

Evaluating Green Stimulus Packages in Pandemic Context

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Abstract

This article analyzes which countries undertook green investments as part of their economic stimulus during the global pandemic. As the financial situation appeared to be tenser, the potential to boost the economy in an environmental direction turned out to be a political crossroad: Taking a risk by investing and restructuring the economic sectors in a green way or prioritizing the traditional sectors with high emissions and negative ecological impacts? The examples of the German and French stimulus packages in 2020 and 2021 illustrate how the pandemic reconstruction plans can stimulate the economy sustainably. At the same time, the article questions whether other economies with a high number of natural resources prefer to stick with the carbon-rich industrial sector while investing in the domestic and traditionally strong areas. The analysis based on the MIT Review Insights' Green Future Index data attempts to explain this divergence by focusing on the environmental characteristics of each country. Finally, the article provides an overview of long-term green investment strategies in countries such as Germany and France as examples of successful attempts to transition towards a greener economy.

Keywords

Green stimulus packages; Carbon neutrality; Emissions; Pandemic Pivot; Green Society.

Introduction

At the 46th G7 Summit in June 2021, the largest countries in the world members put the fight against climate change and the political commitment to the environment at the center of the international political debate and came up with green planning strategies to boost the national economies (Schomberg & Piper, 2021). Even as a new consensus on green investing emerged in this regard, European partners could already look back on a successful national economic stimulus package such as the so-called German "Corona-Shield" (Bundesministerium Der Finanzen, n.d.b.). This package had already proven its environmental viability in 2020 by successfully bringing together the fields of energy production, energy rationalization, and emissions reduction through a dual strategy of guidelines and incentives and cross-border policy coordination (European Commission, 2016).

In the context of the COVID-19 outbreak in late 2019, the world's governments faced a highly complex dilemma. The tradeoff had to be found between drastically slowing

down the economy and risking another stock market crash, or entering into a health crisis with unpredictable developments that would cost countless more lives. The governmental systems were faced with major challenges in the handling and orientation of fiscal policy competencies. The legal *Sui Generis* of the European Union was faced with a very special question: to what extent the 27 economic systems with sub-sectors of varying strength could be led out of the crisis in a unified and joint manner, as otherwise there would be a great potential for division (European Parliament, Directorate General for Parliamentary Research Services, 2021). The two largest economies in the EU, France, and Germany, decided to coordinate their crisis plans, align them, and orient them in similar directions for reasons of competitive and ecological exchanges (Wehrmann, 2020).

This paper aims to better understand how some of the leading countries in decarbonization used the pandemic stimulus money and to analyze statistically what type of countries pivoted towards a greener future during the pandemic.

Other studies about green stimulus packages during the Corona crisis

Our results add to three main studies about stimulus packages during the pandemic. First, Hepburn et al. (2020) investigate the climate impact potential of 25 stimulus packages. They survey central bank officials, finance ministry officials, and other economic experts from rich countries on the relative performance of these fiscal recovery packages. We are using a different method. We are looking at richer cross-country data about pandemic measures and draw more specific conclusions about the types of countries that focused on a green recovery.

In the “Emissions Gap Report 2020,” Höhne et al. (2020) investigate the extent to which the coronavirus recovery measures supported low-carbon development in various countries and conclude that the opening for using the pandemic recovery packages to pursue decarbonization has been largely missed. We also analyze some less environmentally friendly stimulus packages, but also countries such as France and Germany that used this opportunity to decarbonize. Our results add to the UN analysis more understanding to what types of countries used this opening to decarbonize and which ones missed the opportunity. While we use common sources, such as the Vivid Economics Report (Vivid Economics & Finance for Biodiversity Initiative, 2021), we add to the mix statistical analysis of the richer data from the Green Future Index (MIT Technology Review Insights, 2021).

Finally, in a recently published collective report “A Guide to Next Generation EU for the industry to better understand and seize its opportunities”, the European Association of Innovation Consultants (2021) describe how these EU economic packages will be deployed in 21 countries, as well as national priorities and instruments each country plans to use in the following years. We also include in our paper an analysis of the Next Generation EU funds in two of the most environmentally committed EU members (France and Germany) to better investigate if the green stimulus applied in 2020 was a one-time deal or these green EU leaders plan to continue on their decarbonization course.

Germany and France

European financial policy coordination resulted last year in an agreement on 830 billion dollars, the so-called “NextgenerationEU”-Plan (European Commission, n.d.). The important emphasis was placed on intersectoral economic stimulation to respond in an adapted, targeted, and specific manner to the interdisciplinary nature of environmental challenges and the resulting social problems. The areas supported were primarily agriculture, sustainable mobility, research (such as synthetic fuels), and energy production (European Commission, n.d.).

At the federal level in Germany, it was decided to boost the diversity of economic sectors with 1.4 trillion US dollars and an additional future project with 45 billion US dollars in 2020, committing to a green investment focus (Vivid Economics & Finance for Biodiversity Initiative, 2021, p. 18). This investment package was supported by resource taxation for heat capacity, which focused mainly on the construction sector as well as the mobility sector (Vivid Economics & Finance for Biodiversity Initiative, 2021, p. 18).

France also created a reconstruction plan that was not only an economic recovery measure but also a tool for reaching a clear sustainable and climate-friendly objective: Of the 611 billion US dollars, 7.7 billion dollars were used for the climate-friendly conversion of Air France alone (Vivid Economics & Finance for Biodiversity Initiative, 2021, p. 48). As Bruno Le Maire expressed it: Air France “should become the most environmentally respectful airline” (“*Coronavirus aid*”, 2020, May 4). The reduction and neutralization ambitions of the various industrial sectors (construction, agriculture, transport, energy, production) were supported by 35 billion dollars of ecological extra projects. The alignment of Franco-German investment strategies in 2020 can be seen as an ambitious political initiative with a dual function as a retooling of the economy and a European integration measure.

Not so green stimulus packages

The importance of the environment often still ranks behind job security, security policy ambitions, or the preservation of social peace and economic order. In this respect, economic projects in the post-COVID era are considered less sustainable from an environmental perspective than they are often portrayed politically or financially. The environment is often still perceived not as a sector worth protecting or a sector of the future, but as an obstacle and a constraint. The discrepancy between rhetorical finesse and sustainable reality value is not always easy to disentangle, but when it can be recognized, it shows that the investment packages have not always been able to generate a greener economy.

The examples of countries that tend to be resource-rich and still rely heavily on the extraction and delivery of fossil fuels are striking. Russia, Mexico, Saudi Arabia, Brazil, and Turkey are some of the countries that did not pay particular attention to the environment in 2020 (Vivid Economics & Finance for Biodiversity Initiative, 2021, p. 16). Russia, for instance, has taken advantage of the pandemic with a package of 129

billion US dollars to further strengthen its energy sector (mainly gas and oil) and has also accompanied this support financially and fiscally, so that the private-sector investment in carbon-heavy industries remains attractive and subsidies keep export prices very competitive on the international market (Vivid Economics & Finance for Biodiversity Initiative, 2021, pp. 16-68). Also, in the financial predictability and low economic fluctuation potential provided by the state assurance to these traditional industrial sectors, the domestic projections into greener players are also relatively low (Vivid Economics & Finance for Biodiversity Initiative, 2021, pp. 16-68). The concrete example of the state-owned energy company Gazprom investing a further 8 billion dollars in establishing itself as the main energy source throughout Russia does not send a clear signal in the direction of climate neutrality (Vivid Economics & Finance for Biodiversity Initiative, 2021, p. 68). The Mexican government's unconditional assurance to its energy sector is an ecologically similar signal in the same direction, as is the adherence of Saudi Arabia, Turkey, or Brazil to high-emission companies in short-term and long-term reconstruction planning in the post-pandemic phase. The Mexican example however appears to be an environmentally double-edged sword as the 28 USD billion reconstruction investments turn out to be supporting the domestic petrol sector as well as the expansion of Mexico City's cycle paths around 54 km and other infrastructural measures (Vivid Economics & Finance for Biodiversity Initiative, 2021, pp. 16-63). Turkey is keeping its high fiscal value in the oil sector which represents 70% of its energy production (Vivid Economics & Finance for Biodiversity Initiative, 2021, p. 83). Brazil's decision to facilitate agricultural landowning in the post-pandemic period is a clear signal towards more deforestation (Vivid Economics & Finance for Biodiversity Initiative, 2021, pp. 15-17). Saudi Arabia's plan to reduce the electricity cost for businesses and households by around 50% is also another way of supporting the domestic fossil energy that is the main resource for Saudi Arabian electricity (Vivid Economics & Finance for Biodiversity Initiative, 2021, p. 70).

Data and methodology

How can these different ways of investing be assessed from an environmental point of view and linked in the pandemic context? An important tool for this is the Green Future Index which "measures the degree to which 76 countries and territories are pivoting toward a green future by reducing their carbon emissions, developing clean energy, innovating in green sectors, and preserving their environment, as well as the degree to which governments are implementing effective climate policies" (MIT Technology Review Insights, 2021, p. 2). We use various indicators from this dataset in our statistical analysis. We conduct a simple correlation analysis between the variable that measures the greenness of the policies during the pandemic and other variables that describe how "green" the country was, to begin with.

Pandemic Pivot

One of the Green Future Index subcategories is the so-called Pandemic Pivot: "*An assessment of how COVID-19 recovery stimulus packages will accelerate each country's decarbonization through investments in energy transition and low-carbon infrastructure*" (MIT Technology Review Insights, 2021, p. 26). In this respect, the ambitions, planning strategies, and measures of the different countries for post-

pandemic reconstruction can be analyzed, taken into account, and then compared according to the decarbonizing objective in the economic generation of emission reduction and the change in energy production. This investigation takes place across various sectors. Thus, among other things, the promotion of sustainability-focused research companies and institutions that seek technological and innovation-oriented progress in the carbon neutrality sector are also taken into account in the financing strategies. Also, public education on environmental issues, as well as the mobility sector and water issues, plays a special role in the general evaluation. Poor results are given above all to countries that continue to rely on fossil energy production or use, both directly and indirectly (MIT Technology Review Insights, 2021).

According to the Pandemic Pivot Ranking, non-European players, which traditionally have not been at the forefront of so-called green strategies, are now leading the way due to the sustainable reorientation within pandemic investments. New Zealand, Singapore, Costa Rica, India, China, and Nigeria are some of the countries with the greenest stimulus packages, according to the Pandemic Pivot score. Figure 1 illustrates the top 5 scores (11 countries out of 76 countries analyzed in the study).

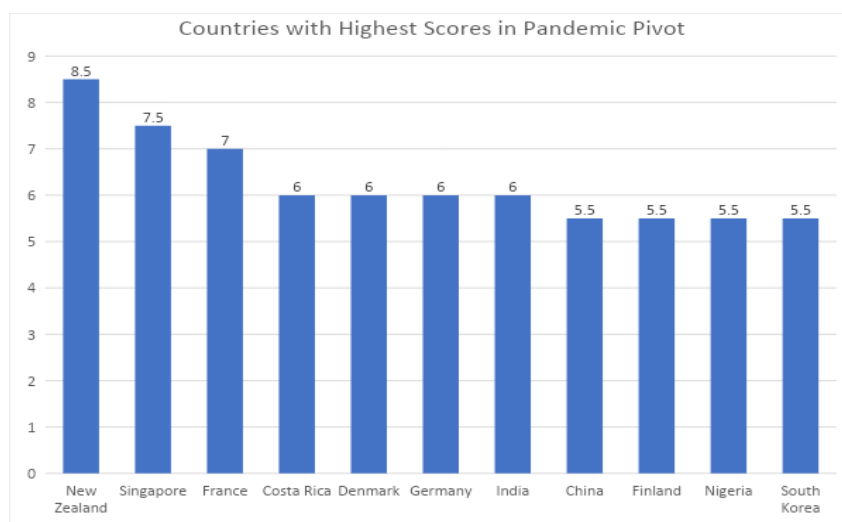


Figure 1
(MIT Technology Review Insights, 2021)

Singapore has already supported air mobility by spending US\$258 million in March 2020, with a complementary package of US\$138 million to further sharpen its green focus (Vivid Economics & Finance for Biodiversity Initiative, 2021, p. 72). Costa Rica has differentiated itself from other countries with major investment announcements in the agricultural sector for sustainable transformation and the ambition to rely only on renewable energy by 2021, extending the ban on oil-based energy use and recycling to 2050 (MIT Technology Review Insights, 2021, p. 9). The Indian training and retraining within the different population groups diversify the investment areas, especially in the ecological transition (Singh, 2021). The world's largest population of vegetarians certainly also has a decisive influence on the economic stimulation goals in the field of agriculture. At the same time, the announcement to invest in the non-fossil energy

generation sector in the post-pandemic period, generating up to 450 GW by 2030, makes a decisive contribution to the positive assessment (MIT Technology Review Insights, 2021, p. 16). China, the regional neighbor and competitor, has long been on the rise in the environmental economy. How the pandemic can be used for green retooling is also demonstrated by Nigeria, which has certainly recognized the transience and resource scarcity of fossil fuels. Nigeria remains one of the world's largest exporters of crude oil (5th). With Nigeria already severely affected by the initial impacts of climate change (water shortages, drought, soils, dry seasons, weather variability) and suffering a 6% decline in the second economic period of 2020, the Nigerian Economic Sustainability Plan of USD 5.9 trillion is more than timely to provide individual and long-term support to medium-sized green businesses and clean energy projects such as the Solar House Project (Nyong et al., 2021). The Nigerian government aims to lower Nigerian emissions up to 20% until the year of 2030 with these policy programs and the fiscal incentives (Nyong et al., 2021). Particularly given the growing climatological relevance, this also places the responsibility on the Nigerian agricultural and food industry sectors to orient themselves towards the food intelligence and resilience programs developed by the UN (Food and Agriculture Organization of the United Nations, n.d.).

But there are nuances even within the environmentally friendly assessment criteria. It is important to consider the general environmental context and the overall economically sustainable situation. For this purpose, the five main criteria pillars of the Green Future Index provide a good general overview of the „greenness“ of the different countries (MIT Technology Review Insights, 2021).

Five Pillars

The main pillars of the Green Future Index are carbon emissions, energy transition, green society, clean innovation, and climate policy. Carbon emissions refer not only to the total amount of gas emitted but also to the capacity for change and the degree of change driven in the industrial, agricultural, and mobility sectors. The change in energy production measures the percentage of renewable ways of obtaining energy, taking into account the traditional change potential. The degree of the greenness of the society is measured by the greenness of the sectors that directly affect society's forestry, the building sector, the processing and reuse of waste, and the food sectors with animal use. The clean innovation variable focuses on the various types of research methods, inventiveness, ingenuity in the area of food production, as well as the cross-border climate-friendly production of drive types. The environmental or climate policy objectives in this ranking take into account the ambition of environmental goals and the effort to achieve them, the development of long-term and nature-oriented financial sectors, as well as the aforementioned special consideration of COVID reconstruction strategies (MIT Technology Review Insights, 2021). In this respect, the extent to which there is or is not a correlation between general green attitudes and post-pandemic recovery plans is extremely important.

The general Green Future Index ranking is led by Iceland, followed by Denmark, Norway, France, and Ireland. The first non-European country is Costa Rica in 7th place. In the general assessment, Algeria, Russia, Iran, Paraguay, and Qatar (ranked 72-76)

perform the worst. In the area of carbon emissions, Ukraine, Norway, Sweden, Luxembourg, and Switzerland lead in the MIT ranking (rank 1-5). In this category, Nigeria, Paraguay, Turkey, Ethiopia, and Pakistan perform the worst (rank 72-76). The African countries Ethiopia, Angola, Uganda, Cameroon, Nigeria (rank 1-5) drive the energy transition and Hong Kong, Iran, Russia, Ukraine, and Qatar score worst in this sector (rank 72-76). Clean innovation in different sectors is driven most by Singapore, Finland, Chile, Luxemburg, and Morocco (rank 1-5) while countries such as Iran, Bangladesh, Qatar, Algeria, and Paraguay lag behind (ranks 72-74). Surprisingly, Morocco's strategy to create the world's largest collection of solar cells did not translate to neighboring Algeria (*ECOHZ, n.d.*). In the ranking of the greenest societies, Singapore, Ireland, South Korea, Taiwan, and the Philippines come out on top (places 1-5), while Ukraine, Pakistan, Argentina, Russia, and New Zealand are the worst performers here (places 72-76). Again, the geopolitical diversity of the countries is surprising. In the last category of climate policy pioneers, New Zealand, Denmark, France, the Netherlands, and Iceland are in the leading positions (1-5) and Uganda, Iran, Guatemala, Paraguay, and Russia are in the bottom (72-76) (MIT Technology Review Insights, 2021).

These five individual pillars correlate in different ways with the COVID reconstruction score. In the low-carbon countries in terms of emissions, there are also predominantly countries from the European region, but among them are also partial war regions such as Ukraine (rank 1). Finland is the only country to make it into the top 10 in both the carbon emissions category and the Pandemic Pivot. India, on the other hand, which scores very well in the Pandemic Pivot, is ranked 69th in the emissions category. Turkey is among the last in both categories (both rank 74). There is no correlation between emissions score and the greenness of the stimulus as can also be seen in Figure 2.

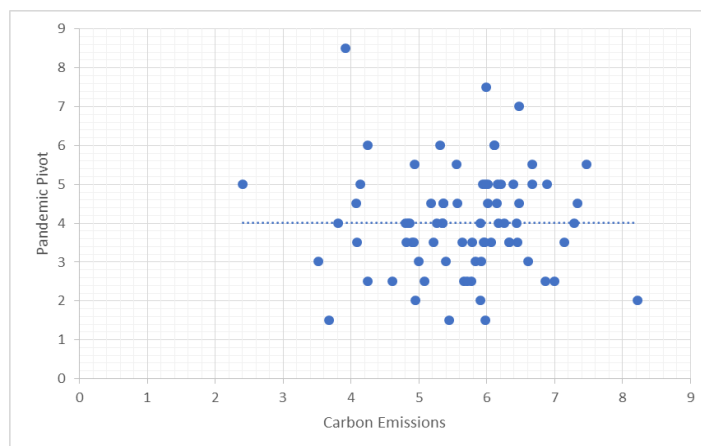


Figure 2. Correlation between emissions score and the Pandemic Pivot
(MIT Technology Review Insights, 2021)

In the second area of energy production, the top countries are almost all African states that know how to export their resources. Ethiopia is on rank one in this sector. Nigeria occupies a top ten place both here and in Pandemic Pivot (5th and 8th). Singapore

scores very differently in this area: Pandemic Pivot 2nd place and Energy Transition 71st. Otherwise, the ratings in this comparison also run rather independently of each other, as is clear also from Figure 3.

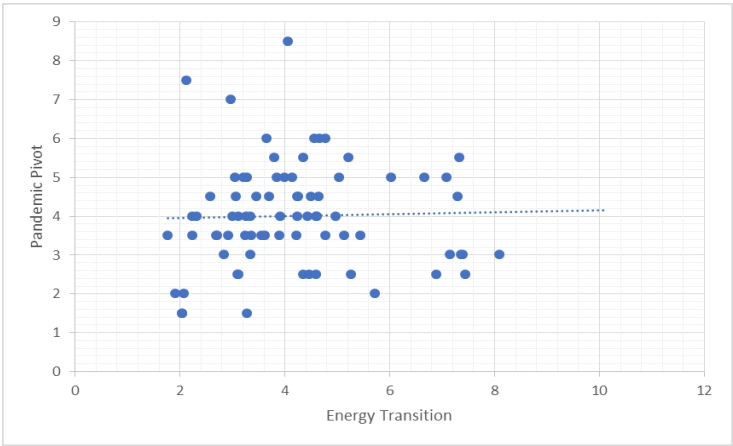


Figure 3. Correlation between energy transition and the Pandemic Pivot
(MIT Technology Review Insights, 2021)

In the third pillar of clean innovation, Singapore (rank 1) and Finland (rank 2) lead. France also makes it into the top ranks (9th place). A correlation can be discerned here, as an investment in the area of green innovation and research, as well as cross-border cooperation, seem to align with green pandemic investment plans. The other non-European countries that score higher in the Pandemic Pivot sub-category (India, China, Nigeria, and New Zealand) tend also to perform better in clean innovation. This again confirms that it is more a matter of the positive correlation between green stimulus packages and overall concern for green innovation (Figure 4).

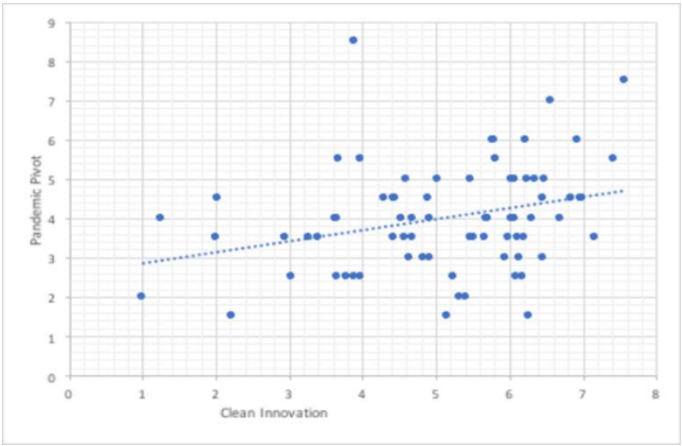


Figure 4. Correlation between Clean innovation and Pandemic Pivot
(MIT Technology Review Insights, 2021)

The fourth pillar area of the so-called "green society" and Pandemic Pivot also show a positive correlation, albeit not that strong (Figure 5). Even though Singapore (rank 1) and Germany (rank 8) are in the top positions here (as well as in Pandemic Pivot), the other top ten Pandemic Pivot countries do not get a place here. Only Nigeria is in the bottom ten (68th place). This is also because France and India in particular have enormous agricultural sectors in their own countries, which also has a particularly strong influence on the consumption of animal products (*How farmers still rule Europe*, 2021, May 29). China's construction sector is growing exponentially, but sustainability does not yet seem to be proven (Wang, 2014). Other countries with strong agricultural and forestry sectors, such as Brazil, do not score well here (71st place).

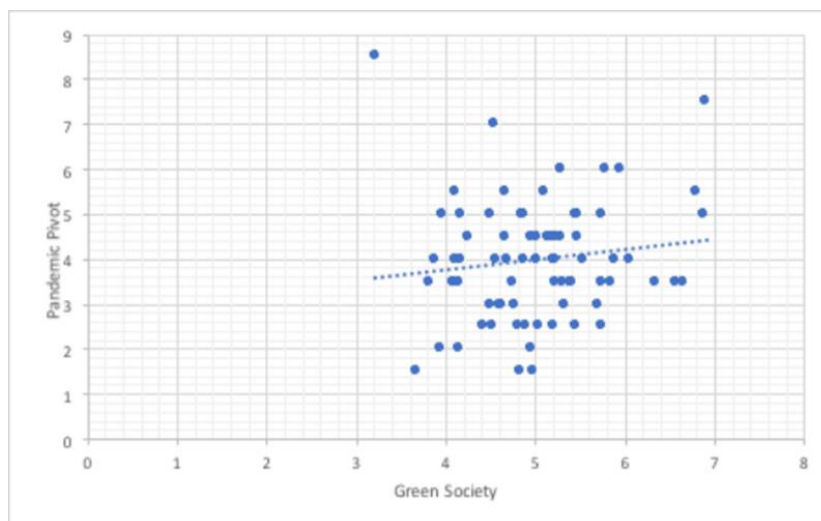


Figure 5. Correlation between Green Society and Pandemic Pivot
(MIT Technology Review Insights, 2021)

In the last and fifth category, however, a stronger interdependence can be identified again: New Zealand (rank 1), France, and Costa Rica, which also score very well in the Pandemic Pivot, are to be found in the top ten alongside other European countries. Resource-rich countries such as South Africa, Saudi Arabia, and Iran (66th, 69th, and 73rd place) are at the bottom of the list due to fossil investment prioritization and subsidies. Figure 6 shows a strong correlation, but since Pandemic Pivot is a component of the Policy score, these results are to be expected.

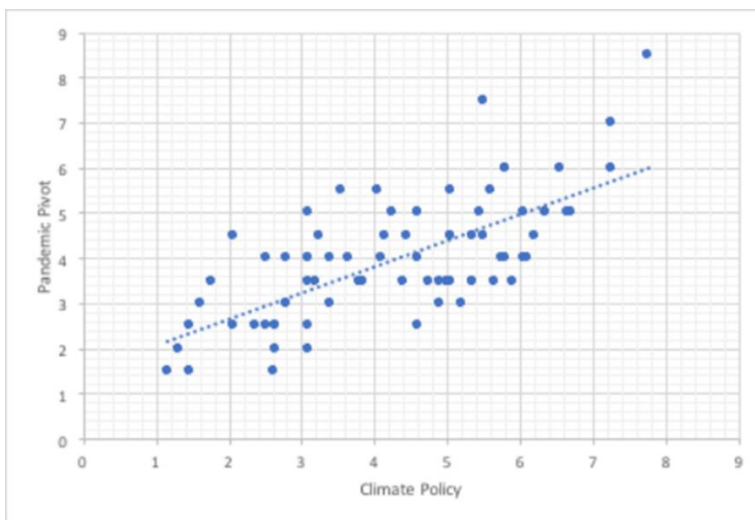


Figure 6. Correlation between Climate Policy and Pandemic Pivot
(MIT Technology Review Insights, 2021)

The opportunities that emerged in the pandemic recovery plans also reveal how national environmental strategies and scales differ. In particular, countries with traditionally strong dependencies on fossil and other fossil resources, as well as heavily developed agriculture and forestry sectors, held on to traditional industries politically and fiscally, sometimes with support and subsidy funds.

Even if the use of a green investment package is certainly also a question of financial sustainability, the question must finally be asked as to how the investment projects are structured in the long term.

Comparative outlook

The best example of a sustainable green investment strategy in the post-pandemic period is not only one in the short term but also in the long term. The green efforts of some of the countries described above are continued in 2021 with the support of the European NextGenerationEU (European Commission) plan. The European Union and its member states decided on a concrete investment strategy for the next seven years but also the following big steps until 2050 through the common investment pot. Until then, the EU wants to reduce its emissions up to 55% compared to the values of 1990 (Cabuzel, 2020). Two countries (France and Germany), that already invested a lot in green projects during the pandemic, continue to finance the transition to a greener economy in 2021.

The German example of the reconstruction and resilience plan that was redefined in early 2021 contains six pillars: environmental and digital advancement (hydrogen research 11.7% and climate mobility 19.4%, building 9.2%), a long-term and inclusive way of growing (digital economy 11.2%), a geographical and social convergence (health 16.3%, societal participation 4.5%), structural and socio-economic adaptability (digital governance 12.4%, data 9.9%), as well as a focus on the importance of the

younger generation (education 5.1%) (Bundesministerium der Finanzen, n.d.a.). For a sustainable building sector, the German government provides 3 billion dollars, for e-mobility (more than 4,5 billion USD) and the research and neutralization of carbon emissions more than 3 billion USD (Bundesministerium der Finanzen, n.d.a.). These investments will be put into the different sectors progressively in the next 5 to 10 years. In terms of the Green Future Index, Germany is a clear example of a country that took a long-term benefit and it shows in the high Pandemic Pivot Ranking, however, the other rankings are still behind the Top ten (except the Green Society pillar).

France on the other hand is already considered in the top ten scorings of the essential Green Future Index categories (e.g. Climate Policy). Similar to Germany, France shares the same investment areas and the ambition to put the financial resources step by step in the various sectors during the next years while always considering the long-term goals (Gouvernement Français, 2021). The budget of France is a bit lower than the German one (redefined in 2021) but gives another good example of how the post-pandemic investment strategies can generate a long-term green benefit (increase to 2.3 billion budgets for sustainability per year) (Gouvernement Français, 2021). As the German partner, 7-10 billion dollars will be provided for the greenness of the building sector (Gouvernement Français, 2021).

The NextgenerationEU fund can help European countries invest more in green projects even after the pandemic. It remains unclear though if the other non-EU countries that used stimulus money to invest in a green economy in 2020 will continue their efforts after the health crisis is over.

Conclusions

While some countries such as France and Germany used the pandemic as an opportunity to spend more money to protect the environment, others promoted stimulus packages that profoundly damaged the environment through measures such as the investment of the state-owned energy company Gazprom in Russia, the Mexican reconstruction investments that ended up supporting the domestic petrol sector or Brazil's decision to facilitate agricultural landowning that led to more deforestation. According to our statistical analysis, how much a country pivoted towards a greener future during 2020 is correlated with the cleanness of its innovation sector and the greenness of its society, measured by forestry, building sector, processing, and reuse of waste, and food sectors with animal use.

There are three major shortcomings with the statistical analysis. First, the method we use is simple correlation and this does not allow us to draw any conclusions about the direction of causation. Does a green society put more pressure on its government to adopt more environmentally friendly stimulus packages or do these stimulus packages encourage the society to become greener? Do stakeholders from an economy based on clean innovation put pressure on the government to pass green stimulus measures or are the green stimulus measures that encourage clean innovation?

Second, while the data from MIT Technology Review Insights is very rich and covers a wide range of countries, some of their indicators are subjective. For example, the

Pandemic Pivot variable measures “an assessment of how covid-19 recovery stimulus packages will accelerate each country’s decarbonization through investments in energy transition and low-carbon infrastructure” (MIT Technology Review Insights, 2021, p. 26). These “assessments” in the data make conclusions about the types of policies enacted more difficult to draw.

Third, the timing of the study limits our ability to draw definite conclusions about the greenness of the package. Since the pandemic is still ongoing in 2021 and reforms meant to support the economies are still adopted, it remains to be seen how much will countries pivot towards a greener economy by the end of the health crisis. Future studies should assess the impact of all policies enacted during the pandemic and their effects several years after the COVID-19 crisis is over.

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