



Finance Watch

Making finance serve society


A safer transition for fossil banking

Quantifying the additional capital needed to
reflect the higher risks of fossil fuel exposures

A Finance Watch report



October 2022



“Over \$1 trillion of oil & gas assets risk becoming stranded as a result of policy action on climate and the rise in alternative energy sources.”

Carbon Tracker International, June 2022¹

“An insufficiently orderly transition to a green economy may translate into significant losses for the banking sector on exposures related to high-emission firms and to exposures vulnerable to climate hazards.”

ECB/ESRB, July 2022²

“Current capital buffers do not capture climate-related financial risks owing to underlying risk weights that do not yet reflect climate-related risks to the full extent.”

ECB, October 2021³

Authors: Greg Ford, Julia Symon, Christian Nicol, Laurent Dicale

Editor: Thierry Philipponnat

Acknowledgements: We are grateful to the members of the expert working group for drawing on their extensive backgrounds in central banking, commercial banking, academia and policy to contribute to the methodology used in this report. We are also grateful to Finance Watch members and staff for their invaluable inputs to the study.

Special thanks to Mahesh Roy, Hugh Miller, Hugues Chenet, Pierre Monnin and Agnieszka Smolenska for their insights and to Riley Yung, Pierre Jacques, Guillaume Kerlero de Rosbo, Valentin Frey, Quentin Fornezzo, Clotilde Naulet, Riwan Driouich and Tiphaine Langlois who carried out research in addition to the authors. All errors and omissions are the responsibility of the authors.

Cover photo: ... / Adobe Stock

Graphics and typeset: Camila Dubois.

© Finance Watch 2022

The contents of this report may be freely used or reproduced without permission provided the original meaning and context are not altered in any way. Where third party copyright has been acknowledged, permission must be sought from the third party directly. For enquiries relating to this report, please email contact@finance-watch.org.

Finance Watch has received funding from the European Union to implement its work programme. There is no implied endorsement by the EU or the European Commission of Finance Watch's work, which remains the sole responsibility of Finance Watch.



Co-funded by
the European Union

Contents

Executive summary	4
1. Introduction	5
2. Results of the study	8
2.1. Stock of fossil fuel exposures on bank balance sheets	8
2.2. Additional equity required to apply a 150% risk weight	10
2.3. “Implicit subsidy” to fossil fuel borrowers	13
3. Notes on implementation of the proposed capital requirements	15
4. Conclusion	18
Methodology	19
Bibliography	26
Endnotes	29

Executive summary

Bank supervisors have recognised the increasing financial stability risks resulting from climate change and warn of possible devastating losses from a disorderly transition. As fossil fuels are the main contributors to accelerating climate change and many of the assets associated with the fossil fuel industry will need to be abandoned before the end of their economic life (stranded) to achieve the transition to a carbon-neutral economy, banks' exposures to fossil fuel assets should be a matter of priority for prudential regulation. Estimating the risks of potential losses and designing appropriate rules to manage them is a key focus for prudential authorities around the globe.

Finance Watch estimates that the 60 largest global banks have around \$1.35 trillion of credit exposures to fossil fuel assets. At the moment, the climate-related risks associated with these assets are not reflected in bank capital rules to make sure that banks can cover future losses.

Applying a 150% risk weight – the risk weight applicable for higher risk assets under the Basel framework – to banks' existing fossil fuel assets globally as a Pillar 1 capital measure, would be an important first step in cushioning banks against future financial losses on these exposures, an idea that legislators are beginning to explore. We estimate that for the 60 banks in our sample, this measure would require additional capital in the range \$157.0 billion to \$210.2 billion, equivalent on average to around three to five months of banks' 2021 net income.

This evidence suggests that increasing capital requirements for fossil fuel exposures in this way can be achieved without a reduction in lending capacity, which is important in the context of the sustainable transition. Finance Watch shows that the required capital gap can be feasibly bridged by retaining profits over short periods of time and supervisors should work with banks to establish plans to do so over a suitable timeframe. This would ensure that an identifiable category of risk is addressed in a timely way and is well managed from a systemic perspective.

The current practice of not treating banks' fossil fuel exposures as higher risk assets under the Basel framework not only encourages the continued build-up of prudential risk, but is also effectively a subsidy from banks to the fossil fuel industry, which we estimate to be worth around \$18 billion a year, equivalent to under-pricing the credit risk by 1.3%.

1. Introduction

Financing provided to the fossil fuel sector is associated with considerable climate-related risks but prudential capital rules for financial institutions acting as finance providers have not yet adapted to reflect these risks. This report looks at the banking sector and presents a quantitative estimate of the potential capital increase required to reflect the higher risk nature of these assets. Specifically, we estimate the additional capital that would be needed by the world's 60 largest banks if prudential regulators were to classify banks' exposures to existing fossil fuel assets, i.e. resources and reserves that are already explored and known, as "*higher risk*" from the **credit risk** perspective, under Pillar 1 of the Basel 3 framework for the prudential regulation of banks and apply a 150% risk weight.

We conclude that the additional capital required for such a reclassification would be relatively modest; for most large global banks, it would be the equivalent of retaining no more than three to five months' worth of earnings, and in many cases considerably less. Precedent suggests this would be manageable without a reduction in bank lending; larger capital increases were achieved following the post-financial crisis reforms mostly by means of retaining earnings.⁴

Policymakers in various jurisdictions are investigating how to integrate climate-related risks into bank prudential frameworks. Several consultations have taken place recently on this issue,⁵ with possible approaches including:

- applying Pillar 1 capital measures such as, for example, sectoral risk weights and systemic risk buffers based on banks' fossil fuel exposures, supplemented as needed by Pillar 2 and 3 measures to gradually enhance banks' own risk measurement and management capabilities, enhance transparency via disclosure requirements and include banks' climate



risk management practices in the supervisory review process;

- using a “softer” combination of only Pillar 2 and 3 measures that would leave Pillar 1 capital levels (applicable for all) on fossil fuel assets fundamentally unchanged and a significant degree of discretion over risk management practices to individual banks. In this case, supervisors’ roles would be to provide mostly principles-based guidance and to opine on the adequacy of banks’ practices and need for any supervisory capital additions on a case-by-case basis.

Finance Watch and many other organisations advocate for the first of these approaches for prudential reasons, specifically a sectoral capital requirement for exposures to existing fossil fuel resources.⁶ Legislative proposals for measures along these lines have recently been made in two jurisdictions.⁷

Pillar 1 of the Basel framework requires higher risk exposures to have a minimum risk weight of 150%, which national authorities can adjust further as necessary.⁸ With the increasing risk that fossil fuel assets will become stranded,⁹ together with the contribution of these assets to climate change and therefore to systemic financial risk,¹⁰ there is a strong prudential case for categorising fossil fuel assets as higher risk and so for taking an approach that includes Pillar 1 capital measures, as provided under the Basel framework.

The legal and prudential reasons for this approach have been clearly set out already (see box below, ‘Background to the Proposal’).¹¹ However, the practical implications – including the impact on banks – have not been estimated as far as we are aware. This report seeks to fill that gap by providing quantitative data that can help policymakers to weigh the impact of a Pillar 1 approach and consider how best to implement it.

The estimates in this report use public data which, due to the lack of sufficiently detailed and harmonised disclosure rules at the time this research was conducted, have been interpreted using a number of cautious assumptions. Researchers at central banks with access to supervisory data would be able to produce a more accurate and comprehensive estimate.¹² Our methodology has been developed with the assistance of an expert advisory group and is outlined below along with our data sources and assumptions.

As well as an estimate of the additional capital required, the research has produced two other interesting outputs: an estimate of the stock of fossil fuel exposures on global banks’ balance sheets as at the end of 2021, and the “implicit funding subsidy” that fossil fuel companies enjoy as a result of the under-capitalisation of climate-related risks, and thus under-pricing, of bank lending to the fossil fuel sector.

The rest of the report presents the results of the study, a commentary on how the 150% risk weights could be implemented, a brief conclusion, and a note of the methodology.

Background to the proposal

Finance Watch first called on regulators in July 2020 to adjust capital requirements by applying higher sectoral credit risk weights to banks' fossil fuel exposures, in a report entitled "Breaking the climate-finance doom loop". This landmark report explained why backward-looking risk models cannot account for banks' climate-related financial risks, which are forward-looking and radically uncertain. It described the feedback mechanism between these risks and banks' own lending for fossil fuel activities, the so-called "climate-finance doom loop", which reflects the 'double materiality' of climate-related risks. The report called for two prudential measures under the Pillar 1 of prudential regulation to break this climate-finance doom loop:

- a minimum 150% risk weight ('higher risk' treatment) for bank exposures to activities related to existing (i.e. already explored) fossil fuel reserves (the subject of this report), and
- a 1,250% risk weight that equates to full equity funding (the so-called 'one-for-one' rule) on bank exposures to activities related to new fossil fuel exploration and production or expansion of fossil fuel reserves, which are incompatible with limiting global warming to 1.5°C.

The precautionary logic of these proposals was adapted for the asset side of the insurance sector in a May 2021 report, "Insuring the uninsurable", which proposed reforms of capital rules in the Solvency II framework.

In a November 2021 report, "A silver bullet against green swans", Finance Watch explained why capital measures on fossil fuel assets applied to financial institutions through Pillar 1 of the relevant prudential frameworks are necessary to achieve timely and impactful outcomes in terms of managing the risk. It detailed the structural reasons why financial institutions' own risk management and supervisory review (Pillar 2) and market disclosure (Pillar 3) on their own would be insufficient to protect banks and insurers from climate-related financial risks including, among other things, the mismatch of prudential and climate risk time horizons, insufficient maturity of other prudential tools such as stress tests, as well as lack of necessary forward-looking data to calibrate existing financial models. In the meantime, insufficient regulatory action leads to a build-up of climate-related financial risks and prospects for a disorderly transition.

The ideas in these three reports¹³ have been elaborated in consultation responses to policymakers over the course of 2022 including to the the Basel Committee on Banking Supervision (BCBS), Financial Stability Board (FSB), European Commission, European Banking Authority (EBA), European Insurance and Occupational Pensions Authority (EIOPA), Office of the Comptroller of the Currency (OCC), Federal Deposit Insurance Corporation (FDIC), Office of the Superintendent of Financial Institutions (OSFI),¹⁴ and hearings before the ECON Committee of the European Parliament.¹⁵

2. Results of the study

The objective of the study was to assess the impact of Finance Watch's proposal to apply a 150% risk weighting to banks' credit exposures to *existing* fossil fuel activities. Finance Watch has also proposed a 1,250% risk weighting for exposures related to new fossil fuel exploration and expansion - the so-called 'one-for-one' rule (see box above). As the one-for-one proposal would affect only new exposures and have no impact on existing bank capital, the treatment of new fossil fuel exposures is outside the scope of this study.¹⁶

This study was carried out by a dozen specialists according to the methodology detailed below. We will make our full dataset including detailed bank-by-bank results available on request to regulators and supervisors. We would be pleased to engage with the banks included in our sample to verify and challenge their respective data.

2.1. Stock of fossil fuel exposures on bank balance sheets

To be representative of the global and European banking system, the study covers the 60 largest banks in the world, including the 28 banks considered to be systemically important at global level and the 22 largest EU banks by assets. The banks included have combined balance sheet assets for 2021 of \$92,264.8 billion globally. These assets represent more than half of global banking assets, and more than 70% of the consolidated banking assets identified by the Bank for International Settlements (which excludes China) plus the Chinese banks in our sample. Asian banks represent the largest part of our sample (44.1% of total assets) followed by the EU banks (24.8% of assets, whereby nearly half of the amount is accounted for by the French banks).

On this perimeter, we recorded from the same financial statements \$6,435.9 billion in equity¹⁷ in total for these banks, and net profits of \$643.4 billion for the year 2021. Details by region are presented in Table 1 below.



The stock of fossil fuel assets in the banking book of banks' balance sheets has been estimated using information from Task Force on Climate-related Financial Disclosures (TCFD) where available and otherwise from sectoral breakdowns of credit exposures in annual financial statements, interpreted using a Distribution Key methodology established in the report "Fossil fuels new subprimes" (see methodology section for details).¹⁸

We estimate that the 60 large global banks in our sample are together exposed to around \$1,354.2 billion of activities related to fossil fuels, or 1.47% of the total assets of these banks. As a historical note, the financial system's exposure to US subprime mortgages in 2007 is estimated to have been a very similar amount, \$1,368 billion, of which around a third was held by banks.¹⁹ Notably, the share of fossil fuel assets in 2021 is smaller on average for the EU banks compared to the banks in other jurisdictions (1.05%). It is with these amounts that we have carried out the calculations to determine the additional capital that would be needed by each bank, as well as the "implicit subsidies" granted to the fossil fuel sector.

Table 1: Balance Sheet Data and Exposures to Fossil Fuel Assets by region (USD billions at Dec 2021)

Location	Number of banks in the sample	Total assets	Total equity	Total profits	Total fossil assets	Fossil assets / total assets %
North America	11	18,904.0	1,470.1	203.8	241.4	1.28%
European Union of which	22	22,836.9	1,211.6	86.1	239.3	1.05%
Germany	4	3,071.8	159.1	5.9	22.8	0.74%
France	6	10,852.8	510.4	37.3	142.3	1.31%
Italy	5	2,769.5	170.8	7.9	16.9	0.61%
Spain	3	3,082.6	194.6	18.9	34.4	1.12%
Other EU	4	3,060.1	176.7	16.1	22.9	0.75%
Europe outside the EU of which	7	9,860.2	592.2	44.9	118.8	1.21%
UK	5	7,914.1	482.7	39.2	96.8	1.22%
Switzerland	2	1,946.2	109.5	5.7	22.0	1.13%
Asia	17	38,592.8	3,014.2	294.5	733.3	1.90%
Australia	3	2,071.0	147.7	14.1	21.4	1.03%
TOTAL	60	92,264.8	6,435.9	643.4	1,354.2	1.47%

2.2. Additional equity required to apply a 150% risk weight

The data in the previous section is then used to estimate the capital impact of Finance Watch's proposal to apply a risk weight of 150% to banks' existing fossil fuel assets.²⁰

The estimate is based on the difference between the 150% proposed risk weighting and current risk weights. To estimate the current risk weights, we have used the risk weights under the Standardised Approach for credit risk and applied an output floor as a proxy for the risk weights that banks use under the Internal Ratings-Based (IRB) Approach.²¹ As the results depend on the undisclosed credit quality of the assets, we have estimated both low and high credit quality scenarios. In the low scenario, we assume that each bank's portfolio of fossil fuel assets has an average credit rating of BBB. In the high scenario we assume the same portfolio has an average credit rating of AA (see methodology section 2.2 for further details).

Thus, for our sample of 60 banks, we estimate that applying a 150% risk weight to banks' existing fossil fuel assets would require a total of \$157.0 billion of additional capital under the low scenario and \$210.2 billion under the high scenario, or \$183.6 billion taking an average of the two scenarios. In aggregate, the average additional capital per bank would be \$3.05 billion, whereas half of the banks would see an additional capital increase of less than \$1.81 billion (Chart 1).

In aggregate, the additional capital equals between 2.44% and 3.27% of the banks' total equity amount in each scenario.²² Taking an average of the high and low scenarios, the aggregate average impact would be 2.85% of equity (Chart 2).

If banks choose to fund the additional capital from profits, they would on average need to retain the equivalent of 3.42 months of 2021 net income based on the aggregate data (the number is impacted by three outlier banks with either very low profits or very high fossil fuel assets). For half of the banks the capital increase could be covered from an equivalent of 2.71 months' net income or less (Chart 3). In practice, banks would have much longer to respond because such capital measures are normally phased in over longer periods.

Chart 1: Additional capital by bank (USD bn)

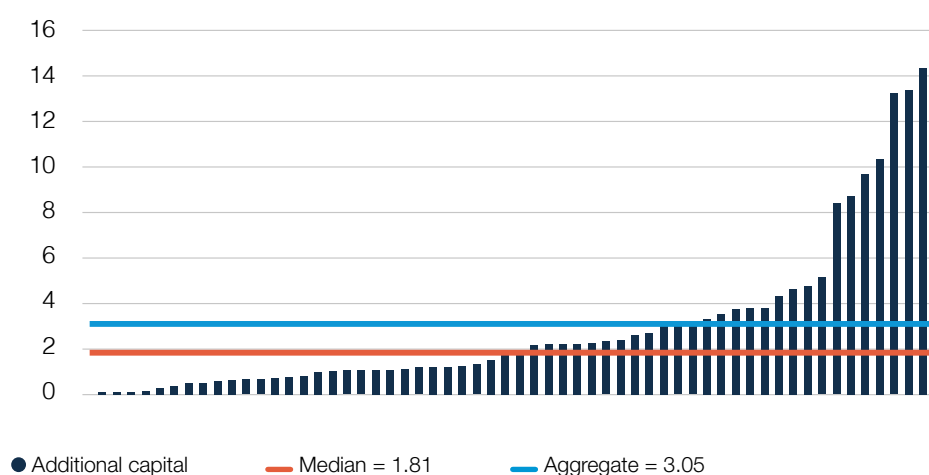


Chart 2: Additional capital as % of equity

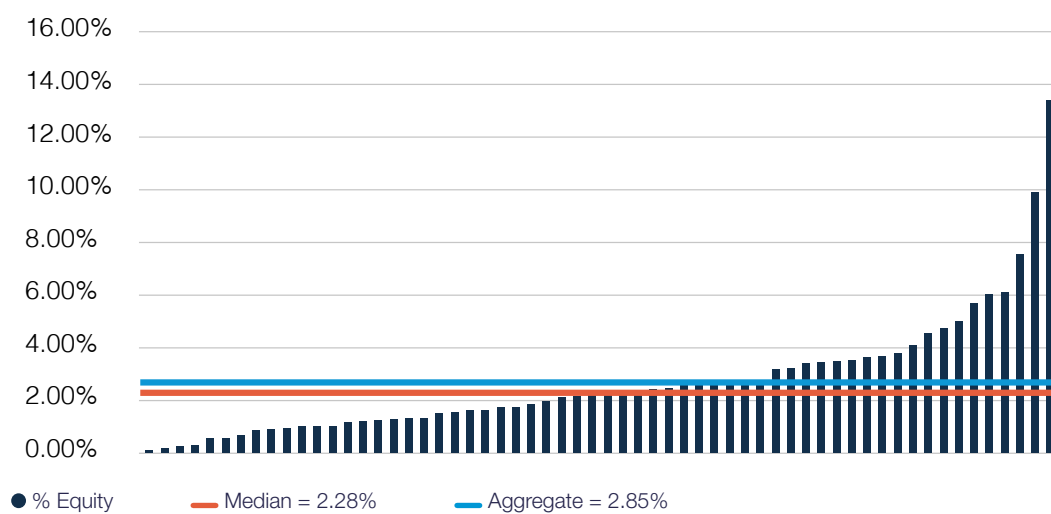


Chart 3: Additional capital in months of 2021 net income

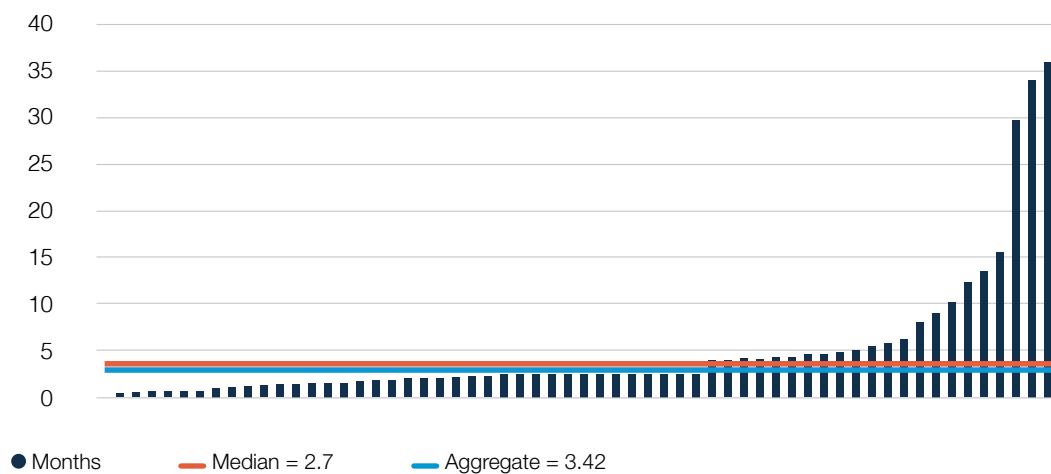
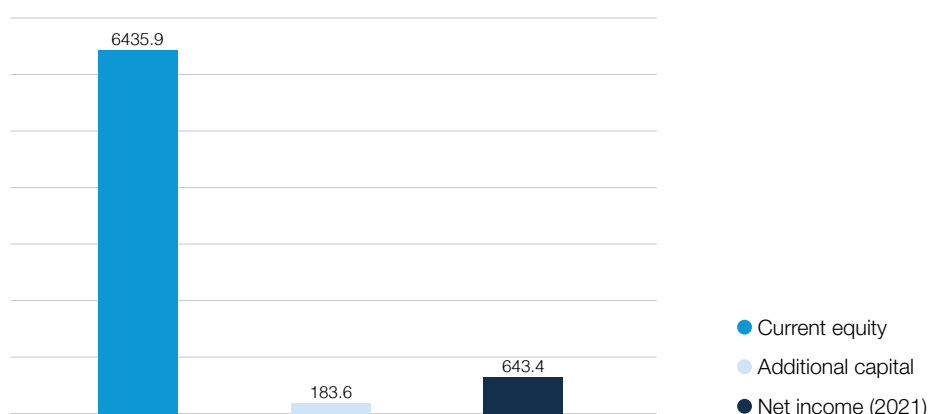


Table 2: Additional Capital Needed to Apply 150% Risk Weights on Existing Fossil Fuel Exposures (USD billions, by region, average of low and high scenarios)

Location	Total additional capital by region	Additional capital per bank – regional average	Additional capital / Total assets %	Additional capital / Total equity %	Additional capital / Net income %	Months of net income to fund
North America	27.89	2.54	0.15%	1.90%	13.69%	1.64
European Union of which	34.06	1.55	0.15%	2.81%	39.55%	4.75
Germany	3.19	0.80	0.10%	2.01%	53.87%	6.46
France	20.29	3.38	0.19%	3.98%	54.47%	6.54
Italy	2.30	0.46	0.08%	1.35%	29.17%	3.50
Spain	4.72	1.57	0.15%	2.43%	24.92%	2.99
Other EU	3.55	0.89	0.12%	2.01%	22.07%	2.65
Europe outside the EU of which	16.93	2.42	0.17%	2.86%	37.75%	4.53
UK	13.80	2.76	0.17%	2.86%	35.23%	4.23
Switzerland	3.13	1.56	0.16%	2.86%	55.13%	6.62
Asia	101.24	5.96	0.26%	3.36%	34.37%	4.12
Australia	3.46	1.15	0.17%	2.34%	24.55%	2.95
TOTAL	183.58	3.06	0.20%	2.85%	28.53%	3.42

Chart 4: Additional capital compared with current equity and net income (USD bn)



2.3. “Implicit subsidy” to fossil fuel borrowers

The proposal would require banks to fund individual fossil fuel assets with more equity. For example, a AA-rated fossil fuel loan might currently be funded with as little as 2.4% equity or even less but under the 150% risk weight proposal would be funded with 18% equity, assuming on average a total capital requirement of 12% including buffers.²³ Given the different costs of capital for bank equity and bank debt, this loan would become more expensive for the bank to fund and we assume that the additional cost would be passed on to the borrower to avoid reducing the bank’s return-on-equity (RoE).

Turning this in the other direction, because banks are not currently required to treat fossil fuel exposures as higher risk assets, they are able to undercapitalise and thus underprice their loans to the fossil fuel sector. This underpricing represents a risk transfer to banks and a subsidy



to fossil fuel borrowers. We can estimate the size of this subsidy by multiplying the additional capital required to implement the 150% proposal by banks' required RoE.

Taking McKinsey's forecast for bank RoE of between 7% and 12% for the next few years, this gives a subsidy in the range \$10.9 billion and \$25.2 billion.

Table 3: Implicit Subsidy to Fossil Fuel Borrowers from Banks' Underpricing of Credit Risk (USD billions)

	Return on Equity	
	7%	12%
Subsidy in high scenario (AA-rated borrowers)	14.7	25.2
Subsidy in low scenario (BBB-rated borrowers)	10.9	18.8

This gives an average estimate of about \$18 billion in implicit subsidies each year from the global banking sector to the fossil fuel industry. While smaller than other subsidies enjoyed by the fossil fuel sector,²⁴ this subsidy effectively puts the financing of sustainable and transition projects at a disadvantage since their more favourable risk profile from the climate transition perspective is not recognised in the capital rules. Expressed another way, the annual subsidy of \$18bn is around 1.33% of the 60 banks' total fossil fuel exposures.

Remarks on the estimates

For the purposes of this study, we have not attempted to estimate the simultaneous cost reduction to banks achieved due to the decrease in banks' non-equity liabilities (in particular, debt financing) that the additional equity would replace, although this would be a positive factor for banks.

The study looks only at the short-term capital impact of the proposal from the point of view of banks. It does not seek to quantify the wider social benefits of increasing financial stability by increasing the amount of bank capital available to absorb losses as climate-related financial risks materialise; however these benefits are likely to be significant.

The estimate in this report could be done with more accuracy by researchers with access to supervisory data provided at 2-digit or 4-digit NACE level and extended, perhaps using Climate Policy Relevant Sectors (CPRS)²⁵ or similar methodologies, to define a broader scope of relevant exposures.



3. Notes on implementation of the proposed capital requirements

Transition period. As with most legislative changes, the implementation of a higher risk weight on existing fossil fuel exposures should be subject to transition and grandfathering provisions to leave banks time to raise capital and to amend existing financing agreements with customers, for example, to avoid loan prices increasing in ways that might affect previously agreed pricing covenants. The implementation schedule could therefore consider the maturities and covenant characteristics of relevant exposures as well as banks' ability to generate or raise the additional capital without reducing lending.

The ratio of individual banks' fossil assets to total assets may be a factor to consider in implementation, as the capital impact on each bank is in almost direct proportion to that ratio. The total fossil fuel exposure is around 1.47% of aggregated assets (Table 1) across all banks in the sample but varies for individual banks between 0% and up to 5% and the small number of banks at the higher end may need more time for implementation.

Identification of exposures. In the EU, Pillar 3 ESG disclosure rules for banks have been in place since June 2022 (first disclosures to be submitted December 2022) and require disclosures at the NACE 2 digit level (e.g. banks would have to disclose exposures under NACE sectors "B.05 - Mining of coal and lignite" and "B.06 - Extraction of crude petroleum and natural gas" etc.).²⁶ Once these disclosure improvements have taken effect, there would be little additional increase in the supervisory resource needed to identify and monitor the treatment of exposures that should be subject to a new 150% risk weighting, as the underlying data and categorisation of assets would already have been required and provided.

Sources of the additional capital. While banks are free to choose how to raise additional required capital, we estimate that it would be possible for banks in the sample to meet the

additional requirement from retained profits on average in around three to five months. As this was estimated using 2021 profits, this time period may be different as bank profits change in future, for example it could be longer as a result of higher loan losses or shorter as bank profits increase in line with rising interest rates. In practice, we expect that regulators would give banks more time to implement the changes. As a historical note, when banks increased their capital ratios to meet Basel III requirements after the financial crisis in 2008 – a much larger capital increase - large global banks did so by retaining earnings within a 18-24 month period, without a reduction in lending or total assets.²⁷

A further consideration is that some of the additional capital estimated in this study overlaps with capital increases that banks need to achieve anyway as part of the final implementation of Basel 3, in particular due to the phased implementation among EU banks of the output floor. In our model, if the output floor were applied at the final rate of 72.5% instead of the 50% transitional rate, the additional capital would be around 10% lower, suggesting an average overlap of around 10%. Refer to Section 2.2 of the methodology detailed below.

The fear that a 150% capital requirement on fossil fuel assets might lead to destabilising asset sales should be seen in the context of the relatively modest impact in terms of additional capital required, as estimated in this study, and the ability of regulators and supervisors to implement the change gradually, over suitably calibrated time periods.

We have assumed a static balance sheet. In practice, if fossil fuel lending generates a lower return on equity while representing higher risk, then banks may choose to reallocate capital to other industry sectors. This could include lending to existing fossil fuel clients to support their transition to more sustainable business models provided it is separately identified, for example by providing project finance for renewable energy assets. To the extent that a reallocation occurs, it would reduce the need for additional capital and any negative impact on banks' RoE, while increasing the amount of bank capital available for other activities, including to fund transition activities and renewable energy.

Financial stability at the heart of prudential rules. The proposed 150% risk weight is a partially qualitative prudential measure for higher risk assets where there is an increasing and clearly identifiable risk that affects a well-defined and limited group of assets / exposures, based on the existing treatment of higher risk assets.²⁸ This prudential measure would thus help to ensure that underpriced risks are priced in more accurately²⁹ and that risks currently pushed on to banks' creditors and eventually taxpayers (in case of bankruptcy/ bail-out) are internalised, and would be fully in line with both the purpose of prudential rules and regulators' core mandates on financial stability. It is important to note, however, that the measure would not prevent fossil fuel lending and banks would still be free to lend to fossil fuel companies at market prices.

A Pillar 1 requirement of 150% risk weight for fossil fuel exposures could be further adjusted in the future as more data emerges about climate-related risks or about the assets in question. Further, the requirement leaves room for additional Pillar 2 measures, for example to reflect

concentration risk, the quality of bank clients' transition plans, and to address climate-related risks in sectors beyond fossil fuels.

Dynamic effects - containing fire sales. Given the interconnectedness and potential for spillover effects within the financial system, increasing capital requirements for a clearly defined and limited scope of exposures subject to transition risk would be an effective tool to mitigate the risk, as it can prevent cascading effects of depreciating assets and fire sale dynamics. If triggered, the latter might lead to much larger losses in the banking sector but could be largely avoided through the use of targeted capital measures, as was shown by Alessi et al. in a recent paper using data for the EU banking sector.³⁰

Pillar 1 measures as the most feasible and impactful. There are also some practical advantages to a Pillar 1 approach, in particular given the current state of data availability and insufficient advancement in climate risk measurement and modelling methodologies.

For banks, a Pillar 1 approach would provide certainty and a level playing field around the treatment of climate-related risk.

For supervisors, a Pillar 1 approach should reduce the emphasis or reliance on Pillar 2 measures and so shield supervisors from regulatory risks and industry pressure relating to the use of capital measures applied under their supervisory discretion: any Pillar 2 add-ons might lead to challenges from banks around data and quantification methodologies and will likely lead to inconsistent outcomes across banks, as banks will have incentives to downplay the risk and are likely to optimise for return on equity instead of managing climate-related prudential risks. A Pillar 1 approach would lessen supervisors' need to rely on supervisory add-ons in case banks internal models are found to be inadequate and would also reduce the likelihood of supervisors facing criticism in the future if they were perceived as not having taken sufficient action under Pillar 2.

For the financial system, a Pillar 1 approach would help to reduce the period in which climate-related risks can build up by helping to address and more adequately capitalise identifiable risks, which would lower the likelihood of a disorderly and costly transition in the longer term.

Overall, it should reduce the possibility of regulators facing legal or other challenges for allowing climate risks to be under-capitalised contrary to core prudential mandates.

4. Conclusion

Financing fossil fuel is an increasingly risky business. Failing to account for the growing prudential risks could lead to their build-up in the banking system and jeopardise the stability of the whole financial system when these risks materialise, as banks' available own resources might not be sufficient to absorb losses.

Although the risks are big, the capital needed to begin addressing them via prudential rules is relatively small. Based on the quantitative results in this study, the additional capital that would be required if policymakers were to apply a 150% risk weight to banks' existing fossil fuel exposures, in line with categorising them as higher risk assets under Pillar 1 of the Basel framework, is cautiously estimated at between three and five months profits on average and appears feasible. Supervisors can work with banks to establish plans to bridge the required capital shortfall over a reasonable timeframe without harming banks' ability to lend.



Methodology

1. Sample and coverage of global banking assets

We have aimed to achieve a representative coverage of the global banking system. We took into account the world's largest banks according to the Banking On Climate Chaos (BOCC)³¹ report as well as the banks in the European Union with the most significant assets according to the Standard & Poor's database,³² of which seven institutions had to be excluded due to the lack of data available over the past two years on their commitments in the fossil fuel sectors.³³

The combined assets of the 60 banks included in our sample, converted to USD at the end of 2021, were \$92,264.8 billion.

The Bank for International Settlements reports the consolidated banking assets of thirty countries at \$100,119 billion,^{34, 35} excluding China. If the \$31,013 billion of Chinese banking assets identified in our study are added to the banking assets in the BIS data, our sample represents more than 70% of those assets.

Another estimate puts the total 2020 amount of banks' assets worldwide, including the 19 members of the euro area and 21 other countries,³⁶ at more than \$180,000 billion,³⁷ of which our sample would represent more than 51%.

In both cases, it can be assumed that most banks of global significance are included and that our sample is therefore representative of the global banking system.

Bank covered in the sample:

North America	Société Générale	Banco BPM S.p.A.
JPMorgan Chase	BPCE / Natixis	Banca Monte dei Paschi di
Bank of America ML	Crédit Mutuel	Siena S.p.A.
Citigroup	Deutsche Bank	BPER Banca SpA
Wells Fargo	ING	Rest of Europe (excluding EU)
Royal Bank of Canada	UniCredit	HSBC
Scotia Bank	BBVA	Barclays
TD Bank Financial Group	Intesa Sanpaolo	UBS
Morgan Stanley	Commerzbank AG	Lloyds Banking Group
Goldman Sachs	Rabobank	NatWest Bank
Bank of Montreal	Nordea Bank	Crédit Suisse
Canadian Imperial Bank of	Danske Bank	Standard Chartered Bank
Commerce	CaixaBank	Asia
European Union	DZ Bank	ICBC
BNP Paribas	La Banque Postale	China Construction Bank
Credit Agricole	Landesbank Baden-Württem-	ABC Agricultural Bank of China
Santander	berg	

Bank of China	Bank of Communications	Postal Savings Bank of China
Mitsubishi UFJ	China Merchants Bank	Australia
Sumitomo Mitsui BC	China Everbright Bank	Australia & New-Zeland Banking
Mizuho FG	China Ping An Group	GroupWestpac Bank
Industrial Bank	Bank of Communications	Commonwealth Bank
China CITIC Bank	China Minsheng Bank	
Shanghai Pudong Develop-	State Bank of India	

2. Definitions and data sources

2.1. Balance sheet data and stock of fossil fuel assets

The **‘total assets’**, **‘total equity’** and the **‘net income’** are taken from the banks’ audited consolidated financial statements to the end of December 2021, or to the end of 2020 for six banks where 2021 data was not available.

The amounts are quoted in billions of national currency units and then converted into billions of dollars on the basis, with some exceptions, of the prices as at 31 December 2021.

The stock of **‘Fossil Fuel assets’**, or **‘Fossil Assets’**, are defined as banking book assets that are related to non-renewable carbon-based energy sources such as solid fuels, natural gas and oil, both conventional and non-conventional.³⁸ We have targeted credit exposures related to the exploration, extraction, and support for the extraction of these resources (i.e. upstream activities), as well as the production of electricity from these fuels, but not distribution through main pipelines.

Distribution keys. Information on exposures related to fossil fuels has been sourced from Task Force on Climate Related Financial Disclosures (TCFD) reports where available in sufficient detail or otherwise derived from sectoral breakdowns of credit exposures in annual audited financial statements using a distribution key methodology. The wide disparities in reporting and the broad sectoral categories used by banks mean that sometimes only a portion of an industry category in a bank’s table of credit exposures can be considered as fossil fuel-related. We have used distribution keys to make this attribution, based on economic indicators such as, for example, the share of fossil fuels in total energy consumption - which results in a distribution key of 81.26% fossil fuel content in total primary energy consumption (world) for assets in the broad category “energy”, based on International Energy Agency (IEA) data from 2019. On the other hand, a 100% distribution key has been chosen for sectors that clearly correspond to fossil assets, such as ‘oil & gas’ or ‘coal’.³⁹

SECTOR	DISTRIBUTION KEY
Oil & Gas	100.00%
Energy	81.26%
Energy & Water supply	65.76%
Mining & Metals	27.30%

Mining & Quarrying	79.01%
Electricity. Gas. Steam. ... WORLD	45.61%
Electricity. Gas. Steam. ... EU 28	28.09%
Electricity World	62.89%
Electricity EU	38.73%
Coal	100.00%

Source: Reclaim Finance

The fossil fuel data collected reflects low granularity of disclosures and there is a risk that our study either underestimates or overestimates the stock of fossil fuel exposures, and thus the additional capital. To mitigate this risk, we have made cautious assumptions when interpreting the available data.

On- vs off-balance sheet exposure. For reasons of data availability and consistency, and to avoid under-estimating the potential capital impact, all the fossil fuel credit exposures collected have been treated in our calculation as on-balance sheet and fully drawn, even in cases where data on commitment utilisation are provided, on the grounds that undrawn commitments could become drawn at any time.

Stock vs flow data. It should also be stressed that this dataset contains the stock of fossil fuel exposures on banks' balance sheets subject to capital requirements at the reporting date and not annual flows of financing that banks arrange for the fossil fuel sector. Data about financial flows are available elsewhere, including in reports from Banking on Climate Chaos (BOCC)⁴⁰ and ShareAction,⁴¹ which include syndicated loans, project financing and underwriting. While highly relevant for analysing the role of banks in facilitating fossil fuel activities and the trends, flow data is not the relevant measure for estimating capital requirements. In particular, flow data in the BOCC report might include maturing exposures, exposures sold to other parties, as well as underwriting activities where the assets are distributed to third parties and not retained on banks' balance sheets.

2.2. Rating composition of credit portfolio – risk weights

Approximation of IRB ratings. Given that the banks in our sample are mostly large internationally active banks, we have assumed that all of them use the IRB approach. We have approximated the risk weights determined under the IRB approach as being 50% of the risk weights applicable under the Standardised Approach for all banks except the US ones (explanation included below). This is to take account of the Basel output floor, which sets the lower bound for risk weighting of exposures assessed using internal models at 50%, which is the starting rate applicable in the phase-in period⁴² for the final Basel 3 output floor.⁴³

While we do not know the reality of banks' IRB ratings, we consider 50% to be a conservative estimate. Taking the example of the EU banks, in its Basel 3 monitoring exercise per 31 December 2020, the European Banking Authority (EBA) estimated that in the first years of the output floor implementation by EU banks, there would be no capital requirement increase until

the output floor reaches 60%. While we do not know how this applies specifically to fossil fuel exposures, this suggests that average IRB risk weights for EU banks are already above 50% of the standardised approach risk weights.⁴⁴

Estimation of rating composition of credit portfolios. It is difficult to estimate the current credit ratings of banks' fossil fuels exposures as banks do not normally disclose this detail. Therefore, we have performed a range estimation and calculated two hypotheses, "high" and "low". In the high hypothesis, we have assumed that the average credit rating of the fossil fuels assets in a bank's portfolio is AA, which results in an assumed current risk weighting for these assets of 20%,⁴⁵ to which is applied an output floor of 50% to give an assumed IRB risk weight of 10%. In the low hypothesis, we assume that the assets are of lower quality with an average credit rating of BBB, which results in a risk weighting of 100%, or 50% after applying the output floor. Overall, this gives an assumed range of 10% to 50% for the current IRB risk ratings of fossil fuel-related exposures.

In reality, some exposures will be rated lower than BBB, for example some mid-market oil and gas companies that rely more on bank debt than capital market financing may have lower ratings and banks with a high exposure to such firms may have a lower average credit quality in their fossil fuel portfolios than BBB. These banks would have higher risk weights to begin with and would therefore need less additional capital than we have estimated (for example assets rated below BB would already have a risk weight of 150% under the standardised approach), which makes this a conservative assumption for the purposes of our estimate.

Treatment of US banks. The determination of the exposure ratings for US banks follows a different approach as US regulations do not allow for the usage of external credit ratings for the purposes of calculating capital requirements, therefore, at the time of our research, all corporate exposures are subject to a risk weight of 100% under the standardised approach.⁴⁶ Further, US regulations apply an output floor to the total risk-based capital requirements equal to the "generally applicable risk-based capital rules" determined under the Standardised Approach. This output floor is set at 100% since the adoption of the Collins amendment in 2010. However, the output floor does not cover operational risk and credit value adjustment risk and, once corrected for the methodological differences, it converts into an effective floor of approximately 75%.⁴⁷ It is therefore this figure that we have taken for the current IRB risk weights of existing fossil fuel-related exposures under both the high and low hypotheses for US banks.

Risk exposures beyond credit risk. Since the proposals, the implementation of which we assess, address materialisation of climate risk via credit risk, we have not accounted for operational risk, market risk or credit value adjustment (CVA) risk. The 150% risk weight that we are testing represents credit risk weight and for the purposes of this study we hold amounts of other risk types unchanged.

Total RWA and output floor. The output floor applies to the total risk weighted assets, which includes credit, counterparty credit, CVA, securitisation, market and operational risk RWA. We did not account for the fact that the output floor might affect different risk types and also risk

weights at asset level vs aggregate level. While this is a simplifying assumption, we do not expect that it would have a significant impact on our estimation, given that credit risk is the largest component of banks' risk weighted assets.⁴⁸

Specialised lending. We cautiously assume that no assets have been risk weighted under the IRB approach for specialised lending (the supervisory slotting approach) and only risk weights for exposures to corporates are applied. To the extent that the use of the supervisory slotting approach usually leads to higher risk weights, for example for specialised lending such as project finance, this assumption would tend to overestimate the additional capital and can be considered cautious.

2.3. Capital requirements

Basel 3 sets a minimum capital ratio of 10.5% of risk weighted assets, comprising 8% minimum regulatory capital requirement and 2.5% capital conservation buffer.

Additional capital in the form of **countercyclical capital buffers** – CCyB – may be required by regulators for the most systemically important institutions, however this rate is 0% in the countries concerned by our study at the time of writing.⁴⁹

Systemic risk buffers are required for systemically important banks, either as globally systemically important banks (G-SIBs) or domestically systemically important (D-SIBs), of which only the higher requirement is applied.

The list of G-SIBs and applicable risk buffer is designated each year⁵⁰ by the Financial Stability Board in consultation with the Basel Committee and the national authorities. Of the 30 banks on this list, 28 are included in our study.⁵¹

The list of D-SIB is determined by each country's regulators for systemically important banks at the national level. The rates are applied individually to banks in the EU,⁵² United Kingdom,⁵³ Switzerland⁵⁴ and India⁵⁵ or to all national banks in Canada.⁵⁶ The United States and Japan do not have domestic systemically important banks, only G-SIBs. Australia has applied an interim 3% D-SIB buffer to its largest banks to be achieved by January 2024, which we have applied following information from the Australian Prudential Regulation Authority (APRA).⁵⁷ We have not been able to identify any buffers concerning Chinese banks⁵⁸ other than those applying to global systemically important banks – G-SIBs.

For the banks in our sample, applying the higher of the applicable G-SIB or D-SIB buffer adds between 0% and 3% to the capital requirement.

Taking the regulatory capital requirement and all the buffers together, the minimum capital ratios for the banks in our sample are between 10.5% and 13.5% of risk weighted assets.

3. Calculation of the required capital increase

We have calculated the additional capital needed to apply a 150% risk weight on banks' existing stocks of fossil fuel assets by working out the difference between banks' assumed current risk weightings and the proposed risk weighting, and multiplying this difference by the required capital ratio and the estimated stock of fossil fuel assets.

For example, Industrial and Commercial Bank of China (ICBC), which has the highest amount of fossil assets in our survey at \$101.6 billion, has a total capital requirement including buffers of 12% of risk weighted assets. In the high scenario, where we cautiously assume that its fossil fuel assets have an average credit rating of AA, applying a 150% risk weight compared with an assumed IRB risk weight of 10% would result in an additional capital need of US\$17.1 billion:

$$101.6 * (150\% - 10\%) * 12\% = 17.1$$

This is equivalent to just under four months of the bank's 2021 net income.

In the low scenario, where we assume that ICBC's fossil fuel assets have an average credit rating of BBB, applying a 150% risk weight compared with an assumed IRB risk weight of 50% would result in an additional capital need of US\$12.2 billion:

$$101.6 * (150\% - 50\%) * 12\% = 12.2$$

This is equivalent to about two and half months of the bank's 2021 net income.

For comparison purposes, the amounts of additional capital are presented together with the bank's total assets, total equity, net income in the previous year, and the number of months it would take each bank to cover the additional capital from its net income should it decide to fund the additional capital from retained earnings. For ease of presentation, we have then aggregated these results by region, using an average of the estimates from the high and low scenarios.

4. Calculation of the “implicit subsidy”

The last calculation in the study seeks to put a figure on the implicit subsidy that banks are currently providing to fossil fuel companies as a result of under-capitalising, and thus under-pricing, their fossil fuel credit exposures. The assumptions in this calculation include that a risk weight of 150% is sufficient to capture the prudential risk associated with existing fossil fuel exposures, that the additional capital needed would be remunerated at banks' required Return on Equity (RoE), and that banks would pass the cost of this fully on to their fossil fuel clients without reducing their exposure to the sector.

We have used a range of 7% and 12% for the required RoE, based on the 2025 forecasts in McKinsey's Global Banking Annual Review (up from an average of 7% to 8% in the period 2010 to 2020).⁵⁹ We have calculated a low estimate for the subsidy based on 7% RoE and the low scenario (BBB) and a high estimate for the subsidy based on 12% RoE and the high scenario (AA). We have not deducted the savings that banks would make from no longer having to remunerate the liabilities replaced by the additional capital.

Bibliography

Alessi, L., Cojoianu, T., and Hoepner, A. (2017), “Fossil fuels: Are they worth the (downside) risk?”, European Commission – Joint Research Centre, Working papers in Economics and Finance, forthcoming, 4(1), cited in Alessi et al (2022)

Alessi, L., Di Girolamo, F., Petracco-Giudici, M. and Pagano, A. (2022), “Accounting for climate transition risk in banks’ capital requirements”, European Commission – Joint Research Centre, JRC Working Papers in Economics and Finance, 2022/8, https://joint-research-centre.ec.europa.eu/publications/accounting-climate-transition-risk-banks-capital-requirements_en

APRA, 2 December 2021, “Finalising loss-absorbing capacity requirements for domestic systemically important banks”, letter, <https://www.apra.gov.au/finalising-loss-absorbing-capacity-requirements-for-domestic-systemically-important-banks>

Bank of England (PRA), 2019, “Systemic Risk Buffer rates for ring-fenced banks and large building societies - applicable from 1 August 2019”, <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/publication/2019/systemic-risk-buffer-rates-for-ring-fenced-banks-and-large-building-societies-may-2019.pdf>

Bank of Finland, 5 November 2021, “China publishes lists of systemically important banks”, BOFIT WEEKLY 2021/44, https://www.bofit.fi/en/monitoring/weekly/2021/vw202144_1/

Battiston, S., Mandel, A., Monasterolo, I., Schütze, F., Visentin, G., Mandel, Antoine Monasterolo, I., Visentin, G., March 2017, “A Climate stress-test of the financial system”, Nature Climate Change, 7(4), 283–288, <https://doi.org/doi:10.1038/nclimate3255>

BCBS, updated 6 July 2022, “Countercyclical capital buffer (CCyB)”, <https://www.bis.org/bcbs/ccyb/>

BCBS, 2019, “Standardised Approach: individual exposures”, CRE20, 20.17, https://www.bis.org/basel_framework/chapter/CRE/20.htm?inforce=20191215&published=20191215

BCBS, 2019, “Calculation of RWA for Credit Risk”, CRE20, 20.30, https://www.bis.org/basel_framework/chapter/CRE/20.htm?inforce=20191215&published=20191215

BCBS, December 2017, “Basel III: Finalising post-crisis reforms”, <https://www.bis.org/bcbs/publ/d424.pdf>

BIS Quarterly Review, September 2013, ‘How have banks adjusted to higher capital requirements?’ https://www.bis.org/publ/qtrpdf/r_qt1309e.pdf

BNP Paribas, 6 December 2017, “Output floor”: On the eve of a (bad) agreement?”, <https://economic-research.bnpparibas.com/html/en-US/Output-floor-agreement-12/6/2017,30476>

Carbon Tracker Initiative, 23 June 2022, “Unburnable Carbon: Ten Years On”, <https://carbon-tracker.org/reports/unburnable-carbon-ten-years-on/>

EBA, 17 June 2022, “Discussion Paper on the role of environmental risks in the prudential framework”, Public Hearing, <https://www.eba.europa.eu/calendar/public-hearing-discussion-pa>

[per-role-environmental-risk-prudential-framework](#)

EBA, “The Role Of Environmental Risks In The Prudential Framework”, Discussion paper, 2 May 2022, EBA/DP/2022/02, <https://www.eba.europa.eu/eba-launches-discussion-role-environmental-risks-prudential-framework>

EBA, 24 January 2022, “EBA publishes binding standards on Pillar 3 disclosures on ESG risks”, press release and disclosure template, <https://www.eba.europa.eu/eba-publishes-binding-standards-pillar-3-disclosures-esg-risks>

EBA, September 2021, “Basel III Monitoring Exercise – Results Based on Data as of 31 December 2020”, EBA/REP/2021/27, page 32, https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Reports/2021/1020673/EBA%20Report%20on%20Basel%20III%20Monitoring%20%28data%20as%20of%2031%20December%202020%29.pdf

ECB, May 2022, “Climate-related risks to financial stability”, Financial Stability Review, https://www.ecb.europa.eu/pub/financial-stability/fsr/special/html/ecb.fsrart202205_01~9d4ae00a92.en.html

ECB, 19 October 2021, “The challenge of capturing climate risks in the banking regulatory framework: is there a need for a macroprudential response?”, Macroprudential Bulletin Article - No. 1,5 https://www.ecb.europa.eu/pub/financial-stability/macprudential-bulletin/html/ecb.mpbu202110_1~5323a5baa8.en.html

ECB/ESRB Project Team on climate risk monitoring, July 2022, “The macroprudential challenge of climate change”, https://www.esrb.europa.eu/pub/pdf/reports/esrb.ecb.climate_report202207~622b791878.en.pdf

ESRB, “Countercyclical capital buffer”, webpage, accessed 29 August 2022, https://www.esrb.europa.eu/national_policy/ccb/html/index.en.html

ESRB, “Systemically important institutions”, webpage, accessed 29 August 2022, https://www.esrb.europa.eu/national_policy/systemically/html/index.en.html

European Parliament, August 2022, Draft report Fernández J., Amending Regulation (EU) No 575/2013 [Amendments 841 and 1034] https://www.europarl.europa.eu/doceo/document/ECON-AM-735613_EN.pdf and https://www.europarl.europa.eu/doceo/document/ECON-AM-735613_EN.pdf

European Parliament and Council, 26 June 2013, Regulation (EU) No 575/2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012 Text with EEA relevance

Finance Watch, August 2022, consultation response to the EBA, <https://www.finance-watch.org/publication/response-to-the-eba-discussion-paper-on-environmental-risks-in-the-prudential-framework/>

Finance Watch, July 2022, consultation response to the FSB, <https://www.finance-watch.org/publication/response-to-the-fsb-consultation-on-supervisory-and-regulatory-approaches-to-climate-related-risks/>

Finance Watch, July 2022, “Open letter to EU legislators: banks and insurers must account for climate risk” <https://www.finance-watch.org/publication/open-letter-banks-and-insurers-must-account-for-climate-risk/>

Finance Watch, June 2022, consultation response to the FDIC, <https://www.finance-watch.org/publication/comments-on-fdic-statement-of-principles-for-climate-related-financial-risk-management/>

Finance Watch, March 2022, consultation response to the European Commission; <https://www.finance-watch.org/publication/improving-the-eu-macroprudential-framework-for-the-banking-sector-consultation-response/>

Finance Watch, March 2022, consultation response to the OCC, <https://www.finance-watch.org/publication/feedback-on-occ-principles-for-climate-related-financial-risk-management-for-large-banks/>

Finance Watch, March 2022, evidence to European Parliament ECON Committee on Solvency II and IRRD <https://www.finance-watch.org/publication/we-can-stop-moral-hazard-and-tackle-climate-risk-in-the-insurance-industry-hearing-on-solvency-ii-and-irrd/>

Finance Watch, March 2022, evidence to European Parliament ECON Committee on the Basel III Finalisation Package <https://www.finance-watch.org/publication/finalising-basel-iii-to-serve-the-european-economy-econ-hearing-on-the-basel-iii-finalisation-package/>

Finance Watch, February 2022, consultation response to EIOPA, <https://www.finance-watch.org/publication/consultation-response-eiopa-orsa/>

Finance Watch, February 2022, consultation responses to the BCBS, <https://www.finance-watch.org/publication/bcbs-consultation-climate-risks/>

Finance Watch, November 2021, “A ‘silver bullet’ against Green Swans – Incorporating climate risk into prudential rules”, report, <https://www.finance-watch.org/publication/report-a-silver-bullet-against-green-swans-incorporating-climate-risk-into-prudential-rules/>

Finance Watch, July 2021, “Insuring the uninsurable: Tackling the link between climate change and financial instability in the insurance sector”, report, <https://www.finance-watch.org/publication/insuring-the-uninsurable/>

Finance Watch, June 2020, “Breaking the climate-finance doom loop”, report, <https://www.finance-watch.org/publication/breaking-the-climate-finance-doom-loop/>

FINMA, “Capital requirements for systemically important banks”, webpage, accessed 29 August 2022, <https://www.finma.ch/en/enforcement/recovery-and-resolution/too-big-to-fail-and-financial-stability/capital-requirements-for-systemically-important-banks/>

FSB, 23 November 2021, 2021 List of Global Systemically Important Banks (G-SIBs), <https://www.fsb.org/wp-content/uploads/P231121.pdf>

Gelzinis G., 11 May 2021, “Addressing Climate-Related Financial Risk Through Bank Capital Requirements”, Center for American Progress, <https://www.americanprogress.org/article/addressing-climate-related-financial-risk-bank-capital-requirements/>

Reclaim Finance, Les Amis de la Terre France, Institut Rousseau (Giraud G., et al), June 2021, “Fossil assets: the new subprimes? How funding the climate crisis can lead to a financial crisis”, report, <https://reclaimfinance.org/site/en/2021/06/10/fossil-fuel-assets-the-new-subprimes-report/>

IPCC Sixth Assessment Report, Chapter 15, page 49; <https://www.nature.com/articles/s41558-022-01356-y>

Kühne K., Bartsch N., Driskell R., Higson J., Habet A., July 2022, “Carbon Bombs” - Mapping key fossil fuel projects”, Energy Policy Volume 166, 112950, <https://doi.org/10.1016/j.enpol.2022.112950>

McKinsey, 1 December 2021, “Global Banking Annual Review”, Report, <https://www.mckinsey.com/industries/financial-services/our-insights/global-banking-annual-review>

OSFI, 10 December 2021 “OSFI maintains the Domestic Stability Buffer level at 2.50%”, Industry letter, <https://www.osfi-bsif.gc.ca/Eng/fi-if/in-ai/Pages/dsb20211210-let.aspx>

Rainforest Action Network, 29 March 2022, “Banking on Climate Chaos - 13th annual report”, <https://www.bankingonclimatechaos.org/>

Semieniuk, G., Holden, P.B., Mercure, J.F. et al. Stranded fossil-fuel assets translate to major losses for investors in advanced economies. Nature Climate Change 12, 532–538 (2022), <https://www.nature.com/articles/s41558-022-01356-y>

Senate of Canada, BILL S-243, Sen. Galvez R., First Reading 24 MARCH 2022, “An Act to enact the Climate-Aligned Finance Act and to make related amendments to other Acts” <https://www.parl.ca/legisinfo/en/bill/44-1/s-243>

ShareAction, 14 February 2022, “Oil & gas expansion A lose-lose bet for banks and their investors”, report, <https://shareaction.org/reports/oil-gas-expansion-a-lose-lose-bet-for-banks-and-their-investors>

U.S. Monetary Policy Forum, June 2008, “LEVERAGED LOSSES: Lessons from the Mortgage Market Meltdown”, page 35, <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.160.4646&rep=rep1&type=pdf>

Endnotes

- 1 Carbon Tracker Initiative, 23 June 2022, 'Unburnable Carbon: Ten Years On', <https://carbontracker.org/reports/unburnable-carbon-ten-years-on/>
- 2 ECB/ESRB Project Team on climate risk monitoring, July 2022, "The macroprudential challenge of climate change", https://www.esrb.europa.eu/pub/pdf/reports/esrb.ecb.climate_report202207~622b791878.en.pdf
- 3 ECB, 19 October 2021, 'The challenge of capturing climate risks in the banking regulatory framework: is there a need for a macroprudential response?', Macroprudential Bulletin - Article - No. 15, https://www.ecb.europa.eu/pub/financial-stability/macroprudential-bulletin/html/ecb.mpbu202110_1~5323a5baa8.en.html
- 4 A 2013 BIS study found that for a sample of 82 large global banks from advanced and emerging economies in the study, retained earnings accounted for the bulk of the increase in risk weighted capital ratios over the period 2009–2012, with reductions in risk weights playing a lesser role. On average, banks continued to expand their lending, though lending growth was slower among advanced economy banks from Europe. Lower dividend payouts and wider lending spreads contributed to banks' ability to use retained earnings to build capital. BIS Quarterly Review, September 2013, 'How have banks adjusted to higher capital requirements?' https://www.bis.org/publ/qtrpdf/r_qt1309e.pdf
- 5 These include EBA discussion on the role of environmental risks in the prudential framework <https://www.eba.europa.eu/eba-launches-discussion-role-environmental-risks-prudential-framework>; FSB consultation on supervisory and regulatory approaches to climate-related risks <https://www.fsb.org/2022/04/supervisory-and-regulatory-approaches-to-climate-related-risks-interim-report/>; Bank of England Call for papers on the complex issues associated with adjusting the capital framework to take account of climate-related financial risks <https://www.bankofengland.co.uk/events/2022/october/climate-and-capital-conference>; BCBS consultation Principles for the effective management and supervision of climate-related financial risks <https://www.bis.org/press/p220531.htm>; Canada's OSFI consultation on expectations to advance climate risk management https://www.osfi-bsif.gc.ca/Eng/osfi-bsif/med/Pages/b15-dft_nr.aspx
- 6 Finance Watch, 7 July 2022, Open letter to EU legislators: banks and insurers must account for climate risk <https://www.finance-watch.org/publication/open-letter-banks-and-insurers-must-account-for-climate-risk/>. Center for American Progress, Addressing climate-related financial risk through bank capital requirements, May 2021 <https://www.americanprogress.org/article/addressing-climate-related-financial-risk-bank-capital-requirements/>.
- 7 EU and Canada, see https://www.europarl.europa.eu/doceo/document/ECON-AM-735613_EN.pdf and <https://www.parl.ca/legisinfo/en/bill/44-1/s-243>

- 8 BCBS, 2019, Calculation of RWA for Credit Risk CRE20, 20.30, https://www.bis.org/basel_framework/chapter/CRE/20.htm?inforce=20191215&published=20191215
- 9 Estimates of global stranded assets as a present value of future lost profits in the upstream oil and gas sector are in the range US\$1 trillion to \$15 trillion or higher. See IPCC Sixth Assessment Report, Chapter 15, page 49; See also Semieniuk, G., Holden, P.B., Mercure, J.F. et al. Stranded fossil-fuel assets translate to major losses for investors in advanced economies. *Nature Climate Change* 12, 532–538 (2022), <https://www.nature.com/articles/s41558-022-01356-y>
- 10 ECB, May 2022, “Climate-related risks to financial stability”, Financial Stability Review, https://www.ecb.europa.eu/pub/financial-stability/fsr/special/html/ecb.fsrart202205_01~9d4ae00a92.en.html; and Kühne K., Bartsch N., Driskell R., Higson J., Habet A., July 2022, “Carbon Bombs” - Mapping key fossil fuel projects”, *Energy Policy* Volume 166, 112950, <https://doi.org/10.1016/j.enpol.2022.112950>
- 11 See Finance Watch’s reports *Breaking the Climate Finance Doom Loop*, June 2020, *Insuring the uninsurable*, July 2021, *A silver bullet against Green Swans*, November 2021, and Finance Watch’s evidence given in March 2022 to the European Parliament Hearings on the Finalisation of Basel 3 and the Review of Solvency II.
- 12 We would be pleased to share our full dataset and calculations to support such work.
- 13 See Finance Watch reports: “Breaking the climate-finance doom loop”, June 2020, <https://www.finance-watch.org/publication/breaking-the-climate-finance-doom-loop/>; “Insuring the uninsurable: Tackling the link between climate change and financial instability in the insurance sector”, July 2021, <https://www.finance-watch.org/publication/insuring-the-uninsurable/>; and “A ‘silver bullet’ against Green Swans – Incorporating climate risk into prudential rules”, November 2021, <https://www.finance-watch.org/publication/report-a-silver-bullet-against-green-swans-incorporating-climate-risk-into-prudential-rules/>
- 14 See Finance Watch’s publications webpage for the respective consultation responses <https://www.finance-watch.org/publications/>
- 15 See Finance Watch’s presentations at ECON Hearings in March 2022 on the Basel III Finalisation Package <https://www.finance-watch.org/publication/finalising-basel-iii-to-serve-the-european-economy-econ-hearing-on-the-basel-iii-finalisation-package/> and Solvency II and IRRD <https://www.finance-watch.org/publication/we-can-stop-moral-hazard-and-tackle-climate-risk-in-the-insurance-industry-hearing-on-solvency-ii-and-irrd/>
- 16 The one-for-one rule is a proposal backed by 111 organisations and 60 individuals including prominent economists. The proposal stipulates that bank credit used to fund exploration and production of new fossil fuel reserves, should be funded entirely with equity. Assets associated with such financing will face a very high stranding risk in the course of transition. Further, continuous fossil reserve expansion will make it very difficult for the planet to remain

below 2C global temperatures rise and, thus, poses a risk of major disruptions in the environment, economy and financial system. For further details, see <https://www.finance-watch.org/the-one-for-one-rule-a-way-for-cop26-ambitions-to-manifest-in-policy/>

- 17 Note that throughout the report the terms “equity” and “capital” are used interchangeably. See the methodology section for details.
- 18 Reclaim Finance, Les Amis de la Terre France, Institut Rousseau (Giraud G., et al), June 2021, “Fossil assets: the new subprimes? How funding the climate crisis can lead to a financial crisis”, report, <https://reclaimfinance.org/site/en/2021/06/10/fossil-fuel-assets-the-new-subprimes-report/>
- 19 U.S. Monetary Policy Forum, June 2008, ‘LEVERAGED LOSSES: Lessons from the Mortgage Market Meltdown’, page 35, <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.160.4646&rep=rep1&type=pdf>
- 20 Both under the standardised and internal ratings based approaches to credit risk, which effectively means that fossil fuel exposures would be ineligible for the IRB approach.
- 21 Given that the banks in our sample are the world’s largest banks, we have assumed that all of them use the IRB approach to credit risk. Since IRB ratings are generally higher and risk weights correspondingly lower than those under the Standardised Approach, this represents a cautious assumption because, to the extent that any credit portfolios in our sample are rated under the Standardised Approach, it would overestimate the additional capital needed.
- 22 Given that the minimum required capital ratio is calculated as a relationship between regulatory capital and risk weighted assets, the potential capital shortfall would be much smaller and would in each case depend on the current level of capitalisation, i.e. whether a bank strictly complies with the minimum capital requirement or has capital above it. In the latter case, it might be that no capital shortfall would result from complying with the increased capital requirement for fossil fuel-related exposures.
- 23 For a AA rated borrower, applying a 20% risk weight as per the Standardised Approach and 12% average regulatory capital ratio including buffers yields a 2.4% capital requirement ($20\% \times 12\% = 2.4\%$). In case the bank applies the internal rating-based approach to determine risk weights for its exposures, risk weights can be below 20%, in which case a capital requirement of less than 2.4% would be applied to such exposures. Increasing the risk weight to 150% would result in a capital requirement of 18% ($150\% \times 12\% = 18\%$).
- 24 Estimates by the International Monetary Fund; <https://www.imf.org/en/Topics/climate-change/energy-subsidies>
- 25 Battiston, S., Mandel, A., Monasterolo, I., Schütze, F., Visentin, G., Mandel, Antoine Monasterolo, I., ... Visentin, G. (2017). A Climate stress-test of the financial system. Nature Climate

- Change, 7(4), 283–288. <https://doi.org/doi:10.1038/nclimate3255>
- 26 See EBA press release and disclosure template, “EBA publishes binding standards on Pillar 3 disclosures on ESG risks”, 24 January 2022, <https://www.eba.europa.eu/eba-publishes-binding-standards-pillar-3-disclosures-esg-risks>
- 27 BIS Quarterly Review, September 2013, ‘How have banks adjusted to higher capital requirements?’ https://www.bis.org/publ/qtrpdf/r_qt1309e.pdf
- 28 BCBS, 2019, Calculation of RWA for Credit Risk CRE20, 20.30, https://www.bis.org/basel_framework/chapter/CRE/20.htm?inforce=20191215&published=20191215
- 29 The IPCC’s 6th Assessment Report, Working Group III, highlighted that “if many enough financial actors have an incentive to downplay climate-related financial risk, then systemic risk builds up in the financial system eventually materialising for tax payers”, IPCC Sixth Assessment Report, Chapter 15, p. 15-49.
- 30 Alessi, L., Di Girolamo, F., Petracco-Giudici, M. and Pagano, A. (2022), “Accounting for climate transition risk in banks’ capital requirements”, European Commission – Joint Research Centre, JRC Working Papers in Economics and Finance, 2022/8. https://joint-research-centre.ec.europa.eu/publications/accounting-climate-transition-risk-banks-capital-requirements_en. While the scope of exposures in Alessi et al’s paper is broader than in our study, the mechanics of the developments apply. Furthermore, the paper offers an indication that the universe of assets affected by transition risk is broader than in the scope of our study, which is more targeted in order to offer a clear policy angle and solutions which can be immediately implemented. Alessi et al simulated the potential impact of transition risk on banks and showed that a fire-sale of high carbon assets could amplify into a systemic crisis with significant losses for the EU banking sector. They concluded that “an extra capital buffer proportional to the transition risk faced by each institution would succeed in protecting the system, as all banks would be adequately protected and hence, a fire-sale would not even start. An extra capital buffer of around 0.5% of RWA on average, or 3% of existing capital, would be sufficient.”
- 31 <https://www.bankingonclimatechaos.org/>
- 32 Source: S&P Capital IQ Pro database. The EU sample included banks with over EUR 500 mn in assets, in particular covering the five biggest banks in Germany, France, Italy and Spain.
- 33 Banco de Sabadell, S.A., KB Kookmin Bank Financial Group, KfW, National Australia Bank, Punjab National Bank, Sumitomo Mitsui Trust Bank, Unicaja Banco, S.A.
- 34 <https://stats.bis.org/statx/srs/table/b1?m=S&f=pdf>
- 35 Australia, Austria, Belgium, Brazil, Canada, Chile, Chinese Taipei, Denmark, Finland, France, Germany, Greece, Hong Kong, India, Ireland, Italy, Japan, Korea, Luxembourg, Mexico,

Netherlands, Panama, Portugal, Singapore, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

36 21 + EA-group : Argentina, Australia, Brazil, Canada, Cayman Islands, Chile, China, Euro Area, Hong Kong, India, Indonesia, Japan, Korea, Mexico, Russia, Saudi Arabia, Singapore, South Africa, Switzerland, Turkey, the UK, the US. That's 40 countries out of the 197 member states of the United Nations.

37 <https://www.statista.com/statistics/421215/banks-assets-globally/#:~:text=In%202020%2C%20the%20assets%20of,U.S.%20dollars%20as%20of%202019>

38 This definition of fossil fuels is in line with the definition of Article 2(62) of the Regulation (EU) 2018/1999 of the European Parliament and of the Council on the Governance of the Energy Union and Climate Action.

39 The methodology has been developed in the earlier report by Reclaim Finance et al, June 2021, Fossil fuel assets 'the new subprimes'?, <https://reclaimfinance.org/site/en/2021/06/10/fossil-fuel-assets-the-new-subprimes-report/>

40 <https://www.bankingonclimatechaos.org/>

41 Share Action, Oil & gas expansion A lose-lose bet for banks and their investors, 14 February 2022 <https://shareaction.org/reports/oil-gas-expansion-a-lose-lose-bet-for-banks-and-their-investors>

42 The final Basel 3 output floor is being implemented in 5% annual increments, starting at 50% in 2022 and reaching 72.5% by 2027. See BCBS, December 2017, Basel 3: Finalising post-crisis reforms, <https://www.bis.org/bcbs/publ/d424.pdf>

43 As banks raise additional capital to implement the Basel 3 output floor, some of that capital overlaps with the additional capital estimated in this study; we estimate that if the final 72.5% output floor that will apply from 2027 were applied now, our estimate of additional capital required would be around 10% lower.

44 EBA, September 2021, Basel III Monitoring Exercise – Results Based on Data as of 31 December 2020, EBA/REP/2021/27, page 32, https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Reports/2021/1020673/EBA%20Report%20on%20Basel%20III%20Monitoring%20%28data%20as%20of%2031%20December%202020%29.pdf

45 BCBS, 2019, CRE20 - Standardised Approach: individual exposures 20.17, https://www.bis.org/basel_framework/chapter/CRE/20.htm?inforce=20191215&published=20191215 (implemented in the EU via the Regulation (EU) No 575/2013 (Capital Requirements Regulation), Article 122).

46 PUBLIC LAW 111–203—JULY 21, 2010, <https://uscode.house.gov/statutes/pl/111/203>.

pdf , Sec. 171 - leverage and risk-based capital requirements (b)-(2). See also §217-32 (f) in <https://www.law.cornell.edu/cfr/text/12/217.32>

47 Estimation provided by BNP Paribas economic research department in a note dated 6 December 2017, ““Output floor”: On the eve of a (bad) agreement?”, <https://economic-research.bnpparibas.com/html/en-US/Output-floor-agreement-12/6/2017,30476>. Based on the reported data of the six US banks included in our sample, we have recalculated the implied effective output floor for credit risk and confirm that the value of 75% represents a conservative assumption for the purposes of our estimates.

48 For example, according to the EBA, as of September 2021, credit risk RWA accounted for 83.2% of the total RWA of the EU banks <https://www.eba.europa.eu/calendar/public-hearing-discussion-paper-role-environmental-risk-prudential-framework>

49 <https://www.bis.org/bcbs/ccyb/> . For the European Union, see also https://www.esrb.europa.eu/national_policy/ccb/html/index.en.html

50 <https://www.fsb.org/wp-content/uploads/P231121.pdf>

51 Two establishments from those listed in this list were not taken into account, ‘Bank of New York Mellon’ and ‘State Street’. These are US non-bank financial companies controlled by the Fed’s Board of Governors, Federal Reserve System, which are outside the scope of this study.

52 https://www.esrb.europa.eu/national_policy/systemically/html/index.en.html

53 <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/publication/2019/systemic-risk-buffer-rates-for-ring-fenced-banks-and-large-building-societies-may-2019.pdf>

54 <https://www.finma.ch/en/enforcement/recovery-and-resolution/too-big-to-fail-and-financial-stability/capital-requirements-for-systemically-important-banks/>

55 https://www.rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=53045#:~:text=S-BI%2C%20ICICI%20Bank%20and%20HDFC,effective%20from%20April%201%2C%202019

56 <https://www.osfi-bsif.gc.ca/Eng/fi-if/in-ai/Pages/dsb20211210-let.aspx>

57 <https://www.apra.gov.au/finalising-loss-absorbing-capacity-requirements-for-domestic-systemically-important-banks>

58 See e.g. https://www.bofit.fi/en/monitoring/weekly/2021/vw202144_1/

59 McKinsey, Global Banking Annual Review, 1 December 2021 <https://www.mckinsey.com/industries/financial-services/our-insights/global-banking-annual-review>

About the authors

Greg Ford is a Senior Advisor at Finance Watch, a consultant for the Climate Safe Lending Network, and a former financial journalist. / **Julia Symon** is Head of Research and Advocacy at Finance Watch and former internal auditor at Commerzbank and State Street Bank. / **Christian Nicol** is a bank executive at Natixis, a municipal councillor in charge of sustainable development in Elancourt in Paris, an ESG consultant, and co-author with Gaël Giraud of the report "Fossil assets: the new subprimes? How funding the climate crisis can lead to a financial crisis". / **Laurent Dicale** is a former departmental branch manager at the Banque de France and a contributing author at the Institut Rousseau.

About Finance Watch

Finance Watch is an independently funded public interest association dedicated to making finance work for the good of society. Its mission is to strengthen the voice of society in the reform of financial regulation by conducting advocacy and presenting public interest arguments to lawmakers and the public. Finance Watch's members include consumer groups, housing associations, trade unions, NGOs, financial experts, academics and other civil society groups that collectively represent a large number of European citizens. Finance Watch's founding principles state that finance is essential for society in bringing capital to productive use in a transparent and sustainable manner, but that the legitimate pursuit of private interests by the financial industry should not be conducted to the detriment of society. For further information, see www.finance-watch.org

Finance Watch
Rue Ducale 67 b3
1000 Bruxelles
T: + 32 (0)2 880 0430

www.finance-watch.org



Finance Watch