

Climate Change, Wars, and the Natural Rate of Interest

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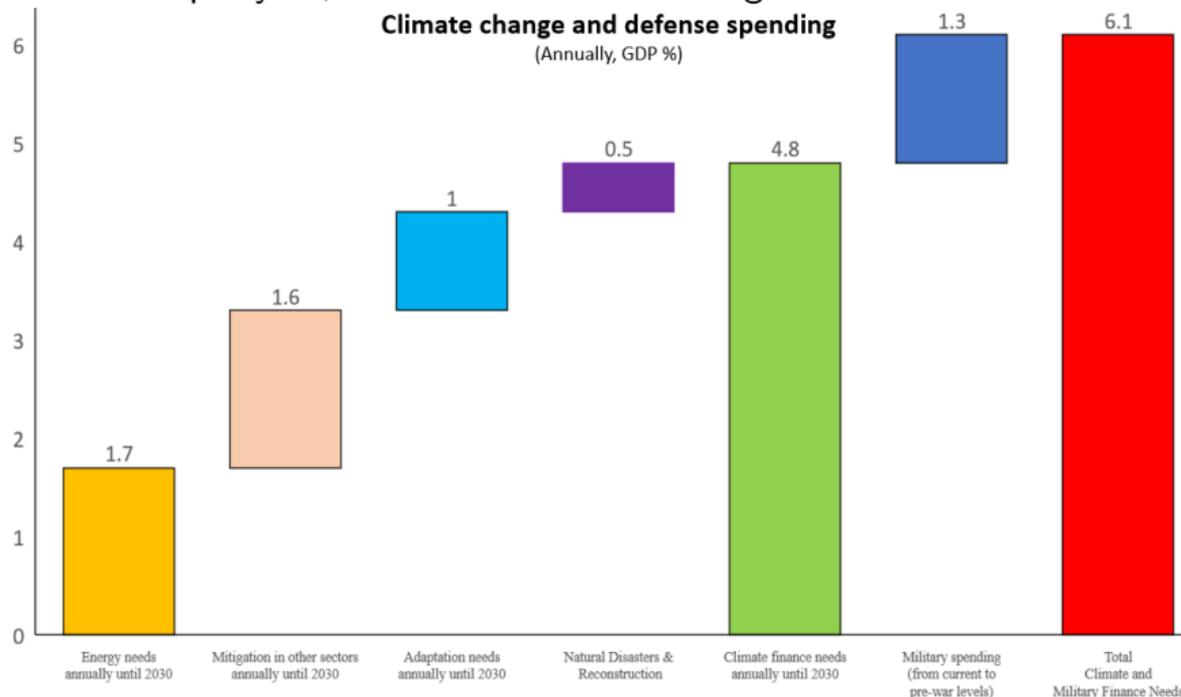
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- ▶ Large investments required to achieve climate transition + Large defense spending due to a more conflictive world \Rightarrow Upward pressure on r^* , a key variable for monetary policy.
- ▶ This paper surveys the literature attempting to quantify these costs, arriving to a staggering figure: 6-8 USD trn per year, near 25-30% of current global investment.



My comments:

Significant uncertainty about how much of this spending, and at what pace, will materialize. Still, let us consider the consequences of such a scenario.

- ▶ Challenges to monetary policy beyond r^* .
 - ▶ Energy transition and inflation.
 - ▶ Fiscal policy.
- ▶ Consequences for developing countries.
- ▶ Suggestions for empirical estimates.

Energy transition and inflation:

- ▶ Transitioning from brown to green energy might have **direct** effects on inflation.
- ▶ Either increases in taxes to discourage the current use of brown energy (e.g. carbon taxes) or the reduction of current energy subsidies will likely have a significant impact on inflation, with a non-trivial activity trade-off.
 - ▶ Some DSGE based analysis: Hassler, Krusell & Olovsson (2022); Del Negro, di Giovanni & Dogra (2023); Nakov & Thomas (2023); Airaudo, Pappa & Seoane (2024).
- ▶ Taxes on brown energy, besides climate-related benefits, are a source of revenue (e.g. Garcia-Macia, Lam & Nguyen, 2024) \Rightarrow More chances for these direct effects to materialize.

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- ▶ Uncertainty about green energy prices:
 - ▶ $MgCost < MgCost$?
 - ▶ Given the sizable initial investment, monopoly power in the future might be required to justify the large initial costs. Will markups be larger?
 - ▶ Is green energy less tradable? Implication for prices? Level vs volatility?

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- ▶ A first important point: the costs quantified in this paper would count as part of the primary fiscal deficit. The financial deficit, specially with rising interest rates, is not quantified.

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- ▶ More generally, a trade-off arises between inflation control and debt stabilization.
- ▶ Unpleasant New-Keynesian Arithmetics:
 - ▶ If people start assigning a probability to **future** monetary policy considering debt stabilization goals, the ability of current monetary policy to control inflation is limited, and inflation becomes endogenously more persistent. See Bigio, Caramp & Silva (2024).
 - ▶ In addition, equilibrium multiplicity might arise, if this perceived probability is increasing in the stock of debt (e.g. more painful to implement a tax reform with a larger debt to repay) \Rightarrow Potential self-fulfilling rollover crisis. See Corsetti & Mackowiak (2024).
- ▶ These challenges are even more relevant if we also add the direct effects from energy price increases in the short-run.

Spillovers from larger long-term rates in advanced economies:

- ▶ Pressures for Real Exchange Rate depreciation: UIP, direct effects + premium.
- ▶ Trade-off for monetary policy.
- ▶ Liability dollarization effects.
- ▶ Additional debt sustainability problems.

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Even without these spillovers:

- ▶ Alternative ways to implement the climate transformation (e.g. brown taxes, green subsidies, public investment) have **qualitatively** different effects on inflation, output, and the real exchange rate \Rightarrow country premium and debt dynamics go in the other direction; non trivial monetary and fiscal interactions. See Airaudo, Pappa & Seoane (2024).

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- ▶ Different impact for current energy importers and exporters:
 - ▶ Tradeability of green energy and comparative advantages.
 - ▶ Effects of brown energy shock in global prices.

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- ▶ Different impact for current energy importers and exporters:
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 - ▶ Effects of brown energy shock in global prices.
- ▶ How to finance the energy transformation? Heterogeneous consequence for rich and poor, net foreign lenders and borrowers.

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- ▶ Some recent papers introduced new long series of interest rates (Jorda, Taylor, et al, 2019, 2024; Rogoff, Rossi & Schmelzing, 2024)
- ▶ Older literature identifying US fiscal shocks, exploring domestic and global consequences (Romer & Romer, 2010; Ramey, 2011; Feyrer & Shambaugh, 2012). Also, news about defense spending (Ramey & Shapiro, 1998). Anticipation is key, as in this analysis.
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- ▶ Suggestion: estimate the effects these shocks on relevant interest rates using these new data sets; either directly or as instruments to movements in global savings or investment.
- ▶ Complementary: Using data on world investment and savings, plus interest rates, implement a strategy to identify shocks to savings and investment (e.g. sign restrictions, long-run/cointegration, new shocks), to estimate the impact on interest rates.