

Appendix for “Towards ’Better Deregulation’: From Crude Cost-Cutting to the Targeted Pruning of Policy Activities”

Supplemental Online material

Abstract

Technical documentation for “Towards ’Better Deregulation’: From Crude Cost-Cutting to the Targeted Pruning of Policy Activities”.

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A Coding manual (excerpt)

A.1 Basic Coding Procedure and Main Concepts

At the most basic level, the coders have to identify single events of policy change in the collected legal documents and, for each single event, assess the direction of change, i.e., whether the event of policy change represents the introduction or abolishment of a given target-instrument-combination.

To come into consideration, a policy change has to meet the following requirements in form and content. Formally, a relevant policy change is any measure or provision in the collected legislation (and where necessary respective administrative circulars specifying these rules) that

- was published during the observation period, which starts on **January 1, 1976**, and ends on **March 31st, 2021**
- was adopted at the **national level**

The second point clearly excludes measures by sub-national jurisdictions such as regional or local bodies, even if the latter are state-like entities with far-reaching competencies as in federal states.

A.2 Coding Categories

The method used to assess and code policy change, is intended to be universally applicable, i.e. over a wide range of countries, irrespective of differing legal and administrative traditions. Thus, the coding rules comprise two invariant general categories. These are policy targets and policy instruments.

By means of these two categories, we seek to measure developments over time in a nuanced manner. Moreover, in order to assess whether a change represents the introduction or abolishment, we are interested in policy change relative to the previous state. Thus, as will be explained in more detail in this section, relative changes to the previous targets and instruments need to be coded. We are interested in the introduction and abolishment of (new) policy target (guiding question: *what is addressed?*), of policy instruments (*how is something addressed?*).

Recalling the observation period (January 1st, 1976 to March 31st, 2021), this stated focus on change has one important implication: Although the relevant information for deciding whether a legal act falls into the observation period is the date of publication, it might be the case that coders need to consult legislation originating from some year before 1980 in order to reconstruct the occurrence and the direction of change. For instance, if a law adopted in 2008 changes a law enacted in 1973, the latter legislation has to be considered in order to make a statement about the direction and nature of change taking place through the 2008 legislation.

A.3 Coding Category 1: Policy Targets

The first and most general coding category is policy targets. For analytical reasons, we use a very narrow conception of policy targets. By policy targets, we mean a very specific activity within a subarea of a policy field guided by the question: who or what is addressed? More specifically, a policy target is subject to state activities in order to achieve a political objective within a specific area. The tables below contain the policy targets this project is exclusively interested in. Thus, when screening the legislative acts, please identify the presence and/or abolishment of any policy targets from these lists and indicate these events of policy change as either introduction or termination.

One single target has to be coded only once per legislative act – it must not be coded multiple times. Any instrument concerning this specific target will be attributed to the one single target. If a policy target from the list is introduced for the first time, i.e. subject to governmental action for the first time, this particular event must be coded as policy introduction. If, by contrast, a policy target from the list is abolished, i.e. is not subject to governmental action anymore, this particular event must be coded as policy termination. Please note that the termination of a target entails the termination of all attached instruments, which have to be coded separately. The same is true when a target is addressed for the first time.

Clean Air Policy

-
1. Air quality standards for nitrogen oxides (NO_x)
 2. Air quality standards for sulphur dioxide (SO₂)
 3. Air quality standard for carbon monoxide (CO)
 4. Air quality standard for particulate matter
 5. Air quality standard for ozone (O₃)
 6. Air quality standard for lead
 7. Nitrogen oxide (NO_x) emissions from large combustion plants using coal
 8. Nitrogen oxide (NO_x) emissions from passenger vehicles using unleaded gasoline

9. Nitrogen oxide (NO_x) emissions from heavy duty vehicles using diesel
10. Sulphur dioxide (SO₂) emissions from large combustion plants using coal
11. Sulphur dioxide (SO₂) emissions from passenger vehicles using unleaded gasoline
12. Sulphur dioxide (SO₂) emissions from heavy duty vehicles using diesel
13. Carbon dioxide (CO₂) emissions from large combustion plants using coal
14. Carbon dioxide (CO₂) emissions from passenger vehicles using unleaded gasoline
15. Carbon monoxide (CO) emissions from large combustion using coal
16. Carbon monoxide (CO) emissions from passenger vehicles using unleaded gasoline
17. Particulate matter emissions from large combustion plants using coal
18. Arsenic emissions from stationary sources
19. Maximum permissible limit for the lead content of gasoline
20. Maximum permissible limit for the sulphur content of diesel
21. Carbon dioxide (CO₂) emissions from aviation activities
22. Maximum permissible limit for the sulphur content of petrol (gasoline, benzene, fuel)

Water Protection Policy

1. Lead in continental surfaces water (i.e. waters that flow or which are stored on the surface, and include natural water channels like rivers, surface runoff, streams, lakes and others)
2. Copper in continental surfaces water
3. Nitrate (NO₃⁻) in continental surfaces water
4. Phosphates in continental surfaces water
5. Zinc in continental surfaces water
6. Oils in continental surfaces water
7. Pesticides (fungicides, herbicides, insecticides, exempt DDT) in continental surfaces water
8. DDT (Dichloro-Diphenyl-Trichloroethane) in continental surfaces water
9. Phenols (as total C) in continental surfaces water
10. BOD (Biochemical Oxygen Demand) of continental surfaces water
11. Lead from industrial discharges into continental surfaces water
12. Copper from industrial discharges into continental surfaces water
13. Nitrate (NO₃⁻) from industrial discharges into continental surfaces water
14. Phosphates from industrial discharges into continental surfaces water
15. Chloride (Cl⁻) from industrial discharges into continental surfaces water
16. Sulphates from industrial discharges into continental surfaces water
17. Iron from industrial discharges into continental surfaces water
18. Zinc from industrial discharges into continental surfaces water
19. Oils and greases from industrial discharges into continental surfaces water
20. Pesticides and herbicides from industrial discharges into continental surfaces water
21. Phenols (as total C) from industrial discharges into continental surfaces water
22. Coliform bacteria from industrial discharges into continental surfaces water
23. BOD (Biochemical Oxygen Demand) from industrial discharges into continental surfaces water
24. COD (Chemical Oxygen Demand) from industrial discharges into continental surfaces water

1. Native Forests
2. Nature protection areas and reserves
3. Import and export of endangered species
4. Import and export of endangered plants

A.4 Coding Category 2: Policy instruments

We define a policy instrument as a tool or means adopted to achieve the underlying political objective of the selected environmental policy target. A policy instrument thus describes the type of governmental action adopted for a given policy target. A policy instrument is intended to have a regulating and/or guiding effect on people's actions. The tables below contain all potential policy instruments for environmental policy. For each policy targets, if addressed, there is at least one policy instrument defined as a tool to achieve the underlying political objective. Yet, any policy target may be addressed by means of various policy instruments. For each addressed policy target, the coders are asked to identify all instruments. Please note that a given policy instrument belongs to one type/group only.

The following table is exhaustive, containing the most common environmental policy instruments.

Instrument	Description	Example
Obligatory standard	A legally enforceable numerical standard, typically involving a measurement unit, e.g. mg/l	Limit value for lead emissions in surface water, e.g. 50 mg/l
Prohibition / ban	A total or partial prohibition/ban on certain emissions, activities, products etc.	Ban on importation of products containing flurochlorocarbons
Technological prescription	A measure prescribing the use of a specific technology or process	Installations have to be operated in accordance with the principle of 'best available techniques' (BAT)
Tax / levy	A tax or levy for a polluting product or activity	Tolls and road user charges for trucks depending on the emission class
Subsidy / tax reduction	A measure by which the state grants a financial advantage to a certain product or activity	Tax reduction for vehicles in series production complying with a regulation
Liability scheme	A measure that allocates the costs of environmental damage to those who have caused the damage	Establishment of an emission trading system
Planning instrument	A measure defining areas or times that deserve particular protection	Action plans indicating the measures to be taken during times when there is a risk of the limit being exceeded
Public investment	A specific public investment	Investment program for the development of green technologies
Data collection / monitoring programmes	A specific programme for collecting data	Establishment of measuring stations designed to supply the data necessary for the application of a certain regulation
Voluntary measures	Voluntary agreements or commitments between the state and private actors or by private actors alone	Manufacturers can apply for the CO ₂ savings achieved as a result of eco-innovation (if approved can used to contribute to manufacturer's specific emissions target)
Information-based instrument	Information provided by the state or the polluters indicating the environmental externalities of a certain product or activity	Label on fuel economy and CO ₂ emissions of a vehicle displayed at the point of sale.
Other	Any instrument that cannot be assigned to the other categories	(...)

B Reduction potential

This section reports the policies (Target and Instrument combinations) with highest reduction potential, and the percentage of the EU portfolio represented in those member states that have reduction potential with the EU portfolio.

Table 3: Policies with maximum reduction potential, 2020. Top-5 per country.

Country	Target	Instrument	EU	Consistency
Australia	Sulphur dioxide (SO ₂) emissions from heavy vehicles destined for the transportation of goods using diesel	Obligatory standards		-2
Australia	Sulphur dioxide (SO ₂) emissions from heavy vehicles destined for the transportation of goods using diesel	Prohibition / Ban		-2
Australia	Sulphur dioxide (SO ₂) emissions from heavy vehicles destined for the transportation of goods using diesel	Technological prescription		-2
Australia	Oils in continental surfaces water	Obligatory standards		-2
Australia	Oils in continental surfaces water	Prohibition / Ban		-2
Austria	Oils and greases from industrial discharges into continental surfaces water	Obligatory standards	Yes	-2
Austria	Oils and greases from industrial discharges into continental surfaces water	Obligatory standards	Yes	-2
Austria	Oils and greases from industrial discharges into continental surfaces water	Technological prescription		-2
Austria	Oils and greases from industrial discharges into continental surfaces water	Liability scheme	Yes	-2
Austria	Oils and greases from industrial discharges into continental surfaces water	Liability scheme	Yes	-2
Belgium	Sulphur dioxide (SO ₂) emissions from passenger vehicles using unleaded gasoline	Technological prescription		-2
Belgium	Sulphur dioxide (SO ₂) emissions from heavy vehicles destined for the transportation of goods using diesel	Technological prescription		-2
Belgium	Carbon dioxide (CO ₂) emissions from large combustion plants of the smallest size as defined by the legal act	Liability scheme	Yes	-2
Belgium	Carbon dioxide (CO ₂) emissions from large combustion plants of the smallest size as defined by the legal act	Liability scheme	Yes	-2
Belgium	Carbon mono oxide (CO) emissions from passenger vehicles using unleaded gasoline	Obligatory standards		-2
Canada	Copper from industrial discharges from industrial discharges into continental surfaces water	Obligatory standards		-2
Canada	Copper from industrial discharges from industrial discharges into continental surfaces water	Obligatory standards		-2
Canada	Copper from industrial discharges from industrial discharges into continental surfaces water	Prohibition / Ban		-2
Canada	Copper from industrial discharges from industrial discharges into continental surfaces water	Liability scheme		-2
Canada	Copper from industrial discharges from industrial discharges into continental surfaces water	Liability scheme		-2
Denmark	Nitrates from industrial discharges from industrial discharges into continental surfaces water	Prohibition / Ban		-3
Denmark	Nitrates from industrial discharges from industrial discharges into continental surfaces water	Technological prescription		-3
Denmark	Nitrates from industrial discharges from industrial discharges into continental surfaces water	Tax / Levy		-3
Denmark	Nitrates from industrial discharges from industrial discharges into continental surfaces water	Liability scheme	Yes	-3
Denmark	Nitrates from industrial discharges from industrial discharges into continental surfaces water	Liability scheme	Yes	-3
Finland	Maximum permissible limit for the sulphur content of diesel	Obligatory standards	Yes	-1
Finland	Maximum permissible limit for the sulphur content of diesel	Obligatory standards	Yes	-1
Finland	Maximum permissible limit for the sulphur content of diesel	Prohibition / Ban		-1
Finland	Lead from industrial discharges from industrial discharges into continental surfaces water	Obligatory standards	Yes	-1
Finland	Lead from industrial discharges from industrial discharges into continental surfaces water	Obligatory standards	Yes	-1
France	Sulphur dioxide (SO ₂) emissions from large combustion plants of the smallest size as defined by the legal act	Technological prescription	Yes	-3
France	Sulphur dioxide (SO ₂) emissions from large combustion plants of the smallest size as defined by the legal act	Technological prescription	Yes	-3

France	Sulphur dioxide (SO ₂) emissions from large combustion plants of the smallest size as defined by the legal act	Tax / Levy		-3
France	Sulphur dioxide (SO ₂) emissions from large combustion plants of the smallest size as defined by the legal act	Liability scheme		-3
Germany	COD (Chemical Oxygen Demand) from industrial discharges into continental surfaces water	Obligatory standards	Yes	-4
Germany	COD (Chemical Oxygen Demand) from industrial discharges into continental surfaces water	Obligatory standards	Yes	-4
Germany	COD (Chemical Oxygen Demand) from industrial discharges into continental surfaces water	Prohibition / Ban		-4
Germany	COD (Chemical Oxygen Demand) from industrial discharges into continental surfaces water	Technological prescription		-4
Germany	COD (Chemical Oxygen Demand) from industrial discharges into continental surfaces water	Tax / Levy		-4
Greece	Nitrogen oxides (Nox) emissions from heavy vehicles destined for the transportation of goods using diesel	Liability scheme		-4
Ireland	Lead in continental surfaces water	Obligatory standards	Yes	-1
Ireland	Lead in continental surfaces water	Obligatory standards	Yes	-1
Ireland	Lead in continental surfaces water	Prohibition / Ban	Yes	-1
Ireland	Lead in continental surfaces water	Prohibition / Ban	Yes	-1
Ireland	Lead in continental surfaces water	Technological prescription		-1
Italy	Air quality standards for nitrogen oxides (Nox)	Obligatory standards	Yes	-1
Italy	Air quality standards for nitrogen oxides (Nox)	Obligatory standards	Yes	-1
Italy	Air quality standards for nitrogen oxides (Nox)	Prohibition / Ban		-1
Italy	Air quality standards for nitrogen oxides (Nox)	Technological prescription	Yes	-1
Italy	Air quality standards for nitrogen oxides (Nox)	Technological prescription	Yes	-1
Japan	Particulate matter emissions from large combustion plants of the smallest size as defined by the legal act	Obligatory standards		-1
Japan	Particulate matter emissions from large combustion plants of the smallest size as defined by the legal act	Obligatory standards		-1
Japan	Particulate matter emissions from large combustion plants of the smallest size as defined by the legal act	Tax / Levy		-1
Japan	Nitrates in continental surfaces water	Obligatory standards		-1
Japan	Nitrates in continental surfaces water	Obligatory standards		-1
Mexico	Carbon dioxide (CO ₂) emissions from large combustion plants of the smallest size as defined by the legal act	Data collection / Monitoring		0
Mexico	Carbon dioxide (CO ₂) emissions from large combustion plants of the smallest size as defined by the legal act	Data collection / Monitoring		0
Mexico	Carbon dioxide (CO ₂) emissions from large combustion plants of the smallest size as defined by the legal act	Information-based instruments		0
Mexico	Carbon dioxide (CO ₂) emissions from large combustion plants of the smallest size as defined by the legal act	Information-based instruments		0
Mexico	The introduction / extension / reduction of import and export of regulations for endangered plants	Prohibition / Ban		0
Netherlands	Sulphates from industrial discharges into continental surfaces water	Obligatory standards	Yes	-2
Netherlands	Sulphates from industrial discharges into continental surfaces water	Obligatory standards	Yes	-2
Netherlands	Sulphates from industrial discharges into continental surfaces water	Technological prescription		-2
Netherlands	Sulphates from industrial discharges into continental surfaces water	Tax / Levy		-2
Netherlands	Sulphates from industrial discharges into continental surfaces water	Liability scheme	Yes	-2
New Zealand	Maximum permissible limit for the lead content of petrol (gasoline, benzine, fuel)	Obligatory standards		-1
New Zealand	Maximum permissible limit for the lead content of petrol (gasoline, benzine, fuel)	Obligatory standards		-1
New Zealand	Maximum permissible limit for the lead content of petrol (gasoline, benzine, fuel)	Prohibition / Ban		-1
New Zealand	The introduction / extension / reduction of nature protection areas/nature reserve	Obligatory standards		-1
New Zealand	The introduction / extension / reduction of nature protection areas/nature reserve	Prohibition / Ban		-1
Norway	Air quality standards for nitrogen oxides (Nox)	Liability scheme		-2
Norway	Air quality standards for nitrogen oxides (Nox)	Liability scheme		-2
Norway	Nitrogen oxides (Nox) emissions from large combustion plants of the smallest size as defined by the legal act	Tax / Levy		-2
Portugal	Oils and greases from industrial discharges into continental surfaces water	Obligatory standards	Yes	-3
Portugal	Oils and greases from industrial discharges into continental surfaces water	Obligatory standards	Yes	-3

Portugal	Oils and greases from industrial discharges into continental surfaces water	Prohibition / Ban		-3
Portugal	Oils and greases from industrial discharges into continental surfaces water	Technological prescription		-3
Portugal	Oils and greases from industrial discharges into continental surfaces water	Liability scheme	Yes	-3
Spain	Iron from industrial discharges into continental surfaces water	Obligatory standards		-2
Spain	Iron from industrial discharges into continental surfaces water	Technological prescription		-2
Spain	Iron from industrial discharges into continental surfaces water	Liability scheme	Yes	-2
Spain	Iron from industrial discharges into continental surfaces water	Liability scheme	Yes	-2
Spain	Pesticides and herbicides from industrial discharges into continental surfaces water	Obligatory standards	Yes	-2
Sweden	Carbon dioxide (CO2) emissions from large combustion plants of the smallest size as defined by the legal act	Liability scheme	Yes	-1
Sweden	Carbon dioxide (CO2) emissions from large combustion plants of the smallest size as defined by the legal act	Liability scheme	Yes	-1
Sweden	Lead in continental surfaces water	Obligatory standards	Yes	-1
Sweden	Lead in continental surfaces water	Obligatory standards	Yes	-1
Sweden	Lead in continental surfaces water	Prohibition / Ban	Yes	-1
Switzerland	Carbon dioxide (CO2) emissions from large combustion plants of the smallest size as defined by the legal act	Technological prescription		-4
Switzerland	Carbon dioxide (CO2) emissions from large combustion plants of the smallest size as defined by the legal act	Technological prescription		-4
Switzerland	Carbon dioxide (CO2) emissions from large combustion plants of the smallest size as defined by the legal act	Tax / Levy		-4
Switzerland	Carbon dioxide (CO2) emissions from passenger vehicles using unleaded gasoline	Technological prescription		-4
Switzerland	Carbon dioxide (CO2) emissions from passenger vehicles using unleaded gasoline	Technological prescription		-4
Turkey	Carbon mono oxide (CO) emissions from large combustion plants of the smallest size as defined by the legal act	Obligatory standards		-1
Turkey	Carbon mono oxide (CO) emissions from large combustion plants of the smallest size as defined by the legal act	Technological prescription		-1
Turkey	Carbon mono oxide (CO) emissions from large combustion plants of the smallest size as defined by the legal act	Technological prescription		-1
Turkey	COD (Chemical Oxygen Demand) from industrial discharges into continental surfaces water	Obligatory standards		-1
Turkey	COD (Chemical Oxygen Demand) from industrial discharges into continental surfaces water	Obligatory standards		-1
United Kingdom	Maximum permissible limit for the lead content of petrol (gasoline, benzine, fuel)	Obligatory standards		-1
United Kingdom	Maximum permissible limit for the lead content of petrol (gasoline, benzine, fuel)	Obligatory standards		-1
United Kingdom	Maximum permissible limit for the lead content of petrol (gasoline, benzine, fuel)	Prohibition / Ban		-1
United Kingdom	Maximum permissible limit for the sulphur content of diesel	Obligatory standards		-1
United Kingdom	Maximum permissible limit for the sulphur content of diesel	Obligatory standards		-1
United States	Arsenic emissions from stationary sources	Obligatory standards		-2
United States	Arsenic emissions from stationary sources	Technological prescription		-2
United States	Arsenic emissions from stationary sources	Technological prescription		-2
United States	Arsenic emissions from stationary sources	Tax / Levy		-2
United States	Arsenic emissions from stationary sources	Liability scheme		-2

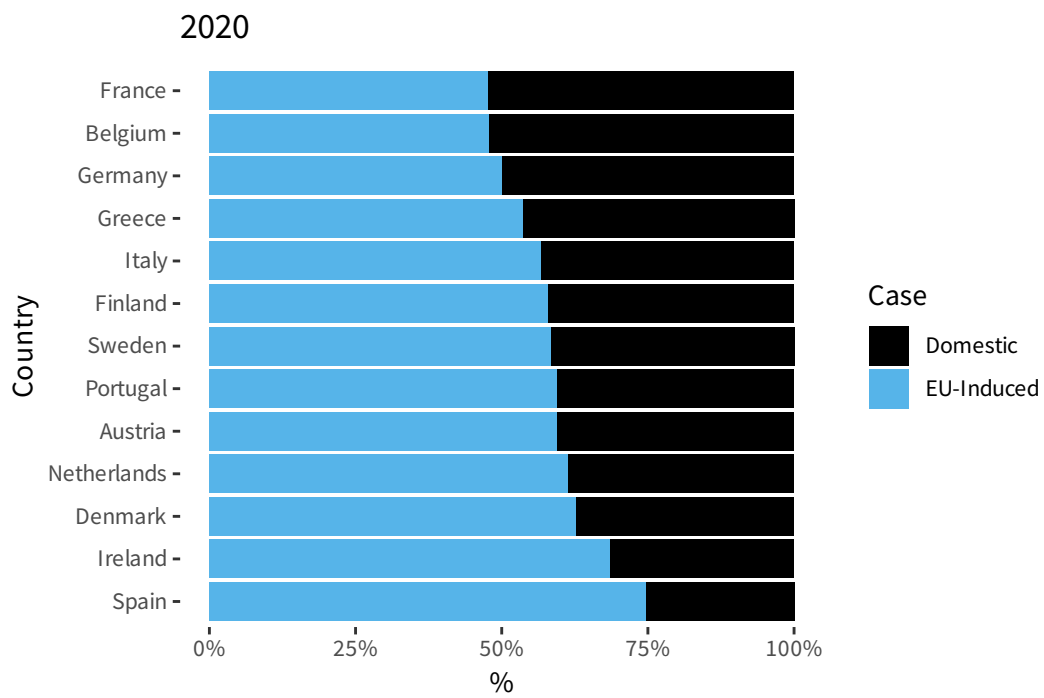


Figure 1: Share of the policies with negative interactions that are part of the EU portfolio. 2020.

C Description

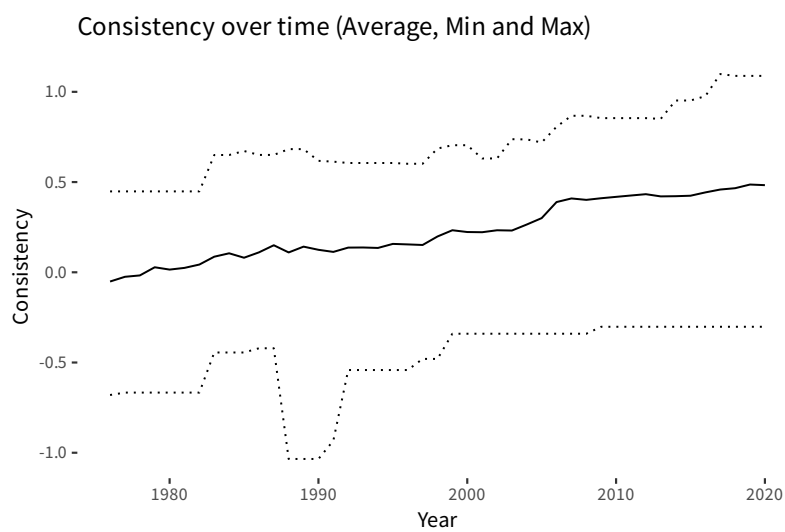


Figure 2: Average, minimum and maximum values over time for Consistency.

D Results

This section contains the whole set of parameters produced for the main model.

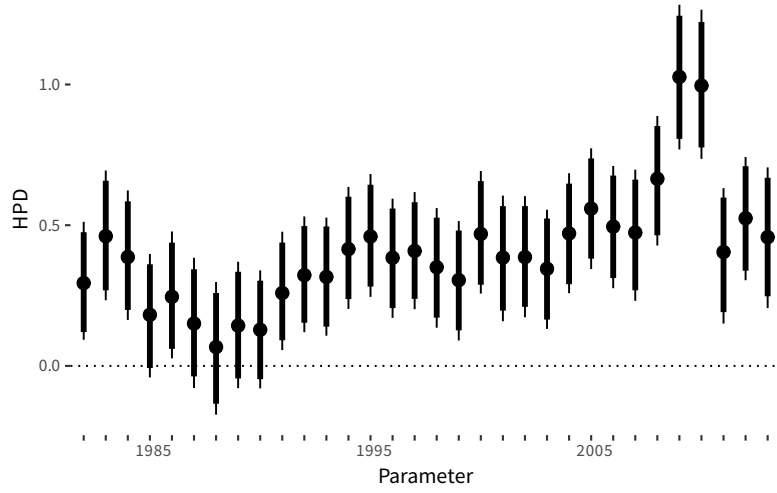


Figure 3: Varying intercepts for the temporal dimension (β).

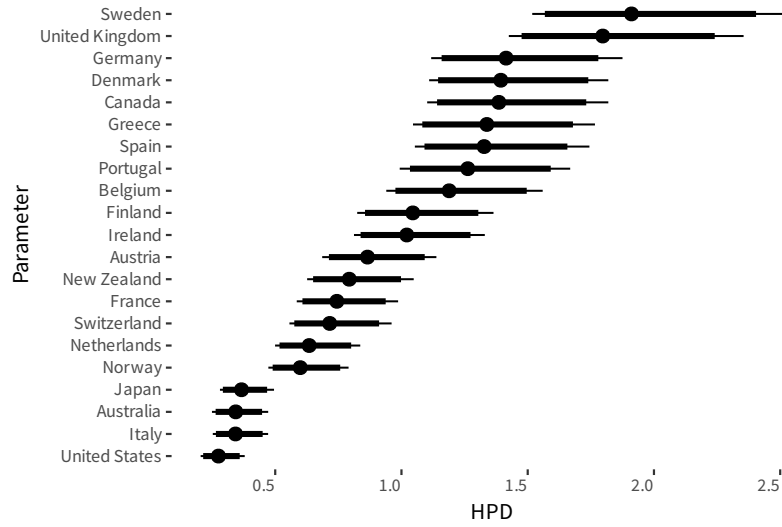


Figure 4: Error component clustered by countries (σ_C).

E Convergence

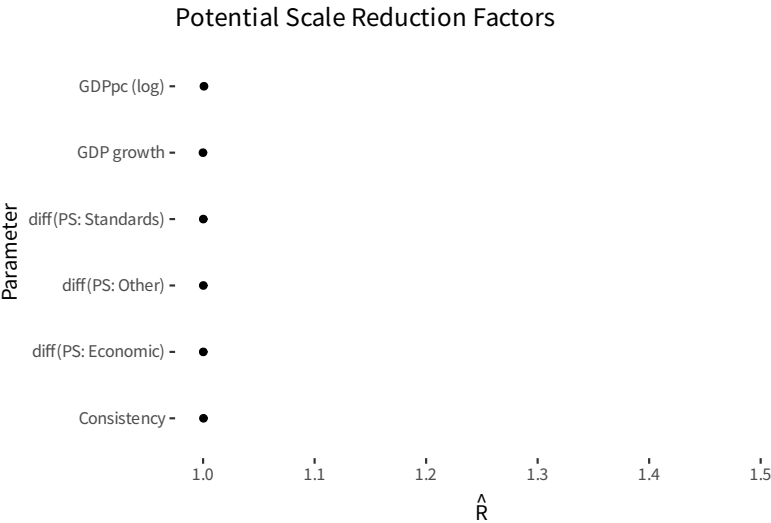


Figure 5: Potential Scale Reduction Factors ($\hat{R}$) for the main parameters of interest (θ).

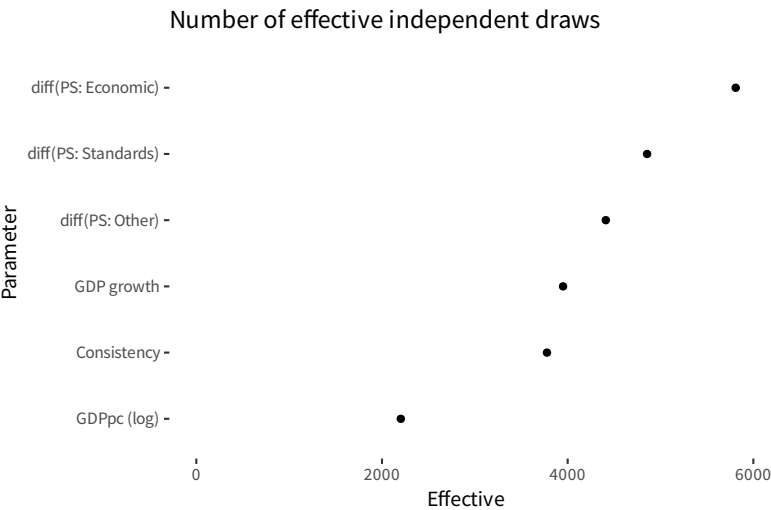


Figure 6: Number of effective independent draws (effective sample size) for the main parameters of interest (θ).

F Robustness

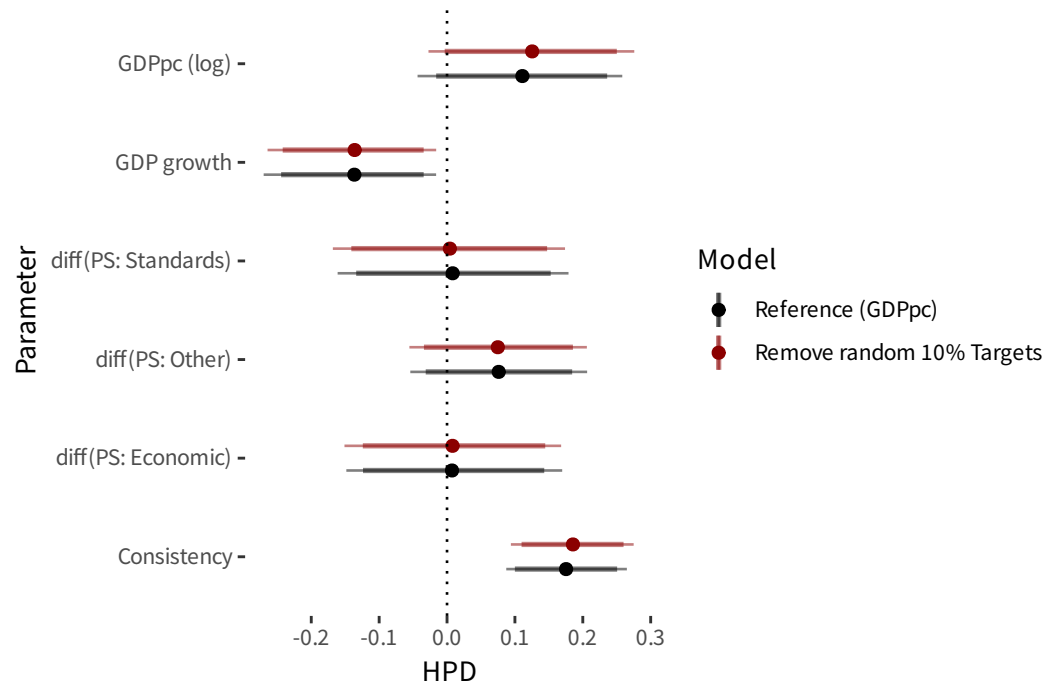


Figure 7: Comparison between the reference model and one with randomly 90 percent of the Targets.

G Positive/Negative interactions between policy instruments

G.1 Obligatory standards OR Prohibition / Ban * Technological prescription

"Although the differences between technology-based and performance-based standards may in some instances be an unintended outcome of regulatory practice, it is difficult not to conclude that they are **fundamentally incompatible policy approaches**. In the case of the former, regulators maintain a high degree of control over the direction and actuality of technological solutions. In the case of the latter, regulators are not concerned with the way in which firms run their industrial processes; rather, the focus is on the level of environmental performance. It is highly unlikely that these two approaches can operate successfully simultaneously, and indeed, it may be argued that some of the difficulties associated in particular with United States' style command and control regulation is the result of authorities failing to adequately recognize their mutual incompatibility, and the merits of applying them in different circumstances." (Gunningham and Sinclair, 1999, p. 556).

G.2 Technological prescription OR Obligatory standards OR Prohibition / Ban * Data collection/Monitoring OR Information-based instruments

"Information is essential to the effectiveness of command-and-control regulation, both flowing from the regulatee to regulator and vice versa. For example, monitoring and disclosure requirements are crucial to ensure adequate compliance and are therefore often built into the legislation itself. Information instruments designed primarily for other purposes may also be of value to regulators, for example, enabling them to target more effectively toxic "hot spots" or worst performers. Conversely, information provided by a regulator to industry may reduce the prospects of regulatory resistance and facilitate best practice." (Gunningham and Sinclair, 1999, p. 55).

G.3 Liability Schemes OR Tax / Levy * Technological prescription OR Obligatory standards OR Prohibition / Ban

"If a command-and-control instrument were to be superimposed on an economic instrument that targets the same behavior, or vice versa, then to the extent that the command-and-control instrument limits the choice of firms in making individual decisions, the economic instrument will be compromised. That is, there will be a **suboptimal regulatory outcome**. This is because economic instruments are designed to exploit differences in the marginal cost of abatement between firms." (Gunningham and Sinclair, 1999, p. 61).

G.4 Liability Schemes OR Tax / Levy OR Subsidy / Tax reduction * Data collection/Monitoring OR Information-based instruments

"Market mechanisms, including economic incentives, also depend heavily for their success upon the availability of sufficient information to enable economic actors to make rational decisions in their self-interest. Indeed, one of the most common failings of pure free-market approaches, such as the creation of property rights, is the lack of access to information of the main parties and their consequent inability to make rational decisions in the absence of such information. **In the case of economic instruments, information is of such fundamental importance** that, in almost every case, its provision will enhance the functioning of individual instruments." (Gunningham and Sinclair, 1999, p. 56).

G.5 Subsidy / Tax reduction * Obligatory standards OR Prohibition / Ban

"Economic instruments in the form of supply-side incentives, such as tax concessions or soft loans for environmental preferred technologies, will **complement command and control regulation** or self-regulation that target environmental performance directly related to those technologies. For example, performance-based regulation that requires firms to reduce their contribution to greenhouse gas emissions will obviously be assisted by incentives for firms to purchase more energy efficient industrial motors and drives or cogeneration facilities." (Gunningham and Sinclair, 1999, p. 56).

G.6 Tax / Levy * Liability Schemes

"(...) Imposing a carbon tax on firms already regulated by a permit trading system will only work to lower the permit price - the level of abatement will be the same, unless the tax is so great that the trading scheme is effectively replaced in its entirety, which seems unlikely. Unless the new tax is coordinated with an explicit reduction in the number of permits, no additional mitigation will be induced. From a political economy standpoint, the simultaneous policy may end up **expending scarce political capital (...) with very little additional abatement** to show for it. Insofar as the decision to introduce an additional carbon tax requires political capital and may generate (or be intended to generate) the perception that "more is being done", it can create an illusion." (Fankhauser, Hepburn, and Park, 2010, p. 9).

G.7 Subsidy * Liability Schemes

"A higher level of subsidy for abatement technologies means that the cost of abatement at any given level of production has decreased. For a given level of emissions cap, demand for permits will be lower, and hence so will prices." (Fankhauser, Hepburn, and Park, 2010, p. 10).

G.8 Voluntary instruments * Obligatory standards

"Voluntarism lacks dependability, and therefore is most effective when used in combination with other instruments to overcome this potential weakness. In this regard, voluntarism will be complemented by most forms of command-and-control regulation, particularly where levels of environmental performance "beyond compliance" are desired. In the case of performance-based command and control regulation, a minimum performance benchmark is established, with voluntary based measures encouraging firms to achieve additional improvements." (Gunningham and Sinclair, 1999, p. 57).

G.9 Voluntary instruments * Data collection/Monitoring OR Information-based instruments

"Information will similarly serve to complement voluntarism, which itself relies largely upon harnessing enlightened self-interest or altruism. In either event, the provision of information is usually necessary to draw the attention of communities or individuals either to their own self-interest or to the wider environmental merits of a particular course of action." (Gunningham and Sinclair, 1999, p. 56).

G.10 Voluntary instruments * Technological prescription

"In contrast, **technology-based command and control regulation is unlikely to produce complementary outcomes** when used in combination with voluntary measures. This is because technology-based standards are highly prescriptive firms can either comply or not, resulting in little room for beyond-compliance achievements. In effect, technology-based standards restrict the way in which firms respond to an environmental imperative, in terms of the method of environmental improvement, whereas voluntary measures are in principle designed to provide additional regulatory flexibility." (Gunningham and Sinclair, 1999, p. 57).

G.11 Voluntary instruments * Liability Schemes OR Tax / Levy

"The incompatibility of these two approaches being used in combination is obvious. If the tradeable permits were to realize their efficiency potential, those firms that faced the highest cost of abatement, irrespective of the particular industry they belonged to or the particular gas they used, should have been allowed to purchase the necessary CFC permits (albeit indirectly through the various importers and manufacturers of CFCs). This would have forced up the market price, thus encouraging those firms, again, irrespective of their industry sector, with lower abatement costs to reduce their consumption of CFCs. By imposing predetermined outcomes on the various industry sectors, the self-regulatory strategy effectively prevented such an outcome." (Gunningham and Sinclair, 1999, p. 64).

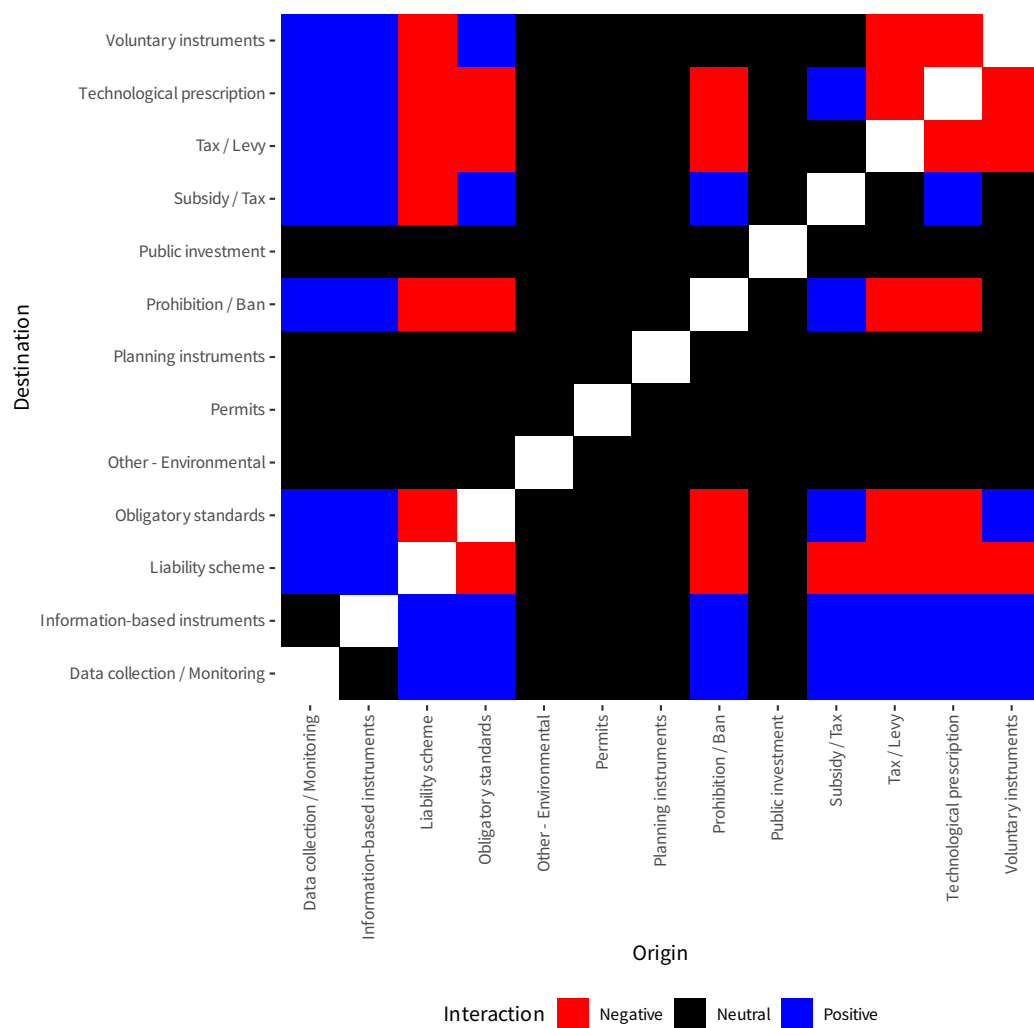
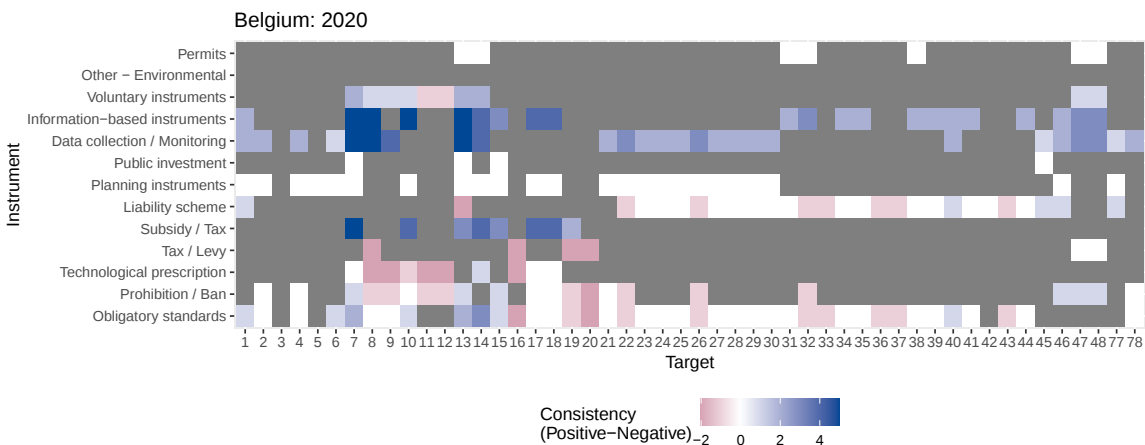
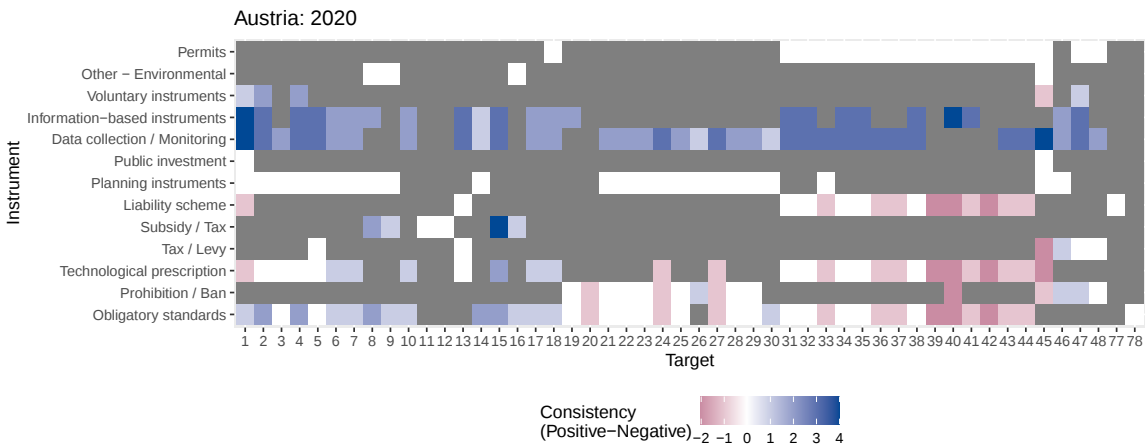
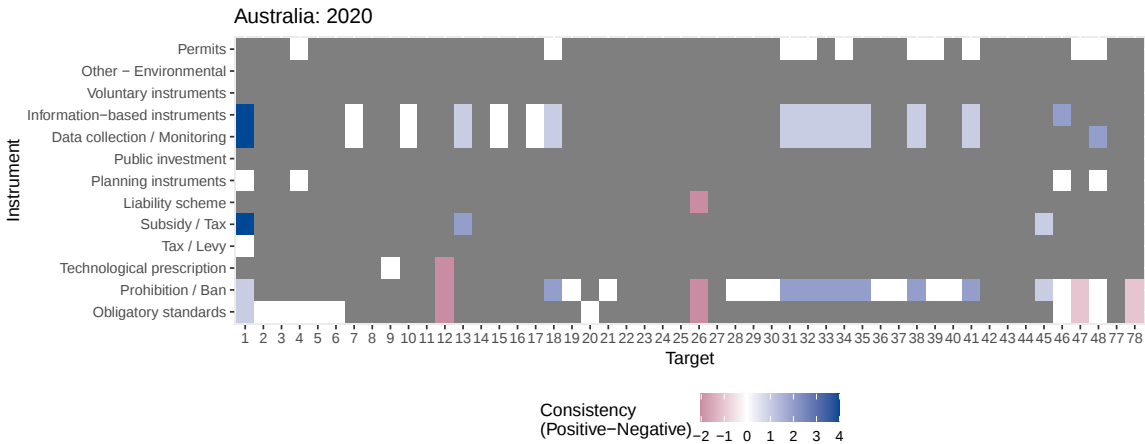
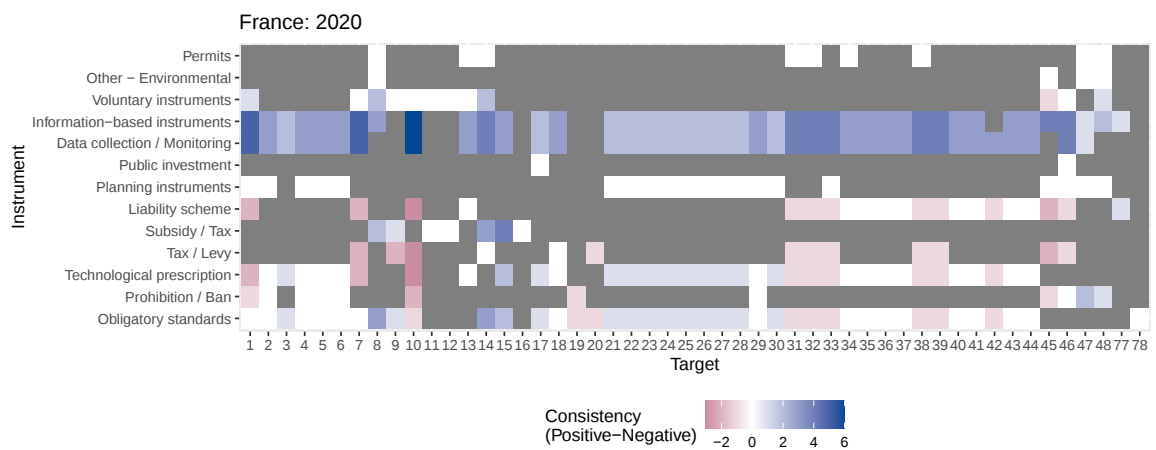
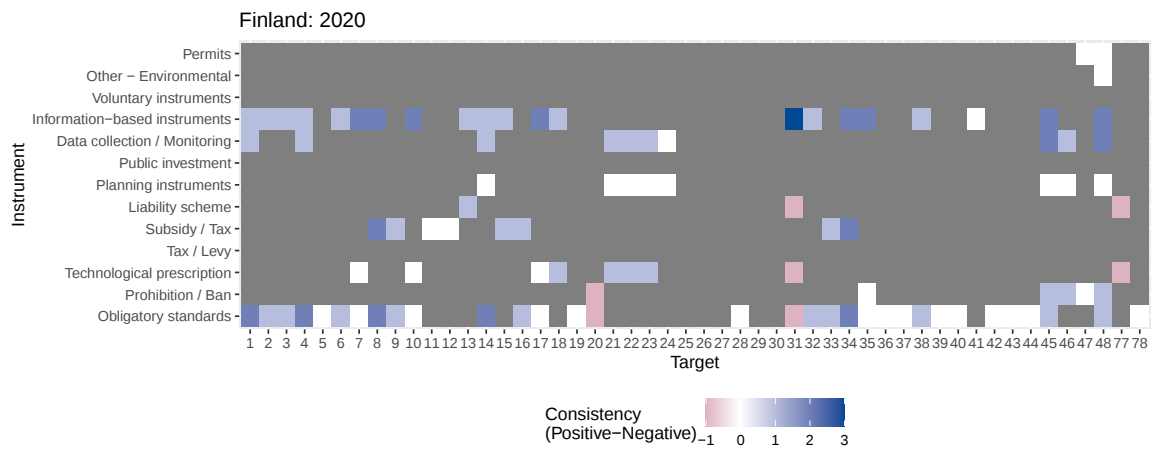
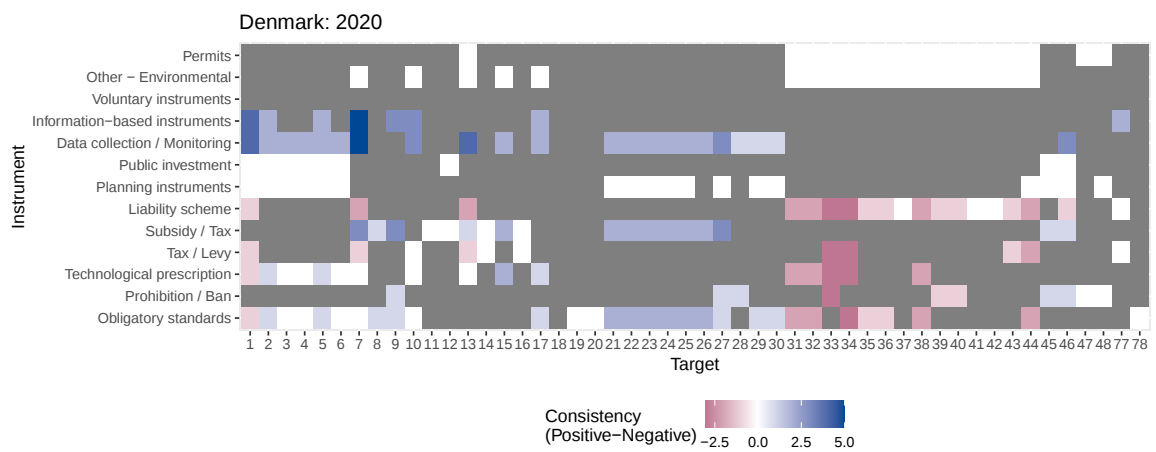
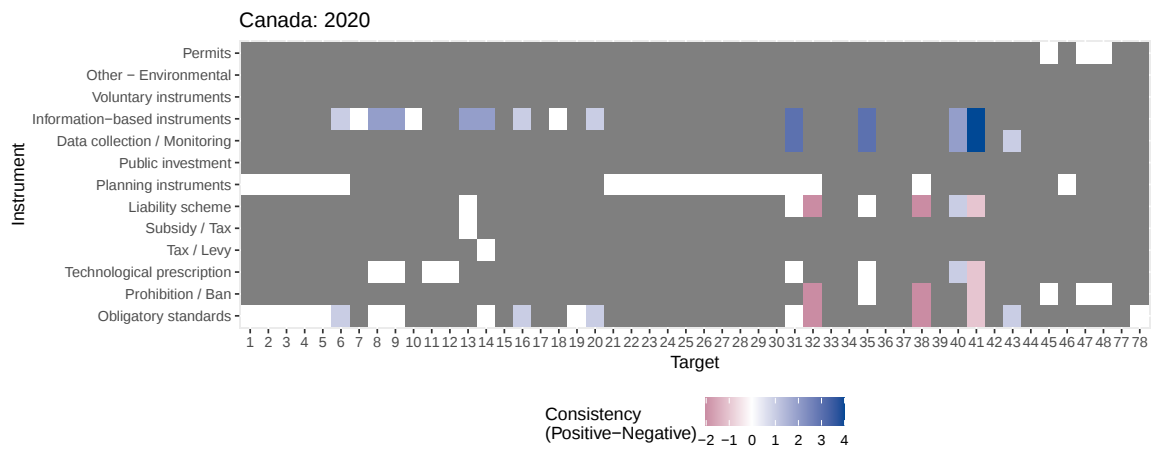


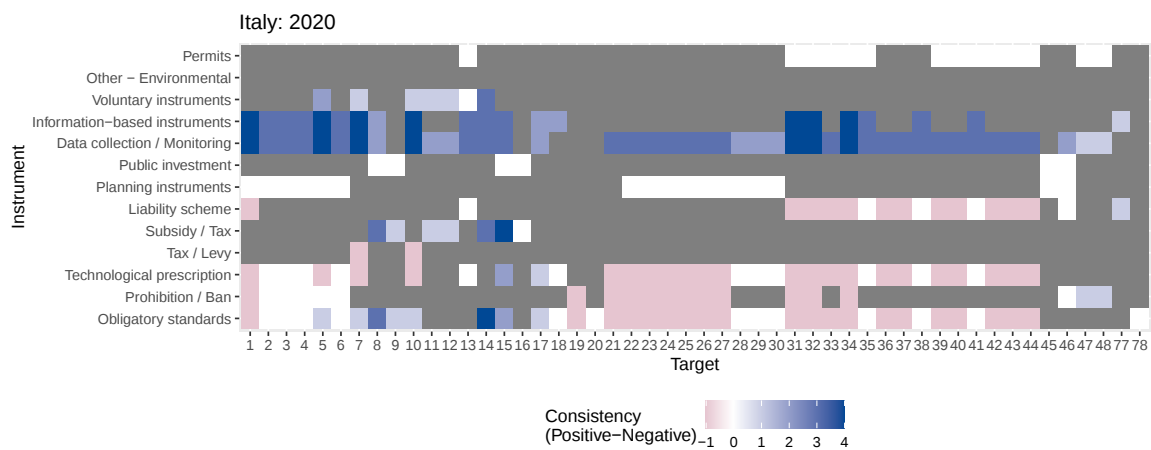
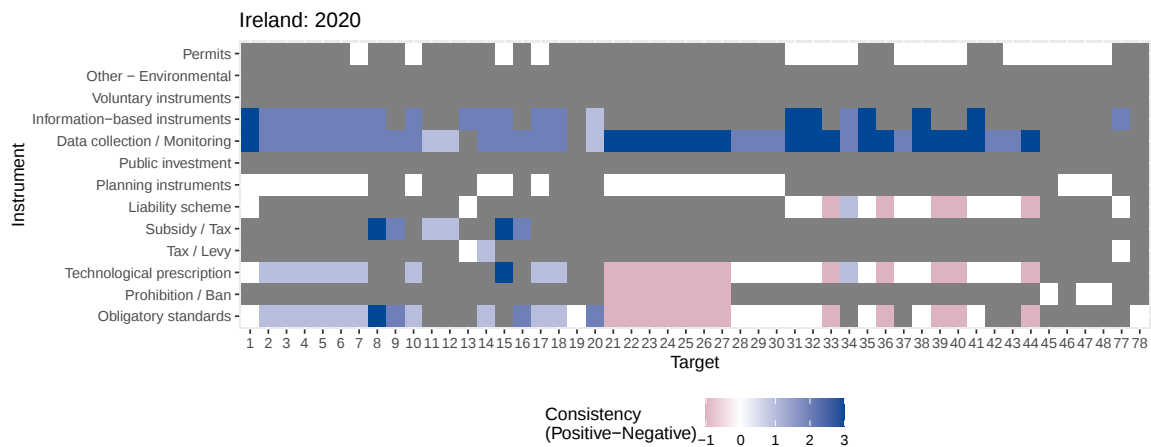
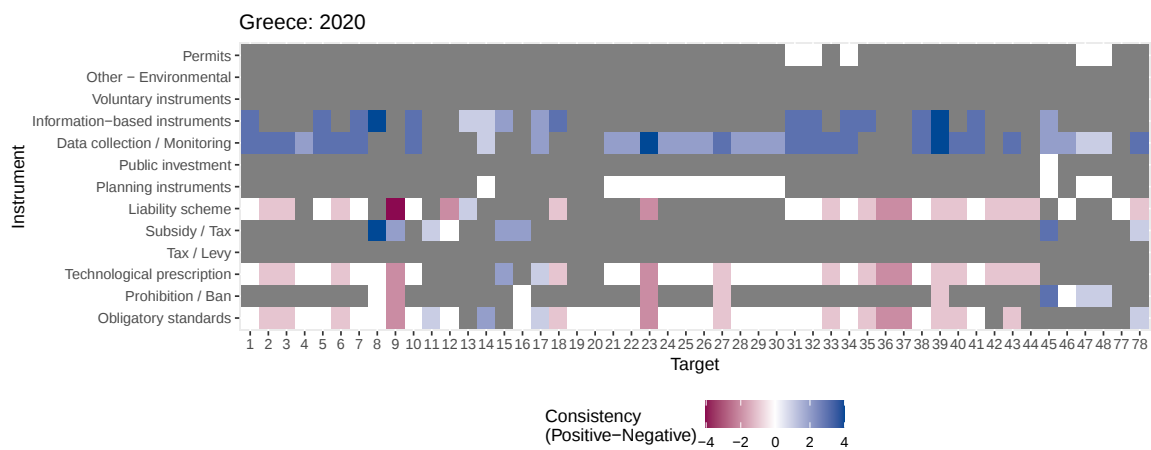
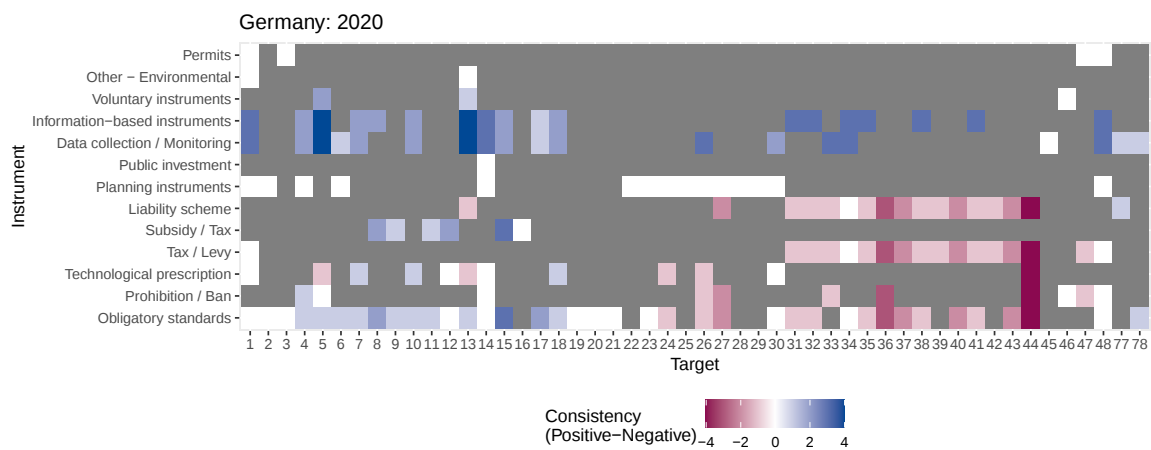
Figure 8: Interactions between policy instruments.

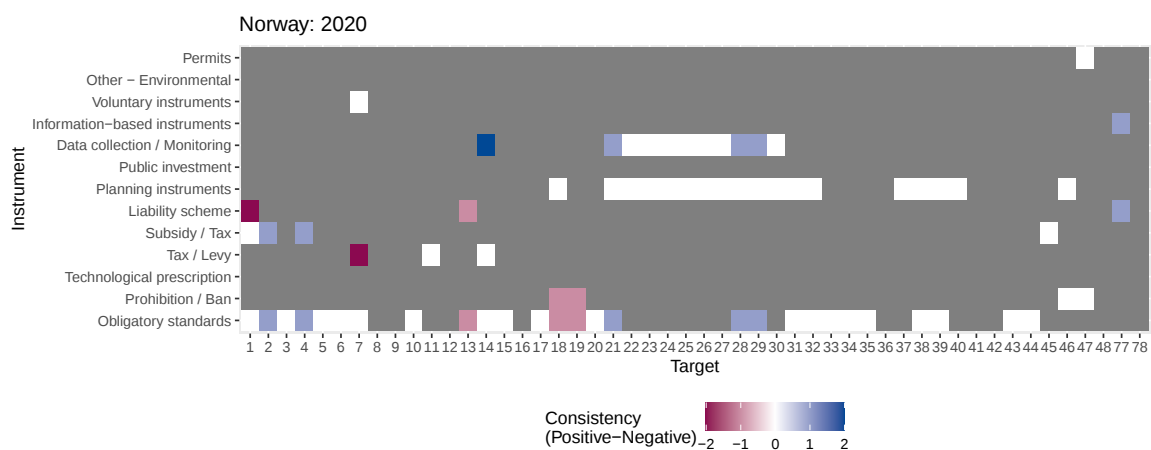
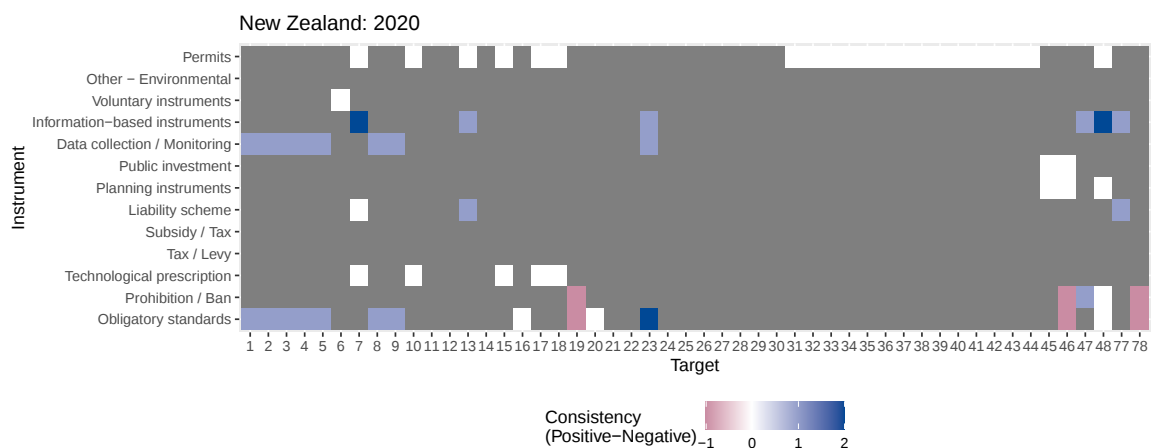
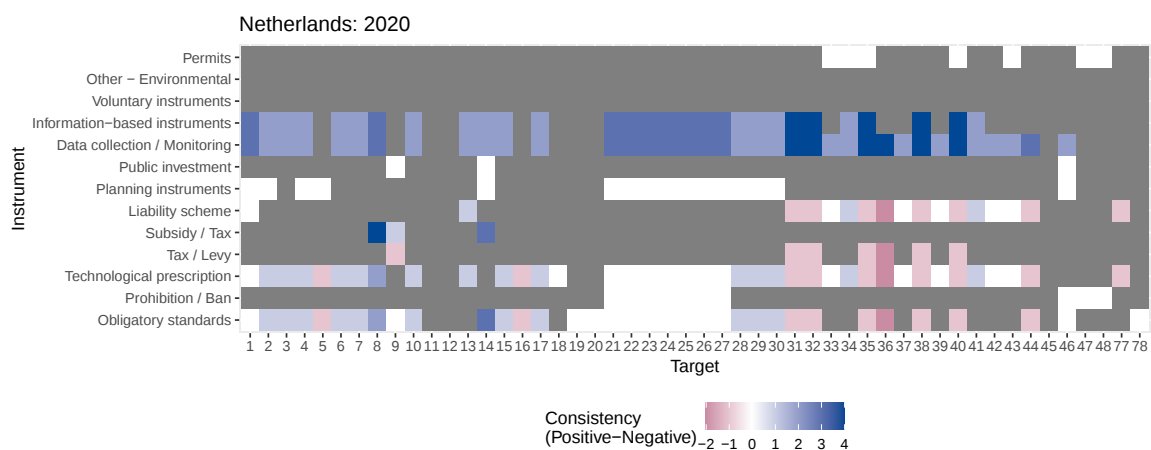
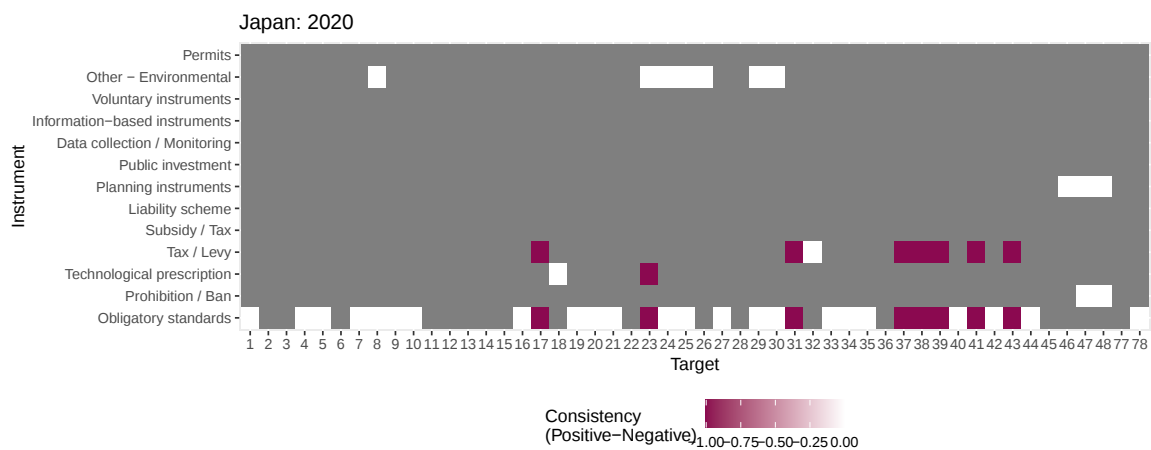
H Policy portfolios

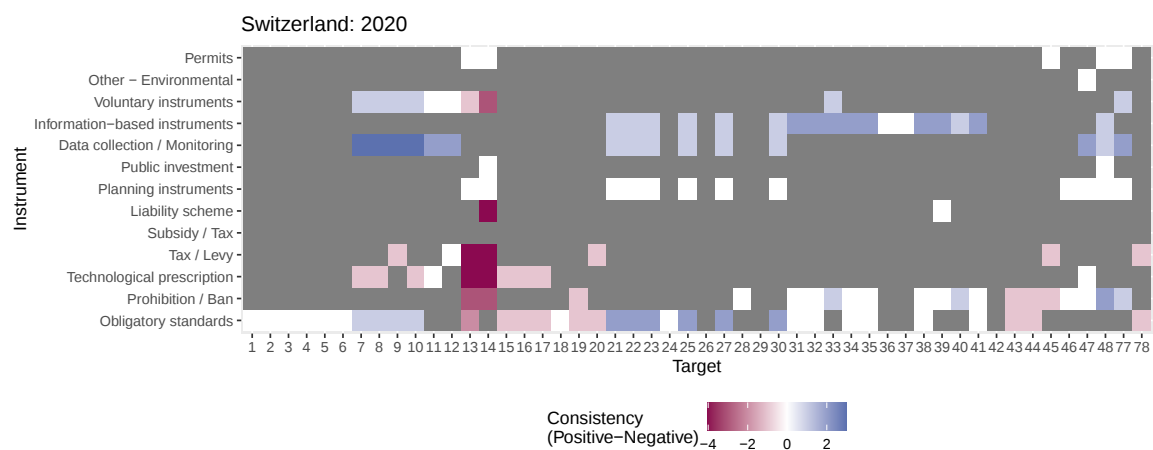
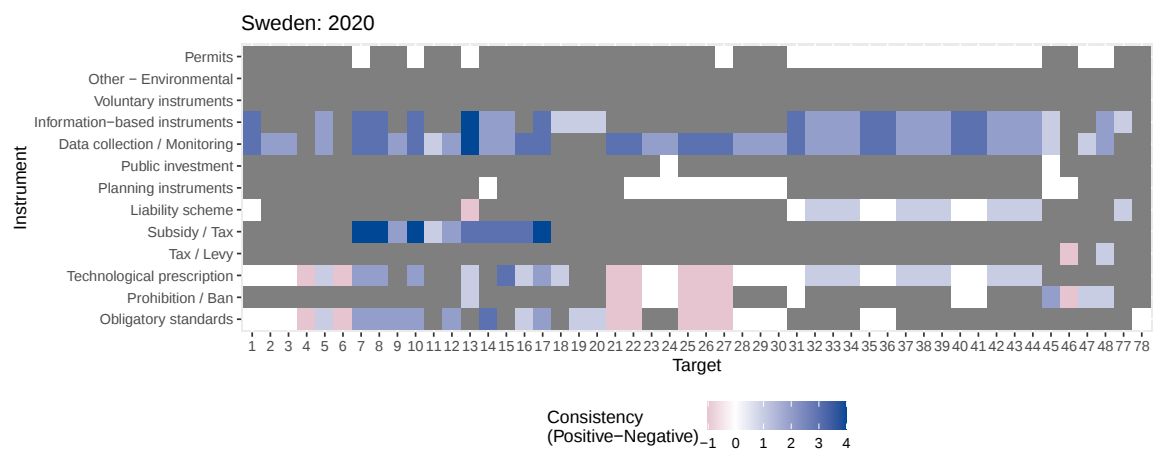
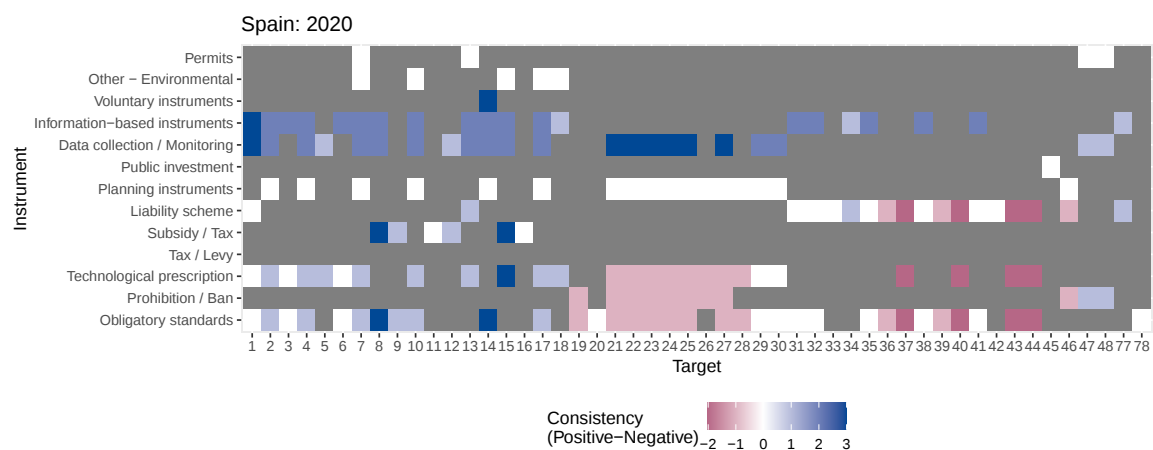
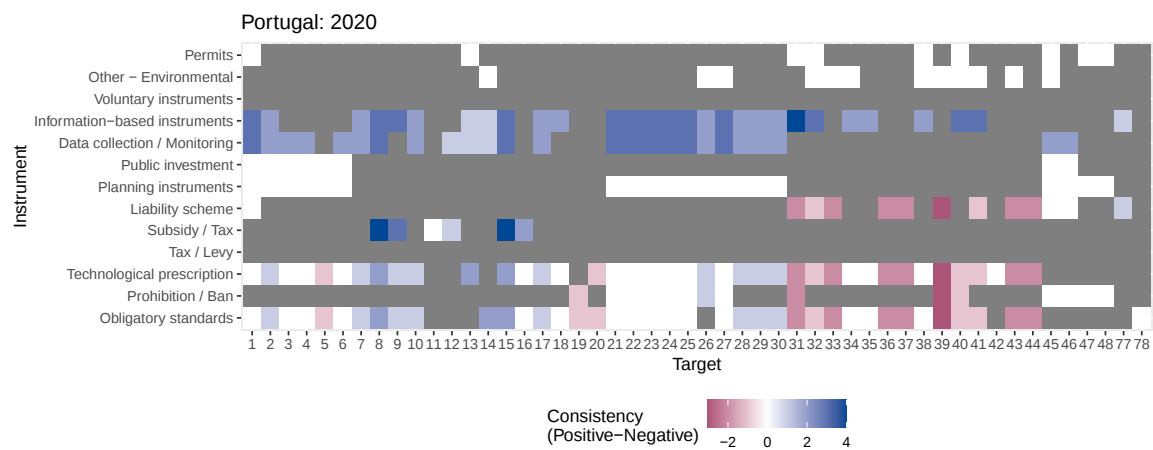
This section reports the policy portfolios of all countries.

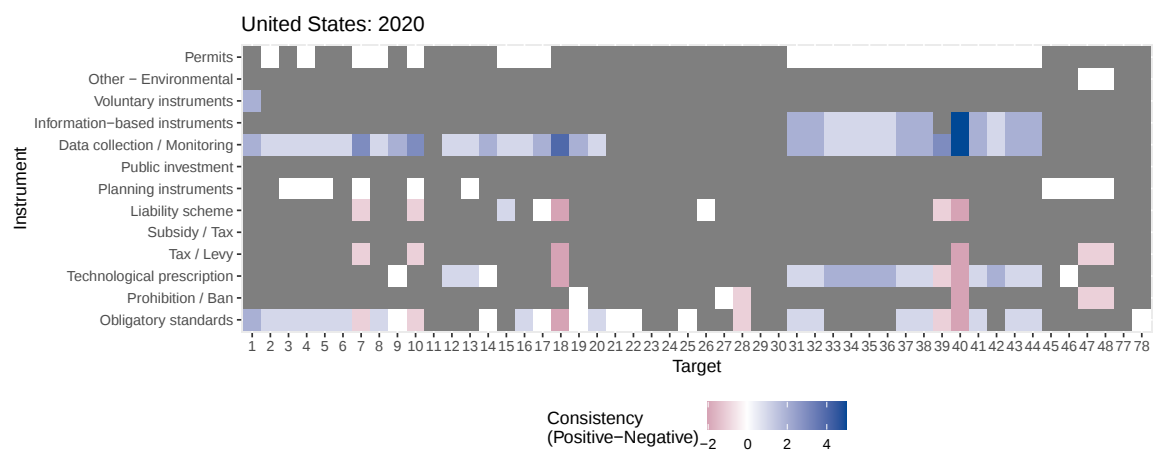
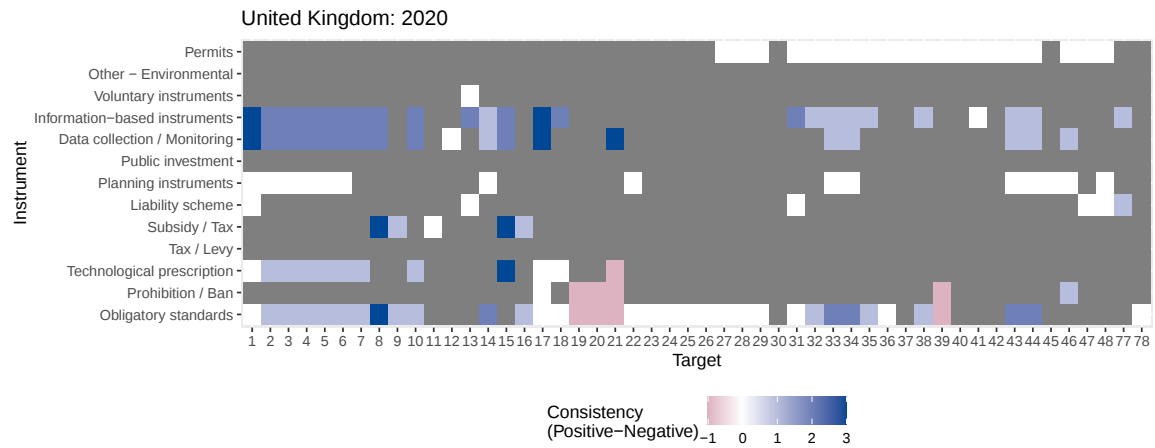












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