

Research Brief

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Consequences of transiting to a climate-neutral economy

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Transition risk is the risk arising from the economy's shift towards net-zero carbon emissions. Applying a novel methodology, we find that large unanticipated increases to transition risk are predominantly related to political events and can have notable macroeconomic consequences. Interestingly, in the short run these shocks do not uniformly generate inflationary pressure, challenging the prevalent notion of "greenflation." Finally, our results highlight an important role for country-specificities, suggesting, for instance, that there may also be economic benefits attached to the transition. Overall, while international policy coordination is essential, these findings underscore the importance of tailoring policy interventions to each nation's unique economic context.

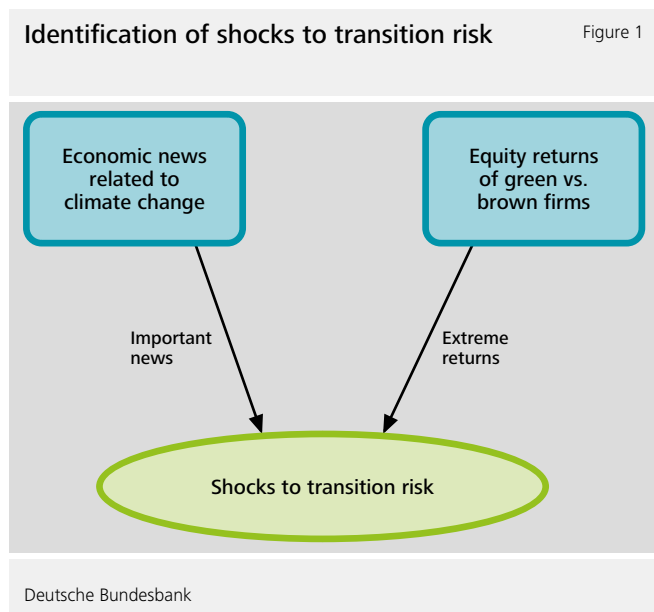
Economically, climate change goes along with a substantial increase in various types of risk. These are typically categorized as being either physical or related to economic transition. Physical risk is the risk arising from an increase in the severity and frequency of extreme weather events, but also from longer-term developments such as higher average temperatures or rising sea levels. Transition risk is the risk arising from the economy's shift towards net-zero carbon emissions. It is central to our discourse on climate change mitigation. Given the urgency of the transition, comprehensively analysing transition risk is paramount.

In theory, putting a globally aligned price on all carbon emissions is the optimal approach to account for the hidden costs of climate change and, thus, to steer the green transition. In practice, however, the transition, and therefore also transition risk, is shaped by a myriad of factors. Policy makers employ a

diverse array of tools. Additionally, their actions are marked by fragmentation and varying degrees of ambition across the globe. Furthermore, there are other drivers besides policy shaping the transition, including technological progress and consumer preferences, the latter driven, for instance, by the rising awareness that combating climate change is an urgent matter. This complexity poses unique challenges for the empirical analysis of the costs and benefits of the transition. Equally worrisome, some proxies proposed in the literature, like carbon taxes, can also be endogenously related to the transition. Such taxes are not merely independent tools to encourage an emission reduction; they are themselves shaped by economic conditions that evolve as the economy adapts to new green policies. This two-way relationship complicates efforts to isolate the true exogenous (and thus causal) effects of transition risk on the economy.

A robust and comprehensive approach to studying the causal effects of transition risk

In our study (Meinerding, Schüler and Zhang, 2023), we acknowledge this complexity and propose a robust and comprehensive approach to studying the causal macroeconomic effects of transition risk. Our method builds on the premise that the overarching theme connecting all instances of economic risks posed by the transition is "stranded assets," i.e., sunk investments that cannot be used or sold profitably due to changes in the market or regulations spurred by the transition. Particularly, our method identifies instances at which there is a significant exogenous increase in the aggregate probability of asset stranding, which we interpret and label as "shocks to transition risk." Practically, our approach combines information from equity returns of carbon-intensive versus carbon-unintensive firms with textual analysis of newspaper archives (see Figure 1). For this, our approach relies on very mild and uncontroversial assumptions. Therefore, our understanding of transition risk is comprehensive, accommodating the variety of reasons why transition risk may increase.



Transition risk shocks are related to major political events

We apply our method to US data from 2010 to 2018 and find four transition risk shocks. Our method identifies political events, such as the climate deal between the United States and China in November 2014 and the Paris Agreement in December 2015 as transition risk shocks, among others. We also apply our method to data from Germany and the United Kingdom. Again, our method reveals major political events that can convincingly be regarded as transition risk shocks,

like the aftermath of the parliamentary elections in the United Kingdom in May 2015 and in Germany in November 2017. Arguably, this finding indicates that abrupt exogenous shocks to transition risk are mostly related to political decisions.

Shocks have sizeable effects, both on aggregate and for transition-sensitive sectors

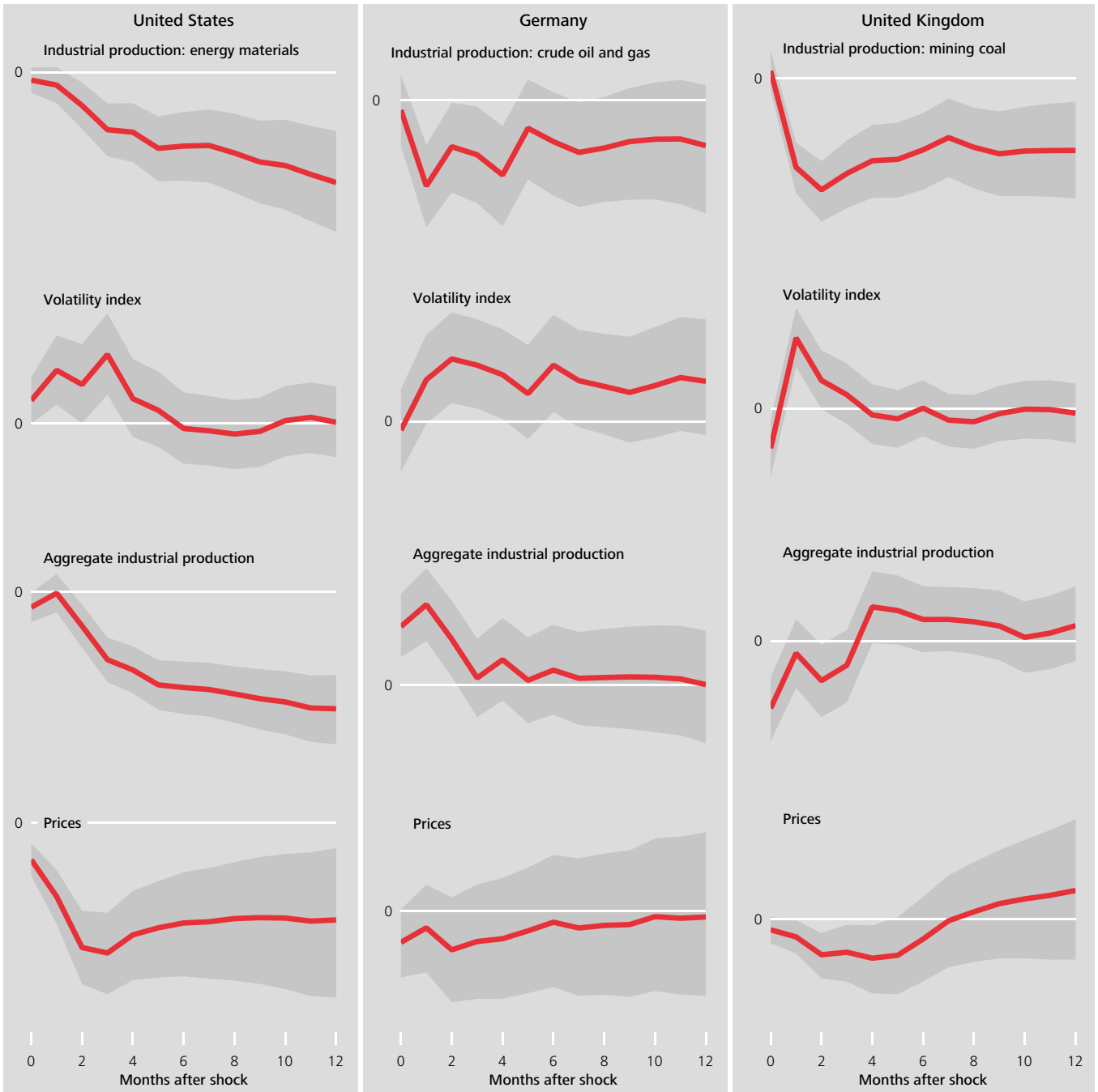
We then evaluate the causal macro-financial implications of our shocks. Figure 2 displays a few selected impulse responses. We find that our transition risk shocks negatively impact transition-sensitive sectors, e.g. by reducing industrial production of energy materials or increasing uncertainty in the oil sector. Sectors which are less affected by the transition show much smaller effects, consistent with our identified narratives. Additionally, we show that the shocks significantly and strongly deteriorate credit conditions and raise volatility on financial markets as indicated by the volatility indices. They also have sizeable aggregate effects. In the United States, a shock significantly lowers the economic outlook for several months, reducing both industrial production and prices. The response of the price level suggests that, other than narrowly defined carbon price shocks, in the short-run, transition risk shocks do not need to be inflationary.

While certain findings hold across countries, notable distinctions also arise. For Germany, the response of industrial production is positive and the response of the price level is insignificant. For the United Kingdom, both responses are slightly negative, but hovering around zero. We hypothesize that such differences in the responses to transition risk shocks are rooted in varying degrees of the economies' "greenness" and their "readiness" for the transition to net zero, with Germany being "readier" over the sample period than the United Kingdom or the United States. Interestingly, in Germany, we observe a strong rise in uncertainty in the "automobiles and parts" sector, suggesting elevated transition risk within this sector.

However, it is important to recognize that such statements may be subject to change. The transition to net zero is clearly evolving and dynamic, which may or may not imply revisions of some of these results in the future. In particular, significant policy shifts continue to happen, an example being the recent U.S. Inflation Reduction Act, which may affect the U.S. economy's readiness for the transition going forward.

The impact of shocks to transition risk on selected variables*

Figure 2



* The red line shows the median and the grey range includes 68 per cent of the possible values, illustrating the uncertainty around the median.
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Conclusion

We offer a robust and comprehensive methodology to identify exogenous shocks to transition risk and apply it to the United States, Germany, and the United Kingdom. Our findings indicate that shocks to transition risk are predominantly politically driven and have significant macroeconomic implications. Interestingly, our analysis challenges the widespread notion of “greenflation,” as – at least in the short run – the shocks do not necessarily exert inflationary pressure. Additionally, the importance of country-specific factors emerges, suggesting that economic benefits may also be associated with the transition. Therefore, while international policy coordination remains crucial, our findings underscore the necessity of designing policy interventions that also respect and respond to each nation's unique economic context.

References

Meinerding, C., Schueler, Y., Zhang, P.: Shocks to Transition Risk, Deutsche Bundesbank Discussion Paper No. 04/2023



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News from the Research Centre

Publications

“New facts on consumer price rigidity in the Euro area” by Erwan Gautier (Banque de France),... Jan-Oliver Menz (Deutsche Bundesbank),... Elisabeth Wieland (Deutsche Bundesbank) will be published in the *American Economic Journal: Macroeconomics*.

“Liquidity in the German corporate bond market: has the CSPP made a difference?” by Kathi Schlepper (Deutsche Bundesbank), Mevlud Islami (Deutsche Bundesbank) and Lena Mareen Boneva (European Central Bank) will be published in the *Journal of International Money and Finance*.

Events

24 September 2024

11th SAFE Asset Pricing Workshop, Frankfurt am Main

01 – 02 October 2024

“Conference on Markets and Intermediaries”, jointly organized by Deutsche Bundesbank and Humboldt Universität, Frankfurt am Main

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