/biofuel industry in Brazil. The historical analysis presented in this paper shows that policies created to support sugarcane had a direct consequence in the development of biofuels in Brazil decades later. As Brazil keeps expanding its biofuel production, the role institutions play lie at the center of the debate.

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International Mining Regulations Through a Constructivist Paradigm

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Abstract. The creation of the Global Mining Initiative saw the CEOs of the world's largest mining companies come together from 1998-2002 to approach the social and environmental concerns voiced by many actors regarding the global impact of the mining industry (Tost et al., 2017). This paper shows that the creation and continued use of the Global Mining Initiative can be explained using a constructivist lens. By looking at the history of international mining regulations, constructivist explanations showcase how norms and cultures overtime encouraged the formation of institutions and relationships between stakeholders. The role of ideas, the impact of global norms on mining actors as well as mining actors attempts to influence global norms are explored. This allows for the showcasing of how the interaction between both actors and structures is not a one-way relationship, but one that changes given the interaction of all participants when looked at through a constructivist lens.

Introduction

Mining as a sector is intrinsically environmentally impactful, whether occurring on a small scale in a developed country, or on a large scale in a country with few mining regulations. The creation of the Global Mining Initiative saw the CEOs of the world's largest mining companies come together from 1998-2002 to approach the social and environmental concerns voiced by many actors about the global impact of the mining industry (Tost et al., 2017). The initiative sought to use scientific knowledge regarding sustainable mining practices, transmit information regarding these practices, and instill these norms so that they become acceptable corporate behavior in the mining sector (Dashwood, 2005: 978). The mining industries' participation and voluntary adoption of international conventions and norms speak to the need to look beyond a realist paradigm as has been done in the past with many other global governance networks such as those by Rhodes (1997), Reinecke (2000) and Waddell (2003). Thus, by taking a constructivist perspective, this paper will address "how and why [change] occurs, clearly specifying the actors and mechanisms bringing about change, the scope conditions under which they operate and how they vary across countries (Checkel, 1998)." As such, this paper argues that the creation and continued use of the Global Mining Initiative (GMI) can be explained using a constructivist lens.

Analyzing the worldview surrounding mining initiatives is important because any future attempts on the part of both state and non-state actors to influence global mining regulations create conditions in which they need to know how to work towards this goal for the best outcome. Viewing the creation of these regulations through a realist or liberal perspective cannot lead to the type of whole scale change that can create better sustainable development and environmental initiatives for the people and communities affected by

harmful mining practices. Instead, emphasis must be put on the norms, ideas, and cultures of all actors involved to affect change indeed. Constructivism, as a perspective, has been chosen given that it is not a state-centered approach to understanding international interactions. Additionally, without understanding the social and underlying conceptions of how companies/individuals wish to be seen in society, it is difficult to explain how these norms have come to be a part of the global narrative that exists today. Moreover, one cannot only understand actor behavior but the conditions that influenced that behavior. Only then can people and bodies interested in influencing how mining practiced today can have a better chance of success in continuing to push mining companies towards a cleaner, safer and more sustainable practices.

The scope of the essay will focus on the creation of international mining norms through the GMI and how companies both influence and are influenced by norms since its inception in 2002. Although other international mining regimes exist, the GMI represents the first and most significant of these reporting mechanisms (Dashwood, 2014). It is also notable as a non-state led initiative that restrained the actions of the industry it was created by. Within the essay, a short definition of constructivism will occur, followed by an examination of how the GMI came to be created. Finally, the role of ideas, the impact of global norms on mining actors as well as mining actors attempts to influence global norms will be explored. This structure will allow for the showcasing of how the interaction between both actors and structures is not a one-way relationship, but one that changes given the interaction of all participants when looked at through a constructivist lens.

Constructivism

Constructivism focuses on ideas of norms, the development of structures, the relationship between actors and structures, as well as how identity influences actions and behaviors amongst and between actors (Reus-Smit, 2005: 188). Norms themselves can shape an actor's character and actions, leading actors to specific activities that cannot only be explained through self-interest or power politics (ibid). A norm within this paper is defined as a "mutually shared beliefs of appropriate behavior, defined in terms of rights and obligations" (Dashwood, 2005: 983). These actors, therefore, act differently based on their own identity, culture, interests, and relationship with one another. Wendt writes, "states act differently towards enemies than they do towards friends because enemies are threatening and friends are not (1992: 397)."

Similarly, Alder (1998) says that where people go, how, when and why "is not entirely determined by physical forces and constraints; it is also a matter of shared knowledge, the collective meaning they attach to their situation, the rules, institutions and material resources they use to find their way and practices (321)." Actions are not just the result of autonomous self-interest, but it is through interpretation that these actions can showcase the importance of ideas and how they influence interactions in the world. The interpretation of actions through a lens of collective meaning helps to create the structures that surround actors (Wendt, 1992: 397).

Forms of identity within constructivism are explained based on interactions between actors, and it is through these interactions that over time those relationships develop (Ruggie, 1998: 859). For constructivists, this occurs not just on a state-to-state level but also between individuals, organizations, and other important institutions on a domestic and international level (ibid). This is key because, in order to analyze the creation of international mining regulations, a frame must be used that recognizes international cooperation beyond cooperation on a state level. Furthermore, simply looking at things through a liberal paradigm ignores that it is ideas that shape international institutions, and what specific actors feel is in their best interest is dependent on cultural, circumstantial and relational circumstances (Risse, 2000: 25).

Taking a constructivist perspective also means that different actions on the part of actors should be expected. Given differences in experiences, similarities but also varying viewpoints, constructivism can explain why actors who seem to have similar self-interest would pursue different actions (Hofferberth et al., 2011: 215). Important to explaining viewpoints is the strength of norms/ideas within a specific time timeframe. This is because changes in actors, ideas, and circumstances are situation (time) dependent (Finnemore and Sikkink, 1998: 889). What acceptable behavior in society is changing over time as norms change, leading to differences in the expected behavior of actors (Hofferberth et al., 2011: 214). Critical to the constructivist argument is the importance of looking beyond anarchy as an explanation for actor actions. Wendt explains this in light of the realist perspective on anarchy, "if today we find ourselves in a self-help world, this is due to the process, not structure. There is no logic in anarchy apart from the practices that create and instantiate one structure of identities and interests rather than another; structure has no existence or causal powers apart from the process (1992, 394)." The process is, therefore, vitally important to explain what occurs in the international system.

Actors in the international system decide how the system should operate, and their positions on issues can change over time (ibid). In contrast to realists and liberals, constructivism focuses on the making of set conditions in the international system (Ruggie, 1998: 877). Because of this significant difference in worldview, constructivism stands in contrast to the philosophical underpinning of all types of realist and liberal views of international relations. Thus, actors are not merely actors responding to a set of given conditions in the international system, but they play a part in creating them (Hofferberth et al., 2011: 214). This is important to emphasize given that many global governance networks are viewed from lens of inter-state governmental viewpoint in which it is solely as a result of either states directly or through appointed players (realist) or states and actors (liberal) that global networks can come together and function (Park et al., 2008: 207).

The properties of a system are because of interactions and interpretations of events in a manner that leads to viewing the world in a particular way, creating norms overtime (Risse, 2000: 27). Constructivists look at how norms develop, who advocates for norms, and who advocates for differing norms from the ones currently in place (Adler, 1998: 338). This is done in everyday international relations settings, or in more particular contexts such as the development of norms in international organizations. As Reus-Smith (2005) explains,

"identities are constituted by the institutional norms, values, and ideas of the social environment in which they act" (199). Thus, by looking at how norms emerge, how they affect states and non-state actors, as well as how these norms are then implemented by states internally, which norms will matter and under what conditions is particularly important (Hofferberth et al., 2011: 212). This paper will, therefore, seek to trace the importance of sustainable development and regulation when it comes to mining activities to showcase not just how mining actors adopted ideas of how they should operate, but also how given their time, relationships, culture and perspectives they advocate for very particular norms on an international stage.

The Adoption of Global Mining Regulations and Global Norms

The global focus on sustainable development became an important issue after World War II when a large acceleration of economic growth and resource extraction could be seen around the world (Tost et al., 2018: 975). In 1987, after decades of work by NGO's, the UN's World Commission on Environmental and Development drafted a definition of sustainable development often still used today, "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987, paragraph 1). This created a link between sustainable development and recognition of the ecological limits of the earth (Tost et al., 2017: 42). The definition was later expanded through the UN's Conference on Environment and Development in Rio de Janeiro, which defined sustainable development as a result of three pillars, environment, social, and economic (UNCED 1992: 2). However, no mining companies were present at this conference beyond the overarching Business Council for Sustainable Development, of which only a few mining companies were nominal members (Dashwood, 2007: 132). By the early 1990s, while the UN, some states, and NGO groups had recognized the need for environmental and social regulations, most mining companies were still resistant to the idea (ibid: 131). Therefore, later actions by companies going beyond regulatory compliance, especially when not facing environmental public relations crisis speak to a shift in thinking on the part of mining executives compared to the past (Hofferberth et al., 2011: 2011).

The Global Mining Initiative was created in the late 1990s at a time in which anti-globalization movements were particularly strong, and as a result, NGO actors pushed to hold MNCs to account not just for their actions domestically, but also internationally (Dashwood 2005: 984). Global recognition from large NGOs and international organizations that economic globalization does not benefit everyone equally was critical in allowing NGOs to bring about a change in thinking about who should be held responsible for the environmental and human impacts of resource extraction (Hofferberth et al., 2011: 210). International nongovernmental organizations such as Transparency International, Human Rights Watch, Greenpeace, and Oxfam pushed for corporate social responsibility through the internet, in person, and through other activist methods (Vogel, 2010: 75). The 2002 UN Conference on Sustainable Development realized this on a larger scale, which

included NGOs, states, and for the first time in a direct manner, mining companies.

The launch of the GMI at this time can be explained through several factors, the initial one being increased awareness on the part of the mining industry of their bad image in the face of these changing norms, and the need for a global forum to engage with the global reach of new discourse on corporate responsibility and sustainability (Dashwood, 2005: 983). The creation of the GMI allowed companies to press for inclusion into events such as the UN Conference on Sustainable Development and be a part of the conversation regarding what should be done to bring about sustainable development (ibid). Additionally, the GMI was an attempt to catch up to the growing number of international voluntary codes and standards developed across international organizations, some of which were relevant to the mining sector and others which did not have the specificity to be useful to mining stakeholders (IIED, 2002: xxiv).

The GMI was created at the World Economic Forum in Davos, Switzerland, when nine CEOs from major global mining companies agreed on the need for global action on the part of the mining industry. It facilitated mining, minerals, and sustainable development projects that seek to understand how sustainable development could be implemented in the industry on local, regional, national, and global levels (Buxton, 2012: 5). The report that was created from this (called Breaking New Ground) was signed in Toronto and formulated as the result of a multi-stakeholder consultation process to bring together actors from academia, the sustainable development policy research community, the labour movement, international governmental agencies, NGO's mining businesses, trade associations community and indigenous peoples' organizations and financial institutions (IIED, 2002). The organization also focused on establishing regional partnerships in Australia, North America, South America, and Africa, with each group setting their agenda and designing regional research initiatives (ibid). Directly from its initial creation, but also as a result of ongoing research projects, the GMI set itself up to create dialogue and promote sustainable development with groups that previously had not cooperated directly with mining MNC's (ICMM, 2003).

The GMI has also worked with the Global Reporting Initiative to establish guidelines that are relevant to the mining sector. It enabled companies to report on sustainable development and mining activities in a way that had not occurred previously and worked to incentivize companies to participate in sustainable development (Global Reporting Initiative, 2018). The Initiative requires all members to accept the obligation to promote sustainable development (IIED, 2002: 15) and member companies to the Global Mining Initiative agree to a number of sustainable practices including ethical corporate governance, the integration of sustainable development considerations, upholding of human rights, continually improving corporate environmental performance, contribute to communities, transparent engagement, communication and independently verified reporting to company stakeholders (Global Reporting Initiative, 2018). Since its inception, the GMI has continued to amass members and uphold international regulatory regimes to the present day. The following section will investigate constructivist explanations for the initial creation and continued use of this regulatory regime.

The Role of Ideas

The creation of the Global Mining Initiative and its subsidiary, the International Council on Mining and Metals, has allowed the mining industry to both absorb global norms and ideas surrounding how extractive industries interact with the environment but has helped them to shape the process itself (Dashwood, 2007: 131). This birthed an interactive or dynamic process in which while actors do not always agree on end goals or exact definition, they all connect within an international space that recognizes the importance of sustainable development. In this way, cooperation between MNCs, NGOs, and other actors on the international stage speaks to the importance of global norms but is also a way to note the role that MNCs are playing in bringing together actors to try to foster cooperation and trust overtime (ibid: 137).

The cooperation between mining companies to not just adopt policies but also promote these policies through practices and rules in the GMI speaks to how ideas create a multi-level impact that affects the reality seen on the ground when building mines. By drafting an internationally recognized set of documents and releasing them publicly, companies are therefore socialized not just by outside but internal forces to adopt and put these ideas into action (Hofferberth, 2011: 215). While this will occur at different times and different levels of success depending on the company, industry association setting standards through persuasion, dialogue, and public shaming forces companies to justify positions that they previously were not scrutinized for (Dashwood, 2005: 983). Although these international agreements are strictly voluntary, their commitments do allow other actors to hold company inconsistencies to account. Ideas consequently do not just influence actor behavior, but the construction of institutions and regulations in the international realm.

The continued role of ideas also means that as notions of sustainable development and corporate social responsibility change, institutional regulations will also change. Over time, the idea of sustainable development has solidified, leading to a more specific, more environmental and climate change focus on development (Tost et al., 2018: 43). For that reason, it has necessitated a rethinking of existing regulations under the GMI as acceptable definitions changed over time. Thus, regulations since their creation in 2000 have been strengthened to include third-party certification through the AA1000 standard, reporting to external stakeholders, standardization of project indicators, and public disclosure of results when judging environmental and social sustainability performance (Dashwood, 2014: 568). The result is revision four times over the 15 years since the regulation's inception (ICMM, 2018), showing how ideas shape institutions and actions overtime despite and because of change.

Influence of Norms and Shared Knowledge

The presence and creation of the GMI speak to the impact that norms and shared notions of knowledge can have on corporate behavior. Mining MNC's, for the most part, exists because of the normative western ideas of what a marketplace is, whether it is ideas

of private property rights, adherence to contracts, and a specific type of justice system (Dashwood, 2005: 982). Their success within this system thereby often encourages them to preserve these norms, even if it requires them to adopt obligations that do not seem in their self-interest but reflect the culture that they are a part of (ibid). The acceptance and participation in the creation of increased norms and regulations on the part of large mining companies with global operations also speak to the preference on the part of these companies to a global western standard setting when compared to the regulatory uncertainty they may face without these norms (Hofferberth, 2011: 2010). The preference to hold to global western standards is especially true in certain developing parts of the world, where the adoption of stricter standardized policies can help companies to decrease risk in the face of regulatory and normative uncertainty (Ougaard, 2006: 244). Increased cooperation and networks on the part of international mining companies show how the GMI used mining companies' propensity for looking out for their self-interest to improve corporate behavior.

NGOs being asked to consult regularly with mining companies as the GMI was developed recognized not just the more extensive and complex network of actors involved in creating international regulations today, but also allowed for recognition of the role that these organizations have in shaping the idea of what responsible mining practices are (Dashwood, 2007: 133). It acknowledged the ability of actors to be influenced by broader norms and values, giving them common worldviews that then encouraged working together (Hofferberth, 2011: 2012). Because NGOs played such a significant role in defining appropriate behavior for mining companies, GMI's recognition of them showed a shared acknowledgment of the broader interests NGOs had been pushing for and the power they have to influence global norms.

That MNC's created transnational networks to assume private authority in pushing corporate social responsibility norms speaks to the need to look beyond a narrow idea of self-interest, or the implementation of these regulations as merely a public relations exercise. Corporations are often excluded from conceptions of global civil society and are usually deemed unable to cooperate both amongst themselves and with other state and non-state actors (Dashwood, 2005: 980). There are good reasons for these assumptions, given the amount of environmental harm and human rights abuses they have contributed to. Because of the cyclical nature of resource extraction and the especially small profit margins during economic downturns for MNC's, if looking through a lens of self-interest on the part of companies, one would expect a very reactive and defensive environmental strategy from the mining industry. However, studies have also shown that companies will undertake costs even when the returns are not easily quantified, as can be seen in the case of international mining regulations (Prakash, 2000).

The fact that both NGO's, governments and mining companies recognize that there is a 'right' way to do sustainable development and corporate social responsibility speaks to the way that ideas influence actors and institutions (Hofferberth et al., 2011: 211). Companies show this through the act of engaging in public discussions and acknowledging stakeholders beyond shareholders represents a substantial shift in perspective for these MNC's (Dashwood, 2014: 565). Since companies are often said to be only responsible to

their shareholders, it seems contrary to ideals of the maximization of profit that they would recognize other stakeholders in the areas of human rights, labor, and the environment. However, companies/the industry wanting to be seen as in favor of sustainable development showcases the impact that ideas have had on the mining industry. For MNCs, implementing the need for public disclosure mechanisms showcases the need for companies to actively implement company level change based on global pressure that did not exist 15 years prior and not just acts in their self-interest (ibid: 567).

Since the initial creation of the Global Mining Initiative, many actors have stated that significant improvements have been made regarding the conduct of mining companies (Tost et al., 2017: 42). Operational safety and health have improved, environmental management systems and impact assessments are now the industry standard across both countries that require and countries that do not require them, mining companies seek to build community relations where they did not before, and many mining companies now publish their annual contribution to sustainable development publicly with third party verification (ibid). Improvement at this level speaks to a recognition on the part of mining companies that having a social license to operate (beyond a regulatory license to operate) creates a learning process in which both self-interested motives and broadly created global norms create incentives for mining companies to adopt sustainable development and corporate social responsibility doctrines (Prno, 2013). For actors, interests are not fixed, but change as the environment around them changes, and actors work together overtime on both international and local scales. It is vital to note that this does not mean that mining practices around the world are perfect or that existing international mining regulations are sufficient to solve the world's large-scale environmental issues. Different actors have responded to GMI regulations; differently, some mining companies such as Placer Dome and Noranda publicly released corporate social responsibility data freely in the 1990s and were initial members of the GMI that pushed for stronger regulations and public disclosure after successful multi-stakeholder mining initiatives in Canada's north (Dashwood, 2007: 152). Other mining companies joined the organization over time (such as Glencore or Areva) after seeing the success of other members or facing public relations difficulties due to the environmental impact of their mining practices. Still others (due to the locations they operate in and/or corporate culture) are not members at all (ibid). However, the increase in companies voluntarily placing themselves under the international regulations created by the GMI speaks to the success of global pressures and a new environment that defines sustainable development as a crucial part of resource extraction.

Attempts to Influence International Norms

The creation of the Global Mining Initiative, as well as ongoing efforts by the industry to introduce international self-regulation, has created a "reconstituted global public domain" which was created by the interaction between civil society actors and multinational corporations, alongside states (Ruggie, 2004: 500). It is not that authority is actively taken away from states, but instead, the private sector has created a new transnational area to push

their agenda (ibid: 503). By voluntarily adopting codes of conduct and creating private governance structures with other mining companies, the mining sector can push its ideas of appropriate behavior for itself beyond that prescribed by the state or NGO's (Dashwood, 2007: 133). Participation on the part of the industry at events such as the World Bank's Extractive Industry Review (which develops corporate social responsibility standards relevant to mining) showcases the ability of the industry to be seen as an actor able to influence final suggested industry outcomes and goals (Dashwood 2007: 134).

In this past, this was particularly important to the mining industry, given that by the late 1990s, NGOs were increasingly involved in decision-making in international organizations such as the UN, while MNC's were not (Dashwood, 2014: 566). The mining industry recognized that the ideas and norms of sustainable development and corporate social responsibility are shaped by international institutions (which had already included NGOs and states) but also critically if they were also included could be shaped by the mining corporations themselves (ibid). The creation of the GMI, therefore, enabled the industry to create an international space where other international bodies could recognize it. The formation of voluntary international regulations and institutions has helped mining companies to have a seat at the table as represented not just with their inclusion to the 2002 World Summit on Sustainable Development but their continued presence at state-based international organizations where these issues are being addressed (Dashwood, 2014: 564). Mining companies both absorbed dialogue about sustainable development but also sought to create an environment of acceptance in which the public and other regulatory actors recognize the trade-off between mining benefits (for example, economic growth) and the environmental impact they have (Dashwood, 2005: 990).

Mining companies have a history of pushing for a definition of sustainable development and corporate social responsibility that acknowledges the importance of growth and profit as well as the importance of environmental protection (Prno, 2013: 581). In doing so, they continue to advocate for actions based on their worldview that profit, development, and social responsibility do not contradict one another (Tost et al., 2018: 972). When looking for a definition of what sustainable development meant for the mining industry, the Global Mining Initiative did not ask a UN body, NGO or government to craft a working definition of sustainable development for their use. Instead, they tasked the World Business Council for Sustainable Development (WBCSD) (ibid). The WBCSD is a CEO industry-led organization that has been charged by NGOs such as Greenpeace as representative of the largest non-renewable energy and carbon-intensive companies in the world (Greenpeace, 2011: ix). The definition of sustainable development crafted by WBCSD for the industry states, "In the context of the minerals sector the goals [of sustainable development] should be to maximize the contribution to the well-being of the current generation…without reducing the potential for future generations to meet their own needs" (IIED 2002). The definition speaks to the mining industry's continued values related to profit and market-based principles rather than a stricter version of sustainability positions (also called strong sustainability) that emphasizes holding back on current production for the environmental wellbeing of the future (Prno. 2012: 348). It also contrasts with the UN

definition, which instead speaks of meeting rather than maximizing the needs of the current generation (WCED 1987, paragraph 1). Currently, none of the large mining companies involved in the Global Mining Initiative support strong sustainability positions and instead advocate for sustainability initiatives that allow for existing business models to continue (Tost et al., 2017: 45).

It is critical when analyzing how mining companies push forward their agenda to recognize that this does not simply represent a liberal politics lens in which the power of actors tells the whole story about what their actions will be. Although companies advocate for policies in their interest, their position regarding creating regulations is determined not simply by the power they possess, or the institutions that surround them, but by ideas and norms. Tost et al.'s show this when stating that the GMI does not need to adopt strong sustainability positions because their position is aligned with current societal expectations (2017: 47). Additionally, the ten-year review of the GMI's progress concluded that while good intentions existed on an industry standards level, the complexity of issues involved at mining sites around the world meant that implementation of the goals of the GMI is highly variable and the industry tends to take a wait and see approach to complex issues such as climate change (Buxton, 2012: 14). As norms and ideas become more accepted by a larger number of actors, however, a rethinking of existing positions can be seen by the mining industry, leading to new vocalized priorities and continual reworking of existing international regulations.

Conclusion

This paper has shown that the creation and continued use of the Global Mining Initiative can be explained using a constructivist lens. Whether looking at the history of the organization, the role of ideas, or how global norms have influenced the mining industry to create these regimes, constructivist explanations showcase how norms and cultures overtime encouraged the formation of institutions and relationships between stakeholders. It is true whether the mining industry is internalizing these norms to create programs for sustainable development and corporate social responsibility or pushing for their definition of sustainable development to further their agendas. Seeing mining MNC's as actors influenced by and influencing broader ideas in this manner helps to understand the shift the industry has experienced and continues to experience concerning sustainable development. In the future, pushing corporations to accept sustainable development and corporate social responsibility initiatives more broadly must include recognition of how ideas and norms influence corporate change. Failure to do so could lead to accusations of the Global Mining Initiatives as merely a form of greenwashing that is not capable of truly changing its policies to reflect the emphasis on sustainable development and adaptation to climate change that it claims to have. Holding organizations accountable is important, but furthermore, understanding how and why they change can give actors the ability to affect change. Understanding the Global Mining Initiative from a constructivist perspective can do this.

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Ending Water Scarcity in the Desert: Is it a Mirage?

Examining Desalination Technology As A Solution For Water Scarcity In Israel

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Abstract. This paper examines contemporary efforts to end water scarcity in the Israeli state. Although the supply of water was initially envisioned as a responsibility solely of the state and took on an almost religious importance, developments over the last 15 years have elevated the role of the private sector, through the use of Public-Private Partnerships, in building new desalination plants and other required infrastructure, filling a role formerly held by the state. Although the amount of potable water in Israel has increased, too much focus has been placed on increasing water supply, while initiatives to decrease demand for water have been largely neglected. Negative externalities stemming from the country's embrace of desalination technology, including damage to marine environments, have been largely ignored as well.

Introduction

The headline of a recent *Scientific American* article seemed almost miraculous: "One of the driest countries on Earth now makes more fresh water than it needs" (Jacobsen, 2016: n.p.) Set against a regional context of frequent water shortages and given that the compounding effects of climate change are expected only further to deplete this resource, the author marveled over Israel's newfound ability to create water in the desert. This apparent abundance is a direct result of Israel's decision to rapidly construct mega-scale desalination plants throughout its coastal region from 2005 onwards, leading to the availability of 582 million cubic metres of new water by the end of 2017. Driven mainly by necessity, Israel has become a global first-mover in the construction of mega-scale desalination facilities The implications of this technology are immense, with some observers going as far as suggesting that, "in many places, squeezing fresh water from the ocean might be the only viable way to increase supply" in the coming years (Talbot, 2015: n.p.)

As water scarcity continues to increase around the world, other countries will likely look for new and innovative solutions to counter this challenge. In light of the seemingly unbridled potential of this new technology – and given Israel's apparent success – a proper evaluation and analysis of Israel's apparent success with desalination technology presents a useful case study to determine the extent which large-scale desalination can successfully "solve" water scarcity. As such, this paper sets out to explore the impact and effectiveness of current desalination technology in mitigating Israel's chronic water scarcity. It suggests that while the Israeli case demonstrates that desalination technology is a useful tool to increase overall water supply, it must be used in combination with other supply and demand-side measures to be truly effective in solving water scarcity.

This study proceeds as follows: first, it offers a historical overview of water management within the Israeli state, and then moves on to examine the early implementation of desalination technology in Israel, as well as where the country currently stands. A broader evaluation of the successes and failures of the technology follows sequentially, before briefly concluding with some policy implications both

within Israel and, perhaps more importantly, for other states who may be looking to solve their water scarcity challenges. Throughout this process, and in keeping with the theme of this journal, it endeavors to map the political narratives that have shaped the debate and the implementation of desalination policy in Israel.

Historical Overview of Israel's Water Management Regime

At the time of its founding in 1948, Israel inherited the legal doctrine of *Mejelle*, the civil code of the former Ottoman Empire which declared water to be a free good, "jointly owned by the public, like grass and fire" (Laster and Livney, 2009: 122). Management of water resources was thus seen as a responsibility of the state, collectively held on behalf of all of its citizens. In its first decades of existence, the Israeli state aggressively encouraged agriculture-based settlements, which would come to play a "major role in the young economy, providing jobs, food, and foreign currency" (Laster and Livney: 122.) These settlements, crucial for realizing the Zionist vision of "blooming the desert" (Teschner et al., 2013: 95), compelled the state to immediately become involved with the management of water resources in the fledging country, in large part due to the "almost mythic control" agriculture played in the government's economy and ideology (Laster and Livney, 2009: 124).

During these initial years, water scarcity in Israel's arid climate was characterized as a problem of accessibility, not quantity. In effect today, a series of laws passed between 1955 and 1959 were vital in creating a new legal imperative for the state control of water resources. The most important law passed during this time was the eponymous Water Law (1959), which declared domestic water sources as "the property of the people […] managed by the State for the needs of the people and development of the country" (Laster and Livney, 2009: 125). Not only was this law promoted by the Supreme Court to an almost-constitutional level, but it also defined "domestic water sources" so broadly the effect was mainly to position any conceivable source of fresh water – in the present, or occurring in the future - as state-managed (Laster and Livney, 2009: 125). This series of legal developments – coupled with nation-wide construction of a state-owned water conveyance system between 1955-1964 led to the organic development of early Israeli water policy as decidedly socialist in tone.

Very little changed for several decades. The 1959 Water Law also called for the creation of a national water company, Mekorot, which was entrusted with the operation of the national water system. The system was, and still is, immense – it lifts water from 213 metres below sea level to 151 metres above sea level – and consumed initially nearly 25 percent of the state's entire electricity generation. Today, it is still the leading user of energy in Israel, although its share has dropped to only six percent of total energy consumption (Teschner et al., 2011: 264). Importantly, the conveyance system has effectively "turned the country into one basin" (Reznik et al., 2017: 223). In contrast to other countries, where periods of water scarcity and drought may be limited to specific regions, Israel's conveyance system supplies water to the entire country. This distinction is important for policymakers and those overseeing the management of water resources since the consumption of a water unit at a particular location within the state must, therefore, be weighed against the need for a unit of water at all other locations in the country.

Israel's profound "hydro-ideological support of agriculture production" eventually led to trouble, however, as the already-scarce water sources had by the end of the 1970s been used "to a degree

of environmental compromise" (Teschner et al., 2013: 96). The depletion of Israel's only lake, the Sea of Galilee, to within a few inches of a "black line" at which salt infiltration would flood the lake and ruin it forever proved to be a catalyst for change (Teschner et al., 2013: 96). The state began to examine new supply-side measures to increase the total amount of water, establishing 178 reservoirs across the country's rain gradient in the early 1990s. These reservoirs allowed the collection of 125 million cubic metres (MCM) per year of fresh water (Tal, 2006: 1082). Demand-side responses to conserve water resources were also embraced. Domestically, the upgrading of inefficient plumbing, along with car washing and toilet regulations, along with seasonal usage restrictions, helped to keep water consumption steady throughout the late 1980s and 1990s (Tal, 2006: 1082).

Decision-makers within the state water management apparatus generally ignored wide-scale desalination as a viable solution for water scarcity during this period due to its extremely high cost of nearly $2.50 a cubic metres in 1970.[1] [2] An unprecedented series of droughts in the late 1990s once again lead to significant public pressure on policymakers and elected officials to solve Israel's water crisis. This overt pressure, coupled with a decrease in the cost of desalination technology persuaded the administration to conduct a series of studies into the main issues related to creating "a new national water source" based on the construction of several large-scale desalination plants, and to create, "on the basis of these studies' findings, an optimal long-range desalination master plan" (Dreizin et al., 2008: 148). The Israeli Minister of Finance initially blocked the plan, as he believed that desalination would still prove too expensive in the long run and that seawater desalination should be a last resort only after the development and utilization of all other water sources and a water pricing reform (Dreizin et al., 2008: 148). Ultimately, the timely release of a report forecasting a thirty percent reduction in rainfall due to climate change during another series of droughts caused the minister to cave to what had become an intolerable environmental problem (Becker and Wart, 2015: 541). The desalination studies were subsequently rushed through on a fast track basis (Dreizin et al., 2008: 148).

The culmination of these studies led the Israeli Water Commission to propose a "Desalination Master Plan" in 1997 to develop large-scale desalination plants along Israel's Mediterranean Coast to increase the country's water supply (Feitleson and Rosenthal, 2012: 275). The plan was deemed to be feasible for several reasons. The first, and most important, was that technical advances in desalination technology had decreased the price of desalinated water drastically, from $2.50 per cubic metres to just 58 cents (Talbot, 2015: n.p.) This rapid development of the technology led to the perception that it was "an economically, politically and strategically superior alternative" to other options on the table (Teschner et al., 2013: 92). Moreover, the potential supply of desalinated water was perceived to be endless, given Israel's proximity to the Mediterranean Ocean, and the plants would also require highly-skilled employees to fill a variety of jobs, employing hundreds of Israelis in meaningful and high-paying work (Semiat, 2000: 194). Thus, the perceived political advantages of successfully carrying out the master plan were significant. Not only would politicians be able to claim that they had solved Israel's historical water scarcity, but they would create jobs and improve the lives of their citizens in doing so.

[1] All financial figure presented are in USD.

[2] A cubic metre of water, or 1000 litres, is what the average Israeli uses per week at the time of writing.

Desalination: A Brave New World

Despite its apparent promise to solve Israel's chronic water scarcity, the implementation of the master plan was initially delayed for several years due to three factors. Above-average winter rains in 2002 and 2003 appeared to reduce the impact of the droughts on Israel's water reserves, lessening the intense political pressure to find an immediate and viable solution. Finding suitable land for the construction of the desalination plants, which are quite large and must also be immediately next to the ocean, on the overcrowded coastal strip of Israeli territory also proved to be challenging (Tescner et al., 2013: 97). Additionally, and most importantly, the construction of the new desalination plants – in part to appease the Minister of Finance, who was still concerned about cost overruns – were to be built by Public-Private Partnerships (PPP), a shift from the historic state monopoly on water management. The state would still be responsible for pricing and distributing water, but the construction and operation of the new plants were put to tender, with the successful company allowed to build the plant and then sell desalinated water in perpetuity to the state at the regulated prices. As a result of this shift in policy, time was needed to create new oversight bodies, such as the Water Desalination Authority, as well as to evaluate the bids put in by private companies (Tescner et al., 2013: 97). By 2004, a national physical master plan had been approved with four major plants to be built, and the first, in Ashkelon, came on-line just a year later in 2005.

Israel's water conveyance system continued to be state-owned under Mekerot even with the shift to public-private partnerships in the construction and operation of the new desalination plants. In effect, this meant that it was neither efficient nor desirable to build smaller, regionalized desalination plants, as a small number of large plants connected to the conveyance system were perceived to be able to supply the entire country with fresh water (Meindertsma et al., 2010: 452). After the initial success in Ashkelon in 2005, four more plants were constructed, the last set to come on-line just a few weeks after the time of writing. The five plants will be able to produce 582 MCM of water annually, meeting about two-thirds of Israel's projected domestic needs. These will not be the last plants; the Israel Water Authority has already approved zoning for another four large plants to be built by 2025, although their capacity remains undetermined (Rinat, 2017, n.p.) By 2020, somewhat amazingly, it has been claimed that 1 billion cubic metres of desalinated water will be introduced into the water supply system per year, meaning it should be possible to start replenishing the overdrawn natural water reservoirs, raising their levels to stop further deterioration of their quality and even to reverse the degradation processes and rehabilitate the natural water reservoirs" (Tenne et al., 2011: 16). Questions remain, however, about how much water the conveyance system will be able to handle each year. Conceivably, there is a point at which increasing the production of desalinated water would provide diminishing returns because it would exceed the total capacity of the pipes that make up the conveyance system and upgrading the system throughout the nation would likely prove costly. Extensive consultation of both academic literature and government documents has frustratingly left this question unanswered.

Although different methods of desalination exist, the design used by the five plants currently in operation is known as reverse-osmosis, which draws in seawater and then uses significant amounts of energy to force the saltwater through semi-permeable membranes. This process allows the fresh water through the membrane into a collection container where it is then piped into the national conveyance system while holding salt ions and other particles back and discharging them into the ocean (Talbot,

2015, n.p). This method of desalination, while more efficient at a large scale than other technologies, is energy intensive. On average, it takes 3.85-kilowatt-hours to produce a cubic metre of water, meaning that close to four kilowatts of energy are needed for an entire hour to desalinate enough water to meet the needs of one Israeli for a week (Tal, 2006: 1083). On a macro level, between 30-50 percent of the total cost of the desalination process is associated with energy consumption, which, in Israel, has historically been produced through imported fossil fuels, and more recently offshore national gas deposits (Meindertsma et al., 2010: 450). Plants must also operate continuously, meaning that any switch to sources of alternative energy must not only be able to generate huge amounts of power, but they must also be able to supply the plant 365 days of the year (Becker et al., 2010: 1047).

Evaluation of Israel's Desalination Paradigm

Although the sheer amount of water produced by the desalination plants – a projected one billion cubic metres per year by 2020 – sounds impressive, it is contended that the ability of the current desalination technology to solve Israel's long-standing water scarcity has been vastly overstated. Thus, the evaluation of Israel's new desalination paradigm is divided into three sections: environmental impacts, the internal political economy of the decision-making process, and the psychology of water supply and demand in Israel. Furthermore, throughout these sections, the argument is put forth that the main actors who have benefited from desalination technology are the companies who produce the technology and who have won the tenders to build the plants, as well as politicians and decision-makers at the policy level from a short-term perspective. In contrast, citizens living near the plants appear to be the most negatively impacted in the short term. Although, when taking a long-term view, it is suggested that Israel's marine environment and broader Israeli society could both potentially suffer serious negative consequences.

Environmental Concerns

A major, but underpublicized environmental problem associated with Israel's desalination plants is the discharge of huge amounts of highly concentrated salt water. There is no scientific agreement on the long-term effects of brine and salt discharges from desalination plants into the marine environment, but several studies have found that the discharge contains dangerous cleaning chemicals from the plants (Meidnertsma et al., 2010: 454), and has led to increased metal concentrations on nearby shores and a substantial increase in salinity to the surrounding waters. Several scientists studying desalination efforts worldwide have concluded that the significant uncertainty surrounding the environmental impacts of desalination means it should be avoided when at all possible (Becker et al., 2010: 1046). Environmental groups have pointed to recent "red blooms" of phytoplankton next to the discharge pipes from several desalination plants as evidence that the plants are hurting Israel's marine environment, although no studies have been conducted on how the effects of desalination may harm the fishing and aquaculture sectors of Israel's economy (Teschner et al., 2013: 98).

Another major environmental problem associated with desalination plants is the emission of air pollutants due to the energy requirements of the plants. Israel's energy needs are mostly met through imported fossil fuels and some natural gas, leading to the perception that the Israeli government "regards

the emission of greenhouse gases and climate change as an irrelevance" via their unequivocal endorsement of the desalination plants (Meindertsma et al., 2010: 455). Jerusalem, Tel-Aviv, and Gaza City are all currently exposed to air pollution levels detrimental to public health according to international standards. Although data is limited, the emissions produced by the plants have been correlated with further air pollution increases in these cities (Meindertsma et al., 2010). Paradoxically, although Israeli companies have developed some of the world's most advanced solar energy equipment and the state enjoys a nearly endless supply of sunshine, the country generates a meager 2.5 percent of its electricity from solar. These solar companies have become "frustrated by government bureaucracy" and have mostly taken their experience abroad (Associated Press, 2017: n.p.) This portrayal of government bureaucracy is worrisome and highlights how the desalination plants have benefitted a select few Israeli corporations. Under Israel's new PPP process, the bids to construct desalination plants must also include the cost of building and operating an adjacent power plant to meet the plant's energy needs.

Taken on its own, this is not especially problematic. Trouble emerges, however, because the desalination companies who have won four out of the five bids are owned by corporations that also have a quasi-monopoly on the energy sector, meaning they can submit a lower bid based on savings from power generation. The dominance by the same few corporations of Israel's water and electricity sector has already been tagged as "the new monopoly, a private one cross-cutting water, and energy sectors" (Teschner et al., 2011: 464). Between 2006 and 2012, when the first wave of desalination plants was being built and coming on-line, the stock price of the Israeli multinational Israel Chemicals Limited, which directly or indirectly owns three of the five plants, tripled from three dollars to twelve dollars – during the global financial recession, no less. Corporations controlling the desalination plants also have a vested interest not to invest in or encourage the expansion of renewable energy, since its advancement runs directly counter to their economic interests and ability to bid on future desalination projects competitively. Thus, as Israel increasingly finds itself locked-in to these PPPs, it is also locking itself into a future of high carbon dioxide emissions and increasingly poor air quality with little room to renegotiate later on.

Political Economy of the Decision-Making Process

Another criticism of Israel's embracement of desalination technology is that it has allowed politicians and policymakers to displace concerns and conflicts about Israel's water security rather than addressing the problems head-on, sacrificing long-term planning and management for short-term political gain. Indeed, Teschner et al. suggest that the adoption of the technology means decision-makers "no longer face the uncertainty of rains, nitrate and pollutant concentrations in aquifers and declining water level in the Sea of Galilee… instead, there are new technical questions, such as who will win the tenders to operate the plants, what would be sufficient depth for the brine discharge pipes from the plants, and stable sources of natural gas required to power the desalination plants" (2013: 98). The type of decisions falling in the second category are fundamentally less explosive, and therefore, less threatening to politicians concerned with re-election than those in the first category. In this sense, Israeli politicians have benefited, at least in the short term, from the implementation of desalination technology.

Nevertheless, the government's decision to rapidly implement and expand desalination capacity led to a series of problems that could have been avoided – or at least, been accounted for – before the plants were fully operational. Although desalination plants are able to produce high-quality fresh water for public consumption, the water from the plants is devoid of some key minerals which cannot be easily added by authorities, such as magnesium. Although desalinated water is typically combined with other "natural" sources of fresh water before being distributed for domestic consumption, nearly half of Israel's population consumes below the recommended amount of magnesium (Rosen et al., 2017: 88). Deficiencies in magnesium have been positively linked to substantially increased risks of heart disease, and the study's authors concluded that Israel's reliance on desalinated water could be harmful to consumer health in the medium to long term (Rosen et al., 2017: 95).

The immense scale and centralization of the desalination plants pose additional problems. The coastal regions, where the five existing plants are located, have extremely high population densities. In these already-crowded areas, the construction of desalination plants results in the loss of significant coastal open spaces, which in some cases were previously marine parks or reserved for public enjoyment (Tal, 2006: 1083). Citizens have raised objections to the plants based on the amount of noise and visual pollution they generate. Residents adjacent to the new construction sites are also concerned that the construction of the plants will allow for further industrialization of the area, thereby contributing to more pollution and decreasing the quality of life (Rinat, 2017: n.p.). Finally, the centralized nature of the desalination plants means that they are susceptible to emergencies in the vicinity, both in water and on land. The membrane technology currently used in the plants is extremely delicate. If unexpected pollutants in the marine environment – from an oil spill, for instance – appear, the plants would be severely damaged (Zinat, 2017: n.p). This risk could have been mitigated if Israel had chosen either a more regionalized desalination strategy or a strategy the involved other sources of water besides desalinated seawater, but the preference for centralization means that the state cannot afford to have even one plant go off-line for any length of time if it wants to meet the increasing water needs of the country.

Finally, the rush for politicians to "solve" Israel's water crisis has led the state to mainly ignoring more cost-effective strategies. Under the 1997 Water Master Plan, desalination plants were chosen in large part because of their perceived cost-efficiency relative to alternative solutions. The actual economic cost of desalination has since been questioned widely. Becker et al. offer perhaps the most comprehensive refutation of the economic arguments undergirding desalination. In sum, the authors suggest that factoring in environmental externalities, the real cost of desalination is anywhere from 6.5 to 20 cents higher than the cost in real terms (2010: 1049). Using this actual cost of desalination as a baseline, Becker et al. conclude that Israel could save over 700 MCM at a cost less than that of desalination, through a combination of demand and supply-side solutions, including reducing evaporation from reservoirs and marginally increasing prices for water used by the agriculture sector (2010: 1053). Although the full list of recommendations is too much to evaluate, given the scope of this paper, Becker et al.'s suggestions are attached for further consultation.

Comparative analysis of water-shortage mitigation alternatives.

	Desalination	Increased Wastewater Treatment	Reduced Evaporation from Reservoirs	Installation of Water Savers	Higher Prices for Water in Agriculture	Changes in Park & Garden Plants & Irrigation	Advanced Grey Water Systems
Direct costs (US$/CM)	0.52	0.45	0.01	0.45	0.20	0.61	~2.00
External costs (US$/CM)	0.065		?		0.03		
Total costs (US$/CM)	0.585	0.45	?	0.45	0.23	0.61	~2.00
Total project costs (million US$)	187	52	0.5	85	71	43	Not calculated
Amount of water saved or added (MCM/year)	320	116	37	190	320	70	0

Table 1- Comparative analysis of water-shortage mitigation alternatives (Source: Becker et al., 2010: 1053.).

Psychology of Water Supply and Demand

Despite the environmental risks and economic inefficiencies with desalination, the single biggest issue associated with desalination technology – and specifically, the way it has been politically positioned - is its encouragement of water consumption in Israel that is unsustainable in the long term. The country has traditionally fostered a mentality of hyper-conservation of water resources; water was previously treated as an ideological good above and beyond a regular consumable commodity. Even as recently as 2009, the state launched a nation-wide, multimedia awareness campaign imploring citizens to conserve water as a result of significantly depleted freshwater resources. The campaign used the extremely low level of the Sea of Galilee as a prominent symbol of the crisis. Throughout 2009 and part of 2010, awareness was raised across radio, television, and the internet; newspapers even featured a "Sea of Galilee tracker" depicting the water level of the lake (Rejwan, 2011: 29). As opposed to the construction of desalination plants, which aimed to address the shortage by increasing supply, the campaign aimed to address the shortage from the other side of the equation: by lowering demand for water. It was incredibly successful. Over its duration, a 10 percent reduction in domestic consumption of water was observed. Even more importantly, months after the campaign's end domestic per capita consumption rates remained at the lowered level, suggesting that the attitude of conservation was more entrenched in Israeli society and not just a temporary response to the perceived crisis. The entire campaign cost $7.5 million to run; translated into the amount of water saved, the Israeli government had paid just over ten cents per cubic metre of water saved, a price less than one-fifth the cost of desalinated water today (Rejwan, 2011: 29).

As another demand-side measure, the IWA also announced in 2009 that it would significantly raise the tariff on marginal consumption of water, effectively leaving rates unchanged except for the top tier of consumers. These changes also led to a lowering of consumption patterns – between an eighteen to twenty percent year-over-year reduction – but political pressures lead to the cancellation of these

price adjustments just one year later (Becker et al., 2010). Regrettably, these political pressures on decision-makers were created by other government officials and water officials who, proud of their achievements in rapidly increasing the supply of fresh water due to the construction of desalination plants, came out with statements in 2010 and 2011 "to the effect that Israel was no longer suffering from a water shortage" (Katz, 2016: 7). These statements were patently untrue and remain so today. Even with Israel's current desalination capacity – which is 70 percent more than in 2011 –the country is still solidly in the category of countries suffering from chronic water scarcity (Katz, 2016: 8). Israel still has huge historical groundwater deficits from years of overdrawing its natural resources – about three to four times its total current desalination capacity – and a "legacy of depleted aquifers and desiccated streams" (Katz, 2016: 8). However, for the first time in the state's 60-year history, policymakers and officials were telling the population that their supply-side management was a permanent solution to this historically omnipresent challenge.

The results of this bragging have not been positive. Demand management measures were quickly phased out by officials, leading many Israelis to conclude that water in Israel was no longer scarce. Between 2013-2016, real prices for domestic water consumption dropped by 20 percent, even though water expenditures represent only one percent of annual household *disposable* income, and as of 2013 average water rates were lower in Israel than the average for OECD countries, many of whom do not have water scarcity (Katz, 2016: 8). Per capita and absolute water, consumption has increased in Israel every year since 2011; a nation-wide survey in 2016 found that nearly 50 percent of respondents agreed with the false statement that "Israel did face water scarcity in the past, but no longer does" (Katz, 2016: 8). In this sense, an increase in water supply from desalination technology has been offset by rising consumption, resulting in a net-zero gain. The most problematic aspect of this development is not that consumption rates have been increasing, but that policymakers and politicians have lost their legitimacy to promote demand-side initiatives given their repeated self-aggrandizement for having "solved" the issue. This handwringing would be irrelevant if desalination had made sure that the supply of domestic water was able to outpace the demand, but this is not the case. Indeed, Katz goes as far as suggesting that the introduction of desalination technology was only ever going to be able to "obviate the need for further overdrafts" given Israel's continued economic and population growth, as well as Israelis' desires for an increasing quality of life, which will likely necessitate further water consumption increases (2016: 9).

The success of desalination technology in increasing water supply has been portrayed as the ultimate solution to Israel's water scarcity, with damning consequences. At the time of writing, despite the extra water provided by the desalination plants, Israel is undergoing another severe drought. The previous four years are reported to have "overtaxed Israel's unmatched array of desalination plants, choking its more fertile regions and catching the government off-guard" (Rabinovtich, 2017: n.p.) The Sea of Galilee is forecast to hit its lowest level ever – never mind in the last ten or twenty years – this winter. Proposed cuts to water consumption have drawn vehement opposition from a public who was told only four years earlier by the minister responsible for the water authority that "today, it can it can be claimed with confidence that the water crisis is behind us" (Katz, 2016: 7). Desalination technology may have been able to provide Israel with 582 new cubic million litres of water, but the country seems to have returned to the exact situation that prompted the construction of the plants in the first place.

Policy Implications and Conclusion

In this section, several policy implications arising out of Israel's new desalination paradigmare highlighted before offering some concluding thoughts about the potential of desalination technology writ large. Firstly, the Israeli government must immediately focus on prioritizing demand-side measures, especially given the future limited potential of desalination technology. The government would be well-advised to leverage the current water crisis in trying to restore an ethos of water conservation among citizens and work to continue that mentality even as the drought eventually subsides. Although politically unpopular, the government should also raise the water tariffs that it has cut over the past few years, especially on the top tier of consumers, at least to where the tariffs stood before. Tariffs in Israel remain below the OECD average; however, at the risk of losing political capital and given Israel's unique geographic circumstances, these rates should ultimately be set higher than the OECD average. Thirdly, any freshwater from additional desalination plants should be immediately directed into restoring natural groundwater supplies, which have been neglected for at least the last 30 years and serve as a critical backup for water planners in the case of future droughts. Fourthly, the state should alter its tender process for the building of future plants to ensure it is both more competitive and should promote the construction of plants that are not reliant on fossil fuels, or at least partly dependent upon alternative energy. Fifth, and finally, the government must look at alternative supply and demand-side measures, outlined in the previous section, that would be both less environmentally damaging and more cost-effective than desalination.

What can be learned from Israel's experience with desalination technology? On the whole, the potential of the technology to solve Israel's – and indeed, global – water scarcity has been significantly exaggerated. It is not a question of if the technology works or not – it does, at least to a certain extent. Some may even suggest that, for all its problems, the technology is justified given its ability to create drinkable water in otherwise parched areas. In some instances, it is acceptable. The bigger problem lies in the fact that desalination technology, as it stands today, is unable to provide a limitless source of consumable water, as has been implicitly and explicitly suggested by politicians looking to offer a "permanent" solution to water scarcity within their borders. Without responsible planning, this expectation-reality gap can subsequently lead citizens in water-scarce nations to consume water resources well above their means, leaving the state's water resources in a worse position than before the implementation of desalination technology in the first place. Current desalination technology represents a useful way for water planners and state bureaucrats to increase overall water supply, but the technology should, and must be seen as a tool to be used in conjunction with multiple other demands and supply-side measures, instead of a singular solution.

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