A “SILENT SPRING” FOR THE FINANCIAL SYSTEM? 
EXPLORING BIODIVERSITY-RELATED FINANCIAL RISKS IN FRANCE

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*THE VIEWS PRESENTED HERE ARE THOSE OF THE AUTHORS AND DO NOT NECESSARILY EXPRESS THE VIEWS OF THE BANQUE DE FRANCE
Biodiversity includes:
- The diversity within species (genetic)
- The diversity between species
- The diversity of ecosystems
  - Almost infinite network of interrelations and interactions

Biodiversity as « enabling asset » (Dasgupta, 2021) allowing natural capital to provide ecosystem services to humans:
- Provisioning services (food, timber, fibers...)
- Regulation and maintenance services (climate regulation, erosion control, flood control, disease control, pollination...)
- Cultural services (recreational, tourism, spiritual...)
  - Underpinned by basic ecological functions (soil formation, nutrient cycling, ...)

“Biological diversity is the variability among living organisms and the ecological complexes of which they are part” (IPBES, 2019)
BIODIVERSITY LOSS

Extinction rate of species currently tens to hundreds times higher than reference rate of the past million years (IPBES, 2019)

The majority of the total biomass of vertebrates is composed of livestock and human beings, with only about 5% made up by wild species (Bar-On et al., 2018)

5 main direct drivers related to human activities (IPBES, 2019):

- Land/sea use change
- Direct exploitation
- Climate change
- Pollution
- Invasive alien species

Potential major socioeconomic impacts, yet difficult to assess:
- Non-linearity of ecosystem processes (tipping points)
- Irreversibility
- Interconnectedness of ecosystems

Source: Our World in Data, Adapted from Bar-On et al. (2018)
Traditionally, central banks and supervisors have adopted a risk-based approach to climate change:
- Risk for financial stability
- Risk for price stability

Rapidly growing awareness of biodiversity-related financial risks (BRFR):
- Central banks: DNB (van Toor et al., 2020), NGFS & INSPIRE (2021)
- Dasgupta Review (2021): one chapter dedicated to BRFR
- Private sector: TNFD (2021); SCOR & MNHN (2021)
- France's article 29 (décret d'application) requires financial institutions to disclose on:
  “Les principaux risques émanant des impacts causés par la stratégie d'investissement et les principaux risques émanant des dépendances à la biodiversité des actifs et activités dans lesquels l'entité a investi”
Insights into the assessment of biodiversity-related physical risks

Insights into the assessment of biodiversity-related transition risks

Biodiversity - How to Account for Physical and Transition Risk?

Dependencies

Non-Financial Corporations

Impacts

French Financial Institutions
DEPENDENCIES TO ECOSYSTEM SERVICES – METRIC AND DATA

Insights into the assessment of biodiversity-related physical risks

Data:
ENCORE database
(Natural Capital Finance Alliance, UNEP-WCMC)

Ecosystem Service
Business process
Firm

Metric:
A dependency score to 21 different ecosystem services
From 0% (no dependency) to 100% (very high dependency)
Insights into the assessment of biodiversity-related transition risks

**Data:**
Global biodiversity score (GBS, CDC Biodiversité), based on GLOBIO (PBL) (used with the support of the BIA, Carbon4Finance)

**Metric:**
Mean Species abundance (MSA).km²
An impact of 1 MSA.km² is comparable with the complete loss of 1 km² of “intact” nature.

**Impacts**
Firm turnover by (region; sector) → Pressures on biodiversity (land use, CC...) → Impacts on biodiversity (MSA.km²)
METHODOLOGY - STEP 1

1. Dependencies

NON-FINANCIAL CORPORATIONS

Securities (995bn EUR, end of 2019)

Impacts

FRENCH FINANCIAL INSTITUTIONS

Biodiversity

METHODOLOGY - STEP 1

- Step 1

- Non-financial corporations

- French financial institutions

- Impacts

- Dependencies

- Securities (995bn EUR, end of 2019)
METHODOLOGY – STEP 2

Biodiversity

Dependencies

Impacts

Non-financial corporations

Securities

French financial institutions

Impacts

Dependencies
METHODOLOGY – STEP 3

Non-Financial Corporations

Impacts

Dependencies

Securities (the “portfolio”)

French Financial Institutions

Biodiversity
RESULTS

130,000 MSA.km²: static (or accumulated) terrestrial biodiversity impact of the portfolio (equivalent to the artificialization of 24% of metropolitan France)

42%: amount of securities in portfolio that comes from issuers that are highly or very highly dependent on at least one ecosystem service

CONCLUSION: FUTURE RESEARCH AVENUES ON BIODIVERSITY-RELATED FINANCIAL RISKS

DANGER / SHOCK

EXPOSURE

Dependency

Impacts

VULNERABILITY / ADAPTIVE CAPACITY

NON-FINANCIAL CORPORATIONS

Debt securities & listed shares (the ‘portfolio’)

FRENCH FINANCIAL INSTITUTIONS
THANK YOU!
ANNEXES
RESULTS – DEPENDENCIES OF THE PORTFOLIO TO ECOSYSTEM SERVICES

DEPENDENCIES OF THE PORTFOLIO TO ECOSYSTEM SERVICES

BIODIVERSITY

Dependencies

NON-FINANCIAL CORPORATIONS

Securities

FRENCH FINANCIAL INSTITUTIONS

Securities

FINANCIAL CORPORATIONS

Biodiversity

Dependences
RESULTS – DEPENDENCIES OF THE PORTFOLIO TO ECOSYSTEM SERVICES – SCOPE 1

Share of the portfolio dependent (through scope 1, direct operations) to \( n \) ecosystem services at least Highly or at least Very Highly

42% of the value of securities held by French financial institutions were issued by companies that are highly or very highly dependent on at least one ecosystem service (\( \approx 420 \) billion EUR)

9% of the value of securities held by French financial institutions were issued by companies that are very highly dependent on at least one ecosystem service (\( \approx 90 \) billion EUR)
RESULTS – DEPENDENCIES OF THE PORTFOLIO TO ECOSYSTEM SERVICES – SCOPE 1

Share of the portfolio dependent (through scope 1, direct operations) to ecosystem services at least Highly or at least Very Highly

Considering dependencies of direct operations the portfolio mostly depends on:

- Ecosystem services related to **water provision**
- Maintenance and regulation ecosystem services such as Mass stabilization and erosion control, Flood and storm protection and Climate regulation
All security issuers become at least slightly dependent to all ecosystem services through their value chains.
RESULTS – IMPACTS OF THE PORTFOLIO ON (TERRESTRIAL) BIODIVERSITY

Biodiversity

Non-financial corporations

Securities

French financial institutions

Impacts
Accumulated (or “Static”) biodiversity footprint (including the impacts along all the value chain): **130,000 MSA.km²**

- Comparable with the loss of at least 130,000km² of “pristine” nature
- Comparable with the complete artificialization of **24% of the area of metropolitan France**
- Mainly due to the **land use pressure** (climate change not included)

The static portfolio footprint is mainly due to securities coming from firms in the following economic sectors:

- **Chemicals**
  - 15.1% of the portfolio’s static biodiversity footprint

- **Processing of dairy products**
  - 12.3% of the portfolio’s static biodiversity footprint

- **Manufacture and distribution of gas**
  - 10.5% of the portfolio’s static biodiversity footprint

- **Manufacture of beverages**
  - 9.7% of the portfolio’s static biodiversity footprint
RESULTS – IMPACTS OF THE PORTFOLIO ON BIODIVERSITY – DYNAMIC

Additional (or “Dynamic”) biodiversity footprint (all value chain included) : 4,800 MSA.km² per year

- Comparable with the loss of at least 4,800km² of “pristine” nature per year
- Comparable with the complete artificialization of the Loire departement each year
- Mainly due to the climate change pressure (included in dynamic analysis)

The dynamic portfolio footprint is mainly due to securities coming from firms in the following economic sectors:

- Chemicals: 10.9% of the portfolio’s dynamic biodiversity footprint
- Manufacture and distribution of gas: 10.2% of the portfolio’s dynamic biodiversity footprint
- Petroleum refinery: 7.7% of the portfolio’s dynamic biodiversity footprint