



## The Return-Predictive Power of Intangibles

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### ABSTRACT

This study examines the performance potential of intangibles based on the EFI (extra-financial indicator) score developed by *The Value Group*, which evaluates the firms' non-financial performance. Around the world, there exists a significantly positive relation between the firm's EFI score and future stock returns. High EFI firms significantly outperform the market as well as low EFI firms on a risk-adjusted basis. As higher EFI scores predict higher future fundamental profitability, the firms' extra-financial performance is also a leading indicator of fundamentals. The EFI score provides investors with unique information about future firm performance that is independent from established return predictors.

*"Start with the obvious... Intangible assets are worth a lot and accountants don't do a good job in assessing their value."*

– Aswath Damodaran,  
The Value of Intangibles

### 1. Introduction

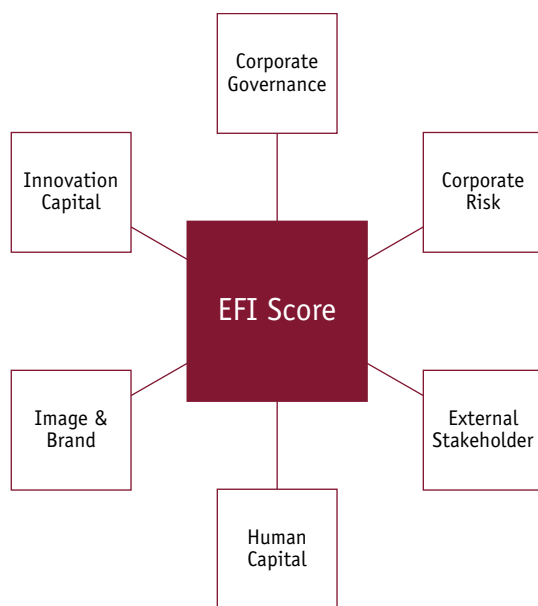
The continuing transformation from a manufacturing to a knowledge-based service economy is increasingly emphasizing the importance of self-created intangible and intellectual assets for sustainable business success. The outstanding performance of the so-called FAANG stocks (Facebook, Amazon, Apple, Netflix, and Google (Alphabet)) over the last five years, which draw much of their advancement primarily from such extra-financial capital, can be regarded as exemplary for this paradigm shift (Brand Finance, 2019).

Intangible assets created, e.g., through innovation, employee development, customer satisfaction, and successful brand management, represent a firm's unique features, which can only be imitated by competitors with difficulty or at great expense. In an international survey by Columbia Threadneedle (2019), 95% of the financial and portfolio managers surveyed, therefore, agree that intangible assets contain valuable information about the firm's prospects. At the same time, however, 88% of those surveyed admit that they face difficulties in adequately assessing intangibles' value using conventional valuation techniques. Based on estimates from Brand Finance (2019), intangible assets represent, on average, 48% of the firm's total value around the world. However, 70% of these are not disclosed in companies' balance sheets due to accounting standards historically developed primarily for manufacturing firms. This implies that

traditional accounting information is losing relevance for today's investors (Lev and Gu, 2016).

Since the 2000s, academic research has shown that the creation of intangible assets significantly contributes to firm value. Firms with superior corporate governance (Gompers et al., 2003; Giroud and Mueller, 2011), high customer and employee satisfaction (Fornell et al., 2006; Edmans, 2011; Edmans et al., 2020), R&D commitment and innovation efficiency (Chambers et al., 2002; Hirshleifer et al., 2013), and successful brand management (Chemmanur and Yan, 2019) all earn higher long-term excess returns.

Why can non-financial firm characteristics lead to excess returns? According to Edmans (2011), the market fails to incorporate intangible assets fully into stock prices. This argument coincides with the Columbia Treadneedle (2019) survey results that document that investors have problems assessing intangibles' value. While easily processible information, such as a profit warning, is immediately capitalized in the market, more complex information like intangibles' value relevance is not. In fact, on average, investors tend to systematically underestimate the value of intangible assets due to incomplete information. Such market behavior should result in *ex ante* predictable return patterns on high and low intangible capital firms for investors who can assess the value of intangibles more precisely.



**Fig. 1.** Components of the EFI score.

Building upon these insights, this study examines the performance potential of intangibles in international stock markets using the valuation approach of *The Value Group*, an independent investment consultant specializing in the analysis of non-financial corporate performance. We employ the EFI (extra-financial indicator) score developed by *The Value Group*, which evaluates the firms' non-financial performance based on their intangible and intellectual capital. The EFI score aggregates numerous data points and key performance indicators from six categories identified as significant value drivers based on the quantitative EFI research model (see Fig. 1).

We address the following research questions in the empirical analysis:

- (1) Does the EFI score predict future stock returns?
- (2) How unique is the information contained in the EFI score in comparison to established return predictors?
- (3) What is the relation between the EFI score and the firms' future fundamental profitability?

The remainder of the study is organized as follows. The next section describes the international dataset. Sections 3 to 5 present and discuss the empirical results, and Section 6 concludes.

## 2. Data and Summary Statistics

We consider an international stock sample consisting of firms from 23 developed equity markets over the sample period from July 2010 to June 2020 (henceforth 2010–2020). The countries' selection resembles the countries included in common world stock market benchmarks. To obtain a very liquid and investable stock sample, only the largest firms in each country are selected, which together account for 95% of the country's total market capitalization each year. This limits the dataset, on average, to the largest one-third of firms in each country. In this way, we ensure that the empirical analysis is carried out under conditions that can be implemented by institutional investors to obtain a realistic assessment of the return-predictive power of the EFI score.

Monthly total returns (including reinvested dividends) on common stocks are obtained from Refinitiv Datastream, and annual firm-level accounting information is from Worldscope. The EFI score, which evaluates the firms' extra-financial performance, is sourced from the database operated by *The Value Group*. The dataset includes surviving and non-surviving firms that appear at any point in time during the sample period. Thus, no survivorship bias is present in the performance analysis. All data are denominated in euros to represent the perspective of a euro-based investor.

**Table 1** shows distributional statistics of sample firms across individual countries. Over the 2010–2020 period, the sample comprises, on average, 4846 firms per month. In line with their economic importance, about half of the sample firms stem from the world's two largest equity markets, the United States and Japan.

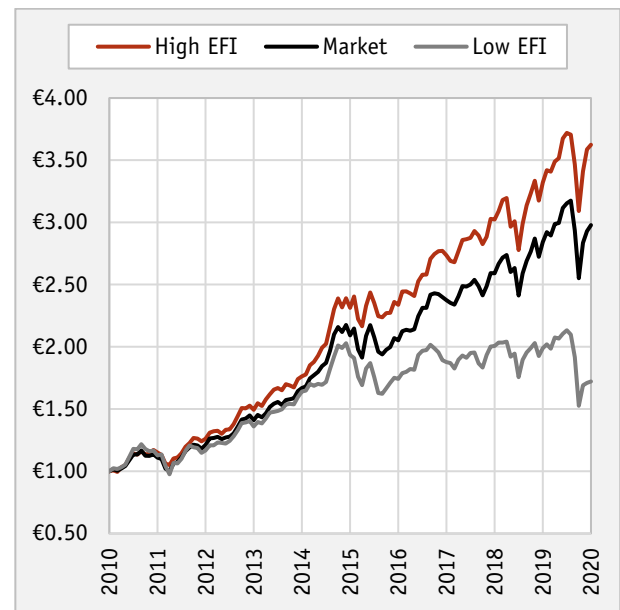
**Table 1.** Summary Statistics, 2010–2020

Country	Firms
Australia	257
Austria	30
Belgium	48
Canada	266
Denmark	36
Finland	43
France	148
Germany	135
Hong Kong	395
Ireland	12
Israel	147
Italy	85
Japan	1038
Netherlands	34
New Zealand	48
Norway	63
Portugal	15
Singapore	125
Spain	47
Sweden	109
Switzerland	90
United Kingdom	303
United States	1372

This table reports the average number of firms per month in each country.

### 3. EFI Scores and Future Stock Returns

To examine how the firms' extra-financial performance impacts future stock-market performance in international markets, we form quintile portfolios. Each June, all firms in the sample are allocated in ascending order to five groups based on their EFI score. Accordingly, the bottom (top) quintile portfolio contains the 20% of firms with the lowest (highest) EFI scores. Monthly returns on the value-weighted portfolios are calculated for the subsequent 12 months, and the portfolios are rebalanced each year.



**Fig. 2.** Cumulative Payoff of a €1 investment.

To begin with, **Fig. 2** illustrates the cumulative payoff of a €1 investment in the portfolio of low EFI firms and the portfolio of high EFI firms over the sample period. For comparison, a similar investment in the value-weighted global market portfolio is included. The figure demonstrates that an investment in high EFI firms rewards large payoffs. A €1 investment in the portfolio of high EFI firms grows over time to €3.62, whereas a likewise investment in low EFI firms yields only €1.72. This is considerably less than a similar market investment, which generates a value of €2.98 at the end of the sample period.

**Table 2** shows the annualized risk and return characteristics of the five EFI portfolios in detail. The results document that sorting firms based upon their extra-financial performance leads to a

strong spread in future stock returns. Besides, we observe that high EFI firms are not only associated with higher returns but also with lower risk. This is particularly evident in the maximum drawdown measure. While investors in low EFI firms have to bear drawdowns as low as -28.48%, high EFI firms experience only a maximum loss of -16.91% over the sample period.

Compared to the market, high EFI firms can improve the Sharpe ratio by 20% on average. High EFI firms' superior risk-return relation is accompanied by a low tracking error relative to the market but a high information ratio, making the firms' extra-financial performance a very useful stock selection criterion. The CAPM regression analysis corroborates this assessment. High EFI firms significantly outperform the market by more than 2.59% per year on a risk-adjusted basis. In comparison, low EFI firms are penalized with a significantly negative alpha estimate of -6.34% per year. After controlling for market risk, this results in a substantial return spread of 8.93% per year between high and low EFI firms.

Fig. 3 complements the global portfolio analysis by examining the stock-market performance of high and low EFI firms in the three major regions

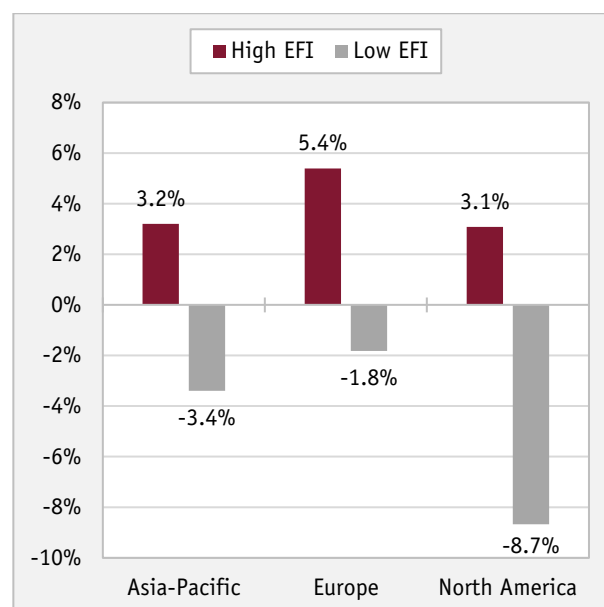


Fig. 3. Regional CAPM alphas.

of the sample, Asia-Pacific, Europe, and North America. The formation of regional portfolios is analogous to the global EFI portfolios, taking into account the respective country affiliation. Asia-Pacific includes Australia, Hong Kong, Japan, New Zealand, and Singapore. North America consists of Canada and the United States. With the exception of Israel, Europe encompasses the remaining sample countries.

Table 2. Risk-Return Characteristics, 2010–2020

Portfolio	Market	1 (Low EFI)	2	3	4	5 (High EFI)
Average Return	11.68%	6.45%	10.12%	10.88%	11.40%	13.61%
Standard Deviation	11.93%	13.96%	12.30%	11.97%	11.96%	11.57%
Max. Drawdown	-19.68%	-28.48%	-21.70%	-21.21%	-19.12%	-16.91%
Avg. Excess Return	11.47%	6.24%	9.90%	10.67%	11.19%	13.40%
Sharpe Ratio	0.96	0.45	0.81	0.89	0.94	1.16
Avg. Active Return		-5.23%	-1.56%	-0.80%	-0.28%	1.93%
Tracking Error		5.00%	2.59%	2.08%	2.07%	2.80%
Information Ratio		-1.30	-0.64	-0.32	-0.07	0.95
Beta		1.10	1.01	0.99	0.99	0.94
Alpha		-6.34%	-1.65%	-0.67%	-0.14%	2.59%
t-statistic		-3.95	-1.94	-0.98	-0.20	2.89

The first table section provides the portfolio's average return, the standard deviation of returns, and the maximum drawdown, i.e., the maximum percentage peak-to-through decline over the sample period. The second section shows the average excess return (portfolio's return net of the risk-free rate), the Sharpe ratio (average excess return divided by the standard deviation of returns), the average active return (portfolio's return net of the market return), the tracking error (standard deviation of active returns), and the information ratio (alpha estimate divided by the standard error of the CAPM). The third section gives the results of the CAPM regression analysis. The beta and alpha estimates are obtained by regressing the portfolio excess returns on the market excess returns. The t-statistic relates to the alpha estimate. The one-month EURIBOR serves as the risk-free rate (negative rates are set to zero).

The figure illustrates the annualized alpha estimates of the CAPM regression analysis using regional value-weighted market benchmarks. The regional results confirm the global evidence. In all considered regions, firms with high EFI scores are associated with positive alpha estimates, which are statistically significantly different from zero at the 5% level or better. In contrast, firms with low EFI scores consistently exhibit negative alphas. Taken in their entirety, our empirical findings show that the firms' intangible and intellectual capital has significant performance implications, both globally and in the individual regions.

#### 4. Incremental Return Predictability of EFI

The portfolio-level analysis represents a very useful approach to investigate how average returns vary with different levels of the variable of interest, such as the EFI score used here. However, finding a positive EFI-return relation in the portfolio sorts does not rule out the possibility that the return effect associated with the firms' EFI score is just a manifestation of already known

determinants of the cross-section of average stock returns.

To examine EFI's incremental power for predicting future stock returns, we perform cross-sectional return regressions at the individual firm level using the Fama and MacBeth (1973) methodology. Specifically, we estimate firm-level cross-sectional regressions of monthly stock returns on the firm's EFI score in combination with established return predictors. Considering the most recent developments in asset pricing (Fama and French, 2015; 2018), the set of common control variables includes firm size (SZ), book-to-market (BM), momentum (MOM), operating profitability (OP), and investment (INV) for measuring the abnormal return effect associated with EFI. SZ is the market value of equity measured as of June of each year in million euros. BM is defined as the ratio of book equity to market equity for the fiscal year ending in the previous calendar year. MOM is the cumulative prior 12-month stock return, skipping the most recent month ( Jegedeesh and Titman, 1993). OP is operating income divided by book equity, and INV is the annual percentage growth in total assets.

**Table 3.** Monthly Cross-Sectional Regressions to Predict Future Returns, 2010–2020

Spec	Sample	Period	EFI	SZ	BM	MOM	OP	INV
(1)	Global	Full	<b>0.43</b> (5.77)	0.00 (-0.15)	0.06 (0.81)	0.61 (1.97)	0.15 (1.10)	<b>-0.15</b> (-2.32)
(2)	Global	Earlier	<b>0.42</b> (3.56)	-0.01 (-0.21)	<b>0.18</b> (2.24)	<b>0.91</b> (2.04)	<b>0.39</b> (2.28)	<b>-0.19</b> (-2.02)
(3)	Global	Later	<b>0.44</b> (4.75)	0.00 (-0.01)	-0.06 (-0.52)	0.31 (0.72)	-0.09 (-0.45)	-0.12 (-1.26)
(4)	Global	Pos. MRP	<b>0.36</b> (4.11)	0.00 (-0.03)	0.12 (1.40)	0.04 (0.11)	0.15 (0.99)	-0.15 (-1.76)
(5)	Global	Neg. MRP	<b>0.58</b> (4.17)	-0.01 (-0.24)	-0.08 (-0.67)	<b>1.83</b> (3.39)	0.14 (0.52)	-0.17 (-1.55)
(6)	Small	Full	<b>0.50</b> (7.00)	0.10 (1.04)	<b>0.14</b> (2.02)	<b>0.59</b> (2.25)	0.17 (1.11)	<b>-0.16</b> (-2.14)
(7)	Large	Full	<b>0.34</b> (3.80)	-0.04 (-1.04)	-0.05 (-0.52)	0.60 (1.54)	-0.04 (-0.19)	-0.09 (-1.04)
(8)	Asia-Pacific	Full	<b>0.44</b> (4.02)	0.03 (0.86)	<b>0.23</b> (2.74)	<b>0.68</b> (2.42)	0.43 (1.58)	-0.14 (-1.60)
(9)	Europe	Full	<b>0.30</b> (3.70)	-0.04 (-0.78)	-0.05 (-0.49)	<b>1.16</b> (3.01)	0.13 (0.48)	-0.21 (-1.72)
(10)	North America	Full	<b>0.41</b> (3.35)	-0.02 (-0.30)	-0.05 (-0.52)	0.25 (0.60)	0.04 (0.23)	-0.17 (-1.71)

This table reports results from different firm-level cross-sectional regression specifications. 'Sample' and 'Period' indicate the considered sample firms and period, respectively. Average coefficient estimates that are significantly different from zero at the 5% level of significance or better are bolded.

Except for momentum, which is measured monthly, we update the explanatory variables each June to predict monthly stock returns from July to the following June. In the regressions, firm size and book-to-market are measured in natural logs (Fama and French, 1992), and all regressions include country dummies to control for possible country effects.

Table 3 shows average coefficient estimates and associated  $t$ -statistics (in parentheses) from different specification variants nested within the outlined cross-sectional return regression. Of primary interest is specification (1), which provides the baseline result for the full sample. We find a significantly positive relation between the firm's EFI score and future stock returns that is not explained away in the presence of established cross-sectional return determinants. Thus, the EFI score provides investors with unique information about future firm performance that is independent from common return predictors, such as firm size, book-to-market, momentum, operating profitability, and investment. In fact, over the 2010–2020 period, the majority of these known return predictors, regularly used as smart beta factors in the financial industry, fail to materialize. This observation is consistent with Blitz (2020), who also finds that the commonly used return factors of Fama and French (1993, 2015) have performed relatively poorly over the most recent decade. Linnainmaa and Roberts (2018) document that the ongoing economic transformation is also reflected in return factors. The information content of factors that derive their return-predictive power from physical capital has weakened over time, while it has become stronger for factors linked to the firms' intangible capital.

The following specifications provide a battery of robustness tests. Specifications (2) and (3) present sub-period results. The earlier half sample runs from July 2010 to June 2015, while the later half sample covers the period from July 2015 to June 2020. For specifications (4) and (5), the cross-sectional return regressions are estimated separately for months in which the market risk premium is positive and for months in which the premium is negative. In this way, we shed light on the EFI score's return-predictive ability in up

and down markets. Though we already limit the dataset to the largest one-third of firms in each country, specifications (6) and (7) offer additional size-segmented subsample results. The small (large) subsample consists of the bottom (top) 50% of firms in each country in terms of market capitalization, measured as of June of each year. Finally, specifications (8) to (10) provide regional evidence.

In summary, the robustness tests corroborate our baseline result. Regardless of whether we split the dataset over time or into sub-samples, we observe a persistent and pervasive return predictability of the EFI score. In fact, among the variables considered here, EFI is the only significant return predictor, both over the most recent five-year period and among larger firms.

## 5. EFI and Future Fundamental Profitability

To explore EFI's association with future fundamental profitability, we follow the methodology described in Bradshaw et al. (2006) and Walkshäusl (2020) and conduct firm-level cross-sectional regressions based on annual realizations of fundamentals. In these regressions, the dependent variable is the firm's one-year-ahead fundamental profitability using return-on-assets (ROA). ROA is defined as being net income before extraordinary items divided by lagged total assets. The independent variables are current profitability, firm size, and EFI, which all can be observed before the future firm performance is realized. That is, we employ variables at time  $t$  to forecast the fundamental profitability at time  $t+1$ . Controlling for current profitability and firm size helps to uncover the genuine impact of the firms' extra-financial performance on future fundamental performance. Previous research shows that the current profitability level is economically the most important determinant of future profitability because fundamental profitability is only slowly mean-reverting (Fama and French, 2006). The inclusion of firm size is motivated by the evidence that smaller firms tend to be less profitable (Fama and French, 1995).

Table 4 shows average coefficient estimates and associated  $t$ -statistics (in parentheses) from the



outlined cross-sectional regression setup to forecast fundamental profitability. As before, firm size is measured in natural logs, and all regressions include country dummies. Specification (1) reports results for the global sample, while specifications (2) to (4) provide regional evidence.

First and expectedly, current profitability exerts the most substantial impact on the firm's subsequent fundamental performance. The current level of profitability accounts on average for about half of the future level. Second, except for Europe, we also observe that larger firms tend to be associated with higher future fundamental profitability, as indicated by the positive average firm size coefficients. Third and finally, the results document a significantly positive relation between the observed EFI score and the one-year-ahead profitability, both globally and in the individual regions. Thus, the firms' extra-financial performance captures additional information about future fundamental performance and, therefore, helps to forecast profitability.

According to Edmans (2011), non-financial firm characteristics only affect stock prices when they subsequently manifest in financial characteristics that are valued by the market. As shown by the results, the EFI score fulfills this condition. High EFI firms' high returns can be traced back to improving fundamental profitability that goes hand in hand with superior extra-financial corporate performance.

## 6. Conclusion

In this study, we have examined the performance potential of intangibles in international stock

markets over the 2010–2020 period. For this purpose, the EFI score developed by *The Value Group* was used, which evaluates the firms' extra-financial performance based on their intangible and intellectual capital. Our empirical results provide the following key insights:

- (1) There exists, on average, a significantly positive relation between the firm's EFI score and future stock returns. High EFI firms are rewarded with significantly positive risk-adjusted returns, while low EFI firms are penalized with negative risk-adjusted returns.
- (2) The EFI score holds unique information about the firms' future stock-market performance that is independent from established return predictors, such as firm size, book-to-market, momentum, operating profitability, and investment. Its return-predictive power is persistent over time, robust across small and large firms, and pervasive in Asia-Pacific, Europe, and North America.
- (3) The examination of fundamentals shows that the firms' extra-financial performance is also a leading indicator of future fundamental profitability. High EFI firms exhibit, on average, a higher future return-on-assets profitability than low EFI firms.

Taken together, our empirical findings document that intangible capital possesses significant performance implications around the world. The firms' extra-financial performance holds unique and valuable information for investors, making it a very useful stock selection criterion.

**Table 4.** Annual Cross-Sectional Regressions to Predict Future Profitability, 2010–2020

Specification	Sample	ROA	SZ	EFI
(1)	Global	<b>46.37</b> (17.59)	<b>0.16</b> (4.63)	<b>2.85</b> (12.41)
(2)	Asia-Pacific	<b>42.29</b> (17.77)	0.11 (1.48)	<b>2.79</b> (17.72)
(3)	Europe	<b>59.21</b> (11.89)	-0.15 (-1.97)	<b>2.05</b> (4.72)
(4)	North America	<b>42.21</b> (8.04)	<b>0.50</b> (3.34)	<b>3.17</b> (8.60)

This table reports results from different firm-level cross-sectional regression specifications. 'Sample' indicates the considered sample firms. Average coefficient estimates that are significantly different from zero at the 5% level of significance or better are bolded.

## Appendix

**Table A1.** Year-to-Year Performance, 2010–2020

Formation	Market	Low EFI	High EFI
2010	10.8%	12.6%	15.0%
2011	9.2%	3.6%	9.7%
2012	16.4%	16.5%	18.4%
2013	18.4%	20.6%	18.0%
2014	25.3%	17.9%	31.2%
2015	-1.9%	-9.9%	1.0%
2016	15.8%	7.8%	17.0%
2017	9.1%	6.9%	10.6%
2018	9.6%	-0.9%	9.8%
2019	4.8%	-13.4%	9.2%

This table reports annual return realizations on the value-weighted global market portfolio and the two portfolios comprising firms with the lowest and highest EFI scores. The annual returns are calculated from July of the portfolio formation year to the following June.

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