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ESG Preferences, Risk, and Return

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There are two primary factors that affect expected returns for companies with high ESG ratings – investor preferences and risk. Although investor preferences for highly rated ESG companies can lower the cost of capital, the flip side of the coin is lower expected returns for investors. Regarding risk, the jury remains out on whether there is an ESG related risk factor. However, to the extent ESG is a risk factor it also points toward lower expected returns for investments in highly rated companies. While ESG investing may have social benefits, higher expected returns for investors is not among them.

ESG, Expected Returns, Risk, Investor Preferences

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Introduction

The massive fund flows into ESG (Environmental, Social and Governance) related investments have focused attention on the risk and return from such investments. As examples of the funds flows, Bloomberg reported on February 8, 2019 that Europe alone has "some $12 trillion committed to sustainable investing." Fish, Kim and Venkatraman (2019) state that sustainable assets under management worldwide were approximately $30 trillion by 2019. Matos (2020) reports that signatories to the Principles of Responsible Investment accounted for more than $80 trillion of assets under management (AUM) worldwide by the end of 2019.

Finance theory teaches that premiums over the risk-free rate arise from three general sources: 1) rewards for bearing risk, 2) behavior biases, and 3) market impediments, such as limited liquidity. Because this paper focuses on the relation between risk, return and ESG characteristics, it is assumed that the securities in question are traded in active developed markets so that impediments are of secondary importance. Furthermore, the only behavioral biases considered here are investor preferences related to ESG characteristics. For this reason, the term bias should not be thought of as pejorative. For example, investors may prefer common stock issued by companies with high ESG ratings because they value ESG characteristics, such as reduced carbon emissions, in addition to the pecuniary return offered by the stock.

One issue that affects analysis of the relation between risk, return and ESG is the ambiguity involved with ESG ratings. Ambiguity arises because there are a large number of organizations that provide ESG ratings. Li and Polychronopoulos (2020) report that as of year-end 2019 they had identified 70 different firms that provide some sort of ESG rating.

Furthermore, they note that this does not include the multitude of investment banks, government organizations and research organizations that conduct ESG-related research that can be used to create customized ratings. Fish et al. (2019) document that more than 600 ESG ratings were produced in 2018. This makes it difficult to determine what companies are "high" ESG firms. For example, do Tesla's Chinese manufacturing operations warrant a high ESG rating? While it is true that Tesla cars are zero emission, producing batteries is energy intensive requiring significant amounts of electricity. In addition, electricity is required to charge the cars. Because over 60% of Chinese electricity is generated by coal plants, building and driving a Tesla in China currently produces more carbon related emissions than those produced by standard gas-powered cars. Does this mean the Tesla's Chinese operations warrant a low ESG rating? As will become clear, these ambiguities, along with the short time interval over which ESG ratings are available, make it particularly difficult to analyze the relation between risk, return and ESG.

Despite the difficulties, there is a large and growing literature on the investment performance of ESG based investment strategies. Recent papers include Berg, Koelbel, and Rigobon (2019), Chatterji, Durand, Levine, and Touboul (2015), Dorfleitner, Halbritter, and Nguyen (2015), Gibson, Krueger, and Schmidt (2020), Semenova and Hassel, (2015), and Li and Polychronopoulos (2020) and the list is growing rapidly. The point of this paper is not to add to the list, but to address the conceptual issues that arise when attempting to assess the relation between risk, return, and ESG. With that objective in mind, the next section analyses the impact of investor preferences for ESG stocks on expected returns. The following section turns to the issue of the relation between ESG and investment risk. A key question in that

regard is whether ESG can be considered a risk factor, and, if so, what implications that has for expected returns.

Investor preferences and ESG expected returns

Following Cornell (2020) and Cornell and Damodaran (2020), there is an important issue that need to be clarified at the outset. That issue involves distinction between equilibrium returns and actual historical returns that may be observed during a transition period in which preferences for ESG stocks are changing. To illustrate, start with the observation that in a reasonably efficient market the value of a company's equity equals the present value of the expected cash flows to equity as given by equation (1). In equation (1), CF_n is the cash flow to equity in year n, k is the discount rate (the cost of equity capital), and E is the expectations operator. From equation (1) it is straightforward to show that the

$$Operating\ Value_0 = \frac{E(CF_1)}{(1+k)} + \frac{E(CF_2)}{(1+k)^2} + \cdots + \frac{E(CF_n)}{(1+k)^n} + \cdots \quad (1)$$

expected return from investing in the equity, E(R), is given by equation (2). The important point to recognize is that the valuation equation (1) necessarily implies that the expected

$$E(R) = \frac{E(P_1) - P_0 + E(CF_1)}{P_0} = \mathrm{k} \quad (2)$$

return equals the discount rate as shown in equation (2) independent of the cash flow forecasts.

Confusion arises when discount rates are changing due, for example, to a rising investor preference for highly rated ESG stocks. If the discount rate declines for certain stocks, then during the transition period when the discount rate is falling, the relative prices of those stocks will rise and investors holding them will earn superior risk adjusted returns. Once that transition is over, however, the expected realized return drops to the discount rate

which has fallen by assumption. Consequently, the higher average returns during the transition period are not predictive of higher future returns. In fact, just the reverse is true. Long-run expected returns will be less than the returns investors could have expected before the transition began. This distinction complicates any analysis relating investor preferences for ESG and stock returns during short periods of time that may not be representative of long-run equilibrium. Before going further, however, it is useful to take a step back and ask from a theoretical perspective how investor preferences for highly rated ESG stocks will affect expected returns.

Fama and French (2007) developed a simple framework that can be applied to determine how investors' preferences for green companies affect expected returns. They show that when utility functions for at least some investors include variables other than future consumption, prices deviate from the standard predictions of conventional risk and return models. If a subset of investors prefers to invest in green companies, the expected return from investing in companies that are greener will be lower, with the magnitude of the effect depending on the amount of money invested by the subset of investors. With upwards of $30 trillion of investment being affected by ESG considerations, the price impact is likely to be material. A more recent and detailed model developed by Pastor, Stambaugh and Taylor (2020) reaches the same conclusion that if investors prefer green companies the risk-adjusted expected returns on those companies well be less in equilibrium.

As an illustration of this effect, Hong and Kacperczyk (2009) and Dimson, Marsh and Staunton (2015, 2020) studied what they call "sin" stocks, i.e., companies involved in businesses such as producing alcohol, tobacco, and gaming. They hypothesize that these are stocks for which investors have negative tastes. Consistent with Fama and French's (2007)

theory, both groups of authors find that sin stocks are less commonly held by institutions and that they have higher average returns than otherwise comparable stocks. They conclude that investors must be compensated in terms of greater expected return for the reputational cost associated with holding sin stocks. The reverse would be true for highly rated ESG stocks for which investors have a positive preference. Note that lower pecuniary risk-adjusted returns on ESG stocks does not mean that the "total" returns are less. It depends on how the total return is defined. For investors that prefer investing in more socially responsible companies, holding stocks of highly rated ESG firms presumably results in a non-pecuniary benefit that increases the total return more broadly defined. Unfortunately, things get sticky where an intermediary, such as a pension fund, makes decisions for a large group of investors that have diverse preferences with respect to ESG characteristics. Those investors with more muted preferences for holding socially responsible companies will be dissatisfied with lower expected returns.

Theoretical results in the spirit of Fama and French (2007) assume that the market is in equilibrium. But concern over ESG is a relatively new phenomenon coming to the fore during the past 10 years or so. Therefore, it is possible that during this period market prices have been adjusting to a new equilibrium that reflects ESG considerations. As the market adjusts to incorporate ESG information, and assuming that the information is material to investors, the discount rate for highly rated ESG companies will fall and the discount rate for low rated ESG companies will rise. Due to the changes in the discount rates, equation (1) implies that the relative prices of highly rated ESG stocks will increase and the relative prices of low ESG stocks will fall. Consequently, during the adjustment period highly rated ESG stocks will outperform the low ESG stocks, but that is a one-time adjustment effect. Once

prices reach equilibrium, the value of high ESG stocks will be greater, as given by equation (1), but the expected returns they offer will be less as given by equation (2). This adjustment process means that the measured performance of stocks as a function of their ESG rating will depend on the sample period. If the sample is drawn from a time period during which the adjustment is underway, highly rated ESG stocks are likely to be found to outperform and the reverse for low ESG stocks. On the other hand, if the sample is drawn from a period after which the adjustment is complete, highly rated ESG stocks should be observed to have lower average returns. This, along with the difficulty of defining exactly what constitutes an ESG investment, offers an explanation as to why reported results regarding the performance of ESG focused portfolios are so heterogenous. For instance, Khan (2019), Morningstar (2019), Winegardern (2019), Glossner (2017), Nagy, Kassam, and Lee (2015), Barber, Morse, and Yasuda (2019), Li and Polychronopoulos, (2020) and Fish et al. (2019) report somewhat differing results regarding whether taking account of ESG characteristics adds alpha. An extensive review by Matos (2020) reports similarly ambiguous results.

There is one possible way that investors can benefit from the adjustment period, but it requires active engagement. As described by Gollier and Pouget (2014), large investors can potentially follow a "washing machine" strategy by establishing a significant position in "bad" ESG companies. They then actively engage with the goal of inducing management to change its ways and become greener. If they are successful, and if that success leads to a drop in the discount rate because the company is greener, they can then sell the shares at a profit.

Finally, if the ESG criteria are hard constraints, they must have a downward impact on investment performance compared to unconstrained investment portfolios. After all, an

unconstrained investor can always choose to hold an ESG constrained portfolio, but the reverse is not true. In addition, adding constraints limits portfolio diversification which will negatively impact the risk-return tradeoff.

The good side of the lower expected returns is an increase in the value of greener companies because of the lower discount rate. As Pastor et al. (2020) show, this has two desired social effects. First, firms choose to become greener because greener firms have greater market value. Second, investment shifts from toward greener firms because of their lower cost of capital. It is worth noting that ESG advocates on occasion conflate these benefits with higher returns for investors. Unfortunately, the two are inconsistent.

The bottom line is that if a sufficient number of investors have non-pecuniary preferences for companies with high ESG scores that will lower the discount rate at which the companies' cash flows are discounted and thereby raise their value relative to that of companies with lower ESG scores. In addition, the lower discount rate produces an incentive for firms to go green to increase their value. It also means that holding cash flows constant, projects undertaken by high ESG firms will have greater value than those undertaken by low ESG firms. This shifts capital investments toward high ESG firms. All these benefits, however, do not come without a cost. The cost is that investors in highly rated ESG companies can expect a lower rate of return on their investments.

Is ESG a risk factor and does it matter?

Investor preferences are not the only pathway through which ESG can affect the risk-return tradeoff. It is also possible that there are direct risks associated with ESG characteristics that may affect expected returns. For example, fossil fuel producers may face risks associated with climate or regulatory shocks to which renewalable energy producers are

immune. Such possibilities have led to questions regarding whether ESG related exposure is either a priced risk factor, or a proxy for a priced risk factor, in the sense posited to by Fama and French (1995). When Ross (1976) originally developed the arbitrage pricing model on which factor models are based, he identified two characteristics of potential factors. First, the factor must be systematic in that it cannot be diversified away by holding a large number of securities. Second, the factor must be "priced." That is there must be a risk premium associated with exposure to the factor. However, the risk premium need not be positive. Risk premiums will be positive for risk factors that investors do not want exposure to but negative for risk factors for which investors desire exposure. For instance, if inflation is a factor, investors may prefer securities that offer higher returns when inflation increases and be willing to accept lower returns on such securities when inflation falls. This would show up as a negative risk premium associated with the inflation factor.

Following Fama and French (1995), Lioui (2018) proposes an ESG factor. He proxies the factor by first dividing stocks into portfolios along the dimensions of strength and concerns. The portfolio (LH) is one that is long stocks with low strengths and high concerns. He argues that his portfolio should be more susceptible to ESG shocks. Conversely, the portfolio (HL) consists of stocks with high strengths and low concerns. Of course, this breakdown is dependent on his estimates of strengths and returns. As a proxy for the unobservable ESG factor, he uses a zero-investment portfolio that is long LH and short HL. Given its construction, highly rated ESG stocks exposed to this factor would be expected to do relatively well in bad ESG related times and relatively poorer in good times. They thus function as hedges against climate risk. Lioui finds that his constructed factor is priced. Like the hypothetical inflation factor, the estimated market price of risk associated with the ESG

factor *negative*. This implies that more highly rated ESG securities have lower expected returns.

Engle, Giglio, Lee, Kelly and Stroebel (2020) develop a more sophisticated algorithm for constructing what they call climate change hedge portfolios, but which are equivalent to factor mimicking portfolios. Like Lioui, they find that the hedge portfolio has a negative risk premium. The conclude that "*This lower expected return corresponds to the insurance premium paid for the climate hedge portfolio.*"

One surprising result that emerges from the Engle et. al. paper is the composition of the hedge portfolios. For the portfolio constructed to hedge again negative climate change news, the largest short position is in "General Building Contractors," followed by "Water Transportation." The largest long positions are "Building Materials and Gardening Supplies" and "Tobacco Products." This highlights the fact that factor mimicking portfolios will not necessarily conform with common priors regarding the optimal way to hedge climate risks of going long green energy stocks and short oil companies.

A word of warning is in order here, particularly given the ambiguity in ESG scores. The problem is that it is too easy to find priced factors, ex-post, if there is sufficient variation in the data. For instance, Harvey, Liu and Zhu (2016) report that their review of 313 published papers on the cross-section of expected returns found 316 priced factors. An update by Arnott, Harvey, Kalesnik and Linnainmaa (2019) reports that over 400 factors had been "discovered" by year-end 2018. Furthermore, attempts to reliably estimate an ESG factor are hindered by the fact sample periods are short. Unlike data on size and value, which can be tracked back nearly a century, data on ESG is pretty much constrained to start about

2009. Both Lioui and Engle et. al. recognize this shortcoming and admit that because of it their estimates are noisy.

For the foregoing reasons, West and Polychronopoulos (2020) argue that the criteria for selecting risk factors should be expanded to include several ex-ante considerations. Following Beck, Hsu, Kalesnik, and Kostka (2016), they propose that a factor must satisfy three criteria:

1) It is grounded long and deep in the academic literature. There should be meaningful evidence that the factor is associated with a reliable risk premium (which could be negative.)

2) It is robust across definitions.

3) It is robust across geographies.

Applying these added criteria West and Polychronopoulos reach several conclusions. First, examining the vast body of research on ESG, they final little agreement regarding its robustness in earning a return premium for investors. Second, West and Polychronopoulos find that how the ESG rating is defined has a marked impact on whether it is associated with a significant risk premium. As an illustration, the authors define four ESG factors: one based on overall ESG rating, one focused on environmental characteristics, one focused on social characteristics, and one focused on governance. They then build long-short factor portfolios based on these characteristics using U.S. stock price data. They find that none of the portfolios has a significant CAPM alpha that could be interpreted as a risk premium. They then repeat the experiment using data on European companies and find that the results are largely consistent with the U.S. results.

The points made by West and Polychronopoulos are well taken. Nonetheless, given the ambiguity in the data and for the sake of argument, suppose that there is a priced ESG factor as Lioui and Engle et. al suggest. That does not imply that tilting an investment portfolio toward highly rated ESG stocks is a superior investment strategy. It simply means that an ESG factor must be included in a multi-factor asset pricing model. In that context, highly rated ESG stocks would be good investments only to the extent the premium associated with investing in them produces returns in excess of the fair risk-adjusted rate. But that has nothing to do with whether ESG is a factor. It depends entirely on whether highly rated ESG companies are properly priced. It does not mean that high ESG stocks have greater expected returns. If the market price of ESG risk is negative, as Lioui and Engel et. al. find, then highly rated ESG stocks will have lower expected returns, ceteris paribus.

It is theoretically possible that investment managers have failed to recognize ESG risks so that they are not properly priced. However, that possibility is hardly consistent with the stated popularity of ESG investing described earlier. Consistent with that evidence, Cerulli Associates (2019) report that 83% of active U.S. investment managers say they are embedding ESG criteria into their investment decision making.

The possibility remains that highly rated ESG stocks will be mispriced for behavioral reasons. But that leads back to the preference analysis of the previous section. In terms of purely pecuniary risk-return considerations, the conclusion of that section was that highly rated ESG companies would not be properly priced – they would have lower expected returns to reflect positive investor preferences.

The bottom line is that it remains uncertain whether ESG is a priced risk factor. However, even it is a priced factor that does not support the popular view that highly rated

ESG companies are superior investments. That requires mispricing of ESG risk. And to the extent that there is mispricing, the enthusiasm for ESG suggests the outcome would be overpricing of highly rated stocks and associated lower expected returns.

Summary and Implications

Premiums over the risk-free rate arise from three general sources: 1) rewards for bearing risk, 2) behavior biases, and 3) market impediments. The analysis here focused on the first two sources by analyzing the relation between ESG characteristics, investment risk, and expected returns. The basic conclusion is that investors attempting to improve performance by tilting their portfolios in the direction of companies with high ESG ratings are likely to be disappointed. To the extent that investors prefer highly rated ESG companies for social reasons, the result will be higher prices and lower expected returns. However, from the point of view of the company and society there will be benefits. The lower expected returns imply a lower discount rate and, thereby, greater investment in green projects and higher market values for green companies.

The jury is still out on whether there is an ESG risk factor. There are no noncontroversial ESG ratings and the available sample period over which ESG data are available is short. However, even if ESG ratings are related to an underlying risk factor that does not mean they can be used to identify superior investments. The existence of superior investments requires that ESG risks are mispriced. Given the intense focus on ESG investing in today's market such mispricing seems unlikely. Putting aside mispricing, if there is an ESG risk factor, then stocks with high ESG ratings that are less exposed to that risk, should provide lower, not higher, expected returns for hedging reasons.

To conclude, the growing focus on ESG in investing may well have social benefits. Investors preferences for companies with high ESG ratings can lead to lower costs of equity capital that encourage investment in green technologies. In addition, a high ESG rating can function as a hedge against climate shocks and unexpected changes in environmental regulation. However, both these benefits come with a cost in the form of lower expected return for investors.

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