# Global REACH?:

# The External Effects of EU Chemicals Regulation

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*Abstract:*

*This paper argues that the EU chemicals regulation 'REACH' has inspired chemicals policy beyond EU borders contributing to closing governance gaps at the international and national level. The REACH Regulation is a pioneer policy. It introduces a comprehensive and ambitious regulatory regime for chemicals that addresses some of the shortcomings of previous chemicals regulation. It is argued that particularly through learning and interdependence-motivated diffusion channels, REACH can play an important external role by raising levels of ambition and comprehensiveness of extra-EU national and international chemicals regulation. Policy diffusion is defined as a set of uncoordinated policy transfers without explicit political pressure. Actors' policy beliefs, domestic institutions and actors' resources act as a filter of pioneer policy in its diffusion process. In the case of REACH, this filter is fine-meshed since REACH is complex and controversial. Polarised debates and adaptation to domestic circumstances will lead to diffused policy that is inspired by REACH rather than a copy.*

*Keywords: Chemicals Regulation, Policy Diffusion, Regulatory Leadership*

# 1  Introduction

The EU Regulation No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) is one of the most ambitious and most controversial pieces of legislation that the EU has ever adopted.[1] It aims at addressing a number of shortcomings of previous EU chemicals governance especially the lack of publically available data, the low degree of innovation activities, and the ad hoc and retrospective approach to chemicals regulation. These shortcomings of chemicals governance are not specific to the EU. They are a symptom of all national and international chemicals policy. Although many of the chemicals in use today have been in commerce for decades, comprehensive data on their characteristics and uses is often not publically available. This makes it impossible to manage some of their risks appropriately or anticipatorily before incidents and damages occur. Chemicals that have newly been placed on the market have to undergo relatively stringent testing requirements whereas chemicals that are already in national inventories can be continued to be used without additional requirements. This favours the use of chemicals that are already listed in inventories and disincentivises innovation for safer chemicals and technologies. Therefore, the R&D investment in alternative chemicals is very low.[2] With the existing regulatory frameworks at the national and international level, risks are addressed once health and environmental problems have occurred. The procedures to restrict or ban the use of certain chemicals are ad hoc and retrospective. There is no systematic screening of chemical risks and regulation is not anticipatory. REACH addresses these gaps and provides a comprehensive and anticipatory chemicals governance framework.[3]

This paper argues that REACH does not only reform EU internal chemicals governance but it also inspires international and extra-EU national chemicals governance helping to address some of the existing governance gaps. Chemicals are a global issue. They migrate across borders and are often found in areas where they have never been released. Therefore, chemicals management requires global responses. Yet, current international activities and agreements only address a small number of chemicals and major chemicals producing countries have so far not addressed the issue in a comprehensive manner.[4] This leaves governance gaps at the international and national level. The EU took on a pioneering role and introduced with its REACH Regulation a comprehensive framework for chemicals management. On the one hand, the REACH Regulation itself and, on the other hand, data that is produced in the implementation phase of REACH can diffuse to extra-EU jurisdictions. The implementation of REACH will lead to the proliferation of a large body of chemicals data that is accessible not only to EU actors. Extra-EU jurisdictions can access the data and learn from the EU experience. The large size of the EU chemicals market could provide an incentive for multinational business actors to change some of their chemicals management.

Section two of this paper describes the REACH Regulation, establishing that the EU took the regulatory leadership position on chemicals regulation. Based on this premise, section three discusses policy diffusion and describes the channels of external influence of REACH. Section four applies the considerations of the previous section to chemicals governance at the international level, in the United States and in China. Evidence shows that REACH inspired external policy debates and regulative activities filling governance gaps at the international and national level.

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[1] Selin 2007, 64; Pesendorfer 2006, 105-6, 108-11.
[2] Wilson, Chia and Ehlers 2006, 7-10.
[3] Schwarzman and Wilson 2009.
[4] Krueger and Selin 2002.

## 2   The REACH Regulation

The EU REACH Regulation introduces a comprehensive and ambitious regulatory regime for chemicals management. It entered into force on 1 June 2007 and its aim is "to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances."[5] REACH provisions will be phased-in over a period of 11 years. The Regulation replaces the previous fragmented patchwork of 40 different legislative texts of EU chemicals policy that were introduced since 1967. Before the entry into force of REACH, the main EU regulatory regime for chemicals applied only to substances placed on the market after 1981, which represent only about 1% of all chemicals on the market. As a consequence, for most chemicals in use there were only few safety regulations and there was little accessible information about the health and environmental risks presented by these so-called 'existing' substances. Chemicals manufacturers, on the one hand, had no incentives to produce and communicate such information. Regulatory authorities, on the other hand, did not dispose of the necessary resources to produce hazard and risk information. This regulatory situation favoured the use and production of existing chemicals that were placed on the market prior to 1981, since new chemicals were regulated more stringently and had to be tested before being placed on the market. This has a discouraging effect on innovation.[6] The REACH Regulation was introduced to address these shortcomings of previous EU chemicals regulation.[7]

REACH consists of three main stages: registration, evaluation and authorisation/restriction. Registration is a precondition for activities in the EU. By the end of May 2018, all chemicals put on the EU market in a quantity over 1t per year per producer will have to be registered in a central database operated by the European Chemicals Agency (ECHA). This covers approximately 30,000 substances of the roughly 100,000 listed in the existing cumulative EU inventory of all chemicals. Not all of these 100,000 substances that were in commerce in 1981 or added afterwards are still in use. Registration rules apply to 'producers', which includes both, EU-based manufacturers and importers of substances from abroad. Companies based in a non-EU country have to assign an 'Only Representative' in the EU if they wish to export to the EU. After a pre-registration phase for all substances that ended in December 2008, chemicals will be registered in a staged approach according to the volume in which they are put on the EU market. High volume and highly toxic substances have to be registered first.[8] The data requirements for 1-10t category are lower than for higher volumes. For the low volume substances a technical dossier including guidance on their safe use is required. Chemicals above 10t per year per producer have to be accompanied by a chemical safety report requiring more extensive sets of data when being put on the market. About two thirds of all registered substances are estimated to fall into the 1-10t category. Producers are obliged to use the provided information to assess the risks that may arise from each substance they use and they have to ensure that these risks are managed appropriately.[9]

REACH contains specific registration provisions for products, such as electronics, textiles and cars, put on the EU market. Substances that are intentionally released from an article, such as a printer cartridge, have to be registered according to the general registration rules. Additionally, substances of very high concern that are placed on the so-called 'candidate list for authorisation' have to be notified to ECHA if they are present in articles above a concentration threshold of 0.1% weight by weight of the article and if they exceed the quantity of 1t per year per producer. Following a notification, ECHA can request a full registration if

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[5] European Commission REACH website:
http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm.
[6] European Commission 2001; Fisher 2008, 546-7; Hey, Jacob and Volkery 2007, 1863.
[7] European Commission 2007, 3.
[8] Hansen and Blainey 2008, 119-21; European Commission 2007, 9.
[9] Schomaker and de Avila 2009, 15-6; Hansen and Blainey 2008, 119-21.

deemed necessary. Upon request, producers are also obliged to provide information to consumers.[10]

In the evaluation stage, the dossiers submitted by producers and the substances registered are examined. ECHA checks the completeness of the dossiers and scrutinises testing proposals. The competent authorities of the EU Member States analyse the data submitted and assess chemicals' possible risks to the environment and human health. Following an evaluation, a substance of very high concern can be placed on Annex XIV to the REACH Regulation and thereby be subjected to authorisation, which means that producers may only put on the market these substances if they have received the prior authorisation to do so. Alternatively to authorisation, EU-wide restrictions of substances can be imposed.[11]

REACH is a pioneer regulation that goes beyond the scope and ambition of prior EU or any other country's provisions. It is more anticipatory than previous approaches. A central and innovative element of the is the information requirements, which apply to all chemicals regardless of whether they have been marketed for decades or whether they are newly put on the EU market. This means that data is collected and evaluated in a systematic way replacing the case-by-case, ad hoc and retrospective approach of previous regulation. This leads to a greater degree of anticipation in managing chemicals because through the systematic screening of all chemicals, risks can be detected at an earlier stage before major incidents or damages occurred. This contrasts with the previous method in which only after there was a serious suspicion that certain chemical bears a risk an in-depth risk assessment was conducted. Moreover, the greater emphasis on producer responsibilities makes the system more anticipatory. Producers are required to communicate hazards and address risks throughout the supply chain. This greater emphasis on the responsibilities of producers to manage risks represents a shift from the previous approach in which mainly public authorities collected data about substances to assess their risks and hazards. With REACH data has to be used for risk evaluation by private actors themselves and by public authorities. No other programme exists worldwide that attempts to collect such a comprehensive set of chemicals hazard and use data and that evaluates possible risks in such a systematic way as REACH does.[12]


## 3   REACHing Out

Given this regulatory leadership, could REACH lead international regulatory developments in chemicals management and help filling some governance gaps outside the EU? This paper argues that through policy diffusion processes, REACH has external effects on third countries and the international level. REACH 'inspires' policy activities in other jurisdictions.

Policy diffusion is defined as a set of uncoordinated policy transfers without explicit political pressure from one political entity to another political entity. These individual transfer cases can be disconnected or only loosely connected but they start from one source, a pioneer policy. The scope of what is included in the concept of policy diffusion is contended. Some scholars include all means of influencing policy in another jurisdiction, including international law and coercion.[13] Some other scholars developed a more narrow definition of policy diffusion. They only include the mechanisms that are predominantly voluntary and uncoordinated, explicitly excluding collective decision-making or asymmetric power relations.[14] This paper applies a narrow conceptualisation of policy

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[10] European Commission 2007, 9-10.
[11] European Commission 2007, 12-4; Schomaker and de Avila 2009, 16-7.
[12] Wirth 2007a, 100.
[13] See for example Dolowitz 2000. Yet, for example Shipan and Volden 2008 and Simmons, Dobbin and Garrett 2006 include coercion but exclude international harmonisation.
[14] Joergens 2004, 252; Busch and Joergens 2007, 58-60.

diffusion. It focuses on learning and interdependence-motivated policy transfers. These two channels are considered the most likely and promising ways in which REACH can exert international influence. A distinction is made between explicit coercive pressure and interdependence-motivated transfers. Coercive pressure is defined as measures with the primary aim of forcing a policy change in a foreign jurisdiction. Interdependence-motivated policy transfers are policy measures that have externalities but whose primary aim is policy change within the EU. REACH falls into this category. Its primary aim is reforming EU domestic chemicals governance and as a secondary effect it has externalities affecting other jurisdictions. Coercive measures from the EU on other countries are not likely to be employed in the case of comprehensive chemicals governance because this method is mostly applied in cases of severe disapproval of other jurisdictions' actions, since it is a rather harsh and strong tool.[15] This paper also does not include international negotiations in the definition of policy diffusion because experience so far has shown that there has always been strong opposition to a comprehensive framework convention on chemicals. Current international agreements on chemicals are not very comprehensive and ambitious. Additionally, with the current system of a number of different international agreements, it may have become too cumbersome and complicated to integrate them into one framework.[16] This paper argues that the uncoordinated transfer without explicit political pressure of elements of REACH to other jurisdictions helps filling national and international governance gaps.

Learning and interdependence-motivated channels of policy diffusion are the most likely channels for REACH's influence on extra-EU jurisdictions. Amongst diffusion scholars, there is no harmonised terminology and clear consensus on what constitutes the channels of policy diffusion. Simmons and Elkins[17] differentiate two broad sets of forces: increasing adoptions changing the benefits of a policy and provision of information about the benefits of adopting a policy. Busch and Joergens[18] distinguish (limited) rational learning, norm-based activities, competition and symbolic emulation. Braun, Gilardi, Fueglister and Luyet[19] discuss learning, competition, common norms, taken-for-grantedness and symbolic imitation. Bringing together these different conceptualisations, three broad categories can be identified, channels derived from the interdependence of jurisdictions, channels based on learning and channels grouping norm- and legitimacy-related motivations. Considering this paper's focus, the REACH Regulation, learning and interdependence-motivated channels appear the most suitable concepts of analysis since no internationally accepted norm that would trigger the diffusion of the requirements of the REACH Regulation could be identified. In the long run, REACH could lead to the international acceptance of certain norms related to its ambitious objectives, which could trigger a diffusion process.[20] Once REACH would have spread to a significant number of political entities, other decision-makers could consider following this trend for symbolic and legitimacy reasons to avoid being considered a laggard.[21] Yet, given the recent entry into force and the 11-year phase-in period of the REACH Regulation, this category of mechanisms is considered not of immediate relevance. Therefore, interdependence and learning were chosen for the analysis of the diffusion of the REACH Regulation. These two channels are not mutually exclusive. A combination of them can be relevant.

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[15] Joergens 2004, 252-3.
[16] Krueger and Selin 2002, 327-9, 338-9; Wirth 2007b; Nanda and Pring 2003, 345; Vanden Bilcke 2002, 338-9.
[17] Simmons and Elkins 2004.
[18] Busch and Joergens 2007, 72-4.
[19] Braun, Gilardi, Fueglister and Luyet 2007, 42-4.
[20] Finnemore and Sikkink 1998, 894-909.
[21] Meseguer 2006, 172; Brooks 2007, 704; Tews, Busch and Joergens 2003, 572-5; Drezner 2001, 57.

### 3.1   Domestic Variables

In most cases, the result of policy diffusion processes is not an exact copy. Domestic variables act as a filter for pioneer policy. They determine whether diffusion takes place and shape the form and degree of the diffused policy measure. Policy diffusing through either the learning or the interdependence channel is filtered by actors' belief systems, institutions and resource-related variables. Dolowitz[22] distinguishes four different degrees of policy diffusion. *Copying* is the direct and complete transfer of a policy. *Emulation* refers to the diffusion of the idea behind a policy but not of all details. *Combination* depicts the situation in which policy-makers combine elements of different foreign policies. *Inspiration* describes the case of a policy change inspired by another jurisdiction's policy but with only little similarities.[23]
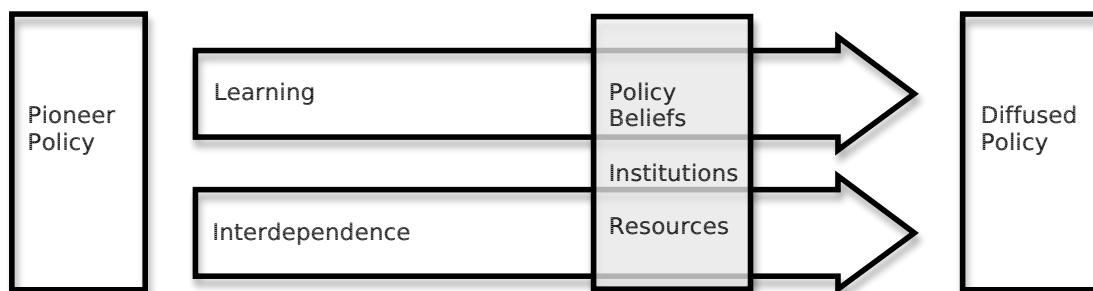


State and non-state actors involved in policy-making are assumed to have a set of policy beliefs that shape their perception and interpretation of pioneer policy. Hall[24] defines the policy-making process as a composition of three central variables: "the overarching goals that guide policy in a particular field, the techniques or policy instruments used to attain those goals, and the precise settings of these instruments." Sabatier[25] conceptualises policy change as a result of competition between advocacy coalitions each of which has a common belief system. Belief systems have a deep core of fundamental normative and ontological axioms, a near (policy) core of basic strategies and policy positions and a set of secondary aspects comprising a multitude of instrumental decisions. Hall and Sabatier agree that fundamental beliefs are more resistant to change than instrumental secondary beliefs, which change at frequent intervals. Actors seek more information and understanding of a policy in order to find ways to achieve their fundamental goal. For this, they are willing to change instrumental beliefs.[26] Actors that are involved in the policy diffusion process are assumed to have a set of policy beliefs composed of a core of fundamental beliefs, beliefs related to specific policies and beliefs about policy settings. Fundamental beliefs, such as the desirability of a liberalised or a socialist market model, are deeply rooted and do not change. A fundamental change of policy direction in a jurisdiction only takes place through a leadership change. Policy-specific beliefs change but not as frequently as beliefs about policy settings. The two latter categories are instrumental to implementing the fundamental beliefs. For policy diffusion this means that if a pioneer policy is incompatible with the dominant fundamental belief in a jurisdiction, its diffusion is unlikely. Only minor elements that are compatible with the dominant beliefs are likely to diffuse and the difference between pioneer and diffused policy is great. In cases of absolute compatibility with the dominant beliefs, a pioneer policy is much more likely to

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[22] Dolowitz 2000, 25.
[23] Tews and Busch 2002, 171.
[24] Hall 1993, 278-91.
[25] Sabatier 1988.
[26] Jenkins-Smith and Sabatier 1993, 5-6.

diffuse and the likelihood of significant similarity between pioneer and diffused policy is high.

State and non-state actors with their respective policy beliefs play a role in policy diffusion processes. Some public policy approaches emphasis the importance of relatively autonomous state actors whereas some other approaches underline the role that societal actors play by stressing that state actors respond to societal pressure. A combination of both, the mutual influence and importance of state and societal actors builds a third approach, which is followed in this paper.[27] Decision-makers can learn about foreign pioneer policy by actively searching for information or non-state actors can provide them with what they consider important information. Actors such as international organisations, NGOs and business serve as facilitators and disseminators foreign experiences. International organisations gather and disseminate state-of-the-art information.[28] NGOs gather and disseminate information about policies from abroad that set higher environmental or health standards and that would further their organisation's aim. Business actors disseminate information about policy experiences abroad for example to ensure compatibility of different national legal requirements.

Institutionalised rules and procedures determine certain ways of policy-making that result in certain outcomes. Existing policies lead to a certain degree of path dependency. Instituionalised procedures can lead to favourable access to the decision-making process for certain actors and exclude others. It can make changes more difficult than preserving the status quo. Once institutions are established, actors rely on them and it becomes difficult to change them. Governments and decision-makers act within and adapt to existing institutional settings that impose constraints and provide opportunities for them to act upon their preferences and beliefs.[29] In cases of incremental change, as opposed to radical change, decision-makers base their action on existing policy and do not substantially depart from it.

Resources enable actors to get involved in policy diffusion. Financial means, human resources and expertise can broaden or constrain actors' scope for action.[30] In cases of scarce resources, only the perceived most important and urgent policy problems can be dealt with. Resources determine whether, how and to what degree actors engage in analysing pioneer policy and developing diffusion strategies.

## 3.2 Learning

Learning takes place when actors become aware of a foreign policy example and draw lessons from it for their own jurisdiction. Decision-makers can actively search for information or information can be brought to their attention by other stakeholders. State and non-state actors' motivation for engaging in policy learning is that, on the basis of their beliefs, they perceive a certain situation, a regulation or the lack thereof as a problem.[31] New information from abroad provides information that can be utilised to achieve some of their fundamental beliefs. Learning from others' experiences reduces costs and uncertainties about the success of a policy. It is easier and more efficient to assess and take over experiences that others have already made than to invent and design a completely new solution, which has never been tested in practice before.[32]

When learning, actors analyse and use information to attain their fundamental beliefs. They revise their beliefs about policy settings and policy instruments but the fundamental core belief persists and filters the pioneer policy.[33] From this

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[27] Bennett and Howlett 1992.
[28] Tews and Busch 2002, 170; Kern, Joergens and Jaenicke 2001.
[29] Scharpf 1997, 40-1.
[30] Scharpf 1997, 43.
[31] Simmons and Elkins 2004, 174-5.
[32] Tews and Busch 2002, 180; Dolowitz 2000, 13.
[33] Sabatier 1988, 149; Hall 1993.

follows that actors are selective in the information that they take into account. They engage in bounded learning, which acknowledges the limits of actors' analytical capabilities and their selectiveness. Actors take "analytical short cuts and cognitive heuristics to process information".[34] Policy beliefs act as a filter that preclude and distort the manner in which external policy experience is analysed and policy decisions are taken.

Not only the policy as introduced by a jurisdiction but also the information that is produced through the implementation of some policies could influence domestic policy in extra-EU jurisdictions. This aspect has often been neglected in literature on policy diffusion. In the implementation process of a policy, for example data on environmental risks, can be made available to other jurisdictions. They can use the data in the implementation of their own legislative frameworks or in their design of new regulation. The international proliferation of information on environmental and health risks can also provide the basis for liability claims. Information can be used in liability-based risk management systems to make accountable some actors for the risk they exposed other actors to.

Diffusion through learning leads to changes in policy instruments and settings. Changes of the dominant fundamental beliefs occur through changes in a country's leadership composition and cannot be triggered by learning. Learning rather is instrumental to achieving and furthering the fundamental beliefs. Therefore, learning is an important element of changes in policy-specific and policy setting beliefs.[35] For changes of fundamental beliefs, learning would require additional supporting factors such as changes in the political power constellation, which could be brought about by changes in the general economic or environmental situation. This could (partially) be a result of diffusion through the interdependence channel.

## 3.3   Interdependence

Through the interdependence of two jurisdictions, pioneer policy can have externalities affecting the respectively other jurisdiction leading to changes in the position of actors and potentially increasing the support for certain policy measures. Pioneer policy can alter for example the economic or environmental situation in another jurisdiction.[36] As a response to these changes, decision-makers can revise their beliefs related to certain policies and policy settings. Significant changes in the economic, environmental or social situation can also lead to shifts in the governmental support resulting in a stronger support of the existing government or in stronger support for the opposition.

The enactment of a pioneer policy can trigger regulatory competition. The assumption is that in liberalised markets goods, capital and people move freely and choose the jurisdiction with the most beneficial regulation. Therefore, interdependent jurisdictions compete with each other to attract and retain capital and international business. If one jurisdiction introduces a policy that makes it more attractive than another, decision-makers of the other jurisdiction might react strategically and consider responding with similar policy.[37] This is often associated with a 'race to the bottom', which means that regulatory requirements converge on a lowest common denominator level, leaving only a minimum of environmental and social protection. Yet, in environmental policy, empirical tests generally find no support for the hypotheses that regulatory competition leads to a race to the bottom. A number of other factors could be responsible for both, a 'race to the top' and a 'race to the bottom'.[38] In most environmental cases, pioneer policy sets higher and more stringent requirements making the race to the bottom argument not applicable. Yet, the regulatory competition argument

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[34] Meseguer 2006, 36.
[35] Sabatier 1993: 17-20, 30-3.
[36] Elkins and Simmons 2005, 39-42.
[37] Simmons and Elkins 2004, 172-3.
[38] Holzinger and Knill 2004, 27-8, Drezner 2001

could also mean that environmental and public health pioneer policy creates favourable conditions for people and attracts them triggering a race to the top.

A more important interdependence-related argument is that pioneer policy can alter the costs and benefits of introducing similar measures in other jurisdictions. If the pioneer policy covers a significant amount of businesses or other actors, the compliance costs of similar measures in the follower jurisdiction can be lowered considerably. Additionally, the introduction of a pioneer policy can improve the environmental and health situation and by following the example with similar policy the follower can achieve a much higher environmental and public health result than in the situation in which it would have acted on its own. Hence, pioneer policy can change the policy-making conditions in other jurisdictions so that they might be more compatible with the policy beliefs of relevant actors in the follower jurisdiction. The costs of introducing a certain policy can be lowered and its benefits can be increased. This can generate the acceptance of actors whose policy beliefs and priorities would otherwise not have been compatible with the diffused policy.

Pioneer policy can have externalities in terms of a direct impact on business in another jurisdiction if they are exporting products or services that are covered by the policy to the pioneer jurisdiction. This assumption holds true in cases in which the pioneer market is attractive enough to incite producers to comply with the regulatory requirements rather than withdrawing from the market. As part of their fundamental beliefs, actors in the potential follower jurisdiction could place a high emphasis on the competitiveness of domestic actors. In the attempt of ensuring domestic industry's competitiveness and preparedness for compliance with the pioneer policy, actors can change their attitudes towards introducing similar policy initiatives. The issue can rise in actors' list of priorities and opposition to certain policy measures can decline significantly. The interest of business actors can change. They can revise their beliefs related to policy instruments and settings and put pressure on their governments to adopt the ambitious standards set by the pioneer jurisdiction in an attempt to try to gain competitive advantages. By introducing the higher standards, a level playing field with other domestic producers would be created. Companies that comply at an early stage with the high standards would then have a competitive advantage because they would be well prepared for compliance and could sell their knowledge and technologies to others.[39] Hence, pioneer policy can change conditions in other jurisdictions that lead to the revision of state and non-state actors' beliefs with regard to the desirability of certain policy measures.

Pioneer policy can diffuse internationally without public policy responses. Pioneer policy can be implemented in the entire supply chain of companies even outside the territory of the pioneer jurisdiction. Changes in the production process for the pioneer market can trigger the application of these requirements in the entire global supply chain of a company. Considerations about economies of scale could incite multinational companies to apply pioneer policy requirements to their global operations. The reason for this is that for multinational companies, it could be economically viable to take on the requirements of the market with the highest standards and apply them to their global production in order to avoid transaction costs caused by maintaining different parallel production lines.[40] Decision-makers' policy beliefs can be that these direct externalities do not require any public policy intervention.

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[39] Vogel 1997, 561-3; Porter and van der Linde 1995
[40] Vogel and Kagan 2002, 6

# 4   Global REACH?

This section applies the considerations about policy diffusion discussed above to the international level, the United States and China. It traces the external effects of REACH. The case studies of the US and China have been chosen because, although the chemicals industry spans the whole globe, the largest share of chemicals production and sales is accounted for by only a small number of countries, in particular the EU, the US, China and Japan. The EU produces the largest share of chemicals with about 31 percent of the world chemical turnover.[41] The US follows with a share of 19 percent of the total world chemical output.[42] China ranks third but with a significantly lower production volume. Hence, external effects of REACH on these two countries means a significant impact on a large share of global chemicals manufacturing and use.

## 4.1   Domestic Variables

Given the complexity and controversy of the REACH Regulation, inspiration of extra-EU chemicals policy-making and combination of REACH element with other chemicals policy elements are more likely than an entire or close to entire copy. In the case of REACH, the domestic variables act as a fine-meshed filter. The REACH Regulation is very complex. Including annexes it encompasses some 850 pages. Understanding chemistry requires pre-existing expert knowledge, which many decision-makers do not have. Additionally, chemicals governance is a very politicised and controversial issue as demonstrated by the tremendous lobbying efforts in the EU.[43] Therefore, a copy of (almost) the entire regulation is very unlikely. Interest groups will emphasise and focus on the parts of REACH that further their organisation's goals. Decision-makers will equally pick and choose the parts of REACH that correspond to their policy beliefs and that they consider the most useful parts for achieving their fundamental beliefs. The controversy of the issue will lead to a variety of different positions and a polarised debate. Such a debate in an extra-EU jurisdiction will not lead to the same result as the text of the REACH Regulation. The dynamics of the decision-making process will produce a policy measure that is inspired by REACH but not a copy.

The 'points of departure' differ between the international level, the United States and China. Existing policies and infrastructures that shape the ways in which actors frame their preferences for policy change are very different. Also the decision-making procedures differ significantly.

### 4.1.1   International Level

International chemicals governance consists of international treaties and activities of international organisations. Voluntary programmes operated by international organisations such as the Organisation for Economic Cooperation and Development (OECD) and the United Nations Environmental Programme (UNEP) aim at gathering and assessing information about the hazard and risks presented by chemicals. They assist national and international policy-making. UNEP operates a chemicals programme that aims "to build national capacity for the clean production, use and disposal of chemicals, and promotes and disseminates state-of-the-art information on chemical safety.[44] The OECD operates a database (eChemPortal) providing free access to information on the properties of chemicals and to hazard and risk assessments[45]. OECD is also involved in developing methodologies for risk assessment and risk management to assist government

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[41] ICCA 2008
[42] ACC 2009
[43] Pesendorfer 2006.
[44] UNEP website: www.chem.unep.ch/default.htm
[45] OECD ChemPortal website:
www.oecd.org/document/9/0,3343,en_2649_34379_35211849_1_1_1_1,00.html#Portal

and industry efforts. It developed guidelines for the testing of chemicals and so-called Good Laboratory Practices "to ensure the generation of high quality and reliable test data related to the safety of industrial chemical substances".[46] The Strategic Approach to International Chemicals Management (SAICM) is a voluntary policy framework that promotes chemical safety around the world. Its main goal is that by 2020 all chemicals are produced and used in ways that minimise significant adverse impacts on human health and the environment.[47]

Legally binding international agreements address some crucial aspects of chemicals management but they do not provide for a comprehensive and ambitious framework. They form a conglomeration of different issue-specific treaties. Despite the occasional flaring up of discussions on creating an overarching framework agreement, there has always been resistance by major nations that deemed this approach to cumbersome and unfruitful. Chemicals are regulated in four international agreements covering different aspects of the life cycle of chemicals. The production and use of chemicals are addressed by the Stockholm Convention, which also covers some elements of trade and disposal. The Rotterdam Convention covers trade in chemical substances and the Basel Convention deals with trade in hazardous waste. The Globally Harmonised System (GHS) introduces a harmonised labelling and classification system facilitating the safe trade in chemicals.[48] One additional element may be added in the future. A legally binding global treaty to tackle mercury pollution is currently being negotiated. International agreements only cover a limited number of substances and they have strong elements targeted towards the needs of developing countries. Situations of industrialised countries are not always addressed suitably leaving governance gaps at the international level.[49]

### 4.1.2   United States

Since 1976, the United States have domestic chemicals regulation in place but the Toxic Substances Control Act[50] (TSCA) has not been very effective and is less ambitious and comprehensive than REACH. TSCA confers to the Environmental Protection Agency (EPA) the rights to (a) issue regulations addressing risks from existing chemicals, (b) request testing of new or existing substances if they may present an unreasonable risk, and (c) issue rules that oblige industry to collect information on production and uses. Furthermore, new chemicals have to be notified to EPA before they can be put on the US market. EPA can ask for further testing of these chemicals if deemed necessary. However, despite these rights, EPA lacks powers to effectively regulate or ban chemicals. Since 1976, only 82 chemicals have been tested and only few substances have been banned or restricted because the burden to act is very high. To restrict the production and use of an existing chemical, EPA has to prove, first, that this chemical will present an unreasonable risk, second, that the restrictive regulation is the least burdensome to reduce the risk and, third, that the benefits of the regulation outweigh the costs. As a consequence of this high burden and after an unsuccessful decade-long attempt to ban asbestos that was overturned by a court, EPA has not started many restriction procedures. Under current US legislation, EPA effectively lacks the power to regulate existing chemicals. For new chemicals EPA has developed methods to assess chemicals before they obtain the permission to enter the market. However, these methods were only applied to less than 1% by volume of the chemicals on the market.[51]

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[46] OECD website: www.oecd.org/department/0,3355,en_2649_34365_1_1_1_1_1,00.html
[47] Secretariat of SAICM: www.saicm.org/index.php?menuid=2&pageid=256; Wirth 2007b, 402
[48] Krueger and Selin 2002.
[49] Wirth 2007b; Krueger and Selin 2002
[50] Toxic Substances Control Act 15 U.S.C. §2601 et seq. (1976).
[51] Tickner, Geiser and Coffin 2005, 116-7; Geiser and Tickner 2003.

### 4.1.3 China

Chinese chemicals regulation is only in its infancy and not as comprehensive and ambitious as REACH. Until 2003, China did not have any chemicals regulation in place. Then it introduced "Measures on the Management of New Chemical Substances" that require toxicity testing and registration for new substances. Following this law, China enacted a number of implementing measures related to the testing and registration of new chemicals, the control of use and marketing of chemicals, and the handling of hazardous chemicals at the workplace. China's chemicals regulation consists of a large number of different measures and guidelines. The current legislative requirements are not as ambitious as REACH. For example, China requires 24 test items whereas REACH requires 60. Additionally, China does not dispose of the technical and scientific infrastructure to enforce chemicals regulation. There are no laboratories that comply with the OECD Good Laboratory Practices (GLP) and China has no experience in comprehensive risk assessments.[52]

The general Chinese regulative structure and decision-making on chemicals matter are complex and act as a fine-meshed filter for the diffusion of REACH. Chinese regulation could be described as a pyramid with few laws at the top that are corroborated by enforcement ordinances, enforcement regulations, public notices and voluntary standards. Nine ministries are involved in chemicals regulation rendering the decision-making process complex and cumbersome. Therefore, a gradual inspiration of Chinese chemicals decision-making by REACH is more likely than a fast copy. At the moment, the chemicals laws that were introduced all range at a high level in the regulatory structure and still require implementation into enforcement regulation, local regulations and standards. China started building up the scientific infrastructure to enforce ambitious legislation.[53]

### 4.2 Learning

This section discusses qualitative empirical evidence corroborating the argument the there are learning processes at the international level, in the US and China.

### 4.2.1 International Level

The work of international organisations is inspired by REACH through the European Commission's and ECHA's active involvement in their activities. This is a mutual learning process since they jointly develop methods and standards. It enables REACH to exert influence on the international level and through this on extra-EU jurisdictions. ECHA contributes to the practical and technical level of international cooperation and the European Commission is in charge of the higher level and political international work.[54] ECHA is particularly active within the OECD. It co-manages the further development of eChemPortal, which ECHA will host as of 2011. Jointly with the OECD, ECHA further develops a toolbox on Qualitative Structure-Activity Relationship (QSAR), a method to fill data gaps on toxicological and physical-chemical endpoints. ECHA chairs the IUCLID User Group Expert Panel. IUCLID is an IT tool for the exchange of data on chemical substances stored according the format of the OECD. Moreover, ECHA contributes to the work of a number of OECD taskforces, for example on exposure assessment and the Test Guideline Programme.[55] The European Commission and ECHA also work on classification and labelling in the GHS and on additions to the lists of chemicals to the Rotterdam and the Stockholm Conventions.[56] Through this active participation and partially lead of international activities, ECHA and the European Commission contribute information about and gathered through REACH to the international

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[52] Park, Song, Lee, Yoon and Cong 2008.
[53] Park 2009.
[54] Article 77, REACH Regulation.
[55] ECHA 2009, 2-3.
[56] ECHA 2009, 4.

level.

REACH was latently present at the negotiations of SAICM triggering some modest learning. The SAICM process started approximately at the same time as the EU White Paper on Chemicals Policy[57]. At the International Conference on Chemicals Management (ICCM) in 2006, all participants were aware of REACH, that was in its second reading at the time, but it was not openly discussed. Non-EU participants were cautious and feared a 'REACHification' of the world. Therefore, the EU did not refer to REACH very frequently. Nevertheless, modest learning took place since some of the basic thinking of REACH is reflected in SAICM. For example the SAICM goal is similar to the goal of the EU White Paper. An important element of SAICM is its technical assistance through which data will be made available to other countries. The REACH registration data will contribute to this effort. REACH is considered the EU's contribution to the SAICM goals.[58]

### 4.2.2   United States

REACH inspires the current debate about reforming US chemicals regulation. Additionally, the registration data on chemicals hazards and uses has the potential to trigger learning processes within the TSCA framework. The data gathered in the implementation phase of REACH can help EPA learn more about certain substances and corroborate its regulative efforts under the current US legislative framework.[59] One of the reasons why TSCA has not led to many restrictions and bans is the lack of data available to EPA, who needs to prove that a chemical presents an unreasonable risk. For this, a large amount of data on properties, manufacturing and uses is necessary. Yet, EPA can only request more data from industry once it has demonstrated that a specific chemical may present such an unreasonable risk.[60] This 'catch-22' situation can be mitigated by some of the data on chemicals' properties and uses that will be produced and made available through the REACH process. EPA could make use of this data for restriction procedures under §6 of TSCA.

REACH has also started inspiring the current debate about reforming TSCA. EPA Administrator Lisa Jackson said at a 2009 OECD meeting that there is some likelihood that TSCA will be reformed in compatibility with REACH.[61] The timing of the intense flaring up of the political discussions about legislative changes to TSCA suggests that the debate leading to the introduction of REACH has fuelled debate across the Atlantic. A TSCA reform started being debated in the 2000s and since the change in the US administration these voices have become louder and fell on more fruitful ground. In Congress, a debate on reforming TSCA has started. The US House of Representatives held first oversight hearings on the issue. Most of the testimonies referred to REACH and in the debate different speakers cited the EU example. Already in 2008, attempts to reform US chemicals regulation inspired by REACH have been introduced but never became law. The so-called 'Kid-Safe Chemicals Act'[62] indirectly refers to REACH by proposing to harvest the information that is anticipated to be produced through the implementation of REACH. The proposed Act determined that each manufacturer shall submit to the EPA Administrator new information that becomes available. This would have meant that if REACH brings about new data on chemicals, manufacturers would have had to communicate this to the US authorities. Also on other elements a similar approach to REACH was taken. The responsibility to gather and provide toxicity and use data was shifted from the public administration to the manufacturers. The Act proposed to introduce a 'priority list' of chemicals to be reviewed first. This has some similarities with the REACH 'candidate list'.

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[57] COM(2001) 88 final.
[58] European Commission 2009; Interview with ECHA official, 18 November 2009.
[59] European Commission 2009, 9; ECHA 2009, 5.
[60] Tickner, Geiser and Coffin 2005, 117-8.
[61] Environmental Policy Alert, 3 June 2009, "*Jackson Says New Chemicals Law Likely, Hints at EU Cooperation*".
[62] S. 3040 and H.R. 6100.

Considering these similarities, it could be concluded that the authors of the Kid-Safe Chemicals Act were aware of the provisions of REACH and learned from the EU experience.

Most actors involved in the debate about reforming US chemicals regulation are aware of REACH and some individuals have studied it in-depth. There are a number of informal meeting between state and non-state actors to exchange information about REACH. For example, in spring 2009, the Swedish NGO ChemSec organised a meeting with European and American NGO representatives to discuss the REACH Regulation and developments in the US. ECHA representatives went on an informal visit to the US. American actors have studied REACH in-depth and communicate their findings to decision-makers. For example, the NGO 'Environmental Defense' has published a number of reports and statements linking REACH to the US and the possible reform of TSCA.[63] The US Government Accountability Office (GAO) published a report comparing TSCA with REACH and Canadian legislation.[64] Academic scholars published articles such as "Five Regulatory Lessons from REACH"[65] and "Synthesizing TSCA and REACH".[66]

Since the US system is based on a liability risk management, actors can learn from new data on intrinsic properties and risks presented by chemicals made publically available through REACH. This information can be used in law suits corroborating liability claims.

### 4.2.3 China

A number of indications show that Chinese chemicals policy-making was inspired by REACH. The timing of the introduction of the first chemicals law in China (2003) coincides with the intense debate and decision-making procedure leading up to the adoption of the REACH Regulation. In May 2009, the Chinese Ministry of Environment Protection launched an inter-ministerial consultation on proposed amendments to the 'Measures on the Environmental Control of New Chemical Substances' law.[67] These changes include a detailed 'general notification' for new chemicals depending on the tonnage (1 ton, 10 tons, 100 tons, 1,000 tons) of the imported or produced chemicals. For higher volumes more information is requested. These elements are very similar to respective REACH requirements. REACH has the same tonnages ranges for registration with more stringent requirements for higher volumes. Both REACH and the Chinese proposal pay special attention to chemicals of concern.

There are a number of venues in which Chinese decision-makers learned about REACH. Mutual learning between China and the EU on chemicals management has been institutionalised through the EU-China Working Group on Chemicals, where Chinese and European experts exchange information about their respective chemicals governance systems. The European Commission and EU Member States implemented a number of projects on REACH and chemicals management in China.[68] In 2008, the European Commission Delegation in Beijing organised two training sessions for Chinese policy-makers. The aim was "to explore how China could build on aspects of REACH to develop its laws on chemical risk management".[69]

### 4.3 Interdependence

This section provides evidence of the strong international economic interdependence in chemicals manufacturing and use and the resulting external influence of REACH.

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[63] Denison 2007.
[64] United States Government Accountability Office 2007.
[65] Farber 2009.
[66] Applegate 2008.
[67] Park 2009, 6-7.
[68] Berend 2009.
[69] European Commission 2009, 24.

### 4.3.1 International Level

REACH exerts direct influence on global chemicals manufacturers and downstream users through economic interdependence. The chemicals sector is highly globalised. The EU is the largest exporter and importer of chemical products globally. In addition, many sectors using chemicals in their production processes and in their products are global in nature with strong trade links between the EU and other parts of the world. Such sectors are for example electronics, toys, cosmetics and textile industries. Given this high degree of economic interdependence, REACH has direct implications for chemicals producers and downstream users in extra-EU jurisdictions if they wish to export to the EU. Imported chemicals and products have to fulfil the registration and notification requirements and are subject to the evaluation and possibly authorisation and restriction procedures.[70] Companies have to comply with the enhanced communication in the supply chain requirements, which means that more risk information will be provided and passed on throughout the supply chain.[71] The information in supply chain requirements means that information from the initial supplier will have to be provided even if this actor does not export directly to EU. Some of their clients' clients may put products on the EU market and therefore need data about the contained chemicals. Given the size of the EU market for chemicals and products containing chemicals, companies are not likely to withdraw from their EU activities but rather to adjust their operations. Hence, policy requirements are transferred through international product flows and REACH directly shapes certain activities of some companies that are based beyond its borders.

### 4.3.2 United States

The US is the main trading partner of the EU in chemical products. Ackerman, Stanton and Massey estimate that US chemicals exports to the EU that are subject to REACH amount to $ 13.7 billion per year and are directly and indirectly accounting for some 54,000 jobs. About 6 percent of all US chemical output is exported to the EU. In addition, there is a large number of exports of products containing chemical substances to the EU. Failing to comply with REACH would be an important loss to the US economy. Gains generated through these exports are expected to outweigh by far the costs for compliance with REACH.[72] From this strong economic interdependence between the US and the EU in chemicals and chemicals-related products, it could be concluded that REACH is likely to have a significant direct influence on the US manufacturing of chemicals and chemicals-related products.

Economic interdependence-induced externalities of REACH can also be observed in the change of position of the US chemicals industry and in the pledges for cooperation in transatlantic economic and trade-related forums. The fact that they have to comply with the REACH requirements changes the costs of complying with similar requirements in the US. This can change the chemicals industry's opposition to policy change. In the case of the American Chemicals Council, such a change of position can be observed. It engaged in fierce opposition to REACH and a possible TSCA reform but recently, it changed its position and supports a moderate TSCA reform. On 13 July 2009, US Trade Representative Ron Kirk and EU Trade Commissioner Catherine Asthon agreed "to initiate a practical dialogue on the trade implications of chemicals regulation in the United States and Europe".[73] The exchange of REACH-related information is also institutionalised as part of the Transatlantic Economic Council (TEC).

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[70] Hansen and Blainey 2008, 123-4.
[71] European Commission 2007, 10; Tickner, Geiser and Coffin 2005, 120.
[72] Ackerman, Stanton and Massey 2006, 1, 4-6, 10.
[73] European Commission Press Release, 13 July 2009, "*EU and U.S. discuss ways forward on bilateral trade issues*".

Chemicals regulation is one issue covered by the 2007 framework agreement for advancing transatlantic economic integration.

### 4.3.3   China

Exports from the EU to China and imports from China into the EU have increased rapidly. Between 2000 and 2007, Chinese EU exports and imports grew at an annual average of 17 and 15 percent respectively. China is a less important chemicals trading partner of the EU than the US but nevertheless it ranks amongst the top five trading partners and chemicals trade has intensified disproportionately fast in recent years.[74] The trade in chemicals-related products such as electronics and textiles is also very high.[75] A number of Chinese chemicals and product manufacturers have to comply with REACH in order to continue being able to access the EU market. Similar to the US case, the increased risk communication in the supply chain can affect chemicals management in Chinese companies and supply chains. Chinese companies are often supplier to larger US- or EU-based companies. Hence, due to economic interdependence in the chemicals and chemicals-related sectors, REACH is likely to have some influence on chemicals management in China and Chinese chemicals policy-making.

## 5   Conclusions

This paper has shown that the EU REACH Regulation has inspired chemicals policy-making beyond its borders contributing to closing governance gaps at the international and national level. The REACH Regulation is a pioneer policy. It introduces a comprehensive and ambitious regulatory regime for chemicals that addresses some of the shortcomings of previous chemicals regulation. Chemicals regulation in major chemicals exporting and importing nations but also international chemicals governance in the form of international treaties and activities of international organisations lack behind the EU in terms of effectiveness and level of ambition. International agreements only cover a limited number of substances and they have strong elements targeted towards the needs of developing countries. Situations of industrialised countries are not always addressed suitably.[76] Through its diffusion REACH can play an important role in contributing to regulatory reforms in a number of chemicals producing countries. Furthermore, REACH generates important data that can be used globally. At the moment, there is a lack of publically available and centralised information about hazards and risks of existing chemicals globally.[77] Therefore, REACH-generated data on intrinsic properties and uses of chemical substances can be fed into the existing databases of international organisations such as the OECD and UNEP. REACH-generated information can be leveraged and disseminated by these organisations that are already active in the area of chemicals governance.

Particularly through learning and interdependence-motivated diffusion channels, REACH can play an important role in influencing international chemicals governance by raising levels of ambition and comprehensiveness of extra-EU chemicals regulation. Policy diffusion is defined as a set of uncoordinated policy transfers without explicit political pressure. Actors' policy beliefs, domestic institutions and actors' resources act as a filter of pioneer policy in its diffusion process. In the case of REACH, this filter is fine-meshed since REACH is complex and controversial. Polarised debates and adaptation to domestic circumstances will lead to diffused policy that is inspired by REACH rather than a copy.

As a means of closing chemicals governance gaps, policy diffusion appears more likely to lead to results than other means of external influence. Ambitious and comprehensive regulation of chemicals is not likely to be subject to coercive

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[74] Eurostat 2008
[75] Eurostat 2009
[76] Wirth 2007b; Krueger and Selin 2002
[77] Koch and Ashford 2006, 44-5

pressure from the EU on other countries because this method of external influence is mostly applied in cases of severe disapproval of other jurisdictions actions, since it is a rather harsh and strong tool. Additionally, coercive measures are generally only targeted at a small number of countries that are outside relevant international agreements.[78] International chemicals governance gaps can also be filled by negotiating new binding agreements as it is currently the case for mercury. And REACH could possibly influence the course and outcome of such negotiations. However, attempts to conclude a comprehensive and overarching chemicals agreement have not gained enough traction so far. It would be very difficult to achieve agreement on an ambitious international treaty, since formal international negotiations and attempts to find common solutions often face difficulties due to lengthy and complex bargaining procedures resulting from diverging vested interests. In cases of widely divergent interests, international agreements can result in only minimal protection levels that lag behind some countries' expectations.[79] This could be the case for the contentious issue of chemicals. Hence, the diffusion of REACH Regulation is considered a more effective way to close some governance gaps on chemicals matters.

Yet, the degree to which REACH influences global chemicals governance partially still depends on its implementation in the next few years. It depends on the effective use, dissemination and evaluation of the registration data and on the effectiveness of the authorisation and restriction procedures whether REACH will have the tremendous external influence that some observers anticipate. Nevertheless, this paper has shown that there is already an external effect of REACH.

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[78] Joergens 2004, 252-3.
[79] Holzinger and Knill 2007, 98-9

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