



GRADIENT WHITE PAPER

International Earnings Quality Model

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BACKGROUND

Many investors appear to fixate on the earnings figure in financial statements rather than a rationalization of economic earnings. However, academic evidence on the link between earnings quality and the sustainability of future stock returns pervades (Chen, and Zhang, 2007). The ability to discern earnings quality, both good and bad, by analyzing accruals and their sustainability provides important insights into the future stock performance of a company. Validating the consensus of the academic community, Gradient's proprietary earnings-quality research has shown that earnings quality is useful in generating alpha in the context of quantitative investment and trading strategies.

Gradient Analytics has been at the forefront of earnings-quality-based quantitative strategies since 1996. The company's proprietary research resulted in the production of domestic earnings-quality-based quantitative models with the ability to systematically predict stock returns for holding periods ranging from 6-12 months. These models identify companies that have good earnings quality as well as those that have poor earnings quality, resulting in the ability to generate excess returns and significant spreads of 24% over a 15-year period. As Gradient Analytics continued to explore market returns related to earnings quality, a study of international firms was a natural step.

The Gradient Analytics International Earnings Quality Model (EQM-I) provides an effective quantitative tool for generating excess returns based on earnings-quality metrics. Unlike the previous models based on U.S. equities, the International Earnings Quality Model has been designed with advanced statistical and nonlinear techniques used in academic studies to mute the noise that is inherent in financial data. The International Earnings Quality Model, in addition to including proven variables used in Gradient's U.S. models, deploys variables identified in recent academic work and includes new accrual and tax variables—based on new research that has been shown to be effective in predicting future returns.

Overview of Earnings Quality

The primary readers of financial statements are current and potential debt and equity holders. These stakeholders rely on financial information to assess each company's financial condition, interest and dividend coverage, and ability to repay loans. Even though the main goal in financial reporting is to facilitate as accurate a forecast as possible of the probability distribution of future cash flows, it is difficult to provide a set of statements that accurately depicts the economic earnings of a firm. Such difficulty results from ambiguities and uncertainties about the consequences of specific transactions, as well as the discretion in accounting practices, such as when cost and benefits are recognized, or how to value assets, etc.¹



This discretion allows the accounting profession to choose accounting principles and make estimates that affect reported financial results. The amount of discretion a company has in preparing financial statements is controlled by two fundamental principles of accounting: conservatism² and objectivity.³ It is not unusual to see these two guiding principles stretched to the limit or ignored, respectively.

The discretion in accounting can cause the delay/expedition of either cost recognition or revenue, or both. This could obscure the actual economic earnings and affect the quality-of-earnings figures found in financial statements. As a result, investors who rely on such information may not get the full picture of a company's earnings, and the stock price may not reflect the true sustainable earnings.

¹ This discretion is both inevitable and to a significant extent beneficial, given that transactions are variable in nature, and thus a one-size-fits-all approach to accounting treatment would provide neither accuracy nor neutrality.
² Under the conservatism principle, when choosing among equally reasonable alternative accounting procedures, the accountant should choose the procedure(s) that produce the lowest net income (and net assets).
³ Information is considered objective if it succeeds in measuring what it is intended to measure, without bias.

The overstatement of economic earnings: The temporary distortion of financial statements can sometimes be caused by earnings management. Executives may see the need to manage earnings to achieve a certain agenda or meet accounting-based goals/targets. For instance, the need for management to display earnings in a favorable light to appease stakeholders (or achieve compensation goals) may supersede accounting conservatism, resulting in earnings that are overstated and costs that are under-recognized. We would describe this situation as one with low earnings quality, as the deferred costs or accelerated revenues must reverse in the future (accrual reversal is a mechanical consequence of the double-entry accounting system), with a reduction in future earnings corresponding to the boost in current earnings.

The understatement of economic earnings: Companies may smooth reported earnings to create reserves which support the companies' ability to continue to meet or beat analyst expectations in the future.⁴ This can be thought of as excessive conservatism. While we do not condone the practice, it is clear that the result is an understatement of current earnings, which may drive reported earnings higher in the future. By our definition, earnings quality at such firms is high as earnings should prove more sustainable. As a firm taps into its reserves, however, its earnings quality may soften and eventually become low.

The distortion of earnings quality does not have to be intentional, and it probably is not in most cases. Companies frequently face different economic choices at any given time and may temporarily have different levels of conservatism. In this regard, the basis for assessing a company's accounting standard is relative. A company that has overly conservative accounting standards at the moment can result in a stock priced lower than a similar company with less conservatism. As this relativity is impounded in stock prices, a reversion in the degree of conservatism from either side will ensure that the price will likely follow suit.

How Does Earnings Quality Get Distorted?

Despite the efforts of the accounting profession to ensure objectivity and conservatism, it is still relatively easy to distort accounting results through liberal (but not necessarily illegal) and/or fraudulent means. The list presented below provides a high-level overview of how accounting numbers can be inaccurately represented.

1. Recording a smaller or larger reserve account than needed
2. Expensing too much or too little cost associated with earnings
3. Including extraordinary or unsustainable events in earnings
4. Recording transactions early or late
5. Mis-stating percentages or amounts involved in a transaction
6. Mis-stating the amounts of assets or liabilities
7. Changing accounting methods or estimates for no substantive reason
8. Using related-party transactions in reported profits

These types of accounting decisions can distort the perception of the underlying economics of the company. And because the economic reality of the company is temporarily masked, the stock price is unlikely to truly reflect the economic value of the company.

It is important to note that these phenomena are often not the consequence of accounting discretion but, rather, could be mandated by GAAP. For example, gains and losses on property sales are generally not sustainable sources of income, but firms are required to include them in net income. Also, both "bad" and "good" earnings quality, in the sense of earnings that are over or understated relative to economic reality, are likely to be associated with mispricing. Thus, the identification of both tails of the earnings-quality distribution should allow investors to achieve excess returns. The question is: What observable variables can be used to estimate earnings quality? For that, we turn to the academic literature.

⁴ While it may seem counterintuitive, it is important to note that sometimes companies have incentive to understate their earnings. For example, Microsoft could have been motivated to understate its profitability while the U.S. Department of Justice considered antitrust actions against the company. Similarly, companies often understate profit in one period then overstate profits in an adjacent period in order to make their earnings stream "smooth." This is commonly referred to as "smoothing" or "earnings management."

Academic Research on Earnings Quality and Future Returns

In addition to the anecdotal evidence provided by qualitative earnings-quality services (i.e., those that use subjective evaluations of financial statements to render an earnings-quality grade), academic research also supports the notion that quantitative models of earnings quality can be used to earn excess returns. The following brief review of the academic literature highlights some of the most important factors that form the basis for Gradient's approach to quantitatively modeling earnings quality and forecasting related excess returns.

The very first studies to investigate issues related to earnings quality were conducted by G. Peter Wilson of Harvard University (1986, 1987) using an event-study methodology.⁵ Wilson's key conclusions were that operating cash flows and total accruals (i.e., changes in current accruals plus noncurrent accruals) are differentially valued and that both are value relevant. That is, the market appears to react to the disclosure of detailed cash flow and accrual data (value relevance). Thus cash flows are valued more than accruals (differential valuation). Wilson's basic findings are also supported by a number of studies that use an association methodology⁶, including Rayburn (1986), Bowen, Burgstahler and Daley (1987), Charitou and Ketz (1990), Livnat and Zarowin (1990), Vickrey (1993), Ali (1994), Pfeiffer et al. (1998), and Vickrey, Swanson and Bettis (2000).

The fact that the market values a dollar of cash flow more than a dollar of current or noncurrent accruals implies that higher levels of accruals are indicative of lower quality of earnings. In other words, the degree to which a company must rely on accruals to boost net income determines the quality of earnings. Nevertheless, it is possible that the market "sees through" the deception and appropriately values companies based on some notion of baseline or sustainable earnings. However, the first studies to investigate this issue (Sloan, 1996 and Swanson and Vickrey, 1997) find that, contrary to the efficient market hypothesis, disaggregating earnings into cash flow and accrual components is useful in identifying securities that are likely to outperform (or underperform) in the future. Thus, the results of these studies imply that security prices do not fully reflect the information contained in the cash-flow and accrual components of earnings.

Following in the path of Sloan (1996) and Swanson and Vickrey (1997), academic researchers are focusing on the development of simple empirical models that objectively assess *earnings quality* in order to predict future return performance. (See, for example, Richardson, Sloan, Soliman and Tuna, 2001; Chan, Chan, Jegadeesh and Lakonishok, 2001; and Penman and Zang, 2001.) Table 1 below summarizes the results of recent academic working papers that focus on the predictive ability of simple earnings-quality models. As shown in the table, these studies find that companies with relatively high (low) levels of accruals tend to underperform (outperform) for periods of 12-36 months after the disclosure of detailed financial data. Specifically, the return spread between stocks with the highest level of accruals (lowest earnings quality) and the lowest level of accruals (highest earnings quality) ranges from 8.8% to 21.7%, depending on the approach used by the authors in forming portfolios. The implication is that measures of earnings quality can be used in forming profitable investing and trading strategies.

⁵ Event studies generally use relatively short return windows to measure the association between returns and the independent variable of interest. For example, Wilson (1986, 1987) measures the association between stock returns and accrual components of earnings around the release of the annual report.

⁶ In contrast to event studies, association studies generally use relatively long return windows to gauge the association between contemporaneous returns and the variable of interest. In the context of earnings-related studies, this implies that returns are measured over a long interval during which information about earnings is gradually released to the market place – for example, during the 12-month period t-8 to t+4, where t represents the last month of the company's fiscal year.

Table 1: Academic Research on the Relationship Between Earnings Quality and Future Returns

Study	Major Findings
Richardson, Sloan, Soliman and Tuna (2001)	<ul style="list-style-type: none"> Higher (lower) levels of accruals are associated with lower (higher) future returns. When firms are placed in deciles based on the level of total accruals, firms in the top decile (highest level of accruals) return 5.9% in the ensuing 12 months while firms in the bottom decile (lowest level of accruals) return 27.6%. Sample period: 1988 to 1998. Given their approach to operationalizing accruals variables, they find no benefit to disaggregating current and noncurrent accruals.
Chan, Chan, Jegadeesh and Lakonishok (2001)	<ul style="list-style-type: none"> Earnings increases accompanied by high (low) levels of accruals (suggesting low-quality earnings) are associated with poor (strong) future returns. When firms are placed in deciles based on the level of total accruals, firms in the top decile (highest level of accruals) return 9.0% in the ensuing 12 months while firms in the bottom decile (lowest level of accruals) return 17.8%. Moreover, the return differential between deciles 1 and 10 persists for at least 36 months. Sample period: 1971 to 1995. There is some evidence that individual accrual accounts provide incremental information over aggregated total accruals.
Penman and Zhang (2001)	<ul style="list-style-type: none"> Higher (lower) levels of the Q-score (high Q-score implies high earnings quality) are associated with higher (lower) returns. When firms are placed in deciles based on the value of the Q-score, firms in the lowest decile (worst earnings quality) return 17.0% in the ensuing 12 months while firms in the top decile (best earnings quality) return 26.1%. Sample period: 1976 to 1995. There is some evidence that individual accrual accounts provide incremental information over aggregated total accruals. It should be noted that Penman and Zhang's Q-score measure actually underperforms simple measures of standardized total accruals. This is because the authors only consider three accrual accounts in constructing their Q-score. While this is an obvious limitation in the context of predicting excess returns, the goal of their paper is broader than the prediction of excess returns.
Phillips (2003)	<ul style="list-style-type: none"> Found that deferred tax expense is incrementally useful over total accruals and abnormal accruals in detecting earnings management to avoid an earnings decline. Deferred tax expense (DTE) is more useful than the modified Jones and forward-looking model of abnormal accruals in classifying earnings-management years.

The above-mentioned papers have shown that earnings quality is relevant in the context of the United States. But is there evidence that accrual accounting also poses earnings-quality issues internationally? In a paper written by Hung (2000), with 17,743 firm-year observations of companies in 21 countries, it was found that the extent of accrual accounting negatively affects the value relevance of financial statements. The study shows that countries with higher use of accruals have negative correlation to returns. The paper thus suggests the universality of earnings quality as a good measure for returns. Finally, in a paper by Leuz et al. (2003) which looks at earnings management over 31 countries, it was shown that earnings management is widespread internationally. The study performed a descriptive cluster analysis to group companies with similar institutional characteristics and found that earnings management varies systemically across the clusters. The paper found that as countries are less developed and

less regulated, the problem of earnings management is more pronounced. The paper confirms that having a firm grasp of earnings quality is even more relevant in the context of companies listed on international exchanges, where accounting regulations are frequently more lax.

International Earnings Quality Model (EQM-I)

The academic research presented above demonstrates that the market does not fully impound information about earnings quality at the time that detailed financial statement data are released. This presents an opportunity to generate alpha by modeling the relationship between earnings quality and stock returns using nonlinear statistically based approaches to yield profitable investment and trading strategies. Such modeling has been done by Gradient's research team and has been continuously refined through the years. With more than 10 years of research and modeling, Gradient has produced earnings-quality models that have proven to be robust in optimizing excess returns based upon various earnings-quality metrics.

The Gradient EQM-I is the first quantitative factor that uses kernel estimation and smoothing techniques to model the relationship between earnings quality and returns. Acknowledging the disparate accuracy of accounting figures between nations, EQM-I covers only developed countries to ensure that variables obtained are legitimate. The model covers 25 developed countries over four continents: North America, Europe, Asia, and Australia. The model defines broad sectors via accounting similarities, resulting in three different accounting sectors: service, merchandising, and manufacturing. Such division allows accounting variables to be compared on a relatively level field. The scores of EQM-I range from 1 to 10, where a higher score indicates a higher quality of earnings reported by a company. There are approximately an equal number of companies for each score. The strength of the model lies within the 20% of firms with tail scores of 1 and 10. It is known that the availability of financial data for international firms is scarce in the 1990s and earlier. Nevertheless, EQM-I was still modeled on over 10 years of rich data. The modeling process was conducted over the period of 1999 to 2004 and has been able to produce compelling spreads year after year from 2005 to present.

Table 2: International Earnings Quality Model Coverage Universe

Europe		Asia Pacific	North America
Austria	Luxembourg	Australia	Canada
Belgium	Netherlands	Hong Kong	
Denmark	Norway	Japan	
Finland	Portugal	Korea	
France	Spain	New Zealand	
Germany	Sweden	Singapore	
Greece	Switzerland	Taiwan	
Ireland	United Kingdom		
Italy			

All Gradient models are developed using a disciplined scientific approach. Our approach can be characterized as follows:

Variable Specification – We begin by carefully specifying each variable to ensure proper measurement and scaling. When more than one specification is defensible, we choose the simplest specification on the theory that simplicity will yield more generalizable results.

Proper Scaling of Variables – Variables defined are always scaled with respect to context for the ability to be compared universally between companies. For instance, an accounts-receivable growth variable would have to be size and sales-growth controlled since measuring the value between a large company with a significant sales increase and a small company with sales decline would produce incomparable results.

Modeling Techniques – Each model is estimated using relatively simple linear and nonlinear regression techniques. Principal components are used to extract the relevant information provided by individual variables as well as information gained from variable interaction. Kernel smoothers are used to minimize the noise present in the data.

Sensitivity Analyses – All models are subjected to sensitivity analyses to determine whether our results are affected by outliers, idiosyncrasies of specific in-samples and out-samples, alternative variable specifications and modeling techniques, and so on.

Control for Potential Threats to Internal and External Validity – Our research efforts are designed to control for common threats to internal and external validity in financial-engineering studies (such as survivorship bias, hindsight bias, selection bias, and so on).

An Evolving Version of The Model (EQM-Ie)

As the EQM-I had parameters estimated up to 2004, an evolving model, EQM-Ie, is also developed to ensure that the most recent data is taken into account. The EQM-Ie uses exactly the same modeling methodology as the EQM-I with one difference. Instead of utilizing a static set of parameters, the EQM-Ie is a model that will have its parameters re-estimated at the end of every year to ensure currency. For the launch of EQM-Ie, an initial parameter estimation was conducted on Sept. 1, 2009. Subsequent updates will take place every December, when the model's parameters will be estimated with all available data up to December 1 of the current year. The new model's parameters will then come into effect on January 1 the following year.

Results Summary (EQM-I)

The appendix provides results for Gradient's International Earnings Quality Model. As shown in the appendix, the model produces highly significant excess returns, performs extremely well both in and out of sample, and is robust across nations. In summary, the results demonstrate the following:

1. Table 3 of the appendix shows the average raw and excess return for the full distribution of Long-Term Scores over all time periods. As shown in the table, **the spread in 12-month raw (excess) returns between the top- and bottom-rated companies is 19.2% (12.3%), and the distribution of returns for each level of the score decreases monotonically.** This result implies that the Earnings Quality International Score is able to reliably and unambiguously forecast expected future returns over longer holding periods by ranking stocks according to their level of earnings quality.
2. Table 4 shows the raw spread between a score of 10 and that of 1 for each nation. The model produces positive spreads for all nations, proving the robustness of the Earnings Quality formula among developed nations.
3. Tables 5 and 6 show the performance of the EQM-I in and out of sample. As shown in these tables, **EQM-I performs well both in and out of sample.** Thus, the model's results are generalizable outside of the modeling period. Note the 12-month raw (excess) return spread between the top- and bottom-rated stocks ranges from 23.7% (16.0%) in sample to 13.6% (8.7%) out of sample. Similarly, the monotonic nature of the returns to each score remains consistent across the in- and out-of-sample periods.
4. Tables 7-9 show the out-sample performance across different capitalization ranges. As shown in these tables, **EQM-I performs very well for large-, medium-, and small-capitalization stocks.** In this regard, the model's results are robust to differences in firm size and the related information environments. Note the 12-month raw (excess) return spread between the top- and bottom-rated stocks ranges from 16.0% (9.5%) for large-capitalization stocks to 15.4% (9.9%) for small-capitalization stocks. Moreover, the monotonic nature of the returns to each score remains consistent across all capitalization ranges.
5. Table 10-12 provides a nonparametric out-sample proportion of winners (stocks above the median) and losers (stocks below the median). As shown in these tables, **55.4%(60.1%) of all large- (small-) cap stocks rated 10 have returns over the median of their capitalization group in the ensuing 12 months, while only 43.9%(41.6%) of all stocks rated 1 were above median over a one-year period.**

- Table 13 provides the correlation of International Earnings Quality Model Score with various widely known earnings-management metrics. The model is positively correlated with variables that signal good earnings quality and negatively correlated with variables with poor earnings quality. For instance, accrual growth is generally a bad sign and is highly negatively correlated with model scores. This validates the ability of the model to seek out earnings-quality metrics when calculating scores.
- Finally, Table 14 demonstrates that ***EQM-I performs exceptionally well throughout different years, proving the robustness of the model throughout different time periods and macro-economical conditions.***

Results Summary (EQM-Ie)

The appendix provides results for Gradient's evolving International Earnings Quality Model (EQM-Ie). In summary, the results demonstrate the following:

- Table 15 of the appendix shows the average raw and excess return for the full distribution of Long-Term Scores over all time periods. As shown in the table, ***the spread in 12-month raw (excess) returns between the top- and bottom-rated companies is 21.5% (15.1%), and the distribution of returns for each level of the score decreases monotonically.*** This result implies that the Earnings Quality International Score is able to reliably and unambiguously forecast expected future returns over longer holding periods by ranking stocks according to their level of earnings quality.
- Table 16 shows the raw spread between a score of 10 and that of 1 for each nation. The model produces positive spreads for all nations, proving the robustness of the Earnings Quality formula among developed nations.
- Tables 17-19 show the performance across different capitalization ranges. As shown in these tables, ***EQM-Ie performs very well for large-, medium-, and small-capitalization stocks.*** In this regard, the model's results are robust across differences in firm size and the related information environments. Note the 12-month raw (excess) return spread between the top- and bottom-rated stocks ranges from 9.9% (7.6%) for large-capitalization stocks to 25.2% (17.8%) for small-capitalization stocks. Moreover, the monotonic nature of the returns to each score remains consistent across all capitalization ranges.
- Tables 20-22 provide a nonparametric proportion of winners (stocks above the median) and losers (stocks below the median). As shown in these tables, ***56.3%(59.2%) of all large- (small-) cap stocks rated 10 have returns over the median of their capitalization group in the ensuing 12 months, while only 41.3%(36.0%) of all stocks rated 1 were above median over a one-year period.***
- Table 23 provides the correlation of the evolving International Earnings Quality Model Scores with various widely known earnings-management metrics. The model is positively correlated with variables that signal good earnings quality and negatively correlated with variables with poor earnings quality. For instance, accrual growth is generally a bad sign and is highly negatively correlated with model scores. This validates the ability of the model to seek out earnings-quality metrics when calculating scores.
- Finally, Table 24 demonstrates that ***EQM-Ie performs exceptionally well throughout different years, proving the robustness of the model throughout different time periods and macro-economical conditions.***

Case Studies

To illustrate the effectiveness of the model in discerning firms with both good and bad earnings quality, three firms from different time periods, different industries, and with different accounting standards are presented to provide some insight on how the model deciphers scores.

Agnico Eagle Mines Ltd. (TSX: AEM) is a Canadian gold mining company with operations in Canada, Europe, Mexico, and the United States. The EQM-I model gave the company a score of 10 (buy signal) on Oct. 10, 2006. The EQM-I model's universal,

normalized peer-comparison system ranked the firm in the bottom 10% for leverage, bottom 70% for accruals growth, and top 20% for sales growth, respectively. The firm's total assets had increased 85% over the previous fiscal year and total long-term debt had been reduced to zero. The resulting yields were a 32.32% one-month return, 27.92% six-month return, and 58.2% one-year return. On the other hand, the firm received a score of 1 (sell signal) on April 9, 2008. The firm's accruals based on free cash flows had increased significantly over the preceding two years, to a figure in the top 10% among peers, and sales growth had become negative, bottom 70%. Long-term and short-term debt also returned to the firm's balance sheet. The one-month, six-month, and one-year returns were -7.56%, -33.38%, and -16.09%, respectively.

Eriks Group (EURONEXT: ERIKS) is a Netherlands-based firm that specializes in the sale of mechanical engineering components and the associated technical and logistical services. On Oct. 9, 2006, the firm was scored at a 10 (buy signal) by the EQM-I model. This score was accompanied by steadily increasing sales growth and free cash flows and a top-10% ranking for return on assets among peers. Capital-expenditures growth also declined 4% during the preceding year. This ranked in the lowest 10% among peers as measured by the EQM-I model. The returns for one month, six month, and one year were 4%, 32%, and 24%, respectively. On Oct. 8, 2007, the firm's performance reversed and the EQM-I model gave the firm a score of 1. During this period, total liabilities were 75% of total assets as compared to the previous year's 50%. The firm's short term notes and long-term debt due in one year were also astronomically high compared to prior years, up over 10 times. The model's peer-comparison system ranked the firm in the top 10% for inventory growth and top 20% for accruals growth. The one-month, six-month, and one-year returns were 2.3%, -10.26%, and -32.28%.

Toll Holdings Ltd. (ASX: TOL) is an Australian company that provides transportation platforms including air, rail, and road fleet services. At April 10, 2006, the firm reported 12% growth in sales and a decrease in leverage by 6.9%. Comparisons using the EQM-I model's universal, normalized metrics yielded a score of 10 (buy signal) on April 10, 2006. The firm's one-month, six-month, and one-year returns were 12%, 16%, and 73%, respectively. However, the following year at April 10, 2007, the model identified problems in the firm's financial statements and assigned the company a score of 1 (sell signal). Short-term debt had increased to 25% of assets as compared to just 9% the previous year. Depreciation had also risen over 100% compared to the previous year. The firm ranked in the lower 80% among peers in accruals growth. The one-month, six-month, and one-year returns for the firm's stock were -34.73%, -38.37%, and -53.58%, respectively.

Conclusion

Earnings-quality analysis is often regarded as the qualitative investment manager's best defense against low-quality financial reporting. The latest academic research also demonstrates that the market does not fully impound sustainable positive information about earnings quality at the time that detailed financial statement data are released. Because investors fixate on the accounting earnings instead of sustainable earnings, understanding the economic earnings and how they relate to returns can allow investors to generate compelling excess returns. Gradient's EQM-I and EQM-Ie have been developed to achieve this goal.

Built upon years of experience, the model is an extremely robust quantitative factor that objectively measures earnings quality for the purpose of forecasting future returns in the global market. The model was developed with attention to robustness across all countries, sectors, and size groups. With an evolved approach from previous models, Gradient's International Earnings Quality Model is unique in its use of advanced statistical techniques, accounting-centric sectors, and rationally scaled variables. Quantitative methods such as kernel smoothing and principal components were incorporated to separate powerful signals from inherently noisy data. Accounting-centric sectors and rationally scaled variables were used to create fair comparisons between companies on a relative basis. The end product is a highly unique factor with exceptional returns that is robust across all nations.

The International Earnings Quality Model has been extensively back-tested across a variety of stock universes and time periods in order to ensure optimal, generalizable results. The results presented in this white paper provide extremely strong evidence demonstrating the usefulness of the model. As shown in the results section of this document, the models produce highly significant excess returns, perform extremely well both in and out of sample, and have sound correlations with well-known earnings-management variables, consistent with various academic papers. And in contrast to competing, commercially available earnings-quality services, the output from the models is derived objectively through statistical analysis of accrual and cash-flow components of earnings.

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Appendix

Table 3: EQM-I Returns by Score – Full Sample Period
(01/01/1999–09/01/2009)

Score	Raw Returns (%)				Excess Returns (%)			
	3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
10	3.89%	7.36%	10.72%	14.08%	1.50%	3.51%	4.04%	5.38%
9	2.83%	5.39%	7.38%	9.69%	0.72%	1.94%	2.01%	2.81%
8	2.48%	4.83%	6.68%	9.17%	0.48%	1.53%	1.47%	2.22%
7	2.29%	4.79%	6.70%	8.69%	0.11%	1.05%	1.20%	1.45%
6	1.67%	3.37%	4.73%	7.17%	-0.19%	0.45%	-0.07%	0.61%
5	1.69%	2.97%	4.18%	6.27%	-0.18%	0.31%	-0.01%	0.68%
4	1.73%	3.37%	4.61%	6.44%	-0.30%	0.63%	0.03%	0.68%
3	0.80%	0.87%	1.79%	3.05%	-0.64%	-1.09%	-1.76%	-1.46%
2	0.03%	-0.88%	-0.15%	0.56%	-1.30%	-2.61%	-3.53%	-3.47%
1	-3.05%	-5.29%	-5.50%	-5.07%	-3.55%	-5.11%	-6.88%	-6.90%

Raw returns are computed using compounded, dividend-inclusive returns. Excess returns are calculated for each score by subtracting the equally weighted mean return for the appropriate country and size category from the raw return for the related security.

Table 4: EQM-I Spread between Score 10 and Score 1 by Nations – Full Sample Period (01/01/1999 – 09/01/2009)

Country	Score Spread (%)			
	3 Month	6 Month	9 Month	12 Month
Australia	5.17%	14.91%	16.45%	27.75%
Austria	14.17%	20.86%	26.51%	31.24%
Benelux	7.33%	16.23%	19.93%	25.86%
Canada	4.27%	9.14%	11.95%	15.20%
Switzerland	4.97%	5.93%	9.97%	15.33%
Germany	16.26%	26.37%	34.85%	43.22%
Denmark	10.21%	17.89%	32.56%	43.69%
Finland	9.20%	16.79%	20.24%	24.79%
France	10.19%	17.37%	25.25%	28.75%
Great Britain	4.59%	5.82%	9.65%	13.53%
Greece/Spain/Portugal	11.88%	19.60%	17.91%	28.07%
Hong Kong	13.92%	22.51%	33.03%	36.10%
Ireland	2.10%	6.95%	6.52%	6.81%
Italy	5.10%	8.41%	8.88%	7.20%
Japan	12.38%	17.08%	20.82%	22.55%
Korea	14.53%	17.13%	20.94%	33.50%
Norway	3.77%	17.84%	21.64%	31.79%
New Zealand	8.61%	16.40%	20.79%	27.92%
Singapore	5.17%	14.91%	16.45%	27.75%
Sweden	14.17%	20.86%	26.51%	31.24%
Taiwan	7.33%	16.23%	19.93%	25.86%

**Table 5: EQM-I Returns by Score – In-Sample Period
(01/01/1999–10/01/2004)**

Score	Raw Returns (%)				Excess Returns (%)			
	3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
10	5.83%	11.33%	18.24%	23.93%	1.72%	4.81%	5.66%	7.28%
9	4.86%	9.41%	14.82%	19.44%	0.60%	2.71%	2.40%	3.20%
8	5.23%	9.22%	14.45%	19.96%	0.86%	2.52%	2.00%	3.08%
7	4.74%	8.67%	13.53%	17.79%	0.00%	0.96%	0.52%	0.63%
6	3.81%	6.77%	12.03%	16.27%	-0.18%	0.63%	0.05%	0.23%
5	3.54%	6.38%	10.71%	15.04%	-0.48%	0.47%	-0.26%	0.97%
4	3.53%	6.21%	11.09%	16.04%	-0.44%	0.66%	-0.04%	1.12%
3	2.44%	3.04%	7.66%	11.45%	-0.61%	-1.31%	-1.91%	-1.63%
2	0.90%	0.18%	3.85%	6.59%	-1.79%	-3.38%	-4.35%	-4.30%
1	-3.85%	-5.22%	-3.10%	0.23%	-4.93%	-6.64%	-8.91%	-8.70%

**Table 6: EQM-I Returns by Score – Out-of-Sample Period
(01/01/2005–09/01/2009)**

Score	Raw Returns (%)				Excess Returns (%)			
	3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
10	2.23%	3.70%	3.34%	3.55%	1.31%	2.35%	2.49%	3.42%
9	1.22%	1.98%	0.73%	0.16%	0.82%	1.30%	1.67%	2.43%
8	0.37%	1.26%	0.09%	-0.72%	0.20%	0.75%	1.03%	1.47%
7	0.39%	1.62%	0.88%	0.35%	0.19%	1.12%	1.77%	2.18%
6	0.09%	0.72%	-1.21%	-0.80%	-0.20%	0.32%	-0.17%	0.94%
5	0.27%	0.20%	-1.36%	-1.79%	0.03%	0.18%	0.20%	0.41%
4	0.37%	1.05%	-0.91%	-2.30%	-0.20%	0.60%	0.09%	0.30%
3	-0.44%	-0.88%	-3.21%	-4.68%	-0.66%	-0.92%	-1.63%	-1.31%
2	-0.67%	-1.80%	-3.75%	-5.28%	-0.92%	-1.96%	-2.81%	-2.71%
1	-2.44%	-5.34%	-7.58%	-10.06%	-2.57%	-3.91%	-5.22%	-5.29%

In each of the tables above, raw returns are computed using compounded, dividend inclusive returns. Excess returns are calculated for each score by subtracting the equally weighted mean return for the appropriate country and size category from the raw return for the related security.

**Table 7: EQM-I Returns by Score – Large-Capitalization Stocks (Out-Sample)
(01/01/2005–09/01/2009)**

Score	Raw Returns (%)				Excess Returns (%)			
	3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
10	3.68%	4.22%	6.70%	7.86%	1.36%	2.01%	2.22%	1.89%
9	2.69%	3.39%	4.23%	2.27%	0.37%	-0.01%	0.67%	0.33%
8	1.56%	2.13%	1.90%	1.66%	-0.05%	0.44%	-0.50%	-0.79%
7	2.92%	4.35%	4.62%	4.48%	0.70%	1.60%	1.56%	1.84%
6	2.12%	1.56%	2.99%	4.02%	-0.05%	0.08%	0.45%	1.36%
5	0.40%	0.08%	0.53%	-1.99%	-0.32%	-0.21%	0.17%	-1.48%
4	2.60%	3.43%	3.37%	4.47%	0.52%	0.71%	0.18%	1.52%
3	1.75%	0.89%	0.85%	-0.78%	-0.14%	-0.58%	-0.80%	-1.19%
2	0.86%	1.47%	2.26%	1.13%	-0.47%	0.28%	0.73%	2.01%
1	0.03%	-2.77%	-4.40%	-8.13%	-1.93%	-3.80%	-5.10%	-7.59%

**Table 8: EQM-I Returns by Score – Mid-Capitalization Stocks (Out-Sample)
(01/01/2005–09/01/2009)**

Score	Raw Returns (%)				Excess Returns (%)			
	1 Month	3 Month	6 Month	12 Month	1 Month	3 Month	6 Month	12 Month
10	1.64%	2.28%	1.53%	1.64%	1.10%	1.64%	1.21%	2.37%
9	1.28%	0.81%	0.16%	0.39%	1.14%	1.00%	1.35%	2.13%
8	1.03%	2.33%	1.08%	-0.60%	0.88%	1.75%	2.06%	1.80%
7	-0.19%	0.46%	-0.29%	-0.79%	-0.37%	0.55%	0.98%	1.40%
6	0.06%	1.25%	0.59%	1.06%	-0.44%	0.12%	0.19%	1.37%
5	0.63%	0.34%	-1.29%	-0.48%	-0.11%	-0.27%	-1.34%	-0.37%
4	1.47%	2.03%	0.79%	-0.45%	0.67%	0.81%	0.56%	0.22%
3	-0.87%	-0.69%	-2.54%	-3.69%	-0.75%	-1.10%	-1.83%	-2.05%
2	-0.29%	-0.99%	-1.72%	-2.42%	-0.61%	-1.76%	-2.50%	-2.28%
1	-2.07%	-3.84%	-5.28%	-8.85%	-2.46%	-2.99%	-4.04%	-5.38%

In each of the tables above, raw returns are computed using compounded, dividend-inclusive returns. Excess returns are calculated for each score by subtracting the equally weighted mean return for the appropriate country and size category from the raw return for the related security. Large-capitalization stocks are defined as the largest companies whose combined market cap makes up 73%⁷ of the size of the total universe. Mid-capitalization stocks are defined as the next largest set of stocks making up 21% of the size of the total universe. Small-capitalization stocks are defined as the next largest set of stocks making up 5% of the size of the total universe.

⁷ In January 2008, large-cap companies were companies with market cap greater than USD7.1billion.

**Table 9: EQM-I Returns by Score – Small-Capitalization Stocks (Out-Sample)
(01/01/2005–09/01/2009)**

Score	Raw Returns (%)				Excess Returns (%)			
	3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
10	1.90%	4.32%	4.42%	4.41%	1.49%	3.32%	4.10%	5.04%
9	0.58%	2.08%	0.48%	-0.45%	0.72%	1.80%	2.13%	3.10%
8	-0.61%	-0.09%	-1.27%	-1.37%	-0.25%	0.04%	0.58%	1.85%
7	0.10%	1.59%	0.87%	0.26%	0.54%	1.46%	2.60%	3.18%
6	-0.43%	-0.27%	-3.42%	-3.15%	-0.08%	0.29%	-0.52%	0.57%
5	-0.21%	-0.22%	-1.82%	-2.76%	0.25%	0.63%	1.48%	1.49%
4	-1.19%	-0.67%	-2.98%	-5.05%	-0.97%	0.46%	-0.26%	0.13%
3	-0.82%	-1.79%	-4.52%	-6.22%	-0.74%	-0.97%	-1.66%	-0.91%
2	-1.35%	-3.13%	-6.11%	-8.32%	-1.25%	-2.49%	-3.64%	-3.75%
1	-3.24%	-7.00%	-9.41%	-10.97%	-2.84%	-4.56%	-5.95%	-4.90%

In each of the tables above, raw returns are computed using compounded, dividend-inclusive returns. Excess returns are calculated for each score by subtracting the equally weighted mean return for the appropriate country and size category from the raw return for the related security. Large-capitalization stocks are defined as the largest companies whose combined market cap makes up 73% of the size of the total universe. Mid-capitalization stocks are defined as the next largest set of stocks making up 21% of the size of the total universe. Small-capitalization stocks are defined as the next largest set of stocks making up 5% of the size of the total universe.

**Table 10: EQM-I Nonparametric Analysis of Large-Capitalization Stocks
(01/01/2005–09/01/2009)**

Score	% Above Median	
	6 Month	12 Month
10	54.79%	55.42%
9	50.97%	50.16%
8	47.93%	46.59%
7	53.67%	52.58%
6	52.00%	52.07%
5	47.53%	50.00%
4	51.53%	52.72%
3	48.23%	46.77%
2	48.30%	47.49%
1	42.47%	43.87%

**Table 11: EQM-I Nonparametric Analysis of Mid-Capitalization Stocks
(01/01/2005–09/01/2009)**

Score	% Above Median	
	6 Month	12 Month
10	52.39%	51.85%
9	50.29%	49.58%
8	53.99%	49.67%
7	50.03%	50.15%
6	50.49%	53.03%
5	51.16%	51.50%
4	51.13%	51.32%
3	48.08%	49.58%
2	48.39%	49.20%
1	43.29%	43.49%

Table 12: EQM-I Nonparametric Analysis of Small-Capitalization Stocks (01/01/2005–09/01/2009)

Score	% Above Median	
	6 Month	12 Month
10	56.52%	60.10%
9	54.13%	54.24%
8	52.31%	52.14%
7	53.55%	54.28%
6	51.03%	49.82%
5	50.37%	49.55%
4	49.09%	48.26%
3	47.77%	47.85%
2	46.30%	46.34%
1	41.50%	41.61%

Table 13: EQM-I Correlation with Common Earnings-Quality Metrics (01/01/2005–09/01/2009)

Score	Raw Return (%)		
	Service	Merchandising	Manufacturing
Capex Growth	-36.87%	-21.60%	-27.68%
Change in Leverage	-11.93%	-29.53%	-12.20%
Accruals Growth	-21.00%	-24.79%	-25.49%
Receivables Growth	-11.20%	1.77%	-1.73%
Operating-Cash-Flow Growth	20.90%	32.02%	36.55%
Free-Cash-Flow Growth	37.84%	39.67%	44.00%
Accounts-Payable Growth	-26.91%	15.37%	4.37%
Inventory Growth	N/A	-17.11%	-22.71%

For Table 13, correlation is done between each variable and its respective EQM-I score. For example, correlation analysis is done on the return on asset for each company in manufacturing and its respective International Earnings Quality Score. The 20.9% correlation coefficient means that scores of service companies are generally higher if they have a high operating-cash-flow-growth figure.. As service companies do not have significant inventory, a correlation analysis is not applicable.

Table 14: EQM-I Results by Year

Year	Score	Raw Returns (%)				Excess Returns (%)			
		3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
1999	10	6.11%	14.39%	16.69%	20.01%	-2.33%	-2.93%	-5.06%	-2.77%
1999	9	6.82%	14.05%	16.05%	20.00%	-1.31%	-1.83%	-8.40%	-9.01%
1999	8	9.05%	17.03%	22.80%	31.78%	-1.59%	-2.04%	-5.43%	-5.17%
1999	7	7.72%	15.24%	20.15%	26.59%	-1.99%	-3.48%	-6.82%	-6.49%
1999	6	6.61%	13.74%	18.00%	24.81%	-2.49%	-2.60%	-7.11%	-7.72%
1999	5	9.47%	17.81%	21.69%	27.31%	-0.69%	1.23%	-2.40%	1.92%
1999	4	8.32%	16.53%	21.83%	32.92%	-1.26%	0.87%	-2.82%	0.87%
1999	3	9.95%	15.21%	22.71%	35.19%	0.91%	-0.65%	-3.79%	0.12%
1999	2	7.81%	12.47%	23.01%	27.29%	-1.70%	-2.52%	0.95%	-1.42%
1999	1	10.39%	21.36%	32.58%	47.27%	1.71%	7.57%	12.19%	15.54%
2000	10	5.06%	8.12%	11.18%	9.88%	8.23%	16.90%	23.22%	28.62%
2000	9	3.83%	5.67%	6.23%	4.88%	7.30%	13.95%	18.13%	22.02%
2000	8	1.54%	2.56%	3.11%	3.14%	4.90%	10.84%	13.66%	18.54%
2000	7	2.64%	2.69%	2.80%	-1.32%	5.69%	10.23%	12.05%	13.39%
2000	6	1.03%	-2.43%	-2.00%	-5.17%	3.73%	5.93%	9.06%	11.18%
2000	5	-1.49%	-2.96%	-6.31%	-8.82%	0.73%	4.04%	3.04%	5.91%
2000	4	-0.19%	-3.54%	-5.52%	-9.25%	1.60%	2.80%	3.67%	6.09%
2000	3	-4.29%	-9.24%	-12.68%	-17.76%	-1.74%	-3.01%	-3.78%	-4.31%
2000	2	-4.93%	-13.29%	-18.79%	-24.11%	-1.47%	-4.26%	-7.12%	-6.65%
2000	1	-14.96%	-26.85%	-38.12%	-44.15%	-12.30%	-19.17%	-26.59%	-26.29%
2001	10	2.95%	2.93%	7.14%	9.01%	1.57%	6.88%	9.32%	11.93%
2001	9	0.43%	0.76%	4.07%	2.51%	-0.80%	3.27%	6.15%	7.55%
2001	8	2.68%	1.06%	2.58%	1.29%	1.32%	4.94%	6.43%	7.54%
2001	7	1.79%	1.22%	3.42%	1.38%	0.88%	4.21%	6.51%	7.88%
2001	6	-0.93%	-2.13%	0.46%	-1.67%	-1.99%	0.27%	2.16%	2.58%
2001	5	-0.24%	-1.73%	-2.10%	-1.75%	-0.10%	2.02%	1.31%	5.16%
2001	4	-0.28%	-2.58%	-2.05%	-4.36%	-1.38%	0.43%	0.29%	1.20%
2001	3	-0.87%	-4.95%	-5.30%	-10.20%	-1.44%	-1.46%	-2.34%	-3.13%
2001	2	-3.42%	-9.46%	-11.63%	-17.79%	-2.45%	-3.79%	-7.88%	-8.70%
2001	1	-9.85%	-19.60%	-19.42%	-27.11%	-6.02%	-9.49%	-13.60%	-16.15%
2002	10	0.05%	-3.09%	4.09%	14.23%	3.28%	6.45%	5.95%	7.50%
2002	9	0.29%	-3.76%	0.27%	7.02%	1.57%	3.26%	2.57%	1.33%

Year	Score	Raw Returns (%)				Excess Returns (%)			
		3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
2002	8	-2.02%	-6.15%	-3.72%	2.80%	1.40%	2.53%	1.67%	1.25%
2002	7	-0.84%	-3.50%	-1.73%	6.10%	0.93%	2.29%	1.81%	1.35%
2002	6	-2.81%	-7.21%	-4.88%	3.12%	0.08%	1.31%	-0.75%	-0.18%
2002	5	-2.70%	-8.55%	-5.05%	2.18%	-0.58%	-0.06%	-0.09%	0.54%
2002	4	-2.58%	-7.88%	-3.01%	5.78%	0.59%	1.05%	1.11%	2.82%
2002	3	-4.52%	-12.19%	-10.34%	-3.46%	-1.22%	-2.60%	-3.71%	-3.71%
2002	2	-6.58%	-13.96%	-10.84%	-2.18%	-2.78%	-4.88%	-4.26%	-3.14%
2002	1	-11.78%	-18.57%	-16.32%	-5.34%	-5.55%	-7.45%	-8.31%	-6.48%
2003	10	13.57%	27.77%	39.76%	46.68%	0.46%	3.29%	3.98%	5.29%
2003	9	10.62%	22.52%	32.60%	39.34%	-1.30%	0.22%	-0.96%	0.96%
2003	8	12.75%	23.73%	33.81%	40.86%	0.30%	0.49%	-1.86%	-0.64%
2003	7	9.60%	20.76%	30.05%	35.59%	-2.23%	-2.09%	-3.83%	-3.81%
2003	6	11.10%	22.36%	32.83%	37.90%	-0.53%	-0.21%	-1.81%	-2.21%
2003	5	10.75%	21.74%	32.81%	37.75%	-0.54%	-0.55%	-0.55%	-0.71%
2003	4	9.60%	21.79%	31.96%	36.61%	-2.14%	-0.69%	-2.51%	-2.99%
2003	3	12.79%	24.69%	38.56%	45.10%	1.73%	2.35%	3.46%	4.72%
2003	2	10.53%	21.76%	32.02%	38.33%	-0.54%	-0.74%	-1.99%	-1.00%
2003	1	9.22%	22.91%	33.58%	39.46%	-1.33%	0.57%	-0.40%	-0.32%
2004	10	4.04%	9.64%	15.96%	22.23%	0.41%	1.86%	2.10%	2.33%
2004	9	4.33%	9.72%	16.14%	22.52%	0.26%	1.74%	1.72%	2.02%
2004	8	4.75%	10.61%	16.77%	23.97%	0.14%	1.79%	1.95%	2.97%
2004	7	4.92%	8.66%	14.54%	19.92%	-0.41%	-0.31%	-0.47%	-0.81%
2004	6	4.62%	8.40%	15.10%	20.56%	0.11%	0.24%	0.61%	0.47%
2004	5	3.67%	8.07%	12.95%	18.68%	-0.93%	-0.54%	-1.53%	-1.35%
2004	4	4.90%	8.95%	14.58%	21.60%	0.04%	0.65%	0.30%	1.24%
2004	3	2.34%	4.99%	10.62%	15.82%	-1.45%	-2.41%	-2.89%	-3.39%
2004	2	2.91%	4.14%	8.64%	13.58%	-1.66%	-3.80%	-5.06%	-5.55%
2004	1	0.36%	2.14%	4.49%	9.20%	-2.92%	-5.42%	-8.04%	-9.36%
2005	10	9.08%	20.31%	26.25%	33.84%	1.35%	2.63%	3.20%	4.21%
2005	9	8.62%	19.15%	24.87%	33.21%	0.21%	1.01%	1.84%	2.28%
2005	8	8.44%	18.46%	24.89%	32.13%	0.19%	-0.11%	1.37%	1.90%
2005	7	9.23%	21.10%	26.01%	34.16%	0.51%	1.75%	2.06%	3.62%
2005	6	7.62%	17.70%	22.74%	30.97%	-1.27%	-1.26%	-1.09%	0.09%

Year	Score	Raw Returns (%)				Excess Returns (%)			
		3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
2005	5	8.31%	18.00%	22.89%	29.56%	-0.17%	-0.39%	-0.12%	-0.17%
2005	4	8.46%	19.98%	24.37%	29.41%	-0.40%	0.33%	-0.13%	-1.13%
2005	3	7.54%	16.56%	19.70%	23.44%	-1.12%	-2.52%	-3.54%	-4.63%
2005	2	7.01%	15.73%	17.94%	23.23%	-1.82%	-3.38%	-5.18%	-5.14%
2005	1	6.45%	15.68%	16.36%	20.82%	-2.34%	-2.68%	-5.84%	-6.24%
2006	10	2.45%	8.10%	15.67%	21.45%	0.96%	2.72%	1.56%	1.75%
2006	9	2.12%	5.11%	10.18%	15.33%	1.12%	0.99%	0.34%	1.98%
2006	8	2.30%	4.93%	11.40%	15.59%	0.87%	0.84%	1.17%	1.21%
2006	7	1.65%	4.70%	11.06%	15.46%	0.13%	0.28%	0.03%	-0.07%
2006	6	1.32%	4.47%	10.41%	15.82%	0.34%	0.69%	0.30%	1.50%
2006	5	1.65%	4.17%	11.22%	15.71%	1.11%	0.66%	1.23%	1.08%
2006	4	1.00%	3.51%	8.43%	12.54%	0.08%	-0.03%	-1.46%	-0.41%
2006	3	1.40%	4.77%	10.76%	15.63%	1.18%	1.72%	1.52%	2.36%
2006	2	0.97%	3.09%	8.88%	12.76%	0.37%	-1.15%	-2.19%	-2.17%
2006	1	-2.56%	-0.18%	6.74%	12.01%	-3.50%	-4.27%	-4.64%	-3.89%
2007	10	0.30%	-2.37%	-11.05%	-20.12%	0.86%	1.87%	2.03%	3.69%
2007	9	-0.71%	-3.34%	-11.73%	-22.12%	0.60%	1.48%	2.13%	2.65%
2007	8	-2.17%	-4.37%	-13.85%	-24.78%	0.22%	1.45%	1.36%	1.41%
2007	7	-1.46%	-4.23%	-13.18%	-22.84%	0.19%	1.21%	1.47%	2.98%
2007	6	-2.21%	-4.98%	-14.44%	-24.36%	-0.60%	0.29%	0.28%	1.58%
2007	5	-1.51%	-4.95%	-14.62%	-24.55%	-0.16%	0.22%	-0.03%	0.61%
2007	4	-2.14%	-4.53%	-14.01%	-25.52%	-0.78%	0.49%	-0.09%	0.15%
2007	3	-2.11%	-5.73%	-16.03%	-26.45%	-0.53%	-0.22%	-0.86%	-0.23%
2007	2	-2.61%	-6.96%	-16.87%	-28.43%	-0.94%	-1.85%	-2.16%	-2.02%
2007	1	-3.68%	-8.48%	-18.97%	-32.32%	-2.31%	-3.11%	-4.18%	-5.40%
2008	10	-6.89%	-13.97%	-15.11%	-27.36%	2.94%	2.65%	2.92%	3.66%
2008	9	-8.24%	-14.17%	-16.16%	-28.34%	2.09%	2.11%	1.99%	2.76%
2008	8	-9.79%	-15.71%	-19.51%	-29.81%	0.39%	0.80%	0.26%	1.26%
2008	7	-10.94%	-16.65%	-17.99%	-29.96%	0.14%	1.17%	3.21%	1.42%
2008	6	-9.64%	-16.61%	-21.10%	-30.58%	0.42%	0.32%	-0.17%	0.48%
2008	5	-10.80%	-17.92%	-21.11%	-31.31%	-0.11%	0.03%	-0.05%	0.16%
2008	4	-10.95%	-17.15%	-19.97%	-28.46%	-0.24%	1.47%	1.91%	3.17%
2008	3	-12.23%	-20.22%	-23.26%	-34.66%	-1.66%	-2.41%	-3.35%	-2.94%

Year	Score	Raw Returns (%)				Excess Returns (%)			
		3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
2008	2	-12.22%	-19.97%	-22.51%	-33.26%	-1.16%	-1.48%	-1.81%	-1.22%
2008	1	-13.98%	-24.98%	-26.61%	-39.81%	-3.29%	-5.25%	-6.18%	-5.58%

Table 15: EQM-Ie Returns by Score – Full Sample Period
(01/01/1999–09/01/2009)

Score	Raw Returns (%)				Excess Returns (%)			
	3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
10	3.90%	7.62%	11.01%	14.69%	1.63%	4.36%	4.88%	6.58%
9	3.29%	5.89%	8.20%	10.95%	1.16%	2.37%	2.57%	3.57%
8	3.12%	5.66%	7.77%	10.60%	1.02%	2.24%	2.09%	2.89%
7	2.15%	4.74%	6.23%	8.64%	0.21%	1.66%	1.50%	2.37%
6	2.09%	3.96%	5.53%	7.47%	0.06%	0.77%	0.45%	0.84%
5	1.43%	3.04%	4.12%	5.40%	-0.39%	0.21%	-0.06%	0.17%
4	1.18%	1.97%	3.44%	5.19%	-0.51%	-0.70%	-0.75%	-0.15%
3	0.45%	0.64%	1.68%	3.04%	-1.32%	-1.65%	-2.33%	-1.83%
2	-0.62%	-1.73%	-0.76%	0.15%	-1.76%	-3.27%	-3.84%	-3.51%
1	-2.71%	-5.37%	-5.63%	-5.81%	-3.48%	-5.55%	-7.63%	-8.49%

Raw returns are computed using compounded, dividend-inclusive returns. Excess returns are calculated for each score by subtracting the equally weighted mean return for the appropriate country and size category from the raw return for the related security.

Table 16: EQM-Ie Spread between Score 10 and Score 1 by Nations – Full Sample Period (01/01/1999–09/01/2009)

Country	Score Spread (%)			
	3 Month	6 Month	9 Month	12 Month
Australia	4.85%	12.66%	15.41%	20.56%
Austria	8.10%	10.82%	13.20%	13.87%
Benelux	6.45%	14.63%	16.10%	20.91%
Canada	5.16%	10.39%	13.45%	18.01%
Switzerland	4.47%	10.51%	13.31%	21.33%
Germany	15.53%	24.46%	34.60%	42.60%
Denmark	-0.83%	-3.62%	-3.30%	-10.97%
Finland	2.58%	8.72%	7.35%	14.55%
France	8.52%	17.72%	21.40%	26.69%
Great Britain	7.29%	14.14%	18.29%	22.56%
Greece/Spain/Portugal	3.58%	-0.04%	0.82%	1.17%
Hong Kong	6.41%	14.42%	12.79%	18.82%
Ireland	11.35%	17.15%	20.43%	28.15%
Italy	3.80%	10.26%	13.84%	18.30%
Japan	6.51%	11.40%	12.71%	13.22%
Korea	12.75%	24.35%	29.53%	33.96%
Norway	12.16%	12.85%	25.99%	35.95%
New Zealand	2.96%	3.99%	4.37%	1.96%
Singapore	8.08%	21.98%	28.14%	34.03%
Sweden	10.26%	22.57%	28.59%	35.83%
Taiwan	3.82%	9.66%	16.09%	16.88%

**Table 17: EQM-Ie Returns by Score – Large-Capitalization Stocks (Full Sample)
(01/01/1999–09/01/2009)**

Score	Raw Returns (%)				Excess Returns (%)			
	3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
10	1.90%	4.14%	6.57%	8.13%	0.48%	2.41%	2.14%	2.44%
9	3.77%	4.76%	7.17%	7.99%	1.01%	1.32%	1.32%	1.41%
8	3.26%	4.07%	5.21%	7.58%	0.79%	1.38%	1.15%	2.34%
7	2.64%	3.47%	4.53%	6.26%	0.19%	0.81%	0.31%	1.14%
6	2.47%	3.73%	5.81%	8.17%	0.73%	1.20%	1.08%	0.92%
5	0.67%	1.80%	2.98%	5.25%	-0.90%	-0.83%	-1.02%	0.15%
4	1.74%	1.63%	2.20%	1.61%	-0.10%	0.06%	-0.74%	-1.43%
3	1.72%	2.15%	3.21%	2.88%	-0.13%	0.54%	0.38%	0.15%
2	-0.57%	-1.98%	-1.46%	-1.00%	-1.36%	-2.24%	-2.60%	-2.56%
1	-1.24%	-3.19%	-1.08%	-1.76%	-2.39%	-3.58%	-3.67%	-5.16%

**Table 18: EQM-Ie Returns by Score – Mid-Capitalization Stocks (Full Sample)
(01/01/1999–09/01/2009)**

Score	Raw Returns (%)				Excess Returns (%)			
	1 Month	3 Month	6 Month	12 Month	1 Month	3 Month	6 Month	12 Month
10	3.24%	5.97%	8.60%	12.44%	1.15%	3.06%	2.89%	4.80%
9	2.91%	5.67%	7.83%	10.13%	0.83%	2.21%	2.60%	3.05%
8	2.86%	5.27%	7.11%	10.05%	1.35%	2.74%	2.37%	3.28%
7	1.92%	3.66%	5.05%	6.93%	0.11%	0.99%	0.64%	0.95%
6	2.41%	4.05%	6.00%	7.78%	0.44%	1.32%	1.67%	2.23%
5	1.03%	2.47%	3.92%	5.10%	-0.40%	0.32%	0.15%	0.59%
4	1.06%	1.61%	3.28%	4.79%	-0.38%	-0.87%	-0.75%	-0.31%
3	0.58%	0.84%	2.01%	4.31%	-1.20%	-1.40%	-1.89%	-0.78%
2	-0.11%	-0.74%	0.44%	1.65%	-1.32%	-2.67%	-3.21%	-3.12%
1	-2.22%	-3.53%	-4.35%	-4.51%	-3.28%	-4.60%	-7.22%	-8.64%

**Table 19: EQM-Ie Returns by Score – Small-Capitalization Stocks (Full Sample)
(01/01/1999–09/01/2009)**

Score	Raw Returns (%)				Excess Returns (%)			
	3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
10	4.62%	9.28%	13.68%	17.65%	2.25%	5.80%	7.05%	8.84%
9	3.38%	6.03%	8.59%	12.07%	1.50%	2.81%	2.87%	4.46%
8	3.15%	6.07%	8.77%	11.64%	0.83%	2.07%	2.13%	2.87%
7	2.15%	5.52%	7.37%	10.27%	0.36%	2.31%	2.42%	3.72%
6	1.70%	3.81%	5.06%	6.92%	-0.29%	0.38%	-0.54%	-0.23%
5	1.71%	3.36%	4.53%	5.68%	-0.29%	0.36%	0.10%	-0.05%
4	1.08%	2.20%	3.81%	6.11%	-0.64%	-0.56%	-0.69%	0.20%
3	-0.10%	-0.24%	1.07%	2.06%	-1.64%	-2.32%	-3.20%	-3.02%
2	-1.06%	-2.55%	-1.45%	-0.72%	-2.13%	-3.90%	-4.48%	-3.93%
1	-3.60%	-7.48%	-7.49%	-7.59%	-3.91%	-6.68%	-8.62%	-8.94%

**Table 20: EQM-Ie Nonparametric Analysis of Large-Capitalization Stocks
(01/01/1999–09/01/2009)**

Score	% Above Median	
	6 Month	12 Month
10	52.46%	56.28%
9	55.94%	55.45%
8	55.36%	54.10%
7	51.58%	50.53%
6	51.86%	52.94%
5	50.28%	51.21%
4	47.86%	46.17%
3	47.63%	46.22%
2	42.98%	45.17%
1	43.52%	41.27%

**Table 21: EQM-Ie Nonparametric Analysis of Mid-Capitalization Stocks
(01/01/1999–09/01/2009)**

Score	% Above Median	
	6 Month	12 Month
10	56.29%	56.37%
9	55.15%	55.04%
8	53.58%	53.91%
7	51.63%	51.74%
6	51.48%	51.23%
5	50.06%	48.75%
4	48.19%	49.82%
3	45.95%	47.17%
2	45.44%	44.83%
1	41.77%	40.81%

Table 22: EQM-Ie Nonparametric Analysis of Small-Capitalization Stocks (01/01/1999–09/01/2009)

Score	% Above Median	
	6 Month	12 Month
10	57.18%	59.16%
9	55.29%	56.16%
8	55.23%	55.53%
7	52.88%	53.03%
6	51.72%	52.19%
5	51.19%	50.49%
4	48.59%	48.72%
3	46.67%	45.82%
2	43.02%	41.87%
1	37.25%	36.04%

Table 23: EQM-Ie Correlation with Common Earnings-Quality Metrics (01/01/1999–09/01/2009)

Score	Raw Return (%)		
	Service	Merchandising	Manufacturing
Capex Growth	-22.04%	-19.77%	-20.47%
Change in Leverage	-9.30%	-13.19%	-17.85%
Accruals Growth	-14.88%	-6.53%	-12.27%
Receivables Growth	-7.01%	5.17%	1.85%
Operating-Cash-Flow Growth	22.87%	8.95%	26.64%
Free-Cash-Flow Growth	30.83%	16.63%	30.74%
Accounts-Payable Growth	-16.08%	7.30%	2.33%
Inventory Growth	N/A	-18.47%	-15.55%

For Table 23, correlation is done between each variable and its respective EQM-I Score.

Table 24: EQM-Ie Results by Year

Year	Score	Raw Returns (%)				Excess Returns (%)			
		3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
1999	10	7.92%	16.77%	20.27%	26.43%	0.65%	3.82%	0.84%	5.01%
1999	9	8.53%	15.60%	18.38%	25.16%	-0.56%	-2.88%	-8.15%	-7.61%
1999	8	6.56%	13.60%	20.38%	27.80%	-1.50%	-2.04%	-1.77%	2.16%
1999	7	8.54%	19.13%	23.50%	30.40%	-1.02%	4.05%	0.28%	-0.07%
1999	6	5.93%	11.28%	17.84%	25.96%	-3.25%	-5.65%	-7.43%	-5.72%
1999	5	6.74%	14.26%	18.62%	28.01%	-3.24%	-2.87%	-6.54%	-3.05%
1999	4	7.66%	16.80%	23.39%	32.10%	-1.60%	-0.37%	-3.39%	-0.91%
1999	3	9.83%	15.93%	20.83%	28.40%	-0.84%	-2.27%	-5.60%	-5.85%
1999	2	7.34%	14.49%	22.61%	30.26%	-1.69%	-0.27%	1.03%	5.14%
1999	1	10.67%	19.09%	29.84%	42.11%	1.60%	3.37%	5.67%	3.34%
2000	10	4.70%	7.33%	9.35%	9.20%	7.81%	16.10%	21.43%	26.97%
2000	9	2.02%	1.70%	0.51%	-1.30%	5.08%	9.70%	12.31%	16.09%
2000	8	1.79%	1.35%	2.08%	-0.74%	3.89%	9.05%	11.98%	14.77%
2000	7	-0.16%	-1.90%	-1.34%	-3.29%	3.34%	6.56%	9.55%	12.79%
2000	6	2.58%	-0.96%	-3.19%	-4.89%	5.18%	6.61%	6.39%	10.60%
2000	5	-2.32%	-3.18%	-2.84%	-6.84%	1.05%	5.05%	7.34%	9.03%
2000	4	-0.13%	-3.11%	-5.22%	-8.58%	2.99%	4.87%	4.58%	6.14%
2000	3	-1.66%	-6.80%	-9.84%	-13.12%	1.12%	1.19%	-0.33%	1.54%
2000	2	-6.82%	-15.78%	-19.58%	-25.85%	-2.91%	-6.60%	-8.37%	-9.01%
2000	1	-14.29%	-26.63%	-36.69%	-42.85%	-10.73%	-17.34%	-23.95%	-23.72%
2001	10	3.55%	2.51%	7.67%	7.25%	1.64%	5.92%	9.97%	12.85%
2001	9	0.90%	-0.28%	1.89%	2.57%	-0.20%	3.86%	5.97%	8.84%
2001	8	2.69%	1.30%	2.33%	1.23%	0.75%	3.59%	5.21%	5.82%
2001	7	0.52%	-0.30%	0.24%	-1.89%	0.73%	4.24%	5.55%	6.87%
2001	6	0.04%	-2.26%	-0.84%	-4.37%	-0.82%	0.99%	1.72%	2.57%
2001	5	0.48%	-2.97%	-3.66%	-5.32%	-0.51%	-0.10%	-0.80%	0.81%
2001	4	-0.08%	-0.02%	-0.23%	-4.80%	-1.11%	1.24%	1.92%	2.12%
2001	3	-1.49%	-6.38%	-6.93%	-11.88%	-2.26%	-2.18%	-4.64%	-5.55%
2001	2	-4.01%	-10.06%	-11.42%	-15.92%	-3.73%	-5.72%	-8.59%	-8.90%
2001	1	-9.07%	-17.79%	-19.81%	-28.02%	-4.70%	-7.42%	-12.25%	-15.14%
2002	10	-0.91%	-3.83%	2.57%	11.83%	1.72%	5.62%	4.72%	6.31%
2002	9	0.98%	-3.16%	2.08%	10.09%	3.44%	4.98%	4.82%	4.70%

Year	Score	Raw Returns (%)				Excess Returns (%)			
		3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
2002	8	-1.26%	-4.71%	-3.75%	3.44%	1.94%	4.22%	1.81%	1.62%
2002	7	-0.41%	-5.46%	-2.39%	4.69%	1.78%	2.24%	1.98%	1.54%
2002	6	-1.99%	-7.47%	-4.06%	3.17%	0.07%	-0.12%	-0.22%	-0.67%
2002	5	-2.78%	-5.31%	-2.01%	6.70%	0.02%	2.01%	2.08%	3.05%
2002	4	-5.00%	-11.95%	-8.97%	-0.95%	-1.49%	-2.70%	-3.54%	-2.45%
2002	3	-4.75%	-10.81%	-8.43%	-0.13%	-1.74%	-1.97%	-2.77%	-1.79%
2002	2	-7.37%	-15.77%	-10.97%	-2.29%	-2.99%	-5.16%	-4.22%	-3.02%
2002	1	-10.85%	-19.16%	-17.64%	-8.65%	-5.98%	-8.95%	-10.93%	-10.32%
2003	10	13.77%	27.97%	37.80%	46.44%	0.77%	3.76%	2.04%	4.69%
2003	9	11.34%	22.72%	33.47%	38.46%	-0.92%	-0.05%	-0.64%	-0.31%
2003	8	11.42%	22.37%	33.53%	41.01%	-0.56%	-0.24%	-1.63%	-0.23%
2003	7	12.27%	25.51%	36.50%	42.19%	-0.22%	2.16%	1.61%	1.49%
2003	6	10.68%	22.46%	32.46%	38.48%	-1.07%	-0.35%	-1.97%	-1.02%
2003	5	9.86%	22.02%	32.42%	36.65%	-2.12%	-0.64%	-2.03%	-2.58%
2003	4	10.99%	20.99%	32.26%	38.88%	-0.13%	-1.28%	-1.59%	-0.25%
2003	3	9.04%	20.48%	32.04%	36.76%	-1.53%	-1.60%	-2.14%	-2.83%
2003	2	10.94%	21.74%	33.69%	38.78%	-0.44%	-1.22%	-0.25%	-0.67%
2003	1	11.24%	24.28%	35.07%	41.09%	0.63%	2.27%	2.46%	3.03%
2004	10	4.37%	11.23%	18.33%	25.33%	0.88%	3.15%	4.04%	5.03%
2004	9	5.10%	10.68%	17.71%	24.67%	0.98%	2.60%	3.35%	4.36%
2004	8	5.37%	9.72%	15.66%	22.09%	0.65%	1.14%	0.71%	0.85%
2004	7	4.08%	8.53%	14.47%	20.40%	-0.35%	0.42%	0.41%	0.53%
2004	6	3.36%	7.51%	13.40%	17.67%	-1.30%	-1.04%	-1.37%	-3.05%
2004	5	4.63%	8.70%	13.30%	19.11%	-0.36%	0.08%	-1.18%	-0.86%
2004	4	3.49%	6.33%	11.56%	18.23%	-1.55%	-2.20%	-3.21%	-2.37%
2004	3	3.27%	7.15%	13.03%	19.14%	-1.67%	-1.36%	-1.16%	-0.70%
2004	2	1.97%	3.62%	8.40%	13.84%	-1.18%	-3.29%	-4.33%	-4.67%
2004	1	0.77%	2.90%	6.33%	12.76%	-2.61%	-4.96%	-7.24%	-7.45%
2005	10	8.77%	19.67%	25.68%	34.96%	0.77%	2.37%	3.29%	4.04%
2005	9	9.41%	21.26%	26.31%	33.05%	0.74%	2.23%	2.67%	2.94%
2005	8	8.38%	19.26%	24.98%	31.57%	0.10%	0.56%	0.95%	0.72%
2005	7	8.15%	18.64%	23.85%	33.31%	0.02%	0.12%	0.24%	2.71%
2005	6	9.04%	20.17%	24.70%	31.57%	0.18%	0.77%	1.08%	1.96%

Year	Score	Raw Returns (%)				Excess Returns (%)			
		3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
2005	5	8.77%	18.89%	23.28%	28.18%	-0.22%	-0.69%	-0.83%	-1.06%
2005	4	7.57%	16.95%	21.87%	29.73%	-0.76%	-1.63%	-0.95%	0.13%
2005	3	7.65%	18.86%	23.64%	28.90%	-1.07%	-0.49%	-0.38%	-0.16%
2005	2	7.35%	16.26%	17.87%	22.79%	-1.81%	-3.30%	-5.12%	-5.73%
2005	1	6.93%	14.76%	16.60%	20.12%	-1.82%	-2.79%	-5.39%	-7.01%
2006	10	3.59%	8.93%	16.88%	24.29%	2.19%	3.00%	2.60%	4.94%
2006	9	2.52%	7.35%	14.34%	21.23%	0.88%	1.63%	1.25%	3.74%
2006	8	3.54%	7.70%	14.68%	20.22%	1.99%	3.07%	3.15%	4.73%
2006	7	1.64%	4.92%	11.06%	14.52%	0.52%	1.40%	1.97%	2.10%
2006	6	1.52%	5.01%	12.74%	18.20%	1.21%	1.67%	2.59%	3.31%
2006	5	1.42%	4.48%	10.90%	14.28%	0.10%	0.50%	0.86%	0.55%
2006	4	1.33%	4.36%	9.70%	13.43%	0.62%	1.07%	0.64%	0.24%
2006	3	0.85%	2.68%	8.35%	12.49%	-0.33%	-1.36%	-2.48%	-2.58%
2006	2	-0.23%	2.85%	9.54%	14.22%	-1.01%	-1.70%	-1.67%	-1.26%
2006	1	-2.37%	-0.29%	5.06%	9.69%	-3.33%	-5.38%	-7.68%	-8.27%
2007	10	-0.23%	-0.17%	-8.38%	-19.05%	1.31%	4.88%	5.84%	6.54%
2007	9	-0.88%	-3.65%	-12.13%	-23.50%	0.73%	1.33%	2.29%	2.14%
2007	8	0.12%	-2.58%	-12.15%	-21.84%	1.54%	2.81%	2.35%	3.46%
2007	7	-1.24%	-4.38%	-13.73%	-23.46%	0.31%	1.11%	0.92%	2.12%
2007	6	-0.77%	-3.43%	-13.97%	-24.72%	0.62%	1.71%	0.84%	1.41%
2007	5	-1.79%	-4.54%	-14.25%	-24.40%	-0.31%	0.02%	-0.80%	0.35%
2007	4	-2.62%	-6.70%	-14.77%	-25.63%	-1.04%	-0.93%	-0.14%	0.09%
2007	3	-2.78%	-7.24%	-16.99%	-27.34%	-1.27%	-2.04%	-2.18%	-1.39%
2007	2	-3.29%	-7.50%	-17.63%	-28.96%	-1.96%	-2.57%	-3.05%	-2.53%
2007	1	-5.06%	-9.79%	-20.71%	-34.80%	-3.68%	-4.66%	-6.15%	-8.09%
2008	10	-6.52%	-13.07%	-13.97%	-28.00%	2.55%	3.90%	4.03%	4.12%
2008	9	-7.29%	-14.29%	-17.05%	-26.64%	2.57%	2.73%	2.82%	4.72%
2008	8	-9.10%	-15.06%	-17.26%	-26.91%	1.84%	3.00%	3.36%	3.85%
2008	7	-11.12%	-15.84%	-20.52%	-30.15%	-0.32%	1.13%	-0.13%	0.89%
2008	6	-10.21%	-15.95%	-19.09%	-30.02%	0.39%	1.40%	1.49%	1.31%
2008	5	-11.41%	-18.14%	-20.12%	-31.86%	0.14%	-0.32%	0.92%	-1.16%
2008	4	-11.24%	-18.50%	-21.56%	-32.61%	-0.49%	-0.89%	-0.45%	-0.96%
2008	3	-13.61%	-20.61%	-23.58%	-33.13%	-2.56%	-2.70%	-3.50%	-1.67%

Year	Score	Raw Returns (%)				Excess Returns (%)			
		3 Month	6 Month	9 Month	12 Month	3 Month	6 Month	9 Month	12 Month
2008	2	-12.84%	-21.73%	-24.16%	-36.27%	-2.03%	-3.57%	-4.27%	-3.38%
2008	1	-13.97%	-26.28%	-26.79%	-42.44%	-4.06%	-6.69%	-6.86%	-7.05%