Here is a list of things that I need to incorporate into my thesis revision:

*Add more details about motivation, as to how ESG would be linked to (systematic or idiosyncratic?) risk and, in turn, Cost of Equity.
*Add a paragraph describe Ke (2021) paper, and clarify how your thesis differs from Ke's research and how yours contributes to the relevant literature.
*Fix the reference list, especially in relation to Ke (2022).
*Add better descriptions about the permutation test.
*Clarify what "fixed effects" has been controlled for, both in the text and in the relevant table captions.
*Add more discussions to clarify the two-groups tests; there currently are some errors and ambiguities in the thesis.
*Discuss the economic significance of your results.
*Add discussions relating to practical implications of your results.
*Correct the IV sub-section of your analysis.
*Add a robustness check subsection, using original ESG scores (not categorical), and discuss your findings.

My revision:

*Add more details about motivation, as to how ESG would be linked to (systematic or idiosyncratic?) risk and, in turn, Cost of Equity.

I explained that my FF4 model estimates systematic risk and ESG can mitigate systematic risk. This answers the questions "How ESG would be linked to risk":

Given the role that ESG practices serve as a buffer against systematic risks, it is essential to examine how traditional financial models like the Fama-French & Carhart Four-Factor Model quantify these risks and the potential mitigative effects of ESG on the cost of equity. The Fama-French & Carhart Four-Factor Model estimates the cost of equity based on market (market risk), size (small minus big), value (high minus low), and momentum (up minus down). The market factor captures the market risk premium. The size factor assesses the difference between small-cap stocks and large-cap stocks. The value factor quantifies the difference between high BV-to-MV stocks and low BV-to-MV stocks. The momentum factor evaluates the difference between winners (high past returns) and losers. All these factors collectively measure the systematic risk (Bello, 2008). ESG investment offers an opportunity to diminish the systematic risk (Cerqueti, et al., 2021). Furthermore, Responsible/ESG investment serves as the downside protection against ESG-related systematic risk because ESG addresses broader, market-wide issues (Jin, 2018). Other scholars also claimed that ESG investment mitigates the systematic contagion risk (De Bandt and Hartmann, 2015), which limits the propagation of negative externalities generated from one financial institution to others in the market (Cerqueti, et al., 2021).

*Add a paragraph describe Ke (2021) paper, and clarify how your thesis differs from Ke's research and how yours contributes to the relevant literature.

Ke's paper offers preliminary evidence on the impact of the COVID-19 pandemic on the cost of equity. This evidence is crucial as it provides a foundational understanding of the increased cost of equity during the pandemic. Ke's paper did not include the topic of ESG. My thesis focused on discussing how ESG tempers the increased cost of equity during the pandemic:

To sum up, Ke (2022) reports the early evidence on how the COVID-19 pandemic damaged the economy by causing a higher cost of equity for firms. Additionally, his research provides insights into the firm-specific characteristics that may influence the cost of equity. Regarding my study, I cover the full 3 years of the pandemic to construct evidence which shows the adverse effect of COVID-19 in the long-run perspective. Although I replicate the control variables from Ke (2022), I use the Fama-Freach Carhart Four Factors model to estimate the cost of equity, which demonstrates how the business suffers from COVID under a different model. However, the main contribution of my study concentrates on the risk-mitigation benefit for the increased cost of equity during the COVID-19 pandemic due to ESG-insurance/protection benefit. Ke (2022) provides me with an appealing structure to incorporate the ESG-related factors in the regression model to make a contribution to fill the gap between ESG benefits during the COVID period and the cost of equity.

*Fix the reference list, especially in relation to Ke (2022).

I fixed the reference list. The reference list has been fixed, which means that the missing references are added; the references are ascendingly sorted by the alphabet; and the reference list satisfies the SGS format requirement.

*Add better descriptions about the permutation test.

I described the Fisher permutation framework by how it works for my coefficient difference test:

In the Fisher permutation test framework, the coefficient difference between two groups is defined as $d=b_1-b_0$. The null hypothesis assumes the difference (d) is equal to 0 whereas the alternative hypothesis assumes that the difference (d) is non-zero. The Monte Carlo simulation is applicable to calculate the p-value for the coefficient difference test if the adherence of "d" to a standard normal distribution [$d \sim N(0,1)$] is certain. However, the conformity of "d" to a standard normal distribution is not guaranteed, which may limit the applicability of the Monte Carlo simulation method in the thesis. Thus, it is recommended to resample the existing data to obtain the empirical samples due to the uncertain distribution of "d". The new samples are used to construct the empirical distribution of the coefficient difference statistics "d". In addition, sampling with replacement is allowed to provide bootstrap evidence to support the fixed effect model test. Based on the sampling evidence, the p-value to support the null hypothesis can be computed. The P-value is calculated as:

$$\hat{p} = \frac{\#\{d^{S_j} > \hat{d}_0\}}{K}$$

$\hat{d}_0$ denotes the estimated coefficient difference between $\hat{\beta}_1$ from group 1 and $\hat{\beta}_0$ from group 0
S denotes the sum of the observations from the two groups

K denotes the numbers of replications of the sampling
S_j denotes the superscript, indicating the estimate obtained using the j empirical sample
$\#\{d^{S_j} > \hat{d}_0\}$ denotes the numbers of d^{S_j} greater than $\hat{d}_0$

*Clarify what "fixed effects" has been controlled for, both in the text and in the relevant table captions.

I specified that firm-fixed effect has been controlled before I spell out the regression equations in the methodology section. I also highlighted the firm-fixed effect in all the regression results tables.

*Add more discussions to clarify the two-groups tests; there currently are some errors and ambiguities in the thesis.

The added table legends help better discuss the two-groups tests. The definition of b0 and b1 have been redefined:

Regarding H2 two groups, b_1 is the estimate of the interaction from the group with negative industrial GDP Growth. b_0 is the estimate of the interaction from the group with positive industrial GDP Growth. Regarding H3 two groups, b_1 is the estimate of the interaction from the group associated with a higher stringency index. b_0 is the estimate of the interaction from the group associated with a lower stringency index.

*Discuss the economic significance of your results.

I discussed the economic significance of my results about ESG benefit after discussing results of the last robust check for original ESG scores:

The original continuous ESG scores exhibit a standard deviation of 19.29 (Table 6). The coefficient of the original "Total ESG" from Table 25 is -0.00463, and the coefficient of the original "COVID*Total ESG" from Table 25 is -0.0031. Economically, these translate to the benefits that ESG provides fundamental risk mitigation of 9% in the cost of equity and an additional 6% reduction during the COVID-19 pandemic for firms with 19.29 ESG scores above benchmark (mean). Although the cost of equity increased by 26% due to the COVID-19 pandemic (Table 25, Column 1), ESG can effectively temper the risk perceived by investors, offsetting the 15% increased cost of equity during the COVID-19 pandemic.

*Add discussions relating to practical implications of your results.

I added discussions relating to the practical implications of my results at the end of the conclusion paragraph. I discussed the implications of my results from the perspective of investors, corporation, and policymaker:

From an investor's standpoint, adopting the Environmental, Social, and Governance (ESG) practices constructs a diligent strategy, especially in the face of exogenous shocks. This is attributed to the ESG insurance mechanisms, which can effectively mitigate systematic risk

during a crisis. The findings of my study also lend support to the potential benefits of ESG practices from a corporate perspective, suggesting that during the pandemic, firms with higher ESG performance may be perceived as less risky. Thus, lower expected returns are required from investors, reducing the firms' cost of equity. Additionally, from a policy-making point of view, the benefit of risk mitigation facilitated by ESG achievements—both under normal conditions and during crises—encourages policymakers to advocate for ESG practices.

*Correct the IV sub-section of your analysis.

I corrected the section name for the discussion of endogenous issue and corrected my analysis. I change the section name from "4.7.3 Instrument Variable" to "4.7.3 Endogeneity Check". I conclude that my study does not detect the serious endogeneity problem. I conclude that this does not completely rule out the possibility of endogenous issues.

*Add a robustness check subsection, using original ESG scores (not categorical), and discuss your findings.

I Added a robustness check subsection [4.7.6 Original ESG Score Tests], using original ESG scores (not categorical), and found consistent results compared to the baseline results:

4.7.6 Original ESG Score Tests
Transforming original ESG scores into ten different groups based on 10 score intervals as a step allows me to explain the ESG benefit in risk mitigation based on one-step firm performance improvement. Although rounding numbers is useful for simplifying the structure of ESG, it comes with the limitation of the loss of precision. The detail of the exact ESG performance can be lost when I round the original ESG scores and send them into groups. In this robust check, I aim to examine the ESG benefit during the pandemic in H1 using the original ESG scores. This robust check allows for a higher accuracy of ESG benefit prediction in risk mitigation based on the improvement of a 1-point ESG score improvement.

The primary focus of my thesis is the application of categorical ESG variables. For an additional robustness check, I incorporate the original, continuous ESG scores into the baseline model as a replacement for the categorical ESG variables. The findings in Table 25 are consistent with the results from the baseline models for H1. Specifically, these robust models demonstrate the negative sign and statistical significance for all interaction terms. The coefficient of "COVID*Total ESG" in Table 25 is 0.331%, compared to 3.21% in Table 13. The interaction coefficients in Table 25 approximate those in Table 13, scaled down by a factor of ten, with a negligible methodological difference of 0.01% between 0.331% and 0.321%, and this difference is even smaller for the individual E, S, and G models. The consistent results indicate the validity of the ESG transformation approach and conclusions drawn from the baseline model.