Global Return Premiums on Earnings Quality, Value, and Size*

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Abstract

We investigate the return premium on stocks with high earnings quality using a broad and recent global dataset covering all developed markets from 7/1988 to 6/2012. We find that a simple strategy that is long stocks with high earnings quality and short stocks with low earnings quality produces a higher Sharpe ratio than the overall market or similar strategies betting on value or small stocks. This result holds both in the overall sample as well as in the more recent time period since 2005. Because the global earnings quality portfolio has a negative correlation with a value portfolio, an investor wishing to invest in both exposures can achieve significant diversification benefits.

JEL classification: G10, G12, G15

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What kind of long-term tilts should an investor have in his equity portfolio? Throughout most of the 1970s and 80s, academic researchers had a simple answer: none. The value-weighted market portfolio was viewed as the best portfolio for an investor with mean-variance preferences, which also led to the birth of the first index fund based on the value-weighted market in 1976. However, gradually the answer started to shift: as evidence showed that small firms earned a return premium over large firms (Banz, 1981) and that value firms earned a premium over growth firms (e.g., Basu, 1983), and as the evidence seemed robust (e.g., Fama and French, 1992 and 1998), the premiums were recognized and many started recommending value and size as strategic portfolio tilts. These days such tilts are also easy for anyone to implement with explicit value indices like the Russell 2000 Value or with fundamentally weighted indices.

However, academic research has also uncovered many other patterns that investors could potentially exploit. Some of them are shorter-term trading strategies based on apparent market anomalies, such as the post-earnings announcement drift (e.g., Bernard and Thomas, 1989), which would be attractive for an active investor but raise questions about investment capacity and whether the effects have recently been arbitraged away. Some patterns such as price momentum (Jegadeesh and Titman, 1993) and short-term reversals (Jegadeesh, 1990, and Lo and MacKinlay, 1990) may be robust but may also require too much trading for many investors. Finally, some patterns such as earnings quality (henceforth just "quality") have produced attractive returns with relatively stable positions, thus allowing greater investment capacity and lower portfolio turnover than the short-term anomalies.

This paper focuses on the premium earned by stocks with high earnings quality, which is one of the most robust long-term patterns documented in the literature (e.g., Sloan, 1996, and Fama and French, 2008). We provide new evidence on quality using a broad international dataset, essentially running an out-of-sample test with almost a decade of new data across all developed markets. We also test how quality has worked in a portfolio together with exposures to value and size to see how much investors could

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benefit from adding quality to an existing portfolio that is already trying to harvest long-term premiums on value and size.

During our sample period from July 1988 to June 2012, we find a positive return premium on our global quality portfolio, both in the full sample as well as in the last five years. This suggests that the high-quality return premiums documented in earlier studies were most likely not due to data mining and that the effect has not been arbitraged away, despite being the focus of some attention among both researchers and practitioners. We also find positive return premiums on the global market portfolio and a global value factor. While the market and value factors had the largest premiums, they also had the largest volatilities, so the highest Sharpe ratio of 0.69 was earned by the quality factor, followed by value at 0.56 and the market at 0.25. While there was a small size premium in the U.S., globally size had essentially a zero premium, generating a Sharpe ratio of -0.06.

Furthermore, quality is negatively correlated with the value factor, implying that it can provide not only diversification but also hedging benefits to the portfolio. As a result, a risk-weighted portfolio combining quality and value has an even more attractive Sharpe ratio of 0.99. Adding value and quality to the market portfolio would have dramatically increased its Sharpe ratio.

These results are not driven by hard-to-implement trades. Even simple cap-weighted long-only portfolios with a combined value-quality tilt have beaten the broad market by 3.9% per year among large-cap stocks and 5.8% among small-cap stocks. Compared with a pure value tilt, the combined value-quality tilt has added 1.2% per year among large caps and 1.8% among small caps.

Relative to the existing literature, our focus is on out-of-sample tests and the portfolio application of quality rather than digging deeper to understand why quality has earned a positive premium. In contrast, Sloan (1996) presents the basic "earnings fixation hypothesis" and discusses how that might lead investors to overvalue positive-accruals firms. Some of the many subsequent papers are summarized in a survey by Richardson, Tuna, and Wysocki (2009). Hirshleifer, Hou, Teoh, and Zhang (2004)

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present a related case about how cumulative balance sheet bloat as measured by net operating assets can predict future stock returns. Among the more recent papers, Lewellen and Resutek (2011) investigate a decomposition of accruals to long-term investment accruals, working capital accruals, and nontransaction accruals, pointing out that the distinct components of accruals separately predict stock returns. Fama and French (2008) dissect a variety of popular anomalies, concluding that the accruals effect is among the three most robust anomalies in the U.S. equity market data. LaFond (2005) and Pincus, Rajgopal, and Venkatachalam (2007) confirm the accruals anomaly with international data, but their samples cover only the periods 7/1990-12/2003 and 1/1994-12/2002, respectively, whereas our sample is about twice that long.

Besides accruals, other measures of earnings quality include, e.g., earnings persistence, smoothness, and loss avoidance, and they are reviewed by Dechow, Ge, and Schrand (2010). These other measures have been related to stock returns by e.g. Perotti and Wagenhofer (2011) and Beckers and Thomas (2010), although the general finding is that accruals have been the strongest quality-based predictor of stock returns.

In this paper we also try other earnings quality measures based on profitability, cash flow, and low leverage. We find that a composite metric of earnings quality that includes all of these attributes produces a portfolio that has negative betas on the market, size, and value factors. Furthermore, that composite portfolio outperforms all single-signal quality portfolios, generating a three-factor alpha of 65 bp per month in the global sample and 64 bp in the U.S.-only sample.

Our paper generally follows the methodology of Fama and French (2011) who investigate size, value, and momentum in international markets. Griffin (2002) and Hou, Karolyi, and Kho (2011) similarly explore global value and momentum factors, and Asness, Moskowitz, and Pedersen (2009) point out that value and momentum work well in a portfolio due to the negative correlation between them. In contrast, we ignore momentum due to its higher turnover which would lead to higher trading costs and taxes, but we point out that quality is another desirable long-term exposure that offers diversification to a value strategy without requiring significant portfolio turnover.

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The paper proceeds as follows. Section I describes our international data sample. Section II explains the construction of our factor portfolios including the quality factor. Section III reports our main empirical findings and discusses the interpretations of those findings. Section IV concludes.

I. Data and Sample Selection

Our main sample consists of stock market data and accounting data from 23 developed markets as defined by MSCI. The accounting data are from Worldscope, and the stock market data are from Barra. This sample becomes fairly comprehensive in 1988 when it comprises an average of 87% of global market capitalization—hence we choose our eligible sample as 7/1988 to 6/2012. For firms listed in multiple markets, we only pick the security corresponding to the primary listing.

We sort the countries into four regions as in Fama and French (2011): North America, including the U.S. and Canada; Europe, including Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom; Japan; and Asia Pacific, including Australia, Hong Kong, New Zealand, and Singapore. Nevertheless, our main focus is on global portfolios that combine all the four regions.

Table I and Table II show some basic statistics for the global sample. In June 2012, the sample covers about 15,200 non-financial stocks, including 5,200 in North America, 3,800 in Europe, 3,100 in Japan, and 3,100 in Asia Pacific. Over the entire sample period, the median firm has a market cap of $145 million; at the end of the sample, this declines to $86 million as more small firms are included. The median book-to-market ratio is 0.65 over the entire sample and 0.89 in June 2012. Financial firms are excluded, following the convention in the literature, because many accounting variables are hard to compare across financial and non-financial firms.

In addition, we have another longer sample based on all publicly traded U.S. firms in CRSP and Compustat. While this sample has fewer firms than the global

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sample, it allows us to go much further back in time and start our performance tests for the U.S. market in 7/1963, giving us a history of almost 50 years.

II. Construction of Factor Portfolios

To investigate the risk and return on portfolios of stocks with quality, value, and size tilts, we construct a separate factor portfolio for each type of exposure. We mostly follow the approach of Fama and French (1993) as revised for international markets by Fama and French (2011).[1]

We form a 2x3 grid of portfolios by size and value at the end of June of each year t. Each firm must have a positive value for book equity in its fiscal year ending in calendar year $t-1$ and a positive market capitalization on December 31 of year $t-1$. All values are converted to U.S. dollars at the prevailing exchange rate. Big stocks are defined as the largest stocks that make up 90% of total market cap within the region, while small stocks make up the remaining 10% of market cap. In the U.S., this procedure sets the large-cap/small-cap boundary very close to the boundary between the Russell 1000 large-cap and Russell 2000 small-cap indices; in international markets, we are defining this boundary similarly based on market cap rather than the number of firms, as the relative number of small-cap and micro-cap listings can vary significantly across markets.

We define value and growth breakpoints by the 30th and 70th percentiles of the book-to-market ratio. Because the distribution of book-to-market can differ significantly between large caps and small caps, we follow the advice of Cremers, Petajisto, and Zitzewitz (2010) and define value and growth breakpoints separately for large caps and small caps.[2] Furthermore, we define breakpoints by percentiles of market value, not percentiles of the number of firms, so that we will get equal market value in all

[1] While we prefer to use our own factor construction methodology, the results remain broadly similar even if we use the official Fama-French factors.

[2] Fama and French (2011) instead define the cutoffs based on large stocks alone and apply the same cutoffs for small stocks. That results in an even distribution of market cap among large caps but not among small caps where the market capitalization of value and growth portfolios may differ by a factor of 2-3.

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portfolios,[3] thus producing portfolios with lower turnover and higher investment capacity. Otherwise we define a small-minus-big (SMB) portfolio and high-minus-low book-to-market (HML) portfolio the standard way as

$$SMB = \frac{1}{3}\left(SV + SM + SG\right) - \frac{1}{3}\left(BV + BM + BG\right) \tag{1}$$

$$HML = \frac{1}{2}\left(BV + SV\right) - \frac{1}{2}\left(BG + SG\right), \tag{2}$$

where S and B stand for small and big stocks, and V, G, and M stand for value, growth, and medium (neither value nor growth). Individual stocks are value-weighted within each of the six component portfolios to help ensure that these are investable portfolios with high investment capacity and minimal turnover.

We form the earnings quality portfolio similarly to HML based on a 2x3 grid, except that we sort by earnings quality instead of book-to-market. To be eligible for a portfolio at the end of June of year t, a firm must have the necessary balance sheet items for its fiscal year ending in calendar year $t-1$.

As our metric of earnings quality, we use accruals which seem to have emerged as the most common choice in the literature. Following LaFond (2005), we use the balance sheet method to calculate accruals because most firms were not required to provide a statement of cash flows over our sample period. Accruals are defined as:

$$\begin{aligned} Accruals = {} & \Delta CurrentAssets - \Delta CurrentLiabilities \\ & - \Delta CashAndShortTermInvts + \Delta CurrentDebt - Depreciation. \end{aligned} \tag{3}$$

We use an annual change reported for two consecutive fiscal years. The final accrual measure is scaled by the average of total assets over the prior year. Financial firms are again excluded from the sample.

We sort all stocks within a region into two size bins (big and small), and separately within each size bin we sort stocks into high, medium, and low quality based on the 30th and 70th percentile quality breakpoints (again determined by market cap, not

[3] This is also the practice of commercial index providers like S&P and Russell.

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number of firms). The high-quality firms are characterized by high cash flows (relative to reported earnings) while the low-quality firms are characterized by high reported earnings (relative to cash flow), so we label our quality factor "cash minus earnings" (CME) and compute it as

$$CME = \frac{1}{2}\Big(BC + SC\Big) - \frac{1}{2}\Big(BE + SE\Big), \tag{4}$$

where C stands for "cash" stocks (low accruals), E stands for "earnings" stocks (high accruals), and S and B again stand for small and big stocks.

While our factor portfolios on size, value, and quality only use stocks that satisfy our data requirements, we construct our market return as a value-weighted return on all the available stocks in each market. We define the market factor (MktRf) as the excess return over the U.S. one-month T-bill rate. All international returns are converted to U.S. dollars, and thus we always compute excess market returns relative to the U.S. T-bill rate.

This approach produces relatively uncorrelated factor portfolios. Table III shows the return correlations of the four global factor portfolios as well as the correlations of the regional factors. The highest positive global factor correlation is 14% and the highest regional factor correlation is 30%, reflecting the diversification investors can obtain across geographical regions. SMB has a small positive correlation with the market and HML has a small negative correlation with the market, because smaller stocks and growth stocks tend to have higher market betas. Global CME has very small correlations with other factors and in fact a negative correlation with HML. This implies that from the point of view of risk, CME and HML work well together in a portfolio, offering diversification and even partly hedging each other.

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III. Return Premiums on Quality, Value, and Size

A. Global Return Premiums

Table IV shows the return statistics for the global factors broken down by geographical region. The global market portfolio earned an annual excess return of 4.0% in U.S. dollar terms from 7/1988 to 6/2012; while individual regions were higher, the global average was weighed down by the significant long-term market decline in Japan. Also the value and quality factors had positive annual excess returns of 4.9% and 2.8%. However, the size factor generated a negative annual excess return of -0.5%, so small stocks actually underperformed large stocks over this time period. The market factor is the most volatile with 16% annualized volatility, followed by size and value at 8% and 9%, respectively. Quality is by far the least volatile with only 4% annual volatility. This indicates that small stocks comove with other small stocks and value stocks comove with other value stocks, but high-quality stocks do not comove much with other high-quality stocks. Hence, size and value factors capture systematic return variation, either driven by firms' fundamentals or investor flows between these investment styles, while the quality factor is less subject to such pervasive comovement across stocks.

Consequently, the annual Sharpe ratio is highest for the quality factor at 0.69. The market and value factors also have positive Sharpe ratios at 0.25 and 0.56, respectively, while size has a slightly negative Sharpe ratio of -0.06. The positive excess returns are statistically significant for quality ($t = 3.38$) and value ($t = 2.73$) but not the overall market.

If an investor combines factors in his portfolio, he can benefit from diversification across investment styles. In fact, because of the negative correlation between HML and CME, combining them in a portfolio can reduce risk even further. We combine the factors in two ways: first, by simply adding up the exposures across HML and CME, and second, by adding up but risk-weighting each factor proportionally to its trailing 36-

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month volatility.[4] The equal-weighted and risk-weighted Sharpe ratios of the combined HML+CME portfolios are 0.91 and 0.99. This is a clear improvement over the Sharpe ratio of either factor alone. If an investor wants to bear exposure to the overall market as well, his Sharpe ratio will be 0.73 (equal-weighted) or 0.93 (risk-weighted), reflecting the lower Sharpe ratio of the market factor.

Table V shows the CAPM and three-factor alphas of the global quality factor. The intercept (alpha) without a model is just the same 23 bp per month or 2.8% per year excess return already reported in Table IV. Controlling for the market factor makes essentially no difference as the market beta of CME is only about 0.01. However, controlling for the global three-factor model actually increases the CME alpha to 29 bp per month or 3.5% per year ($t = 4.09$), mostly because CME has a negative beta with respect to HML. This makes it even more explicit that quality is not spanned by the market, size, and value factors, so it indeed has added value relative to those more common portfolio tilts.

Figure 1 shows how each factor performs over time. The top panel shows the cumulative excess return on each long-short portfolio. Since the factors can have very different volatilities, the bottom panels shows the cumulative performance of each factor when it is scaled to have the same 15% annual ex ante volatility. Ex ante volatility is estimated with each factor's own trailing 36-month volatility.

Overall, value has earned the highest return, followed by the market. However, when quality and value are scaled to have the same volatility as the market, quality performs the best of all the factors due to its highest Sharpe ratio. Quality has actually been a surprisingly smooth performer during the sample period from 7/1988 to 6/2012. Furthermore, quality has performed well even in the last five years of the data. This is interesting because earnings quality has been a well-known investment strategy for a while and a large number of quantitative strategies were investing in quality in the 2005-

[4] Rather than adding up across the factors, we could have also averaged across them. The former approach makes it easier to see how return premiums add up, but it does also generate more levered portfolios. Because volatility scales up with leverage, the Sharpe ratios are the same either way.

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2007 period leading up to the August 2007 quant crisis, yet the figure shows no evidence that the quality premium would have been arbitraged away. In fact, quality was flat on a monthly basis during the quant crisis and performed well immediately afterwards.

Our quality, value, and size factors are formed across all industries, and our sorting variables are likely to be correlated with industries: for example, utilities are always likely to end up in the value portfolio due to their high book-to-market ratio. Hence, each factor can be decomposed into positions across industries and positions within industries. Cohen and Polk (1995) suggest creating industry-specific breakpoints to eliminate these cross-industry effects, and we follow their suggestion for all of our three non-market factors: quality, value, and size. We define ten industries (which we could also call sectors) following the methodology of Kacperczyk, Sialm, and Zheng (2005). Since it is critical to have enough firms within each industry-region pair, we keep the industry definitions very broad for the sake of our international sample.

Industry adjustment (Table VI) reduces the volatility of CME by eliminating all cross-industry positions, but this also slightly reduces its average return; yet the net effect is to raise the Sharpe ratio to 0.80. The performance of HML improves even more with the Sharpe ratio rising to 0.97. The Sharpe ratio of SMB also increases to 0.10.

B. Longer-Term Return Premiums: U.S. Evidence

A significant benefit of our relatively long and comprehensive international sample is that it represents an out-of-sample test, after the return premiums were initially discovered with U.S. data. However, it is still useful to summarize the U.S. evidence with up-to-date data because it allows us to start the sample period much earlier. Following Fama and French (1992), we start using Compustat accounting data in 1962, meaning that our factor returns start in July 1963 and extend to June 2012, spanning almost 50 years and thus doubling the length of our sample period.

Figure 2 shows the cumulative excess returns for the market, size, value, and quality factors over the longer U.S. sample. The top figure shows that the overall market has had the highest absolute return, although it has also been the most volatile factor.

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Once we scale all factors to an ex-ante annualized volatility of 15% (the bottom graph), earnings quality comes out as the strongest performer, with the market falling to a level comparable to HML and SMB.

Table VII tells the same story with numbers. The realized market risk premium has been 5.5%, while SMB, HML, and CME have earned premiums of 2.6%, 4.9%, and 3.4% per year, respectively. When we take factor volatilities into account, we obtain the Sharpe ratios of the factors as 0.35, 0.22, 0.44, and 0.58, respectively, showing that earnings quality has produced the best risk-return tradeoff. The Sharpe ratio rises further to 0.83 if we combine portfolio exposures to the market, value, and quality factors. Industry adjustment does not have a significant impact on the Sharpe ratios of the factors, except for the value factor which becomes less risky and thus gets a higher Sharpe ratio.

The U.S.-only panel of Table V also shows the long-term alphas of the quality factor relative to the CAPM and the three-factor model. Because the quality factor has close to zero betas with respect to the market, size, and value factors, its three-factor alpha is essentially the same as its excess return over the T-bill rate.

C. Alternative Quality Factors and Composite Quality

Figure 3 shows how well global factors based on some other measures of earnings quality have performed over time. CME is our baseline quality factor based on accruals. Its virtues include extensive prior research and backtests in the academic literature, together with a clear story about why it might lead to a return premium as some investors focus on reported earnings. We also build a factor based on return on equity (ROE) to exploit the well-documented "profitability anomaly" by going long high-ROE firms (top 30%) and short low-ROE firms (bottom 30%). The CF/A (cash flow to assets) factor goes long firms with high cash flow to total assets, betting somewhat similarly to the accruals factor that cash flow is either not fully priced in or it represents a source of systematic risk that may earn a return premium. The D/A (debt to assets) factor goes long firms with low leverage and short firms with high leverage, in part because low

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leverage leads to more stable earnings and less dependence on the current financing conditions in the economy.

Among the factors considered, cash flow to assets exhibits the best absolute performance, followed by accruals, ROE, and low leverage. However, the cash flow factor is slightly more volatile than the accruals factor, so when we scale all factors to have the same 15% ex ante volatility in the bottom panel of Figure 3, the performance gap between the cash flow factor and the accruals factor decreases. The ROE factor has been weaker, although it exhibits a nice countercyclical tendency by performing very well during the 2000-2002 bear market and by not falling in the 2008 bear market. The low leverage factor performs very well in the late 1990s but very poorly right after the 2000 tech bubble, although scaling it to constant volatility would have reduced the size of the post-2000 drawdown.

Since multiple quality metrics exhibit positive performance, a natural question is whether we can combine all of them into one composite quality factor. We consider two approaches: a simple equal-weighted average of the four long-short quality factors, which we label the "average," and a scored composite quality metric we label the "mix." To form the composite quality metric, we compute the percentile score of each stock on each of the four quality metrics (where "good" quality has a high score, so ideally a stock has low accruals, low leverage, high ROE, and high cash flow) and then add up the percentiles to get a score for each stock from 0 to 400. We then form the composite factor just like we form CME and other factors, going long the top 30% of stocks and short the bottom 30% and cap-weighting individual stocks within the portfolios.

The top panel of Figure 3 shows the advantage of the composite scoring methodology. While the "average" quality factor gives us simply the average performance across the four component factors, the "mix" factor has earned higher returns than any of its components. This is presumably because the scoring approach uses information more efficiently: rather than just placing stocks in three broad bins for each of the four measures, it distinguishes between stocks within the bins before the

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composite score is computed.[5] However, the "average" factor does end up being more diversified, so when we scale all factors to the same volatility in the bottom panel, the composite "mix" factor still performs the best but now has a smaller lead over the nearest competitors.

Table VIII shows the three-factor alphas and betas of the alternative factors. In the global sample, all except ROE generate statistically significant alphas, confirming the incremental value relative to traditional value and size exposure. The average portfolio has an alpha of 29 bp per month with high statistical significance (t = 8.15), but the composite score factor has clearly dominated the other factors with a highly significant alpha of 65 bp per month (t = 9.02). The high composite score alpha arises from a combination of positive average returns and negative betas on the priced factors. In particular, both ROE and cash flow to assets generate negative market betas, thus partly hedging out general market risk, and they are also more correlated with large stocks, thus hedging out small-stock risk in the portfolio. Returns on both accruals and especially the anti-leverage factor are negatively correlated with value returns, generating a negative value beta for the composite portfolio.

The bottom panel of Table VIII shows the same results for the U.S.-only sample. In spite of the much longer time period, the alphas and betas are surprisingly similar to those of the global portfolios. The "average" and "mix" portfolios have produced significant alphas of 34 bp (t = 9.72) and 64 bp (t = 9.09) per month, respectively, and the composite score portfolio has similar negative loadings on market, small size, and value.

This paper focuses on accruals as a measure of earnings quality, mostly because of the economic story behind it and because extensive prior literature has found that to be one of the strongest predictors of future returns. However, our results on a composite

[5] We also use percentile (ordinal) scores rather than absolute (cardinal) scores to reduce the impact of outliers on portfolio construction.

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earnings quality factor are encouraging and suggest that it would be a reasonable thing to consider for actual investment portfolios.

D. Long-Only Portfolios with Tilts

Can we actually form real-life portfolios to capitalize on these return premiums? For most of the analysis in this paper we follow the standard academic approach because it is a relatively clean way to study the issue and because it allows us to easily compare results with existing studies in the literature. However, studying long-short portfolio returns may raise implementation concerns due to the costs or difficulty of shorting some stocks, in addition to the explicit long-only constraints faced by many institutional and individual investors. Another common concern is whether a return premium exists only in small-cap stocks, where implementation costs are higher, or whether investors can capitalize on it even in the more liquid large-cap space.

We address both of these implementation concerns by constructing cap-weighted unlevered long-only portfolios and doing this separately for large-cap and small-cap stocks. The long-only portfolios are simply the long components of our factor portfolios: the "big-value" portfolio is a cap-weighted portfolio of high book-to-market stocks within big stocks, with the same breakpoints (top 30%) as before, and the "big-quality" portfolio is a cap-weighted portfolio of high-quality stocks within big stocks. The "big-value-quality" portfolio is the intersection of big-value and big-quality portfolios, meaning that each stock has to be in the top 30% by both value and quality.

Figure 4 shows the cumulative returns for these long-only portfolios for large-cap and small-cap stocks. Both the top and bottom figures show surprisingly similar behavior. When compared with a cap-weighted market portfolio, a quality tilt has significantly boosted returns. A value tilt has performed even slightly better. But in both cases, the highest returns were earned by a portfolio that combined these two tilts, requiring stocks to have both value characteristics and high earnings quality.

Table IX quantifies the effect shown in the figures. Across global stocks, the cap-weighted market has generated about 4.0% in excess the U.S. T-bill rate. Among large-

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cap stocks, the quality tilt increases performance to 6.3%, value tilt raises it to 6.7%, and a combined value-quality tilt boosts excess returns to 7.9%, which represents a significant 3.9% premium over the market return. Among small-cap stocks, the combined value-quality tilt produces an even larger 5.8% premium over the market, adding 1.8% per year to a more basic small-value strategy. Even among North American large-cap stocks, perhaps the most efficient market of all, moving from a pure value tilt to a combined value-quality tilt increases returns by 0.7% per year.

When looking at Sharpe ratios, the combined portfolios still produce the best risk-return tradeoffs. Since the portfolio tilts reduce diversification, volatility tends to go up and reduce the attractiveness of the tilts. Nevertheless, the value-quality combinations have Sharpe ratios of 0.49 among large-cap stocks and 0.55 among small-cap stocks, which is still about twice the Sharpe ratio of 0.25 for the overall market.

IV. Conclusions

The U.S. evidence for a return premium on earnings quality, especially including accruals, has grown fairly extensive as researchers have investigated it from multiple different angles. This paper adds to that by presenting essentially an out-of-sample test: we consider a long and broad sample of global developed markets, roughly doubling the sample period relative to earlier studies on the topic with international data. Our tests confirm that the effect has been prevalent in international markets as well, reducing the likelihood that earnings quality is just another spurious result due to extensive mining of the CRSP U.S. stock market data.

Our global long-short earnings quality factor has earned a premium of 2.8% per year, which is both statistically and economically significant. Furthermore, it comes with such low volatility that its Sharpe ratio is as high as 0.69, in contrast to the Sharpe ratio of the overall market of only 0.25. After we control for market, size, and value exposures, the quality factor earns a three-factor alpha of 3.5% per year; if we combine multiple quality scores into a composite quality portfolio, the alpha even rises to 7.8% per year.

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Quality also works well in a portfolio with existing value exposure, as it has a negative correlation of -0.32 with the value factor. This means that in addition to the diversification benefits of having both quality and value tilts in a portfolio, the tilts actually help hedge out each other, resulting in a combined Sharpe ratio of 1.0.

The quality return premium exists also in very realistic cap-weighted long-only portfolios. Adding a quality tilt has significantly boosted returns relative to both a cap-weighted market and a value-oriented portfolio. Among large-cap stocks, the global combined value-quality portfolio has beaten the broad market by 3.9% per year; among small-cap stocks, the combined portfolio beat the market by 5.8% per year.

There have been concerns about earnings quality being a good source of returns going forward, especially given the inflows into quantitative investment strategies in the years preceding the August 2007 quant crisis. Interestingly, the global quality factor did not suffer at a monthly frequency during the various crises in 2007-2008 and it has had a good run since then. Hence, these recent data further strengthen the case that the return premium earned by stocks with high earnings quality remains a robust pattern and something investors can reasonably consider including in their portfolios.

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Table I. Sample Statistics of Global Stocks 1988-2012.

The table shows the cross-sectional distribution of key stock characteristics used in factor construction. Market capitalization is converted to USD and measured in millions. Book-to-market and accruals are computed as explained in the text and winsorized at the 0.5% and 99.5% levels. Each observation is a firm-year with end-of-June values, and all observations are pooled when computing the statistics.

Market capitalization										
				Percentile						
Region	N	Mean	Stdev	1	5	25	50	75	95	99
Global	229,507	1,463	5,522	2	6	38	145	643	6,266	28,203
North America	76,114	2,240	7,546	1	6	58	257	1,141	9,892	42,466
Europe	72,323	1,378	5,324	2	5	29	113	515	5,813	29,829
Japan	51,702	934	2,811	7	14	50	146	511	4,294	16,383
Asia Pacific	29,368	588	2,034	1	3	17	65	277	2,600	10,991
Book-to-Market										
				Percentile						
Region	N	Mean	Stdev	1	5	25	50	75	95	99
Global	229,507	0.97	1.15	0.04	0.12	0.35	0.65	1.16	2.83	5.89
North America	76,114	0.81	1.24	0.03	0.09	0.29	0.51	0.87	2.27	6.32
Europe	72,323	0.90	1.02	0.04	0.12	0.34	0.61	1.06	2.54	5.77
Japan	51,702	1.22	0.98	0.08	0.21	0.54	0.95	1.62	3.18	4.89
Asia Pacific	29,368	1.15	1.38	0.03	0.11	0.37	0.73	1.37	3.54	7.62
Accruals										
				Percentile						
Region	N	Mean	Stdev	1	5	25	50	75	95	99
Global	229,507	-0.04	0.10	-0.36	-0.19	-0.08	-0.03	0.00	0.11	0.30
North America	76,114	-0.04	0.10	-0.37	-0.20	-0.08	-0.04	0.00	0.12	0.31
Europe	72,323	-0.04	0.11	-0.38	-0.20	-0.09	-0.04	0.00	0.12	0.30
Japan	51,702	-0.03	0.06	-0.21	-0.12	-0.06	-0.03	0.00	0.07	0.16
Asia Pacific	29,368	-0.03	0.14	-0.46	-0.22	-0.08	-0.03	0.02	0.17	0.46

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Table II. Sample Statistics of Global Stocks in 2012.

The table shows the cross-sectional distribution of key stock characteristics used in factor construction. Market capitalization is converted to USD and measured in millions. Book-to-market and accruals are computed as explained in the text and winsorized at the 0.5% and 99.5% levels. The table shows a snapshot of the sample in June 2012.

Market capitalization										
				Percentile						
Region	N	Mean	Stdev	1	5	25	50	75	95	99
Global	15,193	1,457	5,777	1	3	20	86	501	6,516	32,311
North America	5,215	2,186	7,740	0	2	15	112	884	10,009	40,873
Europe	3,778	1,663	6,314	1	3	19	81	493	7,435	43,065
Japan	3,057	858	2,764	6	13	39	111	412	4,001	16,424
Asia Pacific	3,143	584	2,134	1	2	14	54	235	2,249	13,566
Book-to-Market										
				Percentile						
Region	N	Mean	Stdev	1	5	25	50	75	95	99
Global	15,193	1.30	1.44	0.03	0.13	0.46	0.89	1.61	3.73	8.40
North America	5,215	1.02	1.54	0.01	0.08	0.33	0.61	1.09	3.18	9.73
Europe	3,778	1.21	1.32	0.04	0.16	0.45	0.82	1.40	3.68	8.64
Japan	3,057	1.59	0.97	0.10	0.38	0.90	1.40	2.07	3.58	4.80
Asia Pacific	3,143	1.57	1.68	0.04	0.16	0.53	1.07	1.98	4.80	9.49
Accruals										
				Percentile						
Region	N	Mean	Stdev	1	5	25	50	75	95	99
Global	15,193	-0.03	0.11	-0.38	-0.17	-0.07	-0.03	0.01	0.13	0.40
North America	5,215	-0.03	0.12	-0.43	-0.20	-0.07	-0.03	0.01	0.15	0.53
Europe	3,778	-0.03	0.10	-0.36	-0.18	-0.07	-0.03	0.00	0.11	0.30
Japan	3,057	-0.03	0.06	-0.20	-0.12	-0.06	-0.03	0.00	0.06	0.17
Asia Pacific	3,143	-0.01	0.14	-0.42	-0.19	-0.06	-0.01	0.03	0.19	0.51

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Table III. Correlations of Factors.

This table shows the return correlations across four factors: market (MktRf), size (SMB), value (HML), and quality (CME). The factors are based on a sample of 23 developed markets, and the results are shown for a pooled global sample as well as within four geographical regions. The factors are zero-net-investment portfolios constructed largely following the approach of Fama and French (2011). The time period is from 7/1988 to 6/2012.

Global				
	MktRf	SMB	HML	CME
MktRf	100%	13%	-22%	5%
SMB	13%	100%	14%	-15%
HML	-22%	14%	100%	-32%
CME	5%	-15%	-32%	100%

North America				
	MktRf	SMB	HML	CME
MktRf	100%	30%	-29%	6%
SMB	30%	100%	2%	-8%
HML	-29%	2%	100%	-9%
CME	6%	-8%	-9%	100%

Europe				
	MktRf	SMB	HML	CME
MktRf	100%	5%	1%	-4%
SMB	5%	100%	15%	-17%
HML	1%	15%	100%	-22%
CME	-4%	-17%	-22%	100%

Japan				
	MktRf	SMB	HML	CME
MktRf	100%	23%	-36%	-5%
SMB	23%	100%	-5%	-25%
HML	-36%	-5%	100%	-3%
CME	-5%	-25%	-3%	100%

Asia-Pacific				
	MktRf	SMB	HML	CME
MktRf	100%	14%	9%	-27%
SMB	14%	100%	19%	-17%
HML	9%	19%	100%	-38%
CME	-27%	-17%	-38%	100%

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Table IV. Factor Returns and Sharpe Ratios: Global Portfolios.

This table shows sample statistics for excess returns on four factor portfolios as well as combinations of those factors. When forming combination portfolios, component factor returns are either equal-weighted or risk-weighted (denoted as "rw") proportionally to the inverse of a factor's prior return volatility. All numbers are annualized. The t-statistics (in parentheses) are based on White's standard errors. The time period is from 7/1988 to 6/2012.

	Excess Return									
Region	MktRf	SMB	HML	CME	CME +HML	CME+HML +SMB	CME+HML +MktRf	CME +HML rw	CME+HML +SMB rw	CME+HML +MktRf rw
Global	4.0%	-0.5%	4.9%	2.8%	7.7%	7.2%	12.0%	6.6%	7.6%	9.6%
North America	7.0%	1.4%	3.2%	2.2%	5.4%	6.8%	12.5%	5.0%	7.1%	9.7%
Europe	5.9%	-0.8%	6.3%	3.7%	10.0%	9.2%	16.5%	9.4%	9.7%	14.3%
Japan	-1.9%	1.8%	6.3%	-0.6%	5.7%	7.5%	4.1%	3.7%	7.1%	3.0%
Asia Pacific	8.0%	4.3%	4.1%	4.0%	8.1%	12.4%	16.2%	8.4%	13.3%	14.6%

	Volatility									
Region	MktRf	SMB	HML	CME	CME +HML	CME+HML +SMB	CME+HML +MktRf	CME +HML rw	CME+HML +SMB rw	CME+HML +MktRf rw
Global	15.9%	7.8%	8.8%	4.0%	8.4%	11.9%	16.4%	6.6%	9.5%	10.3%
North America	15.3%	10.5%	12.0%	6.0%	12.9%	16.5%	17.5%	11.0%	14.4%	15.0%
Europe	17.9%	8.6%	9.3%	4.8%	9.4%	13.2%	20.1%	8.1%	11.1%	12.7%
Japan	21.9%	14.6%	12.6%	8.4%	14.9%	18.9%	22.0%	14.2%	16.2%	16.9%
Asia Pacific	21.4%	12.0%	12.2%	10.2%	12.6%	17.7%	23.4%	12.4%	17.5%	18.6%

	T-statistic									
Region	MktRf	SMB	HML	CME	CME +HML	CME+HML +SMB	CME+HML +MktRf	CME +HML rw	CME+HML +SMB rw	CME+HML +MktRf rw
Global	1.22	-0.30	2.73	3.38	4.47	2.96	3.56	4.85	3.89	4.51
North America	2.23	0.66	1.29	1.80	2.04	2.02	3.49	2.23	2.43	3.16
Europe	1.60	-0.48	3.35	3.73	5.20	3.41	3.97	5.70	4.29	5.45
Japan	-0.41	0.61	2.46	-0.38	1.87	1.94	0.90	1.29	2.14	0.87
Asia Pacific	1.83	1.74	1.64	1.93	3.15	3.42	3.35	3.31	3.73	3.82

	Sharpe Ratio									
Region	MktRf	SMB	HML	CME	CME +HML	CME+HML +SMB	CME+HML +MktRf	CME +HML rw	CME+HML +SMB rw	CME+HML +MktRf rw
Global	0.25	-0.06	0.56	0.69	0.91	0.60	0.73	0.99	0.79	0.93
North America	0.46	0.13	0.26	0.37	0.42	0.41	0.72	0.45	0.50	0.65
Europe	0.33	-0.10	0.68	0.76	1.06	0.70	0.82	1.16	0.88	1.13
Japan	-0.08	0.12	0.50	-0.08	0.38	0.40	0.19	0.26	0.44	0.18
Asia Pacific	0.38	0.36	0.33	0.39	0.64	0.70	0.69	0.68	0.76	0.79

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Table V. Alpha and Betas of Quality Factor.

This table shows the alpha of the earnings quality factor (CME) relative to the CAPM and the Fama-French three-factor model, together with the betas on the explanatory factors. "No model" shows the unadjusted excess return on the factor portfolio. Results are shown for two samples: all developed markets from 7/1988 to 6/2012, and United States only from 7/1963 to 6/2012. Correspondingly, the explanatory factors are either global portfolios or U.S.-only portfolios. The intercept (alpha) is expressed in percent per month. The *t*-statistics (in parentheses) are based on White's standard errors. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Global			United States		
	No model	CAPM	3-factor	No model	CAPM	3-factor
Intercept	0.2329***	0.2280***	0.2867***	0.2836***	0.3048***	0.2863***
	(3.38)	(3.29)	(4.09)	(4.07)	(4.35)	(4.20)
MktRf		0.0140	0.0010		-0.0464**	-0.0072
		(0.79)	(0.06)		(-2.53)	(-0.37)
SMB			-0.0562			-0.0994***
			(-1.45)			(-3.24)
HML			-0.1383***			0.0543
			(-3.50)			(1.29)
N	288	288	288	588	588	588
R^2	0.0%	0.3%	11.2%	0.0%	1.5%	5.5%

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Table VI. Factor Returns and Sharpe Ratios: Global Industry-Adjusted Portfolios.

This table shows sample statistics for excess returns on four factor portfolios as well as combinations of those factors. When forming combination portfolios, component factor returns are either equal-weighted or risk-weighted (denoted as "rw") proportionally to the inverse of a factor's prior return volatility. SMB, HML, and CME are formed by first sorting stocks within ten industries. All numbers are annualized. The *t*-statistics (in parentheses) are based on White's standard errors. The time period is from 7/1988 to 6/2012.

	Excess Return									
Region	MktRf	SMB	HML	CME	CME +HML	CME+HML +SMB	CME+HML +MktRf	CME +HML rw	CME+HML +SMB rw	CME+HML +MktRf rw
Global	4.0%	0.7%	4.7%	2.2%	7.0%	7.7%	11.1%	6.3%	8.2%	9.3%
North America	7.0%	1.5%	3.3%	2.3%	5.7%	7.2%	12.7%	5.3%	7.7%	9.5%
Europe	5.9%	0.2%	5.4%	3.5%	8.9%	9.0%	15.2%	8.8%	9.6%	14.3%
Japan	-1.9%	3.4%	4.4%	0.7%	5.0%	8.5%	3.2%	4.3%	7.8%	2.4%
Asia Pacific	8.0%	2.7%	4.6%	4.3%	8.9%	11.7%	17.0%	8.7%	11.5%	15.2%

	Volatility									
Region	MktRf	SMB	HML	CME	CME +HML	CME+HML +SMB	CME+HML +MktRf	CME +HML rw	CME+HML +SMB rw	CME+HML +MktRf rw
Global	15.9%	7.2%	4.9%	2.8%	5.4%	9.2%	15.6%	4.9%	7.2%	7.1%
North America	15.3%	10.0%	6.8%	4.2%	8.3%	13.4%	15.9%	7.7%	11.0%	10.3%
Europe	17.9%	7.3%	6.0%	4.4%	6.4%	10.0%	19.4%	6.3%	9.2%	11.0%
Japan	21.9%	11.5%	9.7%	9.5%	10.1%	16.1%	21.3%	10.2%	15.6%	14.9%
Asia Pacific	21.4%	9.8%	12.4%	9.5%	12.9%	17.9%	24.9%	12.3%	17.6%	19.7%

	T-statistic									
Region	MktRf	SMB	HML	CME	CME +HML	CME+HML +SMB	CME+HML +MktRf	CME +HML rw	CME+HML +SMB rw	CME+HML +MktRf rw
Global	1.22	0.49	4.76	3.94	6.26	4.07	3.46	6.28	5.53	6.41
North America	2.23	0.74	2.40	2.73	3.34	2.62	3.89	3.37	3.42	4.53
Europe	1.60	0.11	4.41	3.85	6.74	4.40	3.81	6.92	5.14	6.32
Japan	-0.41	1.43	2.16	0.33	2.40	2.53	0.72	2.02	2.39	0.75
Asia Pacific	1.83	1.37	1.81	2.24	3.39	3.18	3.32	3.44	3.21	3.75

	Sharpe Ratio									
Region	MktRf	SMB	HML	CME	CME +HML	CME+HML +SMB	CME+HML +MktRf	CME +HML rw	CME+HML +SMB rw	CME+HML +MktRf rw
Global	0.25	0.10	0.97	0.80	1.28	0.83	0.71	1.28	1.13	1.32
North America	0.46	0.15	0.49	0.56	0.68	0.53	0.80	0.69	0.70	0.93
Europe	0.33	0.02	0.90	0.79	1.37	0.90	0.79	1.41	1.05	1.30
Japan	-0.08	0.30	0.45	0.07	0.50	0.53	0.15	0.42	0.50	0.16
Asia Pacific	0.38	0.28	0.37	0.46	0.69	0.65	0.68	0.70	0.65	0.77

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Table VII. Factor Returns and Sharpe Ratios: U.S. Portfolios 7/1963-6/2012.

This table shows sample statistics for excess returns on four factor portfolios as well as combinations of those factors. When forming combination portfolios, component factor returns are either equal-weighted or risk-weighted (denoted as "rw") proportionally to the inverse of a factor's return volatility. The underlying assets are all U.S. stocks. Industry adjustment is at the level of ten industries. All numbers are annualized. The *t*-statistics (in parentheses) are based on White's standard errors. The time period is from 7/1963 to 6/2012.

	Excess Return									
Industry-adjusted	MktRf	SMB	HML	CME	CME +HML	CME+HML +SMB	CME+HML +MktRf	CME +HML rw	CME+HML +SMB rw	CME+HML +MktRf rw
No	5.5%	2.6%	4.9%	3.4%	8.3%	10.9%	13.8%	7.9%	10.7%	12.2%
Yes	5.5%	1.9%	4.8%	2.5%	7.3%	9.3%	12.8%	6.7%	9.4%	10.7%

	Volatility									
Industry-adjusted	MktRf	SMB	HML	CME	CME +HML	CME+HML +SMB	CME+HML +MktRf	CME +HML rw	CME+HML +SMB rw	CME+HML +MktRf rw
No	15.6%	11.7%	11.1%	5.9%	13.1%	16.4%	16.5%	11.6%	14.7%	14.3%
Yes	15.6%	10.6%	6.8%	4.3%	8.3%	13.5%	15.8%	7.7%	10.7%	9.9%

	T-statistic									
Industry-adjusted	MktRf	SMB	HML	CME	CME +HML	CME+HML +SMB	CME+HML +MktRf	CME +HML rw	CME+HML +SMB rw	CME+HML +MktRf rw
No	2.46	1.57	3.10	4.07	4.44	4.65	5.84	4.75	5.13	5.97
Yes	2.46	1.28	5.01	4.08	6.19	4.81	5.70	6.12	6.13	7.54

	Sharpe Ratio									
Industry-adjusted	MktRf	SMB	HML	CME	CME +HML	CME+HML +SMB	CME+HML +MktRf	CME +HML rw	CME+HML +SMB rw	CME+HML +MktRf rw
No	0.35	0.22	0.44	0.58	0.63	0.66	0.83	0.68	0.73	0.85
Yes	0.35	0.18	0.72	0.58	0.88	0.69	0.81	0.87	0.88	1.08

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Table VIII. Performance of Alternative Definitions of Earnings Quality.

This table shows the alphas of different kinds of earnings quality factors relative to the Fama-French three-factor model, together with the betas on the explanatory factors. The factors include accruals, ROE, cash flow to assets, debt to assets, an equal-weighted average of the factors ("Average"), and a composite scored metric ("Mix"). Results are shown for two samples: all developed markets from 7/1988 to 6/2012, and only United States from 7/1963 to 6/2012. Correspondingly, the explanatory factors are either global portfolios or U.S.-only portfolios. The intercept (alpha) is expressed in percent per month. The *t*-statistics (in parentheses) are based on White's standard errors. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Global					
	CME	ROE	CF/A	D/A	Average	Mix
Intercept	0.2867***	0.1462	0.4024***	0.3062***	0.2854***	0.6503***
	(4.09)	(1.64)	(6.41)	(3.58)	(8.15)	(9.02)
MktRf	0.0010	-0.0983***	-0.1061***	-0.0158	-0.0548***	-0.0916***
	(0.06)	(-4.06)	(-6.48)	(-0.79)	(-6.94)	(-5.52)
SMB	-0.0562	-0.2598***	-0.3134***	0.0603	-0.1423***	-0.2734***
	(-1.45)	(-5.05)	(-8.01)	(1.08)	(-7.15)	(-5.99)
HML	-0.1383***	0.0862	-0.0142	-0.6476***	-0.1785***	-0.3668***
	(-3.50)	(1.51)	(-0.33)	(-13.57)	(-7.06)	(-6.44)
N	288	288	288	288	288	288
R^2	11.2%	24.2%	40.9%	61.2%	50.4%	49.3%

	United States					
	CME	ROE	CF/A	D/A	Average	Mix
Intercept	0.2863***	0.2758***	0.5096***	0.2737***	0.3363***	0.6399***
	(4.20)	(2.98)	(7.51)	(3.18)	(9.72)	(9.09)
MktRf	-0.0072	-0.0369	-0.0831***	-0.0385	-0.0414***	-0.0744***
	(-0.37)	(-1.18)	(-3.51)	(-1.33)	(-4.04)	(-3.59)
SMB	-0.0994***	-0.2266***	-0.2944***	0.0835	-0.1342***	-0.2868***
	(-3.24)	(-3.78)	(-7.87)	(1.50)	(-9.89)	(-10.03)
HML	0.0543	-0.1085	-0.0227	-0.6020***	-0.1697***	-0.2986***
	(1.29)	(-1.35)	(-0.44)	(-11.61)	(-8.38)	(-8.13)
N	588	588	588	588	588	588
R^2	5.5%	12.2%	30.9%	49.5%	40.0%	38.7%

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Table IX. Long-Only Global Portfolio Returns with Factor Tilts.

This table shows sample statistics for excess returns on the global market portfolio as well as long-only portfolios with tilts toward value, earnings quality, or both ("combo"). The tilt portfolios are built separately for large-cap and small-cap stocks. Returns are in excess of the one-month U.S. T-bill rate, which averaged 3.7% over this period. All numbers are annualized. The t-statistics (in parentheses) are based on White's standard errors. The time period is from 7/1988 to 6/2012.

	Excess Return						
		Large Caps			Small Caps		
Region	Market	Value	Quality	Combo	Value	Quality	Combo
Global	4.0%	6.7%	6.3%	7.9%	8.0%	6.9%	9.8%
North America	6.7%	7.2%	7.9%	7.9%	10.6%	9.4%	12.5%
Europe	5.9%	8.7%	7.7%	10.2%	9.8%	7.1%	10.9%
Japan	-2.1%	2.7%	0.6%	5.0%	5.0%	1.5%	4.3%
Asia Pacific	8.7%	5.9%	6.0%	6.9%	13.8%	13.0%	11.3%

	Volatility						
		Large Caps			Small Caps		
Region	Market	Value	Quality	Combo	Value	Quality	Combo
Global	15.9%	14.9%	16.7%	16.2%	16.5%	18.0%	17.7%
North America	15.3%	14.8%	17.9%	17.0%	19.1%	21.8%	21.6%
Europe	17.9%	18.2%	18.7%	19.9%	19.5%	19.2%	20.4%
Japan	22.0%	19.8%	22.1%	21.2%	27.8%	27.8%	27.4%
Asia Pacific	21.3%	22.1%	20.8%	24.2%	26.6%	26.4%	28.9%

	T-statistic						
		Large Caps			Small Caps		
Region	Market	Value	Quality	Combo	Value	Quality	Combo
Global	1.22	2.19	1.82	2.36	2.36	1.85	2.68
North America	2.12	2.35	2.15	2.24	2.70	2.09	2.81
Europe	1.60	2.33	1.99	2.49	2.43	1.80	2.58
Japan	-0.47	0.66	0.12	1.12	0.87	0.25	0.73
Asia Pacific	1.99	1.30	1.41	1.39	2.55	2.42	1.92

	Sharpe Ratio						
		Large Caps			Small Caps		
Region	Market	Value	Quality	Combo	Value	Quality	Combo
Global	0.25	0.45	0.38	0.49	0.49	0.38	0.55
North America	0.44	0.49	0.44	0.46	0.56	0.43	0.58
Europe	0.33	0.48	0.41	0.51	0.50	0.37	0.53
Japan	-0.10	0.14	0.03	0.24	0.18	0.05	0.16
Asia Pacific	0.41	0.26	0.29	0.28	0.52	0.49	0.39

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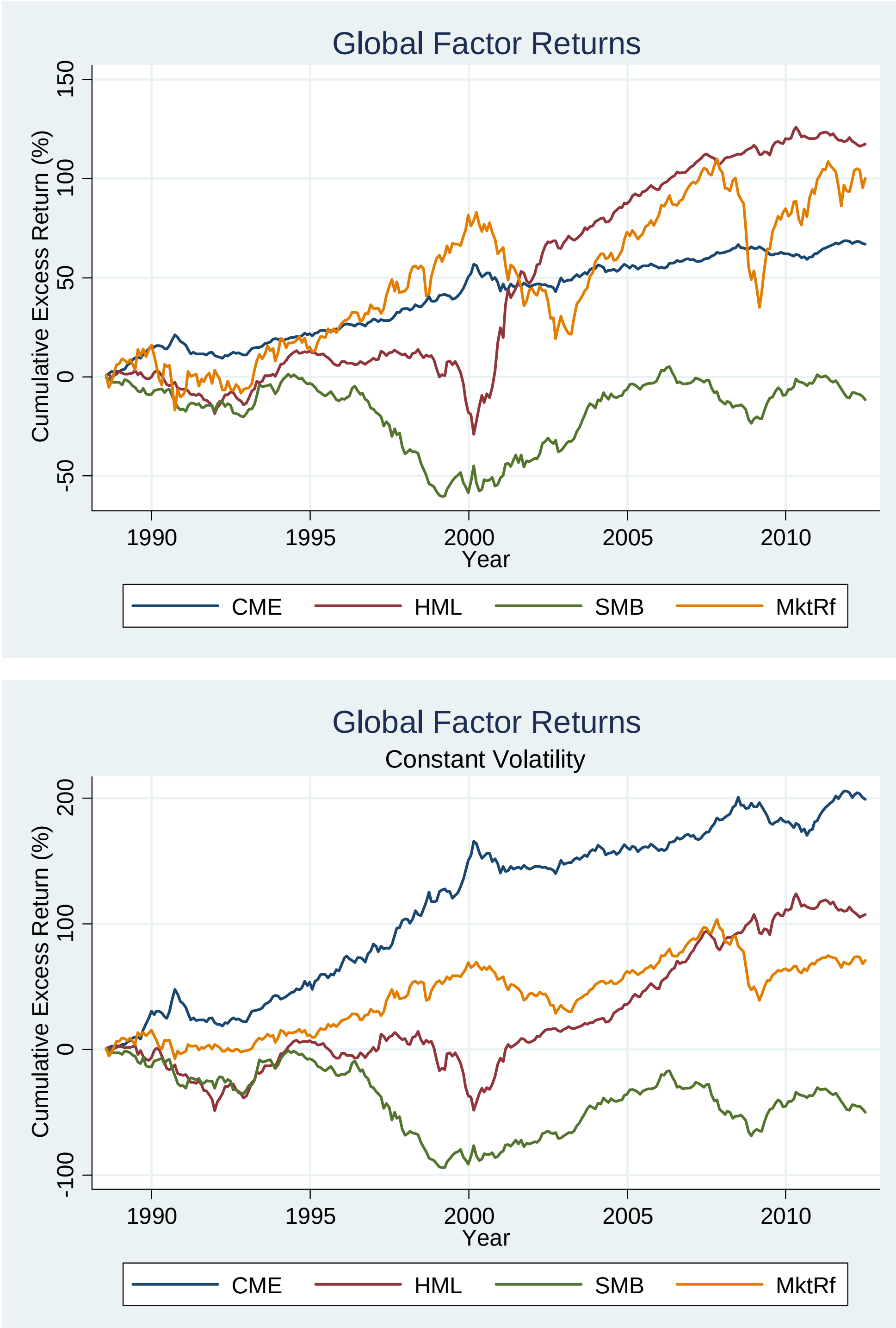

Figure 1. Cumulative Returns on Global Factor Portfolios.

The figure shows the cumulative excess return on each zero-net-investment factor portfolio, expressed as a percentage of the long side. The factors use all qualifying stocks in a sample of 23 developed markets across the globe. Panel B scales each factor to have the same ex ante volatility. The sample period is from 7/1988 to 6/2012.

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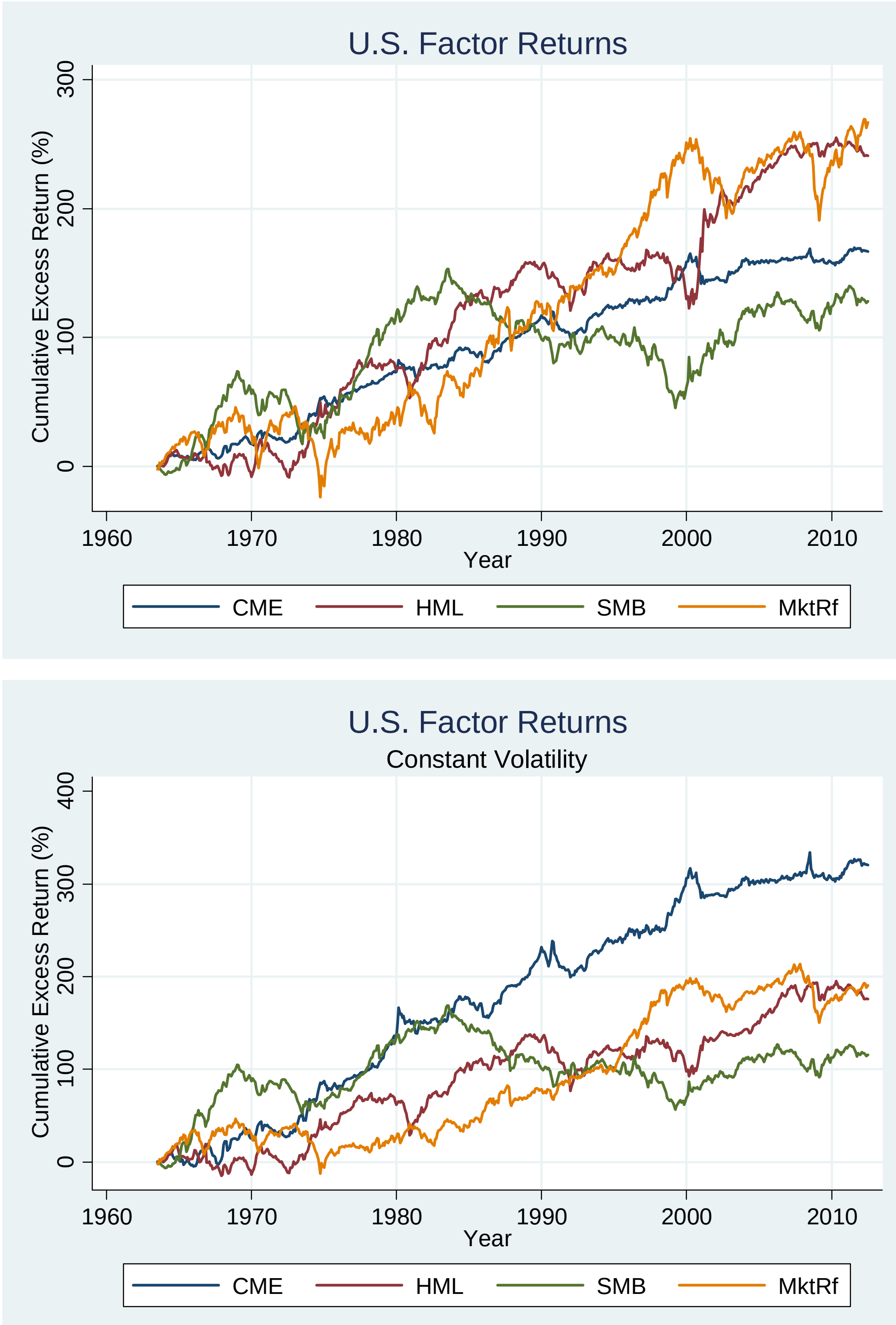

Figure 2. Cumulative Returns on U.S. Factor Portfolios.

The figure shows the cumulative excess return on each zero-net-investment factor portfolio, expressed as a percentage of the long side. The factors use all qualifying stocks listed in the U.S. Panel B scales each factor to have the same ex ante volatility. The sample period is from 7/1963 to 6/2012.

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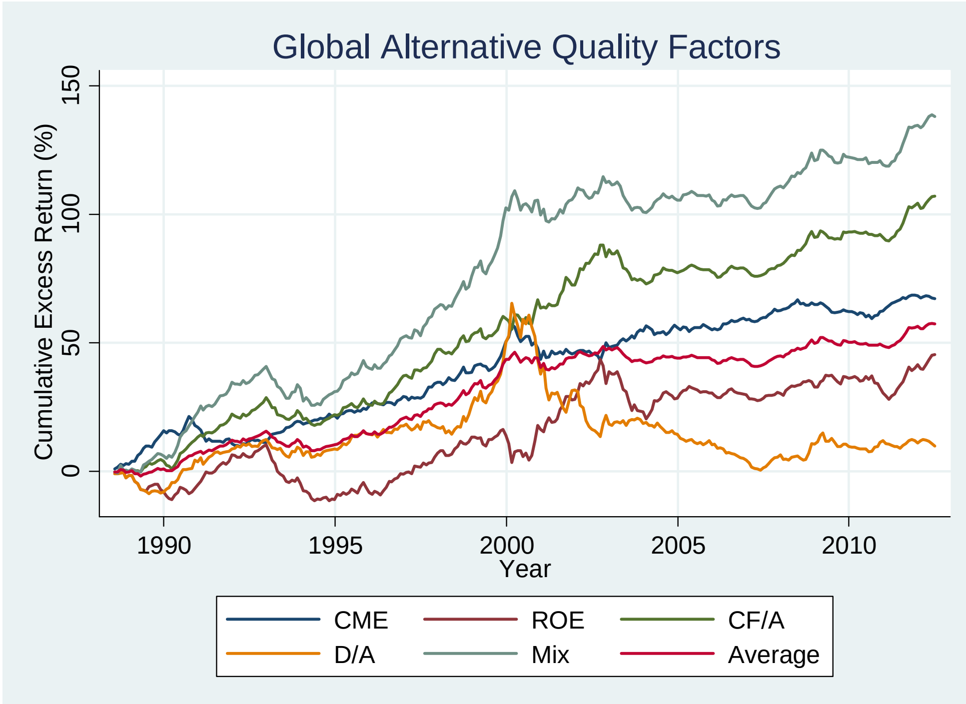

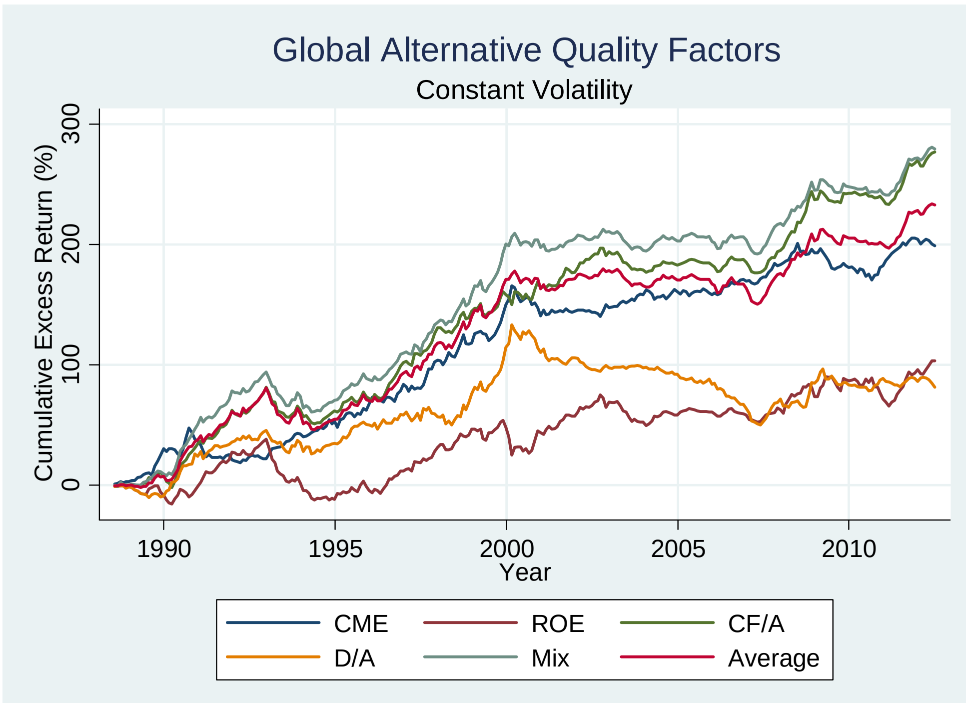

Figure 3. Cumulative Returns on Alternative Definitions of Earnings Quality.
The figure shows the cumulative excess return on each zero-net-investment factor portfolio, expressed as a percentage of the long side. The factors use all qualifying stocks in a sample of 23 developed markets across the globe. The sample period is from 7/1988 to 6/2012.

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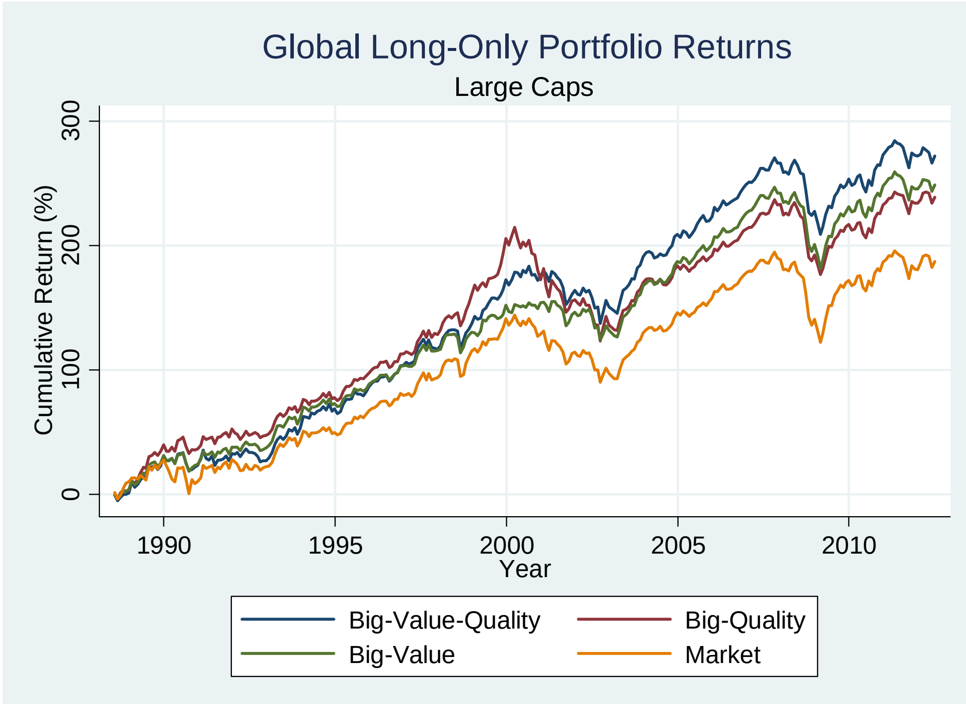

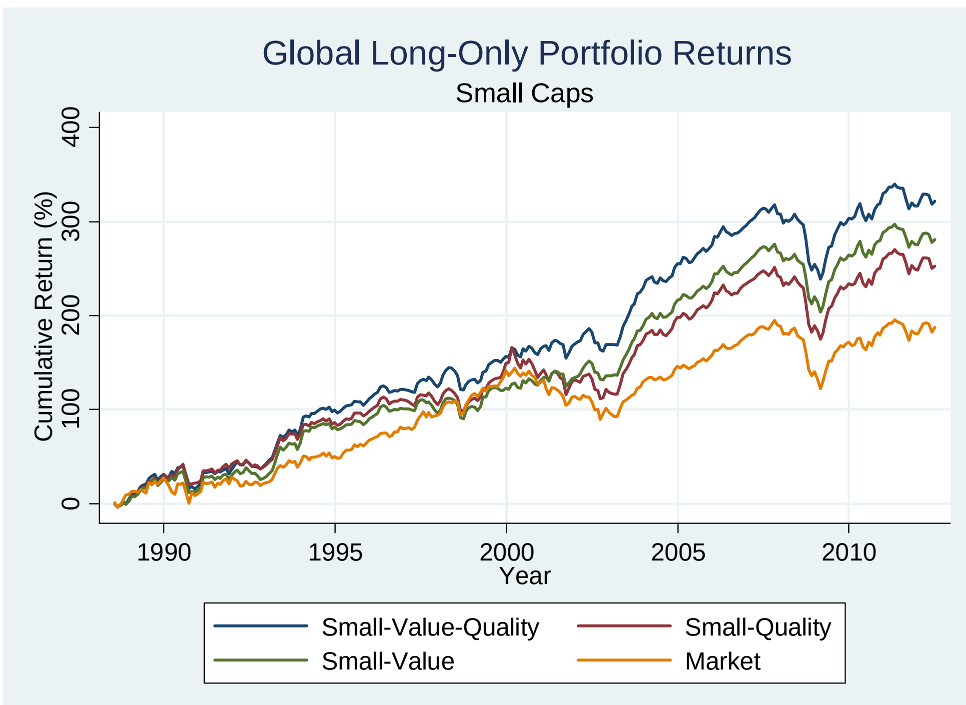

Figure 4. Cumulative Returns on Long-Only Portfolios with Factor Tilts.
The figure shows the cumulative return on a global market portfolio as well as global cap-weighted portfolios that tilt toward value stocks, stock with high earnings quality, or both. The factors use all qualifying stocks in a sample of 23 developed markets across the globe. Panel A includes only large stocks while Panel B includes only small stocks. The sample period is from 7/1988 to 6/2012.

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Disclosure

The strategies discussed are strictly for illustrative and educational purposes and should not be construed as a recommendation to purchase or sell, or an offer to sell or a solicitation of an offer to buy any security. There is no guarantee that any strategies discussed will be effective. The information provided is not intended to be a complete analysis of every material fact respecting any strategy. The examples presented do not take into consideration commissions, tax implications or other transactions costs, which may significantly affect the economic consequences of a given strategy. Past performance does not guarantee future results.

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