Global emissions and temperature increase for various concentration levels

Emissions

Temperature increase

- Trend scenario
- 650 ppm CO₂ eq
- 550 ppm CO₂ eq
- 450 ppm CO₂ eq
- 400 ppm CO₂ eq

Target 50% reduction in 2050 compared to 1990
Target 2°C
Unburnable carbon
Mark Carney: most fossil fuel reserves can't be burned

Bank of England governor lends his support to ‘carbon bubble’ theory that coal, gas and oil assets are at risk, reports BusinessGreen

Bank of England investigating risk of 'carbon bubble'

assess chances of an economic crash if climate change rules make assets worthless
May 16, 2014

‘Both our scenarios (..) do not limit emissions enough to be consistent with the (..) 2 degree scenario. We also do not see governments taking the steps now that are consistent with the 2 degree scenario.’

‘We do not believe that any of our proven reserves will become ‘stranded’’

To whom it may concern,

We are writing this letter in response to enquiries from shareholders regarding the “carbon bubble” or “stranded assets” issue. We have recently discussed this issue with a wider group of shareholders at our
The Price of Doing Too Little Too Late
The impact of the carbon bubble on the EU financial system

Rens van Tilburg (r.vantilburg@uu.nl)
Heinrich Boell Foundation, Washington DC
December 4 2014
Financial impact carbon bubble

**Direct effects**
- Energy commodities
- Market value of oil, gas and coal mining firms
- Credit risk of oil, gas and coal mining firms

**Indirect effects**
- Electricity producers, energy-intensive industries
- Other business sectors
- Governments of resource-rich countries
Research approach

Exposures to high-carbon assets (gas, oil and coal mining companies)

**Pension funds**
- 23 large funds, from 8 EU countries
- >€ 1,200 billion assets (24% of EU total)

**Banks**
- 20 largest banks, from 8 EU countries
- >€ 22,000 billion assets (62% of EU total)

**Insurance companies**
- Aggregated data
Research approach

Potential shocks

Low-carbon Breakthrough

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commodities</td>
<td>-50%</td>
</tr>
<tr>
<td>Equities</td>
<td>-60%</td>
</tr>
<tr>
<td>Bonds</td>
<td>-30%</td>
</tr>
<tr>
<td>Term &amp; project loans</td>
<td>-30%</td>
</tr>
<tr>
<td>Credit facilities</td>
<td>-20%</td>
</tr>
</tbody>
</table>
Research approach

Exposures to high-carbon assets >€1,000 bn

Potential shocks

Commodities
Securities
Loans

Pension funds
Banks
Insurers
Research approach

Exposures to high-carbon assets >€ 1,000 bn

Potential shocks

Estimated losses

Pension funds
Banks
Insurers

Commodities
Securities
Loans

% assets
% capital
Research approach

Pension funds
Banks
Insurers

**Banks**
- Shareholders (profit, capital buffer)
- Firms (credit rationing, deleveraging)
- Government (public support)

**Pension funds**
- Reserves (capital buffer)
- Other investors (de-risking)
- Participants (lower pensions, higher premiums)

Propagation of shocks
Research approach

Pension funds
Banks
Insurers

Exposures to high-carbon assets >€ 1,000 bn

Potential shocks

Estimated losses

Propagation of shocks

Commodities
Securities
Loans

% assets
% capital

Investors
Firms
Households
Research approach

- Carbon bubble shock
- Losses on bank loans increase
- Economy slows down
- Banks reduce lending

Feedback loops

- Investors
- Firms
- Households

Propagation of shocks

Pension funds
Banks
Insurance

Exposures to high-carbon assets

Potential shocks

Estimated losses

% assets

% capital
Research approach

Exposures to high-carbon assets >€ 1,000 bn

Potential shocks

Estimated losses

Propagation of shocks

Pension funds
Banks
Insurers

Feedback loops

Commodities
Securities
Loans

% assets
% capital

Investors
Firms
Households

Economy
Markets
Large differences in high-carbon assets

**Pension funds & Insurers**

High-carbon assets / Total assets

- EU Pension funds
- USS
- PFZW
- Keva
- Alecta
- EU Insurers

- Equities
- Corporate bonds
- Commodities
Large differences in high-carbon assets

**Banks**

**High-carbon assets / Total assets**

<table>
<thead>
<tr>
<th></th>
<th>EU</th>
<th>Lloyds</th>
<th>SG</th>
<th>BBVA</th>
<th>DB</th>
<th>Rabo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate loans</td>
<td>1.0%</td>
<td>1.5%</td>
<td>2.0%</td>
<td>2.5%</td>
<td>1.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Equities</td>
<td>0.5%</td>
<td>1.0%</td>
<td>1.5%</td>
<td>2.0%</td>
<td>0.5%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

**Corporate bonds**

1.8%
Low-carbon Breakthrough

**Scenario**
- Quick and definite transition to low-carbon economy

**Consequences**
- Sudden loss on high-carbon assets
- Estimated total losses for EU banks, pension funds and insurance companies **€350-400 billion**
- This is unlikely to trigger harmful feedback loops
Low-carbon Breakthrough

Pension funds & Insurers

Potential high-carbon losses / Total assets

- EU Pension funds
- USS
- PFZW
- Keva
- Alecta
- EU Insurers

- Equities
- Corporate bonds
- Commodities

6%
Low-carbon Breakthrough

Banks

Underlying profit (2012)
Underlying profit (2013)
Potential losses
Core Capital (2102)

EU
Lloyds
SG
BBVA
DB
Rabo

Corporate loans
Trading assets

Underlying profit (2012)
Underlying profit (2013)
Potential losses
Core Capital (2102)

EU
Lloyds
SG
BBVA
DB
Rabo

Corporate loans
Trading assets

Underlying profit (2012)
Underlying profit (2013)
Potential losses
Core Capital (2102)

EU
Lloyds
SG
BBVA
DB
Rabo

Corporate loans
Trading assets
Low-carbon Breakthrough

Banks

Potential high-carbon losses / Total assets

- EU
- Lloyds
- SG
- BBVA
- DB
- Rabo

Corporate loans
Trading assets

EU: 0.2%
Lloyds: 0.6%
SG: 0.6%
BBVA: 0.4%
DB: 0.4%
Rabo: 0.0%

Total: 0.6%
Uncertain Transition $\rightarrow$ Larger losses

**Scenario**
- Emissions remain eventually within carbon budget
- Transition path is initially slow and uncertain

**Consequences**
- Ongoing capital expenditures € 500 billion/year
- Increasing stranded assets and losses
- Uncertainty about valuation of assets
Carbon Renaissance ➔ Most harmful

**Scenario**
- Strongly increasing demand for fossil fuels
- Ineffective climate policies

**Consequences**
- Uncontrollable climate change (more floods, draughts, extreme storms, etc.)
- Serious harm to global economy
- Larger losses on broad range of assets
Conclusions

• Serious money at stake
• However, no large danger for financial system as a whole (NOTE: from these direct effects)
• Although specific financial institutions could encounter serious problems
• No financial stability argument against effective climate policy
• The longer we wait, the more expensive it gets (and the bigger the financial stability risk)
Recommendations for the EU

- Adopt clear and effective long-term **climate and energy policies**
- Encourage **supervisory assessments** of all large financial institutions
- **Address weaknesses** in individual institutions (risk management, fiduciary duty) and national financial sectors (macroprudential measures)
- Promote active **long-term investment** strategies
- Adopt specific **reporting requirements**
Thank you!
Research approach

Pension funds
Banks
Insurers

Exposures to high-carbon assets >€ 1,000 bn

Data sources

<table>
<thead>
<tr>
<th>Asset distribution</th>
<th>Annual reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commodities</td>
<td>Annual reports</td>
</tr>
<tr>
<td>Equity portfolios</td>
<td>Financial database</td>
</tr>
<tr>
<td>Syndicated corporate loans</td>
<td>Financial database</td>
</tr>
<tr>
<td>Corporate bond portfolios</td>
<td>Estimate (index)</td>
</tr>
</tbody>
</table>

Exposures at 31 Dec 2012
Large differences in high-carbon assets

**Pension funds**

High-carbon equities / Total equities

EU Pension funds  |  USS  |  PFZW  |  Keva  |  Alecta
---|---|---|---|---
0%  | 14%  | 5%  | 10%  | 15%

14%
Large differences in high-carbon assets

**Banks**

High-carbon syndicated loans / Total corporate loans

<table>
<thead>
<tr>
<th>Bank</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>6%</td>
</tr>
<tr>
<td>Lloyds</td>
<td>4%</td>
</tr>
<tr>
<td>SG</td>
<td>10%</td>
</tr>
<tr>
<td>BBVA</td>
<td>8%</td>
</tr>
<tr>
<td>DB</td>
<td>6%</td>
</tr>
<tr>
<td>Rabo</td>
<td>1%</td>
</tr>
</tbody>
</table>

DB has a significantly higher percentage of high-carbon assets compared to other banks.