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
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Discussion by Elisa Luciano

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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 render 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?
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 ...?.