Estimating ESG Portfolio Returns

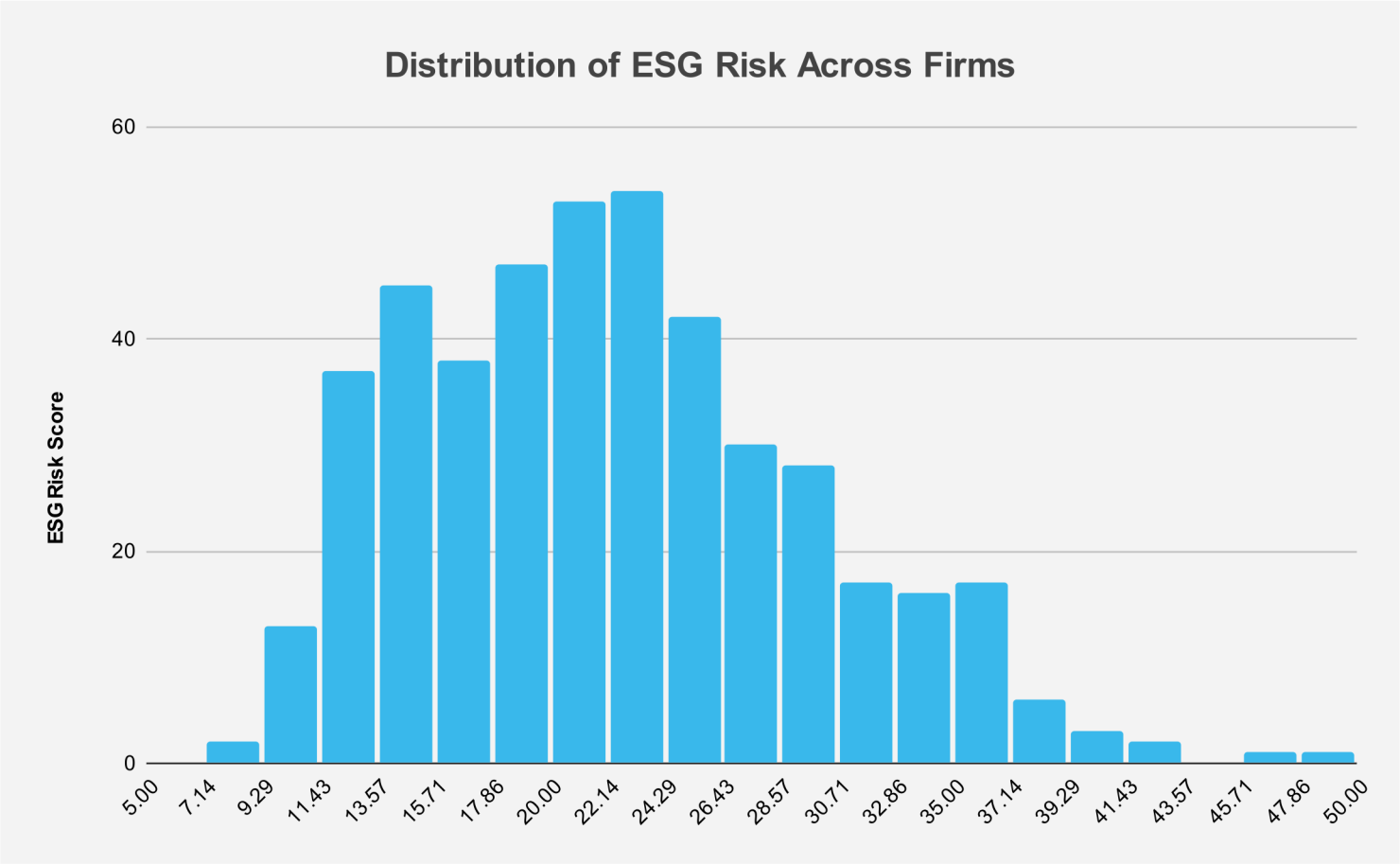
Recap: Updated H3

H3 (Updated): Returns of firms with lower ESG Risk are statistically greater than the returns of firms with higher ESG Risk.

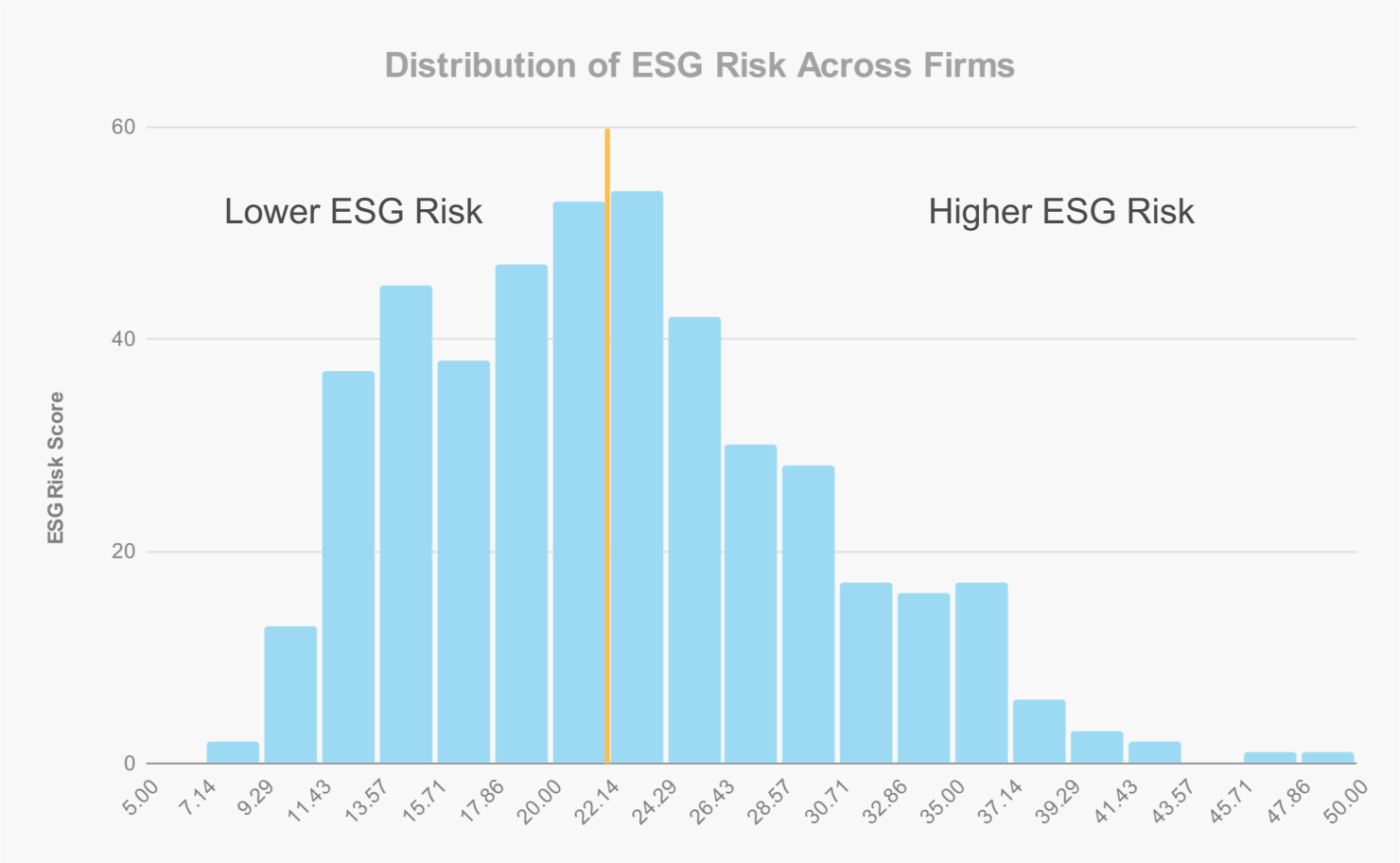
Testing H3 (Updated) requires creating portfolios of firms with higher and lower ESG Risk.

Then statistically testing the difference between the returns on both portfolios.

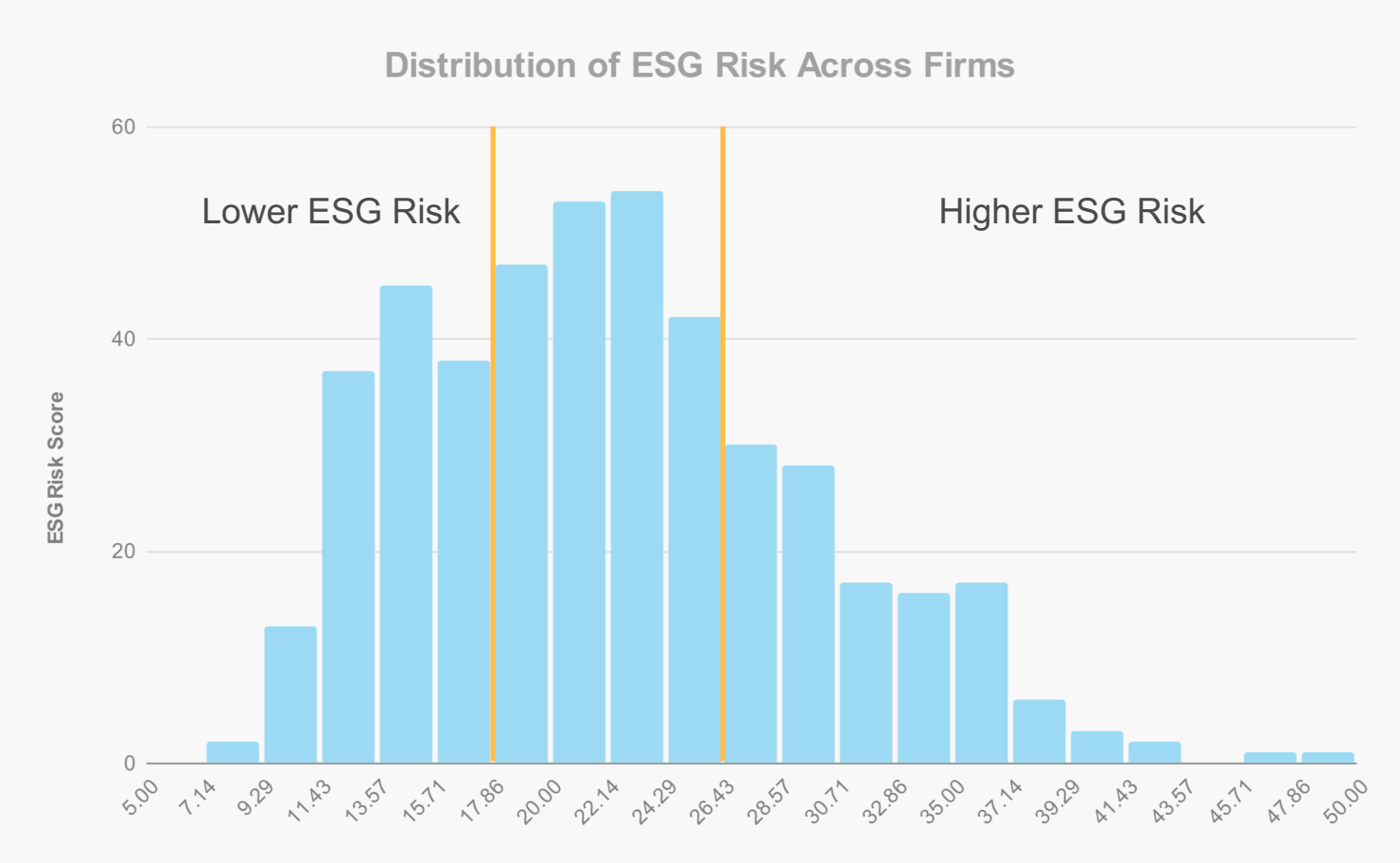
ESG Risk Across Firms



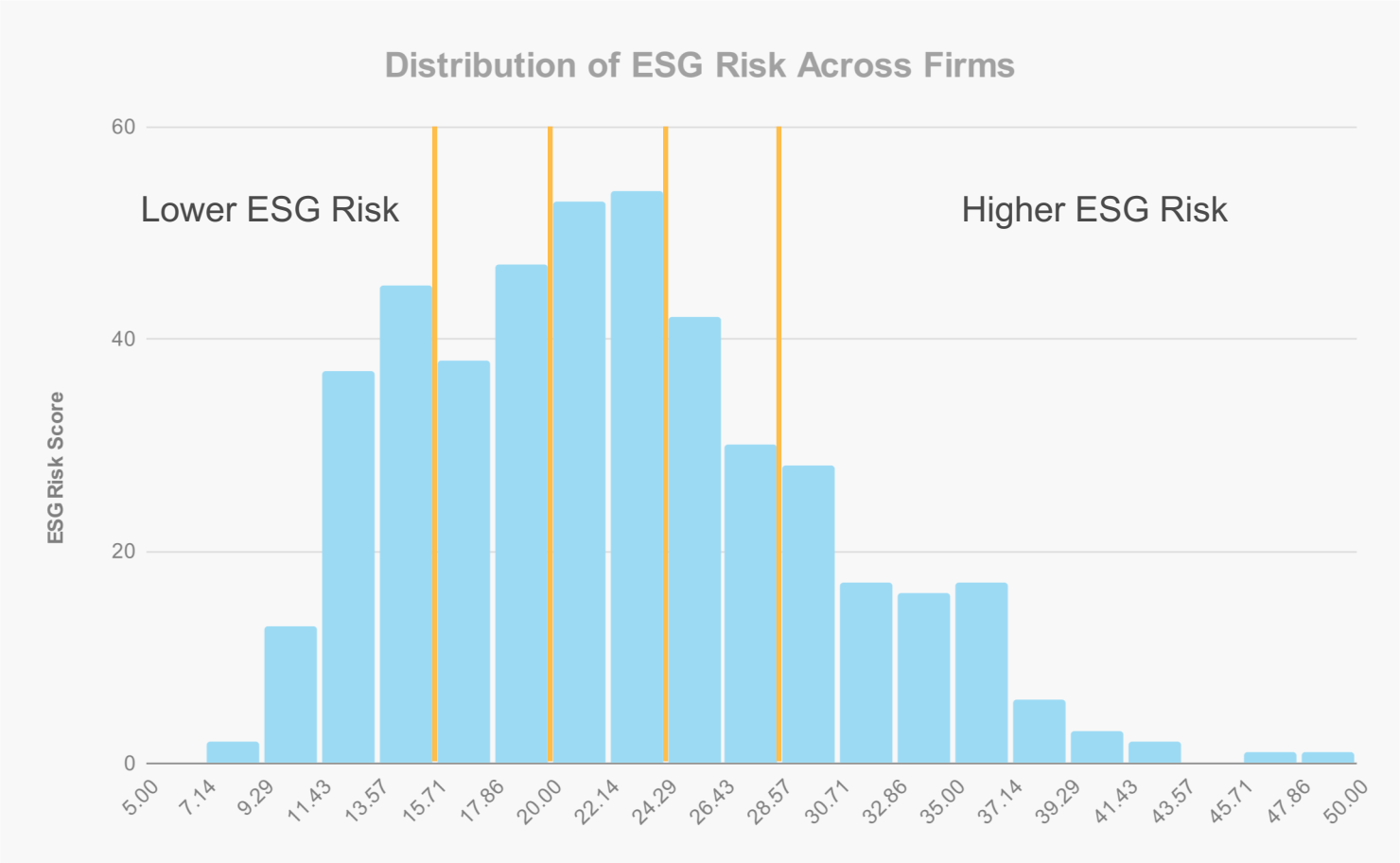
Lower vs. Higher ESG Risk (Median)



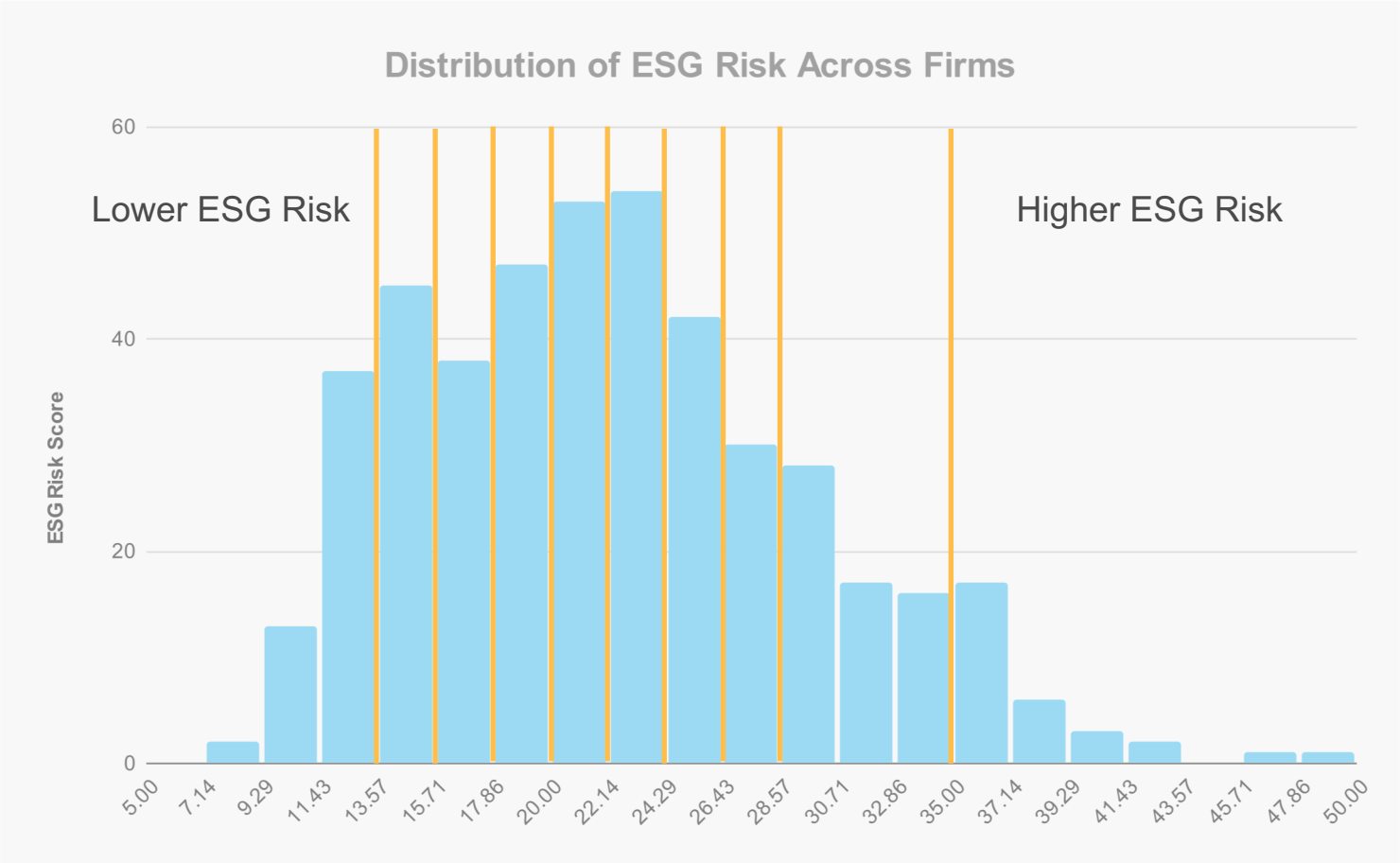
Lower vs. Higher ESG Risk (Tercile)



Lower vs. Higher ESG Risk (Quintile)



Lower vs. Higher ESG Risk (Decile)



Common Sorting Buckets

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	Number of Buckets	Percentiles used
Median	2	Top and Bottom 50% **(Median 1, Median 2)**
Terciles	3	Top and Bottom 33.33% **(Tercile 1, Tercile 3)**
Quintiles	5	Top and Bottom 20% **(Quintile 1, Quintile 5)**
Deciles	10	Top and Bottom 10% **(Decile 1, Decile 10)**

It’s important to ensure there are at least approximately the same number of firms in each bucket.

Otherwise, the results may be influenced by the effects of diversification.

Results Caused By Diversification?

	Quintile 1 (Q1)	Quintile 5 (Q5)
Firms in portfolio	2	20
Portfolio Return	$r_{Q1} > r_{Q5}$	$r_{Q5} < r_{Q1}$
Portfolio Risk	$\sigma_{Q1} > \sigma_{Q5}$	$\sigma_{Q5} < \sigma_{Q1}$

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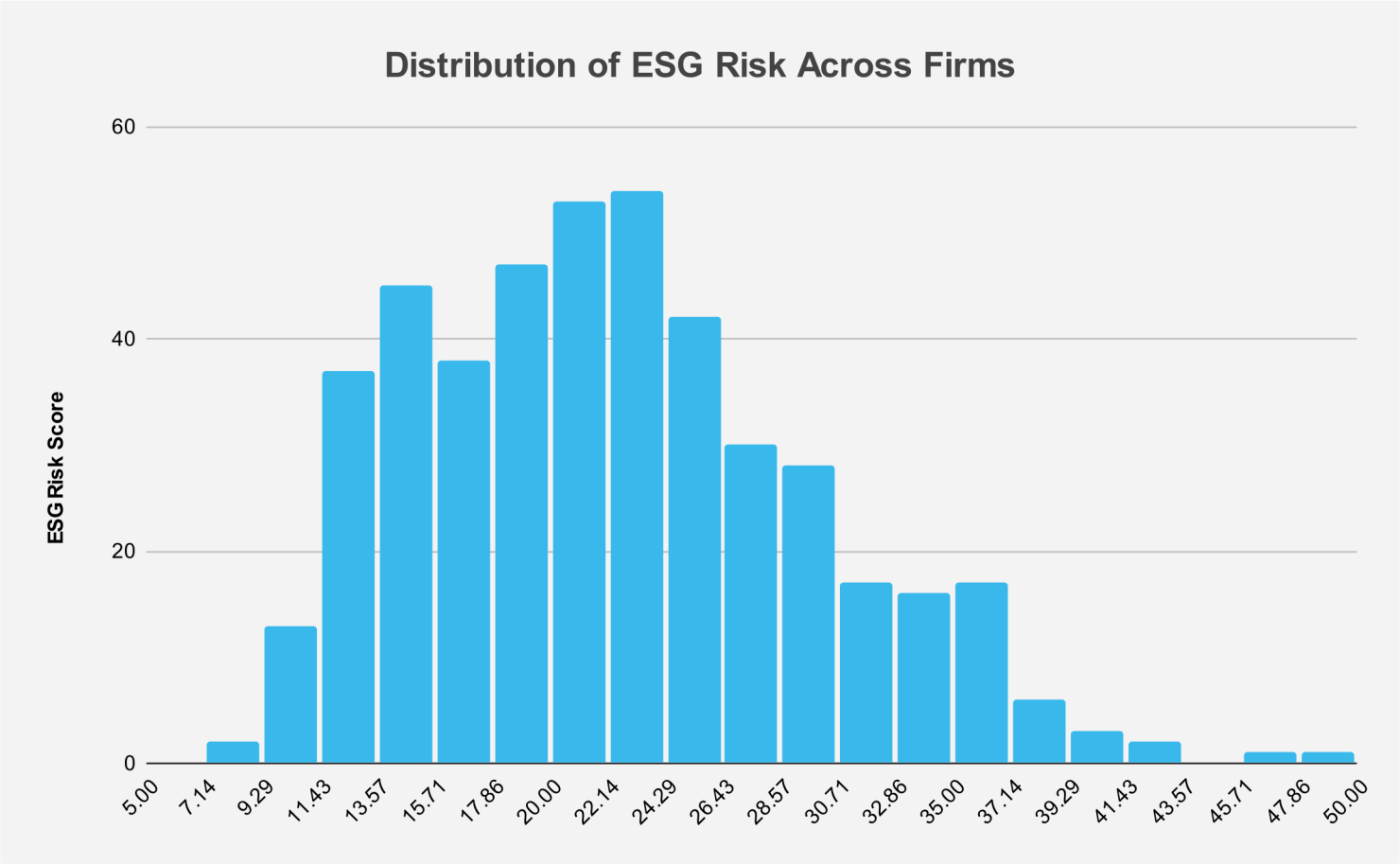
The results may be driven more by diversification effects than by ESG

ESG Risk Across Firms



ESG Portfolio Returns

After grouping firms into lower and higher ESG Risk “buckets”, we can estimate the average return for each bucket each day.

This is equivalent to the return on an equal weighted ESG portfolio.

Recall: Portfolio Returns

$$r_p = \sum_{i=1}^{k} r_i \omega_i \equiv \boldsymbol{R}\boldsymbol{\Omega}'$$

Where:

r_p = Return on the portfolio.

ω_i = Weight of (or proportion invested in) asset i

$\boldsymbol{R}$ = Vector of returns

$\boldsymbol{\Omega}'$ = Transposed vector of weights

Recall: Portfolio Returns

$$r_p = \sum_{i=1}^{k} r_i \omega_i$$

$$r_p = r_1\omega_1 + r_2\omega_2 + \cdots + r_k\omega_k$$

$$r_p = \boldsymbol{R\Omega'}$$

Equal Weighted Portfolio

The return on an equal weighted portfolio is equal to the average return across all assets in the portfolio.

$$r_p = r_1\omega_1 + r_2\omega_2 + \cdots + r_k\omega_k \equiv \frac{\sum_{i=1}^{k} r_i}{k} \mid \omega_i = \frac{1}{k}$$

Equal Weighted Portfolio

$$r_p = \sum_{i=1}^{k} r_i \omega_i$$

$$r_p = r_1 \omega_1 + r_2 \omega_2 + \cdots + r_k \omega_k$$

$$r_p = r_1 \left(\frac{1}{k}\right) + r_2 \left(\frac{1}{k}\right) + \cdots + r_k \left(\frac{1}{k}\right)$$

Equal Weighted Portfolio

$$r_p = r_1\left(\frac{1}{k}\right) + r_2\left(\frac{1}{k}\right) + \cdots + r_k\left(\frac{1}{k}\right)$$

$$r_p = \frac{r_1}{k} + \frac{r_2}{k} + \cdots + \frac{r_k}{k}$$

$$r_p = \frac{r_1 + r_2 + \cdots + r_k}{k} \equiv \frac{\sum_{i=1}^{k} r_i}{k}$$

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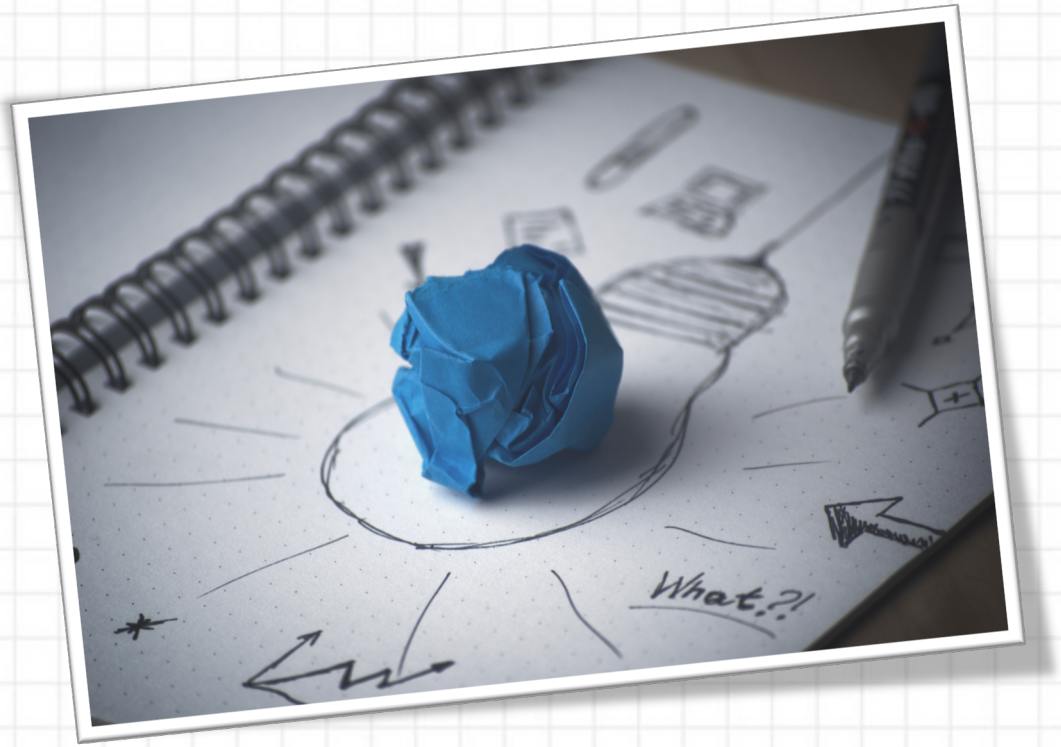
Did you get it?

Watch the example again if you haven’t quite got it yet.



ESG Portfolio Returns

By estimating portfolio returns using the simple mean, we're implicitly assuming *daily* rebalancing.

This can be very expensive to implement.

It is NOT advisable to implement daily rebalancing for real world investing.

Summary

Estimating ESG portfolio returns involves sorting firms into “ESG Risk buckets” and then estimating returns for each bucket.

Common “sorting buckets” include Median, Terciles, Quintiles, and Deciles.

For sorts greater than 2 (e.g., quintiles), we’re largely interested in the first and last bucket (e.g., quintile 1 and quintile 5) as far as evaluating differences in returns goes.

Now have a go at the quiz!