RECONSTRUCTING THE HISTORICAL PERFORMANCE OF MERGED E-COMMERCE MUTUAL FUNDS

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In the current Canadian regulatory environment, a mutual fund company is able to delete the history of an underperforming fund from public record by merging it with another fund. This paper addresses the effects of this rule on the super-concentrated group of Canadian mutual fund mergers that involved eCommerce portfolios between 2001 and 2004. A weighted average technique is proposed to reconstruct the pre-merger historical performance of a 'combination fund'. It is found that mutual fund companies are able to make their merged funds look considerably better by truncating the funds' pre-merger performance data.

Section 1: Introduction

In the late 1990s and the first part of the year 2000, eCommerce stocks were hot, and, much like their American compatriots, Canadian mutual fund companies wasted no time creating portfolios to take advantage of the heat. Between November 1998 and December 2000, a total of 17 'specialty' Internet sector mutual funds appeared on the Canadian market. Through these funds, Canadians investors funnelled billions of dollars into the Internet sector before the bubble burst in late 2000. Before most of these funds were dissolved, terminated, merged, or repositioned, hundreds of millions of dollars of investors' capital simply disappeared into the swill of market forces.[2]

While the industry may not want to talk about this unfortunate time in investment history, several lessons can be learned about the functioning of the Canadian legal system as it pertains to mutual funds. When things start to go wrong, mutual fund companies in Canada have a considerable amount of flexibility with respect to how they deal with underperforming funds. While not all provinces adopt the same rules and policies, most of the major players within the mutual fund industry are regulated under National Instrument 81-102. Pursuant to the rules found therein,

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2 Consistent with previous studies that address deceased mutual funds, the abovementioned failed funds are referred to as 'non-survivors' and the funds into which they are merged are identified as 'survivors' (see Elton, et al. (1996)).

mutual funds can be terminated, renamed, or merged into other funds at the discretion of management, subject to unit-holder approval. While these provisions are necessary given that some mutual funds eventually out-live their intended life-spans and have to be written off, several fine points in the sections relating to fund mergers allow companies to make any embarrassing performance that may be on their record books all but disappear.

Pursuant to NI 81-102 as of 2001, merged mutual funds are not required to report pre-transaction performance data in future prospectuses or sales communications; a summary footnote describing the transaction is sufficient. If a company desires to report pre-transaction performance, it can only do so if it includes in its materials the performance of *all* component funds. Moreover, if a company chooses to do this, it is proscribed from reporting performance data that combines the periods before and after the merger. While the culmination of these rules has a prima facie attractiveness, given that the merged fund is a new entity with potentially new risk-return parameters, the Instrument has the effect of allowing companies to hide their funds' poor historical performance. In practice, post-merger prospectuses and sales communications do not include pre-transaction performance data, and, 12 months after the date of a merger, survivor funds usually starts reporting performance as if they were entirely new creations. While the pre-merger performance of component funds can be collected from archived sources, the *company's* materials – the only source of information for most investors – can be purged of unsatisfactory performance.

This does, of course, create a discrepancy. In the prospectus of the surviving fund, the listed date of inception and the first indication of performance may be several years off. NI 81-102 essentially allows companies to 'start fresh' and disregard the cumulative performance of their fund managers – while retaining all of their original investors' capital.

To illustrate the effect of this practice on investor perceptions of a fund, take the Royal eCommerce Fund (REF) and its partner fund, the Royal Global Technology Sector Fund (RGTSF #1) – which together managed $30.30 million at the time of their merger in July 2002. At the end of 2000, the REF and the RGTSF #1 posted cumulative losses of -53.60% and -41.8% respectively (Black, 2002). In 2002 the RGTSF #1 was merged into REF and the REF was renamed the Royal Global Technology Sector Fund (RGTSF #2). On page 65 of the 2003 annual report of RBC Funds, it was highlighted that RGTSF had a return of 12.3% since inception, even though RGTSF's net asset value (hereafter referred to as NAV) had been $7.10, $3.30, $1.76, and $2.27 at the end of years 2000 to 2003 respectively. While this performance communication is entirely legal given the current wording of NI 81-102 §15.9, it effectively allows companies to 'sweep underperformers under the rug' when they are performing below company standards.

Given the potential for mutual fund companies to mislead investors by using the provisions of NI 81-102 to cover up past poor performance, the purpose of this paper is to propose a technique to report merged fund performance that does not allow companies to cover up poor performance. The eCommerce funds that were merged out of existence between 2001 and 2004 in Canada are used as a sample in an empirical analysis using the proposed technique to determine whether or not this technique has a material impact on the communication of performance.

Section 2: Methodology for Empirical Analysis

This paper addresses the full population of mergers that involved specialty Internet sector mutual funds between 2001 and 2004. Due to complex merger relationships, this paper deals with 'merger families' – i.e. groups of funds that came together to form one final product fund – instead of with individual mergers. Of the seven mergers identified, four continuing funds (and hence: 'families') were ultimately created. Table 1 shows the merger families.

Table 1: Merger Families

Merger Family #	Non-Survivor(s)	Survivor
1	· Royal e-Commerce Fund	· Royal Global Technology Sector Fund
2	· Keystone Altamira e-Business Capital Class · Keystone Altamira Science and Technology Capital Class · Keystone Altamira RSP e-Business Fund · Keystone Altamira RSP Science and Technology · Mackenzie Universal RSP Emerging Technologies Fund · Mackenzie Universal Internet Technologies Fund	· Mackenzie Universal Emerging Technologies Capital Class
3	· Investors Global e.Commerce Class	· Investors Global Science & Technology Class
4	· Sentry Select E-Commerce and Internet Technology Fund 1999 · Sentry Select Internet Technology Fund	· Sentry Select Wireless Communications Fund

With regard to pre-merger reconstruction, the logical technique would be to calculate the monthly percentage returns of a combination portfolio that consists of all of the funds that were eventually merged into a survivor. As it is rarely ever the case that all of a product fund's components had equal asset bases prior to a merger, a weighted average must be taken to adjust for relative fund size. Because of the nature of mutual fund unit prices, reported as NAV per unit, component funds should be weighted by the relative number of their outstanding units. Weighting the NAVs collected from archived periodicals by relative units outstanding is mathematically equivalent to summing the asset bases of both funds and dividing the aggregated asset value by the sum of the outstanding units.[3] This weighted average NAV (WANAV), while not useful in any

[3] The mathematical proof of the equivalence is available from the authors.

absolute sense, can be used to determine the monthly returns of a hypothetical combination fund before the date of merger.[4]

By weighting the monthly per-unit prices of each component fund as described above, the return that would have been on a merged fund can be estimated prior to the merger date.[5] This is, of course, assuming that the sample funds do not substantially alter their investment structures after a merger and that the ratio of the units that each component fund has outstanding relative to each other remains constant. It is not necessary that every fund has the same number of units outstanding throughout the entire period, but it is necessary that increases and decreases in units happen proportionally. In addition, this technique does not account for transaction costs, which is reasonable since transaction costs are usually proportional to the NAV.

Once the pre-merger performance records of the sample funds are all reconstructed, this paper will use the data to identify any discrepancies that may exist between how the sample mutual funds currently convey their past performance and how they should report their historical performance if the weighting technique outlined above were employed. Because mutual fund companies are only required to report their raw returns (in terms of current and effective yields, and annual compound rate of return, known in the NI 81-102 as "total return"), this paper will place a heavy emphasis on two non-risk-adjusted measures: yield–since-inception (YSI), calculated as the change in NAV from the date of inception to the end of the investigation period as a percentage of the initial NAV, and compound annual growth rate since inception. As noted by Carhart, et al. (2002), mutual fund companies often go to extreme lengths to upwardly bias the returns reported in their prospectuses (and communicated through their sales representatives). Prospectus-compliant raw performance measures are therefore critical to the analysis. By merging during an anticipated recovery in securities prices, it is hypothesized that a fund will capture the most favourable YSI and compound annual rates when the fund performance report follows NI 81-102. It furthermore allows a fund to conceptually truncate its below industry average compound rates. Both of these behaviours are investigated in the empirical analysis of this paper.

Conforming to performance and risk measures used by mutual fund rating institutions (e.g. Morningstar and GlobeInvestor), this paper will also describe the pre-merger, post-merger, and full-history funds in a number of performance and risk measures that include fund volatility, variability, Sharpe ratio, Treynor's measure, and excess-return based on Jensen regression, in addition to raw return measure. (See Table 2 for details).

Fund specific raw-return data used in this study were collected from different sources depending on availability. Monthly percentage returns of non-survivor funds were calculated from the NAV reported in archived issues of the Globe and Mail between the fund's inception and the

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[4] Note that WANAV on any particular date is not equivalent to what NAV would be if the two funds merged. This is because of the nature of a merger. To maintain the per unit price of the continuing fund, units of the non-survivor are not exchanged with units of the survivor on a 1:1 basis. They are rather converted at an appropriate ratio as to maintain the per-unit price of the continuing fund. WANAV is only calculated to capture the monthly percentage change in the aggregate value of mutual funds' holdings.

[5] Further details of the proposed technique and mathematical proofs are available from the authors.

date of its merger. Monthly returns for surviving funds were taken from the Gold Investor archives of GlobeFund.com.

Section 3: Empirical Analysis

3.1 Pre- and post- merger performance

Before addressing the effects of weighted averaging technique on pre-merger fund performance, it is necessary to note the differences in performance and in risk between pre- and post- merger periods. As shown in Table 2 [6], after a merger, mutual funds report in accordance with NI 81-102 higher performance and lower risk than their original component funds aggregated. Without exception, reported post-merger raw performance for each fund is higher than that for the pre-merger period. The differences can be staggering, particularly with regard to yield since inception (YSI). Even more importantly, there was a major discrepancy between the pre- and post-merger average annual compound rate of return, which must be reported in the prospectuses of mutual funds. As noted above, Carhart et al. (2002) suggests that the competitive nature of mutual fund market drives fund management companies to employ sometimes questionable practices so as to report favourable returns. The metrics below indicate that mutual fund companies may be able to use mergers as one technique to prevent unfavourable historical annual compound returns from being published after merger.

The average for every other performance metric, furthermore, is higher for the post-merger funds when their histories are truncated than for any of their components. In addition, the average risk related metrics are lower for each post-merger fund than for their pre-merger components.

Table 2: Pre- and post-merger metrics

	Pre-Merger	***Post-Merger***
YSI(raw)	-66.99%	11.98%
i(inception)	-34.78%	6.09%
α(J)	-0.98%	-0.82%
Sh	-0.4339	0.0790
Tr	-1.3030	0.4298
β(J)	2.0462	1.4649
σ	11.61%	6.36%

Where

- YSI(raw) = yield since inception;
- i(inception) = annual compound return since inception;

[6] Index data and risk-free rates from the U.S. markets are used in producing the results in the tables in this section because the majority of the money in these specialty mutual funds was invested in the U.S. markets.

- $\alpha(J)$ = excess return based on Jensen (1968) regressions (using monthly performance data as fund return, a value-weighted index of all NSYE, AMEX, and NASDSQ stocks as a market proxy, and one-month US treasury bill rates as the risk-free rate);
- Sh = Sharpe Ratio (1966) (average fund return is entered as an arithmetic mean of monthly performance data taken between the beginning and end of the period, the average risk free rate is calculated as the arithmetic mean of monthly one-month US Treasury bill rates, and variability is σ, defined below);
- Tr = Treynor's Measure (1965) (based on arithmetic mean performance, the arithmetic mean one-month US treasury bill rate, and $\beta(J)$, below);
- $\beta(J)$ = volatility (beta coefficient from Jensen regressions, above);
- σ = variability (standard deviation calculated based on monthly fund returns between the beginning and end of the investigation period).
- The four merger families listed in Table 1 are used in producing the results in this table. For the pre-merger metrics, the investigation period runs from the first day that the fund reported NAV until the day prior to the merger; for the post-merger metrics, the period runs from the first day that the merged fund reported NAV until December 2005.

3.2 Reconstructed histories

After the full and truncated metrics of the eCommerce merger families (using the reconstruction technique outlined in the methodology section) had been averaged, it was found that, in general, performance per unit of variability (Sharpe Ratio), performance per unit of volatility (Treynor's Measure), excess return (Jensen's α), yield-since-inception, and compound annual return since inception all appear higher for the post-merger funds (as shown in Table 3). In addition, volatility and variability are both reported at reduced levels when pre-merger performance was abridged.

Table 3: Full and truncated history metrics

	Full-History	***Post-Merger***
YSI(raw)	-58.16%	11.98%
i(inception)	-16.90%	6.09%
α(J)	-1.24%	-0.82%
Sh	-0.0918	0.0790
Tr	-0.5405	0.4298
β(J)	1.9909	1.4649
σ	11.81%	6.36%

Mutual fund companies always try to make the historical performance of their portfolios seem favourable (ostensibly to make ill-informed investors think that their funds are 'hot'). Unsophisticated investors often form opinions of mutual funds and compare competing funds on the basis of the numbers reported in the materials published by fund companies. Table 4 compares the surviving funds' full-period compound returns to the Altamira eBusiness fund (Alt. eBusi), the only specialty eCommerce fund that did not undergo a merger during our sample period. This is included to show the importance of levelling the playing field. Whereas Alt. eBusi performed comparably to, or better than, most of its competition – when their full histories are taken into account – in June 2006 it was reporting lower compound rates since inception as compared to the published materials of the three post-merger funds that still existed at that time. While the latter three each reported their inception dates *before* the tech market collapsed in late 2000, they each started reporting performance data *after*.

Table 4: Full-History annual compound rates juxtaposed to Alt. eBusi

	RGTSF	MUETCC	IGGSTF	SSFTF	Alt. eBusi**
1 –year	4.64%	-2.91%	-7.50%	*	-7.73%
3-year	3.30%	6.44%	2.01%	*	-3.30%
5-year	-19.53%	-18.53%	-16.55%	*	-14.58%
since inception	-24.50%	-23.46%	-2.49%	-17.15%	-6.55%

† RGTSF - Royal Global Technology Sector Fund; MUETCC - Mackenzie Universal Emerging Technologies Capital Class; IGGSTF - Investors Group Global Science and Technology Fund; SSFTF - Sentry Select Focused Technologies Fund.
* This fund was terminated in May 2004.
** As reported on June 30th, 2006, from GlobeInvestor. Care must be exercised when comparing these numbers to the other columns, as they are offset by six months.

In addition to having notably poor performance past the three-year mark, each of the above funds reports a negative annual compound return since inception. On average, the eCommerce funds in the sample returned -16.9% per year between when they were formed and the end of December 2005, compounded annually. When the pre-merger performance of these funds is truncated, however, they form an average annual return of 6.09% (see Table 3), compounded annually between inception and the end of December 2005. It is apparent that the fund mergers in the sample took place around the time of a rebound in securities prices.

All of this being said, however, it is possible to argue that the post-merger funds are *more* than simple combinations of their components and that consequently it does not make sense to pool pre-merger data with post-merger data. To address this concern, it was necessary to determine whether there was a structural break in the time series data assembled for the full histories of any of the fund families. This was done by using a Chow test for structural breaks that studies the statistical significance of the differences between the parameters in the regression lines generated from the pre- and post- merger periods. In cases where the differences were found to be significant at 5% level, a shift could be gleaned in the fund family's characteristics – i.e. it could be said that the fund underwent a fundamental change at the date of the merger. For three of the merger families encompassing 12 of the 14 funds addressed in this paper, there was no evidence of a structural break; the hypothesis that the coefficients were equal could not be rejected. For the RBC merger, however, there seems to be a notable difference in how the fund performed after the merger date, as compared to the monthly change in WANAV before the merger date.

Section 4: Conclusion

In the May 2002 merger documents of the continuing fund Mackenzie Universal Emerging Technologies Capital Class, the preparing lawyer explicitly stated that "in accordance with regulatory requirements, no performance information is shown for the Fund, as any past performance information prior to the date of the acquisition of these assets would be misleading" (Behrman, 2001). While the lawyer was correct that including the past performance of *just* the continuing fund (the survivor) would be misleading, the omission of any sort of indication of pre-merger performance is equally detrimental to investors.

As shown in this paper, monthly (or daily or even yearly) returns of a combination of component funds before a merger can be calculated using a weighted average net asset value based on the number of units outstanding. Using this technique, the eCommerce mutual funds in the sample appear considerably different when their pre-merger histories are taken into account, both in terms of prospectus reporting and in the financial metrics compiled by investment institutions.

Even if mutual fund companies are not engaging in merger activities solely for the purpose of covering up unfavourable statistics, it is possible to use a merger as a vehicle to achieve more favourable prospectuses. Without exception, the eCommerce mergers sampled in this paper reported higher compound returns after their histories were truncated. It is asserted here that National Instrument 81-102 should be amended so as to require fund companies to include past performance data in their prospectuses and sales materials. It is suggested that this data should be provided separately for each component fund, or, if there is no structural break in the time series data, for the full-history of the combination fund. While this latter option is not consonant with the current wording of NI 81-102 (see s. 15.9(2)(d)), the Canadian Securities Administrators may be advised to consider an amendment of this provision. The marginal cost of such a change would be relatively small, but it would have the salutary effect of providing fuller disclosure to investors.

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