Who benefits from climate investments? It depends.

Ulrike Lehr[1,*], Markus Flaute[1] , Malte Oehlmann, Ralph Büchele

[1] *Gesellschaft für Wirtschaftliche Strukturforschung mbH, Osnabrück, Germany*
** Corresponding author. Tel: +4954140933280, Fax: +4954140933110, E-mail: lehr@gws-os.com*

Abstract

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1. Background

Latest after the Paris COP 21 agreement it became clear that the world has to seriously increase its efforts in climate change mitigation. Meanwhile, 187 nations, representing 98 percent of the world's greenhouse gas emissions, submitted their Intended Nationally Determined Contributions (INDC). Fulfilling these commitments of limiting warming to below 2 degrees Celsius will spur a huge dollar clean energy investment opportunity; IEA (2016) estimated $16.5 trillion. Moreover, investment in clean energy surpassed investment in fossil fuels already in 2015 and 2016, mainly, of course, due to the low fossil fuel prices. But not only clean energy requires more investment to reach the GHG targets, also energy efficiency and green infrastructure offer wide investment opportunities.

For some European countries, in particular for Germany, a too low level of public and private investment has been discussed in the last two or three years. Though the empirical results are mixed (Alm, Meuers 2015) lower investment activities can be detected in particular in the public sector. This translates into the concern that Germany will live off the depreciating stock of infrastructure in the near future.

The contribution takes these two strands together and analyses the effects of a scenario with higher investment targeted at GHG mitigation and green infrastructure. The scenario covers renewable energy (PV, wind), efficiency increases in the residential and commercial building stock, expansion of bicycle lanes and rails and the improvement of the electricity grids with a focus on storage. The economic effects are obtained by model based scenario analysis. The additional measures suggested help to fulfil the GHG targets of Germany. The focus is on those measures, which are expected to have the largest GHG mitigation effect.

2. Methodology

The analysis is based upon simulation results obtained with the macro-econometric model PANTA RHEI. PANTA RHEI. PANTA RHEI has a macro-econometric simulation and forecasting model at its core, which consistently describes the annual inter-industry flows between the 63 sectors, their contributions to personal consumption, government, equipment investment, construction, inventory investment, exports as well as prices, wages, output, imports, employment, labor compensation, profits, taxes, etc. for each sector as well as for the total economy.

In the behavioral equations decision routines are modeled that are not explicitly based on optimization behavior of agents, but are founded on bounded rationality. The parameters in all equations in PANTA RHEI are estimated econometrically from time series data. Producer prices are the result of mark-up calculations of firms. Output decisions do not stem from an optimization process but follow observable historic developments, including observed inefficiencies. Employment

is determined from the production volume and the real wage rate in each sector, which in return depends on labor productivities and prices.

To examine the economic effects green investment strategies in Germany our analysis applies PANTA RHEI to two scenarios: a business as usual scenario and the investment scenario. Both scenarios are implemented in the macro-econometric model PANTA RHEI. The reference scenario is compared with an investment scenario that aims not only at the implementation of the objectives of the energy sector, but also aims at more ambitious targets and tries to achieve them with the focus on investment activities. The two scenarios and their sensitivities are consistent in themselves; they form closed, possibly contradictory, possible worlds. This also includes investing in the expansion of renewable energy exceeding the objectives of the German government. In areas where there is direct competition between the investment in climate protection and the investment in climate-degrading technologies, this is taken into account in the scenarios.

The respective differences in economic indicators, such as employment, GDP etc. can then be attributed to the additional efforts in the sectors described above, since all other factors are held equal. Changes in volumes and prices are fully accounted for. The simulation model runs until 2030.

3. Results and Conclusion

The results of the economic model calculations represent the overall economic responses to a scenario that is increasingly investing in climate protection. These are positive. Moreover, the effects are positive for each single measures, but their effects differ significantly.

The resulting growth effects are not particularly large, expressed by changes in GDP. The largest specific impact is found in efficiency increases, in particular in industry. This is due to two effects: firstly, many efficient technologies are produced in Germany, therefore additional investment directly increases domestic demand and production. Secondly, most efficient technology have a rather short payback period and are actually economically efficient. The barriers lie somewhere else. The increase in energy efficiency by means of cross-sectional and process technologies leads to energy savings. The latter enhances in the positive effects in the economic cycle, since what is saved in energy expenditure can be spent again for other purposes. The energetic building renovation pays for itself in the long term, so the savings are also used for the counter-financing of the investment over a longer period. Renewable energy leads to revenues from the operators, but in the short to medium term they increase the prices for those consumers who are burdened with them. This reduces the effect on GDP.

In terms of employment, the labor intensity in the construction industry overlays all other effects. Infrastructure investment in the "Sustainable Mobility" area therefore has the greatest impact on employment, followed by the energetic building renovation. Also with regard to employment, the expansion of renewable energy has relatively little effect.

4. References

IEA (2016) World Energy Outlook, Paris November 2016.

Alm, B, Meurers, M. (2015) Essential Facts on Weak Investment Levels in Germany, Wirtschaftsdienst 2015.