Indexing prudential requirements on climate: what impacts can be expected?

Finance for Tomorrow and I4CE Webinar

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Background to the study

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- Debates mainly focused on a risk-based approach
  - Regulation is primarily designed for risks, with a persistent debate on the risk differential between green and brown activities
  - Difficulties in correctly measuring climate risks

  Our study does not position itself as a response to this debate

- Focus of the study : look at the different impacts of these instruments
  - Simulate the application of different GSF and PF
  - Evaluate the impact on the financing of green projects (mobility, energy retroffiting and renewables) and carbon-intensive activities
  - Evaluate the impact on the banks' internal profitability
  - Evaluate the effects of growth and contraction of all credits

Modeling results for the Green Supporting Factor

The effects on bank lending rates of transition projects

- Modeling of 3 values 15%, 25% and 50%

- The GSF applies only to incoming flows

- Very favourable assumption of transferring all the cost reduction from the bank to the client

SCENARIO	Low GSF at 0.85 (15% reduction in prudential requirements)	Moderate GSF at 0.75 (25% reduction in prudential requirements)	High GSF at 0.5 (50% reduction in prudential requirements
INITIAL ANNUAL LOAN RATE	4.41%[2]	4.41%	4.41%
ANNUAL LOAN RATE WITH GSF	4.28%	4.19%	3.97%
PERCENTAGE POINT CHANGE IN ANNUAL RATE	0.13PTS	0.22PTS	0.44PTS

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The effects on bank lending rates of transition projects

- ## Mobility sector
  - Credit parameters: 48 months, 3% interest rate
  - Impact of the GSF = maximum 0.6% decrease in total cost
  - Ex: for the purchase of an electric vehicle at 30 000€, the gain linked to a strong GSF will be 200€.
  - → To be compared to public subsidies (5k to 7k€ in France) and to the electric car cost reduction (2 months)

- ## Energy retroffiting sector
  - Loan parameters: 82 months, interest rate at 3.6%.
  - Impact of the GSF = maximum 0.7% decrease in total cost
  - Ex: for a deep renovation costing 80 000€, the gain linked to the GSF is 600€.
  - → To be compared to public subsidies : on average €10,500 for the higher-income households

The effects on bank lending rates of transition projects

- Renewable energy sector: example of wind power
  - Loan parameters: 15 years, annualized rate of 3.5%.
  - Impact of the GSF = 1% decrease in total cost with a -25% GSF, 2.5% decrease with a -50% GSF
  - Impact is more interesting when maturity is longuer

  But this should be put into perspective in view of the existence of the Infrastructure Supporting Factor, the regulatory and financial risks that exist at the beginning of a project, and the abundance of financing offers when projects are mature

# Effects on the credit growth and bank profitability

- The expected effect of the GSF on loan volumes is uncertain, and even under a favourable assumption, the additional growth in credits (green and generalist) would be very low (around 0.08%/year).

- Despite its low impact on the transition, the GSF is moderately profitable for banks, with a gain of €0.1 to €0.4 billion/year for the entire French banking sector

- The GSF does not particularly encourage the banking sector to adopt a proactive climate strategy. Indeed, in the short term there is no additional remuneration compared to a wait-and-see attitude

The effects on bank profitability

FIGURE 6: ASSUMPTION OF BALANCE SHEET GROWTH STRATEGY: A LIMITED EFFECT ON CREDIT, AND WEAK CORRELATION WITH BANKING SECTOR CLIMATE COMMITMENT
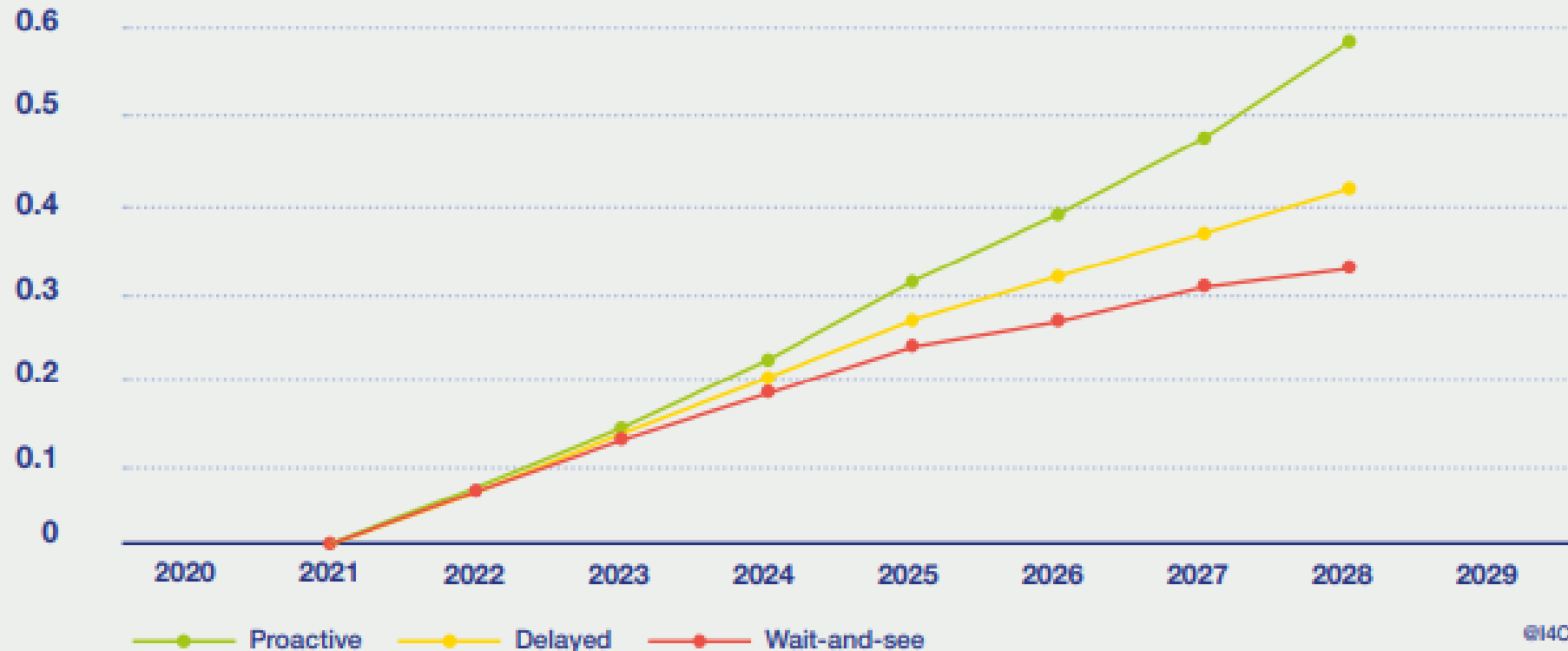
Modeling results for the Penalising Factor

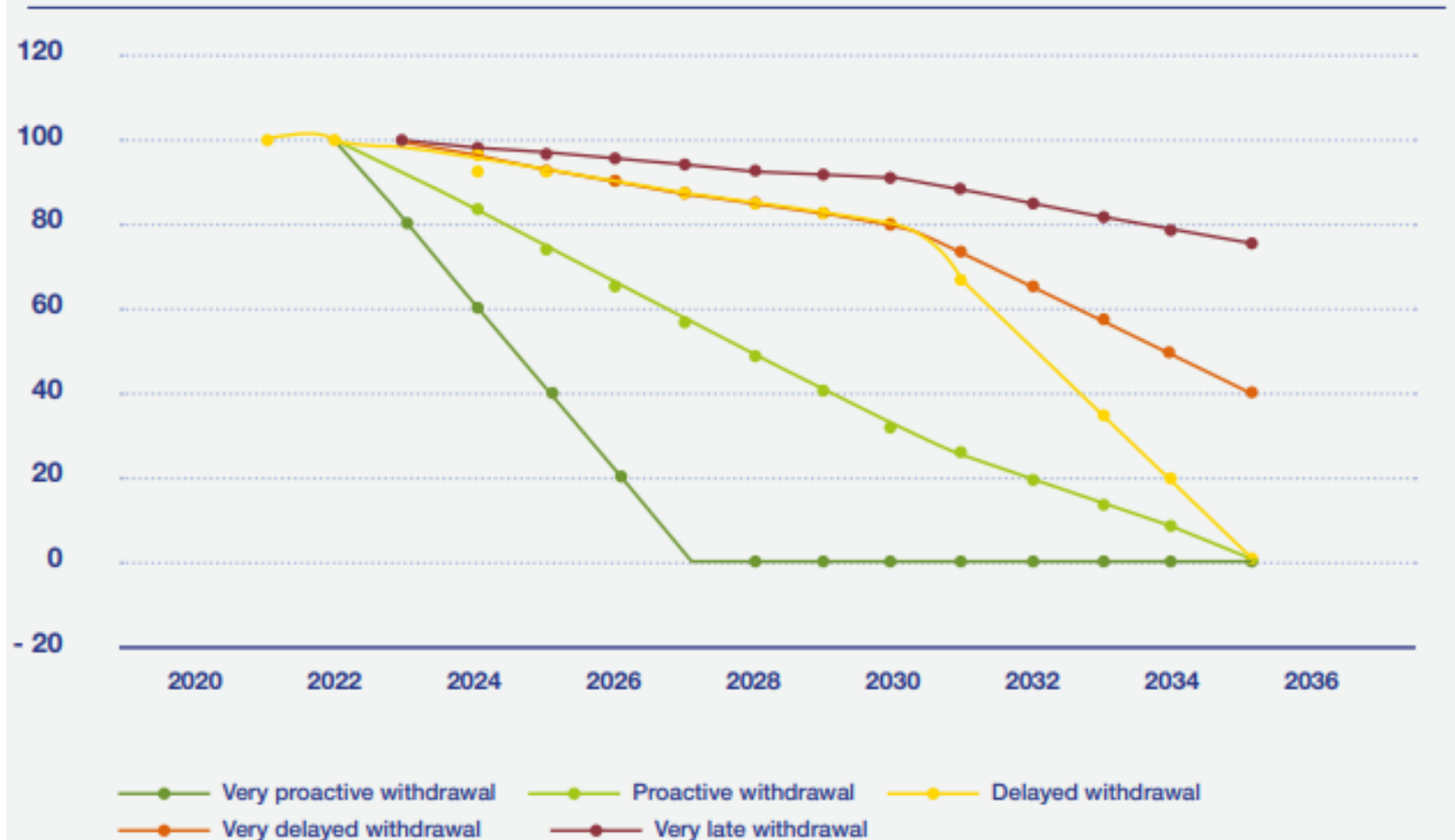# Determining calibration and scope of application

- PF applies to both stocks and inflows

- Assuming that all additional costs are transferred to the customer

SCENARIO	Extreme PF, localised scope	Moderate PF, limited scope	Low PF, broad scope
CALIBRATION	3.5	1.25	1.1
SHARE OF RWAS (CONCERNED BY PF)	0.4%	4%	10%
PLAUSIBLE SCOPE OF SECTORS CONCERNED	Coal	Coal, oil, gas	Coal, oil, gas, cement, petrochemicals, aeronautics, combustion vehicles
INCREASE IN PRUDENTIAL REQUIREMENTS	1%	1%	1%

Modeling the behaviour of banks following PF

- Modeling of 5 exit scenarios

- Not all scenarios are possible depending on the chosen perimeters

FIGURE 12: EVOLUTION OF HARMFUL ACTIVITIES SHARE OF RWAS REBASED TO 100 ACCORDING TO ASSUMPTIONS ON HARMFUL SECTOR WITHDRAWAL

Legend:
- Very proactive withdrawal
- Proactive withdrawal
- Delayed withdrawal
- Very delayed withdrawal
- Very late withdrawal

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Results for PF +250% on a "coal" perimeter

- A strong or even extreme PF (increase in requirements from 100% to 250%) can increase the cost of some projects by about 10%, especially those with a long maturity.

- The entry into force of a PF has an immediate and significant effect on the banking sector, which can either increase its capital or contract its balance sheet.
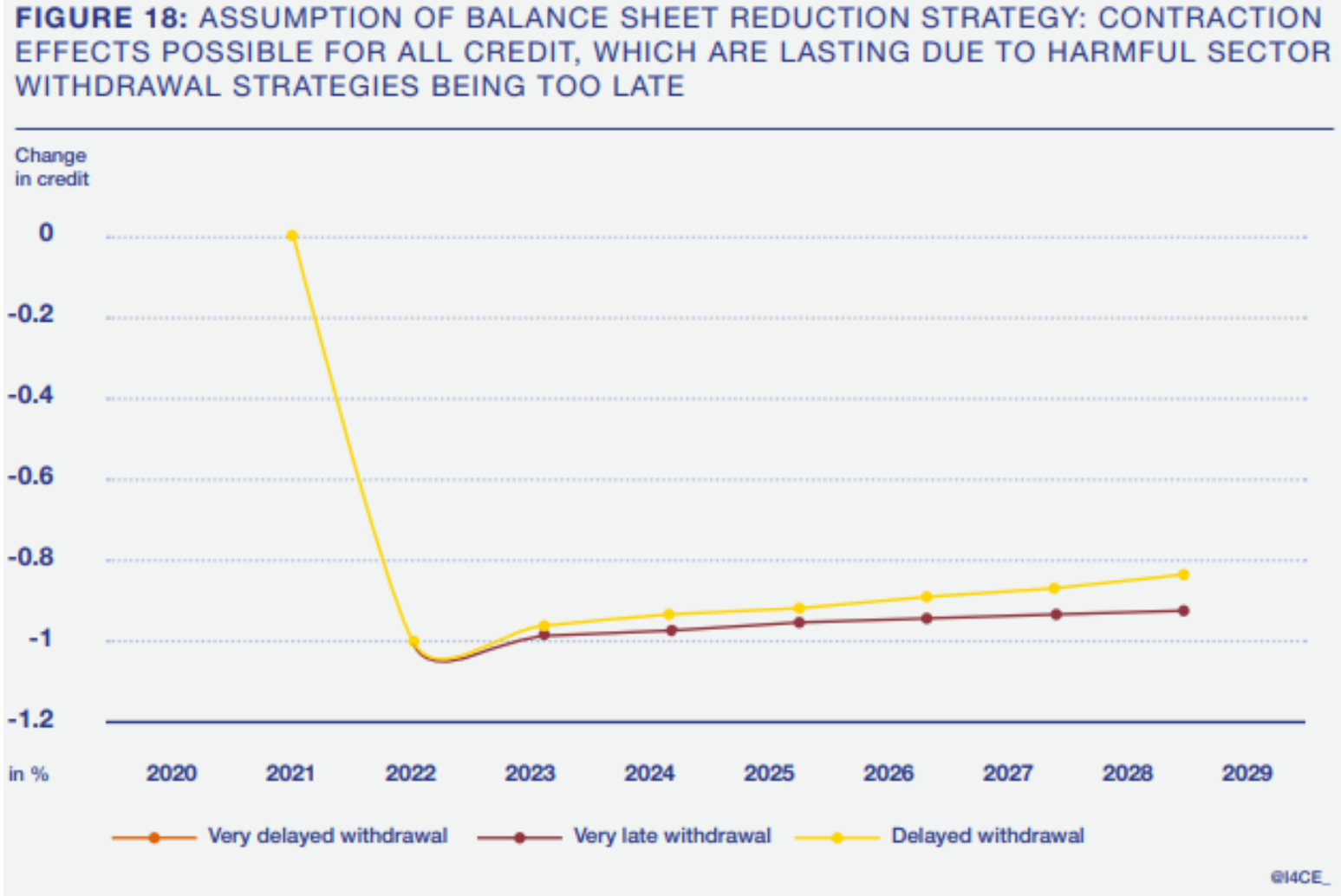
Results for PF +250% on a "coal" perimeter

- Applying an extreme PF on a localised perimeter creates a **strong incentive** and a mobilisation of banks **to quickly exit** the activities concerned, making **the effects on credit transitory and limited.**

FIGURE 14: ASSUMPTION OF BALANCE SHEET REDUCTION STRATEGY: AN IMMEDIATE REDUCTION IN NET INCOME, RECOVERED IN THE CONTEXT OF A VERY PROACTIVE WITHDRAWAL
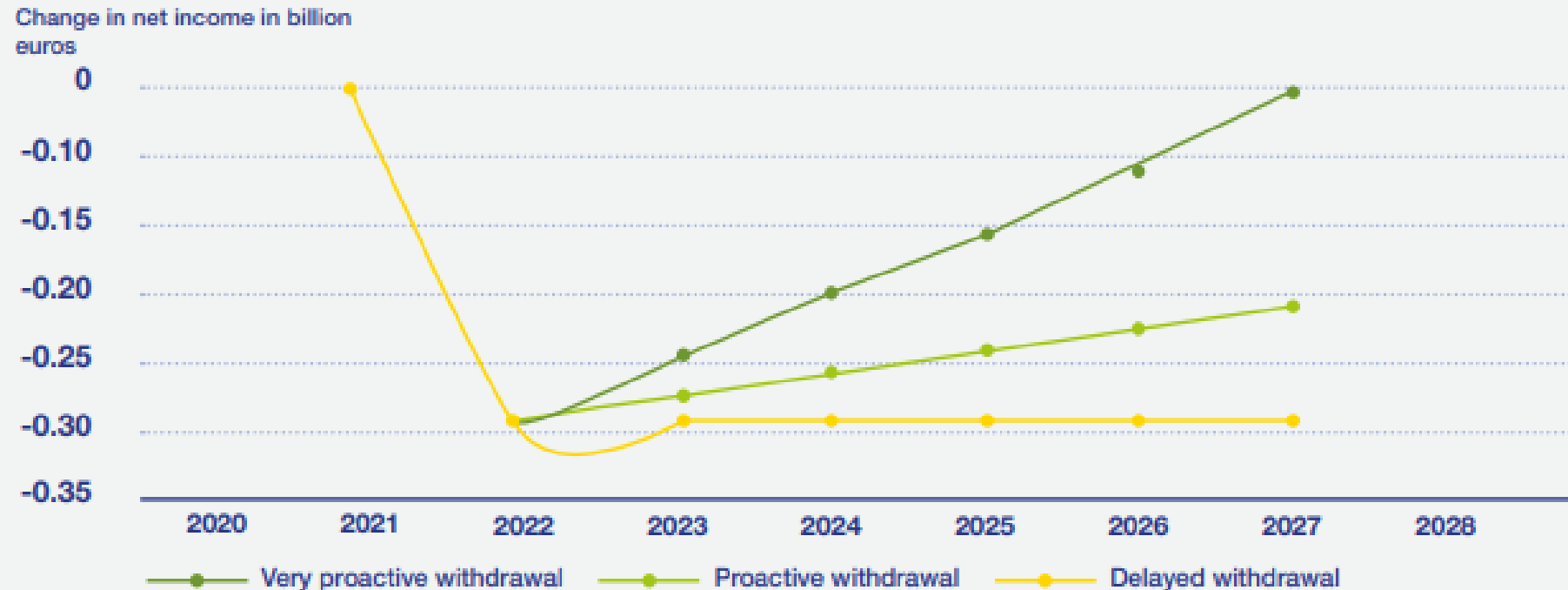
Results for the FPs +25% "fossil fuels" and +10% "fuel-intensive activities"

- The incentive is **diffuse** (weak and on a large number of sectors), the **exit** from carbon-based activities is **longer** to set up

- The contraction of credit is 1% from the first year and in 2028, the **amount outstanding remains 0.8% below** the reference scenario.

- This credit crunch is affecting **all sectors, including the transition sectors**

- The effects of the credit crunch are more lasting over time

FIGURE 18: ASSUMPTION OF BALANCE SHEET REDUCTION STRATEGY: CONTRACTION EFFECTS POSSIBLE FOR ALL CREDIT, WHICH ARE LASTING DUE TO HARMFUL SECTOR WITHDRAWAL STRATEGIES BEING TOO LATE

Results for the PFs +25% "fossil fuels" and +10% "fuel-intensive activities

- If applied widely, the PF could penalise carbon-intensive sectors in transition

- The PF adopts a very static reading of companies and their role in the transition, without analysing the dynamics of transformation.

- If the scheme is limited to fossil fuel producers: the negative effects are limited due to the very specific organisation of the energy sector into subsidiaries.

- On the other hand, in the case of a broad scope, there is a significant risk of penalising the financing of green projects (automobile, aeronautics, cement industry, etc.)

Recommendations

Handle PF with cautious and explore Pillar 2 options

➔ The impact of the GSF is not significant enough to trigger new green projects

➔ A very strong PF can be interesting to accelerate the end of fossil fuels for which we already have a clear exit strategy

➔ However, the PF must be handled with care and restricted to a limited scope to avoid the effects of a credit crunch and penalization of transition companies

➔ It seems more interesting to explore Pillar 2 instruments such as net-zero commitments to 2050 and transition plans for banks

Questions / Answers

Impact assessment of the GSF

Description of the rate model and results for the GSF

The rate model

- ## Objectives:

    1. Propose a model for setting the bank loan rate as a function of tied-up capital
    2. Use the model to determine the impact of a GSF on the level of rates

- ## Methodology:

Calculation of the equity capital raised

Calculation of the expected profit, then of expected GNP

Amount of the loan concerned	Weighted risk factor	Prudential ratio	Equity capital raised
100	0,75	0,08	6

Level of expected ROE	Expected benefit	Profit/GNP ratio	Expected GNP
6,3%	0,126	0,19	1,99

Calculation of the interest rate

Cost of financing	Total cost bank	Expected bank rate
0,93	2,92	2,92%

I4CE – Institute for Climate Economics

The rate model

Methodology:

Calculation within the framework of a GSF

Amount of the loan concerned	Weighted risk factor	Prudential ratio	GSF level	Equity raised without SF
100	0,75	0,08	**0,75**	**4,5**

<u>HYPOTHESIS:</u> bank earnings are deferred into profits for customers **Constant ROE**

- Calculation of the new expected profit, then of new GNP at constant costs

Level of expected ROE	Value of expected profit	Expected GNP
6,3%	0,283	**1,86**

- Calculation of the interest rate at ongoing funding

| Cost of financing	Total cost bank	Expected bank rate
0,93	2,79	**2,79%**

Result of the rate model

Percentage point change in bank lending rates as a function of GSF levels (assuming a transfer of earnings from banks to their customers)

Change in percentage points

- 0,60%
- 0,50%
- 0,40%
- 0,30%
- 0,20%
- 0,10%
- 0,00%

0,51%
0,34%
0,25%
0,25%
0,17%
0,17%
0,15%
0,13%
0,08%
0,08%
0,10%
0,08%
0,04%
0,05%
0,03%

- GSF strong (0.5)
- Low GSF (0.85)
- GSF moderate (0.75)

0   0,5   1   1,5   2

Weighted risk factor (RW) of the asset class (0.5 for low-risk assets including real estate, 1 for loans to healthy companies or households, 1.5 for loans to risky companies or households)
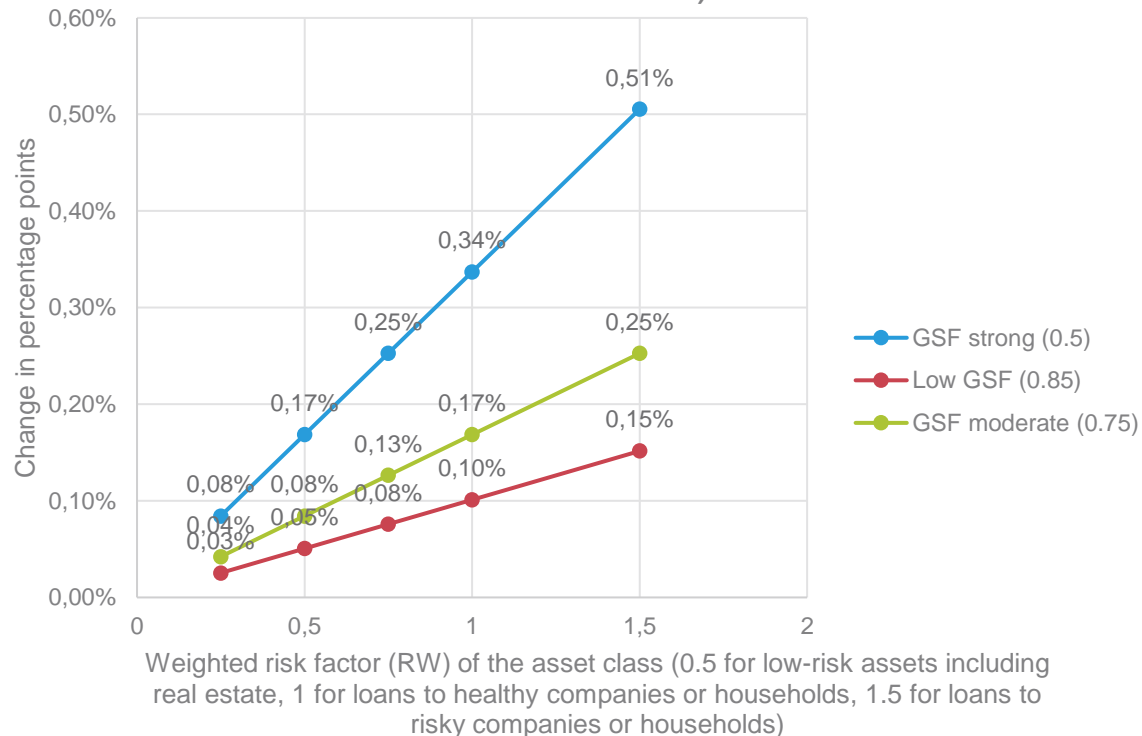
Rate changes of between 0.1 and 0.5 percentage points **on annualised rates**

The riskier the loans, the more they benefit in absolute terms from a rate reduction

Result of the rate model
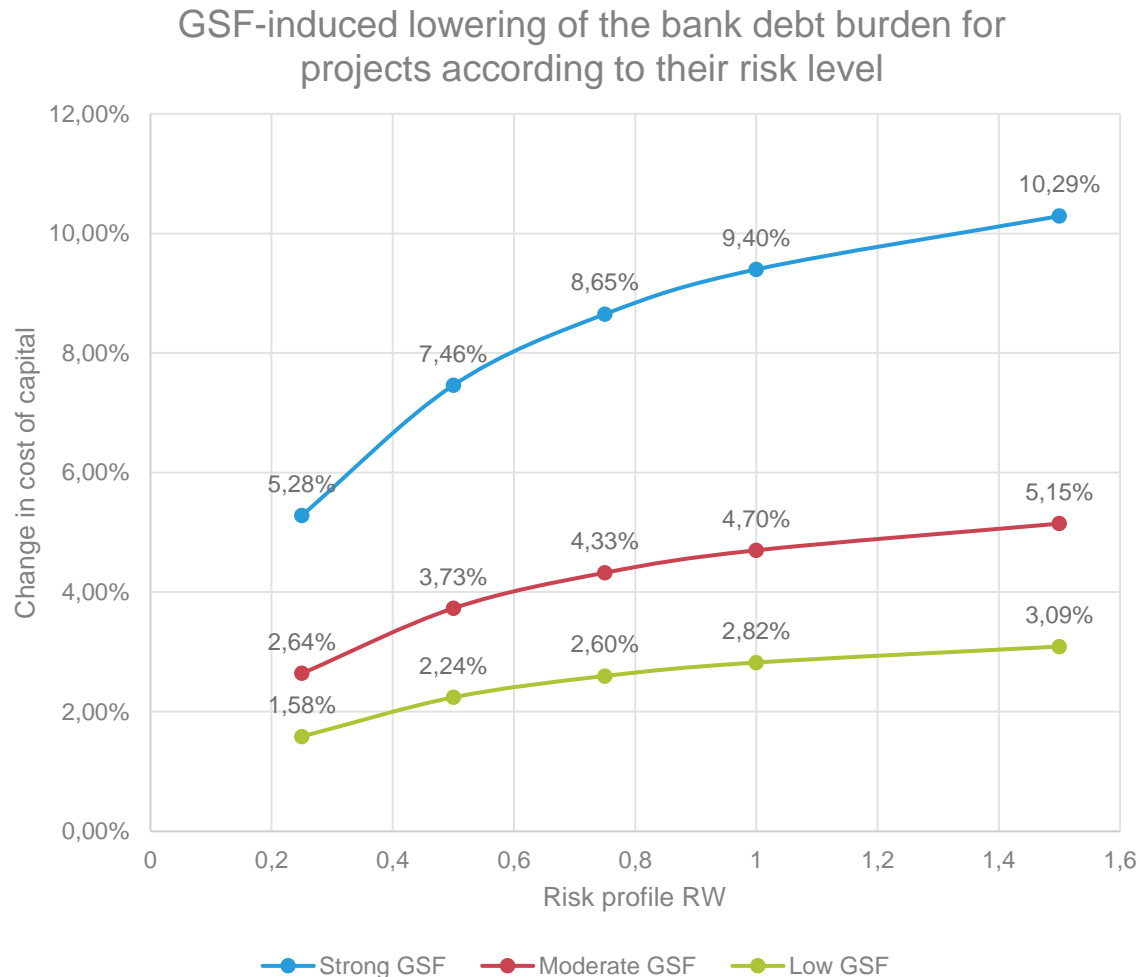
GSF-induced lowering of the bank debt burden for projects according to their risk level

In order to calculate the impact on long-term loans, it is **necessary to reason in proportion.**

A GSF of 0.85 lowers the bank debt burden of a project by **2.82%.**

Impact of the GSF on the transition sectors

Different sectors studied:

- **Energy renovation:** an inadequate tool for the amount of public aid
    - Bank financing reserved for the highest deciles (7-10).
    - A low bank debt burden (7%) in relation to the cost of the project because i) 50% bank financing ii) 8 year maturity
    - A **variation in total cost of 0.2 to 0.7% depending on the level of the GSF** (2-10% of the 7% of the debt burden)
    - For an 80k€ project, a maximum impact of 600€.
    - **State subsidies are 20 times higher** (>10k€)

- **Mobility:** a market too short-term for the GSF to be relevant
    - A market financed by bank debt (1/3 of vehicles financed between 50 and 100% by bank debt)
    - Short to medium term bank debt (average maturity = 4 years)
    - At current interest levels, **the debt burden represents at best 10% of the total project cost**.
    - A **variation in total cost of 0.2 to 1% depending on the level of the GSF** (2-10% of the 10% of the debt burden)
    - For a 40k€ project, a maximum impact of 400€.
    - **Bonus-malus of an amount 10 times higher** (between 4 and 6,000€ for electric vehicles)

Impact of the GSF on the transition sectors

Different sectors studied:

- Energy:
  - 80% of the renewable projects market is financed by bank debt
  - Long-term projects (average maturity=15 years)
  - The **debt burden is therefore significant in proportion (25% of total cost)**
  - A **variation in total cost of 0.5% to 2.5% depending on the level of the GSF**. (2-10% of the 25% of the debt burden)

  - BUT
    - A prudential tool already exists (ISF at 0.75)
    - The financing gap relates to assets under exploration or under construction, not to completed projects
    - These projects are more risky (regulatory risk, local opposition, etc.)
    - The **FRG does not reduce the risk of these unsuccessful projects**, and therefore does not fill this gap
    - **The GSF, added to the ISF, would further tighten the financing offer for completed projects** => risk of overvaluation

  - SO
    - Keep the ISF, but green it (adapt criterion 1(o) of article 501 of the CRR and ask for eligibility to the green taxonomy, in addition to the current environmental assessment)

Impact assessment of the GSF

Analysis and impact for banks

The impact model for banks

- Objectives:
  1. Propose a model to assess the impact of the GSF on banks
  2. Use the model to determine the predicted effect of an GSF on credit
  3. Use the model to determine the gain to the banking system from an GSF

- Methodology:
  - Construction of a base scenario (same as PF)
  - Definition of banking strategies in case of GSF
  - Elaboration of climate scenarios
  - Analysis of the results of the simulations compared to the baseline scenario

# Definition of banking strategies in case of GSF

- Definition of banking strategies in case of GSF
  - Less recapitalization strategy:
    - Bank balance sheet constant compared to the trend
    - RWA/Balance sheet ratio reduced in proportion to the eligible green share in the portfolio
    - RWAs and CET1 capital are lower in trend
    - **The bank uses the GSF to grow at its trend level, without having to recapitalize as much**.

  - Balance sheet growth strategy:
    - CET1 capital and RWA are constant and equal to the trend
    - The RWA/Balance Sheet ratio is reduced in proportion to the eligible green share in the portfolio
    - The bank balance sheet is up compared to the trend
    - **The bank uses the GSF to grow above its trend level, and reinvests the capital freed up by lower prudential requirements.**

  - We model these strategies in the "constant ROE" framework, i.e. the bank passes on the gains to its customers, and in the "increased ROE" framework, i.e. the bank absorbs the gains

Scenarios for the evolution of green investments

- Hypothesis:
    - The GSF is applied **to incoming flows in 2022** (flows from 01/01/2022 are taken into account and the RWAs for the year 2022 are thus reduced)
    - The **green share of incoming flows is estimated at 2%.**
    - The **balance sheet renewal rate is set at 12%.**

- Voluntary scenario:
    - The French banking system is committed to the climate, and **green banking investments are growing by 20%/year** (the rate required to comply with the SNBC)

- Strategy 5 years late:
    - The French banking system is committed to the climate, but lacks ambition. **Growth in green banking investments of 10%/year** (at this rate, the 2028 investment values will correspond to the 2023 SNBC objectives)

- Strategy no effort
    - The French banking system is not involved in the climate. **Growth of green banking investments at the same rate as the trend growth of the balance sheet, i.e. 3%/year.**

Simulation of the evolution of the green share in the portfolio

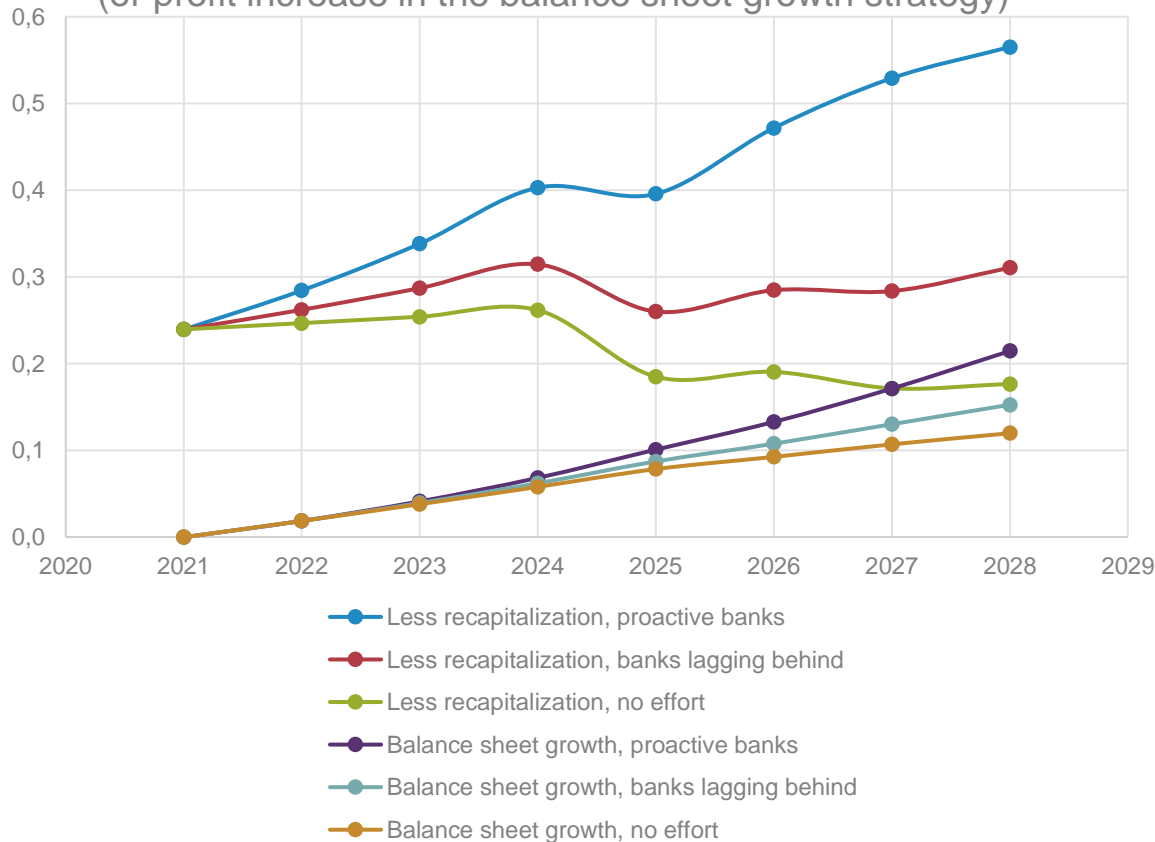Green share in portfolio (or Decrease in requirements = $(1-GSF)*X\%$)

Voluntary scenario — Scenario 5 years delay — Effortless Scenario
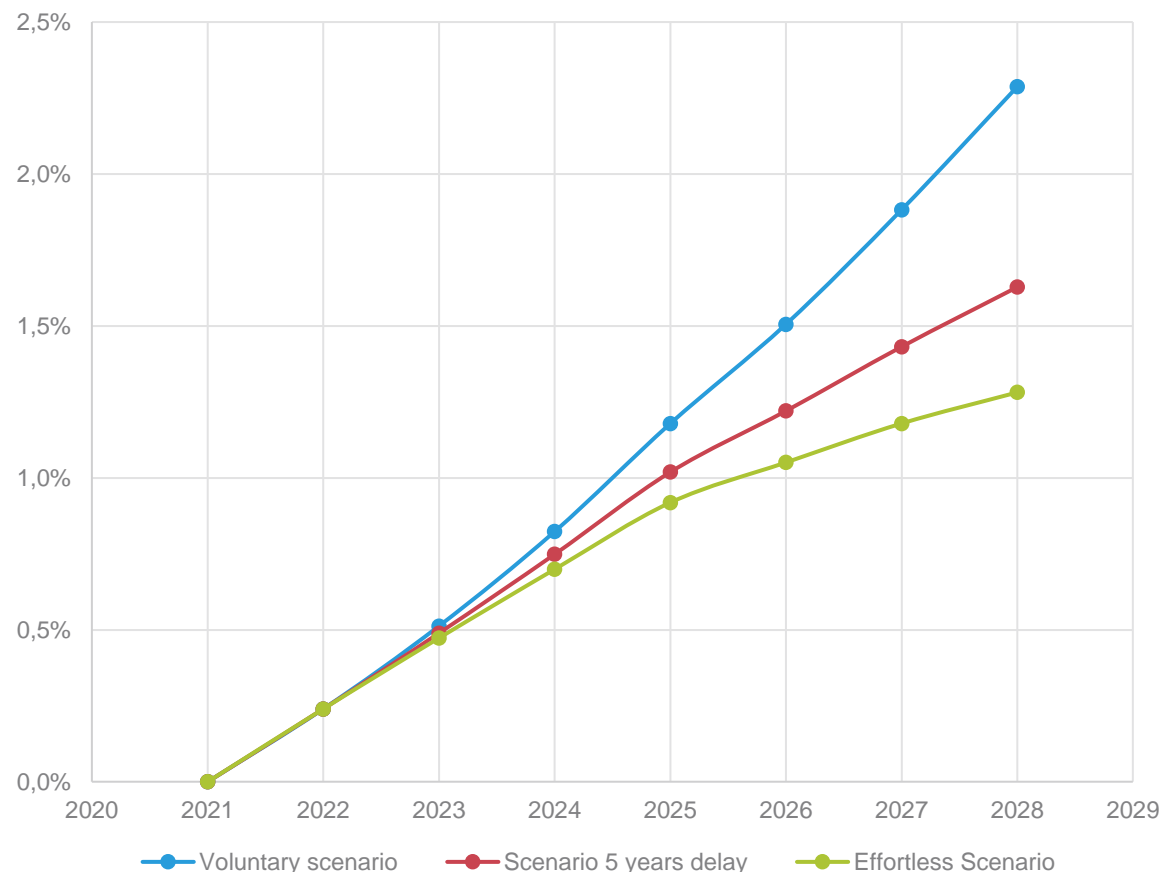
Applying a GSF on incoming flows **makes the impact gradual and later**.

It is necessary to **wait until 2025 to exceed 1%**, whereas at that time the green share of inflows is 3.2% in the voluntarist scenario.

Prudential requirements lowered **from 0.3% to 0.5% by 2028 if GSF at 0.75**. (to be linked to the immediate 1% of EMS SF)

Simulation for GSF at 0.75 and ROE+.

Paid-up capital for shareholders per year per decrease in recapitalization requirements (or profit increase in the balance sheet growth strategy)

- Less recapitalization, proactive banks
- Less recapitalization, banks lagging behind
- Less recapitalization, no effort
- Balance sheet growth, proactive banks
- Balance sheet growth, banks lagging behind
- Balance sheet growth, no effort

Possibility of releasing capital in the short term and distributing it to shareholders (**for 1% of annual net income**)

Possibility to reinvest this capital but the gain is long term **(0.3% of net income over 2022-2028, weighted by 2028)**
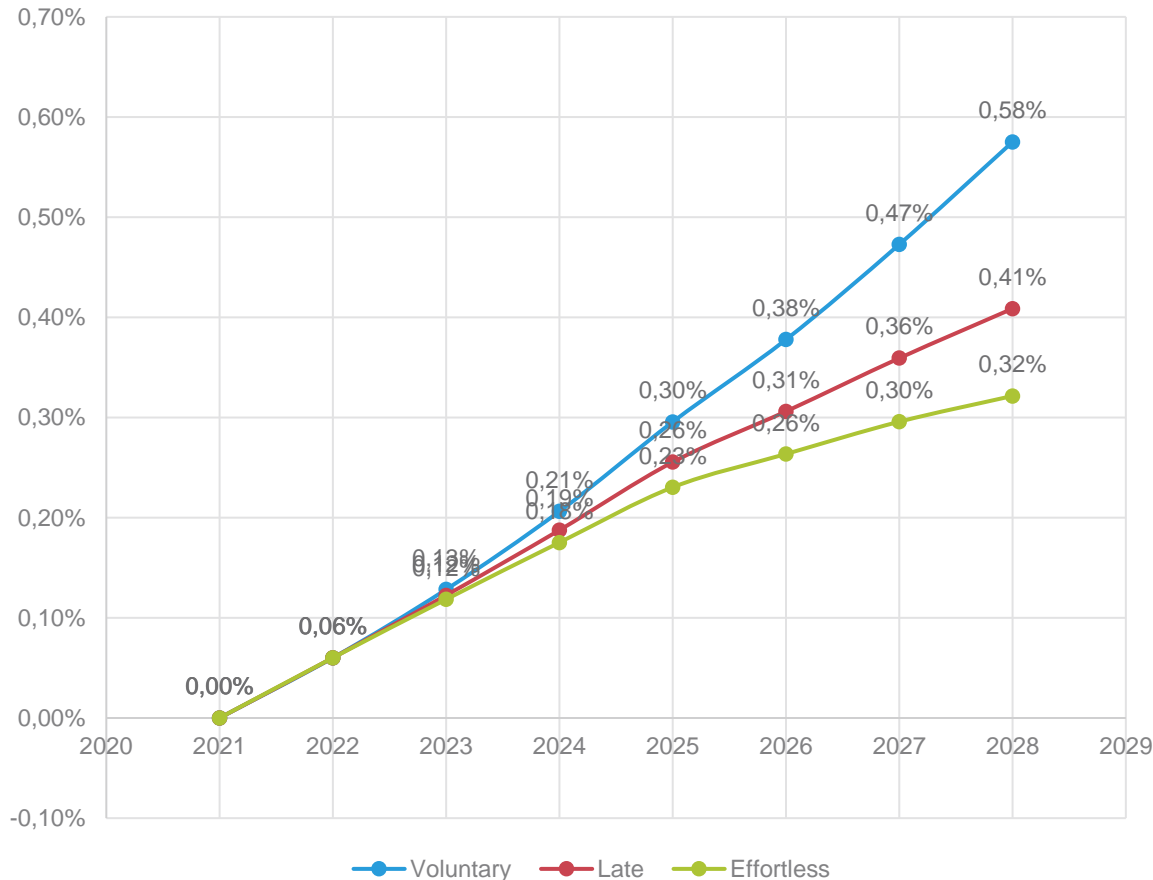
Even with no effort, the banking system is rewarded (almost 50% of the voluntary gain)

The gap widens in 2028 and beyond => **incentive to be proactive in the long term when immediate investment is needed.**

Impact on credit

Balance sheet surplus compared to the base case balance sheet

Only the balance sheet growth strategy **allows for a credit surplus.**

It is a strategy that has advantages only in the long term => will it be the most chosen?

Limited reduction in requirements => **even in the best scenario, limited effect on credit (0.6% is 2 months of growth at 3%).**

Conclusion: We should not expect the GSF to have an effect on credit, compatible with the magnitude of the transition needs (+20%/year of green bank investments

PF impact assessment

Description of the rate model and results for the PF

The rate model

Objectives:

1. Propose a model for setting the bank loan rate as a function of tied-up capital
2. Use the model to determine the impact of a PF on rate levels

- ## Methodology:

  - Calculation of the equity capital raised

  - Calculation of the expected profit, the of expected GNP

  - Calculation of the interest rate

Amount of the loan concerned	Weighted risk factor	Prudential ratio	Equity capital raised
100	0,75	0,08	6

Level of expected ROE	Expected benefit	Profit/GNP ratio	Expected GNP
6,3%	0,126	0,19	1,99

Cost of financing	Total cost bank	Expected bank rate
0,93	2,92	2,92%

The rate model

Methodology:

- Calculation in the context of a PF

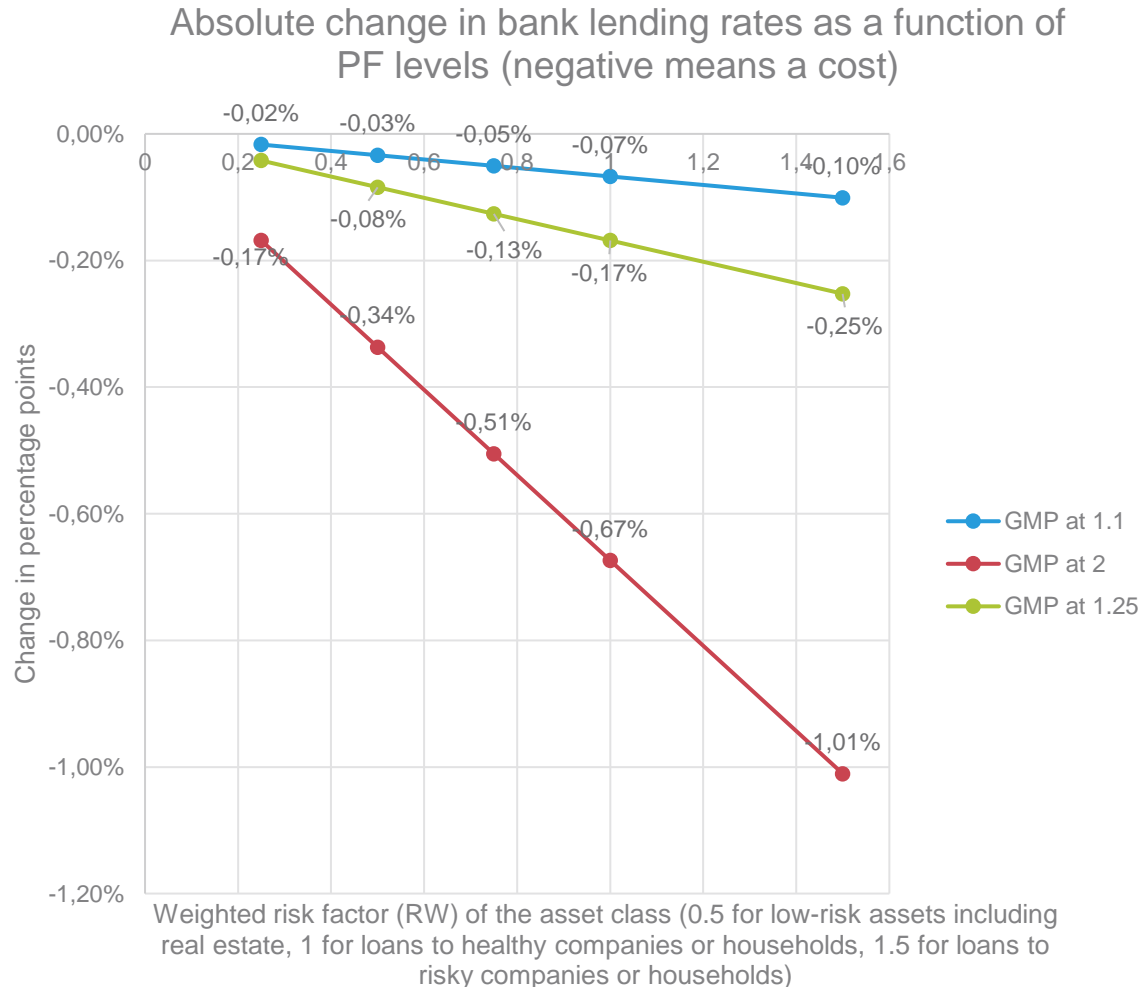| Amount of the loan concerned	Weighted risk factor	Prudential ratio	PF level	Equity raised without SF
100	0,75	0,08	**1,25**	**7,5**

- <u>HYPOTHESIS:</u> banking costs are passed on to customers **constant ROE**

- Calculation of the new expected profit, then of new GNP at constant costs

Level of expected ROE	Value of expected profit	Expected GNP
6,3%	0,472	**2,11**

- Calculation of the interest rate at ongoing funding

Cost of financing	Total cost bank	Expected bank rate
0,93	3,05	**3,05%**

Result of the rate model

Absolute change in bank lending rates as a function of PF levels (negative means a cost)
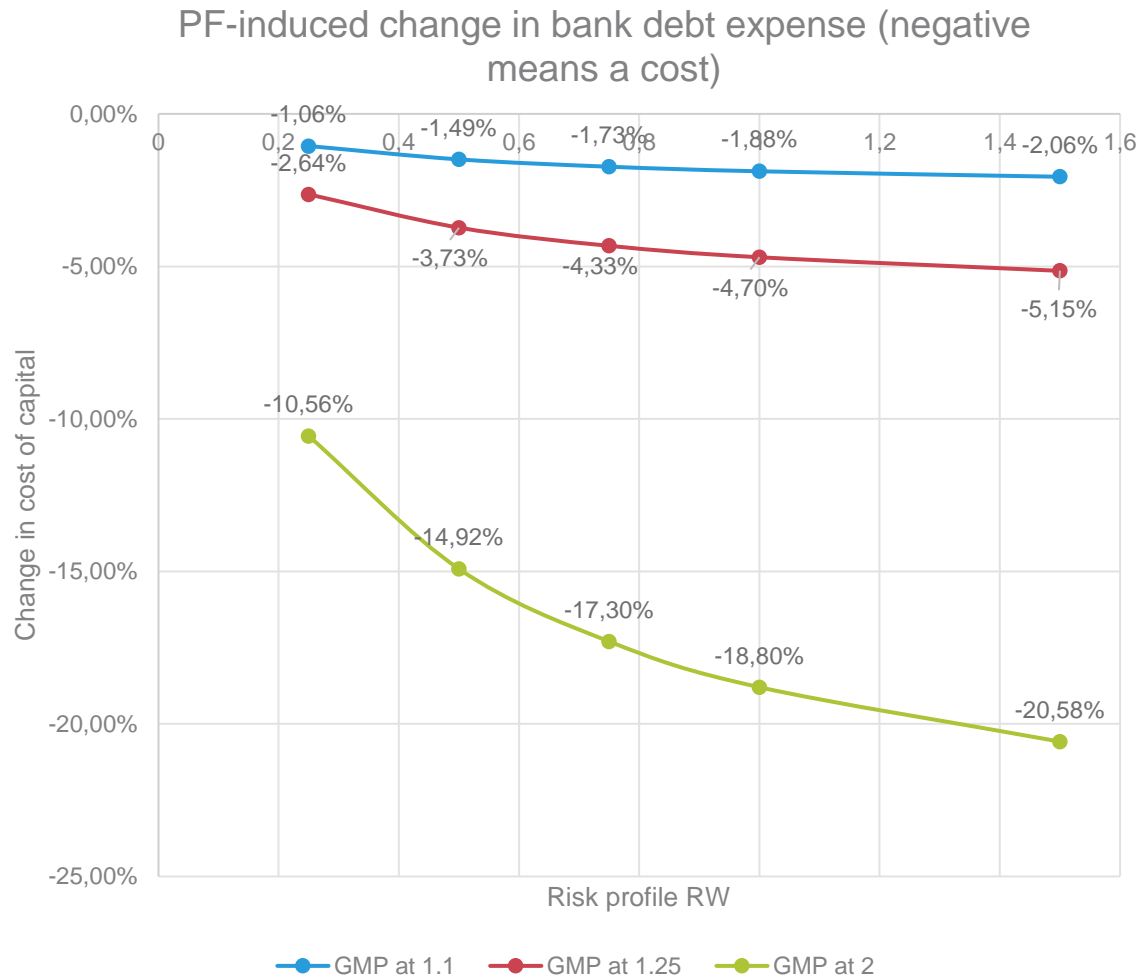
Rate changes between 0.1 and 1 percentage point **on annualized rates**

The more capital-intensive the loans, the more they are affected by an increase in the rate in absolute terms

Result of the rate model

PF-induced change in bank debt expense (negative means a cost)

In order to calculate the impact on long-term loans, it **is necessary to reason in proportion.**

A PF of 1.25 increases the bank debt burden of a project by **5.15%.**

The final impact depends on the weight of the bank debt burden in the total cost of the project.

The curve is not linear since the financing rates are constant, regardless of the risk profile.

Result of the rate model

Variation for RW=1

$y = -0.188(x-1)$
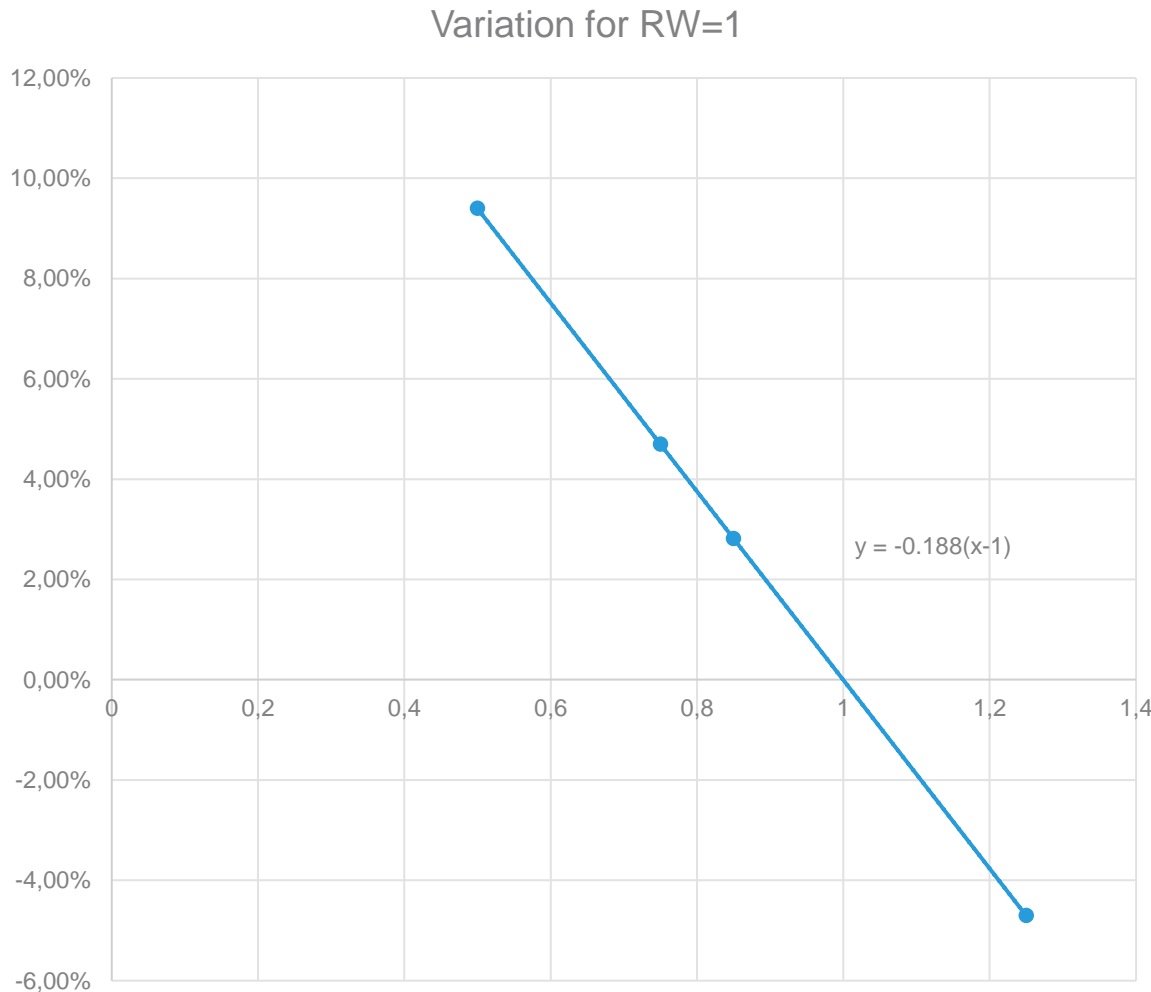
At RW=1, we have an elasticity of 0.188

1% decrease in prudential requirements => 0.19% decrease in proportion to the bank rate.

Example: a GSF of 0.75 leads to a 25% reduction in requirements, i.e. 25x0.188=4.7% reduction in the bank rate

PF impact assessment

Analysis and impact of PF on the banking system

The impact model for banks

- Objectives:
  1. Propose a model to assess the impact of the PF on banks according to i) calibration ii) scope of application
  2. Use the model to determine the predicted effect of a PF on credit
  3. Use the model to determine the losses to the banking system due to the PF

- Methodology:
  - Construction of a basic scenario
  - Definition of PF implementation procedures
  - Definition of banking strategies in case of PF
  - Elaboration of exit scenarios
  - Analysis of the results of the simulations compared to the baseline scenario

Construction of the base scenario

- Study on the 6 major French banking groups
- Construction of the scenario from the 2019 aggregate data (ACPR), before the health crisis
- Scenario assumptions:
  - The aggregate bank balance sheet tends to grow at a given rate on entry (here 3%/year)
  - The ratios NBI/Balance Sheet (2.15%), Results/NBI (0.19), RWA/Balance Sheet (0.34), CET1/RWA (14.4%), are fixed constant during the simulation and equal to their value in 2019 (see parenthesis)

- The baseline scenario provides data on changes in **the balance sheet, NBI, earnings, RWAs and CET1 capital**

# Definition of banking strategies in case of PF

- Recapitalization strategy :
    - Bank balance sheet constant compared to the trend
    - RWA/Balance sheet ratio increased in proportion to the eligible gross share in the portfolio
    - RWA and CET1 capital are higher in trend
    - **The bank adapts to the PF by recapitalising to maintain its balance sheet level.**

- Balance sheet contraction strategy:
    - CET1 capital and RWA are constant and equal to the trend
    - The RWA/Balance Sheet ratio is increased in proportion to the eligible gross portion in the portfolio
    - The bank balance sheet is down compared to the trend
    - **The bank adapts to the GFC by reducing its balance sheet so as not to have to recapitalise heavily => credit contraction**

Definition of PF implementation procedures

– No brown taxonomy => theoretical freedom regarding i) calibration ii) scope of application

– For comparison purposes, all scenarios are for a **1% increase in prudential requirements.**

– It is assumed that the RWA/Balance sheet ratio is representative for the portfolios studied, i.e. coal=0.4% of assets, => coal=0.4% of RWA.

– **In all scenarios, the PF applies in 2022 to the stock of eligible assets**

– Strong PF scenario but localized on coal
  – PF set at 3.5
  – Coal perimeter set at 0.4% of assets (source ACPR-AMF)

– Moderate PF scenario on fossil perimeter
  – PF set at 1.25
  – Fossil perimeter set at 4% (estimated gas+oil exposure)

– Low but extended PF scenario
  – PF set at 1.1
  – Fossil perimeter set at 10% (brown and derivative activities including aeronautics, thermal automobiles, etc.)

Elaboration of exit scenarios

Gross portfolio share according to exit strategies from 2021 to 2035 (illustration with values for the coal scenario on the ordinate)
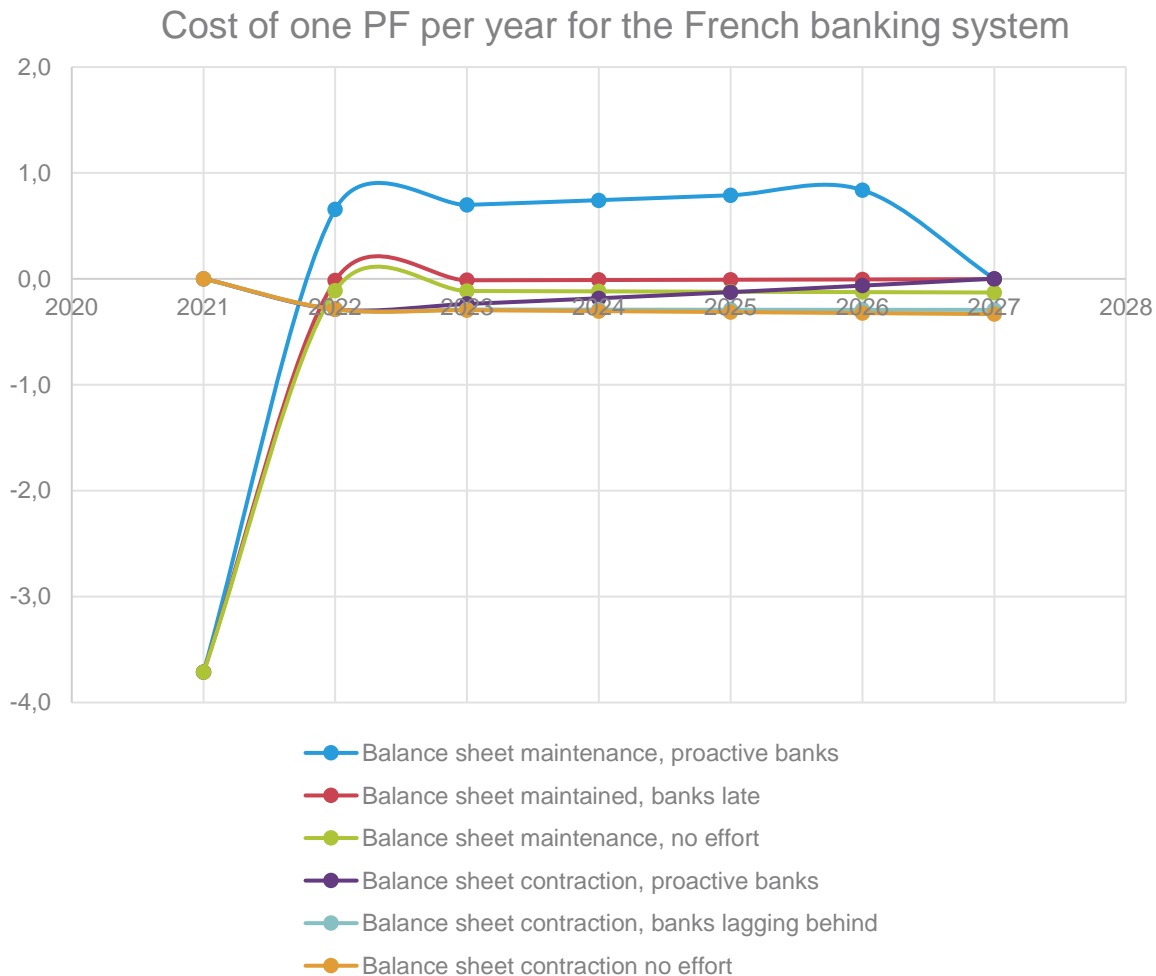

Voluntary exit — Delayed exit — No output
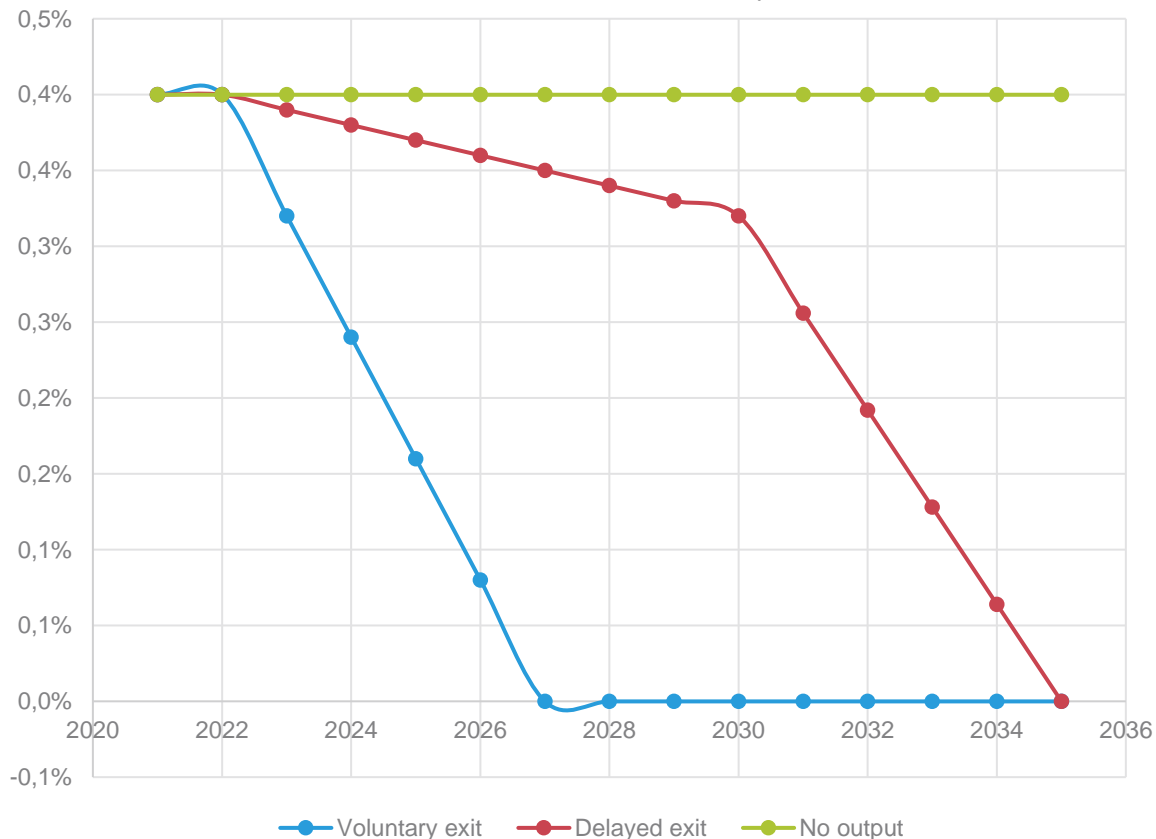
The variable that dictates the behavior of the model is the output rate. We have modeled 3 of them here:

1) **Voluntary exit at 100% in 2027**
2) **Exit 5 years late in 2035 with a** 20% reduction target for 2030
3) **No exit**

These exit scenarios are more or less realistic depending on the size of the portfolio eligible for PF. => choose as **input variable**

# Financial impact of the PF on the banking system

Cost of one PF per year for the French banking system

- Balance sheet maintenance, proactive banks
- Balance sheet maintained, banks late
- Balance sheet maintenance, no effort
- Balance sheet contraction, proactive banks
- Balance sheet contraction, banks lagging behind
- Balance sheet contraction no effort

The 1% increase in requirements is immediate. Effective as early as 2021, as the banks are setting aside 2021 capital for 2022.

Two consequences:
- **banks recapitalize €3.7bn at the end of 2021**(12% of net income, 1% of current capital). **Banks are squeezing credit** (strategy of less recapitalization)

Effect on the credit

Effect on credit of a PF in the context of specific bank behaviour
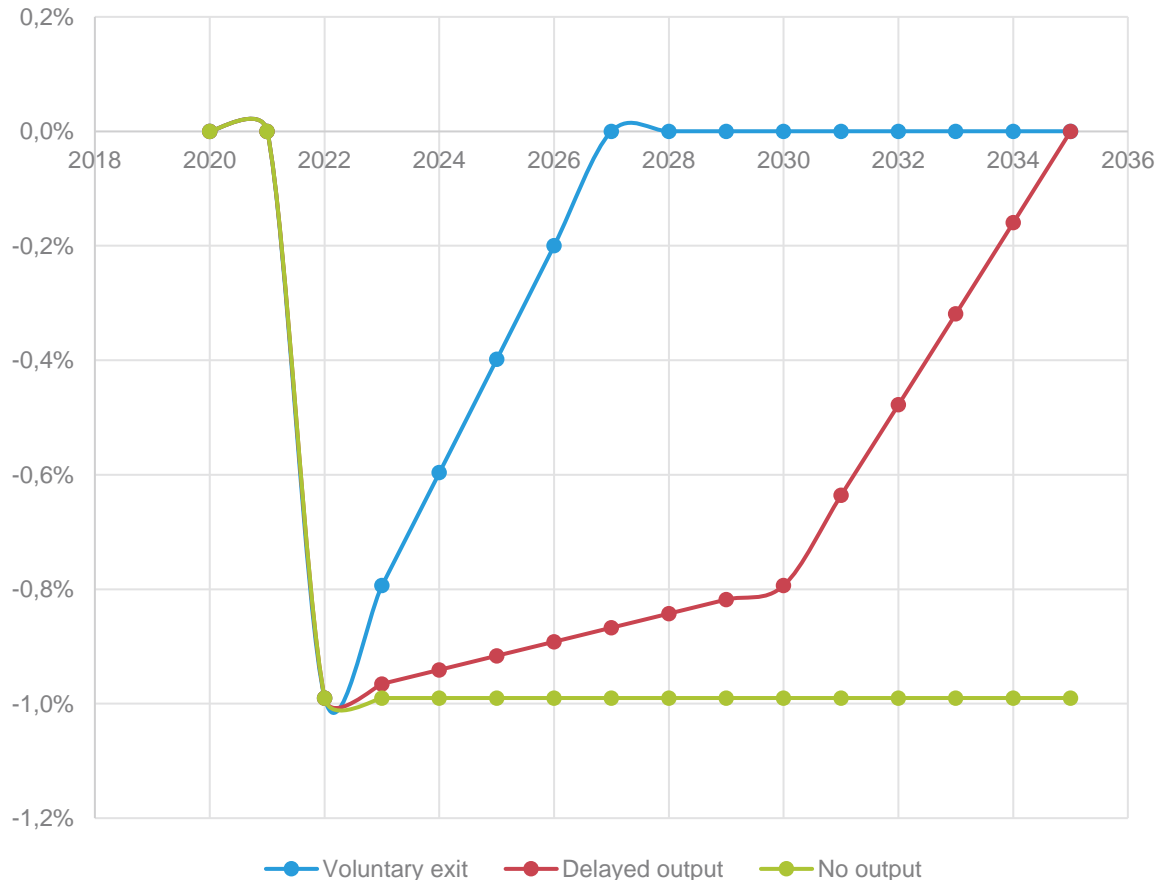
In the case of banks that do not wish to recapitalise, the contraction of credit relative to trend is immediate: **-1% of balance sheet vs. trend**

If quick exit, then effects can quickly fade.

=> Argues (impact level) for a strong but localized PF, which really encourages exit when possible.

Thank you for your attention!