Výnosy zo zelených investícií

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22. október 2021, Česká repubлиka
Sustainable investing assets have grown more than 50% to $35.3 trillion since 2016

- **Australasia**
  - 2016: $516.0B
  - 2018: 734.0B
  - 2020: 906.0B

- **Canada**
  - 2016: $1.1T
  - 2018: 1.7T
  - 2020: 2.4T

- **Japan**
  - 2016: 474.0B
  - 2018: 2.2T
  - 2020: 2.9T

- **Europe**
  - 2016: 12.0T
  - 2018: 14.1T
  - 2020: 12.0T

- **U.S.**
  - 2016: 8.7T
  - 2018: 12.0T
  - 2020: 17.1T

Source: Global Sustainable Investment Review 2020

*Note: Australasia and Europe have enacted significant changes in the way sustainable investment is defined, complicating direct comparisons between regions.*
Motivation

• Which investments do we expect to perform better: “green” (ESG/sustainable/responsible) or “brown”?

• Many **investors expect high returns from green** investments
  • Surveys by BlackRock, BNP Paribas, Schroders

• Asset managers often market green investments as offering superior risk-adjusted returns
  • Blackrock: “integrating sustainability can help investors build more resilient portfolios and achieve better long-term, risk-adjusted returns"
  • State Street: “ESG is a source of alpha that leads to positive portfolio performance"
Main points

- Green assets have **lower expected returns** than brown
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- **Green** assets have **lower expected returns** than **brown**, because
  1. Investors have tastes for green assets
  2. Green assets are a hedge against climate risk

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• Green assets have lower expected returns than brown, because
  1. Investors have tastes for green assets
  2. Green assets are a hedge against climate risk


• Green assets have lower expected returns than brown, even though they had higher realized returns recently
  • Expected returns ≠ Realized returns

Tastes for green assets

- We assume that investors derive
  - Utility from holding green assets
  - Disutility from holding brown assets

\[ g_n < 0 \quad g_n > 0 \]
Tastes for green assets

- We assume that investors derive
  - Utility from holding green assets
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- These tastes push asset prices:
  - green ↑, brown ↓

- In equilibrium, investors
  - “overpay” for green assets,
  - “underpay” for brown assets,
  - relative to assets' cash flows

\[ g_n < 0 \quad g_n > 0 \]

\[ d_i > 0 \]  \hspace{1cm} \[ d_i = 0 \]
Expected returns: Tastes

• Thus, **green assets have lower expected returns than brown**
  • If investors are reluctant to hold brown assets, such assets must offer higher expected returns
Expected returns: Tastes

• Thus, **green assets have lower expected returns than brown**
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• Mathematically, expected return on stock $n$ in equilibrium:

$$E(R_n) = R_f + \beta_n(E(R_M) - R_f) - \frac{d}{a} g_n$$

where $d > 0$ is average strength of green tastes, $a > 0$ is risk aversion, $g_n$ is stock $n$’s ESG score

• Note: $g_n \uparrow \Rightarrow E(R_n) \downarrow$ (higher ESG score $\Rightarrow$ lower expected return)
Expected returns: Risk

- Second reason why green assets have lower expected returns: Green assets offer a **hedge against climate risk**
  - Green assets tend to perform better when climate shocks hit

- Brown assets are riskier as they are more exposed to climate risk
  ⇒ Brown assets must offer higher expected returns to compensate
Can green assets outperform brown?

• Yes, if **tastes shift unexpectedly** in the green direction
  • Consumers' tastes shift toward green products
  • Investors' tastes shift toward green assets

• If the taste shift is unexpected, we **temporarily** see
  • **Green** firms' realized returns > expected returns
  • **Brown** firms' realized returns < expected returns

⇒ High past returns need not indicate high future returns
Example: German twin bonds

• German government has been issuing green bonds since 2020
  • First issue: September 2020 (10-year, zero coupon; €6.5 billion)

• Each green bond has a conventional “twin”
  • Same issuer, maturity date, coupon rate, coupon payment dates
  • Twin bonds offer identical cash flows but different greenness
    • Expected returns?
    • Realized returns?
German twin bonds: Yields

Panel A. Bond Maturity: 10 Years

Percentage Points

-0.7
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
-0.0
0.0
0.1
0.2
0.3
0.4
0.5


Green
Non-Green
Panel A. Yield spread ("greenium")

Panel B. Cumulative return on the long-short portfolio
Example: U.S. stocks

- Use MSCI ESG data to sort stocks by their environmental scores
  - **Green** stocks: Top tercile (most environmentally friendly)
  - **Brown** stocks: Bottom tercile (least environmentally friendly)
The green factor

• We construct a **green factor** motivated by our theory
  • Long green, short brown stocks. Weight by greenness.
Climate concerns and the green factor

• We measure **climate concerns** by the media index of Ardia, Bluteau, Boudt, and Inghelbrecht (2021)
Adjusting the green factor for news
Conclusions

• Green assets have lower expected returns than brown, because
  1. Investors have tastes for green assets
  2. Green assets are a hedge against climate risk

• Green assets had higher realized returns than brown in the 2010s, because climate concerns strengthened over that period
  • When we remove the effect of strengthening climate concerns, the green outperformance disappears

• Expected returns ≠ Realized returns