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A Green New Deal after Corona: What we can learn from the financial crisis

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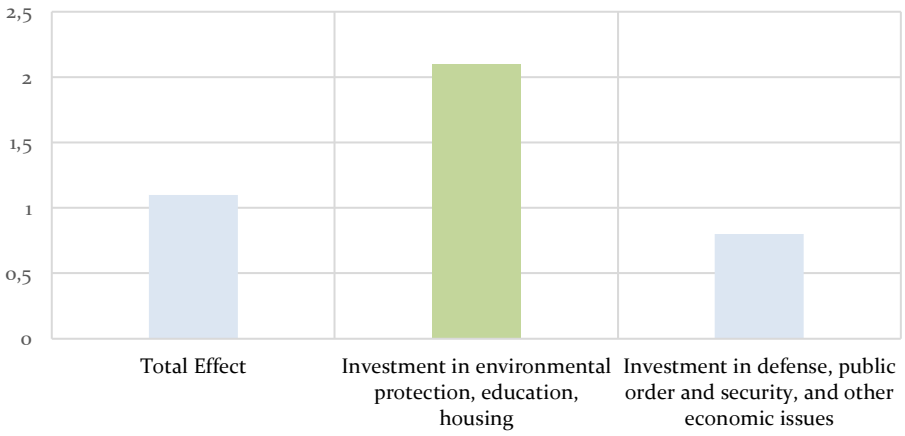
Already after the financial crisis in 2008/2009 there was a debate on whether elements aiming at sustainable development can be part of the stimulus packages and support the recovery of the economy. Despite the instinct of policy makers to prioritise battle-tested policies during a crisis, significant levels and different types of climate-friendly components were integrated in the 2009 stimulus packages across the globe. The experience from the past crisis proves that such climate-oriented economic stimulus policies not only raise investments with benefits for economic output and jobs in the near term, but can also lay the groundwork for long-term innovation and economic development aligned with environmental constraints. By introducing policies such as Contracts for Difference for low-carbon industrial processes and renewable energy, and Green Public Procurement, governments can further ensure that their stimulus packages are transformative. Hence, "green stimuli" have the capacity to boost economic recovery also during the current Corona crisis.

When discussing the design of a stimulus, economists often claim that it should be "targeted, timely and tem-

porary".[1] The goal of a stimulus is to provide a short-term boost for consumption and investment in order to prevent or overcome an economic recession. Meanwhile, the goal of environmental and climate policies is to be "transformative".[2] These policies are supposed to overcome market failures by altering the structure of the economy in the long-run. This raises the question, whether these two objectives are in conflict with each other or can be mutually reinforcing so that the green stimulus package unlocks synergies between the short- and long-term objectives. Opponents argue that not only are stimulus measures inadequate for achieving green objectives, but that introducing green components into stimulus packages also reduces the policy's ability to revive the economy. Similar arguments about the "incompatibility" of climate protection and economic recovery have been made in the current crisis. [3]

Contrary to this, proponents of a Green New Deal see the current economic crisis as an opportunity to combine stimulus and climate policies. This call for a climate stimulus package is currently being voiced both by green think tanks and by a broad coalition of industrial companies. [4] It is also supported by economists who argue that such a stimulus package can combine economic recovery and an ecological transformation of the economy. [5]

Figure 1: **Average effects of increasing public investment on private investment in the Euro area**
per billion invested after five years



Source: Own representation based on data by Clemens, Goerge and Michelsen (2019)

In general, research confirms that the effectiveness of fiscal policy measures is higher during a recession. [6] The low interest rate policy, the very good fiscal situation in Germany and relatively good public investment effi-

[1] See Douglas W. Elmendorff and Jason Furman (2008): Three Keys to Effective Fiscal Stimulus, Brookings Institution, January 26, 2008.

[2] See Nick Robins, Robert Clover and Charanjit Singh (2009): A Climate for Recovery The colour of stimulus goes green. HSBC Report.

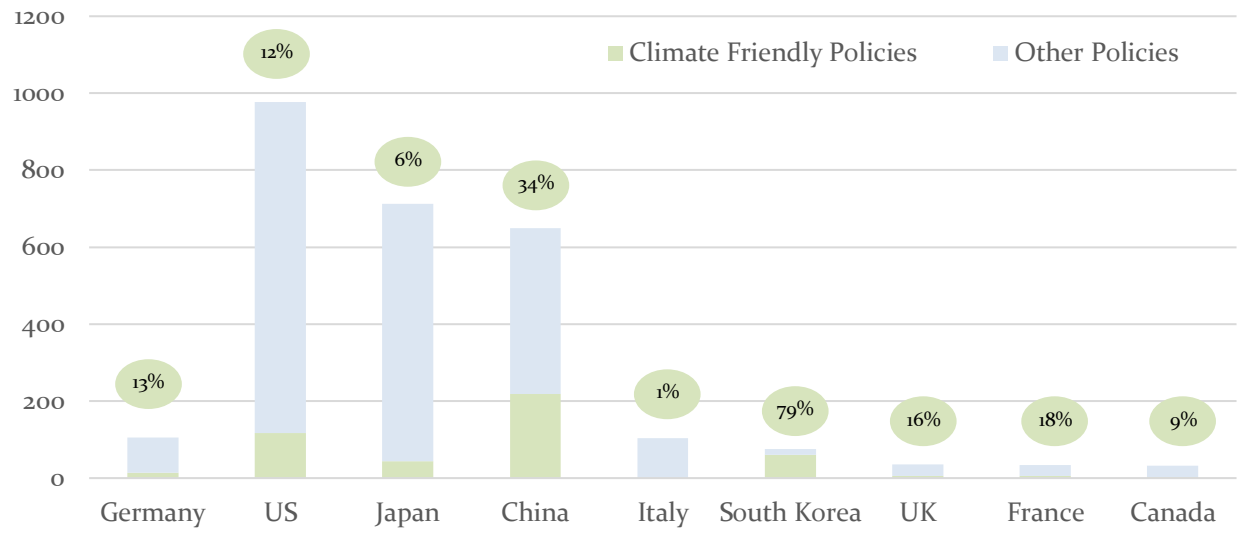
[3] See Reuters (2020): Poland says virus fallout makes it tough to hit EU climate goal.

[4] https://www.stiftung2grad.de/unternehmensappell-klima-konjunkturprogramm
[5] See beispielsweise Tom Krebs (2020): Ein Konjunktur- und Transformationspaket für Deutschland, Makronom, 18. März 2020.

[6] See Alan J. Auerbach and Yuriy Gorodnichenko (2012): See Measuring the Output Responses to Fiscal Policy. American Economic Journal: Economic Policy 4(2), pp. 1-27 oder Alan J. Auerbach and Yuriy Gorodnichenko (2013): Output Spillovers from Fiscal Policy. American Economic Review 103(3), pp. 141-46.

ciency are further arguments in favor of a government stimulus in the current crisis.[7] Moreover, recent studies show that some measures, especially public infrastructure investment and research-intensive spending, are suitable for providing positive impulses both in the short term – by giving a signal for companies to generate above-average profits in these areas – and long term – by increasing productivity, for example through technological innovation.[8] A properly designed climate and economic policy aimed at infrastructure and research investments can therefore offset the costs of environmental policy and promote economic growth.[9]

Figure 2: Share of green measures in 2009 for G7, South Korea and China
In billion US dollars and percent



Source: Own representation based on data by Barbier, 2011

Green stimulus packages in the financial crisis 2008/2009

In response to the financial crisis all industrial nations introduced significant economic stimulus packages. Similar to today, this process was accompanied by calls for making the stimulus a "Green New Deal". Despite

[7] See Valerie A. Ramey and Sarah Zubairy (2018): Government Spending Multipliers in Good Times and in Bad: Evidence from US Historical Data. Journal of Political Economy 126(2), pp. 850-901 and Abdul Abiad, Davide Furceri and Petia Topalova (2016): The Macroeconomic Effects of Public Investment: Evidence from Advanced Economies. Journal of Macroeconomics 50(C), pp. 224-240.

[8] See Marius Clemens, Marius Goerge, and Claus Michelsen (2019): Public Investment a Key Prerequisite for Private Sector Activity. DIW Weekly Report 31, pp. 25-261, and Matteo Deledi, Vincenzo de Lipsis, Mariana Mazzucato, Josh Ryan-Collins, and Paolo Agnolucci (2019): The macroeconomic impact of government innovation policies: A quantitative assessment. UCL Institute for Innovation and Public Purpose, WP 2019-06.

[9] Clemens, M., Goerge, M. and Michelsen, C. (2019) show that in the euro region public investment in environment, R&D and public infrastructure can raise private investment by 1.3 euro (per euro invested) more than other types of public investment, such as defence spending, security and economic affairs. This can also be interpreted as an indication of the relatively high level of green multipliers.

this, climate-friendly stimulus measures remained only a minor part of the German stimulus packages (Figure 2).

Germany

Germany invested around 13% of its stimulus into green sectors, which is slightly below the average of 15% found by a review of recovery plans from over 20 countries. [10] The green component came almost exclusively from the renovation of buildings that was supported with approximately €12.2 billion euros (Figure 3). [11] These measures were based on existing programs[12] and included both credit-guarantees and direct investment into public infrastructure. Implementing the stimulus within existing structures is an important factor for funds to be dispersed in a timely manner. Building refurbishment is considered a fast and effective means to stimulate employment while reducing emissions at the same time.[13]

Figure 3: Climate Friendly Policies in the German Recovery Packages

Policy	Type	Sum (in Euro)
Energy efficiency of buildings	Credit	2,5
KfW-program "Special Fund for Energy Efficiency SMEs"	Credit	0,3
Refurbishment of educational infrastructure buildings	Investment	8,65
Refurbishment of federal buildings	Investment	0,75
Sum (Energy Efficiency):		**12,2**
Research in the field of mobility	Investment	0,5
Rail transport	Investment	1,32
Sum (Transport):		**1,82**
Sum (Overall):		**14,02**

Source: Schmidt et al., 2009

Germany's most famous stimulus measure - the scrappage premium ("Abwrackprämie") - shows the importance of clear targets and government buy-in for a green stimulus measure to be transformative. Despite being labelled "environment premium" ("Umweltprämie") the German scrappage premium had only minimum requirements with regard to the emissions of a replacement car. In fact, all cars produced after 2005 fulfilled the requirements so that there were nearly no cars on the market that did not qualify. [14] This explains the em-

[10] See Nick Robins, Robert Clover and Charanjit Singh (2009): A Climate for Recovery The colour of stimulus goes green. HSBC Report.

[11] See Sebastian Schmidt, Florian Prange, Kai Schlegelmilch, Jacqueline Cottrell and Dr. Anselm Görres (2009): Sind die deutschen Konjunktur Programme nachhaltig? FÖS Studie.

[12] See. Jan Rosenow (2013): The politics of the German CO2-Building Rehabilitation Programme. Energy Efficiency.

[13] See Edward B. Barbier (2011): Linking green stimulus, energy efficiency and technological innovation: The need for complementary policies. Atlantic Energy Efficiency Policy Briefs.

[14] See Sebastian Schmidt, Florian Prange, Kai Schlegelmilch, Jacqueline Cottrell and Dr. Anselm Görres (2009): Sind die deutschen Konjunktur Programme nachhaltig? FÖS Studie.

pirical finding of an ex-post study that the German program had a far lower effect on emissions relative to comparable programs in other European countries. [15]

Currently there is another discussion, whether such a "scrappage premium" should be introduced to support the sector in an economic recession. However, in parallel the automotive industry has asked to weaken the EU fuel efficiency standards because of difficulties to produce the sufficient number of all electric cars in order to meet the standard. Given this existing constraint, a scrappage premium would not increase the overall production of clean cars, but instead reinforce the focus on the production of conventional or hybrid cars. Thus, a new scrappage premium cannot be expected to lead to transformative investment in the industry.

South Korea

South Korea, on the other hand, embedded its stimulus within an "Green Growth Strategy". In fact, South Korea was the only country considered in this analysis that officially proclaimed its program a "Green New Deal" and spent according to some analysis more than 78 percent of their stimulus on sustainable projects. A significant part of this investment went into both railway infrastructure and the support of renewable energy. Since such projects are material-intensive, they show how important it is to focus on the climate-friendly implementation of such projects in order to avoid a poor climate performance due to high emissions during the implementation phase.

However, the South Korean stimulus package was also criticized for its definition of "Green" that included projects such as the "Four Major Rivers Restoration Project" that had significant, adverse effects on ecosystems.[16] In addition, an overall review of the Korean Green Growth Initiative found that it failed to achieve its targets in the energy sector. The authors of the review attribute this to South Korea's failure to change the values and structure of their energy sector. [17] Similarly, an evaluation of the Korean Green New Deal showed that it did not affect the drivers of Co2-emissions in South Korea in the short-run and that it did not manage to decouple economic growth and emissions.[18] This underscores the importance of supporting legislature for the decarbonization of the economy: The benefits of the Green New Deal accrue in the long-run and no one-off investment, however large, can solve the issue of climate change.

United States of America

The example of the American economic stimulus package illustrates that there must not be a trade-off between sustainable stimulus measures and economic recovery. The American Recovery and Reinvestment Act contained sustainable investment expenditures of 90 billion US-dollars. The investment into renewable energy, where the expansion of manufacturing capacity was paired with research funds, led to transformative improvements in green technologies. At the same time, workforce training programs supported the renewable sector in reaching the highest employment rate among all sectors after the crisis. [19] A recent empirical study

[15] See Laura Grigolon, Nina Leheyda and Frank Verboven (2016): Scrapping subsidies during the financial crisis — Evidence from Europe. International Journal of Industrial Organization 44, p. 41-59.

[16] See Sun-Jin Yun(2010): Not So Green: A Critique of South Korea's Growth Strategy. Global Asia.

[17] See Jonas Sonnenschein, Luis Mundaca (2016): Decarbonization under green growth strategies? The case of South Korea. Journal of Cleaner Production 123, p. 180-193.

[18] See Yoon-Hee Ha and John Byrne (2019): The rise and fall of green growth: Korea's energy sector experiment and its lessons for sustainable energy policy. Wiley Interdisciplinary Reviews: Energy and Environment 8(4), e335.

[19] See Joseph E. Aldy (2013): A Preliminary Assessment of the American Recovery and Reinvestment Act's Clean Energy Package. Review of Environmental Economics and Policy 7, 136-155.

supports these figures and finds that the ARRA clean energy expenditure was overall effective in the creation of green jobs. [20]

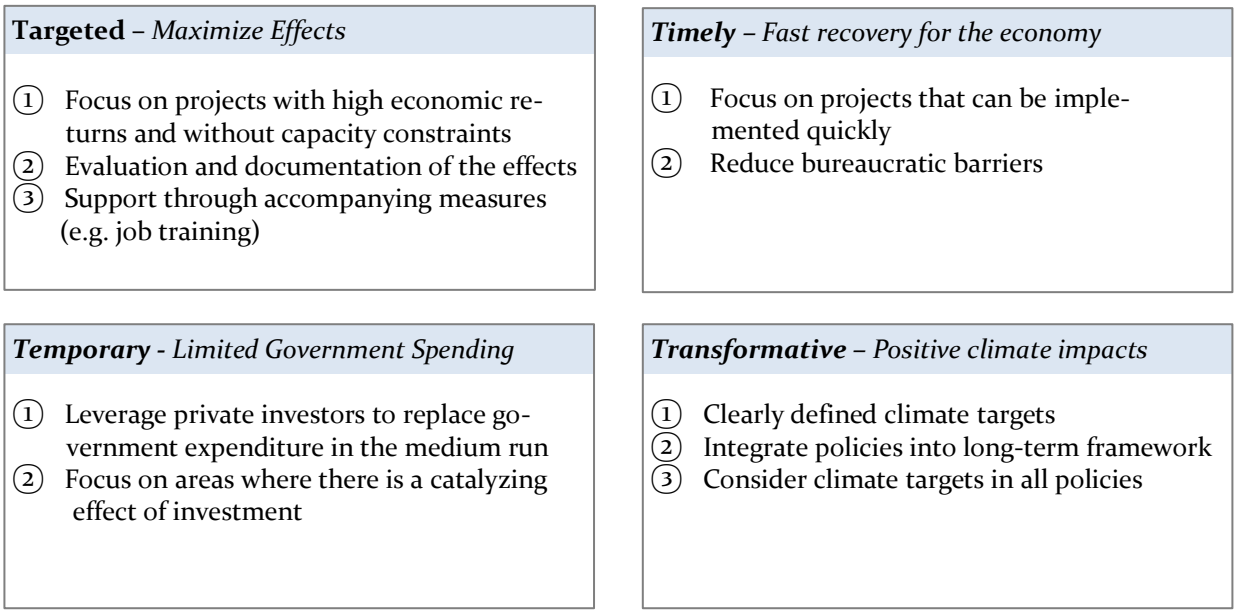
The example also underlines the importance of supporting policy frameworks. Initially the program was supposed to be complemented by a cap-and-trade program. This would probably have incentivized the industry to invest in sustainable technologies due to an expected increase in market share by said technologies. Thus, it would have strengthened the trend towards a climate-neutral economy and supported this trend beyond the economic stimulus package. [21]

Policy implications

Governments considering the introduction of green stimulus packages in response to the Corona crisis should take into account the lessons learned from the previous crisis (Figure 4). The above-mentioned experiences from the last crisis suggest that the additional transformative feature of a green stimulus can reinforce rather than hamper the targeted and temporary effect of a conventional stimulus and support its short-term objectives.

The experience of the financial crisis also shows, that in order to be transformative, a stimulus package has to be aligned with a broader investment framework. This requires clearly defined climate targets in order to motivate investment by the private sector and thereby strengthen the effectiveness of the stimulus measures. This can lead to the creation of markets similar to those in the US renewable energy industry. Furthermore, short-term stimulus measures should be integrated into a long-term energy and climate policy framework, so that the investments in climate-friendly technologies and businesses are attractive for the private sector. The experiences also show that it is critical to consider the overall environmental and climate objectives when designing the components of the stimulus packages. Instruments from sustainable finance such as the new EU taxonomy and disclosure mechanisms offer selection criteria and reporting for this purpose. This avoids ineffective or harmful climate-policy measures such as the German scrappage premium.

Figure 4: Lessons from the Financial Crisis



[20] See Taekyoung Lim, Tatyana S. Guzman and William M. Bowen (2020): Rhetoric and Reality: Jobs and the Energy Provisions of the American Recovery and Reinvestment Act. Energy Policy 137.

[21] See Luis Mundaca and Jessika Luth Richter (2015): Assessing 'green energy economy' stimulus packages: Evidence from the US programs targeting renewable energy. Renewable and Sustainable Energy Reviews 42, 1174-1186.

Possible policy instruments: Contracts for Difference and Green Public Procurement

In recent years, a mix of instruments for a transformation towards climate neutrality has been developed and tested in various countries. Here we discuss how two examples of such policies - contracts for difference for low-carbon industrial processes and for renewable energies as well as Green Public Procurement - meet the criteria for measures in a green economic stimulus package. Additionally, Green Public Procurement can ensure the climate-friendly implementation of public investments.

Investments in climate-friendly technologies and production processes in the heavy industrial sectors (e.g., steel, cement, plastics) can play an important role for the green stimulus. A number of these approaches has been developed and can be implemented in a **timely** manner. However, the economic viability of such capital-intensive technologies depends heavily on regulatory risks. Companies in these sectors will only invest in climate-neutral technologies if they see a business case even after the short-run support of a stimulus expires.

State-backed *Carbon Contracts for Difference* can offer **targeted** support to hedge against such regulatory risks and cover increased operational costs of climate-neutral innovation projects in carbon-intensive industrial sectors. With these contracts, the investors in a low-carbon project (e.g., hydrogen-based steel production) are guaranteed a fixed revenue per ton of CO_2 saved through the project when compared to conventional technology. As long as CO_2 prices in European emissions trading are below this level, the difference is paid to them by the government. If CO_2 prices exceed the level, a corresponding repayment is required from the investor. This creates security for the operation and financing of climate-neutral investments, reduces the financing costs and thus prevents companies from waiting to invest until the CO_2 price increases. Furthermore, it reduces the need for state funding and can even lead to the recuperation of state expenses in later years, when the CO_2 price rises. [22]

Contracts for Difference in the renewable energy sector make it possible to **timely** implement and accelerate investments in large wind and solar energy projects. They protect investors against fluctuations in the electricity price level and thus enable the accelerated implementation of projects. Strengthening the investment framework for energy stimulates the economy by supporting low-carbon investments in related areas such as electric cars, hydrogen production and heat pumps. These rely on large amounts of clean electricity so that the decarbonization of electricity production is a prerequisite for increased economic activity in these sectors. [23]

In both applications, the Contracts for Difference protect investors against regulatory risks and thus allow for the consideration of longer-term environmental benefits of a project. This contributes to faster project implementation and reduces or avoids the need for subsidies.

Green Public Procurement practices can be an important instrument for the climate-friendly implementation of the entire economic stimulus package, thus helping to ensure that economic recovery is in line with climate goals. These measures can unfold their potential in a **targeted** manner, for example in infrastructure investments. Such investments are a core element of many economic stimulus packages. However, they are also responsible for a large share of emissions. By implementing such projects in a climate-friendly manner, the government can resolve the trade-off between short-term increases in emissions and the long-term benefits for decarbonization. By accounting for emissions from services, products and construction in public procurement,

[22] See Jörn Richstein and Karsten Neuhoff (2019): CO_2-Differenzverträge für innovative Klimalösungen in der Industrie. DIW Aktuell 23. (available online)

[23] See Nils May, Karsten Neuhoff and Jörn Richstein (2018): Kostengünstige Stromversorgung durch Differenzverträge für erneuerbare Energien, DIW Wochenbericht 28. (available online)

the carbon footprint of infrastructure investments can be reduced and markets for transformative low carbon practices and products can be strengthened. [24]

In the current crisis, European governments appear to be better equipped to implement a green stimulus package. This is due to increased public awareness of the issue and an improved national and international framework for climate legislation. This, combined with the lessons learned from the last crisis, should enable policy makers to enhance the role of green measures in the forthcoming stimulus packages.

Conclusion: Green components in economic stimulus packages are possible and sensible

Following the global financial crisis of 2008/2009, governments around the world included "green" components into economic stimulus programs. The experiences from different sectors and with different instruments show that green components can very well fulfil three basic requirements of an economic stimulus. Firstly, they are targeted and increase the economic impact of public expenditure. Second, they can be timely, since they can build on the preparatory work of recent years. Third, the public expenditure needed is temporary, since it aims to initiate a transformation. This positive experience and the criteria that have emerged from it can become the basis for a more comprehensive Green Recovery Package.

A Chinese Translation of DIW focus 4 can be found here: https://www.diw.de/id/diw_01.c.790675.de

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[24] See Olga Chiappinelli, Friedmann Gruner and Gustav Weber (2019): Green Public Procurement: climate provisions in public tenders can help reduce German carbon emissions. DIW Weekly Report 51, 52.(available online)

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