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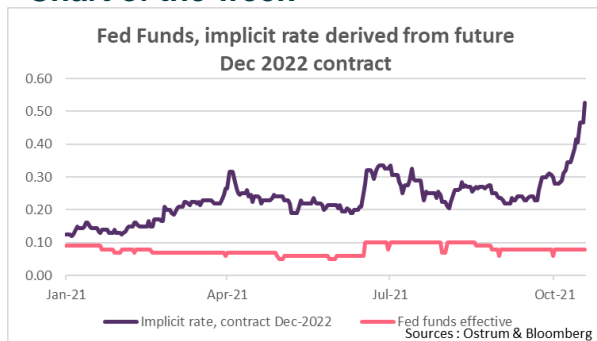
● Topic of the week: Climate risk / Financial risk

- We propose a typology of climate risks for the financial system. The diversity of these risks, the many channels and the specificities of the actors make the analysis complex;
- Climate risk is well taken into account by markets, but only in a piecemeal way, “green swan”, extreme events, seem to be underestimated;
- The regulator is aware of this and may have a driving role in this transition.

● Market review: Backfire

- Sharp flattening sparks risk asset rebound;
- US inflation remain high at 5.4%;
- Continued tensions on energy prices ;
- High yield spreads stabilize after a tough month.

● Chart of the week



Expectations on the Fed funds have changed considerably since the last FOMC on September 22. Prior to this Fed meeting, our models showed an implicit probability of a 65% increase in Fed funds over 2022. The market was therefore anticipating the possibility of an increase in rates but without really believing it.

Monday morning the future contract on Fed funds maturing in December 2022 anticipates Fed funds at 0.525%. This represents an anticipation of two rate increases.

A radical change, which may seem excessive so quickly after the end of the tapering.

● Figure of the week

40%

Source : Ostrum AM

The proportion of U.S. households that say they face financial difficulties as Covid-19 pandemic continue.



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• **Topic of the week**

Climate risk / Financial risk

The financial system as a whole (banks, insurance, financial markets) is at risk with climate change. However, the channels of contagion are very varied, complex and often indirect, so it is advisable to propose a mapping of these risks. Are they taken into account correctly? If there is undeniable progress, it seems that we are far from fully embracing all the aspects: methodological problems are one of its elements. The regulator is aware of this and is also working on the issue. It could play an important driving role in the future.

Financial risk, a mapping

Measuring the risks to the financial sector related to climate impact and policies in this area has become a major topic. However, there is a debate on whether implementing climate policies under target 2°C generates systemic risk or, rather, opportunities for low-carbon investments.

A detailed analysis of these risks in Europe leads to a very contrasting picture of exposure by region, sector and financial institution.

The first risk is a physical risk related to a climate event

Natural disasters can take the form of floods, forest fires or heat waves, for example. Consideration should also be given to the potential rise in sea-level, which may be a significant risk by 2050.

A mapping of these risks requires that the hazards be geolocated. Such an approach reveals a very heterogeneous situation. The ESRB estimates in a recent study that such a combination of environmental problems could affect up to 30% of the corporate credit portfolio of euro area banks.

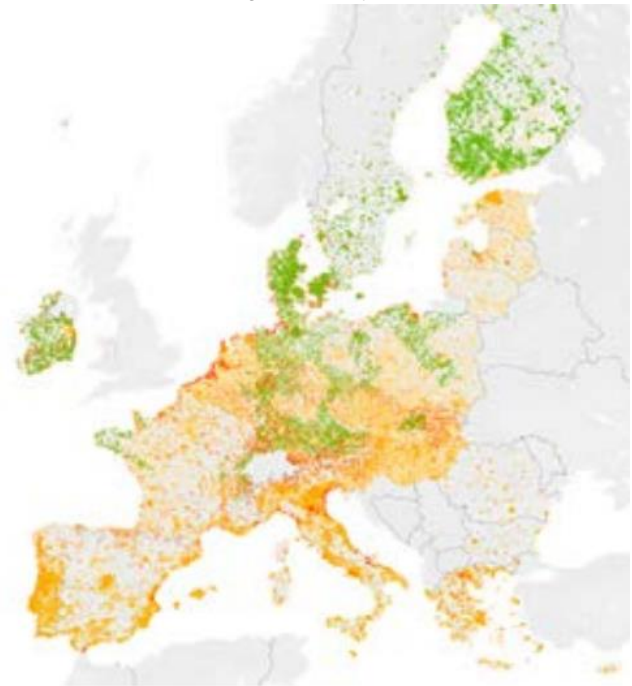
The risk could be amplified in terms of funding through two mechanisms.

- Natural disaster could impact already weakened companies, for example because they are insufficiently capitalized or profitable.
- It could affect the quality of the collateral accepted by the banks. A typical phenomenon of real estate crises and that undermines the quality of banks' assets.

Again, according to the ESRB, only 35% of the potential economic risks associated with climate hazards are insured.

The map below, taken from an ECB study, shows the regional disparity of these risks.

Physical risks related to climate change,
regional analysis



Each point is a corporate head office, the risk is on a scale of green (minor risk) to red (extreme risk).

Source: ECB

The second risk is related to the destabilization that the energy transition can create.

Risk materialization can take many forms.

- This may involve destruction of "stranded" assets¹. For example, some oil companies are forced to book provisions because some of their oil fields will never be able to be exploited. The magnitude of these "locked-in" assets in a 2°C economy has been estimated at approximately 82% of the world's coal reserves, 49% of the world's gas

¹ A "stranded asset" refers to an investment or asset that lose value due to market developments. This devaluation of assets is mainly linked to significant and sudden changes in legislation,

environmental constraints or technological innovations, which then renders assets obsolete before they are fully depreciated.

- reserves and 33% of the world's oil reserves².
- It can also be a loss of competitiveness in some sectors that are too carbon-intensive or a loss of profitability that can endanger financial health.

More generally, the green transition can only take place if part of the current capital stock is destroyed in favor of greener investments. You can't make an omelet without breaking some eggs...

The European regulator estimates that the exposure of eurozone banks to high-emitting sectors would represent on average only 14% of their balance sheet.

If the physical risk is very heterogeneous from a geographical point of view, the intensity of emissions is just as heterogeneous from one sector to another. This results in pockets of vulnerabilities due to exposure concentration. In an extreme case, the losses of the banking system could reach 10% in the event of an aggressive lowering of the credit rating attributed to high-emission companies and in

the event of rapid increases in the price of carbon.

A risk of violent turnover in the financial markets.

If these risks are well documented, the debate remains open on how they are taken into account by the market. Of course, there is a very strong increase in ESG management. There is also a rapid expansion of the green bond market: the amount of green bonds in Europe now exceeds €500 billion, with issues growing by more than 20% per year.

However, it is far from clear whether the market takes into account the entire climate risk (Cf. below). In particular, it appears that the extreme risk (a "too late too sudden" adjustment) is not taken into account.

The risk then is that we will see a sectoral rotation when markets finally take into account the extent of risk. A movement that will be accompanied by its share of volatility and therefore financing problems for certain issuers.

Evidence suggests that the impacts of these risk drivers on banks can be observed through traditional risk categories

The table below summarizes the potential effects in each risk type

Risk	Potential effects of climate risk drivers (physical and transition risks)
Credit risk	Credit risk increases if climate risk drivers reduce borrowers' ability to repay and service debt (income effect) or banks' ability to fully recover the value of a loan in the event of default (wealth effect).
Market risk	Reduction in financial asset values, including the potential to trigger large, sudden and negative price adjustments where climate risk is not yet incorporated into prices. Climate risk could also lead to a breakdown in correlations between assets or a change in market liquidity for particular assets, undermining risk management assumptions.
Liquidity risk	Banks' access to stable sources of funding could be reduced as market conditions change. Climate risk drivers may cause banks' counterparties to draw down deposits and credit lines.
Operational risk	Increasing legal and regulatory compliance risk associated with climate-sensitive investments and businesses.
Reputational risk	Increasing reputational risk to banks based on changing market or consumer sentiment.

Source BIS, Cf. « Climate-related risk drivers and their transmission channels » <https://www.bis.org/bcbs/publ/d517.pdf>

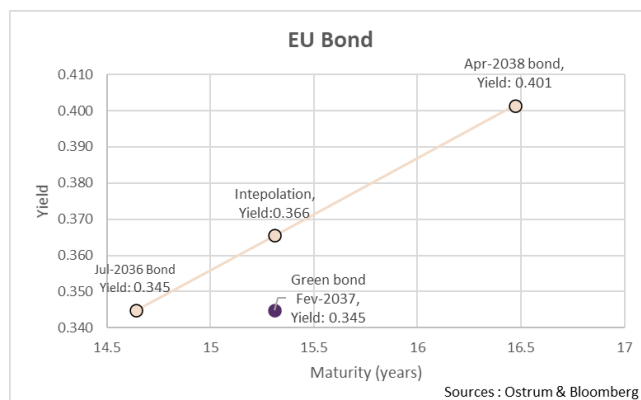
² McGlade, C. & Ekins, P. (2015) « The geographical distribution of fossil fuels unused when limiting global warming to 2 °C ». Nature

An underestimated risk

Progress

Financial markets are increasingly taking climate risk into account. In a recent paper, Bolton and Kacperczyk (2021)³ show that there is a carbon premium for the worst emitting companies in this area. In other words, companies with higher emissions must compensate investors by offering higher returns. Another dimension is the production of data on the domain, the impact of these data is undeniable, they have become more complete and more targeted. Mesonnier and Nguyen (2020)⁴ have shown that these disclosure obligations for French institutional investors have led to the disposal of 40% of fossil fuels compared to banks and investors located in other jurisdictions. Finally, Alessi et al. (2021)⁵ in a paper that has just been published, show the existence of a negative “greenium” for European equities: investors favor greener equities, but only if these companies are also more transparent in terms of environmental performance.

Last example, the European Union issued its first green bond last week, a bond with a maturity of February 2037. The demand was colossal, 135 billion bids at the auction, for 12 billion issued. As a result, on Friday night the rate on this bond was 0.345%. If we look at the other European bonds (June-2036 and April-2038) we can, with the help of a simple interpolation, estimate where the rate of this green bond should be. There is a difference of 20 bps (the famous “greenium”) between this theoretical value and the observed course. Investors therefore left behind 20 bps of yield to position themselves on a green bond.



A methodological problem

If climate risk is increasingly taken into account by an increasing number of investors, it would be wrong to think that the markets take it completely into account.

The first problem, perhaps the most difficult, is one of methodology. The consideration of potential future climate risks in all types of financial contracts and portfolio performance is difficult due to the very nature of climate risks. The academic literature in particular has highlighted the importance of some specific features of climate change:

- The deep uncertainty and recurrence of extreme events, known as black swan in finance and otherwise renamed green swan for climate events.
- The risk of violent inflection points, and indeed we wrote about “Minsky climate moment” in a recent publication.
- Non-linearities of this type of risk which make some of the risk measurement instruments inadequate.
- Potential domino effects that may have major impacts on co-movements of certain asset classes.

Moreover, the endogeneity between climate policies and investors' expectations of risks arising from these same policies creates the possibility of multiple equilibrium. The degree of financial risk associated with climate scenarios depends very much on how the transition is implemented. The following typology has been proposed⁶:

³ Bolton, P. and Kacperczyk, M.T. (2021), “Global pricing of carbon-transition risk”

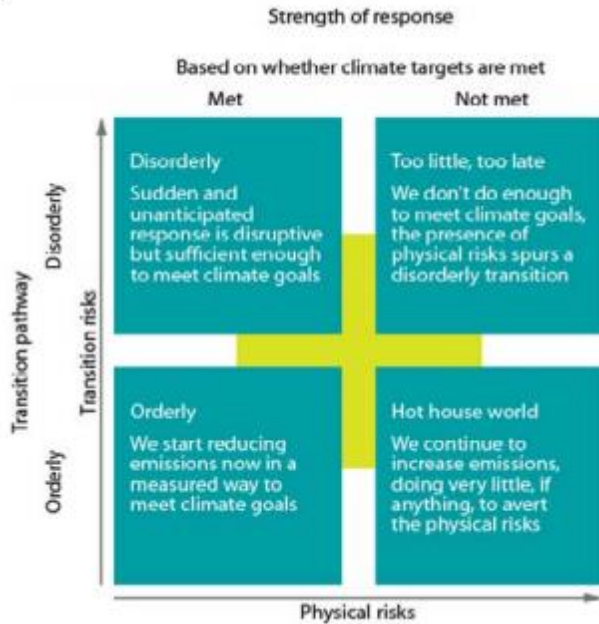
⁴ Mesonnier, J.-S. and Nguyen, B. (2020), “Showing off cleaner hands: mandatory climate related disclosure by financial institutions and the financing of fossil energy”, Working PaperSeries, No 800, Banque de France.

⁵ Alessi, L. et al. (2021), “What greenium matters in the stock

market? The role of greenhouse gas emissions and environmental disclosures”, Journal of Financial Stability, Vol. 54, June.

⁶ NGFS. 2019a. “NGFS First Comprehensive Report. A Call for Action - Climate Change as a Source of Financial Risk.” April 2019. Available at:

<https://www.ngfs.net/en/first-comprehensive-report-call-action>.



As a result, the standard financial risk valuation models à la Merton and Black are inadequate to deal with the complexity of the climate and financial risks because they are based on average value analyses and deviation to the most likely. The underlying assumptions (linearity of normal processes and distributions, for example) only poorly describe climate risk.

Inadequacies, the “green swan” is not taken into account

As a result, while climate risk is undoubtedly increasingly taken into account by investors, it seems nevertheless that the risk premium does not fully reflect the extreme risks, precisely the most restrictive, etc. and the most difficult to model.

In particular, there was an IMF study last year in its “Global Financial Stability Report”, which showed that the response of equity prices to major climate shocks over the past few decades has been generally modest. The study, therefore, concludes that physical risk appears to be only partially reflected in global equity valuations⁷. On this same subject, we can also consult the blog of the IMF with the article “Equity investors must pay more attention to the physical risk related to climate change”⁸. Here too, the main problem is the partial and therefore insufficient, consideration of extreme events.

In summary, climate risk is therefore indeed taken into

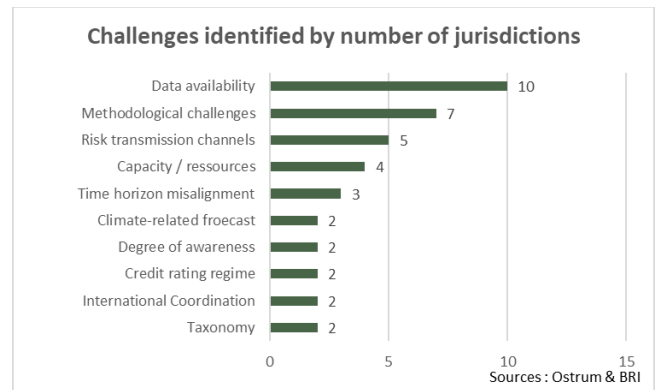
account by markets, and increasingly so. But only in a piecemeal way, the “green swan”, the extreme events, always seem to be underestimated.

The central role of the regulator

The observation we have just made is shared by a number of regulators. In particular, the Bank for International Settlements has devoted a great deal of work to this subject with the conclusion that the efforts made so far may prove insufficient.

The BIS has identified regulatory initiatives around the world on climate-related financial risks⁹. Unsurprisingly, it found that the majority of the Basel Committee members felt that climate issues should be addressed and that financial risks should be tackled within their existing regulatory and supervisory frameworks.

In fact, an overwhelming proportion of members have done research related to the measurement of climate-related financial risks. Of the 27 entities that participated in the survey, 24 have already conducted research on the subject. The main problems of the approach are listed on the following chart:



The vast majority of members, 23 out of the 25 responses, began an outreach effort with banks through various channels. A large majority, 18 out of 24 responses, also analyzed climate risk for banks. Finally, it is important to note, in this context, that banks publish climate risk information in 20 of the 23 jurisdictions concerned.

About two-fifths of members (16 out of 27 members) have published or are in the process of publishing (5 out of 27)

⁷ IMF (2020), “Physical risk and equity prices”, Global Financial Stability Report, April, Section 5.

⁸ [https://blogs.imf.org/2020/05/29/equity-investors-must-pay-more-](https://blogs.imf.org/2020/05/29/equity-investors-must-pay-more-attention-to-climate-change-physical-risk/)

[attention-to-climate-change-physical-risk/](https://www.bis.org/bcbs/publ/d502.pdf)

⁹ Voir <https://www.bis.org/bcbs/publ/d502.pdf>

more principled guidance on climate-related financial risks.

Conclusion

In a recent paper, the ECB concluded in two stages: “Banks must accelerate their efforts” and “banks and supervisor have very busy months ahead”. It seems that the argument can be extended to all financial markets.

While it is indisputable that progress has been made in

taking climate risk into account, the road remains long. One of the risks with climate change is having to face a “too sudden too late” adjustment because of the postponement of deadlines. The argument is also valid for financial markets which do not necessarily take account of extreme events appropriately. The regulator is aware of this and could play a leading role in this transition.

Stéphane Déo

● **Market review**

Backfire

The flattening of the yield curves drives equities higher despite tensions on energy prices.

The theme of stagflation seems to be taking hold in financial markets as the energy crisis worsens. The transitory nature of the inflation increase is called into question given the succession of supply shocks reinforcing the impact of supply bottlenecks on activity. The risk of monetary tightening contributes to a curve flattening movement as forward real rates fall. Paradoxically, equity indices are on the rise again. The unwinding of positions, long dollar and short bonds, amplified the rebound in risky assets. The only exception appears to be investment grade credit, which is lagging behind in the risk asset rally, possibly due to unattractive valuations. Conversely the recent widening in high yield spreads is fading somewhat.

The energy crisis represents a major brake on economic growth, on top of the logistical and supply difficulties for businesses. German institutes have therefore sharply reduced their growth projections for 2021 precisely because of supply constraints. The IEA report confirms that the rise in gas prices will result in a demand shift for oil estimated at 500k barrels per day for a period of at least 6 months. Brent is trading above \$ 85 a barrel. Two new bankruptcies occurred this week in the UK among electricity suppliers due to rising gas prices. In addition, the use of coal, a few weeks ahead of the COP26, is an additional signal of the consequences of underinvestment in fossil fuels. This backdrop gives Putin considerable leverage. If the situation worsens, investment in shale oil could resume in the United States, despite the climate challenges. In addition, the rise in gas has sparked a dizzying rise in the prices of fertilizers which, in turn, drive up the prices of agricultural products and cause supply disruptions in the metals sector. Inflation is a hot topic that could turn out to be the central theme of the US midterm elections next year.

The US yield curve flattened sharply again. The release of the US CPI at 5.4% in September is traceable to the rise in volatile items (energy, food) but also the recovery of more persistent inflation components such as rents. The short-term interest rate markets now price in a scenario of rapid tapering (6 to 8 months) before one or two rate increases in Fed Funds, from September 2022 on. This adds to the pressure on short-term rates. In contrast, demand at auctions for 10- and 30-year Treasuries proved to be strong last week. At the same time, investors have favored convex strategies (such as flatteners) or unwound their steepening positions. MBS are hit by rising mortgage rates as demand

for refinancing subsidies. The inflationary risk contributes to the rise in breakeven inflation rates. The 10-year inflation swap rate now stands at 277bp.

In the euro area, the yield on Bunds approached their highest level of the year (-0.085% intraday) before falling below back -0.15%. Like US Treasuries, the unwinding of positions reversed the recent steepening trend. The 2-10 year spread tightened by 3bp last week. Sovereign spreads have changed little, with primary euro sovereign bond issuance totaling just € 16 billion (Germany, Ireland) last week. Irish bonds were well received despite recurring tensions over the consequences of Brexit. However, the Italian BTP spread widened at the end of the week to 104bp. The EU has attracted considerable demand worth about € 140bn for the € 12bn issue of its first green bond (15 years; mid-swap -8bp). Fund managers, banks (LCR buffer accounts) and insurers took out most of the deal.

On credit markets, investor sentiment has deteriorated. The shadow of Evergrande hangs over credit markets even though the PBoC has tried to reassure market participants regarding the crisis management. Spreads widened slightly, especially subordinated financial debt (+5bp). Primary market activity is slowing down with only €8 billion issued this week, including €6 billion of non-financial. The real estate sector remains under pressure. Valuations remain unappealing (with yields about 0.38% or 88bp spreads against the Bund), as ECB purchases (€5.6bn in September) keeping constant pressure on the market prices. That said, improved total yield levels compared with a month ago are attracting interest from institutional investors.

On the other hand, after a month of significant spread widening (+38bp), spreads are easing on high yield (323bp). The improving valuation backdrop prompts us to be more constructive about the asset class. Securities rated BB present the best risk/return trade-off in the context of rating upgrades. German real estate still warrants caution.

One of the drivers of the rebound in the risky assets is the dollar falling alongside US curve flattening. In the foreign exchange market, the Japanese yen is accelerating to the downside. The Japanese currency seems to have regained its role as funding currency and popular carry strategies on the Australian dollar have resumed. The dollar-yen exchange rate is above 114. Commodity currencies (CAD, AUD) are appreciating.

Equity indices reacted favorably to the turnaround in the bond market. The Nasdaq is up 2%. The risk of stagflation is not unfavorable to the theme of secular growth. Energy is benefiting from the upward pressure on oil prices. In Europe, cyclicals (automotive, distribution) are outperforming while profit taking hit bank stocks. Q3 publications will shed light on the margin situation amid rising inflation.

Axel Botte
Global strategist

● Main market indicators

G4 Government Bonds	18-Oct-21	-1wk (bp)	-1m (bp)	YTD (bp)
EUR Bunds 2y	-0.63 %	+5	+7	+7
EUR Bunds 10y	-0.13%	-1	+15	+44
EUR Bunds 2s10s	50 bp	-5	+8	+37
USD Treasuries 2y	0.44 %	+12	+22	+32
USD Treasuries 10y	1.62 %	+1	+26	+71
USD Treasuries 2s10s	118 bp	-11	+4	+39
GBP Gilt 10y	1.15 %	-4	+31	+96
JPY JGB 10y	0.1 %	+1	+4	+8
€ Sovereign Spreads (10y)	18-Oct-21	-1wk (bp)	-1m (bp)	YTD (bp)
France	34 bp	+0	+1	+11
Italy	106 bp	+2	+6	-5
Spain	64 bp	+0	0	+2
Inflation Break-evens (10y)	18-Oct-21	-1wk (bp)	-1m (bp)	YTD (bp)
EUR OATi (9y)	164 bp	+5	+13	-
USD TIPS	257 bp	+6	+22	+59
GBP Gilt Index-Linked	398 bp	+7	+20	+98
EUR Credit Indices	18-Oct-21	-1wk (bp)	-1m (bp)	YTD (bp)
EUR Corporate Credit OAS	87 bp	+1	+4	-5
EUR Agencies OAS	43 bp	+0	+2	+2
EUR Securitized - Covered OAS	39 bp	0	+3	+7
EUR Pan-European High Yield OAS	321 bp	+2	+39	-37
EUR/USD CDS Indices 5y	18-Oct-21	-1wk (bp)	-1m (bp)	YTD (bp)
iTraxx IG	51 bp	-1	0	+4
iTraxx Crossover	263 bp	-6	+10	+21
CDX IG	53 bp	-1	-1	+3
CDX High Yield	303 bp	-5	+16	+10
Emerging Markets	18-Oct-21	-1wk (bp)	-1m (bp)	YTD (bp)
JPM EMBI Global Div. Spread	357 bp	-3	+14	+5
Currencies	18-Oct-21	-1wk (%)	-1m (%)	YTD (%)
EUR/USD	\$1.160	+0.44	-1.05	-5.02
GBP/USD	\$1.373	+1.02	+0.56	+0.47
USD/JPY	¥114.3	-0.87	-4.25	-9.67
Commodity Futures	18-Oct-21	-1wk (\$)	-1m (\$)	YTD (\$)
Crude Brent	\$85.8	\$2.1	\$11.2	\$35.0
Gold	\$1 764.1	\$10.0	-\$0.1	-\$134.3
Equity Market Indices	18-Oct-21	-1wk (%)	-1m (%)	YTD (%)
S&P 500	4 471	1.82	0.87	19.04
EuroStoxx 50	4 141	1.68	0.25	16.56
CAC 40	6 661	1.38	1.39	19.99
Nikkei 225	29 025	1.85	-4.83	5.76
Shanghai Composite	3 568	-0.66	-1.27	2.74
VIX - Implied Volatility Index	17.58	-12.10	-15.52	-22.73

Additional notes

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