

# Dynamic ESG equilibrium

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# Summary

Discrete-time, multiperiod asset pricing model with ESG assets. Recursive utility defined on the sum of physical and non-physical consumption (infinite elasticity of substitution). Delivers

- asset pricing formula which includes greenness
- market risk premia with 3 covariance components (consumption growth, return on aggregate wealth, growth of total vs physical consumption) minus a convenience yield

## Add

- mean reverting long-run risk of consumption growth (à la Bansal and Yaron)
- a mean-reverting specification for the dynamics of supply and demand

to obtain

- actual (not expected) returns price to consumption ratio, return on wealth and SDF
- all affine and increasing in greenness  $G$ , greenness appreciation  $\delta$  and long-run risk
- actual (not expected) price-to-dividend ratio
- affine and increasing in greenness  $G$  and greenness appreciation  $\delta$
- actual (not expected) return on market, fixed + time-varying, the latter positive in the long run
- VAR estimate of the parameters on US data 1991-2019

# Comments

# Contribution

- Very nice and very much due multiperiod equilibrium model
- which confirms the role of convenience yield of static models: green assets expected returns smaller than brown;
- and rationalizes the intuition of static models: shocks to demand and supply may reneedr the actual returns on green assets higher than the brown
- with robustness results, both in the theory and empirical part

## Are $G$ and $\delta$ separable?

- Aggregate behavior towards ESG is the result of attitude and regulation (institutional investors such as insurance companies, banks..). Add constraints on  $G$
- for realism
- and to see whether you can separate  $\delta$  from  $G$  in the investor problem, because utility is defined on  $C + \delta G(W - C)$ ,
- $\delta$  represents the valuation of greenness and the ESG share in the consumption bundle, so DEMAND, while  $G$  is ESG SUPPLY.

# Are physical and non-physical consumption (ESG pleasure) perfect substitutes?

- Infinite elasticity of substitution between physical and non-physical consumption: is it realistic?
- isn't there a minimum subsistence level of physical consumption?
- why not a Cobb-Douglas production function?



# VAR Estimates

- The initial level of ESG demand, as well as its average (long-run) value are estimated, while the mean reversion is not.
- The last is exogenously set to .999, so low mean reversion, and this delivers tranquil and second-order supply effect in equilibrium, strong first-order and long-lasting demand effects.
- If mean reversion is low, the long-run variance of ESG demand is high. That is my intuition for the long-lasting effects of demand
- What if mean reversion is high, which seems plausible, since ESG preference seems to be growing, not being random? The long run variance of demand would be low and ...?.