

Pricing ESG risk in credit markets

Through volatility, our conviction affirmed

Fixed Income Research Paper

Federated Hermes

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Back in 2017 we analysed the link between ESG factors and credit spreads in an effort to refine our ability as fixed income investors to more accurately price factors beyond traditional operating and financial risks. We presented the results of that analysis in our pioneering paper 'Pricing ESG in Credit Markets', in which we demonstrated that companies with better environmental, social and governance (ESG) practices tended to have lower credit default swap (CDS) spreads, even after controlling for credit ratings and other risk factors. Using the results, we plotted predictions of CDS spreads for given values of ESG scores, drawing an innovative implied ESG pricing curve. In 2018 we published an updated study with a longer sample period which produced similar results. We have recently completed a third study, expanding the sample period to include the period from the start of 2012 to the end of a volatile 2020, the results of which are published here.

Key findings

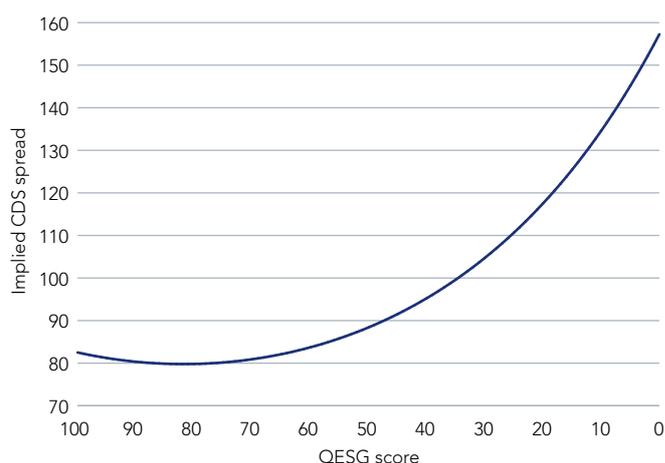
- The significant relationship between ESG factors and CDS spreads persists: companies with better ESG practices tend to have lower CDS spreads, even after controlling for credit risks.
- The explanatory power of the model increased from both the 2017 and 2018 studies.
- High levels of market volatility throughout 2020 did not significantly affect this relationship (a closer investigation of the relationship within 2020 is, however, warranted).

We launched the process of updating the original study in 2020. However, with Covid-19 impacting fundamentals and sentiment and triggering violent moves in credit spreads, we decided to wait and use the full ESG-CDS dataset for the whole calendar year 2020. This would allow us to test the resilience of our model and the relationship between ESG and credit risk through the volatility as a measure of its veracity and strength.

The relationship reconfirmed

Our latest research shows that even when controlling for operating and financial risks (measured by credit ratings), as ESG factors deteriorate, credit spreads widen. Because the reverse is also true, this relationship has very important investment implications. Figure 1 shows the implied ESG pricing curve using the full dataset from 2012 to 2020.

Figure 1: Implied CDS spreads and corresponding QESG scores, 2012-2020:



Source: Federated Hermes, as at 31 December 2020. Note: The QESG Scores, generated by our Global Equities at the international business of Federated Hermes, rank each stock worldwide in accordance with its ESG risk.

Our results suggest that credit markets are likely to reward companies that make the transition from ESG laggards to leaders with tighter CDS spreads. This observation is particularly poignant given that asset owners and fund managers are increasingly looking to 'screen in' companies seen as ESG and sustainability leaders to reinforce the ESG credentials of their portfolios. In this environment, companies with credible transition stories represent an excellent investment opportunity as they join the elite sustainable leaders of their industries. Moreover, according to our credit analysts and engagement specialists, the desire by companies themselves to be 'screened in' explains much of their acceptance of sustainability. We believe that senior management who embrace the consideration of non-fundamental factors appreciate that being a sustainability leader brings measurable operational, reputational, and cost-of-capital benefits.

Why we give credit to ESG analysis and engagement

While a review of the entire literature on ESG and its effects on fixed income markets is beyond the scope of this research, there is no shortage of evidence of the benefits of investing in

sustainability leaders. Companies with better ESG practices tend to have a lower cost of capital, lower operational costs and are less vulnerable to negative cash events than their less sustainable peers.¹ It has also been shown that successful company engagement by institutional investors on ESG considerations can have positive implications for a company's performance.² Conversely, companies with poor ESG characteristics tend to have a higher cost of capital because they are exposed to more risks and costs stemming from non-financial externalities – such as fines for not complying with environmental or health and safety regulations – that undermine corporate financial performance.

Rationale and dataset

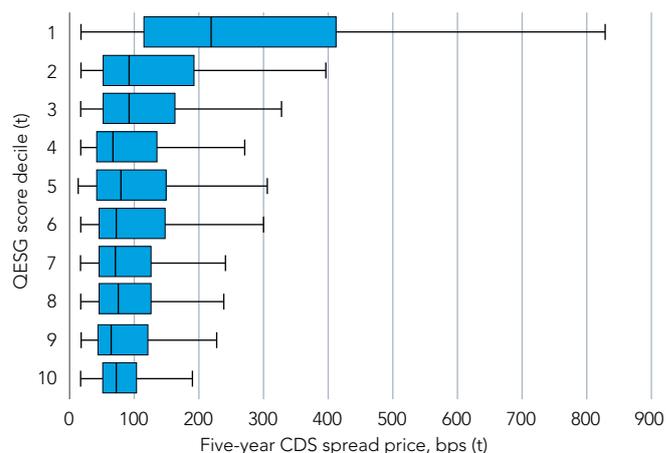
With financial markets having undergone significant changes since our original study in 2017, we wanted to test whether the conclusions of our previous research held true. As demand for more sustainable investment products increases, does the market continue to reward ESG leaders as expressed through relatively tighter CDS spreads? And how is this dynamic affected by periods of high volatility?

In this update, we have therefore analysed the constituents of the same four CDS indices – the CDX High Yield, CDX Investment Grade, iTraxx Europe, and iTraxx Crossover – over the longer nine-year period from 2012 through 2020. This sample consisted of more than 3,285 issuer-year observations.

As our proxy for the ESG performance of issuers we again relied on our proprietary QESG scores. These scores combine specialist ESG research from Sustainalytics, MSCI, Bloomberg, the Carbon Disclosure Project, WRI, and Trucost with fundamental insights gained through in-depth engagements with companies by our stewardship team, EOS at Federated Hermes. Each company was given a proprietary score for its exposure to the three ESG subcategories – environmental, social and governance – from which we generated an overall QESG score. This not only captures a company's current level of ESG risk exposure but also the changes in various metrics that indicate the direction of travel. The QESG scores range from 0 to 100: the higher the score, the better the ESG policies and practices.

As with our original study, we started by splitting the sample of observations into deciles based on their QESG scores, the first decile containing issuers with the lowest scores and the tenth decile the highest. We then calculated each issuer's average annual CDS spread, using daily CDS spread prices over each annual period. Putting these together, we calculated the distribution of annual average spreads in each QESG score decile. Figure 2 shows these distributions, including the minimum, maximum and median spread.

Figure 2: CDS spreads by QESG decile, 2012-2020



Source: Federated Hermes, as at 31 December 2020.

ESG risk and credit spreads: the relationship continues

As evidenced in Figure 2, the results are comparable to those in our original paper: companies with the lowest QESG scores have the widest spreads, while companies with the highest QESG scores have the tightest spreads. Also, as with our previous studies, the widest dispersion of spreads is in the first decile, which is occupied by the band of lowest QESG scores. We believe this band is more likely to include stressed or distressed companies who either do not have the capacity to focus on ESG factors and/or whose weakened ESG factors have transitioned into operating and financial risks. These factors eclipse the influence of ESG factors, being so elevated that the vitality of the companies at the wide end of the range is in doubt.

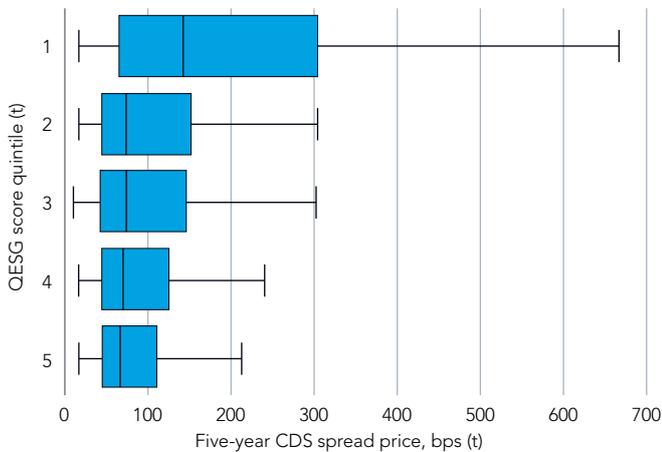
As you can see, the boxplots show that for the full sample period 2012-2020 the median CDS spread for deciles four to ten are very similar, with a median range between 64 and 77 bps – this is again in line with the original study. Noteworthy is the fact that the median CDS spreads for deciles two and three are lower than in the original study and much more similar to the median values of the other deciles. This implies that the median CDS spreads for these deciles came down in 2019 and 2020.

To make these observed trends more visible we repeated the exercise but calculated the boxplots across ESG quintiles so that there were more observations in each group. The results are shown in Figure 3.

¹ See, for example: Gordon L. Clark, Andreas Feiner, and Michael Viehs, "From the Stockholder to the Stakeholder", published by University of Oxford and Arabesque Partners as at March 2015; Gunnar Friede, Timo Busch, and Alexander Bassen, "ESG and financial performance: aggregated evidence from more than 2000 empirical studies", published by the Journal of Sustainable Finance and Investment as at December 2015.

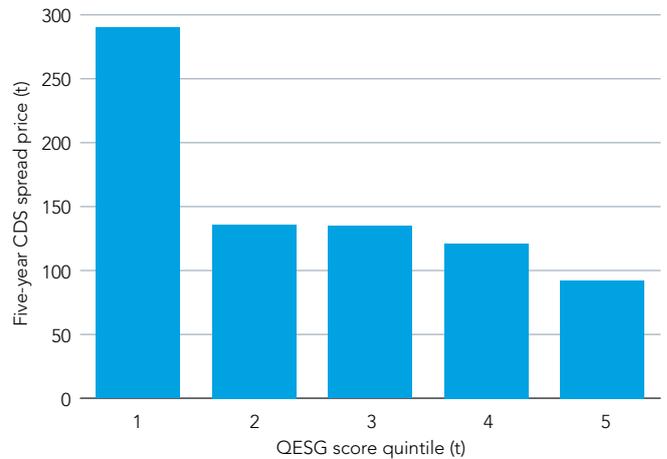
² See, for example: Elroy Dimson, Oguzhan Karakas, and Xi Li, "Active Ownership", published by the Review of Financial Studies as at August 2015; Andreas G.F. Hoepner, Ioannis Oikonomou, Zacharias Sautner, Laura T. Starks, and Xiaoyan Zhou. "ESG Shareholder Engagement and Downside Risk", published by SSRN as at November 2016 (last revised June 2020).

Figure 3: CDS spreads by QESG quintile, 2012-2020



Source: Federated Hermes, as at 31 December 2020.

Figure 4: Average annual CDS spreads by QESG quintile, 2012-2020



Source: Federated Hermes, as at 31 December 2020.

Once again, companies with the worst ESG credentials, on average, in quintile one, have the highest CDS spreads along with the widest variation in observed CDS spreads.

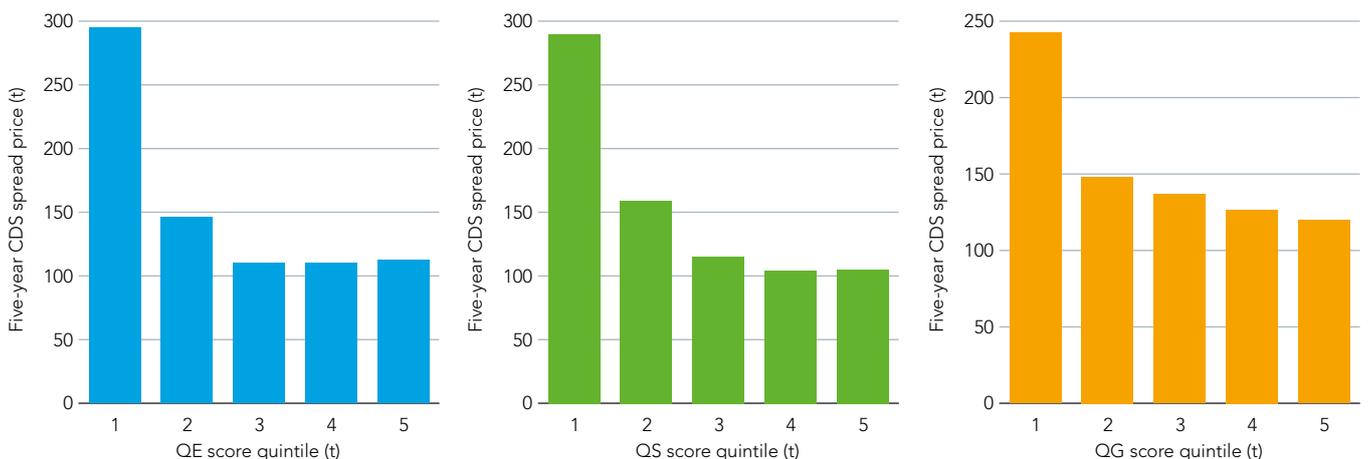
From the boxplots, one could conclude that the variation of CDS spreads within each quintile is quite wide and that outliers in the sample might be driving our results. To challenge that concern, we will now turn to average CDS spreads instead of median values. The results of this analysis can be seen in Figure 4.

As you can see, average annual CDS spreads in quintile one are the highest and in quintile five the lowest, confirming our initial impressions and implying that our findings are not driven by significant outliers. It is worth noting that the average CDS spreads for quintiles two to four are very similar at 125bps, 130bps and 119bps respectively, so that the picture of decreasing CDS spreads with increasing ESG performance of the underlying issuers is not entirely linear. However, the average CDS spread in quintile five is by far the lowest with only 82bps.

Analysis by individual ESG pillar

Carrying out a similar quintile analysis for each of the three individual ESG pillars (i.e. environmental, social and governance) again demonstrates the inverse relationship between ESG and CDS spreads, as Figure 5 shows.

Figure 5: Average CDS spreads by environment, social and governance quintiles, 2012-2020



Whilst the relationship is quite consistent for the environmental and social pillars, for the governance pillar the average CDS spread of observations included in quintile four is the lowest, only minimally 'beating' quintile five.

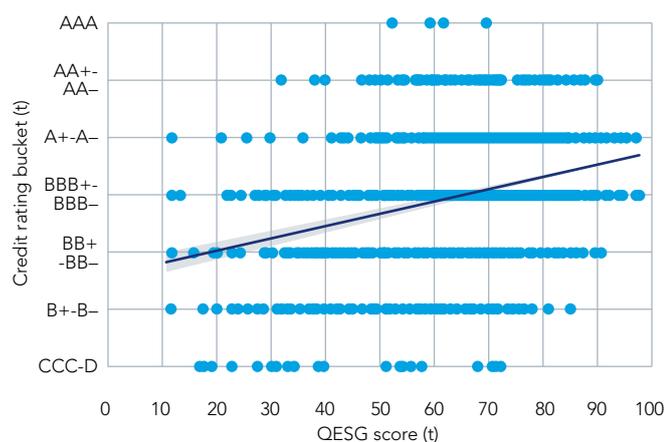
Despite this anomaly, we are confident to conclude that at an unconditional level companies with the worst ESG credentials tend to have the highest CDS spreads, while companies with the best ESG credentials tend to exhibit the lowest CDS spreads. We will now consider whether credit risk may be having an explanatory or confounding effect on that observation.

Is ESG performance correlated with credit ratings?

Credit risk is of course an important determinant of CDS spreads. So, having reconfirmed the persistent correlation between companies' ESG credentials and their CDS spreads, we focused on looking for any correlation between ESG concerns and credit ratings: a significant relationship between credit ratings and ESG performance would mean that we would have to control for credit ratings in our empirical analysis.

We used credit ratings assigned by Fitch, since, of all the ratings agencies, it covered the most companies from our sample (when a Fitch rating was not available, we used a Standard and Poor's assessment instead). As in our previous studies, we applied the scheme shown in the appendix to assign a numerical value to every credit rating. We then ran an ordinary least squares (OLS) regression between the credit ratings (the dependent variable) and the QESG scores to measure the correlation between issuers' credit ratings and their ESG behaviours. The results of that analysis are shown in Figure 6.

Figure 6: QESG scores by credit rating, 2012-2020:



Source: Federated Hermes, as at 31 December 2020.

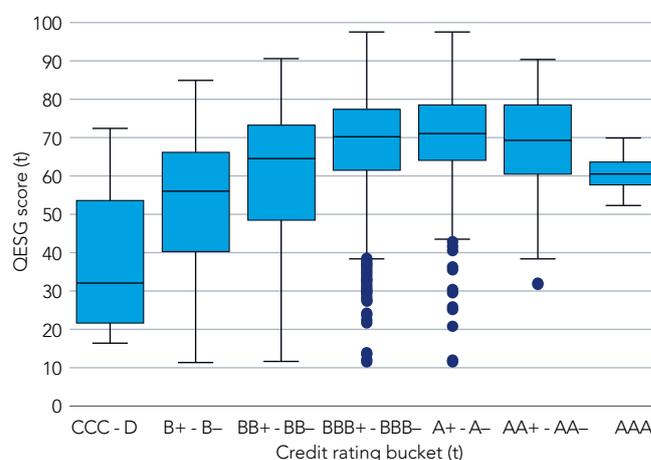
The straight, upwards-sloping blue line depicts the fitted values from the linear OLS analysis, which represent the predicted relationship between credit ratings and QESG scores. The grey area around the straight blue line is the 95% confidence interval, depicting the area in which the actual observations fall within a 95% likelihood. The scatter plot of blue dots depicts the actual observations in our sample.

While we are aware of the potential econometric problems that could arise from conducting a simple OLS analysis using this type of data, the results still yields an interesting insight: there is a significant positive correlation, with higher QESG scores tending to coincide with better credit ratings, on average.

Having said that, within each credit rating bucket there is a very wide variation of the observed QESG scores. More specifically, many issuers have a good credit rating – which places them in the upper half of the chart – but a relatively low ESG score – which puts them on the left-hand side of the chart. On the other hand, there are also issuers with a low credit rating and relatively good ESG scores, placing them in the lower right quadrant. This distribution documents why investors should be mindful of an issuer's ESG performance even when they have a good credit rating.

To look more closely into this positive relationship between credit ratings and ESG performance, we next created boxplots for every credit rating bucket and measured the median ESG performance for each. The results are displayed in Figure 7.

Figure 7: Distributions of QESG scores by credit ratings, 2012-2020:



Source: Federated Hermes, as at 31 December 2020.

As you can see, up until A-rated issuers, the further to the right on the x-axis we go and the better the credit ratings become, the better the median QESG score. Once we reach credit ratings for the two rating buckets AA+ - AA- and AAA the median ESG scores drop again slightly, probably driven by the low number of observations. However, what's more important to note is the existence of various outliers in the BBB and A buckets (visible as the blue dots underneath the boxplots for these ratings). These are issuers which have reasonable credit scores but low ESG scores, suggesting they may be mispriced. This raises an important point: by relying solely on credit ratings an investor could underestimate the potential risks carried by issuers with low QESG scores. For this reason, while assessing operating and financial risks – as reflected by credit ratings – is a necessary component of pricing credit risk, to price credit risk with even more precision credit investors should be considering ESG factors as well.³

³ We acknowledge that rating agencies are now much more transparent about articulating how non-fundamental factors meaningfully affect credit ratings. However, we are also told by the agencies themselves that changes to their practices driven by greater awareness of ESG aren't substantial enough to make today's ratings any different than those prior to the more ESG-aware period we are now in.

The updated pricing model

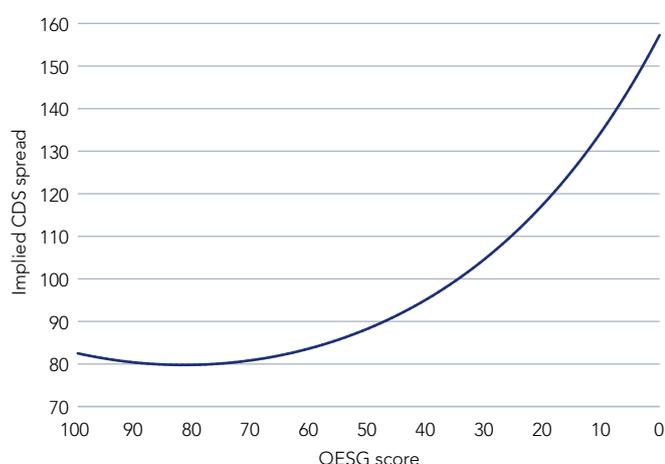
We employed the same econometric model as in previous studies for the updated pricing model, again adopting an OLS regression model that sought to explain the level of CDS spreads of the issuers in our sample. As explanatory variables for these spreads we took the issuers' QESG scores, the square of the QESG scores, and credit ratings, enabling us to decompose the effects of the QESG score and the credit rating. We included the square of the QESG score to capture the non-linear relationship between QESG scores and credit spreads that we observed previously. The results of our econometric analysis can be found in the appendix. From the estimated regression, we then calculated the implied CDS levels for each QESG score, which are listed in Figure 8 and shown graphically in Figure 9.

Figure 8: Implied CDS spreads based on QESG scores, 2012-2020

QESG score	Implied CDS spread (2012-2020)
100	82.51
90	80.33
80	79.81
70	80.91
60	83.72
50	88.39
40	95.24
30	104.73
20	117.52
10	134.57
0	157.26

Source: Federated Hermes, as at 31 December 2020.

Figure 9: Implied CDS spreads and corresponding QESG scores, 2012-2020:



Source: Federated Hermes, as at 31 December 2020.

Once, twice, three times you've swayed me

Having completed this third review, we are encouraged that our pricing model for ESG factors not only remains robust but it's explanatory power, as measured by the R-squared, has actually increased. What's more, the model has performed effectively through one of the most volatile periods ever in credit markets. This makes us confident that when we use the model in credit committees it is providing that additional precision that we seek.

Looking at the trajectory of the implied ESG pricing curve, we can see that in the higher quality QESG categories there is little differentiation in credit spreads (this will be the subject of future analysis). However, at 75 basis points, the difference between high quality and low quality is stark. In multiple terms, the weakest bucket is nearly twice as wide in spread as the strongest bucket. This tells us that the market recognises ESG quality – and dramatically so.

Manage transition risk, but buy transition opportunity

The investment implications of the market's ability to differentiate between low ESG quality and high ESG quality creates real opportunities. While it is important to control for operating and financial risks, we believe buying into credible transition stories can deliver alpha – whilst also benefiting society – as the market recognises an improving ESG story.

Our own investors have increased their scrutiny of sustainability credentials, whether mainstream or thematic (e.g. Sustainable Development Goals; Climate Change). Given the rising interest in ESG throughout the investment industry and the surge in sustainability-themed funds and strategies, we see rising demand for the so-called ESG leaders. Demand for sustainability-themed bonds in the primary market is often stronger than for mainstream bonds, suggesting investors are pining for ESG leaders to strengthen the underlying sustainability credentials of their portfolios. With this in mind, we believe buying credible transition stories will deliver alpha as they evolve into leaders and become 'screened-in'. Our ESG pricing model shows that our investors will be rewarded for identifying these transition opportunities.

Appendices

Appendix 1: Regression output for the pricing model

This table presents the regression output of the underlying regression model for our developed pricing model. It takes the form:

$$\ln(\text{Annual average CDS spread})_{t_0} = \text{Constant} + b_1 * \text{QESG score}_{t-1} + b_2 * (\text{QESG score}_{t-1})^2 + b_3 * \text{Credit rating}_{t-1} + \text{error}.$$

The CDS spreads are measured at t_0 while the explanatory variables are measured in $t-1$, one year before. ***, **, * are indicating the level of significance at the 1%, 5%, and 10% level. P-values are displayed underneath each coefficient.

	ln(Annual average CDS spread)
QESG score	-0.0166*** (0.003)
(QESG score squared)	0.001** (0.021)
Credit rating	-0.6513*** (0.000)
Constant	7.6970*** (0.000)
R-squared	52.80%
Number of observations	2,238

Appendix 2: Converting credit ratings into a numerical value

Fitch rating	Rating grade	Assigned rating code
AAA	Investment	7
AA+		6
AA		6
AA-		6
A+		5
A		5
A-		5
BBB+		4
BBB		4
BBB-		4
BB+	Speculative	3
BB		3
BB-		3
B+		2
B		2
B-		2
CCC		1
DDD		1
DD		1
D		1

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