

## Carbon debt

Currently, there is around 200 GtC more in atmosphere than before emissions started. Since the start of industrialization, accumulated emissions are around 500 GtC. In Golosov et al. (2014) we calculate that of the extra 200 GtC, approximately half will slowly trickle down into the atmosphere and the rest stays for ever (thousands of years). Using this, we can calculate the carbon debt as.

$$Y_t \gamma \left( \frac{100}{\rho} + \frac{100}{\rho + (1 - \rho) \varphi} \right)$$

Using our the parameters from Golosov et al (2014)  $\gamma = 2.38 * 10^{-5}$ ,  $Y_t = 70 * 10^{12}$ ,  $\varphi = 0.00228$  and a subjective discount rate of 1% per year, this yields a value of 30 trillion US dollars.

Reference

Golosov, Mikhail, John Hassler, Per Krusell, and Aleh Tsyvinski, (2014), "Optimal Taxes on Fossil Fuel in General Equilibrium", *Econometrica*, forthcoming.