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The World's Leading Regulator: Why Countries Must Abide by the European Union's Strict Chemical Laws and What that Means For its Closest Trading Partners

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Abstract

The European Union is the world's leading regulator, imposing strict laws on all sectors of industry including chemical manufacturers. The bloc's programs imposing these strict chemical regulations are entitled Restriction of Hazardous Substances Directive (RoHS) and Registration, Evaluation, Authorization and Restriction of Chemicals, or REACH. These laws are imposed to ensure that the chemicals present in products are properly recorded and to ensure the health and safety of citizens and the environment. This thesis will discuss the role the European Union plays in the world regarding the chemical industry and how countries modify their own regulations to ensure their companies have continued access to the EU's market, and with the use of case studies which test *The Brussels Effect,* coined by Anu Bradford. The history of European integration and the European Union is discussed, as it provides important context for why the bloc imposes strict regulatory standards. The largest trading partners of the EU were forced to comply and adopt many of the EU's new laws while one in particular (the United States) did not, and instead left it up to the private companies.

The evidence reported in this thesis will prove that the European Union is the world's leading regulator of chemical and toxic waste substances and that many non-EU countries are forced to comply and adopt REACH-like policies if they want to have continued access to the EU's markets. Three of the EU's largest trading partners, South Korea, Japan and China amended their chemical regulations to be more in line with the EU. Further, the EU will continue to be the most important regulator for at least another half century. It will be up to other countries with large markets to decide if they want to be crowned as the world's regulator.

I recommend that developed countries agree on one set of regulations to ensure the health and safety of their citizens and the environment as a whole. Developing countries are not well-equipped enough yet to abide by these standards, therefore, allowing them to have their own standards is understandable. Eventually, as developing countries grow, the health and safety of all citizens and the environment will become the norm.

Chapter 1: Literature Review

The European Union is known to have some of the strictest chemical regulations in the world. These regulations concern everyday products including food, chemicals, clothing, furniture and electrical products. This thesis will focus on the EU's regulation of chemicals.

The first main source of legislation to regulate hazardous chemicals in the European Union was called the Restriction of Hazardous Substances, or RoHS. RoHS originated in 2002 affecting six hazardous products found mostly in electrical products and equipment. The ban went into effect on June 1st, 2006, in which all products sold in the European Union had to comply by these regulations.[1]

The European Union monitors chemical regulations through its Registration, Evaluation, Authorization and Restriction of Chemicals program, or REACH. REACH's main aim is to protect the citizens and the environment by better identifying the chemicals present in substances. Manufacturers and companies are required to provide data and information on the substances that are being sold in the EU market. If the manufacturer does not do so, then they will be barred from selling their products in the EU market. That information provided by them will be uploaded to a single database in the European Chemicals Agency (ECHA), based in Helsinki, where citizens and companies have full access to this information. One of the main reasons for developing and implementing REACH was because of the hazardous products developed and sold within the market. In some cases, very high amounts of hazardous materials were sold but were not known to the EU regulators or the customer buying the products. With

[1] "RoHS Guide" https://www.rohsguide.com

the implementation of REACH, customers and the EU regulators now have a single database to check the hazards of certain chemicals and products.[2]

Since the increased shipments of hazardous materials throughout the world began in the 1980s, numerous global treaties and conventions have been written to set rules and standards to regulate these chemicals. The European Union is a party to the Basel, Rotterdam and Stockholm conventions, binding the community to follow what is written in the document. Further, the EU has implemented legal measures ensuring that all member states abide by the rules of the treaty. Since each member state must abide the treaties, the laws are enacted on a national level, not on the community level.[3] Therefore, when REACH was established, many of the goals that the EU wanted to change were in the process of being changed at the national level. These four conventions are the Basel Convention (1989), Rotterdam Convention, (1998), The Convention on Long-Range Transboundary Air Pollution (1979) and the Stockholm Convention (2001). These conventions were designed due to the increase of shipments of hazardous waste from industrialized, global north countries to developing, global south countries. Many of these developing countries import these banned chemicals at lower costs than industrialized nations. Additionally, there have been many reports of chemicals beings imported without the formal consent of the country's government. Most of these countries are in Africa, including Zimbabwe, Nigeria, Guinea, Sierra Leone, Congo, Liberia and Gabon.[4]

The Basel Convention outlines the legality of waste management. It was established in 1989 to protect human health from garbage being transported from developed countries to

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[2] "REACH." European Commission. https://ec.europa.eu/environment/chemicals/reach/reach_en.htm

[3] "Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposals." UN Environment Programme. http://www.basel.int/?tabid=4499#EU

[4] OKARU, VALENTINA O. "THE BASEL CONVENTION: CONTROLLING THE MOVEMENT OF HAZARDOUS WASTES TO DEVELOPING COUNTRIES." Fordham Environmental Law Report 4, no. 2 (1993): 137-65. Accessed February 1, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/44174465.

developing countries. According to Katharina Kummer Peiry, the Basel Convention was a good example of an approach moving from bipolar to multipolar. The issue of waste management has moved beyond the export, transit and import of trash to the overall global issues it possesses. Further, non-state actors have become increasingly part of the issue, partnering with governments and the secretariat to ensure the Basel Convention is carried out accordingly. Peiry points out the difficulty in beginning the implementation of the treaty as amendments discussing the ban of shipment of waste from OECD countries to non-OECD countries. The amendment slowed the process down because countries could not agree whether to adopt or not adopt the changes. This ban forced many industrialized countries to leave the negotiating table as it was not in any of their best interests (politically) to allow that amendment to pass. Many developed nations began to see the treaty as assisting the global south to help them improve their waste practices, which was seen a politically irrelevant to the industrialized nations. With changing trade patterns, technologically advancing global south nations and the spike in the price of raw materials began to be taken seriously by the convention. The lone NGO monitoring and evaluating the convention was originally fully supportive of the ban of the shipment of waste from developed to developing countries but started to ease their support of it. Peiry states that the change in the NGO's stance was due to the possibility of using the waste as a cheap alternative to certain raw materials and the possibility of creating new environmentally friendly jobs in these waste receiving nations.[5]

The Rotterdam Convention deals with the international trade in pesticides and industrial chemicals. According to Tomas Mac Sheoin, the Rotterdam Convention faced strong opposition

[5] Katharina Kummer Peiry. "The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal." Proceedings of the Annual Meeting (American Society of International Law) 107 (2013): 434-36. Accessed February 1, 2021. doi:10.5305/procannmeetasil.107.0434.

to the language in the convention that banned certain chemicals and toxic substances, including chrysotile asbestos. The countries that objected to it being placed on the list were the ones most dependent on the industry. Further, it will take a long time for any chemicals or toxic substances to be placed on the list because it must undergo a rigorous set of drawn out and complex procedures. The convention covers 40 chemicals, some of which faced major opposition from many nations. Sheoin mentions two examples, one regarding chrysotile asbestos and the other involving pesticide endosulfan. Canada was thoroughly opposed to listing this toxin under the convention, along with a small number of other countries. They opposed this effort against 100 other countries who were for it in 1998, 2003, 2004 and 2006. Once Canada closed their last asbestos mine in 2013, Canada dropped the issue and went forward with allowing it to be listed as a toxic chemical, though seven other countries, still with open asbestos mines, continued to oppose its listing as a toxic chemical. Second, India rejects the listing of pesticide endosulfan as they are the largest producer and consumer of the chemical.[6]

The Convention on Long Range/Transboundary Air Pollution (CLRTAP) was struck to counter the harmful effects that acid rain and snow have on the environment and human populations. Armin Rosencranz states that the convention was a major advance in international law regarding environmental protection. Additionally, it was the first environmental agreement that brought together both Europe's Western and Eastern Blocs. The agreement allowed for information sharing on certain harmful emissions such as sulfur.[7] Further Jorgen Wettestad in *Designing Effective Environmental Regimes: The Case of the Convention on Long-Range*

[6] Mac Sheoin, Tomás. "Controlling Chemical Hazards: Global Governance, National Regulation?" Social Justice 41, no. 1/2 (135-136) (2014): 101-24. Accessed February 1, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/24361593.

[7] Rosencranz, Armin. "The ECE Convention of 1979 on Long-Range Transboundary Air Pollution." The American Journal of International Law 75, no. 4 (1981): 975-82. Accessed February 1, 2021. doi:10.2307/2201373.

Transboundary Air Pollution (CLRTAP) states that certain countries signed onto the treaty, did not implement enough environmental regulations to achieve its goal, but still reduced their emissions that were called for in the treaty. Wettestad uses the examples of the United Kingdom, the Netherlands and Norway. In the United Kingdom, it was industrial recession, lower demand for energy and privatization of companies that led to emissions reduction. The Netherlands saw a switch from coal to natural gas and Norway reduced their consumption of oil. These three countries are in contrast to Germany where regulation was the reason that they were able to reduce their emissions in line with the treaty. Third, Wettestad states that the United Kingdom does not experience the environmental issues that their neighbors do because of its location. He writes that because of the country's wind and atmospheric conditions, the UK exports most of its pollution to the Scandinavian countries of Norway and Sweden which negatively impacts their soil and precipitation. Britain's switch from cheap coal fired power plants to more expensive, but cleaner, natural gas ones would benefit more of its neighbors than it would itself, proving to be a difficult and expensive situation. Politics transcend the situation as well, as switching from coal to natural gas would mean the loss of thousands of jobs, many who are miners and those who live and work in mining communities. Wettestad sees the situation as toxic for all parties involved.[8]

The Stockholm Convention tackles the issue of pesticides and is designed to help protect the health of humans and the environment from persistent organic pollutants (POPs). Peter L. Lallas states that the treaty contains strong language to restrict if not eliminate much of the world's toxic chemicals. Further, the convention's framework allows for the document to be

[8] Wettestad, Jørgen. "DESIGNING EFFECTIVE ENVIRONMENTAL REGIMES: THE CASE OF THE CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION (CLRTAP)." *Energy & Environment* 10, no. 6 (1999): 671-703. Accessed February 8, 2021. http://www.jstor.org/stable/44397000.

amended to shape the future needs of the world. Further, Lallas states that there is not one framework for all countries to abide by. Instead, there are country specific exemptions that allow for individual countries to be evaluated on their own circumstances. Therefore, underdeveloped countries have more time and are exempt from certain features and requirements listed in the treaty that developed countries must abide by. The ten substances originally discussed for the convention are industrial chemicals. The delegations began negotiations with the intent on fully eliminating these toxins with exceptions of those with "recognized uses." The negotiations proceeded and allowed for each country present at the discussion to state their position on each of the ten chemicals and explain the use for the ones that they didn't want banned.[9]

The EU's REACH program encompasses many of the ideas and policy goals set forth in the global treaties. The EU established its REACH program, as I discussed earlier, to ensure the safety of its member states' citizens and to protect the environment from hazards. The four conventions are specified to certain environmental issues which the EU set out to resolve when implementing its REACH program. The Stockholm Convention, for example, was convened to regulate (or eliminate) toxic pesticides. The EU's REACH program forces the manufacturer to submit the chemical to its main data base, and if EU regulators brand it as being too toxic, then the manufacturer must remove it from market. Therefore, the EU's REACH program essentially compiles all the policies written in each document and puts them into legal force.

I argue here that countries outside the EU are enacting rules to comply with EU regulations. In response to the implementation of the EU's REACH program, Japan revised their regulations regarding chemicals as well. Yoshiko Naiki writes that Japan adopted some of the EU's regulations, but changed them to be more suitable to Japan. Indeed, there were concerns

[9] Lallas, Peter L. "The Stockholm Convention on Persistent Organic Pollutants." The American Journal of International Law 95, no. 3 (2001): 692-708. Accessed February 1, 2021. doi:10.2307/2668517.

among Japanese government officials in attempting to force foreign practices and cultures into Japan. They realized that the difference in culture needed to be amended to allow for compatibility in taking a European law and transforming it to Japanese law. Naiki discusses Japan's Chemical Substances Control Act, known in Japan as Kashinho. Unlike in the EU where the burden is placed on the companies and manufacturers to list the chemicals in their products, in Japan it is the opposite. The government took control of the process to list the chemicals in the products produced by private companies. Due to the size and the importance of the EU market, similar to other countries that will be discussed below, Japan adopted these new regulations to keep their access to the European market open. Similar to the EU, however, the changed policy of Kashinho allows for a sped-up assessment of toxins and chemicals present already on the market. The government will then take those lists of chemicals and create a database similar to the one in the EU.[10] In addition to Japan's new government-run database that lists which chemicals are in specific products, some private Japanese companies have also been following the lead of the EU. Anu Bradford writes that Hitachi, following a RoHS directive decided to phase out six chemicals that are present in 70 of its products by March 2005. Additionally, the company switched to lead-free solder that was used in its Japanese based factories and all of its products produced throughout the world.[11]

Tomas Mac Sheoin adds to Naiki's description regarding Japan. In addition to Japan, both South Korea and China have revised their chemical regulations following the EU's REACH program implementation. Sheoin writes that there are similarities between the new South Korean

[10] Naiki, Yoshiko. "Assessing Policy Reach: Japan's Chemical Policy Reform in Response to the EU'S REACH Regulation." *Journal of Environmental Law* 22, no. 2 (2010): 171-95. Accessed February 1, 2021. http://www.jstor.org/stable/44248732.
[11] Bradford, Anu. *The Brussels Effect. How the European Union Rules the World.* New York: Oxford University Press, 2020.

regulations colloquially known as K-REACH which were introduced in April 2013 and the EU's program. Additionally, China's chemical regulation policies have become increasingly similar to Europe's. In both cases, the regulation of the chemicals gap has increasingly closed, due to the importance of the European market. However, Sheoin notes that while Chinese laws regarding toxins may be increasing, the laws are worthless if they are not enforced. Many of the regional environmental agencies throughout China lack the proper technology and training to ensure the enforcement of these laws, therefore the oversight of chemical regulation slips.[12] The South Korean based company of Samsung proudly displays its compliance to the EU's RoHS standard on its website and ensures that this is part of its global compliance strategy. [13]

Unlike the EU, Japan, South Korea and China, the United States has taken a hands-off approach to regulation in the past three decades. Tomas Mac Sheoin writes that the last time major legislation was written and passed by the United States Congress was following the 1989 oil disaster of the Exxon Valdez off the coast of Alaska. The legislation strengthened federal oversight of the industry. Twenty years later, following the Deepwater Horizon disaster in the Gulf of Mexico, legislation was introduced into Congress but was blocked because a higher dollar limit was placed on oil companies' liability for damages. Throughout those twenty years, the EU overtook the United States as the standard bearer for chemical regulation.[14] Further, many companies have understood the importance of the EU and East Asian markets, and individual companies have come to put their own regulations in place, since the government will

[12] Mac Sheoin, Tomás. "Controlling Chemical Hazards: Global Governance, National Regulation?" Social Justice 41, no. 1/2 (135-136) (2014): 101-24. Accessed February 1, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/24361593.
[13] Bradford, Anu. *The Brussels Effect. How the European Union Rules the World.* New York: Oxford University Press, 2020.
[14] Mac Sheoin, Tomás. "Controlling Chemical Hazards: Global Governance, National Regulation?" Social Justice 41, no. 1/2 (135-136) (2014): 101-24. Accessed February 1, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/24361593.

not. If these companies want continued access to these markets, then they must meet baselines. Anu Bradford states that the vice president of the chemical giant DuPont independently implemented many of REACH's policies ensuring their continued access to the world market.[15] Anu Bradford discusses the importance of REACH legislation, and how with public concern, individual member states and the support of NGOs, the EU increased its oversight of the industry.[16] In addition to DuPont, tech giants such as Apple and Dell have complied with the European standards and advertise this on their respective websites. The leadership of these three massive corporations make it almost impossible for smaller ones not to follow, as long as they want to be relevant.[17] States in the United States began to take action to comply with Europe's REACH program before the federal government did. REACH was implemented by California and the California Department of Toxic Substances Control is forced now to gather safety information and stay in compliance as much as possible with the EU.[18] As other states began amending their chemical regulations, the United States government at the federal level began to do so as well. The Toxic Substances Control Act (TSCA) is the US's chemicals regulation legislation. It began to be revised in 2016 amid lower opposition by private chemical companies. As stated, many American chemical companies have been in compliance with REACH already, so the changes were in the interest of them as well. The amendments to the legislation are similar to REACH but have some important differences. The changed TSCA requires companies to compile less information about the chemicals being used and that it mandates the EPA to show "unreasonable risk" for the chemical to be regulated.[19]

[15] Bradford, Anu. *The Brussels Effect. How the European Union Rules the World.* New York: Oxford University Press, 2020.
[16] Ibid.
[17] Ibid.
[18] Ibid.
[19] Ibid.

The Toxic Substances Control Act (TSCA) was established in 1976 to oversee chemical regulations in the United States. According to John S. Applegate, the TSCA was progressive for its time as it was the standard bearer for regulating chemicals. Unlike REACH, however, the TSCA underperformed as its parent agency, the EPA, did little to enforce it. Additionally, its final text was compromised to appeal to both the left and right and weak interpretation by the judiciary gives it little power and enforcement over national regulating laws. According to Applegate, if the TSCA is *thesis,* then REACH is its *antithesis.* The lack of powerful language and strong interpretation by legislatures and the judiciary makes it weak and difficult to enforce. Whereas REACH is the opposite, it possesses strong language and is enforced vigorously. Applegate states that the TSCA can learn and adopt a lot from REACH and believes the United States should do more to regulate on a federal level. He makes it clear, however, that both programs will continue to guide chemical regulation around the world. Further, Applegate explains that both the TSCA and REACH are not looking to eliminate all toxic chemicals, instead both, even if only in theory, are looking to regulate and control the manufacturing and consumer use of toxic chemicals. Transparency and simplicity should be the end goal for both for these programs. Consumers should be able to have access to information regarding the chemicals in their products, and he believes it should be the government at the helm. Lastly, Applegate states that globalization intensifies the importance of TSCA and REACH. The regulation of chemicals is vital to the safety of human health and the environment.[20]

The EU's REACH program, based on this literature review, shows the influence it has around the world. REACH and RoHS influenced other countries to upgrade their regulations regarding chemicals and toxins. Japan, South Korea and China have adopted many of REACH's

[20] Applegate, John S. "Synthesizing TSCA and REACH: Practical Principles for Chemical Regulation Reform." *Ecology Law Quarterly*35, no. 4 (2008): 721-69. Accessed February 8, 2021. http://www.jstor.org/stable/24114958.

programs and policies to continue to have open access to Europe's market. International treaties that comprise dozens of nations help give legitimacy to Europe's policies and additionally bind nations to certain regulatory standards and to ensure future generations live healthy and in a healthy environment. There are, however, certain gaps present in the literature. These gaps, include, for example, how far will the European Union's policies go to influencing other countries to adopt some of their policies? In other words, will all countries that want access to the European market continue to change their regulatory policies, or will there be a stopping point? Will another country eventually hold the torch of the "world's regulator?" My research adds to the literature by exploring these issues further.

Chapter 2: History of the European Union and its Regulatory Authority

The idea of a unified Europe can trace its roots back to 1693 when English Quaker and American immigrant William Penn developed a proposal entitled "Essay Towards the Present and Future Peace of Europe" which would ensure harmony reigned over the continent.[21] It's obvious to state that Penn's proposal did not come to fruition, as over the next 300 years hundreds of millions of people would die at the expense of leaders' egos and failed attempts at world domination. Following the Napoleonic Wars and the changes Napoleon brought to the continent, French philosopher Saint-Simon wrote his ideas on unifying Europe which similarly reflect the EU institutional framework that is currently present, including a capital that would be close to the EU's current capital, Brussels.[22] The next 100 years would bring about nationalism, the second stage of imperialism and a massive military buildup. The period between Napoleon and World War I experienced relative peace compared to what would follow. Following the deaths and destruction brought upon by World War I, the League of Nations was established to ensure peace prevailed. Hawks on France's political right urged for tougher reparations on Germany, but many hardliners were blocked by the United Kingdom and the United States which signed the Treaty of Versailles, but never joined the League of Nations. Rapprochement between the two countries began with France's foreign minister Aristide Briand who aspired for peace with Berlin. His German counterpart, foreign minister Gustav Stresemann also wanted

[21] PENN, WILLIAM. "AN ESSAY TOWARDS THE PRESENT AND FUTURE PEACE OF EUROPE, BY THE ESTABLISHMENT OF AN EUROPEAN DYET, PARLIAMENT, OR ESTATES CONCLUDED." *The Advocate of Peace (1894-1920)* 58, no. 11 (1896): 280-83. Accessed February 20, 2021. http://www.jstor.org/stable/25750960., 25.
[22] Ibid.

peace between the two nations. Briand understood that peace would only be ensured if both countries worked closely together.

In 1925, both men struck the Locarno Treaty, which secured the post-war settlement and the new territorial changes with Alsace-Lorraine on the border between France and Germany and with Poland on Germany's eastern border (which earned both men a Nobel Peace Prize the following year). In a speech to the League of Nations in 1929, Aristide Briand spoke of the idea of a united Europe. He presented his ideas formally to his European counterparts the following year. The initial discussion centered around a customs union as the Great Depression began to destroy states' economies. Briand's main idea of the union was for France and Germany to cooperate closely together. Briand and Stresemann's ideas were never realized due to the onset of the Great Depression and the rise of nationalism in Germany. The deaths of Briand and Stresemann in 1932 and 1929, respectively, ensured the mutual destruction of any peace between the two countries.[23] The number of deaths and destruction, and the organized killings of eleven million people during WWII, renewed talks of peace. The United Nations was established in 1945 following the war, succeeding the failed League of Nations. However, peace in Europe was a main concern for France especially. France was invaded by Germany three times in less than a century, so they worried for their safety. To begin, the Council of Europe was established in 1949 to ensure peace and democracy, and to protect European citizens from being oppressed by the state. Today, the Council of Europe, with its broad membership of 47 countries, and the European Court of Human Rights, which upholds the European Convention of Human Rights.[24]

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[23] Fischer, Conan. "The Failed European Union: Franco-German Relations during the Great Depression of 1929–32." *The International History Review* 34, no. 4 (2012): 705-24. Accessed February 20, 2021. http://www.jstor.org/stable/24701354., 26.

[24] Cuyvers, Armin. "The Road to European Integration." In *East African Community Law: Institutional, Substantive and Comparative EU Aspects*, edited by Cuyvers Armin, Ugirashebuja Emmanuel, Ruhangisa John Eudes, and Ottervanger

The establishment of the Council of Europe was one step forward in ensuring state sponsored oppression did not occur. Further integration was vital for peace and cooperation among European states, more importantly between France and Germany. The idea of an economic union between states began to take shape, twenty years after Briand's proposal failed. French Foreign Minister Robert Schuman gave a speech, in what is now known as the Schuman Declaration, proposing the idea of pooling resources such as coal and steel between member states. Acting upon this proposal, the European Coal and Steel Community (ECSC) was born and consisted of France, West Germany, and four other Western European nations, the Netherlands, Belgium, Luxembourg and Italy.

Thus, a communal high authority was established to oversee the shared resources of coal and steel. Coal and steel were the backbone of any industrialized state, and there was a lucrative market provided by the US who was supporting the war in Korea which began in 1950. Sharing resources would expound the economies of the six nations, and once these commodities were joined, war would destroy the six countries.[25] The ECSC was the main forerunner to what would become the European Union and the supranational powers it consists of today. The ideas of Briand and Stresemann twenty years earlier finally began to bear fruit. The newfound success of the ECSC led to the establishment and de facto successor of the coal and steel community, the European Economic Community, or the EEC. The Treaty of Rome, signed in 1957, put the EEC into force, allowing trade to move freely across the borders of the six countries, expanding the Community beyond just coal and steel. No specific economic factors were singled out, ensuring that all parts of the economy were now free for trade.[26] In 1984, the EEC became the European

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Tom, 22-42. LEIDEN; BOSTON: Brill, 2017. Accessed February 22, 2021. http://www.jstor.org/stable/10.1163/j.ctt1w76vj2.6. 26.

[25] Ibid., 27.

[26] "History of the European Union." https://europa.eu/european-union/about-eu/history/1945-1959_en

Community (EC) which enhanced economic ties to include political, security and social cooperation. The EC and its forerunner the EEC evolved into the European Union, allowing all sectors of the economy to trade freely across borders and expand this cooperation to other areas. Member countries do not collect tariffs on traded goods, ensuring goods made in Amsterdam will be sold at the same price in Naples. Further, the EEC underwent three enlargements, the first in 1973 with the additions of Denmark, Ireland and the United Kingdom (the latter of which was stalled by Charles de Gaulle's France), the second in 1981 with the addition of Greece and the third in 1986 with the additions of Spain and Portugal.[27] The Community gained further power as the economies of Western European nations added to the wealth and importance of the bloc.

The fall of the Berlin Wall and the Soviet Union led to a new alignment in the community. Germany reunified, shifting the balance of power away from Britain and France and more squarely onto Berlin. The Treaty on the European Union, commonly known as the Maastricht Treaty was signed in 1992, which created the basis of today's European Union. It sets out to further bind the union together, including having a common foreign and security policy, strengthening the power of the European Parliament, and introducing European citizenship. Eventually, a subgroup of the EU created a framework for a common currency known as the Euro.[28] The Maastricht Treaty allowed for the union to take on more responsibility above the individual member states. The most recent convention was the Treaty of Lisbon in 2009, which resolved issues that arose from previous treaties. The treaty greatly expanded the power of the European Parliament and its legislative authority, including in agriculture and energy. Further,

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[27] Cuyvers, Armin. "The Road to European Integration." In *East African Community Law: Institutional, Substantive and Comparative EU Aspects*, edited by Cuyvers Armin, Ugirashebuja Emmanuel, Ruhangisa John Eudes, and Ottervanger Tom, 22-42. LEIDEN; BOSTON: Brill, 2017. Accessed February 22, 2021. http://www.jstor.org/stable/10.1163/j.ctt1w76vj2.6. 34.

[28] "Treaty of Maastricht on European Union." EUR-Lex. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:xy0026

the Parliament and the EU Commission are on an equal footing, ensuring that elected officials have a say in how and what the Union achieves.[29] The history of European integration stretches back centuries, yet it has only been in effect since 1950. As the 20th century continued, the desire for further integration increased and the European Union has adapted to this. Today, the EU consists of 27 countries and over 40 agencies, one of which will be discussed in this thesis, the European Chemicals Agency which oversees the REACH program.

[29] "Treaty of Lisbon." Fact Sheets on the European Union. European Parliament. https://www.europarl.europa.eu/factsheets/en/sheet/5/the-treaty-of-lisbon

Chapter 3: Regulatory Authority

Three EU institutions oversee the regulatory tasks of the EU: The Council of the European Union, the European Parliament (EP) and the European Commission. According to Anu Bradford, author of *The Brussels Effect*, "The Council brings together the executive branches of the member states and is composed of the government ministers of each member state." "The EP represents the EU citizenry and exercises legislative authority in conjunction with the Council in this capacity." Finally, "The Commission functions as the EU's executive arm and enjoys substantial independent decision-making authority."[30] These three institutions are intended to balance each other out, to ensure one branch does not have more power than the other or that one acts on their own. However, the Commission retains a great deal of power, as one of its main objectives is to uphold its commitment of integration. "The Commission has a strong ideological commitment and institutional preference for European integration. As more regulation typically amounts to more integration, the growing regulatory agenda has clearly served the Commission's fundamental goal of furthering European integration."[31] The Commission seeks to ensure all laws and regulations passed in the EU are integrated into the bloc.

Since all regulations are common among the 27 member states, integration is a result regardless. The EU's vast regulatory ability is unmatched when it comes to the world's other economic powerhouses. The United States and China (both of which will be discussed in detail

[30] Bradford, Anu. *The Brussels Effect. How the European Union Rules the World.* New York: Oxford University Press, 2020., 7.
[31] Ibid., 15.

later) are two countries that have the ability and would have the global influence, but both choose not to for separate reasons. The United States lacks the political will to regulate extensively, instead chooses to regulate when it deems only essential. China's regulatory capacity, however, will take some time to build, and it would prefer to build its internal market before mandating further regulations.[32] Therefore, this leaves the European Union as the mantle holder regarding regulations. As a union composed of democratically elected governments, along with its own parliament, the Commission must also work to make sure that its actions taken are accepted by member states, its citizens, and the platforms of political parties across the spectrum. "Harmonized environmental or product safety standards across the EU allow political parties on the left to protect consumers while also allowing parties on the right to prioritize trade across the common market."[33] Both sides of the aisle can claim a victory in this instance, as environmental hazards are commonly a more liberal platform while prioritizing economic trade and business are typically a more conservative platform. European Union regulations, as will be seen later in this thesis, will be the baseline for its regulatory global standing. Countries around the world have adapted to European standards for all products, including chemicals, to ensure their continued access to the EU market.

[32] Bradford, Anu. *CONNECTIVITY WARS: WHY MIGRATION, FINANCE AND TRADE ARE THE GEO-ECONOMIC BATTLEGROUNDS OF THE FUTURE*. Report. Edited by LEONARD MARK. European Council on Foreign Relations, 2016. 133-40. Accessed February 23, 2021. doi:10.2307/resrep21667.20., 135.
[33] Bradford, Anu. *The Brussels Effect. How the European Union Rules the World.* New York: Oxford University Press, 2020., 13.

Chapter 4: REACH Legislation

REACH, or Registration, Evaluation, Authorization, and Restriction of Chemicals is the legislation that oversees limits that requires private companies to report hazardous materials found in their products. REACH is overseen by the European Chemicals Agency (ECHA), an agency of the European Union, established in 2007 and based in Helsinki.[34] The mission of the organization is "To be at the center of knowledge on the sustainable management of chemicals, serving a wide range of EU politics and global initiatives, for the benefit of citizens and the environment."[35] The agency is present to ensure the safety of citizens and the environment of the EU and its member states. According to the European Commission's website,

> REACH shifts the responsibility from public authorities to industry with regards to assessing and managing the risks posed by chemicals and providing appropriate safety information for their users. It impacts on a wide range of companies across many sectors beyond the chemical industry. It requires new forms of cooperation among companies, enhancing communication along the supply chain, as well as developing tools to guide and assist companies and public authorities in its implementation.[36]

REACH puts the responsibility on the private companies as opposed to the government. Though the EU does not restrict REACH to the chemical private sector, this thesis will just focus on the

[34] "This is ECHA" https://echa.europa.eu/documents/10162/13550/this_is_echa_en.pdf/fd62ae88-bfbb-7bf4-a3c5-acd9a78e3096
[35] "Mission." ECHA https://echa.europa.eu/about-us/who-we-are/mission
[36] "Internal Market, Industry, Entrepreneurship and SMEs." European Commission. https://ec.europa.eu/growth/sectors/chemicals/reach_en

chemical companies involved. The main objective of the program, similar to the overall objective of the ECHA, is to ensure maximum protection of the health of citizens and the environment, while at the same time allowing the free movement of chemicals throughout the bloc. The goals include ensuring competitiveness and innovation.[37]

REACH and the ECHA work closely with the European Commission which was discussed in further detail in chapter 3. "The Commission plays a key role in the authorization process as it determines the substances subject to authorization and decides whether to grant authorization."[38] After being recommended or not recommended for authorization by REACH and the ECHA, it is up to the Commission on whether or not to allow the chemical to enter the market. Further, a committee composed of representatives from each EU member state is present to discuss the following tasks: regulation of fees, regulations on the arrangements for the Boards of appeals and ECHA and the regulations on test methods.[39] The committee, made up of individuals from member states, has the final say on whether to grant access, or not, to the distribution of a certain chemical. REACH and the ECHA can work together to allow, or not to allow a certain chemical to be distributed. Then the decision is passed onto the Commission, who's leadership may say yes or no. However, the committee has the power to reverse that decision.

One more step is required if the above succeeds. The governments of member states must then ensure careful enforcement of the regulations. This is where the ECHA's Enforcement Forum formally known as the Forum for Exchange of Information on Enforcement, comes into play. The forum works with regulation networks across the Union to ensure correct enforcement

[37] Ibid.
[38] Ibid.
[39] Ibid.

on the EU's set of regulations and make sure they are correctly applied. The Forum is composed of one representative from each member state and meets three times a year to ensure the enforcement of REACH regulations.[40] The bureaucracy surrounding chemical regulation in the EU may seem extreme, but it is set up to protect the health and safety of European citizens and the environment they live in. REACH was created to enforce private companies in taking responsibility for being transparent to their consumers.

Anu Bradford in *The Brussels Effect* discusses the importance of REACH legislation. Public concern helped drive the EU to act along with new legislation arising from member states. "Sweden spearheaded a push for new chemicals regulation, supported by Austria, Denmark, Finland, and the Netherlands. A number of environmental, health, and consumer advocacy NGOs voiced support."[41] Bradford writes that a large coalition between the public and numerous governments helped to drive the bloc to adopt new chemical regulation standards. Other organizations started to support the need for new legislation as well. "In particular, large retailers, who sought to bolster consumer confidence and avoid chemical standards, supported REACH. Regulators also received critical backing from the Commission's Directorate General for the Environment and the Parliament's Environment Committee."[42] The vast support for reforms made it almost impossible for the Commission and Parliament *not* to act. Unlike in other countries such as Japan and the United States (both of which will be discussed in a later chapter) the majority of the public *and* private businesses supported the new legislation. This is a huge contrast especially with the United States, where private companies and anti-regulators cry foul when drafting new legislation that would reform the industry.

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[40] "Enforcement Forum." ECHA. https://echa.europa.eu/about-us/who-we-are/enforcement-forum
[41] Bradford, Anu. *The Brussels Effect. How the European Union Rules the World.* New York: Oxford University Press, 2020., 195.
[42] Ibid.

Though many industries supported new reforms, there were obviously critics mostly from the chemical industry itself. They argued that new regulation would increase costs which would eventually be passed down onto the consumer and that the law would impede new development of substances, fearing that they would not comply with EU requirements.[43] European nations with large chemical industries including France, Germany, Italy, Ireland and the United Kingdom understood the concerns of the industry, but failed to match the enthusiasm of those supporting the legislation.[44] Four out of the five largest producers were the bloc's largest and most influential nations, and even they could not stop the passage of the legislation. This shows how dedicated the advocates of the bill were. In addition to the European governments and chemical companies against the reforms were, one of the, if not the largest opponents to the reforms was the United States. As will be discussed in a later chapter, the United States prefers to take an anti-regulation approach, mostly backed by large corporations who have sway over politicians. Bradford writes: "With the full support of the Bush administration, US firms engaged in 'eight years of vigorous opposition,' arguing that REACH would burden manufacturers for little gain for health and the environment. In 2002, then-Secretary of State Colin L. Powell directed American embassy staffs across Europe to oppose REACH."[45] Due to its anti-regulatory stance it is clear why the United States did not want REACH to pass. They understood the implications the legislation could have on the American chemical industry and the loss of profit that would happen. In addition to Powell's direction, Washington filed a formal complaint with the Commission and again with industry leaders, they "engaged in efforts to 'educate' other [non-EU] countries so that they could join the United States in raising concerns about

[43] Ibid.
[44] Ibid., 196.
[45] Ibid.

REACH."[46] As we know today, the efforts of the US to erase REACH were moot. Even with the backlash, the legislation was able to be passed through, and REACH became the world's most impactful regulations.

[46] Ibid.

Chapter 5: Non-EU Countries Adapting REACH-Like Legislation

This chapter explores how non-EU countries adopted REACH like legislation and programs in the wake of EU adoption. Countries outside Europe that have adopted some REACH programs include South Korea, Japan and China. Europe's large internal, high income market, consisting of over 440 million people, makes it a desirable place for goods from other countries. These goods must abide by regulations put in place by the European Union, therefore, non-EU countries must ensure their goods comply.

South Korea

South Korea's regulation of chemicals dates back to the 1960s, similar to when other nations began regulating their chemical industries. The first piece of legislation was passed in 1963 titled the "Act on Poisons and Toxins" which focused on preventing the poisoning of human beings by chemicals. In 1990, the government enacted the Toxic Chemicals Control Act (TCCA) which expanded the scope of chemical protections, beyond just citizens' health, but also included the environment as well.[47] Following the passage of Europe's Restriction of Hazardous Substances Directive (RoHS) initiative which restricts the use of certain chemicals and toxins in consumer electronic equipment, the South Korean government adopted their own version, The Act for Resource Recycling of Electrical and Electronic Equipment, colloquially known as "Korean RoHS," which has the same functions as the EU's legislation.[48] Seoul began to copy

[47] https://www.ipc.org/media/2442/download
[48] https://www.ipc.org/media/2442/download

much of the legislation passed by the EU that became known as REACH. South Korea's Ministry of Environment of Korea (MoE) enacted "The Act on Registration and Evaluation, etc. of Chemical Substances," and was dubbed "K-REACH."[49] K-REACH mirrors much of the EU's own program and was designed to do so. Some similar qualities include appointing an only representative (someone based physically in the EU who possesses abundant knowledge in the handling of toxic substances[50]) and both share a main purpose: to ensure the health and safety of citizens and environment.[51] Some differences include South Korea's coverage of biocides while the EU does not. Also, the EU requires all companies to register all existing substances, while South Korea only mandates registration of *required* substances.[52] South Korea's implementation of similar REACH legislation was due in part to acquiring access to the European Union's market.

South Korea's adoption of many EU policies has proved the importance of the EU's market to the country. In *The Brussels Effect,* Anu Bradford notes that South Korea has quickly copied many of REACH's policies. "Several sources indicate that the EU was used as a model for South Korea's law. The Korean Ministry of Environment website notes that 'Advanced countries enforce a variety of environmental regulations on electrical & electronic and automobile industry more strictly to serve the cause of sustainable development…'"[53] Bradford states that regulations are put forward to ensure the health and safety of their citizens and the

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[49] https://www.reach24h.com/en/service/chemical-service/k-reachact-on-registration-and-evaluation-etc-of-chemical-substances.html

[50] https://echa.europa.eu/support/getting-started/only-representative

[51] https://www.reach24h.com/en/service/chemical-service/k-reachact-on-registration-and-evaluation-etc-of-chemical-substances.html

[52] https://www.chemsafetypro.com/Topics/Korea/Difference_between_K-REACH_and_EU_REACH.html#:~:text=EU%20REACH%3A%20mainly%20registration%20of,for%20product%20of%20risk%20concern.

[53] Bradford, Anu. *The Brussels Effect. How the European Union Rules the World.* New York: Oxford University Press, 2020., 224.

environment, and that all developed countries have an obligation to do so. The South Korean government adopted these EU laws for these reasons. According to Tomas Mac Sheoin in "Controlling Chemical Hazards: Global Governance National Regulation?" he states that South Korea was forced to adapt to European like chemical policies if they wanted to continue their access to the EU market. "In the case of [South] Korea, the state argued that the regulatory gap between [South] Korea and the EU and OECD countries was a threat to competitiveness of the [South] Korean chemical industry due to its lack of capacity to respond to foreign regulations."[54] South Korea's chemical industry was growing exponentially throughout the first decade of the twenty-first century, Mac Sheoin adds. South Korea's chemical industry rounded out the top five for the first time, leapfrogging over nations such as France, Taiwan and the Netherlands, worth over USD$149 billion by 2014.[55] The country's growing chemical industry increased due to its use of regulated chemicals in their products.

Unlike in the United States, France and Taiwan who produce biochemicals and pharmaceuticals for export, countries like South Korea produce chemicals that are then used in a finished product manufactured in their own country.[56] Chemicals produced in South Korea are put into finished products including automobiles and machinery, and then exported to its major trading partners such as the United States and the European Union. Indeed, the European Union is South Korea's third largest export destination, and South Korea is the EU's eighth largest export destination. The main exports to the European Union include machinery, transport

[54] Mac Sheoin, Tomás. "Controlling Chemical Hazards: Global Governance, National Regulation?" Social Justice 41, no. 1/2 (135-136) (2014): 101-24. Accessed March 16, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/24361593., pg. 110.
[55] Ibid., 103.
[56] Ibid.

equipment, appliances and plastics, all four of which require chemicals to be produced.[57] South Korea's adoption of REACH-like policies allows for easier access to trade without worrying about abiding by EU REACH regulations. Further, South Korea has achieved a trade surplus with the European Union beginning in 2017. Since 2009, trade has grown between the two nations, and grew faster following the passage of K-REACH. In 2009, the EU imported nearly €30 billion worth of South Korean goods. By 2019, that number surpassed €47 billion. The majority of the surplus began after the adoption of K-REACH, growing nearly €10 billion over four years, from 2015 to 2019.[58] Easing the barriers to trade by synching their chemical regulations made it significantly easier to export goods from South Korea to the European Union. Brussels' tightening of regulations forced other countries, in this example, South Korea, to do the same. It would have been too much to lose access to South Korea's third major trading partner had they not further regulated their chemical industry.

Japan

Japan's original chemical legislation was passed in 1973, titled Chemical Substances Control Act, colloquially known as Kashinho. The legislation predated that of the Europe (1979) Union and the United States (1976).[59] Japan's chemical legislation began to develop around the same time as it did in other developed countries. Yoshiko Naiki in "Assessing Policy Research:

[57] "Countries and Regions: South Korea." European Commission. https://ec.europa.eu/trade/policy/countries-and-regions/countries/south-korea/
[58] "European Union: Trade in Goods: South Korea." European Commission. https://webgate.ec.europa.eu/isdb_results/factsheets/country/details_south-korea_en.pdf
[59] Naiki, Yoshiko. "Assessing Policy Reach: Japan's Chemical Policy Reform in Response to the EU'S REACH Regulation." Journal of Environmental Law 22, no. 2 (2010): 171-95. Accessed March 22, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/44248732., pg. 184.

Japan's Policy Reform in Response to the EU's REACH Regulation," writes that like many other non-EU countries Japan adopted many EU like REACH regulations to ensure the continued access Tokyo has to the European market.[60] Japan is the EU's second largest trading partner in Asia, just after China and is the bloc's seventh largest importer and exporter of goods overall.[61] Japan exported €63 billion worth of goods in 2019, surpassing the 2011 high of €60 billion.[62] The European Union is a vital market for Japanese goods and securing its continued access had to be ensured. As stated above, the EU and Japan were integral trading partners before the implementation of REACH, but one of REACH's defining principles was to ensure that *all* chemicals entering the market were accounted for and studied. "REACH now covers 'old' substances that are already on the market in addition to 'new' substances yet to be introduced into the market."[63] The term 'old substances' refers to chemicals present on the market before the passage of chemical legislation in the 1970s. Chemical manufacturers were obligated to submit the risks of these toxins, but only certain ones were given 'priority.' This allowed chemical producers to skirt the long, sometimes arduous system of waiting for a chemical to be allowed to be sold on the market as it was already grandfathered into the system. The new legislation, however, closed this loophole, ensuring that all chemicals are thoroughly studied for the benefit of the consumer and the environment. Kashinho requires all substances to be studied including old and new chemicals. Similar to prior REACH regulations, Kashinho underwent minor delays in assessing the risks of old chemicals. These delays were overcome, however, when Japan's

[60] Ibid., 177.
[61] "Countries and Regions: Japan." European Commission. https://ec.europa.eu/trade/policy/countries-and-regions/countries/japan/
[62] "European Union: Trade and Goods with Japan." European Commission. https://webgate.ec.europa.eu/isdb_results/factsheets/country/details_japan_en.pdf
[63] Naiki, Yoshiko. "Assessing Policy Reach: Japan's Chemical Policy Reform in Response to the EU'S REACH Regulation." Journal of Environmental Law 22, no. 2 (2010): 171-95. Accessed March 22, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/44248732., pg. 183.

three ministries overseeing Kashinho (Ministry of Economy, Trade and Industry, the Ministry of the Environment and the Ministry of Health, Labor and Welfare) proposed amending the legislation in 2008. The amendment passed the Japanese Parliament in May 2009, only three years after REACH legislation was passed by the EU.[64] Kashinho's amendments were passed by Parliament relatively quickly, considering the entire process lasted only about a year from proposal to passage. The Japanese Government may have seen the influence REACH was going to have on trade in the long term and acted quickly to avoid a drop off in trade or a possible trade deficient in Brussels' favor. Japan's adoption of REACH-like policies ensured continued access to the EU market. However, Japan tailored these new amendments for them to operate more smoothly in their own work culture.

One of the policies adopted by Japan from REACH was the speeding up of the risk assessment process from the 'old' substances already on the market. Unlike the European legislation, however, Japan sets up a 'prioritization' approach. "Based on such information provided by industry, the government will make a list of 'priority chemicals.'…when a substance falls into the 'priority chemicals' category, industry is required to conduct a hazard assessment, and is subject to further risk assessment by the government."[65] Japan adopted the general practice of the REACH's policy to speed up risk assessment, but customized it to fit their own regulation policies.

Japan copied many of the same ideas of REACH, but it diverged greatly from Europe on who should bear the responsibility of risk assessment. As discussed earlier, one of the main policies Japan took from REACH was to regulate old chemicals already on the market and to speed up the process of assessing them. However, one of the most important differences is who

[64] Ibid., 185.
[65] Ibid., 186.

oversees the process and who is in charge of conducting risk assessment. Earlier in the thesis, it was stated that REACH places this responsibility on the industry manufacturers. In Japan, however, the responsibility of risk assessment is placed on the government *not* the manufacturers. Naiki lays out four reasons why Japan uses this approach as opposed to the European one, but only two are relevant for this thesis. First, Naiki discusses the reason why the Japanese government retains responsibility over risk assessment. "Why wasn't the [government] attracted by industry responsibility? It is difficult to discern a clear reasoning from the proceedings, but one member in the working group stated that 'basically, risk assessment done by the government is more trustworthy (than that one done by industry).'"[66] Indeed, the working group established by the three ministries mentioned above understood the lack of trust citizens had in private industries, and believed it was best for the government to have the final say in risk assessment.

Second, Naiki writes: "there was no emerging action on the part of Japanese industry to support REACH-type reforms. Yet, since Europe is the second largest export destination for Japan, Japanese industry needs to implement REACH respectively in order to continue trading with Europe."[67] Manufacturers in Japan were not enthusiastic, or able and willing to adopt REACH-like reforms if they did not have to. However, it was understood that continued access to the European market forced them to adopt these policies.

Naiki's first and second points show that Japanese citizens' lack of trust in industry integrity led the government to ensure the oversight of chemical risk assessment. Unlike in the EU where industry bears all of the responsibility, in Japan the industry contributes some, but the final risk assessment lays with the government.

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[66] Ibid., 190.
[67] Ibid., 191.

In addition to Naiki's findings, in *The Brussels Effect,* Anu Bradford also discusses Japan's adoption of REACH-like policies. To a lesser extent than South Korea, Japan amended Kashinho to mirror some REACH policies, but veered away from duplicating the entire legislation. "However, Japanese law does not, for instance, extend the need to disclose information regarding the entire supply chain. Importantly, the government conducts risk assessment in Japan, whereas under REACH, industries that manufacture or import chemicals in quantities exceeding ten tons bear that responsibility."[68] Bradford states that Japan does not force the industry manufacturers to include the entire supply chain from the start of the chemical production to the finished product. The reason for that is because the government oversees the risk assessment of the chemicals and the industry does not, contrary to Europe.

Japan's oversight of the chemical industry rests mainly on the government with only some input from private manufacturers. As stated above, citizen's lack of trust in private industry is one of the main reasons. Private companies understand the fruitful European market and they need to ensure they abide by their regulations to ensure their continued access. Though Japan did not copy word for word from REACH, in contrast to South Korea, they instead adopted the policies that would fit their workplace culture more and still have access to the European market.

China

China's intense economic growth throughout the 1990s and first two decades of the 21st century has catapulted it to the top of the list of EU trading partners. As of 2014, China's chemical industry was valued to be USD $930.7 billion, way ahead of the United States at only

[68] Bradford, Anu. *The Brussels Effect. How the European Union Rules the World.* New York: Oxford University Press, 2020., 203.

USD $517.7 billion. The American Chemistry Council (ACC) projected in 2006 that China's chemical industry would grow at a rate of 10.6% per year.[69] Indeed, China's rise to the top has offset the historical balance between North America and Europe, and now forces these nations to adapt. In "Controlling Chemical Hazards: Global Governance, National Regulation?" Tomas Mac Sheoin writes: "Effective law enforcement has been a challenge for the government. Some of the factors that comprise this include legislative lacunae such as the lack of effective penalty clauses and implementation procedures."[70] Sheoin's first point is that the lack of government oversight leads to local governments being content with not following Beijing's laws. If the laws are not to be enforced, then why follow them? Further, Sheoin writes:

> Particular problems result from the fact that that 2,500 local Environmental Protection Bureaus (EPBs), which are responsible for the day-to-day enforcement of environmental regulations, while ultimately reporting to the Ministry of Environmental Protection (MEP) in Beijing, also report to local governments, which control their financial and human resources…EPBs often lack proper technology and a trained cadre to monitor and enforce standards, whereas discharge fees, despite being prescribed in governmental regulations, 'are in reality negotiable with EPBs or local governments.'[71]

Sheoin writes that the local EPBs do not have the proper resources to follow the protection legislation imposed by Beijing. For the environmental protection to be successful, the local governments need these resources, or the entire body of legislation is pointless.

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[69] Mac Sheoin, Tomás. "Controlling Chemical Hazards: Global Governance, National Regulation?" Social Justice 41, no. 1/2 (135-136) (2014): 101-24. Accessed March 26, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/24361593.,, pg. 103.
[70] Ibid., 119.
[71] Ibid.

Why am I writing about Chinese environmental protection legislation in this thesis? For the Chinese government to adopt REACH policies, the entire line, from chemical producers in Yichung City to the finished product being shipped off from a dock in Guangzhou, needs to be airtight. No illegal chemicals, or corruption in local government, can allow this to happen if China wants to continue shipping their goods to the EU market.

Trade between the Chinese and European markets is enormous. Trade between the two countries in 2020 amounted to €585 billion. China was the third largest exporter to the EU and the largest partner for imports.[72] The main goods exported to China from the EU are machinery and equipment, motor vehicles and aircraft, whereas the main goods exported to the EU from China are consumer goods, footwear and also machinery and equipment.[73] The goods traded between the two markets help drive the economies of both countries. Therefore, China's need to adopt REACH-like policies is high.

According to "Regulating Chemicals: Law, Science and the Unbearable Burdens of Regulation," China's Ministry of Environmental Protection in 2010 revised their provisions on chemical protections. "China released a revised version of the Provisions on Environmental Administration of New Chemical Substances under which companies are required to submit new chemical substance notifications to the Chemical Registration Center (CRC) of the MEP for new chemicals irrespective of annual production tonnage."[74] Following the EU passage of REACH in 2006, China understood that they had to update their chemical regulations and did so four years

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[72] "China- EU: International Trade in Goods Statistics." Eurostate, Statistics Explained. https://ec.europa.eu/eurostat/statistics-explained/index.php/China-EU_-_international_trade_in_goods_statistics

[73] "Countries and Regions: China." European Commission. https://ec.europa.eu/trade/policy/countries-and-regions/countries/china/#:~:text=The%20European%20Union%20and%20China,open%20trading%20relations%20with%20China.

[74] "Regulating Chemicals: Law, Science and the Unbearable Burdens of Regulation." Annual Reviews. https://www.annualreviews.org/doi/full/10.1146/annurev-publhealth-031914-122654

later. This became known as China REACH, albeit some major differences. Unlike South Korea where much of the European version was adopted into their legislation, China fares more like Japan, but still with some differences. "China REACH has no requirements for registration (with data) for the 45,612 chemicals already listed in the Chinese existing chemical inventory."[75] Registration of already listed chemicals are not required to be newly listed, even after the passage of the new amendments. This is a significant difference from the EU, South Korea and Japan as they require *all* substances to be listed. Further, unlike the two markets previously discussed, "in China REACH, some ecotoxicological tests must be carried out on Chinese-specific creatures in certified Chinese laboratories."[76] As we know, China's government has a larger and more influential say in their chemical industry as their government is different from the two already mentioned. Industry in China is more regulated as well, giving significantly more power to its government, and allowing them to decide what chemicals can and cannot be present on the market and which ones can be investigated further for the risks they impose on the health of its citizens and to the environment.

Additionally, in *The Brussels Effect,* Anu Bradford writes further about the policies China's Ministry of Environment Protection adopted in 2010.

> China's tonnage-based notification system (that is, a system requiring different disclosures for quantities of 1 ton, 10 tons, etc.) is similar to REACH's structure. Thus, both systems apply the principle of 'higher volume, more data.' Also, the Chinese reform, like REACH, subjects both producers and importers to annual reporting and record-keeping requirements.[77]

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[75] Ibid.
[76] Ibid.
[77] Bradford, Anu. *The Brussels Effect. How the European Union Rules the World.* New York: Oxford University Press, 2020., 203.

Bradford points out that China was—and still is—impacted by the EU's health and environmental legislation, and until China's government decides to surpass the EU in tightening regulations, Brussels will be the major force.

Further, Bradford states China has adopted many policies almost immediately after the EU imposed them. For example, Bradford uses an example of consumer products and children's toys. Bradford writes: "a year after the EU restricted the use of phthalate plasticizers in toys, China similarly updated its own toy safety standard in 2014. The new Chinese safety standard presented a significant change, and it was made with reference to the prevailing EU standards."[78] China's quick response to EU restriction shows the importance that the European market is to them, and the strength and influence that the bloc's regulations have on foreign markets. As will be discussed next, China's regulations are more in line with United States legislation, although their governments and approach to industry are drastically different.

[78] Ibid., 204.

Chapter 6: The United States' Independent Approach to Chemical Regulation

Unlike the previous three countries discussed, the United States takes a unique approach regarding its regulations. The United States' main guiding regulatory document is the Toxic Substances Control Act (TSCA), entering into force in 1976. The TSCA was conceived based on a paper titled *Toxic Substances* written by the Executive Office of the President's Council of Environmental Quality (CEQ) in 1971. The CEQ was concerned about the gap between the health of individuals and the laws regarding the quality of the air and water. Congress eventually wrote much of what the paper proposed into law in 1976.[79] The passage of the TSCA was a success at the time for environmentalists and for those who believed the current laws were not strict enough for regulating the health of individuals. The final text, however, was still a compromise for those that believed the passage was too much government regulation. Even worse, adverse judicial interpretation and weak implementation by the federal government and states rendered the document almost useless, as the Environmental Protection Agency (EPA) relies on informal voluntary measures to regulate the chemical companies more than they strictly implement the legislation.[80] The United States Congress made little attempt to enforce this legislation and left much of the work up to the respective states where many also made only small attempts at enforcement. However, when a single river runs through numerous states, it will only take one small incident to affect the others downstream.

[79] Applegate, John S. "Synthesizing TSCA and REACH: Practical Principles for Chemical Regulation Reform." Ecology Law Quarterly 35, no. 4 (2008): 721-69. Accessed April 11, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/24114958., pg. 723.
[80] Ibid.

The last major response Congress made following an environmental disaster was in 1989 following the Exxon Valdez oil spill off the coast of Southern Alaska. Unlike the European Union who prefers to act before a disaster strikes, the United States favors a "show me the bodies" approach, where they wait until after a disaster occurs before taking action. The approach in the US is championed by anti-regulators those who believe in smaller government. After the above-mentioned oil spill, Congress passed the "Oil Pollution Act of 1990 which significantly strengthened federal regulation."[81] According to the EPA, the legislation "streamlined and strengthened the EPA's ability to prevent and respond to catastrophic oil spills. A trust fund financed by a tax on oil is available to clean up spills when the responsible party is incapable or unwilling to do so."[82] Congress used their governing power to ensure another disaster like the Exxon-Valdez could be cleaned up safely and effectively, albeit what anti-regulators wanted. The Deepwater Horizon Oil Spill of 2011, which was larger and more disastrous, failed to create any legislation, as anti-regulators proved successful in their quest to block government oversight. Tomas Mac Sheoin writes: "While legislation was introduced that would tighten regulatory standards for offshore drilling and put a higher dollar limit on liability for damages, strong Republican support for offshore oil drilling prevented its enactment."[83] Twenty years after what many thought would be the worst oil disaster in history were proven wrong. However, Congress united to act in 1989 which they failed to do twenty years later because of the increased strength of private business interests. This can be seen as a point where

[81] Mac Sheoin, Tomás. "Controlling Chemical Hazards: Global Governance, National Regulation?" Social Justice 41, no. 1/2 (135-136) (2014): 101-24. Accessed April 11, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/24361593., pg. 110.
[82] "Summary of the Oil Pollution Act." EPA. https://www.epa.gov/laws-regulations/summary-oil-pollution-act
[83] Mac Sheoin, Tomás. "Controlling Chemical Hazards: Global Governance, National Regulation?" Social Justice 41, no. 1/2 (135-136) (2014): 101-24. Accessed April 11, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/24361593., pg. 110.

the European Union increased its power in being the world's regulator. Unlike in 1989, where the EU's predecessor, the European Community consisted of nations west of the Berlin Wall, in 2011, the European Union had expanded eastward, encompassing many former Soviet occupied states and a significantly expanded into a larger market. At the same time, the US was backing away from regulating pollutants and toxic waste. This evidence further proves my argument that the European Union is the world's largest and most important regulator, overtaking the United States especially following the 2011 oil spill. The EU's increased market strength since 1989 assists this claim.

Four large, comprehensive international treaties have come into force in the second half of the twentieth century and the first decade of the twenty-first century regarding hazardous chemicals and toxic waste. The influence of these treaties has proved important for governments reforming their chemical regulatory laws, but have also revealed differing national views, pitting countries against each other. It is important to understand the background of each agreement, why were written initially, and then detail the importance of implementation or non-implementation of their policies. In addition, I show which agreements the US and EU members have signed and ratified.

First, the Basel Convention deals with the shipment of toxic waste from industrialized countries to poorer, mostly African states. The convention went into force in 1989 and was in response to the massive increase in shipments of toxic waste throughout the 1980s. In the United States alone, the number of companies looking to export waste reported to the EPA went from only 12 in 1980 to more than 638 in 1988. The European Union is a party to the convention, along with all EU member states, whereas the United States signed it, but its Senate has not

ratified it.[84] Toxic waste management affects every country, no matter where the waste ends up. Shipping the waste to Nigeria can have ill effects as far away as Australia, as a globalized world will have products shipped from the former to the latter, resulting in harm to the latter.

Second, the Rotterdam Convention was adopted in 1998 and entered into force in 2004. The treaty bans 40 chemicals but considering there are over 80,000 chemicals on the market in the United States alone, this number seems rather small. However, attempting to get all parties to sign onto the banning of certain chemicals is a monumental task in itself. One of the largest obstacles was attempting to ban asbestos, which we know as being very toxic and can eventually lead to cancer. Canada played a large role in defending the product, as it operated one of the largest mines. Eventually, once that mine closed in 2013, Ottawa surrendered and eventually supported the effort to ban the toxin.[85] As with most treaties and international decisions, the decision to ban or fight to keep certain chemicals on the market is a political issue. Like the Basel Convention, the European Union, along with 164 other UN member states and a handful of observer nations are partied to the Rotterdam Convention, whereas the United States is not.

Third, the Convention on Long Range/Transboundary Air Pollution (CLRTAP) was written during the Cold War and went into effect in 1983. The treaty was a major win for environmentalists and diplomats especially those interested in the East-West détente. It was one of the first treaties that brought together Europe's Eastern and Western Blocs, plus Canada and the United States. The treaty was successful in decreasing emissions, especially sulfur, but not to

[84] OKARU, VALENTINA O. "THE BASEL CONVENTION: CONTROLLING THE MOVEMENT OF HAZARDOUS WASTES TO DEVELOPING COUNTRIES." Fordham Environmental Law Report 4, no. 2 (1993): 137-65. Accessed April 14, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/44174465., pg. 137.
[85] Mac Sheoin, Tomás. "Controlling Chemical Hazards: Global Governance, National Regulation?" Social Justice 41, no. 1/2 (135-136) (2014): 101-24. Accessed April 11, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/24361593., pg. 105.

the extent that the treaty called for.[86] The treaty's importance rests on the fact that emissions do not just harm the health of citizens and the environment in one country, they affect neighboring countries as well. Reducing one's emissions helps everyone at large.

Fourth, the Stockholm Convention was written in 2001 and covers pesticides and safeguarding the health of citizens and the environment. Unlike the previous three conventions discussed, the Stockholm Convention does not have one standard set of rules that all countries need to abide by. Instead, developing countries are exempt from certain parts of the treaty that industrialized countries must follow.[87] The convention takes into consideration countries of the global south, many of whom cannot afford to obey the strict policies imposed on the advanced OECD countries.

These four conventions eventually establish two sides of the debate on regulating toxins in the international community, as argued by Tomas Mac Sheoin. "Two main positions have been identified in these negotiations: on one side are the United States and the chemical industry; on the other, the European Union and various other national governments, as well as international and non-governmental organizations (INGOs)."[88] Following a lack of reform in its own chemical regulation policies, and the rise of the EU's influence, the United States ceased to be the world's regulator, and blindly passed that torch to the EU. As will be discussed further in this chapter, the US's TSCA policies have been largely ignored and have since become outdated.

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[86] Wettestad, Jørgen. "DESIGNING EFFECTIVE ENVIRONMENTAL REGIMES: THE CASE OF THE CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION (CLRTAP)." *Energy & Environment* 10, no. 6 (1999): 671-703. Accessed February 8, 2021. http://www.jstor.org/stable/44397000., pg. 672.
[87] Lallas, Peter L. "The Stockholm Convention on Persistent Organic Pollutants." The American Journal of International Law 95, no. 3 (2001): 692-708. Accessed April 14, 2021. doi:10.2307/2668517., pg. 692.
[88] Mac Sheoin, Tomás. "Controlling Chemical Hazards: Global Governance, National Regulation?" Social Justice 41, no. 1/2 (135-136) (2014): 101-24. Accessed April 11, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/24361593., pg. 109.

John S. Applegate continues by discussing the EU's adoption of the precautionary principle. The precautionary principle was first introduced in 1972 following the Stockholm conference on the environment and was developed further in 1985 at a Vienna Conference discussing the depletion of the ozone layer and can be defined as moving legislation forward albeit scientific uncertainty of a specific causal outcome. In the context of REACH, there may be uncertainty regarding the environmental or health risks, however, limits should be placed to ensure a toxic incedent does not commit major damage. The text states:

> In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.[89]

The European Union wants to ensure that an environmental disaster, regardless of size, does not occur, and therefore puts laws into place *before* one can. Uncertainty regarding a hazard can be quite large, but governmental institutions step in to ensure they have some control over the situation. The United States' TSCA was never amended to encompass the precautionary principle, and therefore, it is left up to private companies and state and local governments to ensure a disaster is met with a proper response. As discussed earlier, a disaster that occurs upriver will affect everyone living downstream, regardless of municipal boundaries.

John S. Applegate further discusses three points that demonstrate the differences between REACH and TSCA. First REACH's approach is to find safer alternatives to industrial chemicals.

[89] Applegate, John S. "Synthesizing TSCA and REACH: Practical Principles for Chemical Regulation Reform." Ecology Law Quarterly 35, no. 4 (2008): 721-69. Accessed April 11, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/24114958., pg. 748.

It has been noted that it would be improbable to attempt to have a chemical-free future. Instead, REACH provides incentives for chemical manufacturers to develop less hazardous and more environmentally friendly products. Additionally, it is the chemical companies who are held responsible for the safety of their chemicals. Since they are legally required to provide this information to consumers, it would cause a public relations nightmare for the company if consumers discovered the company was selling highly toxic products. "The authorization procedure that is required for the most dangerous chemicals creates an even more intense regulatory incentive to find safer substitutes…Authorization is public and expensive…and public analysis is likely to be highly critical of the manufacturers."[90] Applegate states that REACH policies give large incentives to chemical companies to reduce the toxicity levels in their products. The combination of the law and the possibility of outrage from the public will lead to (if it hasn't already) chemical manufacturers to finding safer alternatives than what they are using already.

Second, REACH relies on the principle of "right-to-know," which TSCA does not yet require. Right-to-know laws have two purposes, both of which are important. "The normative purpose gives the legislation its name: citizens are entitled to know the chemicals to which they are exposed and the chemicals' effects. The instrumental purpose of right-to-know laws is to embarrass the users or emitters of chemicals, which has been shown…to act as a strong incentive to reduce or replace the chemicals."[91] What seems like a small clause in REACH, ensuring consumers have open access to what is in their products, has a big impact. Companies do not

[90] Ibid., 750.
[91] Applegate, John S. "Synthesizing TSCA and REACH: Practical Principles for Chemical Regulation Reform." Ecology Law Quarterly 35, no. 4 (2008): 721-69. Accessed April 11, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/24114958., pg. 750.

want to face backlash from their buyers, and to avoid this, they will develop new, safer chemicals. It is a short, one-line sentence in the legislation, but it has large influence.

Third, REACH severely limits the use of chemical testing on animals. The American people are significantly less concerned than populations in other Western countries. However, Applegate writes that the reduction in animal testing presents a problem

> The reduction in animal testing runs directly counter to the commitment to generate more test data…In debates over REACH, industry and animal rights groups both emphasized the uncertainties of animal tests as a surrogate for testing on humans, and they agreed on the desirability of finding alternatives.[92]

This conflict between testing and not testing on animals also presents a question to the populace at large: should I risk using these products on myself when they have not been tested on other living things? To answer that question, the deal struck between the animal rights groups and the chemical industry is to use quantitative chemical structure-activity (QSAR). "QSAR analysis and in-vitro testing [can be used] as a substitute for traditional animal testing. By translating the results of non-animal testing to mammalian effects, QSARs aspire to be the cheap, 'fast track option to deal with data gaps on chemicals.'"[93] What usually seems, from an American point of view anyway, as an almost impossible compromise between large corporations and animal rights groups, was actually achieved. Testing on animals was decided to be a last resort option by both parties. Those against further government regulation in the United States have been very successful in recent years at ensuring Washington does not go too far. However, eventually the time will come that the government will need to ensure that private businesses upgrade their

[92] Ibid., 751.
[93] Ibid., 752.

chemical safety regulations for the health of people and the environment, and, most importantly to many, to ensure that access to the European Union remains open.

One major difference between governmental regulations in the United States and other countries is the powers the American constitution delegates to the states. As this thesis discussed in an earlier chapter, the governments of South Korea, Japan and China were more easily able to impose regulation on chemical manufacturers for numerous reasons, but one that was not discussed is their greater authority over more local, provincial governments. States rights are deeply rooted in the history of the United States, going back to the founding of the nation. As we still see today, states justice departments can sue the federal government if it imposes a policy it does not agree with, or the state believes is unfair, unjust or contrary to its position. The combination of states rights and anti-regulation hawks make it incredibly difficult for members of Congress to pass any form of legislation, much less sweeping, impactful laws.

Chris Hastings, in "TSCA Reforms and the Need to Preserve State Chemical Safety Laws" elaborates further on this point. Hastings begins by using an early court case regarding nuclear safety. The court ruled that the federal government held sole authority over the regulation of nuclear power.

> In *English v. General Electric Co,* [1990] the court determined that the federal government exclusively occupied the field of nuclear safety…because the federal government began regulating in 1954 with the passage of the Atomic Energy Act, continued regulating with the Energy Reorganization Act in 1974, and had routinely amended both statues.[94]

[94] Hastings, Chris. "TSCA REFORM AND THE NEED TO PRESERVE STATE CHEMICAL SAFETY LAWS." Journal of Land Use & Environmental Law 30, no. 2 (2015): 307-30. Accessed April 13, 2021. http://www.jstor.org.ccny-proxy1.libr.ccny.cuny.edu/stable/43741167., pg. 313.

In this example, the court ruled that the federal government had exclusive control over nuclear energy, and that the states only had limited powers, given to them by federal authorities. Further, the federal government continued to amend and reform the original law, most notably in 1974, giving further credibility to Washington's power. The federal government's actions regarding nuclear safety, stands in direct contrast to their lack of actions when it comes to regulating toxins. Unlike nuclear safety, the federal government has not amended the TSCA at all since its inception in 1976. Hastings notes that it has been individual states in the past two decades that have taken it upon themselves to impose regulations. "TSCA expressly permits states to ban a chemical even if the EPA has issued a requirement on the chemical. Therefore—because of the absence of federal toxics regulations, and because of the many laws passed by states in recent years—states have traditionally regulated the field of chemical safety."[95] TSCA allows states to create legislation regarding their chemical industries, but each state will have its own code of laws, differing from state to state. The TSCA essentially serves as the lowest bar which states must comply with. However, other nations have upgraded their laws to be more in line with the European Union, the federal government of the United States should do the same but the backlash by business interests continue to be a challenge.

[95] Ibid., 314.

Chapter 7: Conclusion and Recommendations

This thesis discussed the influence the European Union's REACH program had on nations' chemical regulation policies around the world. Three of the EU's largest trading partners, South Korea, Japan and China all updated their chemical regulation policies to comply with the bloc. The tumultuous history of Europe over the past five centuries forced its member states to cooperate in a new way and ensure peace could be sustained. European integration after World War II brought the two main belligerents of the second millennium, France and Germany, together ensuring war was an act of the past. The regulatory authority of the EU is overseen by the three main bodies of the organization: The Council of the European Union, the European Parliament and the European Commission. These bodies must ensure that the regulations imposed by the Union are implemented throughout the bloc's 27 member states. The REACH legislation enacted in 2007 is the world's most innovative, putting the health and safety of its citizens and environment before that of large corporations and interests of the few. Many of the REACH policies evolved out of single member states like Sweden and Austria and eventually adopted by the Union at large. Reforming the bloc's chemical industry was not a simple task, as Brussels faced backlash from European member states and large industry, along with that from non-EU countries like the United States and its chemical industry. However, the EU's adoption of REACH forced other nations to draft their own REACH-like legislation, including South Korea, Japan and China, all with their own adjustments. These three countries are some of the EU's largest trading partners, and to ensure continued access to its market, respective companies needed to be in compliance with their regulations. However, another large trading partner, the

United States, did not reform to the extent that the Asian countries did. Anti-regulators and proponents of small government oversight helped block any sweeping legislation Congress attempted to pass. The country's guiding document, the TSCA, is outdated and has not been properly updated since its inception in 1976.

The research demonstrated the importance that REACH had on other major economies around the world. Brussels succeeded in become the "world's regulator," proving that the EU's market is an important destination for goods from around the world. Countries were forced to comply with the European Union's new chemical regulations, whether they wanted to or not. The difference between the four countries discussed is the extent each government took to ensure their respective companies' compliance. South Korea and the United States are on opposite ends, the former adopting many of REACH's policies, mirroring much of the EU's legislation, whereas the United States left it up to its individual companies, forced to do so by private businesses' objections to government oversight. Japan and China were more moderate, adopting some REACH-like policies but modified them to their liking. This research answered the first question presented in this thesis: how far will the European Union's policies go to influencing other countries to adopt some of their policies?

The second question: Will another country eventually hold the torch of the "world's regulator?" proves more difficult to answer than the first. Based on the completed research, it is unlikely that another country will take over the lead as the "world's regulator" in the foreseeable future. Japan and South Korea are major exporters to the European Union, and have large economies respectively, but not large enough for other nations to accept full compliance with any new regulations implemented. The evidence provided in this thesis proves that anti-regulators and promoters of small government in the United States possess too much control over

legislators for them to pass any expansive chemical regulations that could rival that of the EU, and force other large economies to change their regulations. China is the only nation left that remains capable of holding the torch. However, this possibility remains highly unlikely. As based on the research, we learned that environmental protection in China can be corrupt and unless Beijing reforms the chain of command, corruption will continue to thrive. Additionally, China only ensured compliance with the EU because of the importance of its market, valued at half a trillion Euros. If the bloc's market were smaller and less important to its trade China, most likely, would not comply and possibly just lose the market entirely. Further, the reason this thesis discussed these four nations in particular is because they are large trading partners of the EU and they are developed economies. There are developing nations, such as India and Brazil, that might one day be in a position to further regulate their chemical industries, but I believe it is safe to say that this will not occur for at least another half century. Therefore, I believe it is accurate to state that the European Union will continue to be the "world's regulator" for decades to come.

Recommendations

Based on the research presented throughout this thesis, for the health and safety of the entire human population the developed and soon to graduate developing world needs to have one set of chemical regulations. The differing laws throughout the world regarding chemical regulations not only hurts those living in that respective country, but in every country in the world. For example, chemical waste that is dumped in the Western Atlantic Ocean, off the coast of the United States, will affect all nations. The United States has relatively relaxed chemical regulations compared to its northern neighbor and the most regulated bloc in the world, the EU,

which is across the ocean. The ocean's currents will eventually take that waste to both destinations harming the environment and the health of its citizens. It does not matter how strict the regulations are in one country of the world, because similar to this example, chemical waste will affect all, regardless of region.

However, it is understood that *every* nation cannot abide by strict standards that Brussels imposes. It would be almost impossible for developing countries like India and Brazil to fully comply with these laws. The developed world should have their own set of rules which includes the United States. But, as discussed in the previous paragraph, waste affects everyone, and the environment does not recognize geopolitical boundaries. Therefore, international regulations should be implemented, to help graduate developing countries with chemical industries to eventually be among the developed nations. It is understood that further regulation will lead to higher prices and a switch to less expensive chemicals which would probably be manufactured in less developed countries. However, this can be offset by developed countries ensuring compliance to their own regulations, which would force chemical companies in developing nations to comply.

This recommendation is crucial to ensure the health and safety of human beings and the environment they live in. It is understood and almost guaranteed that the price of chemicals *will* increase due to these new regulations and the compliance by chemical companies. Additionally, there will be hesitancy and pushback from chemical manufacturers as seen when the EU was discussing REACH. However, this also might be a blessing in disguise. Chemical companies will be forced to develop new products to ensure they are in compliance with these new regulations. These new chemicals will be safer and ensure the consumer and the environment will not be poisoned by the product. Eventually, the product produced in these countries will trickle down to

developing ones that do not have their own chemical industries or manufacturing capability, and their citizens and environment will also benefit from the regulations. Regulations from developed nations have far reaching effects to countries around the world, regardless of their geopolitical status. Reforming the chemical industry will benefit everyone and ensure a safer, a more environmentally friendly, and a more prosperous future.

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