NGFS

Purpose → developed by central banks as 'what if' pathways

    → stress-test macro-financial systems under climate risk

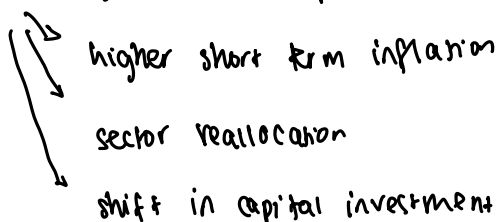climate change → policy & weather change → economic shif → bank portfolio impact

transition risk → economic disruption caused by trying to fix climate change

    ↳ carbon tax, emission caps, regulation, subsidies for renewables

    ↳ EV's, solar, battery storageh, H_2 gas → old assets may get stranded

    ↳ carbon price is the main lever that represents overall climate policy intensity

       · higher carbon price → higher cost for polluting industries

             higher short term inflation

             sector reallocation

             shift in capital investment

    ↳ this matter for banks as it affects borrower profitability, asset values, loan default

physical risk → risk from climate change itself

    ↳ chronic risk → rising tem, productivity decline, sea levels, drought, GDP drag

    ↳ acute risk → hurricanos, floods etc. big sudden economic hits

    ↳ banks : collateral value, real estate exposure, agricultural loans, insurance-backed assets

macro impacts → NGFS takes transition and physical risk and feed to macro model (NiGEM)

    output → GDP growth paths, inflation, policy rates, long term rates, unemployment

energy system transformation → structural shift in how energy is produced/used

net zero 2050 → ↓ fossil fuels, 80% renewable, massive capital investment

core question → How do NGFS scenarios change commercial loan outcomes

NGFS GDP path captures the combined macro effects of transition and physical risk. Using this path as primary driver of C&I loan behavior should be internally consistent → see after preliminary whether incorporating interest rate path meaningfully improves explanatory power

need to decide focus

1. how do scenarios change the size of commercial lending

   growth ≠ risk

   reflects demand not credit stress

2. how do scenarios change credit stress / default proxy

   more aligned with stress testing

   more complex

Phase V changes

- introduce new damage function which includes temp. variability, precipitation, wet days, extreme rainfall, persistent effects
- chronic physical risk estimates are 2-4x higher by 2050
- physical risk is much larger than transition risk, currently
- carbon emission reductions have been slow, more aggressive policy requiring $300/tCO_2 by 2035 ($50 more than phase IV)

core macro results

- by 2050

  net zero : 7% chronic loss

  current policy : 15% chronic loss

modelling caution → do not agg. acute and chronic as there is double counting risk increases long run physical risk severity, amplification of credit stress under current policies

what decisions do the models inform

- capital allocation
- risk appetite
- protfolio balancing
- preparedness for regulation

QUESTIONS

more interested in methodological transparency or predictive accuracy

what outcome metric to prioritise → loan growth, credit loss, capital ratio, PG/LGD shifts

are you more concerned about short term macro shocks or long term drag

C & I portfolio concentration by sector. ex. 20% energy 30% real estate etc.
  ↳ should loans be one bucket or climate-sensitive sector wise

what threshold would make a scenario actionable internally. ex. 2% increase in loss
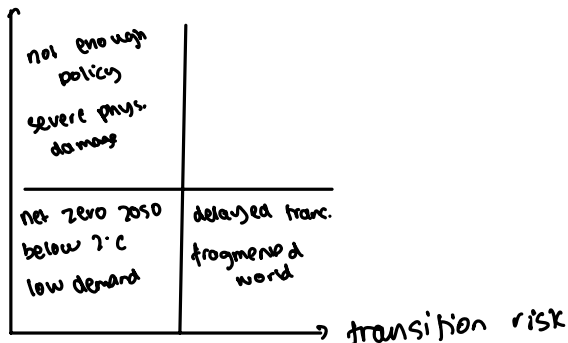
should we benchmark against Fed CCAR

CCAR → fed stress testing framework

  outputs → projected losses, capital buffer impacts, stress horizon

what time horizon is most decision-relevant to you - near term, medium term or long term,

and should we focus on that window or the 2050 horizon

physical risk

not enough policy severe phys. damage	
net zero 2050 below 2°C low demand	delayed tranc. fragmented world

→ transition risk

outline:

step 1: test historical relationship

    loans = f (GDP, unemployment, rates)

step 2: test in/out sample performance

step 3: identify most relevant drivers

step 4: apply NGFS macro paths to selected drivers
    ↳ net zero, below 2°C, delayed transition, current policies

step 5: quantify cumulative loss

proposed structure → evaluate whether NGFS scenario driven macroeconomic paths materially affect commercial credit risk outcomes, specifically charge off rates. begin by estimating historical sensitivity to core macroeconomic drivers. After validating in and out of sample performance, simulate projected credit loss paths under each NGFS scenario. compare cumulative projected loss across scenarios to assess if economically meaningful stress outcomes are produced. We may extend framework to incorporate additional macro drivers such as interest rates

why charge off rates?
    ↳ scale naturally over time
    ↳ statistically cleaner
    ↳ less sensitive to volume fluctuations
    ↳ align with stress testing logic

$$\frac{\text{loans written off}}{\text{total loans outstanding}}$$