

The Basel Committee on Banking Supervision

Issued a public consultation paper on a Pillar 3 disclosure framework for climate-related financial risks.

Forms part of its holistic approach to address climate-related financial risks to the global banking system.

The Committee invites for submissions and comments until 29th February 2024.

Dr. Axel Sauer y; submissions and comments 28th February 2024

Dr. Axel Sauer does permit to publish these submissions and comments on the Bank for International Settlements' website.

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Glossary

Introduction

The commenter's reply – on climate-related financial risks, and by financial and carbon market participants applied mechanisms **to manage climate-related financial risks by** either **cash-flow based** sustainable **investments** and their degree of empirical content, or by **non-cash-flow related options** certifying the permission **to emit** i.e., **one ton (CO₂)**; might be seen as the commenter's attempt or recommendation to decision maker at markets and banks, **to manage** by bank's **decision makers** identified and quantified **climate-related financial risk exposures**, by (purchasing or selling) **CO₂ options** at banks **"banking and trading books"**.

Even when these CO₂ options - **currently** are certifying **a not globally eligible permission to emit** i.e., for each purchased CO₂ option **one ton (CO₂)**; and even when these CO₂ options - **currently** are **not globally eligible** for bank's management **to manage bank's climate-related financial risks** within by i.e., supervising authorities specified i.e., one year **reporting period**; **to report** about i.e., **bank's** managed (enlarged or mitigated) **climate-related financial risk exposures**; within by i.e., **bank's** supervising authority defined **reporting area** - i.e., the European Union (EU).

And, even when **these CO₂ options** and other greenhouse gas emissions (GHG) **"facilitated during the reporting period**, expressed as **metric tons of CO₂ equivalent** accounted for only in the year the facilitation occurs. **All** the transactions during the year would be aggregated over that one year to generate **total facilitated emissions"** (see, Basel Committee on Banking Supervision. 2023. Consultive document. Disclosure of climate-related financial risks. Issued for comment by 29 February 2024. Basel, Switzerland: Bank for International Settlements, Template CRFR5: Transition risk – facilitated emissions related to capital markets and financial advisory activities by sector, p. 38); and, even when **these CO₂ options** and other greenhouse gas emissions (GHG) **facilitated during the reporting period**, **do rely or depend on** at least EU-wide accepted financial value of i.e., a non-cash-flow related **"Green Future" contract** with a clearly **defined underlying** (one metric ton CO₂), being at least EU- wide cross border **deliverable**, do depend on **sustainable-linked bonds** denominated in EU currencies, **listed** and **traded** at platforms or **Exchanges**; and, even when **these CO₂ options** are **complemented**, by at least within **the EU eligible carbon credits** (equivalent to finance by sustainable-linked bonds) **offered and placed** at carbon markets to companies, organizations and other market participants, **do become effective** **"to offset hard-to-abate emissions**. Each carbon credit is equal to one ton of carbon-equivalent removed from the atmosphere." (See, Mauderer, Sabine, 2023. *'Harnessing Collective Strength – Scaling up Green Finance for the Global South'*, Keynote Oxford Sustainable Finance Summit 2023, Oxford, 19 July 2023, p. 3.)

The commenter does **not rely** on concepts, models or theories where market solutions promoter should highlight **"... that it is preferable, ..., not to assume uncritically that the terms 'empirical' and 'well-formed' (or 'meaningful') must coincide** - and that the situation is hardly improved if we assume, uncritically, that probability or probabilistic **'confirmability'** may be **used as a criterion of the empirical character of statements or**

theories,” (see, Popper, Karl Raimund. 1968, *Conjectures and refutations: the growth of scientific knowledge*. New York, NY: Harper & Row, Appendix: A presumably false yet formally highly probable non-empirical statement, p. 250.) on i.e., quantified and aggregated climate-related financial risk exposures.

Particular when these by financial and carbon market participants identified and quantified climate-related financial risk exposures are **managed** by decision maker at markets applying concepts, models or theories empowered by “invisible forces” to achieve; - (i) a globally effective price to emit one ton CO₂; (ii) a globally effective natural interest rate; (iii) decision making by duration; or to achieve lower CO₂ emissions by (iv) “Blended Finance” also called mixing up **cash-flow based sustainable investments** and their degree of empirical content with **non-cash-flow related options** certifying the permission to emit i.e., one ton (CO₂).

The commenter will show that **unintended consequences** out of a Pillar 3 framework for climate-related financial risks, *could be overcome* by **establishing (i) a falsifiability or testability criterion** as a criterion of the empirical character of **scientific theories**, **(ii)** by disclosing on structured or blended financial products that structuring, **blending or mixing-up** climate funding resources with carbon market mechanisms, **does convey an un-rejectable message** to carbon markets participants aiming to mitigate (CO₂) emissions **there is - a financed** cash-flow related investment, **and** a non-cash-flow related option price **which does mitigate (CO₂) emissions**, *by (iii) the proposal to separate - structured or blended financial products into “cash-flow” related items* (i.e., finance by loans, bonds) *and “non-cash-flow” items* (i.e., options certifying the permission to emit i.e., one ton (CO₂)), as required by IFRS accounting standards and as recommended by the Committee at Basel II and Basel III.

And the commenter will show that **unintended consequences** of a Pillar 3 framework for climate-related financial risks *will be overcome* by **(i) defining** for the CO₂ permit an underlying i.e., one ton CO₂ as one ton CO₂ taken out of the atmosphere at i.e., EU countries, by **(ii) establishing** at least within EU countries one metric ton CO₂ as cross border deliverable commodity, by **(iii) establishing** for purchased or sold CO₂ permits, eligible to emit at i.e., the EU one ton CO₂ - cash and noncash settlement - i.e., through physical delivery of one ton CO₂ or the CO₂ equivalent of cashflow related investments to mitigate CO₂ emissions, traded at Exchanges or platforms.

And the commenter does show that daily reviews and disclosures of banks climate-related financial risk exposures at **banks’ “trading book”** by bank’s responsible staff i.e., traders, treasurers, accountants and risk managers according to the Committee’s simplified standardized approach (SSA) and recommendations outlined in the Basel Committee on Banking Supervision revisions to the market-risk disclosure requirements and **Basel II** (pillar 2, “Internal Capital Adequacy Assessment Process” (ICAAP)) **will improve banks’ trading book management of climate-related financial risk exposure changes.**

Note 1; The commenter took notice

- 1) - "that the development of a meaningful (*content rich*) and robust (*to withstanding server empirical tests*) Pillar 3 framework for climate-related financial risks is likely to be an iterative (*trial and error*) process". (See, Basel Committee on Banking Supervision. 2023. Consultive document. Disclosure of climate-related financial risks. Issued for comment by 29 February 2024. Basel p.1)
- 2) - "that the "consultation paper summarizes the Committee's work to assess the prudential rationale for potential disclosure requirements. (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.2)
- 3) - that "for each area under consideration the Committee has included draft disclosure templates for illustrative purposes and to solicit stakeholder feedback on the meaningfulness and comparability of potential future disclosures". (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.2)
- 4) - that "the Committee is seeking views on all aspects of this consultation paper, including the importance, feasibility and features of a Pillar 3 framework for climate-related financial risks, and prudential metrics that would most effectively support the Committee's mandate". (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.2)
- 5) - on the definition; "Transition risks include the societal changes arising from a *transition to a low-carbon economy* and arise through changes *in public sector policies*, innovation and *changes in the affordability of existing technologies* or investor and consumer *sentiment towards sustainable consumption and production practice*". (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.2)
- 6) - on the definition; "Physical risks result from *acute* (and/or) chronic *climatic trends or events*, such as *rising sea levels, wildfires, storms, floods and droughts*" (see, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.2) and the commenter is asking should volcano eruptions be taken into consideration as emitting large quantities of greenhouse gases (GHGs)?

Note 1.1; The commenter does make his comments

- 7) - on the Committees' objectives – "assessing the impact of the magnitude and timing of climate risk drivers on banks' exposures to climate-related financial risks, little reliance can be placed upon historical events, giving rise to a high level of uncertainty. In addition, climate-related financial risks have unique characteristics relating to the complex interlinkages between transmission channels, longer time horizons, uncertainty and the non-linear nature of climate effects, as well as the *feedback loops between physical and transition risks*". (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.2)
- 8) – on facts that "climate-related financial risks *impact banks' credit, market, liquidity, operational and other risks* based on the physical locations of banks' operations and through the counterparties and other stakeholders with whom they interact or invest in". (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.2)

And on the fact - "... that banks transact with *counterparties exposed to transition and physical climate-related financial risks*, part of these risks will pass on to the bank". (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.2)

- 9) – on the Committees’ acknowledgement of transition and physical climate-related financial risks and that; “As a result, climate-related financial risks need to be *assessed and considered in a forward-looking manner*, as they (the climate-related financial risks) may materialize over a longer time horizon, with currently limited but evolving data to predict future impacts." (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.2)
- 10) - on the Committees’ - "Pillar 3 disclosures aim to promote market discipline and enable market participants to access key information relating to a bank's regulatory capital and risk exposures in order to increase transparency and confidence about a bank's exposure to risk and the overall adequacy of its regulatory capital." (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.3)
- 11) -on the fact that "the existing Pillar 3 framework **does not provide** distinct or **comparable information** as to **how climate risks drivers could impact a bank** or the banking sector." (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.3) And intends to become supportive to the Committee when “seeking views on whether the introduction of a Pillar 3 framework would help **to promote comparability of banks' risk profiles** and **enable market participants to access** key information relating to a **bank's risk exposures in relation to climate-related financial risks**." (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.3)
- 12) - on the fact that "the Committee is exploring both **qualitative and quantitative disclosure requirements for climate-related financial risks** in the banking book and would welcome feedback on the meaningfulness and feasibility of these proposals." (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.3)

Note 1.2; The commenter’s reply – on a Pillar 3 framework to identify, quantify and to manage climate-related financial risk exposures on two (2) consultation questions

The commenter does reply to question number 5: – “Would there be any **unintended consequences** of a Pillar 3 framework for climate-related financial risks? If so, how could these be overcome”?

The commenter does reply to question number 6: – “What are your views on potentially extending a Pillar 3 framework for climate-related financial risks to the **trading book**”?

The commenter does outline unintended consequences of a Pillar 3 framework for climate-related financial risks even when the Committee admits "the existing Pillar 3 framework does **not provide** distinct or **comparable information** as to **how climate risks**

drivers could impact a bank or the banking sector.” (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.3)

Answers to Q5 - note 2: Would there be any unintended consequences of a Pillar 3 framework for climate-related financial risks? If so, how could these be overcome?

My guess is yes – **as banks should be enabled by external and internal supervisor to disclose and to manage climate-related financial risk exposures** by comparing - *either cash-flow based sustainable investments and their degree of empirical content, or by betting on non-cash-flow related assets i.e., options certifying the permission to emit i.e., one ton (CO₂).*

Climate Change is “a classic example of a negative externality: carbon emissions represent a cost that spills over onto other markets besides the one in which they originated” (See Visco, Ignazio. 2021. Remarks on financing carbon neutrality, remarks (via prerecorded video) by Mr. Ignazio Visco, Governor of the Bank of Italy, at the roundtable on financing carbon neutrality, BOAO Forum for Asia Annual Conference, 20 April 2021, p. 1). And, with focus on a model framework quantifying climate-related financial risks the Committee or the Basel Committee on Banking Supervision (BCBS) does outline: “When quantifying climate-related financial risks, a challenge that follows from establishing a risk classification and enhancing data collections is designing a modelling framework that facilitates the translation of climate risk drivers into financial risk parameters in a forward-looking manner” (See Basel Committee on Banking Supervision. 2021. *Climate-related financial risks – measurement methodologies*. Basel, Switzerland: Bank for International Settlements, p. 39).

During the “Great Financial Crisis” (GFC) and the COVID-19 pandemic, financial and carbon market participants looking for a trading partner facing informational asymmetries (i. e., on FX-forward contracts (bets)) did respond, by shortening FX-forward contract maturities (i.e., from 3 months to 1 month) to mitigate (i.e., DVP settlement) risk.

FX-forward contracts with shorter settlement periods decrease settlement risk between trading partner and increases FX-forward contracts informational content, as the contract partners commit themselves to fulfill their obligations within a shorter time period. And as during the GFC, the FX-forward contract markets were getting “thin”, the FX-forward transaction providers ended up with overnight FX-forward transaction and funding by the Central Bank.

In particular, after the GFC, central banks focused on market participants’ reasons for distrust and on market participants’ inability to approximate (i.e., DVP settlement) risk (on FX-bets with longer than “spot” maturities) as arguments for market failure. The GFC “market failure” might have led the Basel Committee on Banking Supervision (BCBS or the Committee) to fundamentally review and to invite comments on the BCBS consultative document, “**fundamental review of the trading book**”, in May 2012 (see Basel Committee on Banking Supervision. 2012. *Fundamental review of the trading book*. Basel, Switzerland: Bank for International Settlements), and to propose market risk guidelines that would make it appropriate for traders at banks with trading books

to estimate and quantify market risk based on traded and to-be-traded instruments, to be implemented around 2022 (see Basel Committee on Banking Supervision. 2019. *Minimum capital requirements for market risk*. Basel, Switzerland: Bank for International Settlements).

Answers to Q5 - note 2.1; Would there be any unintended consequences of a Pillar 3 framework for climate-related financial risks? If so, how could these be overcome?

Two future cash flows with identical yields, underlying borrowers, and maturities but with different duration or empirical content

My guess is yes – as **banks management should be enabled by external and internal supervisor to disclose and to manage climate-related financial risk exposures** by comparing – *two future cash flows with identical yields, underlying borrowers, and maturities but with different duration or empirical content*.

Regardless of whether financial or carbon market participants use conventional funding, or green finance in all cases where **cash flows** with identical yields, underlying borrowers, and maturities, **differ** in their **durations** choosing **the lower duration cash flow** this choice applied as a “market” decision rule **will guide** decision makers looking for a trading partner **to make loss-mitigating decisions**.

However, if the growth of science (or the mitigation of risks (including climate-related financial risks) **requires that we operate with theories that increase in content** (i.e., coupon-bonds and installment loans, or green bonds), **it must also require that we operate with theories** (concepts, i.e., to disclosure climate-related financial risks) **that decrease in probability** (in the sense of calculating and aggregating the probabilities of future climate-related financial risks).

Note: The concept of duration introduced by Macaulay (1938) includes a calculation of the average life to maturity of a payment stream and provides information to investors regarding how long they should expect to wait, or how long it might take, until they (the investors) receive back their invested monies. (see Macaulay, Frederick R. 1938. *Some theoretical problems suggested by the movements of interest rates, bond yields, and stock prices in the United States since 1856*. New York: Columbia University Press for the National Bureau of Economic Research, pp. 45 ff. and Appendix A.)

Regardless of whether financial or carbon market participants use conventional funding, or green finance – in all cases were two future cash flows with identical yields, underlying borrowers, and maturities, differ in their duration – choosing **the lower duration** cash flow will guide investors and should convince decision makers to make loss mitigating decisions.

- (i) **Market participants compare investment cash flows by using the degree of empirical content and not by accumulating probabilities**

Only one additional future payment more will mitigate conventional, or green investors’ expected climate-related financial losses (i.e., based on two future cash flows with identical yields, underlying borrowers and maturities but which differ in their durations). However, the probability of receiving this additional payment is smaller.

9 y; The following content reflects the personal view of Dr. Axel Sauer - [www: drsauerconsulting.de](http://www.drsauerconsulting.de)

Example: “Let **a** be the installment, and **b** the final payment, and **a b** the installment and the final payment: it is then obvious that **the informative content of the conjunction a b, will exceed** that of its component **a** and also that of its component **b**. **But: The aggregated probabilities or likelihoods to receive**, to value or to “price” these payments or items **a b will be smaller** than that of either of its components. Writing Ct (a) for the content of the statement a, and Ct (a b) for the content of the conjunction a and b, we have

$$Ct(a) \leq Ct(a b) \leq Ct(b) \quad (1)$$

***This contrasts with the corresponding law of the calculus of probability** (i.e., if the probability of receiving the installment (a) is 50% and the probability of receiving the final payment (b) is 50%, then the probability of receiving both only occurs in the highly unlikely case of certainty, 100%).*

$$p(a) \geq p(a b) \geq p(b) \quad (2)$$

where the inequality signs of (1) are inverted.

Together, these two laws, (1) and (2), state that with increasing content (receiving more than one payment which mitigates the outstanding amount), the aggregated probabilities of receiving both outstanding items (payments) decreases, and vice versa; or in other words, that content increases with increasing improbability.

This trivial fact has the following inescapable consequences: if growth of science (or the mitigation of the risk receiving back an outstanding amount of money) means that we operate with theories of increasing content (i.e., additional payments on coupon bonds, installment loans), it must also mean that we operate with theories (concepts) of decreasing probability (in the sense of calculating the probabilities of receiving future installment payments).

Thus, if our aim is the advancement (or “to mitigate expected losses through installments”), then a high probability (in the sense of calculating probabilities) cannot possibly be our aim as well: these two aims are incompatible” (see Popper 1968, chapter 10, paragraphs 2 and 3).

In all cases where decision makers are comparing cash flows with identical yields, underlying borrowers, and maturities but different durations, **the cash flow with the lowest duration** is compatible with this decision rule, as it **reflects the highest degree of informational content**.

There are only a few “market advocates” who argue that cash flows with identical yields, the same underlying borrower, and differences in informational content (i.e., maturities) *cannot be made equal* (creating an indifferent, equilibrium situation) *by changing the cash flow’s relation between yield and risk* (i.e., risk measured by summing up probabilities of future payments). Therefore, mainstream “market advocates” muddy the waters by stating that in cash flows with identical yields, the same underlying borrower, but different content i.e., related to maturities, there is *an “observable” relation between yield* (i.e., measured by and summed up as probabilities of future payments) *and informational content* (i.e., shortening or extending the maturities of future payments).

Answers to Q5- note 2.2: Would there be any unintended consequences of a Pillar 3 framework for climate-related financial risks? If so, how could these be overcome?

10 y; The following content reflects the personal view of Dr. Axel Sauer - www.drsauerconsulting.de

The theory of arbitrarily acting market participants - a backward-looking description of human behavior, highlighting the process to diversify investments - cannot by humans logically consistent reversed

My guess is yes – as banks management should be enabled by external and internal supervisor to disclose and to manage climate-related financial risk exposures by assessing – *the theory of arbitrarily acting market participants as backward-looking description of human decision maker*, and by disclosing that - *the process to diversify climate-related investments - cannot by humans logically consistent reversed*.

Market advocates who combine yield and informational content are making claims based on their observations made in hindsight i.e., there is a possibly observable or “given” yield level that is capable of tempting any human investor to revise or to change their investment decision.

And, as it is “logically impossible to derive theories from observations” (see Popper, Karl Raimund. 1968. Conjectures and refutations, chapter 8), **the myth** was established by some market advocates in markets with or without human decision maker, yield level temptations and decision revisions does take place and will take place.

In addition, as humans who reverse their decisions are observable, **the myth** was successfully placed; human decision maker looking for trading partner make buy and sell decisions in markets, despite higher degrees of informational content available elsewhere – for example they shift from yield based installment payment cash flows to zero-coupon bonds.

Hereby have market advocates to ignore: If despite a higher degree of informational content available elsewhere, in markets with human decision-maker looking for trading partner, there is or might always be a yield (or price) level that is capable of tempting the decision maker to review or to put on hold the decision-making process. **This does imply that human decision-maker** looking for trading partner in markets are not able to make decisions to the best of their ability and therefore **do act arbitrarily**.

However, these economists and market advocates promoting arbitrary decision making at interrelated financial and carbon markets, should be aware of the following logical implications; **any theory which is defining arbitrarily acting market participants** (decision-maker looking for trading partner), implies that this theory **has no explanatory power in regard to human investors’ decisions**, i.e., the decision **to diversify investments**.

Therefore, is the theory of arbitrarily acting market participants (decision-maker looking for trading partner), at is best a backward-looking description (of human behavior), highlighting that the process of deciding to diversify investments, cannot be logically reversed by humans, and legally not by human decision-maker who found a trading partner.

Answers to Q5- note 2.3: Would there be any unintended consequences of a Pillar 3 framework for climate-related financial risks?

Market advocates might look for decision maker who simultaneously maximize the content and probability of investment alternatives

My guess is yes – as banks management should be enabled by external and internal supervisor to disclose and to manage climate-related financial risk exposures by assessing - *the theory decision maker at financial or carbon markets do simultaneously maximize the content and probability of climate-related financial investment alternatives.*

There are market advocates who cannot resist the temptation to refer to “market environments, platforms, or places” which are containing human decision-maker looking for a trading partner who are simultaneously maximize the content and probabilities of investment alternatives. The reference to simultaneous content- and probability maximizing human decision-maker looking for a trading partner has failed, and will fail for logical reasons, as this “observational” statement turns traders and other market participants into contradictions which have to be ignored, by the human decision-maker and the trading partner, or into idiots (i.e., sloppy, irresponsible traders who maximize value at risk and maximize content-based loan portfolio income, see, Morgan, J. P. 2012. *The case of structured products, Claire Célévier and Boris Vallée, What Drives Financial Complexity? A Look into the Retail Market for Structured Products, 2013 Business*).

Therefore, advisors might repeat, decision-making humans looking for a trading partner are putting all efforts to the best of their ability into the process to make (i.e., deductively) their decisions by applying a “logical” rule based on increasing or decreasing informational content. This decision rule is not equivalent to maximizing simultaneously probability statements and informational content.

Answers to Q5- note 2.4: Would there be any unintended consequences of a Pillar 3 framework for climate-related financial risks? If so, **how could these be overcome?**

The concept to diversify investments mitigates (i.e., on average, over predefined time periods) value or performance losses, as there is - no money making out of money without gambling or fraud

Banks should be enabled by external and internal supervisor to overcome unintended consequences of a Pillar 3 framework for climate-related financial risk exposures by maximizing either content out of climate-related financial cash flow investments **or** by purchasing or selling non-cash-flow related options certifying the permission to emit i.e., one-ton (CO₂).

The fact, **there is for decision makers** looking for a trading partner at financial and i.e., interrelated carbon markets - **no money making out of money** without gambling or fraud. This fact has for financial and carbon markets participants who are looking for a trading partner, and do admit or ignore their **inability to make reliable value or market price forecasts**, the following inescapable consequence: - *there is no applicable reversal of the decision-making process to diversify climate-related financial risks out of climate-related investments. Any attempt to leave the reversal to diversify risk out of their investment*

decisions up to market participants looking for a trading partner, **or to ignore** the above-described deductively applied logic of the decision-making process, aiming to mitigate risk including the risk to make financial losses out of climate change, **puts decision maker** looking for a trading partner **into an environment** where they must either become “Enlightened” or use “Models” that make market participants looking for a trading partner redundant.

- (i) Attempts to **reverse the process of risk diversification** might be seen by decision maker looking for a trading partner in products and processes such as
 - the securitization of assets,
 - the origination of structured or “blended” assets,
 - the risk assessment (i.e., “rating”) by agencies of structured or “blended” assets, defined as a “snapshot” but applicable i. e., for assessing risk at investors, for one year,
 - the differentiation between banking and trading books without “limiting” the default risk in banks’ proprietary trading activities (i.e., the Paul Volcker rule). (See, Financial Times. 2013. *Volcker rule receives regulatory approval, Dec. 13.*)

The failure of **reversing the process of risk diversification**, by originating and placing **structured or “blended” products** might be seen by supervisors, investors (market participants who found a trading partner) and originators (or issuer) of structured products in the following facts:

- investors (market participants who found a trading partner) received compensation from originators (or issuer) of structured or “blended” products,
- originators (or issuer) of structured or “blended” products paid fines after banking supervisors investigated the “risk” of these “blended” products and came to the conclusion that the risk in these “blended” products were “obviously” (i.e., in a legal sense) not properly explained to investors,
- and US banking supervisor came to the conclusion (the Paul Volcker rule) that **any differentiation in TIRE 1 capital-absorbing risk weights**, i.e., **between banking and trading books** might not be sufficient to **“limit” market risk** out of **trading book proprietary trading activities** (i.e., in zero-risk weighted US Treasury bonds). (See Financial Times 2013, Dec. 13).

Answers to Q5- note 2.5: Would there be any unintended consequences of a Pillar 3 framework for climate-related financial risks? If so, how could these be overcome?

Are models, concepts or theories capable to replace market participants decision making under “uncertainty” by stating - to calibrate “risks” and to calculate “equilibrium prices” simultaneously?

Banks should be enabled by external and internal supervisor to disclose and to manage climate-related financial risk exposures by maximizing either **content** *out of cash-flows* or **probabilities** *out of non-cash-flow related options* **certifying the permission to emit i.e.,**

one-ton (CO₂) on their operations, and should **not rely** on concepts, models or theories which are “*powered by invisible forces*”.

There are models or trading systems that claim, **to reverse the process of risk diversification** by simulating purchasing or selling activities what do intend to replace decision-making market participants looking for a trading partner, by mechanics or invisible market participants guiding forces which simultaneously - calibrate and allocate uncertainty or risk?

“Moreover, **data describing the historical relationship between climate-related impacts and their economic and financial consequences may not be representative of future climate-economy or climate-financial relationships**”. (See Basel Committee on Banking Supervision. 2021. *Climate-related financial risks – measurement methodologies*. Basel, Switzerland: Bank for International Settlements, p. 10)

And, “in assessing the impact of the magnitude and timing of climate risk drivers on banks’ exposures to climate-related financial risks, **little reliance can be placed upon historical events**, giving rise to a high level of uncertainty. In addition, climate-related financial risks have unique characteristics relating to the complex interlinkages between transmission channels, longer time horizons, uncertainty and the non-linear nature of climate effects, **as well as the feedback loops between physical and transition risks**”. (See, Basel Committee on Banking Supervision. 2023. *Consultive document. Disclosure of climate-related financial risks*. Issued for comment by 29 February 2024. Basel, Switzerland: Bank for International Settlements, Basel, 2023, p. 2)

As a market and credit risk mitigating advisor to financial and carbon markets participants it might be worth to mention that it was Albert Einstein (1879 – 1955) who **eroded the importance of gravity** as a force in the **model world developed by Mr. Isaac Newton** (1642-1727). And, in the case of **Adam Smith**, it might be the 2007 great financial crisis... which has eroded or even is eroding belief in the **invisible hand**, and in the **forces** i.e., on one **unobservable** and four **observables** interrelated parameters **presented and applied at “stock” and “option” market equilibrium price models** among decision makers looking for a trading partner, at financial markets and interrelated carbon markets.

A model (theory, concept) **should not and cannot use observations** (i.e., one unobservable and four observables interrelated parameters) **to explain** i.e., each option price including **the price for the permit to emit on our planet, one ton CO₂**.

The author does endorse **the Paris Accord and the by men kind widely accepted need to decrease CO₂ emissions** by *empirical – testable and rejectable investments outlined at theories, concepts or models*, even when the current CO₂ emissions decreasing **model obstacles**;

- (i) no worldwide standardized and commonly agreed (CO₂) definition to emit one ton CO₂ and the fact
- (ii) one ton CO₂ is currently not a cross-border deliverable commodity,

do hinder financial and carbon markets participants to mitigate CO₂ emission.

The author wants encourage CO₂ market advocates, to erode the faith of some of their colleagues, claiming being capable **to derive deductively a price (> 0) for the permit to emit one ton CO₂ by a testable but un-rejectable model.**

Particularly when this price (> 0) to emit one ton CO₂ should be - eligible i.e., within the EU (in future “globally”) and applicable EU-wide (in future worldwide), by carbon market participants on their CO₂ investment and disinvestment decisions. And, as it is currently and in the foreseeable future impossible i.e., to derive deductively the price of one ton CO₂ generated i.e., in 2020 at North Rhine Westphalia (NRW), Germany, as “global” or EU-wide CO₂ equilibrium price, or as price, calculated backwards in response to five interrelated parameters

- i.e., ***the price of the underlying permit*** to emit one ton of CO₂;
- ***the strike price of permit or option*** to emit one ton CO₂;
- ***the risk-free rate of return*** also called the “real equilibrium interest rate” (equivalent to an “equilibrium interest rate, or r^* ” (See, Carney, Mark. 2016. *Resolving the climate paradox*, remarks by Mr. Mark Carney, Governor of the Bank of England and Chairman of the Financial Stability Board, Text of the Arthur Burns Memorial Lecture by Mr. Mark Carney, Berlin, 22 September 2016, p. 6), **or** “the “real equilibrium interest rate” – the rate at which all factors of production are at full capacity and inflation is stable” (See, Schnabel, Isabel. 2021. ‘*From green neglect to green dominance?*’ speech by Ms. Isabel Schnabel, Member of the Executive Board of the European Central Bank (ECB), at the “Greening Monetary Policy – Central Banking and Climate Change” online seminar, organized as part of the “Cleveland Fed Conversations on Central Banking”, 3 March 2021. p. 2; **and** see, Schnabel, Isabel. 2023. ‘*Monetary and financial stability – can they be separated?*’ speech by Ms. Isabel Schnabel, Member of the Executive Board of the European Central Bank (ECB), at the Conference on Financial Stability and Monetary Policy in the honor of Charles Goodhart, London, 19 May 2023.), **or** “the ***natural rate of interest is a purely notional and unobservable variable***; it is intimately linked to a *specific* view of the inflation process, in which economic slack plays a key role; and *it is beyond* the influence of monetary policy. Importantly, the “existence” of such a rate does *not* imply that saving and investment directly determine any *market* interest rate. In fact, I (Mr. Borio) would argue, quite plausibly they do not” (See, Claudio Borio, November 2021, *Navigating by r^* : safe or hazardous?* BIS Working Papers, No. 982, p. 2; **and** see, Borio, Claudio, Ilhyock Shim and Hyun Song Shin. 2022. ‘*Macro-financial stability frameworks: experience and challenges*,’ BIS Working Papers, No. 1057.), **or** “the ‘equilibrium’ or ‘neutral’ real interest rate is usually defined as the real interest rate required to close the output gap and sustain the inflation rate at its target. The equilibrium interest rate ***cannot be directly observed, and must be estimated***. Such estimates are typically highly uncertain and so are not used as a mechanical guide to monetary policy.” (See, Bailey, Andrew; Cesa-Bianchi, Ambrogio; Garofalo, Marco; Harrison, Richard; McLaren, Nick; Piton, Sophie; Sajedi, Rana. October 2022. *Structural change, global R^* and the missing-investment Puzzle*, Bank of England (BoE) Staff Working Paper, No. 997, p. 3.), **or** as in case of Japan’s monetary policy the Central Bank of Japan did, after implementing in 2013 a 2 percent inflation target, respond to facts i.e., “a declining birth-rate and a low potential growth rate”, by measures - ***lowering market interest rates***, to boost “GDP and increasing employment”, hereby using “the natural rate of interest -- that is, the rate of interest at which the economy is in equilibrium”, as nonmechanical guide to their monetary policy. (See, Wakatabe, Masazumi. 2023. ‘*Japan’s Economy and Monetary Policy*’, speech by Mr. Masazumi Wakatabe, Deputy Governor of the Bank of Japan, at meeting with local leaders in Shizuoka, 2 February 2023 p.12 and p.13.), **or** as

Mr. Olli Rehn did formulate it. “In sum, current information suggests that the natural rate is likely to hover close to the pre-pandemic levels. This said, what is **certain** is that the ongoing secular shifts and the risk of new shocks leaves the outlook for r^* highly uncertain”. (See, Rehn, Olli. 2023. ‘*Whither r^* ? The outlook for the natural rate of interest under short-run inflationary pressures and structural shifts*’, speech by Mr. Olli Rehn, Governor of the Bank of Finland, at the Bank of Finland and CEPR Joint Conference 'Monetary Policy in Times of Large Shocks', Helsinki, 16 June 2023, page 3);

- **the movements (volatility) in the underlying asset price** to emit one ton CO₂, and
- **the remaining time to maturity**, applied for valuing (pricing) a **European option to emit EU-wide (in future worldwide or “globally”) one ton CO₂**.

The **backwards calculated option price** i.e., **to emit one ton CO₂**, was presented by Merton (1973) and Black and Scholes (1973) as an option price calculated by empirical and “**observable**” parameters and is also called - **option pricing process at a ‘complete market’**. (See, Bellalah, Mondher. 2010. *Derivatives, risk management & value*. Singapore: World Scientific, p. 85.)

However, even in a ‘complete market’ the option pricing process does base on **four empirical and observable backwards calculated parameter** and **one** obviously **unobservable** and therefore **non-empirical variable r^*** .

The **empirical status** of the Merton (1973) and Black and Scholes (1973) option pricing model - **being testable and rejectable**, is therefore facing the risk - being **shifted** to a **metaphysical status** of a testable but **un- rejectable model**. And for this **metaphysical model status**, we the CO₂ market solutions promoter should raise the following questions;

- (i) the CO₂ option or certificate price calculated backwards, by the **unobservable variable r^*** and four **observable parameters** should be an CO₂ option or certificate price which is **achievable despite CO₂ originators (accounting) differences at amortized costs** for one ton of CO₂ originated in China, India, or at least at the European Union;
- (ii) should be **achievable despite** the issue of **moral hazard** on CO₂ originator (or issuer); and
- (iii) should be **commonly agreed** by worldwide CO₂ originator (or issuer) - despite **the fact that** i. e., a **German buyer** of CO₂ option certifying the permission to emit one ton CO₂ originated in 2020 at China or EU country Italy, **is not running the risk** that an Indian or Dutch seller of one ton CO₂ originated in 2020 at China or the Netherlands, is **delivering one ton CO₂ taken out of the air** in 2020 at China or the Netherlands, as i.e., one ton CO₂ comprised and filled in bottles, after paying the mutually agreed price by the German buyer to the Indian or Dutch seller, **as there are currently no cross border** delivery agreements between China or the Netherlands, India or Italy (and even not within all European (EU) countries) to deliver cross border – metric tons of commodity CO₂ .

And, we the advocates for market solutions to mitigate CO₂ emissions should take into consideration, there is currently **no market mechanisms or financial system *that place***, as a snap-shot, ***a world-wide or even European Union (EU) wide accepted financial value of i.e., one ton CO₂***.

Therefor are market solutions to mitigate CO₂ emissions which cannot overcome above-described ***CO₂ obstacles or Markets Dysfunctions***, are certainly not applicable to 'financial system' definition, designed i.e., by Mrs. Michelle W. Bowman, member of the Board of Governors of the Federal Reserve System: "A financial system is considered stable when its markets and institutions are resilient and able to function even following a severe shock.

The Federal Reserve monitors risks to financial stability and uses its supervisory and regulatory tools to mitigate the risks and consequences of financial instability. During periods of financial system stress, the Federal Reserve can use additional tools, such as lending facilities and **open market operations**, to directly support the effective functioning of key financial markets and the flow of credit throughout the economy."

(See, Bowman, Michelle W. 2023. 'Panel on "Design Issues for Central Bank Facilities in the Future', page 1.)

"To address the liquidity strains **in cash-flow related Treasury and repo markets**, the Fed directly purchased large amounts of Treasury securities and conducted term and overnight repo operations using the FOMC's open market operations authority. To address strains in other markets, with the backing of the cash-flow related U.S. Treasury, the Fed used its 13 (3) emergency lending authority to establish a number of facilities to support the flow of credit to households, businesses, and communities. (2)

(See, Bowman, Michelle W. 2023. 'Panel on "Design Issues for Central Bank Facilities in the Future', page 1.)

(2) The Fed also used its open market operations authority to purchase cash-flow related agency residential and commercial mortgage-backed securities and conducted repo operations with an expanded set of global counterparties. Some of the 13(3) facilities were versions of those that had been used during the 2008 financial crisis and others were new, such as cash-flow related corporate credit facilities, which directly purchased cash-flow related corporate bonds to support the flow of credit to the economy. All 13(3) lending facilities require the approval of the Secretary of the Treasury. For further details, see Board of Governors of the Federal Reserve System (2021), "Funding, Credit, Liquidity, and Loan Facilities," webpage, <https://www.federalreserve.gov/funding-credit-liquidity-and-loan-facilities.htm>.

And Mrs. Bowman continues: "Significant asset purchases and take-up of the Fed's repo operations were required to restore smooth functioning in Treasury markets because of the liquidity needs of a wide swath of investors. By comparison, many of the 13(3) lending facilities saw relatively limited take-up, but they helped support market functioning and the supply of credit in the targeted markets by offering a backstop and bolstering investor confidence (4)". (See, Bowman, Michelle W. 2023. 'Panel on "Design Issues for Central Bank Facilities in the Future', page 2.)

(4) For a discussion of the 13(3) lending facilities and their usage, see Board of Governors of the Federal Reserve System (2020), Financial Stability Report (Washington: Board of Governors, November), <https://www.federalreserve.gov/publications/files/financial-stability-report-20201109.pdf>.

And, “it is important for the Federal Reserve to engage along with the other agencies in a thoughtful consideration of possible regulatory adjustments and structural reforms to increase the resiliency of the cash-flow related Treasury markets and reduce the likelihood of future market dysfunction (6)”.

(6) For a discussion of potential reforms, see Inter-Agency Working Group on cash-flow related Treasury Market Surveillance(2021), *Recent Disruptions and Potential Reforms in the U.S. Treasury Market: A Staff Progress Report* (Washington: U.S. Department of the Treasury November) ,<https://home.treasury.gov/system/files/136/IAWG-Treasury-Report.pdf>; and Inter-Agency Working Group on Treasury Market Surveillance (2022), *Enhancing the Resilience of the U.S. Treasury Market:2022 Staff Progress Report* (Washington: U.S. Department of the Treasury, November), <https://home.treasury.gov/system/files/136/2022-IAWG-Treasury-Report.pdf>.

(See, Bowman, Michelle W. 2023. ‘Panel on “Design Issues for Central Bank Facilities in the Future’, page 4, and see, Waller, Christopher J. 2023. ‘The Future of Macroeconomic Policy’, remarks by Christopher J. Waller, Member of the Board of Governors of the Federal Reserve System, at a conference sponsored by the Norges Bank, the International Monetary Fund, and the *IMF Economic Review*, Oslo, Norway, June 16, 2023, pages 2 and 3.)

Answers to Q5- note 2.6; Would there be any unintended consequences of a Pillar 3 framework for climate-related financial risks? If so, how could these be overcome?

The need for the falsifiability or testability criterion as a criterion of the empirical character of scientific theories, will not replace market participants decision making under “uncertainty” by claiming to calibrate “risks” and to calculate “equilibrium prices” simultaneously

Banks should be enabled by external and internal supervisor to disclose and to manage climate-related financial risk exposures by a *falsifiability or testability criterion* what does segregate banks operations into **content** maximizing or **probabilities** maximizing **operations**, particular when probabilities maximizing operations do rely on non-cash-flow related models or theories i.e., *the effective natural interest rate, or the un-rejectable model* (or statement) there is - *a financed* cash-flow related investment, and *a non-cash-flow related* option price which does, if combined effectively *mitigate CO₂ emissions*.

The commenter will show why carbon market advocates who are claiming to mitigate i.e. CO₂ emissions, by *non-empirical* or *un-rejectable* market *models* or *theories* should take very seriously the reminder by the United Nations (UN), the Central Banks and Supervisors Network for Greening the Financial System (NGFS) and others **that it is for mankind not affordable, to wait additional decades** for i.e., the *‘harmonization in carbon accounting practices’*, and that it is not affordable **to wait additional decades** for i.e., *a properly defined and cross boarder deliverable carbon emission permit underlying i.e., one ton CO₂*.

The Committee took notice “**that the development of a meaningful** (“content rich”) **and robust** (“withstanding server tests”) **Pillar 3 framework for climate-related financial risks is likely to be an iterative** (“trial and error”) **process**”. (see, for comments Sept. 2023, p.1)

Particular *when “differences in **carbon accounting** and **credit recognition** practices across jurisdictions* have led to carbon credits being treated with a degree of skepticism. To build ‘an efficient and trusted carbon market’, we will need better and verifiable abatement **data, harmonization in carbon accounting practices, and interoperability between the voluntary and compliance carbon markets.**” (Menon, Ravi, 2022. ‘*Net zero - act now, act fast, act together*’, speech by Mr. Ravi Menon, Managing Director of the Monetary Authority of Singapore, at COP27 Singapore Pavilion Finance Day, Sharm El-Sheikh, 9 November 2022, page 3; **and** see, Menon, Ravi, 2023. ‘*The work of the NGFS in four emerging issues in climate change*’, opening remarks by Mr. Ravi Menon, Managing Director of the Monetary Authority of Singapore and Chairman, Network for Greening the Financial System (NGFS), at the NGFS Workshop, Singapore, 26 April 2023; **and** see, Menon, Ravi, 2023. ‘*A supervisory push for transition planning and blended finance*’, opening remarks (virtual) by Mr. Ravi Menon, Managing Director of the Monetary Authority of Singapore and Chair of the Network for Greening the Financial System, at the Green Swan conference 2023, Basel, 31 May 2023, “*What we need is public-private partnership in financing that is synergistic not duplicative. We need to make every dollar of public capital count. We need blended finance*”, page 4.)

And, therefore **it should be paramount to enable**, by a Pillar 3 disclosure framework for climate-related financial risks, financial and carbon market participants including **banks management** - to identify, quantify and **to manage climate-related financial risk exposures, not by concepts, models or theories** which do **rely** on or are “**powered by invisible forces**” **to achieve**; - (i) a globally or worldwide effective **natural interest rate** by non-empirical theories, (ii) a worldwide effective **price to emit one ton CO₂** by testable and un-rejectable models, (iii) that financial and carbon market participants **decision making** on climate-related financial risk exposures does **rely on duration mitigation**, (iv) that decision making on “**Blended Finance**” should first be implemented regional and EU wide, and later Globally; and, that “**Blended Finance**” should **never** mixing up **cash-flow based sustainable investments** and their degree of empirical content with **non-cash-flow related options** - certifying a regional or at least EU wide, eligible permission **to emit** within the European Union, **one ton CO₂**; and (iv) that the proposed and EU wide applicable Pillar 3 disclosure framework for climate-related financial risk exposures, managed by financial and carbon market participants including banks management **should use as a criterion of empirical character the falsifiability or testability** of by banks management applied scientific theories or models.

Additionally, the commenter will show (v) that on a regional or EU level these within the EU by financial and carbon market participants including banks, managed Pillar 3 framework climate-related financial risk exposures, will become **a manageable climate-related financial risk exposure**, after

- (i) defining for a CO₂ permit the underlying one-ton CO₂ as one ton CO₂ **taken out of the atmosphere** at i.e., the EU level, by
- (ii) establishing at least within the EU one metric ton CO₂ as **cross border deliverable commodity**, by
- (iii) establishing for purchased or sold CO₂ permits (options), eligible to emit at least within the EU one ton CO₂ – **cash and noncash settlement** – i.e., through

physical delivery of one ton CO₂ or the equivalent of cashflow related investments to mitigate CO₂ emissions, traded at Exchanges or platforms.

Answers to Q5- note 2.7; Would there be any unintended consequences of a Pillar 3 framework for climate-related financial risks? If so, how could these be overcome?

Commenters recommendation - to apply on models and theories a falsifiability or testability criterion what is segregating banks operations into content maximizing or probabilities maximizing operations

Particular when bank's **operations maximizing probabilities do rely on non-cash-flow related models or theories** - i.e., a worldwide effective **price to emit** one ton CO₂; a **globally** or worldwide **effective natural interest rate**; and that decision making by financial and carbon market participants including banks management on "**Blended Finance**" should **never mixing up cash-flow based sustainable investments** and their degree of empirical content, with non-cash-flow related *CO₂ permits, Green Future contracts* or cash-flow related *carbon credits*.

A model what for example is claiming being capable **to sell** at a price (>0) i.e., **a non-cash-flow related permit to emit one ton CO₂**, by structuring, blending or mixing-up climate funding resources with carbon market mechanisms, does convey ***an un-rejectable message*** to carbon markets participants aiming to mitigate (CO₂) emissions; ***there is - a financed cash-flow related investment, and a non-cash-flow related option price which does mitigate (CO₂) emissions.*** And is enabling CO₂ emissions mitigating investments, financed by climate funders "to benefit from more certainty concerning the future cash flows generated by carbon market activities in the context of climate change mitigation programmes". (See, Mikolajczyk, Szymon; Imogen Long; Gabriela Martinez. 2022. 'Survey report on climate funding and carbon markets; Positions of key international climate funds, donor and recipient countries on blending climate funding with carbon markets. Climate Focus, Amsterdam, the Netherlands, 18 October 2022, page 2.)

In regard to an un-rejectable or not fallible message i.e., there is - ***a financed*** cash-flow related investment, ***and*** a non-cash-flow related carbon option price ***which does mitigate (CO₂) emissions***, it is **at least premature**;

- ***to conclude*** "the adoption of the Article 6 rulebook at COP26, held in Glasgow in November 2021, has generated new momentum behind the implementation of climate action through market and other co-operation mechanisms, and its implementation is expected to unlock cost-effective emissions reductions" (See, Mikolajczyk, Szymon; Imogen Long; Gabriela Martinez. 2022. 'Survey report on climate funding and carbon markets;' page 2.),

- ***or to assume*** "the implementation of climate action through market and other co-operation mechanisms, and its implementation (is expected) to unlock cost-effective emissions reductions" (See, Mikolajczyk, Szymon; Imogen Long; Gabriela Martinez. 2022. 'Survey report on climate funding and carbon markets;' page 2.),

- ***or to highlight***, "as a result, the ***climate funding transformation return can be more than the sum of the actual direct investments supported***". (See, Mikolajczyk, Szymon; Imogen Long; Gabriela Martinez. 2022. 'Survey report on climate funding and carbon markets;' page 10.)

Additionally, on the attempt to manage **climate-related financial risk exposures**, by a worldwide **effective price to emit** one ton CO₂, or by a **natural rate of interest** as a purely notional and unobservable variable, or by a **financed cash-flow related investment**, and a **non-cash-flow related option price which does when “blended” or combined mitigate (CO₂) emissions**.

The commenter is showing with reference to Mr. Popper - *“the need for the falsifiability or testability criterion as a criterion of the empirical character of scientific theories* (i.e., *there exists a worldwide effective price to emit one ton CO₂; there exists a natural rate of interest as a purely notional and unobservable variable; or the search for a financed cash-flow related investment and a non-cash-flow related option price which does when “blended” or mixed-up mitigate (CO₂) emissions*),

I (Mr. Popper) will discuss, as an example, a simple, purely existential statement which is formulated in purely empirical terms.” (See, Popper. 1968. Chapter 10, p. 249.)

Hereby, consists Mr. Popper’s example out of the following purely existential theory:

“There exists a finite sequence of Latin elegiac couplets such that, if it is pronounced in an appropriate manner at a certain time and place, this is immediately followed by the appearance of the Devil - that is to say, of a man-like creature with two small horns and one cloven hoof”. (See, Popper. 1968. Chapter 10, p. 249.)

And Mr. Popper argues: *“Clearly, this untestable theory* (i. e., *the devil-summoning spell, the existence of a worldwide effective price to emit one ton CO₂; the existence of a natural rate of interest as a purely notional and unobservable variable; or the search for a financed cash-flow related investment and a non-cash-flow related option price which does when “blended” or mixed-up mitigate (CO₂) emissions*) *is, in principle, verifiable.*

I (Mr. Popper) believe that the existential statement (the devil-summoning spell) *is false: but I (Mr. Popper and the commenter do) believe that it* (the devil-summoning spell, the natural rate of interest as a purely notional and unobservable variable; or the search for a financed cash-flow related investment, and a non-cash-flow related option price which does when “blended” or mixed-up mitigate (CO₂) emissions) *is a false metaphysical statement. Empirically, it is irrefutable. No observation in the world can establish its* (the devil-summoning spell; the existence of a worldwide effective price to emit one ton CO₂; the existence of a natural rate of interest as a purely notional and unobservable variable; or the search for a financed cash-flow related investment and a non-cash-flow related option price which does when “blended” or mixed-up mitigate (CO₂) emissions) *falsity. There can be no empirical grounds for its falsity.*

Moreover, it can be easily shown to be highly probable: like all existential statements (the devil-summoning spell; the existence of a worldwide effective price to emit one ton CO₂; the existence of a natural rate of interest as a purely notional and unobservable variable; or the search for a financed cash-flow related investment and a non-cash-flow related option price which does when “blended” or mixed-up mitigate (CO₂) emissions), *it is in an infinite (or sufficiently large) universe almost logically true, to use an expression of Carnap’s. Thus, if we take it* (the devil-summoning spell; the existence of a worldwide effective price to emit one ton CO₂; the existence of a natural rate of interest as a purely notional and unobservable variable; or the search for a financed cash-flow related investment and a non-cash-flow related option price which does when “blended” or

*mixed-up mitigate (CO₂) emissions) **to be empirical, we have no reason to reject it, and every reason to accept it and to believe in it – especially upon a subjective theory of probable belief.***

*Probability theory tells us even more: it can be easily proved not only that **empirical evidence can never refute an almost logically true existential statement** (like the devil-summoning spell; or the existence of a worldwide effective price to emit one ton CO₂; the existence of a natural rate of interest as a purely notional and unobservable variable; or the search for a financed cash-flow related investment and a non-cash-flow related option price which does when “blended” or mixed-up mitigate (CO₂) emissions), **but that it** (the devil-summoning spell; or the existence of a worldwide effective price to emit one ton CO₂; the existence of a natural rate of interest as a purely notional and unobservable variable; or the search for a financed cash-flow related investment and a non-cash-flow related option price which does when “blended” or mixed-up mitigate (CO₂) emissions) **can never reduce its probability. ... So, the empirical probability or degree of empirical confirmation** (in Carnap’s sense) **of our statement about the devil-summoning spell** (or about the existence of a worldwide effective price to emit one ton CO₂; the existence of a natural rate of interest as a purely notional and unobservable variable; or the search for a financed cash-flow related investment and a non-cash-flow related option price which does when “blended” or mixed-up mitigate (CO₂) emissions) **must forever remain equal to unity, whatever the facts may be.**” (See Popper. 1968. Chapter 10, p. 249.)*

This said about an **existential statement**, here my take on the real carbon emission (CO₂) equilibrium price or the natural rate of interest; “The concept of the natural rate of interest goes back a long way in the history of economic thought. While it is most closely associated with Knuth Wicksell (1898; 1851-1926), the seeds of the idea can already be found in John Stuart Mill (1806-1873)” (See, Borio, Claudio. 2021. *Navigating by r*: safe or hazardous?* BIS Working Papers, No. 982, p. 2.) And Mr. Popper does conjecture “the concept of the natural rate of interest did J. St. Mill inherit from Comte. And ... that the concept of the natural rate of interest were held in ancient times by Plato, and before him by Heraclitus and Hesiod.” (See, Popper. 1968. Chapter 16, p. 338.)

The “*natural interest rate* is generally defined as the short-term real interest rate that, in the absence of shocks – in steady state – equates saving and investment, clearing the goods market at the level of output that corresponds to potential. At that point, inflation is seen as stable. In addition, *in virtually* all representations, r^* is independent of monetary policy and driven exclusively by structural factors. **The natural rate of interest is a purely notional and unobservable variable**; it is intimately linked to a *specific* view of the inflation process, in which economic slack plays a key role; and *it is beyond* the influence of monetary policy. Importantly, the “existence” of such a rate does *not* imply that saving and investment directly determine any *market* interest rate. In fact, I (Mr. Borio) would argue, quite plausibly they do not.” (See, Claudio Borio, November 2021, *Navigating by r*: safe or hazardous?* BIS Working Papers, No. 982, p. 2.)

For the **empirical probability or degree of empirical confirmation** of i.e., *the natural rate of interest*, the commenter refers to Mr. John C. Williams, President and Chief Executive Officer of the Federal Reserve Bank of New York, thoughts; “The idea of a natural rate of interest has been around ever since the Swedish economist Knut Wicksell wrote about it

in 1898. Early on, it was recognized that it's not something that can be directly observed or measured. As the economist John H. Williams wrote in 1931: "The natural rate is an abstraction; **like faith**, it is seen by its works. One can only say that if the bank policy succeeds in stabilizing prices, the bank rate must have been brought in line with the natural rate, but if it does not, it must not have been." (See John H. Williams. "The Monetary Doctrines of J. M. Keynes," *The Quarterly Journal of Economics* 45, no. 4 (August 1931): 547 – 587.)

And Mr. John C. Williams, continued; "The topic gained renewed relevance in 1993, following John Taylor's famous description of a monetary policy rule that incorporated an assumption of **a natural rate of 2 percent**. (See, John B. Taylor. "Discretion versus Policy Rules in Practice", *Carnegie-Rochester Conference Series on Public Policy*, Vol. 39 (December 1993), pp. 195 – 214.)

For policymakers, the natural questions—pardon the pun—were: Is 2 percent the right number? Does it change over time? And how would we know? Those were the very questions than then-Federal Reserve Governor Larry Meyer posed to Board staff back in 2000. And that's what brought Thomas and me (Mr. John C. Williams) together. On December 14, 2000, after a few short months of working together, we wrote our ideas and results in a memo to the Board of Governors. The memo started with the bold declaration: "This memo is a first report on a broader project to study alternative definitions and estimates of the equilibrium real rate (R^*) and to evaluate their usefulness in the conduct of monetary policy." (See, Thomas Laubach and John C. Williams. *Estimates of a Time-varying Equilibrium Real Federal Funds Rate*. Memo to the Board of Governors of the Federal Reserve System, December 14, 2000.)

Let me (Mr. John C. Williams) conclude by sharing something I learned from Thomas and hold dear. It's actually hidden in the last line of the abstract from our first published paper. It says: "*Estimates of the natural rate of interest, however, are very imprecise and subject to real-time measurement error.*" (See Thomas Laubach and John C. Williams. "Measuring the Natural Rate of Interest," *Review of Economics and Statistics* 85, no.4 (November 2003): 1063-70.)

To some, that may sound like a negative statement. But it's also what makes **empirical research** so exciting and challenging. There is no one right answer and no single way to view the world. **Empirical research is a process of continuous learning and adaptation—fueled by perseverance**. People come up with different approaches, and we learn from all of them." (See, Williams, John C. 2023. *Measuring the Natural Rate of Interest: Past, Present, and Future*, speech by John C. Williams, President and Chief Executive Officer of the Federal Reserve Bank of New York, at the Thomas Laubach Research Conference, Board of Governors of the Federal Reserve System, Washington, DC, May 19, 2023, page 4.)

However, we the market solutions promoter should keep in mind; "... **that it is preferable, ..., not to assume uncritically that the terms 'empirical' and 'well-formed' (or 'meaningful') must coincide** - and that the situation is hardly improved if we assume, uncritically, that probability or probabilistic '**confirmability**' may be **used as a criterion of the empirical character of statements or theories**." (See, Popper, Karl Raimund. 1968, *Conjectures*, Appendix: A presumably false yet formally highly probable non-empirical statement, p. 250.)

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This said, we the market solutions promoter should take into consideration; “there will be well-testable theories, hardly testable theories, and **non-testable theories**. Those which are non-testable **are of no interest to empirical scientists**. **They may be described as metaphysical**.” (See, Popper. 1968. Chapter 11, p. 257.)

And therefore, we the market solutions promoter on mitigating CO₂ emissions, should take results out of a system of estimates of r^* which are similar or coincide to those estimated directly before the pandemic’,

“as scientific only if it (the system of estimates of r^* , or the model claiming there is - a financed cash-flow related investment, and a non-cash-flow related option price which does mitigate (CO₂) emissions) **makes assertions** (i.e., there is always a positive price (>0) achievable for each by a human decision maker and carbon markets participant sold CO₂ emission permit) **which may clash with observations; and ... is, in fact, tested by attempts to produce such clashes, that is to say by attempts to refute it.**” (See, Popper. 1968. Chapter 11, p. 256.)

The attempts to produce such clashes **to refute** i.e., the model claiming there is - a financed cash-flow related investment, and a non-cash-flow related option price which does mitigate (CO₂) emissions, **or** there is always a positive price (>0) achievable for each by a human decision maker and carbon markets participant sold CO₂ emission permit, **or** there is always achievable a positive amount of monies out of the sale of metric tons CO₂ when purchased as carbon credits by MDBs, **or** there is always a positive price (>0) achievable out of the purchase of Green Future contracts.

These statements are testable, by their assertions (i), (ii), (iii) which **clash with** –

- (i) **deficits** on the ‘harmonization in carbon accounting practices’, **to define a carbon permit to emit one ton CO₂**, do clash with
- (ii) a currently **not properly defined** and **cross boarder deliverable** carbon emission permit **underlying**, to emit one ton CO₂, do clash with
- (iii) **the deficit** for carbon market participants **not be capable to trade** a *CO₂ permit*, a *Green Future contract* or a *carbon credit*, at *EU-wide* (in a for seeable future hopefully) **world-wide interrelated** carbon credit and carbon option **markets**.

These assertions clashes or tests on carbon credit or carbon option markets with statements to mitigate by measures CO₂ emissions, cannot and will not be ignored by human decision maker. And might, according to above outlined deficits, at least currently, prevent decision maker to classify these measures outlined at models (i.e., to mitigate CO₂ emissions), as an *efficient* or *trustful* interrelated **market mechanisms**.

Answers to Q6 - note 3:

The commenter does reply to question number 6: – “What are your views on potentially extending a Pillar 3 framework for climate-related financial risks to the **trading book**”? (See, Basel Committee on Banking Supervision. 2023. Consultive document, p.10)

The duration concept applied to climate-related financial risk exposures is mixing up content and probability statements

"The Committee is exploring both qualitative and quantitative disclosure requirements for climate-related financial risks in the banking book and would welcome feedback on the meaningfulness and feasibility of these proposals." (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.3)

The commenter's reply – on climate-related financial risks, and by financial and carbon market participants applied mechanisms **to manage climate-related financial risks by** either **cash-flow based** sustainable **investments** and their degree of empirical content, or by **non-cash-flow related options** certifying the permission **to emit** i.e., **one ton (CO₂)**; might be seen as the commenter's attempt or recommendation to decision maker at markets and banks, **to manage** by bank's **decision makers** identified and quantified **climate-related financial risk exposures**, by (purchasing or selling) **CO₂ options** at banks **“banking and trading books”**.

Even when these CO₂ options - **currently** are certifying **a not globally eligible permission to emit** i.e., for each purchased CO₂ option **one ton (CO₂)**; and even when these CO₂ options - **currently** are **not globally eligible** for bank's management **to manage bank's climate-related financial risks** within by i.e., supervising authorities specified i.e., one year **reporting period**; **to report** about i.e., **bank's** managed (enlarged or mitigated) **climate-related financial risk exposures**; within by i.e., **bank's** supervising authority defined **reporting area** - i.e., the European Union (EU).

My guesses on potentially extending a Pillar 3 framework for climate-related financial risk exposures to **banks “banking and trading books”** refer to i.e., **EU-Banks need to manage** by duration climate-related financial risk exposures at **banks “banking and trading books”** by i.e., CO₂ certificates providing the permit (i.e., within the EU) to emit one ton CO₂.

Any investor with purchasing interest in a Green Coupon Bond or Zero-Coupon Bonds (see **Appendix A** and **B**) compares, to the best of her/his ability, the duration changes caused by

- (i) decreasing present values or prices for the Green Coupon Bond or Zero-Coupon Bond, equivalent to yield increases, by keeping the maturity (content) constant,
- (ii) a shortening of maturity (content) of the Green Coupon Bond or Zero-Coupon Bond **cannot be offered** by market participants with selling or disinvestment interests, but
- (iii) **any shortening of the current duration** of the Green Coupon Bond or Zero-Coupon Bond can be achieved by yield increases or price decreases.

Only price decreases or increases are included in the duration concept.

Therefore, any shortening of the duration due to increases in the Green Coupon Bond or Zero-Coupon Bond yield (i.e., the ratio of the yield to the price), **is not equivalent** to a shortening of the maturity or **an increase in the informational content**. Any debt restructuring arrangement with focus on bonds outstanding maturity has to be agreed upon by the current investors and the borrower.

Answers to Q6– note 3.1: What are your views on potentially extending a Pillar 3 framework for climate-related financial risks to the **trading book**?

Market prices are usually seen by market participants as cash flows, discounted by an “equilibrium interest rate or r^* ” and do not explain market price changes

My guesses on potentially extending a Pillar 3 framework for climate-related financial risk exposures to **banks “trading books”** refer to i.e., EU-Banks need to manage climate-related financial risk exposures at **banks “banking and trading books”** i.e., by purchasing and selling CO₂ certificates providing the permit (i.e., within the EU) to emit one ton CO₂ at market prices usually derived from interrelated financial and carbon markets cash flows discounted by market participants using an “equilibrium interest rate, or r^* ”.

Market prices are usually seen by market participants as cash flows discounted by an “equilibrium interest rate, or r^* ” (see Carney, Mark. 2016. *Resolving the climate paradox*, remarks by Mr. Mark Carney, Governor of the Bank of England and Chairman of the Financial Stability Board, Text of the Arthur Burns Memorial Lecture by Mr. Mark Carney, Berlin, 22 September 2016, p.6). In regard to cash flows which are identical on yields, same counterpart (borrower), and maturity, it was shown that only one payment more does increase **cash flow informational content**. And did enable markets participants to make a decision (purchasing or selling), and after finding a trading partner, ownership change will take place through delivery versus payment (DVP) settlement.

According to text books, these activities (purchasing or selling) between trading partner take place in the status of between trading partner mutually agreed price, what after DVP settlement cannot impact the cash flow payments, yield or the mutually agreed price. **Movements in** (mutually agreed or “equilibrium”) market prices are usually not text books objectives. But if movements in market prices are observable by market participants who did find a trading partner and after DVP settlement. These **movements in market prices should** in the common understanding of most market participants who did find a trading partner, and particular after DVP settlement, **be related to cash flows increased or decreased informational content**.

The informational content for trading partner at cash flows with identical yields, same counterpart (borrower), same maturity and after DVP settlement, **cannot explain** price or fair value movements from an “equilibrium” or **a mutually between trading partner agreed price** (or interest rate) but **does explain trading partner’s decisions**.

In case of Future Rate Agreements (FRAs) bets between trading partner, where the bets met the underlying or reference interest rate (i.e., the “equilibrium interest rate, or r^* ”

(see Carney 2016, p.6, 2016), this at FRA markets observable FRA option price status, reflects no movement from between trading partner agreed FRA option price but **does explain trading partner's non** (delivery versus payment (DVP)) **settlement activities**, and might be defined by FRA market participants as “snap-shot equilibrium interest rate without DVP settlement”.

The fact that increased informational content **cannot** be compensated for by a higher yield (in the sense of the probability of receiving future payments) has inescapable consequences for decision-making investors' “state of indifference”.

Market advocates who are focusing on the difficult-to-observe status of indifference of decision-making investors are stating that:

- Whether decision-making investors (trader) preferred method of adjustment (i. e., on cash flows) is **content or price changes** (i.e., yield changes) seems to be unpredictable or impossible to forecast.

The solution proposed by market advocates:

- Decision-making investors (trader) in markets adjust **yield and/or content** (i.e., maturity, metric tons CO₂).

This solution is a logical contradiction: It is not possible to use price or yield changes of cash flows to create the same duration or state of indifference (equilibrium price, fair value) between zero-coupon bonds, green coupon bonds or other installment payment cash flows,

- without commingling the high probability with facts (a green coupon bond “one payment more” in comparison to a zero-coupon bond) also to be called informational content.

And, if any commingling of high probability with high informational content has to be rejected, **any increase in informational content** (i.e., on cash flows) **cannot be compensated for by a higher yield**. Or, as outlined by Mr. Mark Carney, “the game of guessing what everyone else is guessing (everyone else is guessing...) was familiar to Keynes who observed that too often investors ‘devote [their] intelligences to anticipating what average opinion expects the average opinion to be’ (see Keynes, John Maynard. 1936. *The general theory of employment, interest and money*. London: Palgrave Macmillan, chapter 12).

“This disconnection between decisions and fundamentals feeds market volatility and capital misallocation” (see Carney, Mark, Three truths for finance, remarks by Mr. Mark Carney, Governor of the Bank of England and Chairman of the Financial Stability Board, at the Harvard Club UK Southwark Cathedral dinner, London, 21 September 2015, p. 4).

In addition, some traders and market participants might even see “market failures” as a result of market participants “decisions” commingling or mixing up high probabilities i.e., out of equity and option pricing with high cash flow related finance and its informational content.

Answers to Q6 – note 3.2; What are your views on potentially extending a Pillar 3 framework for climate-related financial risks to the **trading book**?

EU-Banks acting at financial and commodity markets to manage climate-related financial risk exposure by CO₂ certificates providing the permit (i.e., within the EU) to emit one ton CO₂ have to find a trading partner

My guesses on potentially extending a Pillar 3 framework for climate-related financial risk exposures to **banks “trading books”** refer to i.e., EU-Banks need to manage climate-related financial risk exposures at **banks “banking and trading books”** by CO₂ certificates providing the permit (i.e., within the EU) to emit one ton CO₂ and the need to find at financial and commodity markets a trading partner.

Stating that there is always a positive relation between yield (or price) and informational content is false, as aggregating informational content and aggregating probabilities are two incompatible aims.

Therefore, market advocates should encourage market participants to make decisions, to the best of their ability, by accumulating either probabilities or informational content. Moreover, in all cases where humans act on strategies that are based on accumulated informational content, the decision maker cannot simultaneously accumulate probabilities to make a decision. **As for logical reasons** (not political reasons), neither a deductive nor an inductive inference **can lead from consistent premises** (bid and offer prices for i.e., security, option, commodity, and noncash flow related carbon emission (CO₂) permission) **to a conclusion that contradicts them**. (See Popper 1968, chapter 1).

Traders in markets and other decision makers do make decisions to the best of their ability, by maximizing cash flow related informational content or by accumulating probabilities of future events, i.e., on certified noncash flow related carbon emission permission i.e., to emit one ton of CO₂ *without to establish* i.e., within the EU, *a cross-border deliverable (DVP) underlying* – the permission to emit, during EU-Banks reporting period, i.e., *commodity one ton CO₂*.

Answers to Q6 – note 3.3: What are your views on potentially extending a Pillar 3 framework for climate-related financial risks to the **trading book**?

A note – why financial and commodity market advocates like to promote a symmetric relation between market price or yield changes and identified and quantified climate-related financial risk exposure changes

“The Committee welcomes feedback on the meaningfulness and feasibility of these metrics, (see item, Exposure by sector,) **particularly if disclosed on a mandatory basis, to enable comparability across banks**. In addition, **views are welcome on other potential metrics** that would enable market participants to assess climate-related financial risks at banks”. (See, for comments Sept. 2023, p.4)

My guesses on potentially extending a Pillar 3 framework for climate-related financial risks to the trading book refer to i.e., EU-Banks need, to manage climate-related financial risk exposure by CO₂ certificates providing the permit (i.e., within the EU) to emit one ton CO₂ and refer to the fact why financial and commodity market advocates

like to promote a **symmetric relation** between market **price or yield changes** and identified, quantified **climate-related financial risk changes**.

Stating that there is always a positive relation between market price or yield changes and quantified climate-related financial risk exposure changes is false, as aggregating and combining informational content and probabilities are incompatible aims.

However, EU-Banks decision maker who are accumulating either probabilities or informational content will operate on their banking and trading books in compliance with the Basel Committee on Banking Supervision (the Committee or BCBS) proposal and recommendation, **to apply on bank's trading books** the Committee's simplified standardized approach (SSA) documents.

"Market risk or climate-related financial risks at banks is defined as the risk of losses arising from movements in market prices. The risks subject to market risk capital requirements include but are not limited to: (1) default risk, interest rate risk, credit spread risk, equity risk, foreign exchange (FX) risk and commodities (i.e., the permission to emit, during a one year reporting period, within the EU area, one metric ton CO₂) risk for trading book instruments; and (2) FX risk and commodities (i.e., the permission to emit, during a one year reporting period, within the EU area, one metric ton CO₂) risk for banking book instruments" (see Basel Committee on Banking Supervision 2019, *Minimum capital requirements for market risk*).

In the case of market risk **or** climate-related financial risk exposure at banks, the Basel Committee on Banking Supervision simplified standardized approach (SSA) documents, prepares bank **trading book instruments** (i.e., the permission to emit, during a one year reporting period, within the EU area, one metric ton CO₂) **for disclosure**, by referring to **(i) one calendar-day trading time horizons**, including a **one calendar-day instrument** (i.e., the permission to emit, during a one year reporting period, within the EU area, one metric ton CO₂) **transaction settlement** (delivery versus payment (DVP)) **for each end-of-trading day profit and loss (P&L)** in the trading book; **(ii) all traded instrument profits (margins) over a one calendar-day trading time horizon**, including instruments with a (delivery versus payment (DVP)) transaction settlement **longer than one calendar-day**; and **(iii) the fair value** of all trading instruments as **calculated under the SSA** in the bank's **trading book** at the end-of-trading and which will be **kept** (until the next trading day) **as trading instruments** (i.e., the permission to emit, during a one year reporting period, within the EU area, one metric ton CO₂).

In all cases where the risk-weighted assets for market risk are determined under the SSA, uncertainties about future value developments, apart from the remaining *instruments to be traded the next day and the calculated fair value of transactions with a settlement of more than one calendar-day*, are replaced with the *"certain" end-of-trading day profit and loss (P&L) in the trader's trading account* (see Basel Committee on Banking Supervision. 2019. Minimum capital requirements for market risk. Basel, Switzerland: Bank for International Settlements, paragraph 40.1).

The SSA is recommended by the Basel Committee on Banking Supervision as an alternative method to calculate the capital requirements for market risk. For banks that

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have relatively small or noncomplex trading portfolios, the SSA a recalibrated version of the Basel 2.5 market risk standardized approach may be used by banks in lieu of the “full” standardized approach, subject to supervisory approval (see Basel Committee on Banking Supervision. 2020. *Revisions to market risk disclosure requirements*. Basel, Switzerland: Bank for International Settlements).

Traders, accountants and supervisors may believe in the daily change in the “fair value” of each traded instrument, calculated by a “snapshot” analysis, and may also believe that the calculated fair value of the trading instruments that remain at the end-of-trading day are profit and loss (P&L) amounts that have been, to the best of the traders’ and accountants’ ability, calculated and accumulated for disclosure in **each trading book at the end-of-trading day**.

The SSA process for estimating and quantifying the “market risk” of instruments traded with **settlements (DVP) longer than one day**, and the calculated fair value of instruments remaining at the end-of-trading day which are used as the basis for calculating capital requirements, is in conflict with “the second lie” of Mr. Mark Carney’s three truths for finance, which is outlined as follows: **the belief that markets** (supervisors and accountants using the SSA for (market risk) disclosures at the end of each trading day) **always clear mitigates two dangerous consequences**.

First, if markets always clear, they can be assumed to be in equilibrium or, said differently, “to be always right”.

Second, if markets always clear (at the end of each trading day), they should be naturally stable.

“Evidence to the contrary [as shown by SSA calculations for settlements that do not occur on the same day and for transactions remaining at the end-of-trading day] must be the product of market distortions or the result of incomplete markets” (see Carney 2015, p. 3, 4).

The SSA process of estimating and quantifying the “market risk” of instruments with settlements that are not on the same day and the estimated fair value of instruments remaining at the end of the trading day is used in calculating capital requirements.

However, traders’ and accountants’ end-of-trading day fair-valued **instruments that have not cleared** (remaining instruments and traded instruments that are not settled on the same day) **should be not assumed to be in equilibrium**. Therefore, it might be worth mentioning that if, i.e., securities markets do not always clear at the end of each trading day, they cannot be naturally stable. This fact will be considered as an estimated and quantified climate-related financial “market risk” exposure change by the SSA.

The finding on how the SSA estimates and quantifies climate-related financial risk exposure changes (“market risk”) should bring traders and other decision makers back to “the challenge”: humans are not capable of making “reliable” fair-value calculations or prognoses.

However, humans applying the SSA are, to the best of their ability, putting all efforts into the SSA process to make (i.e., deductively) their decisions by using a “logical” rule based on increasing or decreasing informational content (which is not equivalent to

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probability statements), or are using the SSA to calculate fair values (probabilities) to the best of their ability.

The simplified standardized approach (SSA) applied by banks extending a Pillar 3 framework for climate-related financial risk exposures to **banks “trading books”** by CO₂ certificates providing the permit (i.e., within the EU) to emit one ton CO₂ and the need to find at financial and commodity markets a trading partner, are a by banks responsible staff **daily prepared “snapshot” analysis**, and is for banks supervising authorities **of limited prognostic power**.

However, the SSA “snapshot” analysis result will not be in conflict with climate-related financial risks need - to be *assessed and considered in a forward-looking manner*, as they (the climate-related financial risks) may materialize over a longer time horizon, with currently limited but evolving data to predict future impacts." (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.2)

And the SSA “snapshot” analysis result will not be in conflict with the Committee’s proposal **“banks should disclose forward-looking information, such as forecasts**, to **allow market participants to assess banks’ exposure** to the transitioning activities of their counterparties in certain sectors.” (See, for comments Sept. 2023, p.6)

As daily reviews and disclosures of banks climate-related financial risk exposures at **banks’ “trading book”** by bank’s responsible staff i.e., traders, treasurers, accountants and risk managers according to SSA and recommendations outlined in the Basel Committee on Banking Supervision revisions to the market-risk disclosure requirements and **Basel II** (pillar 2, “Internal Capital Adequacy Assessment Process” (ICAAP)), **will improve banks’ trading book management of climate-related financial risk** (“market risk”) exposure changes.

And, the daily review and disclosure by banks’ responsible staff on banks trading book as bank’s daily quantified climate-related financial risk and market risk exposure will provide a basis to calculate daily bank’s capital requirements.

Therefore, is it for banks climate-related financial risks management activities not appropriate - **to hedge climate-related financial risks** measured by **metric tons of carbon dioxide equivalent (MtCO₂e)**, by purchasing or selling MtCO₂e certificates emitted by originator (banks) providing the permit to emit one metric-ton MtCO₂e, **as the certificate to emit one metric-ton MtCO₂e has no for banks trading book usefully defined and deliverable underlying** i.e., one metric ton CO₂ or other climate related gases i.e., one metric ton methane.

Additionally, hedging effectively **a methane exposure** will be without at least within the EU accepted CO₂ – methane conversion formular and according to IFRS accounting standards, not provide an **effective** (market risk including **climate-related financial risk** compensating) **hedge** of one ton methane or one ton of other greenhouse gases (GHGs), quantified by EU-Banks during their reporting period, and converted into equivalent metric tons of CO₂.

The Committee should consider that in “a first view” the climate risk assessing and calculating process indicator (**MtCO_{2e}**) cannot assist financial and carbon market participants to manage their exposure to climate-related risks.

Therefore, the commenter proposes to refer to the Committee’s “Pillar 3 disclosures aim to promote market discipline and enable market participants to access key information relating to a bank's regulatory capital and risk exposures in order to increase transparency and confidence about a bank's exposure to risk and the overall adequacy of its regulatory capital.” (See, Consultive document. Disclosure of climate-related financial risks, Sept. 2023, p.3).

And the Committee should **not to expect that by disclosing i.e., a bank’s aggregated metric tons of carbon dioxide equivalent (MtCO_{2e})**, that this bank Pillar 3 disclosure of aggregated metric tons of carbon dioxide equivalent (**MtCO_{2e}**) will show, the reporting bank was enabled by the following Templates;

- CRFRA: Qualitative information on climate-related financial risks (governance, strategy and risk management);
- CRFRB: Qualitative information on climate-related financial risks (transition risk, physical risk and concentration risk);
- Template CRFR1: Transition risk – exposures and financed emissions by sector;
- Template CRFR2 - Physical risk – exposures subject to physical risks;
- Template CRFR3 -Transition risk – real estate exposures in the mortgage portfolio by energy efficiency level;
- Template CRFR4 -Transition risk – emission intensity per physical output and by sector;
- Template CRFR5; Transition risk – **facilitated emissions related to capital markets and financial advisory activities by sector** to manage **adequately** their identified and quantified CO₂ **exposures out of climate-related financial risks.**

EU-Banks disclosure of their exposure to climate-related risks by aggregated metric tons of carbon dioxide equivalent (MtCO_{2e}) **will not and cannot enable these EU-Banks to manage their climate-related risks** at their trading books as for example proposed, by Basel Committee on Banking Supervision (BCBS) by the simplified standardized approach (SSA). The commentator tried to provide “feedback on proposals for the calculation of facilitated emissions and whether it is feasible to disclose facilitated emissions for activities other than underwriting.

This metric would be subject to jurisdictional discretion. For illustrative purposes, it is presented in Template CRFR5: Transition risk: Facilitated emissions related to capital markets activities by sector.” (See, for comments Sept. 2023, p.8)

And the commentator is on the believe that EU – banks will never manage their exposure to climate-related risks **by tradable carbon dioxide equivalent (MtCO_{2e}) certificates**, as long as the underlying of a MtCO_{2e} certificate does not refer to an appropriately defined CO₂ or methane emission certificate what is - at least within the EU, a cross-border deliverable certificate, providing the permission to emit - at least within the EU, one metric ton CO₂.

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Appendix A

The Coupon Bond

Maturity = 6 years, coupon = 8%, and redemption payment = 1,000;

PV present value = 1,000; R = yield = 8%; cash flow = CF; t = year

t	CF_t	$PV_t = \frac{CF_t}{(1+R)^t}$	$w_t = \frac{PV_t}{1000}$	$t * w_t$
1	80	74.07	0.0741	0.0741
2	80	68.59	0.0686	0.1372
3	80	63.51	0.0635	0.1905
4	80	58.80	0.0588	0.2352
5	80	54.45	0.0545	0.2725
6	1080	680.58	0.6806	4.0836
Total		1000.00	1.0	D=4.993

Observation: Maturity=6 year, but Duration=4.993 year.

The Zero-Coupon Bond

Duration equals maturity, since 100% of its present value is generated by the cash flow redemption payment (CF) at maturity.

The duration of a zero-coupon bond with a 6-year maturity and a redemption payment (CF) of 1,000 equals 6 years.

t	CF_t	$PV_t = \frac{CF_t}{(1+R)^t}$	$w_t = \frac{PV_t}{630.2}$	$t * w_t$
6 th year	1000	630.2	1.0	6.0
Total		630.2	1.0	D=6.0

- Duration gives us **the average life to maturity of a payment stream**.

For all other bonds with installment or coupon payments: **duration < maturity**

Appendix B

“Green bonds are fixed income securities whose proceeds are used to finance new or existing eligible green projects, e.g., projects to combat pollution, climate change or the depletion of biodiversity and natural resources (see Ehlers and Packer (2017) pp 89-104). They are either asset-backed or asset-linked, and issuers must declare the types of green projects eligible to receive funds at issuance.

A key catalyst for market development was the 2014 introduction by the International Capital Market Association (ICMA) of the Green Bond Principles (GBPs). The GBPs govern: (i) the use of proceeds; (ii) the process for project evaluation and selection; (iii) the management of proceeds; and (iv) reporting. Bonds meeting the GBPs or the Climate Bond Initiative’s (CBI) Climate Bonds Standard (CBS) are eligible for green bond certification by either third-party providers or the CBI. Certification gives comfort to investors that the bonds confer environmental or climate-related benefits, helping to safeguard against “greenwashing” (see Fender, 2019. BIS Quarterly Review, September 2020, p. 54). Green bond liquidity; “An instrument is said to be liquid if transactions in it can take place rapidly and with little impact on price (see Borio, 2008. BIS Papers, No 38, March 2008, p.4). As a result, green bonds may not be eligible for the liquidity or working capital tranches of central banks’ reserve portfolios” (see Fender, 2019. BIS Quarterly Review, September 2020, pp.55, 56).

Green bond safety; To assess the eligibility of green bonds from a credit risk perspective, investor have to investigate the credit ratings of newly issued green bonds by issuance year, and compare these with those of conventional bonds. Green bonds are mostly backed by the full balance sheet of the issuer, and not only by the cash flows related to the climate-friendly project financed from the proceeds (Ehlers and Packer (2017)), allowing direct comparisons across both market segments (see Fender, BIS Quarterly Review, September 2020, p. 56).

Green bond return; Evidence from both primary and secondary markets points to a small and negative yield premium (“greenium”). Mr. Oliver D., Zerbib 2019 provides a comprehensive literature review (see Zerbib, Journal of Banking and Finance, 2019 Elsevier, vol 98(C), pp 39–60). And, “he finds, controlling for liquidity, an average green bond premium of –2 basis points. This suggests that, on average, holding such bonds to maturity yields a lower return” (see Fender, BIS Quarterly Review, September 2020, p. 57). And does raise the question; “do green bond investments generate diversification benefits relative to their conventional peers? A majority of reserve managers saw no meaningful difference between green and conventional bond returns” (see Fender, BIS Quarterly Review, September 2020, p. 60).

Glossary

“Physical risks economic costs and financial losses resulting from the increasing severity and frequency of:

- extreme climate change-related weather events (or extreme weather events) such as heatwaves, landslides, floods, wildfires and storms (i.e., acute physical risks);
- longer-term gradual shifts of the climate such as changes in precipitation, extreme weather variability, ocean acidification, and rising sea levels and average temperatures (i.e., chronic physical risks or chronic risks); and
- indirect effects of climate change such as loss of ecosystem services (e.g., desertification, water shortage, degradation of soil quality or marine ecology).

Projection a potential future evolution of a quantity or set of quantities, often computed with the aid of a model. Unlike predictions, projections are conditional on assumptions concerning, for example, future socioeconomic and technological developments that may or may not be realized. A climate projection, different from climate prediction, is the simulated response of the climate system to a scenario of future emission or concentration of greenhouse gases (GHGs) and aerosols, generally derived using climate models.

Transition risk: the risks related to the process of adjustment towards a low-carbon economy” (see Basel Committee on Banking Supervision. 2021. *Climate-related financial risks – measurement methodologies*).