

# Company age – How to measure it and why it matters

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## Key takeaways

- Academic research indicated that there is a relationship between a company's age and stock returns.
- Calculating company age is more subjective than it would seem.
- We found that the interaction of company age with other factors in our decision trees could yield significant benefits beyond the contributions of company age alone.

The research team at MDT Advisers casts a wide net to find new ideas to test as possible enhancements to our investment process. In 2019, we came across a paper entitled "Age Matters"<sup>1</sup>, primarily authored by a Ph.D. student in statistics at the University of Waterloo. The paper was not published and did not make much of a stir online (3.5 years later, it has been cited on Social Science Research Network (SSRN) only once). However, we were intrigued by the paper's finding that there was a relationship between company age and stock returns — particularly by the nature of that relationship. The report used standard regression tools to uncover the relationship and performed additional analysis to show that the effect was significant only among the younger half of firms. We hoped that by applying our decision tree modeling to this factor, highly differentiated from our other factors and non-linear in its nature, we would be able to make a significant improvement in the accuracy of our alpha forecasting.<sup>2</sup>

## How to measure age

At first we followed the paper's authors in simply using the pricing data from the Center for Research in Securities Pricing (CRSP) to determine age. Doing it this way makes age a function of how long the security has been traded on a major stock exchange. However, as we often find to be the case, the construction of a factor, even one that represents such a seemingly straightforward idea as a company's age, can be improved with craftsmanship. For example, for a company that goes bankrupt, delists, and later returns to the stock market, the CRSP dataset will split this into two separate securities. Is it right to treat the stock of a company that has emerged from bankruptcy as having the same age as the stock of a recent IPO? Similarly, should a company that emerged from a merger with a SPAC (Special Purpose Acquisition Company) be treated as older than a company with an IPO simply because the SPAC vehicle traded on the exchange for months, if not years, before consummating the merger?

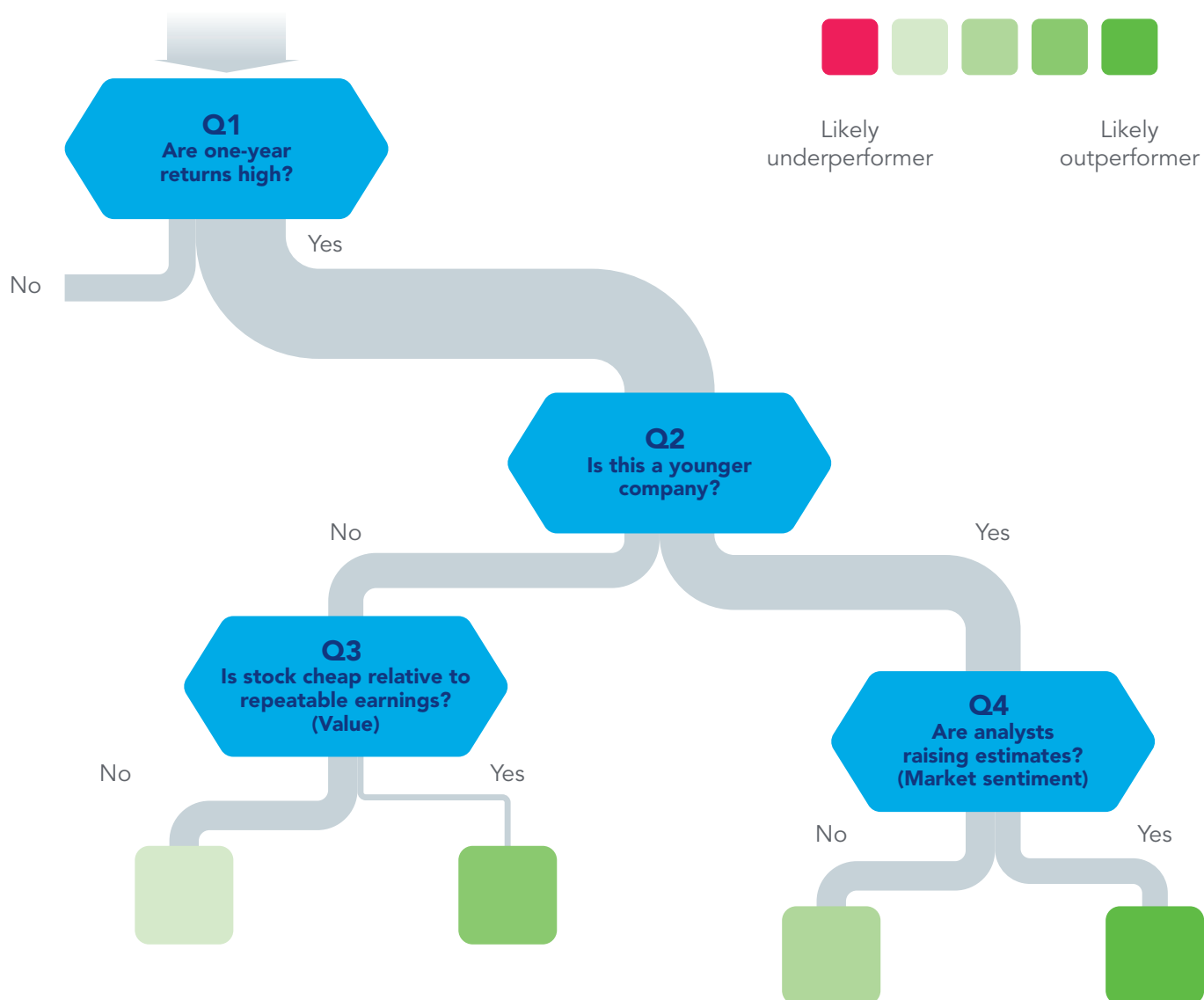
Whether a company is "young" or "old" is relatively easy to define for most firms, and the paper's definition certainly suffices. However, for a non-trivial subset of companies, calculating age is a subjective exercise. Our company age factor utilizes not only pricing data but also various pieces of information from a firm's financial statements to do the best job we can at capturing the essence of how old the company behind a stock listing truly is. We continue to look for ways to refine and enhance the factor as we come across examples in trading our portfolios where the calculation of age conflicts with our intuition.

## Why age matters

Our research generally agreed with the paper's findings that company age does have a relationship with future returns, at least within the younger cohort of companies. The paper's authors, interestingly, did not perform the standard asset pricing model tests in presenting their results. Instead, they offered some evidence that at a minimum, the size factor was not responsible for their findings. However, it is not unreasonable to suspect that other known factors could explain some of the "age effect" found in the paper. For example, certain measures of value are correlated with company age. So, while we were pleased to see directionally similar results to the paper, it was not surprising to find that the "age effect" was weaker in a multi-factor framework.

What we hadn't anticipated was that the interaction of company age and our other factors in the context of our decision trees would yield significant benefits from an alpha-modeling perspective — much greater than the contributions of company age on a stand-alone basis. One of the powerful features of using a decision tree for stock picking is that not all companies get scored the same way. The algorithm figures out the most important questions to ask of a particular type of company (and, conversely, it determines what questions are not essential to ask). By integrating company age into our factor lineup, we have given the trees a mechanism to discover that certain factors are more important for younger companies (e.g., price and analyst-based sentiment) and other factors are more important for older companies (generally speaking, value and quality measures).

## Applying company age in a regression tree



This partial tree shows how company age fits within a more extensive regression tree analysis. After finding a group of companies with high one-year returns (the “Yes” path out of Q1), the best question to ask those companies concerns company age (Q2). After answering the age question, the best question for older companies is about value (Q3), while the best question for younger companies is different, about analyst-based sentiment (Q4). The diagram shows how the company age factor is meaningful enough that the successive questions for young and old companies are very different, as well as showing that answers higher on the tree determine a set of subsequent questions tailored to a company’s own characteristics.

We have found that inclusion of the company age factor into our investment process significantly improves the forecasting accuracy of our alpha model and the simulated returns of our model backtests.

## Conclusion

Our ongoing search for ways to improve stock selection can lead to unusual places. Company age may seem unlikely to have predictive value on its own or in a multi-factor framework, however its interaction with other factors in our regression tree analysis has increased the trees' predictive power. Our decision tree model continues to show that over time some factors are more relevant to certain companies than others, and an unusual factor like company age may become more valuable inside a forest of decision trees. We will continue to evaluate new factors and enhance others in order to try to unlock the predictive powers of our model.

## References

- <sup>1</sup> Guo, Danqiao & Boyle, Phelim & Weng, Chengguo & Wirjanto, Tony, 2019. "Age matters," MPRA Paper 93653, University Library of Munich, Germany, revised 01 May 2019.
- <sup>2</sup> As part of our ongoing research, in 2023 we discovered a previously published work discussing the company age factor which was not cited in the 2019 research paper. We want to note the work done by that author. Zhang, X. Frank, (April 20, 2004), "Information Uncertainty and Stock Returns".

There is no guarantee that the use of regression trees will be a successful investment approach.

The quantitative models and analysis used by MDT may perform differently than expected and negatively affect performance.

**Investing in equities is speculative and involves substantial risks.**