MSCI

Submitted through the ESMA website

12 September 2011

Re: ESMA's draft technical advice to the European Commission on possible implementing measures of the Alternative Investment Fund Manager's Directive

Dear Sirs,

We are pleased to offer these comments on the recent draft technical advice. We commend the work that ESMA has conducted in preparing such a thorough and broad reaching document, and thank ESMA for the opportunity provided to stakeholders to comment on the proposed advice.

MSCI is an active participant in the financial marketplace as a vendor of risk management and equity analytics (under the RiskMetrics and Barra brands), corporate governance services (under the ISS brand) and equity index data. Many of the world's largest banks, exchanges, hedge funds and asset managers utilize our technology and services to support their investment decision making and risk management processes. We are a leading independent provider of risk management analytics and data to large hedge fund managers, and as such are intimately familiar with the exposure, risk and counterparty measures at issue in this technical advice. Through our Hedge Platform service, coupled with our recent acquisition of Measurisk, we are the leading provider of hedge fund transparency services, and now provide position-based risk information to investors that invest in over 1500 hedge funds globally. In delivering this service, we have played an important intermediary role in establishing a form of risk transparency that is useful to investors but that also satisfies fund manager concerns on confidentiality. The service has also given us a unique perspective on the operational challenges of producing the types of disclosure that are discussed in this technical advice. As background, and as some indication of the state of best practices in risk transparency, we include as annexes to this document a sample of a typical report that a hedge fund using our services would provide to a hypothetical hedge fund investor, as well as a report on the aggregate risks in a sample of the universe of funds that we cover.

Our comments include some general observations about the use of leverage as a risk monitoring mechanism, which are most relevant to Section VI (Possible Implementing Measures on Methods for Calculating the Leverage of an AIF and the methods for Calculating the Exposure of an AIF), followed by specific responses to the questions posed in Section VIII.II (Possible Implementing Measures on Disclosure to Investors) and Section VIII.III (Possible Implementing Measures on Reporting to Competent Authorities).

Leverage

At the broadest level, we wish to express our concerns over what we see as an overreliance of the proposed guidance on leverage as a single risk metric. The events of 2008 reinforced the notion that it is incomplete to utilize a single number to characterize, forecast and manage risk. Value-at-Risk (VaR) and other statistical risk measures bore a large share of criticism, not only for the strawman assertion that

everyone used them blindly, but because they were used at the expense of simpler, common sense metrics. Leverage is one of the oft cited common sense metrics whose use it is now fashionable to promote at the expense of other, more complicated and less intuitive measures. But in creating a supervisory structure so heavily dependent on leverage as the arbiter of risk, ESMA is in danger of falling victim to the same narrow view of risk on which many of our recent ills are blamed. Just like VaR, leverage employs simplifying assumptions; just like VaR, leverage is an incomplete characterization of risks; and just like VaR, leverage needs complementary information, especially in order to justify the sort of interventions or supervisory limits that are envisioned in Section VII.

Certainly, there are benefits to using a leverage measure. First among these is that leverage is commonly understood and intuitive; supervisors, investors and managers alike have a feel for the measure, at least when applied to specific cases, and as such there is at least some institutional instinct as to what levels of leverage are too large.

Second is that leverage, given the definitions proposed, is relatively straightforward to compute, relying on not much more information than gross and net exposures to coarse categories of trades. A corollary of this benefit is that leverage does not entail a particularly high level of position disclosure, and as such is not likely to be met with strong objections on the grounds that it is too revealing of proprietary trading strategies. Moreover, leverage requires few technical assumptions, and nothing at the level of probability distributions.

Third, leverage is not just a measure of risk, but also a measure of connectedness. A manager with sufficient capital can make large, unlevered bets, but any losses that arise from these bets are confined to the manager's investors. A manager with less capital but using leverage to make the same bets creates a risk profile from which losses can impact not only the manager's investors but also his creditors, thereby potentially enabling losses to propagate through the financial system. As a proxy for the use of financing, then, leverage is a key metric for supervisors in particular to monitor.

But leverage suffers from a number of drawbacks as well, not severe enough to warrant discarding it, but critical enough to demand complementary information. If nothing else, the market at large should be well aware of the shortcomings of the leverage measure, so as not to be drawn into a false sense of security that if leverage is controlled, then so too are risks.

First, leverage is insensitive to size. By construction, leverage is a ratio of a measure of exposure to a measure of capital. This means that a fund can double its capital, double its financing and double its risk positions without impacting its leverage ratio. And yet surely, the double-sized fund represents a different set of risks to investors and the system alike. Size is a crucial input to the assessment of a fund's contribution to systemic risk, so information about fund size must somehow complement the leverage measure.

Second, leverage is not sensitive to risks, either across securities or across time. The same amount invested in a small capitalization or large company stock, in a speculative grade or credit risk-free fixed income security contributes in the same way to both an exposure and a leverage measure; yet certainly different securities pose different likelihoods of losses, and leverage employed to invest in riskier securities is more of a concern than leverage employed to invest in safer ones.

Moreover, the risks of short-term losses change through time, both in absolute and in relative terms across securities. Leveraged positions today may pose greater short-term concerns than the same positions have historically.

Third, leverage is insensitive to concentration. A diversified portfolio of stocks contributes the same exposure as a single stock position of equal size. A simple rebuttal to this is that the measure is conservative in not allowing for any benefit for such an illusory notion as diversification. But what is gained in conservatism is lost in discrimination; the measure fails to be discriminating, and as such fails to implicate heavily concentrated portfolios.

More generally, leverage relies on arbitrary correlation assumptions. In its Point 10 on Page 192 of the Advice, ESMA indicates that it decided against using a VaR approach to calculate global exposure because VaR "utilizes correlations". It is important to bear in mind that the leverage approach described also utilizes correlations, albeit implicitly. The clearest incidence of this is in the point above: by ascribing the same exposure to a portfolio of a given size, regardless of the number of positions the portfolio contains, the exposure measure is implicitly assuming a correlation of one. Again, while this is attractive for being conservative, it is lacking in its ability to identify concentration risks.

A more subtle version of the correlation assumptions lies in the decisions on which positions qualify for treatment as either hedging or netting arrangements. As the application of these arrangements involves a binary decision as to whether security level exposures may offset each other or not, these can be seen as decisions as to whether the correlation of the securities in question is either +1 or -1. One of the examples of a (possibly) compliant hedging strategy is an investment in a long-dated bond, combined with an interest rate swap. While it is true that the general interest rate (or duration) risk may be fully hedged in such a combination, there could be a small or significant amount of residual risk owing to (among other things) the credit spread mismatch between the bond and the swap. The true risk is therefore somewhere between a fully hedged or completely unhedged trade, and yet the exposure framework allows only the treatment of the swap as a full offset of exposure or as no offset at all.

Another implicit correlation assumption is indicated in the explanatory text, Point 28 on Page 201. In this point, ESMA indicates that in order for positions to qualify for hedging treatment, they should not "aim to generate a return". To take the example above to an absurd conclusion, consider two hypothetical managers taking the same bond-swap position; one manager operates a credit arbitrage strategy and puts on the position with the explicit aim to bet on the bond's credit spread, while the second manager operates a global interest rate strategy, and puts on the swap as a macro hedge on interest rate moves. The two managers have the same positions, but different aims. The credit arbitrage manager, because of his explicit aim to generate a return, is not permitted to apply a hedging relationship, and consequently is assessed higher leverage. Meanwhile, because of his aim to globally hedge interest rates, the global macro manager is assessed lower leverage. We would argue that it is actually in the global macro fund in this example, where the residual risk is less likely to be scrutinized, that supervisors should be more concerned with the position. Intent, then, is another input to the assumptions on correlation.

We do acknowledge that for purposes of consistency, anything other than binary decisions on netting arrangements is impractical, but we are concerned that the advice on the Advanced Method would suggest that even this approach would

require a binary decision, rather than allowing for the subtleties of a partial hedge. We warn again not to fall back on simplistic advice on conservatism; the goal of the advice should not simply be to make all exposure measurements high, but to adequately distinguish the riskiest funds.

As a complement to the prescriptive but simple leverage metrics, we strongly recommend that ESMA consider other metrics that address some of these shortcomings. One possibility is stress tests. Designed appropriately (meaning that they cover all of the relevant sources of risk for a particular strategy), stress tests can address many of the shortcomings of the leverage measure: riskiness across assets or securities can be treated through different stress factors or betas, and residual risk issues (such as the partial bond-swap hedge discussed earlier) can be treated by offsetting some but not all sources of risk.

We also point out that VaR can address all of the shortcomings discussed above, as it is sensitive to size, security riskiness, concentrations and can accommodate partial offsets of positions. As such, we recommend that ESMA reconsider the use of VaR as a complementary measure, but also recommend that in so doing, ESMA bear in mind two important caveats. The first is that there is often a gap between what VaR can do and what it does. Most often, historical failures of VaR measures to illuminate risks have derived from the failure of a VaR implementation to cover all relevant risk types. A VaR model with a single source of interest rate risk may be sufficient for a long-only government bond portfolio, but not for a credit arbitrage fund. Any use of VaR should come with demonstrations that the model covers all of the risks that a manager is utilizing to generate returns.

The second caveat is that VaR, as ESMA has pointed out, utilizes correlations. We assert that any portfolio measure utilizes correlations, at least implicitly, and that the appropriate response is not to discard all of these measures, but rather to make the correlation assumptions explicit, and to use a variety of different assumptions to reveal different risks. We have observed that many hedge fund managers now monitor at least two VaR measures. The first measure is calibrated on a long historical period, and is intended to be stable and to characterize average market conditions. The second measure is calibrated to more recent data, and is designed to illuminate changes in actual market volatility. Increasingly, a third measure is used, calibrated to data over a historical stress period, in order to highlight the impact of yet another set of correlations.

We do not mean to conclude from these remarks that the leverage measure should be abandoned. Far from this, we believe that there is significant value in a consistently defined, simple metric, especially as a means for comparing funds operating similar strategies. We wholeheartedly agree with the recommendation that all funds report leverage based on one or two simple yet prescriptive definitions. On the other hand, we strongly recommend that supervisors examine a broader set of risk measures as a complement to leverage. Overall, our recommendation is a bit of a barbell approach: be prescriptive and consistent with the Gross and Commitment methods, but open up the Advanced method to describe more dimensions of a fund's risk profile. This is crucial if supervisors, as suggested by Section VII, foresee at times utilizing the leverage and risk information as an input to a decision on whether to intervene with a specific fund.

Investor disclosure (Section VIII.II)

The advice provided in this section largely relates to the policies of the funds, rather than its actions or its current positions. An exception to this is the advice on risk disclosure. We provide comments on risk disclosure and risk systems, in response to Questions 67 and 68.

Question 67 asks which of the two options given for risk profile disclosure we support. The first option emphasizes exposure disclosure and a discussion of limits, while the second option advises the identification of risks, the use of exposure measures and the disclosure of stress tests or other relevant risk metrics. As discussed previously, we believe that exposure and leverage are in most cases incomplete measures of risk, and require complementary information to produce meaningful risk disclosure. A breakdown of exposure to broad asset categories is useful only if the netting used within categories is non-controversial, and if the categories themselves represent homogeneous risks. This not being the typical case, we feel that it is important to disclose a slightly richer set of risk information.

We do acknowledge that fund managers are reluctant to disclose information at too granular a level, out of concern of revealing too much about their own trading strategies. This concern often leads to very generic risk disclosure, at the level of exposure to broad asset classes. With a set of well defined stress tests, however, the manager can disclose useful information about how the portfolio would respond to plausible market events, without revealing the specifics of the portfolio itself. It is necessary to work with position-level information to produce the results of such stress tests, but it is not necessary to disclose the positions themselves.

The advice places a heavy emphasis on risk limits, and urges managers to describe the circumstances that accompany any breach of these limits. While such a description would be useful, our concern with the emphasis on limits is that hard limits will only infrequently be breached, and therefore this advice would lead to relatively little material disclosure. As a best practice, we recommend a discussion of changes in the risk profile, even short of any risk limits. As a minimum standard, the recommendation that a description accompany risk limit breaches strikes us as reasonable.

One missing element to the risk disclosure advice is liquidity. While the advice does include explicit items on liquidity, these focus primarily on the fund's policies related to special arrangements, and any changes that might have applied to these. The advice in IV.V, in particular Box 33, recommends that fund managers conduct stress tests to ascertain whether the liquidity of the assets in the portfolio is sufficient to cover the range of possible cash needs, from collateral and margin calls to abnormal redemption requests. Particularly following the important role of liquidity in the crisis of 2008, we see that fund investors are increasingly calling for disclosure of asset liquidity. There are few standards for this disclosure as of yet, but we do feel that this is a trend that will continue. It is premature to include asset liquidity disclosure in a set of minimum standards, but it is appropriate to include this in any statement of emerging best practices. We attach with our comments a recent research paper detailing some of our efforts to describe asset liquidity risks.

Question 68 asks our opinion on the advice related to disclosure of risk management systems. We feel that disclosure of risk systems themselves (Item 4 of Box 107) is less useful to investors than disclosure of risk management procedures (Item 5). A good risk system can be poorly implemented or go unused, while a

simple risk system used appropriately with its limitations understood can be an input to a solid risk practice. More relevant than system labels are descriptions of the procedures the fund has in place to ensure that all relevant risks are monitored and how the risk information gets utilized in the context of fund management.

Supervisory disclosure

At a high level, the motivation for the advice related to disclosure to competent authorities is similar to the advice published earlier this year in the US. Fund managers should disclose relevant risk and liquidity metrics in order to enable supervisors to assess possible contributions to systemic risks. While ESMA proposed advice and disclosure forms (Annex V) do differ from the proposals in the US, they are similar enough that we feel it is justified to reiterate some of our comments made to the US authorities. In particular, we wish to reiterate three main points.

First, an assessment of hedge fund risks as a whole, or an assessment of an individual hedge fund's contribution to systemic risks, requires an aggregation and comparison of risk measures. This places a heavy emphasis on standardization of metrics. The advice related to leverage measures is an important contribution to this standardization, but other areas, in particular liquidity, are still in need of standard measures. Moreover, VaR, while having a standard definition, differs widely in implementation, and so aggregation of self-reported VaR estimates should be done with care.

Second, there is a need to balance the desire for relevant data with the reporting burden placed on the individual funds. In order to limit the degree of unnecessary reporting, it would be helpful for ESMA to provide a vision for how this data will be used on an aggregate basis, and to link each reporting requirement to this vision.

Third, the requested information on counterparties is very similar in this advice and in the Form PF in the US. As we commented on Form PF, we are concerned that simply looking at current exposure metrics does not tell the whole story of counterparty risk. A reasonable complement to this information would be an estimate of how these counterparty exposures would change under a small number of pre-specified market shocks.

We provide a more detailed discussion of these points in our comments on the proposed Form PF. A copy of those comments are included with our submission.

Question 69 asks our opinion of the proposed frequency of disclosure. We believe the proposed frequency is prudent at this stage considering the data collation demands that fund managers will be asked to meet. As more of the collation processes become automated, one would expect fund managers to produce such data on a more frequent basis if demanded. MSCI has found that investors in alternative investments demand monthly risk disclosures at a minimum, and frequently "on-demand" risk disclosures during periods of significant market volatility.

Question 70 asks for an analysis of the costs we might expect for a fund to comply with the proposed disclosure, both initially and on an ongoing basis. It is the data collection exercise for Sections 1 and 3 that will drive the majority of the costs, and impact the completion date for the reporting template. The data that is required will exist in a mixture of accounting, legal, trading, and risk systems, databases and

documentation. The frequency of reporting (quarterly is being proposed, though MSCI finds that hedge fund investors demand more frequent reporting of risks) demands some kind of automated approach to manage and present the data.

We expect that fund managers will take undertake three key steps (amongst others) to develop an automated process to generate the desired report: data analysis and conformance, interface development, Quality Assurance (QA) and Testing. As reporting Value at Risk (VaR) is optional, it may not be accounted for in the conformance stage. Other factors that fund managers will have to factor into their costs include the acquisition of software, database and reporting tools, as well as the maintenance/upkeep of the data collection process.

Depending upon the complexity of the strategies being run by the fund manager, costs of collating and reporting the data may vary. Multi-strategy houses should expect the costs to increase in the order of 50-75% due to number of systems that may be involved. Conversely, long-short equity houses may find that the costs decrease by the order of 25-50%.

Fund managers may also be able to take services from their fund administrator, as part of a suite of services offered to them, which may incur an increase in their fee schedule in terms of basis points of NAV. However, fund administrators may not have direct access to certain information, e.g. controlling information, liquidity profiles, VaR where used, and exposure calculations, making the use of their services inefficient.

Question 71 asks our opinion on the proposed reporting deadline, with information to be reported to the competent authorities one month after the end of the reporting period. We believe the proposed reporting deadline is prudent at this stage considering the data verification demands that fund managers will be asked to meet at the outset. As more of the collation processes become automated, one would expect fund managers to produce such data closer to the end of the reporting period.

In closing, we reiterate that we fully support the efforts of ESMA to establish a standard in risk management and disclosure, and commend ESMA for their diligence in providing this advice. We appreciate the opportunity to comment, and look forward to continuing to contribute to the dialogue. We are available for further comment or clarification, should that be necessary.

Sincerely,

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For further information, please visit our web site at www.msci.com

ATTACHMENT - MSCI's comments on the proposed Form PF.

MSCI

April 11, 2011
Via email to: Rule-comments@sec.gov
Mr. David A. Stawick
Secretary
Commodity Futures Trading Commission
Three Lafayette Centre
1155 21st Street, NW
Washington, DC 20581.

Re: 76 FR 8068 Commodity Futures Trading Commission 17 CFR Part 4 Securities and Exchange Commission 17 CFR Parts 275 and 279 Reporting by Investment Advisers to Private Funds and Certain Commodity Pool Operators and Commodity Trading Advisors on Form PF

Dear Mr. Stawick,

We are pleased to offer these comments to the Commodity Futures Trading Commission (CFTC) and the Securities Exchange Commission (SEC) regarding the recent publication of *"Reporting by Investment Advisers to Private Funds and Certain Commodity Pool Operators and Commodity Trading Advisors on Form PF"*.

We commend the work that the SEC and CFTC have begun with the Financial Stability Oversight Council (FSOC) and its continuing work in the time ahead. We thank the CFTC and SEC for the opportunity provided to the public to offer their viewpoints on the important legislation and proposed rules coming down the pipeline.

MSCI is a firm that is an active participant in the financial marketplace as a vendor of risk management and equity analytics (under the RiskMetrics and Barra brands), corporate governance services (under the ISS brand) and equity index data. Some of the world's largest banks, exchanges, hedge funds and asset managers utilize our technology and services to support their investment decision making and risk management. We are the leading independent provider of risk management analytics and data to large hedge fund managers, and as such are intimately familiar with the exposure, risk and counterparty measures that form much of the proposed Form PF. Moreover, through our legacy Hedge Platform service, coupled with our recent acquisition of Measurisk, we are the leading provider of hedge fund transparency services, and now provide position-based risk information to investors that invest in over 1500 hedge funds globally. In delivering this service, we have had to address the same issues of data consistency across funds that now face the FSOC in this exercise at an even larger scale. As background, and as some indication of the state of best practices in risk transparency, we include as annexes to this document a sample of our reporting to a hypothetical hedge fund investor, as well as a report on the aggregate risks in a sample of the universe of funds that we cover.

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We begin with a summary list of our comments and recommendations. We follow with a set of general observations, in part to establish some broad criteria by which the contents of the proposed form should be evaluated. We then proceed to a number of comments on specific portions of the proposed form.

Executive summary

- **Standardized information**. To derive the most value from the Form PF reporting exercise, the agencies should focus on information that can best aid the mandate to assess systemic risk. Crucial to this is the standardization of information, to enable comparison and aggregation of fund- or adviser-level statistics, whether we are analyzing VaR, stress tests, liquidity or even exposures.
- **Focus on connectivity**. Of the two main facets of systemic risk, we feel that Form PF is best suited to assess systemic risks due to connectivity and contagion. We see less potential benefit from this exercise to track the formation of asset class bubbles.
- **Best practices, limited burden**. To the extent possible, the form should cover information that a large private fund adviser following best market practices would produce in the course of its risk management or other internal functions. The reporting exercise should not create an unacceptable burden on the responding institutions.
- **Counterparty connections**. The proposed questions on counterparty exposure provide a valuable, though incomplete view into the map of overall systemic connections. Our recommendation is to extend these questions to cover exposures under small set of hypothetical scenarios, in order to probe the effect of contingent exposures on the system.
- **VaR consistency**. Value-at-Risk, while valuable for fund risk management and for investor reporting, is computed differently in most implementations. We emphasize that standardization of this statistic calculation using consistent market data and model parameters across responding firms will be a necessary criteria for meaningful aggregation of this portfolio statistic. We are of a similar opinion regarding duration statistics. We do feel it is important to track changes in risks in the marketplace, and recommend that the FSOC monitor the risk of key indicators, as well as well known hedge fund strategies.
- **Asset liquidity**. We support the effort to collect asset liquidity information, and aggregate this across funds. We are concerned, however, that this information is usually the product of a subjective analysis, and that there are few benchmarks for measuring asset liquidity. We encourage the FSOC to help the industry push toward standards in this area.

- **Use for stress tests**. The proposed stress tests on Form PF cover broad asset classes, and as such can disclose only the exposure of funds to broad directional moves. While it is possible that these directional exposures could cause sudden, systemic hedge fund losses, we feel that other, strategy-specific events are more likely to provoke distress. Regarding the proposed stress tests, we do feel that these types of scenarios do have the potential to illuminate contingencies in counterparty exposures, and recommend that scenarios be included in that part of the reporting process.

General comments

The Securities and Exchange Commission and Commodity Futures Trading Commission (hereafter "the agencies") have stated that the aim of Form PF is to aid in the fulfillment of their mandate to provide the Financial Stability Oversight Council (FSOC) with information to assess systemic risk. This should be the guiding principle for every item on the form. In particular, while we will suggest that some areas should be expanded to include better information on systemic risks, we will also suggest that other items, while appropriate perhaps for an investor in an individual fund, do little to illuminate risks of the system. There is some, but not complete overlap in what would be needed to assess systemic risk and to provide investor protection; we should bear in mind that the aim here is the former, and not the latter.

In order to establish the systemic risk "litmus test" for the proposed form, it is important to expand somewhat on what systemic risk means. In discussions of this topic, we have seen systemic risk split into two distinct, albeit related themes. The first theme is the formation of asset class bubbles. The systemic importance of such bubbles is evident, as they create the conditions under which many investors can simultaneously suffer large losses. In the most serious of cases, those losses can be broad and deep enough so as to disrupt the normal functioning of the financial system. An example of asset bubbles under this definition includes the substantial investor holdings in US start-up technology stocks beginning in the late 1990's and the subsequent dot-com bust in 2000-2001. Another more recent asset bubble is the high activity in mortgages in the 2000's, specifically highly-rated subprime residential mortgages that contributed to the financial crisis in 2008.

The second systemic risk theme is connectivity. Under this theme, risks to the system come from the prospect of a failure of a single institution that is connected enough – through financing, derivatives transactions, and the like – to provoke failures or at least distress at other institutions, which in turn provoke a general systemic contagion and breakdown. Assessing these connectivity risks themselves involve two aspects: the likelihood that a given institution might fail on its own (and be the catalyst for systemic contagion); and the degree of connectivity of an institution, indicating the severity to the system of the institution's prospective failure.

Reflecting on these two themes, we feel that Form PF reporting is appropriate for assessing risks of the second type, but not necessarily of the first. Large private fund advisers are by no means the only candidates to be catalysts for systemic contagion, but they do potentially pose these risks, and the questions proposed in Form PF are a step toward illuminating these. Moreover, in investigating the connectivity of these advisers, the FSOC may well identify other institutions that are not subject to the Form PF reporting, but nonetheless present connectivity risks. Thus, while it is important to also investigate the connectivity of other financial institutions within the system, it is worthwhile and appropriate to ask these questions on a standalone basis for private fund advisers.

On the other hand, the critical aspect of asset class bubbles is breadth, and so ascertaining the positioning of only a portion of the financial system with respect to a given asset class is inadequate to address the formation of a possible bubble. While we are admittedly skeptical about the identification of bubbles generally, we acknowledge the importance of this issue to the FSOC, and are supportive of efforts to address it. We feel strongly, however, that this systemic risk theme must necessarily be part of an assessment of a broader set of financial market participants, and as such should not be part of the aims of Form PF.

Though the primary aim of the Form PF relates to systemic risk, the agencies should be cognizant that any requests for reporting have effects on the responding institutions. As a positive, some of the information requested in Form PF is consistent with desirable risk management practices at private fund advisers. As such, this information will either be something the adviser produces already, or arguably should. We feel that Form PF for the most part achieves this objective, requesting information that is part of, or should be part of, the existing risk management processes at the responding institutions.

As a negative, reporting has a cost, even if it is a matter of simply consolidating existing results produced by different systems. Though clearly the agencies are in a position to formulate Form PF to their needs, they should refrain from making the process so burdensome that it provokes more efforts to avoid reporting than it does to improve risk management practices. The reporting process, however burdensome, should be clearly linked to the stated goals, as discussed above. Moreover, as we will detail below, we feel that there is a clear need for the agencies to be able to alter the form or make ad hoc reporting requests. Consequently, we would encourage the agencies to limit the burden of the baseline Form PF to the extent possible.

Our final general comment concerns two structural limitations of the reporting process. The first is frequency. As proposed, reporting will be either quarterly or annually, with the information in a given report being no more frequent than monthly. Linked to our comments regarding reporting burden, it is inappropriate to require reporting that is any more frequent. With monthly or quarterly data it may be possible to gauge the level of systemic risk at a given time, and to track broad trends in this risk. On

the other hand, the agencies should be cautious about inferring more from these trends. In particular, it may be challenging with data on a monthly frequency, to gather adequate information to discover statistical relationships that will persist into the future.

The second limitation regards the comparability of data across funds. In many cases, the information required by Form PF is unambiguous, and aggregation of fund-level information to a systemic risk analysis is possible. In other cases, the information requested is either subjective or has no industry standard definition, making aggregation difficult, or at worst meaningless. When considering the information requested in Form PF, we should ask in all cases whether aggregation is meaningful, and if not, whether the agencies or the FSOC might be in a position to promote benchmark measurement standards.

With these comments as background, we now offer some specific observations.

Strategy identification

In Section 1C, the responding adviser is requested to identify the strategies of its funds. A self-identification such as this is a subjective exercise, and difficult to verify. It is important not to ascribe too much importance to trends in the distribution of funds across strategies, as we should expect that the identification will vary across respondents. With that bit of caution, it is fair to say that a coarse distribution of funds by strategy can be a useful initial filter for systemic risk concerns. For one, a buildup of assets in one or a set of related strategies should cause the FSOC to question the market's capacity to support such a strategy, and to investigate further whether many assets in a low capacity strategy may have created conditions where crowded trades could be unwound quickly, with a systemic impact. In addition, an identification of strategies could lead in the future to a more tailored set of questions – for example, exposure to specific market shocks. In short, the strategy identification is useful as a coarse categorization, but is far from a scientific determination.

Given that the strategy identification is at best coarse, it is important not to create an unnecessary burden in this part of the Form. Though there is not a single market standard for the hierarchy and description of hedge fund strategies, there are a small number of large data providers who utilize similar nomenclatures. As many hedge funds report into these services already, it would be helpful to adopt a hierarchy that is similar or identical to one of these. There is little to be gained from creating yet another strategy identification system, and burdening the respondents with mapping their assets to this.

As an addition to the strategy identification, the Form requests the percentage of funds that are traded under algorithmic strategies. While we acknowledge that some algorithmic trading does have some potential to pose systemic risk, we feel that simply tracking how much algorithmic trading activity exists is too coarse a measure to be useful for monitoring systemic risk. More relevant than simply whether a trading activity is driven by an algorithm or not is the frequency of trading and turnover, and the degree to which traders can exercise discretion or intervene in the trading process. Rather than

asking about algorithmic trading, then, we feel the agencies could address the same issue through their questions on trading frequency and turnover.

Counterparty exposure

From a systemic risk perspective, this is the most relevant information on the form, as it goes to the heart of the issue of connectivity. Questions 19 and 20 in Section 1c of the Form require the identification of the five trading counterparties to which a respondent is most exposed, as well as the five trading counterparties that are most exposed to the respondent. This information could enable the FSOC to construct an approximate map of the counterparty interactions in the market, and to identify parties that appear "too connected to fail". There are a number of cautionary points here, however.

First, the map that the FSOC would construct based on the responses to Form PF would be necessarily incomplete. While the Form will reveal connections between hedge funds and broker-dealers and between distinct hedge funds (if that counterparty activity is large enough), it will not reveal, for instance, the extent of the connectivity between distinct broker-dealers. While the reporting may inform on the potential for one bank's distress to propagate to another bank through their hedge fund counterparties, it cannot uncover the direct exposures across banks. Without information on this crucial dynamic, the map here is only a beginning. We acknowledge that the investigation of inter-bank exposures is outside the scope of this particular reporting exercise, but nonetheless suggest that it be part of the FSOC's overall mandate.

As to whether five is an adequate number of counterparties to report in this section, our feeling is that it is. We expect that the most likely outcome of the "five" exercise is that the largest counterparties are in fact the largest broker-dealers and prime brokers. Increasing the number of counterparties to be identified in the standard questionnaire is unlikely to change this. That said, it is reasonable to expect that should a specific institution be identified at some point as overly connected, or in distress, the agencies would reserve the right to ask for exposure information specific to this institution on an ad hoc basis.

A second note of caution is that the map that the counterparty exposures reveal is only a map of exposures at a single point in time. Of course, many of the exposures in question will be derivatives, and as such will change as the underlying market changes. The agencies seem to acknowledge this, and state that observing the counterparty information through time will allow them to "track how different strategies are …correlated with different market stresses". We disagree with this assertion. With at best monthly figures, aggregated by counterparty, the observed changes in counterparty exposures will be driven as much by discretionary changes in positions as by moves in the market. We believe it is highly unlikely that the FSOC will be able to ascertain a meaningful statistical relationship between these exposure changes and market events based on monthly data. .

In order to evaluate the potential changes in counterparty exposure due to market shocks, an alternative would be to rely on Potential Future Exposure (PFE) modeling. Modeling of this type creates a statistical distribution of the possible shocks, in order to estimate the range of potential exposure outcomes. We recommend against this approach because it would necessarily rely on the respondents' own models. While we acknowledge that many funds have implemented PFE models, and that doing so is a good risk management practice, we stress that the salient point here is comparability, in that ultimately the map of exposure interactions is the goal. We feel that a compilation of PFE results stemming from distinct model implementations would not serve the FSOC's purpose.

Our recommendation is that the FSOC define a small number (five, for instance) of market shocks under which the respondents should report their five largest counterparty exposures, in both directions, as in the base case. This will shed light on the relationship between exposure connectivity and market stress, with comparable results across advisers, and without requiring more frequent reporting or heavy statistical modeling. In fact, this proposal is similar to the "10-10-10" proposal of Darrell Duffie.[1]

Collateral and credit support

Beyond the aggregate counterparty exposure at the adviser level, the Form also requires, in Questions 32 and 33 of Section 2b, a breakdown at the fund level of the collateral and credit support related to each of the large trading counterparties. While some of this information is potentially illuminating in the context of systemic risk, we feel that this section is more burdensome than it need be for its purpose.

We do see as useful the requests for the value of collateral posted, in cash and non-cash form, as well as the request for the percentage of margin that may be re-hypothecated. This information, aggregated across funds, can give an indication of the potential overall leverage in the system, which could be a useful indicator to monitor. We do not see, however, the need for this information to be reported at the fund level, as in Section 2, rather than just in aggregate at the adviser level as in Section 1.

On the other hand, the request to break down collateral by initial and variation margin amounts strikes us as needlessly detailed. Especially since these figures represent collateral that has been already posted, it does not strike us as relevant whether it was posted as an initial margin or as a subsequent variation item. We can speculate that perhaps the agencies are trying to address the issue of a possible failure of a margin mechanism, which would be relevant to future variation margin but not to initial amounts. That said, we do not see how information about the current mix of initial and variation margin can reveal the risk of future collateral failures. We recommend that the agencies clarify their objective with this reporting requirement, and consider whether a different set of questions might achieve their goal.

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[1] "Systemic Risk Exposures: A 10-by-10-by-10 Approach," Working Paper, National Bureau of Economic Research, Systemic Risk Measurement Initiative, November, 2010.

Fund exposure and duration, position concentration

In Section 2a at the adviser level, and in Section 2b at the fund level, the Form requires a breakdown of exposures into long and short positions, bucketed according to an asset class hierarchy. We recognize the importance of this type of information, and see that it could feed a variety of possible systemic risk indices. We do, however, have two pieces of constructive feedback on the specific reporting required.

First, the asset class breakdown strikes us as uneven. Listed equity is a single category, with no further breakdown, while there are eleven different categories of asset-backed securities. While we can appreciate the focus on ABS given their place in the last crisis, we do not understand the rationale behind the asset class hierarchy that is proposed.

Second, we believe that the duration measures in the fixed income categories will be less useful than originally planned. Our concern is again comparability: there are many different conventions for duration, particularly in the more highly structured fixed income products. For instance, duration on a mortgage-backed security could mean only the sensitivity to the discount rate, under the assumption that cashflows are static, or it could mean the sensitivity to discounting and to the impact of interest rates on the timing of the cashflows. We find it unlikely that the aggregation of durations across funds will be meaningful, and recommend eliminating this reporting requirement.

Asset liquidity

In Question 28 of Section 2b, the Form calls for a profile of the asset liquidity of the reporting fund. Specifically, the profile is an estimate of the portion of the portfolio that could be liquidated within one day, seven days, 30 days and so on, assuming current market conditions and no heavy discounting. This is increasingly a request of hedge fund investors, particularly for comingled funds, where a given investor can be adversely impacted by a sudden large redemption by another party. For these investors, the aim is to compare the liquidity of the assets with the redemption terms of the investor, as well as the concentration of other investors in the fund.

From a systemic risk perspective, it would be informative to know the overall pressure on the system that could arise from heavy investor redemptions. It strikes us as quite difficult, however, to meaningfully aggregate the fund level liquidity information. One point is that a fund holding illiquid assets is not a problem in itself; risk arises from assets whose liquidity is incompatible with the fund's liabilities.[2] So any aggregation must account for the liquidity of the asset-liability mix at each individual fund.

More importantly, there is again the issue of comparability. Our experience is that many funds estimate liquidity for their assets, in many cases assigning a days-to-liquidate estimate to individual trades. This estimation, however, typically relies on some

[2] For a proposal on quantifying this aspect of liquidity risk, please see Finger and Acerbi (2010), "The Value of Liquidity" (attached in annex) and references therein.

qualitative judgment – including the interpretation of "no heavy discounting" – of people actively transacting in the positions in question. Aggregating this information, even for an individual fund, and especially across distinct strategies, is problematic, as the individual, qualitative estimates would necessarily come from distinct sources. As a consequence, there are some funds that aggregate this information, but most rely on asset liquidity analysis that is largely decentralized. One clear implication is that reporting aggregated liquidity statistics, as in Question 28, will be a burden on funds. Another is that the aggregation within funds, and certainly across funds, will be questionable.

So while we recognize the central place of liquidity in systemic risk analysis, we are concerned that the actual measurement of liquidity lacks the standards or benchmarks that would enable a true systemic analysis. In order to make Question 28, and related analyses, relevant in the future, we encourage the FSOC to support the development of standard measures in this area.

Value-at-Risk

We recognize the usefulness of VaR, and other measures like it, as a short horizon risk indicator for many strategies. For all but the most illiquid strategies, hedge fund managers utilize these statistical risk measures for internal management and for investor reporting. This is a practice that will continue.

However, in the context of the Form PF, we are concerned that the VaR levels reported by different respondents will not be comparable, since most institutions implement statistical risk models in slightly different ways. In fact, even two VaR implementations that coincide across the parameters requested in Form PF (volatility weighting scheme, confidence level, etc.) can vary significantly with choices of time series, return distribution assumptions and other aspects. Given all of these differences, we find it unlikely that any means of aggregating the VaR figures across respondents will produce credible systemic risk indicators. Moreover, the agencies cannot make the same inferences from changes in VaR across different funds, as the different funds' model implementations will make their models more or less sensitive to new market information. Finally, we recall our comments related to reporting frequency, and reiterate that we see little chance to derive any meaningful statistical relationships between changes in the VaR figures for different funds, or between VaR figures and market factors.

As a systemic risk indicator, then, unless the agencies can establish a truly consistent mechanism for VaR analysis across funds, the fund-level VaR reports are unlikely to illuminate anything about fund connectivity, nor about asset class bubbles. Without this consistency, our recommendation is that the agencies eliminate this aspect of the reporting.

This is not to say that market risk monitors are not an important tool for the FSOC. The risk of any fund will change over time for two reasons: positions changing,

or market conditions changing. Between the exposure, leverage, liquidity and stress testing sections of the Form, the agencies have ample information to assess position changes. We would recommend that in addition to these aspects, the agencies develop a set of metrics by which to track changing market risks. Some of these metrics are simple: volatilities of key indices or rates, for instance. Others might be more subtle, such as the risk of simple strategies that mimic known hedge fund practices (carry trades, merger arbitrage, trend following, etc). A good sense for which markets or strategies are entering risky regimes would arm the FSOC with a filter by which to focus on funds or advisers that are most likely to be impacted by these changes.

Stress tests

In Question 36 of Section 2b, the reporting fund is requested to provide the effect of a set of specified market factor shocks on the portfolio. The shocks are granular in size and direction – for each factor, there are separate questions for up and down, and large and small, shocks – but otherwise extremely coarse – the shocks are specified only for broad asset classes such as equity or risk-free interest rates. While the granular questions may help to identify non-linearities in fund positioning, the shocks overall can only identify significant directional bets. More thought may be needed on development of scenarios to capture non-directional investment strategies.

One purpose of the stress test exercise may be to inform on the appearance of asset class bubbles; as we have stated before, we do not feel that this is an appropriate goal for the Form PF reporting. A more relevant goal would be to assess the likelihood of significant, sudden and systemic fund losses. Many hedge fund managers will claim to be minimally exposed to broad directional moves. At best, the proposed stress tests provide a check on this claim. On the other hand, the agencies should recognize that the more likely cause of sudden and somewhat broad losses is an unexpected relative move in securities (as in the so-called Quant Crisis of 2007). In arbitrage strategies, the scenarios that are most likely to cause large losses are relative value shocks – to the bond-CDS basis, or the spread between out-of-the-money and at-the-money options, or to the relative liquidity of convertible bonds and equity options – and these shocks are distinct across strategies. We question then how much the broad set of asset class shocks can add to the simple asset exposure profiles in providing a meaningful assessment of systemic risk.

Where we do see a place for these broad asset class shocks is in the assessment of counterparty exposure. As we mentioned above, we are concerned that a picture of counterparty exposures based only on current market conditions is incomplete. And while we believe most funds position themselves neutrally to broad market shocks, they do so by placing offsetting (or almost offsetting) positions with different counterparties, in large part to avoid disclosing their overall strategy to other market participants. Thus, while the overall fund position is likely to be close to neutral to a broad market shock, it is quite possible that the exposure to a significant trading counterparty may be heavily impacted by the same shock. Our recommendation is to eliminate the stress tests in

Question 36, but add some stress testing component to the counterparty exposure analysis, as discussed above.

In closing, we reiterate that we are in full support of the efforts of the agencies and the FSOC toward monitoring and managing systemic risks, and commend the agencies in setting forth this proposed reporting standard. We are appreciative of the opportunity to comment, and look forward to continuing to contribute to the dialogue.

We are available for further comment or clarification. If you have any questions regarding any of these comments, please do not hesitate to contact us at our respective email addresses below.

Sincerely,

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Jorge Mina
Managing Director
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Exhibit 1

Fund Risk Summary – this summary is an example of a report which aggregates data from multiple hedge funds. This type of report can aggregate hundreds or thousands of hedge funds for a top down view of holdings based on data MSCI collects at the position level from individual hedge funds. Utilizing a standard data input approach with consistent statistics calculations, we are able to source and aggregate portfolio and holdings data across a large base of investment strategies to provide a systematic view into underlying trends and patterns in the hedge fund marketplace. This is a typical report offered to clients through MSCI's Hedge Fund Transparency Services.

Exhibit 2

Single Hedge Fund Report – this report is an example of a standard hedge fund report that a hedge fund investor would receive. This illustrates the basic risk characteristics of this convertible arbitrage hedge fund. This fund level data can then be aggegrated to produce a high level overview of multiple hedge funds within an investor portfolio or across the whole industry as demonstrated in Exhibit 1.

Exhibit 3

The Value of Liquidity- Finger and Acerbi (2010) A proposal on quantifying liquidity risk

Exhibit 1

Fund Risk Summary

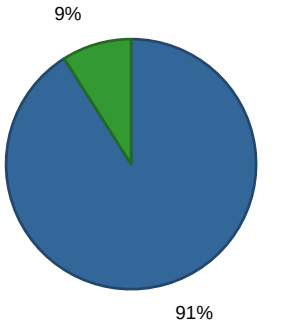
* Sector chart values as % of total statistic.

COMPANY: ABC Company
PORTFOLIO: Sample
CURRENCY: USD
ANALYSIS DATE: October 31, 2008

Portfolio Summary

Market Value

Total	Long	Short
147,662,795	163,832,057	-16,169,262



Overview

Statistic	Value	% Portfolio	Long	Short
Position Count	172	-	159	13
Std Dev	14,439,452	9.78	15,592,205	1,306,148
VaR 95	22,091,076	14.96	23,836,690	2,325,199
VaR 99	31,494,252	21.33	33,381,460	3,493,406
VaR 95 (10 Day)	64,431,382	43.63	69,055,516	7,885,943
VaR 99 (10 Day)	88,140,466	59.69	93,071,289	12,706,934
Expected Shortfall	27,848,279	18.86	30,123,787	2,844,064
Duration	1.04	-	2.32	-17.64
Equity Delta	1,929,452	1.31	2,076,143	-146,691
FX Delta	4,109,249	2.78	4,320,409	-211,160
Vega	0	-	0	0

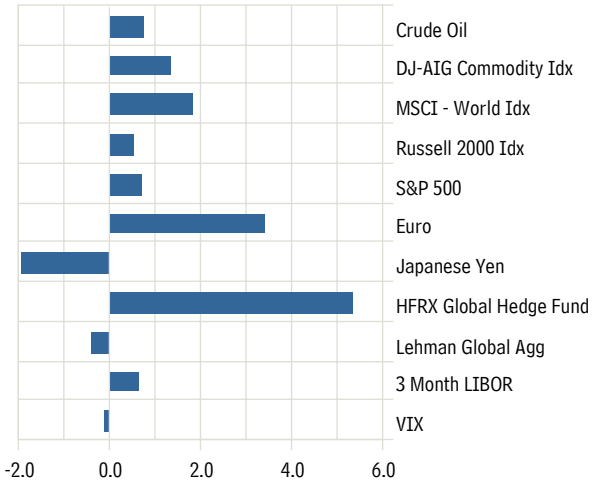
Monte Carlo VaR 95%

Risk Type	Value	% Total PV
Total	22,091,076	14.96
Equity Risk	13,063,791	8.85
FX Risk	9,083,736	6.15
IR Total Risk	1,324,502	0.90
IR Market Risk	1,324,502	0.90
Commodity Risk	1,617,284	1.10

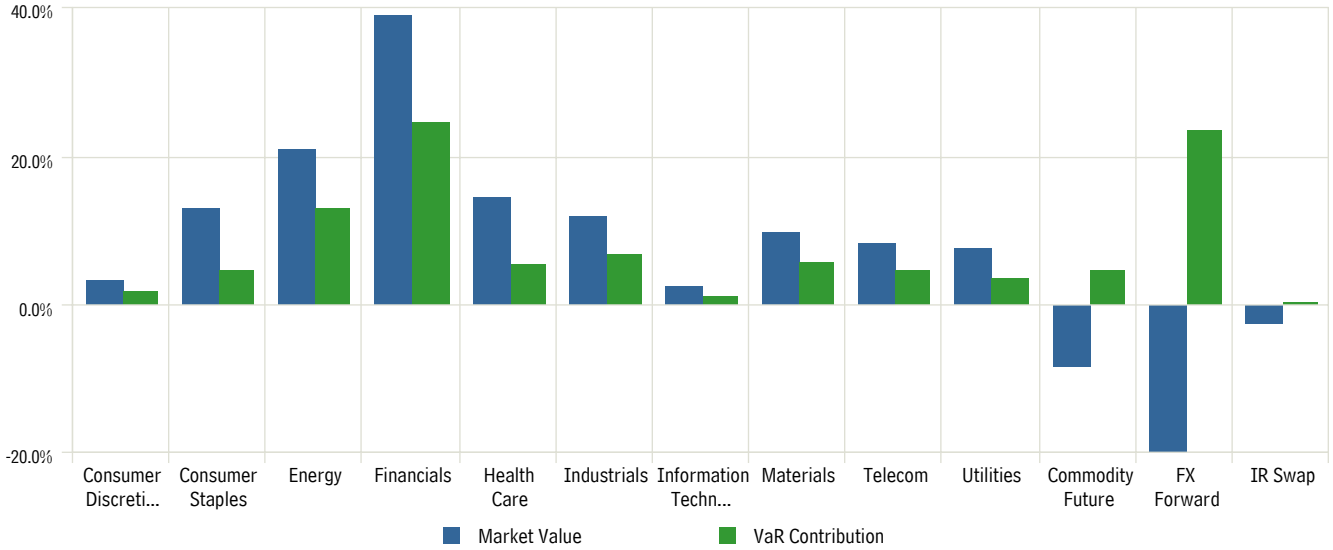
Expected Tail Risk

Risk Type	Value	% Total PV
Total	27,848,279	18.86
Equity Risk	16,318,387	11.05
FX Risk	11,579,232	7.84
IR Total Risk	1,599,594	1.08
IR Market Risk	1,599,594	1.08
Commodity Risk	2,051,228	1.39

Beta



Sector Summary



Sector Market Value and Incremental VaR

	% Net	Long MV	Short MV	Inc VaR
Total	100.00	163,832,057	-16,169,262	22,091,076
Consumer Discretionary	3.26	4,813,797	-	402,184
Consumer Staples	13.14	19,402,554	-	1,006,083
Energy	20.84	30,778,759	-	2,893,250
Financials	38.93	57,691,795	-210,636	5,423,191
Health Care	14.42	21,288,518	-	1,216,171
Industrials	11.79	18,685,978	-1,270,005	1,516,253
Information Technology	2.42	3,570,817	-	247,481
Materials	9.72	15,822,589	-1,473,460	1,288,485
Telecommunication Servi	8.47	20,629,524	-8,123,661	1,050,679
Utilities	7.68	14,929,963	-3,591,327	795,277
Commodity Future	-8.23	-17,103,047	4,946,750	1,019,342
FX Forward	-20.00	-29,529,124	-	5,224,225
IR Swap	-2.44	2,849,933	-6,446,923	8,455

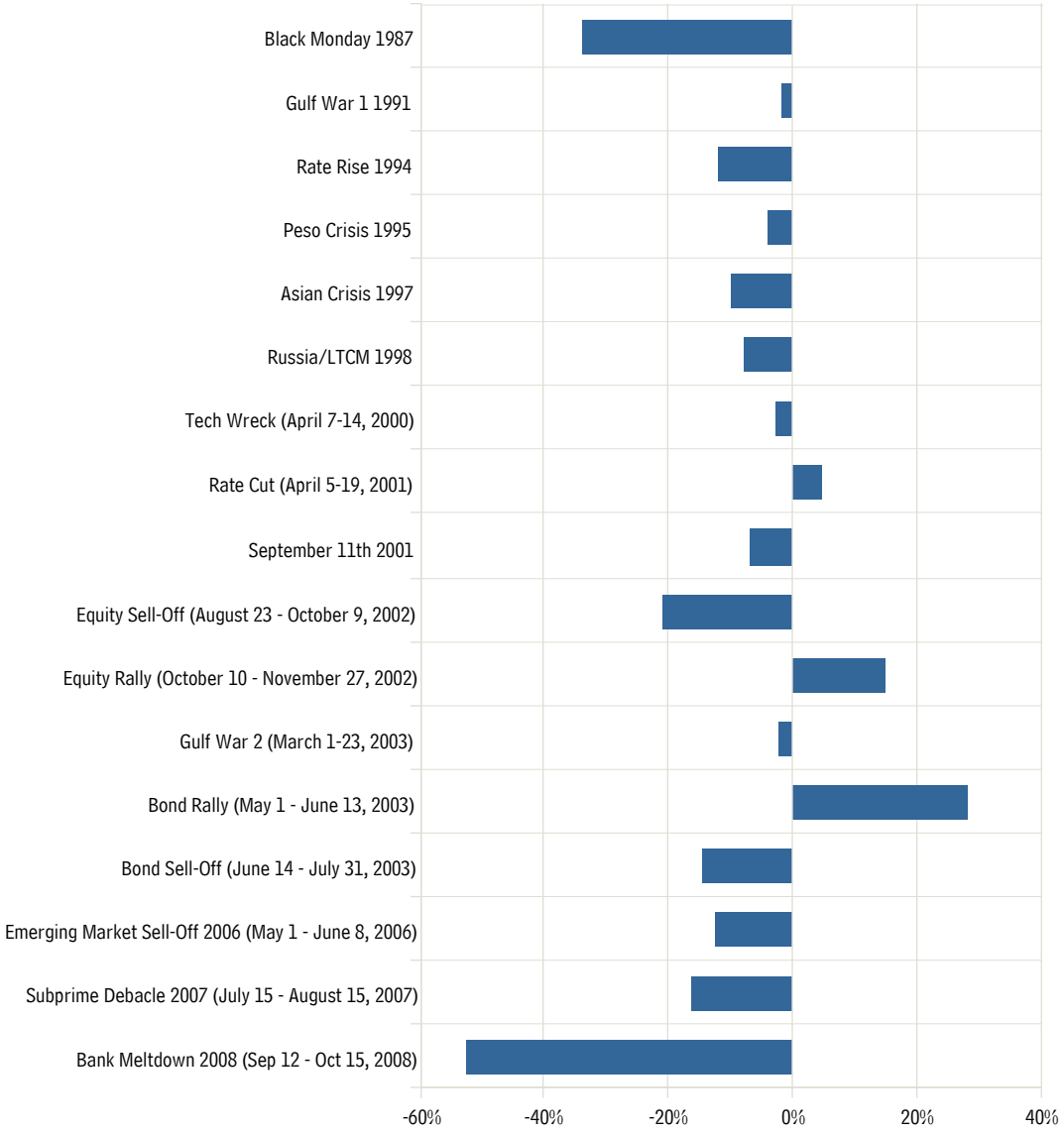
RiskMetrics
An MSCI Brand

Fund Risk Summary

* Stress chart and table values as % of total market value.

COMPANY: ABC Company
PORTFOLIO: Sample
CURRENCY: USD
ANALYSIS DATE: October 31, 2008

Portfolio Stress Test Summary



Price vs Volatility Shocks

	Volatility Shock %						
Price Shock %	-30	-20	0	+10	+30	+50	+100
-30	-39.20	-39.20	-39.20	-39.20	-39.20	-39.20	-39.20
-20	-26.13	-26.13	-26.13	-26.13	-26.13	-26.13	-26.13
-10	-13.07	-13.07	-13.07	-13.07	-13.07	-13.07	-13.07
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
+10	13.07	13.07	13.07	13.07	13.07	13.07	13.07
+20	26.13	26.13	26.13	26.13	26.13	26.13	26.13
+30	39.20	39.20	39.20	39.20	39.20	39.20	39.20

Equity Shocks by Sector

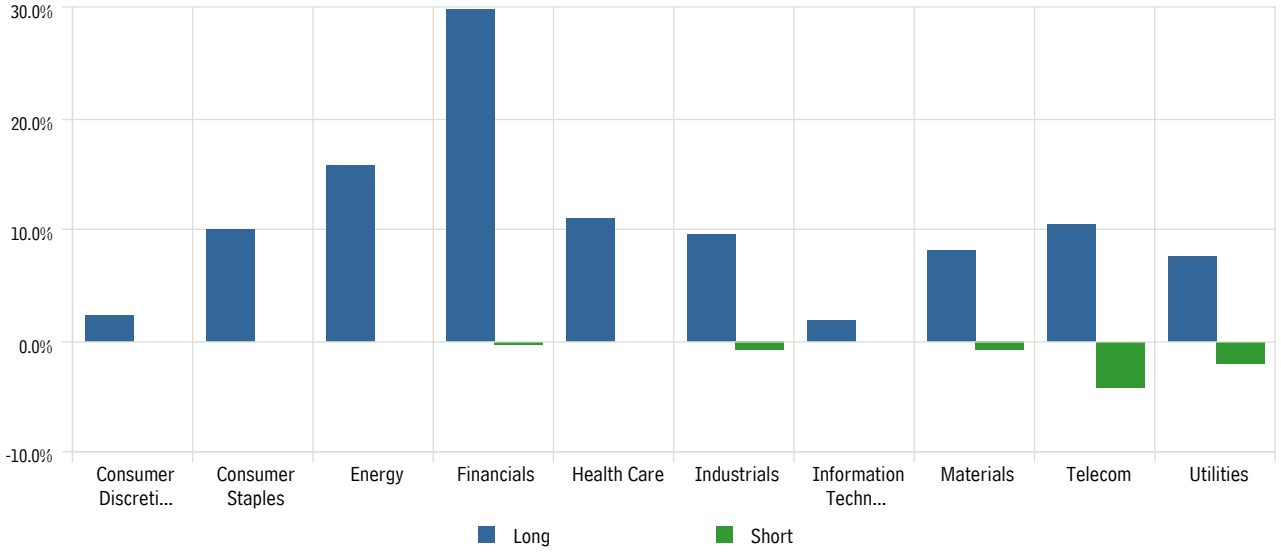
	Equity Shock %					
Sector	-30	-20	-10	+10	+20	+30
Total	-39.20	-26.13	-13.07	13.07	26.13	39.20
Consumer Discretionary	-0.98	-0.65	-0.33	0.33	0.65	0.98
Consumer Staples	-3.94	-2.63	-1.31	1.31	2.63	3.94
Energy	-6.25	-4.17	-2.08	2.08	4.17	6.25
Financials	-11.68	-7.79	-3.89	3.89	7.79	11.68
Health Care	-4.33	-2.88	-1.44	1.44	2.88	4.33
Industrials	-3.54	-2.36	-1.18	1.18	2.36	3.54
Information Technology	-0.73	-0.48	-0.24	0.24	0.48	0.73
Materials	-2.92	-1.94	-0.97	0.97	1.94	2.92
Telecommunication Services	-2.54	-1.69	-0.85	0.85	1.69	2.54
Utilities	-2.30	-1.54	-0.77	0.77	1.54	2.30
Commodity Future	0.00	0.00	0.00	0.00	0.00	0.00
FX Forward	0.00	0.00	0.00	0.00	0.00	0.00
IR Swap	0.00	0.00	0.00	0.00	0.00	0.00

Fund Risk Summary

* Delta adjusted exposure chart and tables as % of equity market value.

COMPANY: ABC Company
PORTFOLIO: Sample
CURRENCY: USD
ANALYSIS DATE: October 31, 2008

Delta Adjusted Exposure by Sector (GICS only)



Delta Adj. Exposue	Long	Short	Net	Gross
Total	207,614,296	-14,669,089	192,945,207	222,283,385
Consumer Discretionary	4,813,797	0	4,813,797	4,813,797
Consumer Staples	19,402,554	0	19,402,554	19,402,554
Energy	30,778,759	0	30,778,759	30,778,759
Financials	57,691,795	-210,636	57,481,160	57,902,431
Health Care	21,288,518	0	21,288,518	21,288,518
Industrials	18,685,978	-1,270,005	17,415,973	19,955,983
Information Technology	3,570,817	0	3,570,817	3,570,817
Materials	15,822,589	-1,473,460	14,349,130	17,296,049
Telecom	20,629,524	-8,123,661	12,505,863	28,753,186
Utilities	14,929,963	-3,591,327	11,338,636	18,521,290

Issuer Delta Adjusted Exposure

Top 10 Long Issuers

Issuer	Delta Adj. Exposure $	Delta Adj. Exposure %	Inc VaR	Betas S&P 500	Betas Lehman Agg	Betas MSCI World
Total S.A.	10,883,069	5.64	1,056,499	0.46	-1.15	1.13
AstraZeneca PLC	9,528,395	4.94	540,934	0.40	-0.65	0.80
Sanofi-Aventis	8,800,231	4.56	498,748	0.47	-0.62	0.88
Vodafone Group PLC	8,486,420	4.40	685,443	0.54	-1.06	1.08
Nestle S.A.	7,700,565	3.99	313,495	0.27	-0.20	0.59
Zurich Financial Services G	7,190,774	3.73	668,713	0.44	-0.45	1.02
HSBC Holdings PLC	6,249,948	3.24	603,880	0.60	-0.91	1.17
BAE Systems PLC	5,943,812	3.08	463,765	0.55	-0.71	1.07
BG Group plc	5,371,882	2.78	531,463	0.61	-0.94	1.33
Centrica PLC	5,271,214	2.73	314,799	0.38	-0.75	0.77

Top 10 Short Issuers

Issuer	Delta Adj. Exposure $	Delta Adj. Exposure %	Inc VaR	Betas S&P 500	Betas Lehman Agg	Betas MSCI World
France Telecom SA	-8,123,661	-4.21	-563,986	0.36	-0.32	0.76
RWE Aktiengesellschaft	-3,591,327	-1.86	-344,323	0.39	-0.30	0.91
Thales SA	-1,084,290	-0.56	-48,227	0.32	-0.66	0.71
Eurasian Natural Resources	-623,589	-0.32	-59,227	0.54	-0.93	1.41
Svenska Cellulosa AB	-477,738	-0.25	-29,639	0.37	-0.54	0.94
Clariant AG	-372,132	-0.19	-31,943	0.45	-0.60	1.05
Helvetia Holding AG	-210,636	-0.11	-16,102	0.45	0.16	0.92
QinetiQ Group Plc	-185,715	-0.10	-8,206	0.40	-0.51	0.81

Fund Risk Summary

COMPANY: ABC Company
PORTFOLIO: Sample
CURRENCY: USD
ANALYSIS DATE: October 31, 2008

Position Summary

Top 5 Weights

Position	% of Port	Total MV	Long	Short	Type	Currency
Rec CAD vs USD 0.9363 12/15	-14.77	-21,805,044	-21,805,044	-	Foreign Exchange Fo	USD
CRUDE OIL FUTURE 20NOV08 98	-11.58	-17,103,047	-17,103,047	-	Commodity Future	USD
TOTAL SA EUR2.5	7.37	10,883,069	10,883,069	-	Equity	EUR
ASTRAZENECA ORD USD0.25	6.45	9,528,395	9,528,395	-	Equity	GBP
SANOFI-AVENTIS EUR2	5.96	8,800,231	8,800,231	-	Equity	EUR

Top 5 VaR 95 (Monte Carlo)

Position	% of Port	Long	Short	Type	Currency	VaR 95
Rec CAD vs USD 0.9363 12/15	-14.77	-21,805,044	-	Foreign Exchange Fo	USD	4,472,398
CRUDE OIL FUTURE 20NOV08 98	-11.58	-17,103,047	-	Commodity Future	USD	2,665,568
Rec EUR vs USD 1.4099 12/15	-5.08	-7,506,314	-	Foreign Exchange Fo	USD	1,316,423
IRS #1458 REC FIXED USD 4.	1.29	1,897,582	-	swap	USD	1,309,014
BRENT OIL FUTURE 13NOV08 87	3.35	-	4,946,750	Commodity Future	USD	1,205,600

Top 5 FX Risk

Position	% of Port	Long	Short	Type	Currency	FX Risk
Rec CAD vs USD 0.9363 12/15	-14.77	-21,805,044	-	Foreign Exchange Fo	USD	4,405,145
Rec EUR vs USD 1.4099 12/15	-5.08	-7,506,314	-	Foreign Exchange Fo	USD	1,314,011
ASTRAZENECA ORD USD0.25	6.45	9,528,395	-	Equity	GBP	259,359
VODAFONE GROUP	5.75	8,486,420	-	Equity	GBP	230,997
TOTAL SA EUR2.5	7.37	10,883,069	-	Equity	EUR	219,757

Top 5 VaR Contribution 95 (Monte Carlo)

Position	% of Port	Long	Short	Type	Currency	Inc. VaR
Rec CAD vs USD 0.9363 12/15	-14.77	-21,805,044	-	Foreign Exchange Fo	USD	4,078,174
CRUDE OIL FUTURE 20NOV08 98	-11.58	-17,103,047	-	Commodity Future	USD	1,706,567
Rec EUR vs USD 1.4099 12/15	-5.08	-7,506,314	-	Foreign Exchange Fo	USD	1,126,493
TOTAL SA EUR2.5	7.37	10,883,069	-	Equity	EUR	1,056,499
VODAFONE GROUP	5.75	8,486,420	-	Equity	GBP	685,443

Top 3 Beta to S&P 500

Position	% of Port	Long	Short	Type	Currency	Beta
Rec CHF vs USD 0.8808 12/15	-0.04	-59,896	-	Foreign Exchange Fo	USD	2.56
IRISH LIFE&PERMANENT ORD	0.16	242,685	-	Equity	EUR	1.51
ROYAL BANK OF SCOTLAND GRP	0.37	540,517	-	Equity	GBP	1.10

Bottom 3 Beta to S&P 500

Position	% of Port	Long	Short	Type	Currency	Beta
IRS #1458 REC FIXED USD 4.	1.29	1,897,582	-	swap	USD	-7.85
IRS #1407 REC FIXED JPY 1	0.10	149,476	-	swap	JPY	-2.03
IRS #1459 PAY FIXED EUR 4.	-1.82	-	-2,682,353	swap	EUR	-1.58

Top 3 Beta to MSCI World

Position	% of Port	Long	Short	Type	Currency	Beta
IRISH LIFE&PERMANENT ORD	0.16	242,685	-	Equity	EUR	2.45
KAZAKHMYS ORD GBP0.20	0.10	145,308	-	Equity	GBP	2.31
XSTRATA COM STK USD0.50	2.01	2,967,430	-	Equity	GBP	2.08

Bottom 3 Beta to MSCI World

Position	% of Port	Long	Short	Type	Currency	Beta
IRS #1458 REC FIXED USD 4.	1.29	1,897,582	-	swap	USD	-7.62
IRS #1407 REC FIXED JPY 1	0.10	149,476	-	swap	JPY	-3.26
IRS #1459 PAY FIXED EUR 4.	-1.82	-	-2,682,353	swap	EUR	-2.71

Top 3 Beta to Lehman Agg

Position	% of Port	Long	Short	Type	Currency	Beta
IRS #1458 REC FIXED USD 4.	1.29	1,897,582	-	swap	USD	85.64
IRS #1407 REC FIXED JPY 1	0.10	149,476	-	swap	JPY	18.14
IRS #1459 PAY FIXED EUR 4.	-1.82	-	-2,682,353	swap	EUR	13.67

Bottom 3 Beta to Lehman Agg

Position	% of Port	Long	Short	Type	Currency	Beta
Rec CHF vs USD 0.8808 12/15	-0.04	-59,896	-	Foreign Exchange Fo	USD	-13.67
Rec CHF vs USD 0.9278 12/15	-0.11	-157,870	-	Foreign Exchange Fo	USD	-4.92
KAZAKHMYS ORD GBP0.20	0.10	145,308	-	Equity	GBP	-2.20

TIER I EXPOSURE

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

	% Modeled			Present Value (% of NAV)				Notional (% of NAV)			
	Best Practice	Proxy Rule	Cash	Long	Short	Net	Gross	Long	Short	Net	Gross
Security Type	**84.65**	**15.22**	**0.13**								
Cash & Cash Equivalents	100.00	0.00	0.00	68.07	55.16	12.91	123.23	68.07	55.16	12.91	123.23
Available Cash	100.00	0.00	0.00	44.04	31.13	12.91	75.17	44.04	31.13	12.91	75.17
Money Market	100.00	0.00	0.00	24.03	24.03	0.00	48.05	24.03	24.03	0.00	48.05
Equity	84.64	15.36	0.00	101.69	17.90	83.79	119.60	149.91	149.73	0.17	299.64
Common Share	97.00	3.00	0.00	14.74	13.35	1.39	28.08	14.74	13.35	1.39	28.08
Convertible Bond	0.00	100.00	0.00	18.39	0.00	18.39	18.39	18.39	0.00	18.39	18.39
Depository Receipt	100.00	0.00	0.00	0.15	0.34	(0.19)	0.48	0.15	0.34	(0.19)	0.48
Equity Option	98.88	1.12	0.00	10.17	4.00	6.17	14.17	58.35	135.83	(77.48)	194.18
Exchange Traded Fund	100.00	0.00	0.00	0.00	0.22	(0.22)	0.22	0.00	0.22	(0.22)	0.22
Preferred Share	0.00	100.00	0.00	2.57	0.00	2.57	2.57	2.57	0.00	2.57	2.57
Private Equity	0.00	100.00	0.00	28.65	0.00	28.65	28.65	28.65	0.00	28.65	28.65
Restricted Common Share	72.73	27.27	0.00	20.11	0.00	20.11	20.11	20.11	0.00	20.11	20.11
Warrant	2.56	97.44	0.00	6.93	0.00	6.93	6.93	6.96	0.00	6.96	6.96
Fixed Income	0.00	100.00	0.00	3.58	0.00	3.58	3.58	3.58	0.00	3.58	3.58
Corporate Bond	0.00	100.00	0.00	3.58	0.00	3.58	3.58	3.58	0.00	3.58	3.58
Foreign Exchange	50.00	0.00	50.00	0.23	0.00	0.23	0.23	6.16	0.00	6.16	6.16
FX Option	50.00	0.00	50.00	0.23	0.00	0.23	0.23	6.16	0.00	6.16	6.16
Industry Sector	**84.65**	**15.22**	**0.13**								
Cash & Cash Equivalents	100.00	0.00	0.00	68.07	55.16	12.91	123.23	68.07	55.16	12.91	123.23
Not Applicable	100.00	0.00	0.00	68.07	55.16	12.91	123.23	68.07	55.16	12.91	123.23
Equity	84.64	15.36	0.00	101.69	17.90	83.79	119.60	149.91	149.73	0.17	299.64
Basic Materials	100.00	0.00	0.00	0.00	4.62	(4.62)	4.62	0.00	4.81	(4.81)	4.81
Consumer Goods	87.10	12.90	0.00	5.08	0.40	4.68	5.47	6.70	3.15	3.54	9.85
Consumer Services	71.43	28.57	0.00	1.68	0.51	1.17	2.19	2.64	2.43	0.21	5.08
Financials	100.00	0.00	0.00	0.72	0.51	0.21	1.23	1.80	52.75	(50.95)	54.56
Health Care	99.20	0.80	0.00	17.50	10.03	7.48	27.53	50.69	70.64	(19.95)	121.32
Industrials	35.71	64.29	0.00	5.39	0.00	5.39	5.39	5.39	0.00	5.39	5.39
Not Applicable	0.00	100.00	0.00	28.65	0.00	28.65	28.65	28.65	0.00	28.65	28.65
Not Found	0.00	100.00	0.00	22.69	0.00	22.68	22.69	22.69	0.00	22.68	22.69
Oil & Gas	100.00	0.00	0.00	0.66	0.03	0.63	0.69	3.50	3.87	(0.37)	7.36

RiskMetrics Group

TIER I EXPOSURE

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

	% Modeled			Present Value (% of NAV)				Notional (% of NAV)			
	Best Practice	Proxy Rule	Cash	Long	Short	Net	Gross	Long	Short	Net	Gross
Technology	95.35	4.65	0.00	19.22	1.81	17.41	21.03	27.71	12.08	15.64	39.79
Utilities	66.67	33.33	0.00	0.10	0.00	0.10	0.10	0.14	0.00	0.14	0.14
Fixed Income	0.00	100.00	0.00	3.58	0.00	3.58	3.58	3.58	0.00	3.58	3.58
Not Found	0.00	100.00	0.00	3.58	0.00	3.58	3.58	3.58	0.00	3.58	3.58
Foreign Exchange	50.00	0.00	50.00	0.23	0.00	0.23	0.23	6.16	0.00	6.16	6.16
Not Applicable	50.00	0.00	50.00	0.23	0.00	0.23	0.23	6.16	0.00	6.16	6.16

RiskMetrics Group

TIER II SENSITIVITIES PART I

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

	Greek Sensitivities (bps)				Equity Beta (% of NAV)				FI Beta (% of NAV)	
	Equity Delta	DV01	FX Delta	Vega	S&P 500	MSCI World	Russell 2000	Wilshire 5000	Lehman Aggregate	JPMorgan EMBIG
Security Type	**74.58**	**(0.03)**	**12.53**	**0.09**	**0.45**	**0.54**	**0.34**	**0.45**	**(0.21)**	**1.54**
Cash & Cash Equivalents	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00
Available Cash	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00
Money Market	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity	71.01	(0.03)	14.30	0.07	0.45	0.55	0.34	0.45	(0.22)	1.54
Common Share	1.39	0.00	0.00	0.00	(0.09)	(0.08)	(0.06)	(0.08)	0.10	(0.21)
Convertible Bond	18.39	0.00	0.00	0.00	0.18	0.17	0.13	0.17	(0.33)	0.34
Depository Receipt	(0.19)	0.00	0.00	0.00	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	0.00
Equity Option	(6.62)	(0.03)	0.00	0.07	(0.05)	(0.05)	(0.04)	(0.05)	0.09	(0.11)
Exchange Traded Fund	(0.22)	0.00	0.00	0.00	(0.00)	(0.00)	(0.00)	(0.00)	0.01	(0.01)
Preferred Share	2.57	0.00	0.00	0.00	0.03	0.02	0.02	0.02	(0.05)	0.05
Private Equity	28.65	0.00	10.69	0.00	0.32	0.33	0.23	0.30	(0.39)	0.76
Restricted Common Share	20.11	0.00	0.00	0.00	(0.00)	0.08	0.01	0.01	0.43	0.55
Warrant	6.93	0.00	3.61	0.00	0.07	0.07	0.05	0.07	(0.08)	0.16
Fixed Income	3.58	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.03
Corporate Bond	3.58	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.03
Foreign Exchange	0.00	(0.00)	(1.78)	0.02	(0.01)	(0.01)	(0.01)	(0.01)	0.01	(0.03)
FX Option	0.00	(0.00)	(1.78)	0.02	(0.01)	(0.01)	(0.01)	(0.01)	0.01	(0.03)
Currency	**74.58**	**(0.03)**	**12.53**	**0.09**	**0.45**	**0.54**	**0.34**	**0.45**	**(0.21)**	**1.54**
AUD	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00
CAD	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00
CHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GBP	0.00	0.00	(0.00)	0.00	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
HKD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00
KRW	14.28	0.01	12.51	0.02	0.07	0.07	0.05	0.07	(0.03)	0.20
MXN	0.00	0.00	(0.00)	0.00	(0.00)	(0.00)	(0.00)	(0.00)	0.00	(0.00)
SEK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SGD	0.00	0.00	(0.00)	0.00	(0.00)	(0.00)	(0.00)	(0.00)	0.00	(0.00)
TWD	0.00	0.00	(0.00)	0.00	(0.00)	(0.00)	(0.00)	(0.00)	0.00	(0.00)
USD	70.98	(0.04)	0.00	0.09	0.38	0.47	0.29	0.38	(0.18)	1.34
Credit Rating	**74.58**	**(0.03)**	**12.53**	**0.09**	**0.45**	**0.54**	**0.34**	**0.45**	**(0.21)**	**1.54**

TIER II SENSITIVITIES PART I

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

	Greek Sensitivities (bps)				Equity Beta (% of NAV)				FI Beta (% of NAV)	
	Equity Delta	DV01	FX Delta	Vega	S&P 500	MSCI World	Russell 2000	Wilshire 5000	Lehman Aggregate	JPMorgan EMBIG
Not Applicable	74.58	(0.03)	12.53	0.09	0.45	0.54	0.34	0.45	(0.21)	1.54
Industry Sector	**74.58**	**(0.03)**	**12.53**	**0.09**	**0.45**	**0.54**	**0.34**	**0.45**	**(0.21)**	**1.54**
Basic Materials	(4.77)	(0.00)	0.00	(0.00)	(0.13)	(0.13)	(0.09)	(0.13)	0.18	(0.33)
Consumer Goods	3.99	(0.00)	0.00	0.00	0.04	0.04	0.03	0.04	(0.13)	0.07
Consumer Services	0.37	(0.00)	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.01
Financials	(3.71)	(0.00)	0.00	0.02	(0.04)	(0.03)	(0.03)	(0.03)	0.10	(0.06)
Health Care	0.55	(0.02)	0.00	0.04	0.01	0.01	0.01	0.01	(0.02)	(0.00)
Industrials	5.39	0.00	3.60	0.00	0.05	0.06	0.04	0.05	(0.05)	0.16
Not Applicable	28.65	(0.00)	8.92	0.02	0.31	0.32	0.22	0.29	(0.38)	0.73
Not Found	26.26	0.00	0.00	0.00	0.24	0.22	0.17	0.22	(0.40)	0.46
Oil & Gas	0.06	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	(0.00)
Technology	17.69	0.00	0.00	0.00	(0.03)	0.06	(0.01)	(0.01)	0.49	0.50
Utilities	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)	0.00

TIER II SENSITIVITIES PART II

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

Parallel Shocks (% of NAV)

	Equity		Interest Rates		Credit Spreads		Volatility		Commodity	
	-10%	+10%	-1%	+1%	-10bps	+10bps	-10%	+10%	-10%	+10%
Security Type	**(6.53)**	**7.96**	**0.01**	**(0.03)**	**0.00**	**0.00**	**(0.79)**	**0.90**	**0.00**	**0.00**
Cash & Cash Equivalents	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Available Cash	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Money Market	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity	(6.17)	7.60	0.01	(0.03)	0.00	0.00	(0.63)	0.74	0.00	0.00
Common Share	(0.14)	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Convertible Bond	(1.84)	1.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Depository Receipt	0.02	(0.02)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity Option	1.59	(0.16)	0.01	(0.03)	0.00	0.00	(0.63)	0.73	0.00	0.00
Exchange Traded Fund	0.02	(0.02)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Preferred Share	(0.26)	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private Equity	(2.87)	2.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Restricted Common Share	(2.01)	2.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Warrant	(0.69)	0.69	(0.00)	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00
Fixed Income	(0.36)	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Corporate Bond	(0.36)	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign Exchange	0.00	0.00	0.00	(0.00)	0.00	0.00	(0.15)	0.16	0.00	0.00
FX Option	0.00	0.00	0.00	(0.00)	0.00	0.00	(0.15)	0.16	0.00	0.00
Currency	**(6.53)**	**7.96**	**0.01**	**(0.03)**	**0.00**	**0.00**	**(0.79)**	**0.90**	**0.00**	**0.00**
AUD	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GBP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HKD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
KRW	(0.36)	0.36	(0.01)	0.01	0.00	0.00	(0.15)	0.16	0.00	0.00
MXN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SGD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TWD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TIER II SENSITIVITIES PART II

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

Parallel Shocks (% of NAV)

	Equity		Interest Rates		Credit Spreads		Volatility		Commodity	
	-10%	+10%	-1%	+1%	-10bps	+10bps	-10%	+10%	-10%	+10%
USD	(6.17)	7.60	0.02	(0.03)	0.00	0.00	(0.79)	0.90	0.00	0.00
Credit Rating	**(6.53)**	**7.96**	**0.01**	**(0.03)**	**0.00**	**0.00**	**(0.79)**	**0.90**	**0.00**	**0.00**
Not Applicable	(6.53)	7.96	0.01	(0.03)	0.00	0.00	(0.79)	0.90	0.00	0.00
Industry Sector	**(6.53)**	**7.96**	**0.01**	**(0.03)**	**0.00**	**0.00**	**(0.79)**	**0.90**	**0.00**	**0.00**
Basic Materials	0.47	(0.48)	0.00	(0.00)	0.00	0.00	0.00	(0.00)	0.00	0.00
Consumer Goods	(0.40)	0.40	0.00	(0.00)	0.00	0.00	(0.05)	0.05	0.00	0.00
Consumer Services	(0.04)	0.04	0.00	(0.00)	0.00	0.00	0.00	(0.00)	0.00	0.00
Financials	0.99	(0.13)	0.00	(0.00)	0.00	0.00	(0.13)	0.22	0.00	0.00
Health Care	0.22	0.29	0.01	(0.02)	0.00	0.00	(0.39)	0.41	0.00	0.00
Industrials	(0.54)	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Not Applicable	(2.87)	2.87	0.00	(0.00)	0.00	0.00	(0.15)	0.16	0.00	0.00
Not Found	(2.63)	2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oil & Gas	(0.02)	0.00	0.00	(0.00)	0.00	0.00	(0.03)	0.03	0.00	0.00
Technology	(1.72)	1.80	(0.00)	0.00	0.00	0.00	(0.04)	0.03	0.00	0.00
Utilities	(0.01)	0.01	(0.00)	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00

TIER III STRESS HISTORICAL

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

	Historical Stress (% of NAV)						
	Tech Wreck	Rate Cut	Equity Sell-Off	Equity Rally	Gulf War 2	Bond Rally	Bond Sell-Off
	04/07/00-04/14/00	04/05/01-04/19/01	08/23/02-10/09/02	10/10/02-11/27/02	03/01/03-03/21/03	05/01/03-06/13/03	06/14/03-07/31/03
Security Type	**(7.23)**	**7.11**	**3.55**	**12.58**	**(0.83)**	**11.53**	**(5.56)**
Cash & Cash Equivalents	(0.00)	0.00	0.00	0.00	(0.00)	0.00	(0.00)
Available Cash	(0.00)	0.00	0.00	0.00	(0.00)	0.00	(0.00)
Money Market	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity	(7.24)	7.23	3.46	12.44	(1.04)	11.46	(5.51)
Common Share	(0.71)	0.46	(0.53)	2.02	0.35	0.33	0.56
Convertible Bond	(1.94)	1.63	(3.21)	3.09	1.19	1.45	0.03
Depository Receipt	0.07	(0.07)	0.13	(0.01)	0.03	0.03	(0.05)
Equity Option	3.79	0.65	3.14	0.31	(0.42)	0.99	0.40
Exchange Traded Fund	0.01	(0.02)	0.05	(0.04)	(0.01)	(0.02)	(0.00)
Preferred Share	(0.27)	0.23	(0.45)	0.43	0.17	0.20	0.00
Private Equity	(2.09)	2.57	(5.27)	4.86	0.73	2.81	0.19
Restricted Common Share	(5.59)	0.75	10.89	0.27	(3.14)	4.93	(6.95)
Warrant	(0.52)	1.02	(1.27)	1.50	0.06	0.74	0.31
Fixed Income	0.00	(0.02)	(0.01)	0.22	0.05	0.13	(0.03)
Corporate Bond	0.00	(0.02)	(0.01)	0.22	0.05	0.13	(0.03)
Foreign Exchange	0.01	(0.10)	0.09	(0.08)	0.17	(0.05)	(0.03)
FX Option	0.01	(0.10)	0.09	(0.08)	0.17	(0.05)	(0.03)
Currency	**(7.23)**	**7.11**	**3.55**	**12.58**	**(0.83)**	**11.53**	**(5.56)**
AUD	(0.00)	0.00	0.00	0.00	(0.00)	0.00	(0.00)
CAD	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
CHF	0.00	(0.00)	0.00	(0.00)	(0.00)	0.00	(0.00)
EUR	(0.00)	(0.00)	0.00	0.00	(0.00)	0.00	(0.00)
GBP	(0.00)	(0.00)	(0.00)	0.00	0.00	(0.00)	0.00
HKD	(0.00)	(0.00)	0.00	0.00	0.00	(0.00)	(0.00)
KRW	(0.20)	1.20	(0.98)	1.31	(0.45)	0.63	0.38
MXN	0.00	(0.00)	0.00	(0.00)	(0.00)	0.00	(0.00)
SEK	(0.00)	0.00	0.00	0.00	(0.00)	0.00	(0.00)
SGD	(0.00)	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00
TWD	(0.00)	(0.00)	0.00	(0.00)	0.00	(0.00)	(0.00)
USD	(7.03)	5.88	4.46	11.20	(0.36)	10.88	(5.94)

TIER III STRESS HISTORICAL

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

	Historical Stress (% of NAV)						
	Tech Wreck	Rate Cut	Equity Sell-Off	Equity Rally	Gulf War 2	Bond Rally	Bond Sell-Off
	04/07/00-04/14/00	04/05/01-04/19/01	08/23/02-10/09/02	10/10/02-11/27/02	03/01/03-03/21/03	05/01/03-06/13/03	06/14/03-07/31/03
Credit Rating	**(7.23)**	**7.11**	**3.55**	**12.58**	**(0.83)**	**11.53**	**(5.56)**
Not Applicable	(7.23)	7.11	3.55	12.58	(0.83)	11.53	(5.56)
Industry Sector	**(7.23)**	**7.11**	**3.55**	**12.58**	**(0.83)**	**11.53**	**(5.56)**
Basic Materials	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)
Consumer Goods	(0.36)	0.34	(0.64)	0.91	0.24	0.38	0.08
Consumer Services	(0.02)	0.01	(0.17)	0.03	0.01	0.01	0.00
Financials	1.57	(0.11)	1.61	(0.12)	(0.08)	(0.12)	(0.01)
Health Care	1.31	0.36	1.19	0.76	0.19	1.32	0.61
Industrials	(0.26)	0.81	(1.07)	1.01	(0.47)	0.40	0.52
Not Applicable	(2.08)	2.47	(5.18)	4.78	0.89	2.76	0.16
Not Found	(2.39)	2.00	(3.97)	4.03	1.52	1.92	0.01
Oil & Gas	0.00	0.00	0.00	0.00	0.00	0.00	(0.00)
Technology	(5.01)	1.24	11.79	1.18	(3.13)	4.86	(6.94)
Utilities	(0.00)	0.00	(0.00)	0.00	0.00	0.00	0.00

RiskMetrics Group

TIER III STRESS PREDICTIVE

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

	10 Day Predictive Stress (% of NAV)						
	Black Monday 1987	Gulf War 1 1991	Rate Rise 1994	Peso Crisis 1995	Asian Crisis 1997	Russia 1998	Sept 11th 2001
Security Type	**(6.44)**	**(5.93)**	**39.34**	**(1.31)**	**(5.07)**	**(3.08)**	**(4.71)**
Cash & Cash Equivalents	(0.00)	(0.00)	0.00	(0.00)	(0.00)	(0.00)	(0.00)
Available Cash	(0.00)	(0.00)	0.00	(0.00)	(0.00)	(0.00)	(0.00)
Money Market	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity	(6.67)	(5.99)	38.96	(1.35)	(5.52)	(3.11)	(4.79)
Common Share	1.55	0.07	1.40	0.12	2.87	0.55	0.93
Convertible Bond	(4.79)	(1.08)	(0.43)	0.20	(1.73)	(1.84)	(1.88)
Depository Receipt	(0.09)	0.08	0.01	0.04	(0.02)	(0.03)	0.06
Equity Option	8.67	0.71	3.67	(0.11)	1.55	1.41	1.76
Exchange Traded Fund	0.09	0.03	0.02	0.01	0.04	0.04	0.04
Preferred Share	(0.67)	(0.15)	(0.06)	0.03	(0.24)	(0.26)	(0.26)
Private Equity	(8.23)	(2.25)	1.20	(0.66)	(4.90)	(2.70)	(3.24)
Restricted Common Share	(1.45)	(2.71)	32.82	(0.73)	(1.59)	0.42	(1.37)
Warrant	(1.75)	(0.69)	0.31	(0.22)	(1.49)	(0.70)	(0.82)
Fixed Income	(0.24)	(0.08)	0.45	(0.02)	(0.23)	(0.07)	(0.09)
Corporate Bond	(0.24)	(0.08)	0.45	(0.02)	(0.23)	(0.07)	(0.09)
Foreign Exchange	0.47	0.15	(0.06)	0.06	0.68	0.10	0.18
FX Option	0.47	0.15	(0.06)	0.06	0.68	0.10	0.18
Currency	**(6.44)**	**(5.93)**	**39.34**	**(1.31)**	**(5.07)**	**(3.08)**	**(4.71)**
AUD	(0.00)	(0.00)	0.00	(0.00)	(0.00)	(0.00)	(0.00)
CAD	(0.00)	(0.00)	0.00	(0.00)	(0.00)	(0.00)	(0.00)
CHF	(0.00)	0.00	(0.00)	(0.00)	(0.00)	0.00	0.00
EUR	(0.00)	0.00	0.00	(0.00)	0.00	0.00	0.00
GBP	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
HKD	(0.00)	0.00	(0.00)	0.00	(0.00)	(0.00)	(0.00)
KRW	(1.70)	(0.76)	0.19	(0.44)	(2.16)	(0.64)	(0.79)
MXN	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00
SEK	(0.00)	(0.00)	0.00	(0.00)	(0.00)	(0.00)	(0.00)
SGD	0.00	0.00	0.00	(0.00)	0.00	0.00	0.00
TWD	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00
USD	(5.06)	(5.20)	39.15	(0.87)	(3.11)	(2.47)	(3.96)

RiskMetrics Group

TIER III STRESS PREDICTIVE

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

	10 Day Predictive Stress (% of NAV)						
	Black Monday	Gulf War 1	Rate Rise	Peso Crisis	Asian Crisis	Russia	Sept 11th
	1987	1991	1994	1995	1997	1998	2001
Credit Rating	**(6.44)**	**(5.93)**	**39.34**	**(1.31)**	**(5.07)**	**(3.08)**	**(4.71)**
Not Applicable	(6.44)	(5.93)	39.34	(1.31)	(5.07)	(3.08)	(4.71)
Industry Sector	**(6.44)**	**(5.93)**	**39.34**	**(1.31)**	**(5.07)**	**(3.08)**	**(4.71)**
Basic Materials	2.68	0.52	(0.55)	0.25	2.47	1.02	1.28
Consumer Goods	(0.88)	(0.23)	3.48	0.02	(0.58)	(0.43)	(0.46)
Consumer Services	(0.04)	(0.01)	1.93	(0.01)	0.01	0.00	(0.01)
Financials	5.56	0.42	(0.07)	(0.05)	1.89	1.02	1.07
Health Care	1.75	0.03	(2.28)	(0.16)	0.42	0.06	0.65
Industrials	(1.15)	(0.50)	2.94	(0.19)	(1.44)	(0.44)	(0.62)
Not Applicable	(7.76)	(2.10)	1.14	(0.60)	(4.22)	(2.59)	(3.07)
Not Found	(6.14)	(1.42)	(0.09)	0.22	(2.36)	(2.34)	(2.41)
Oil & Gas	(0.00)	(0.02)	(0.02)	(0.01)	0.03	(0.04)	(0.05)
Technology	(0.44)	(2.62)	32.84	(0.78)	(1.27)	0.67	(1.09)
Utilities	(0.00)	(0.00)	0.01	(0.00)	(0.01)	(0.00)	(0.01)

RiskMetrics Group

TIER IV VAR 95% CONFIDENCE

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

	95%, 1 Day VaR (bps)				95%, 1 Day VaR by Risk Type (bps)						
	VaR	MVaR	IVaR	EXP SF	Total	Equity	FX	CMDTY	Int Rates	Spread	Vol
Security Type	**142.18**	**142.18**	**142.18**	**180.95**	**142.18**	**142.33**	**12.89**	**0.00**	**0.07**	**0.00**	**5.80**
Cash & Cash Equivalents	0.01	0.01	0.01	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00
Available Cash	0.01	0.01	0.01	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00
Money Market	(0.00)	(0.00)	(0.00)	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity	142.53	139.91	143.15	181.77	142.53	142.53	14.83	0.00	0.06	0.00	6.20
Common Share	20.66	(6.51)	(5.36)	25.66	20.66	20.66	0.00	0.00	0.00	0.00	0.00
Convertible Bond	17.10	7.06	11.55	20.83	17.10	17.10	0.00	0.00	0.00	0.00	0.00
Depository Receipt	4.30	1.25	(0.00)	5.60	4.30	4.30	0.00	0.00	0.00	0.00	0.00
Equity Option	13.41	2.37	(5.40)	17.13	13.41	20.49	0.00	0.00	0.06	0.00	6.22
Exchange Traded Fund	0.34	(0.51)	(0.27)	0.44	0.34	0.34	0.00	0.00	0.00	0.00	0.00
Preferred Share	2.39	3.01	1.61	2.91	2.39	2.39	0.00	0.00	0.00	0.00	0.00
Private Equity	35.05	11.17	22.73	43.01	35.05	29.09	11.09	0.00	0.00	0.00	0.00
Restricted Common Share	129.71	91.67	113.90	159.94	129.71	129.71	0.00	0.00	0.00	0.00	0.00
Warrant	8.19	5.48	4.38	10.00	8.19	6.19	3.74	0.00	0.00	0.00	0.02
Fixed Income	0.77	1.17	0.33	0.95	0.77	0.77	0.00	0.00	0.00	0.00	0.00
Corporate Bond	0.77	1.17	0.33	0.95	0.77	0.77	0.00	0.00	0.00	0.00	0.00
Foreign Exchange	2.41	(0.66)	(1.31)	3.07	2.41	0.00	1.65	0.00	0.02	0.00	1.16
FX Option	2.41	(0.66)	(1.31)	3.07	2.41	0.00	1.65	0.00	0.02	0.00	1.16
Currency	**142.18**	**142.18**	**142.18**	**180.95**	**142.18**	**142.33**	**12.89**	**0.00**	**0.07**	**0.00**	**5.80**
AUD	0.01	0.01	0.01	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00
CAD	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00
CHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GBP	0.00	(0.00)	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HKD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
KRW	14.00	2.29	4.87	17.78	14.00	4.07	12.87	0.00	0.01	0.00	1.16
MXN	0.00	(0.00)	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEK	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SGD	0.00	(0.00)	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TWD	0.00	(0.00)	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
USD	139.88	128.18	137.32	174.91	139.88	143.79	0.00	0.00	0.06	0.00	6.20
Credit Rating	**142.18**	**142.18**	**142.18**	**180.95**	**142.18**	**142.33**	**12.89**	**0.00**	**0.07**	**0.00**	**5.80**

RiskMetrics Group

TIER IV VAR 95% CONFIDENCE

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

	95%, 1 Day VaR (bps)				95%, 1 Day VaR by Risk Type (bps)						
	VaR	MVaR	IVaR	EXP SF	Total	Equity	FX	CMDTY	Int Rates	Spread	Vol
Not Applicable	142.18	142.18	142.18	180.95	142.18	142.33	12.89	0.00	0.07	0.00	5.80
Industry Sector	**142.18**	**142.18**	**142.18**	**180.95**	**142.18**	**142.33**	**12.89**	**0.00**	**0.07**	**0.00**	**5.80**
Basic Materials	8.87	(5.86)	(6.53)	11.69	8.87	8.87	0.00	0.00	0.00	0.00	0.02
Consumer Goods	4.43	4.61	3.08	5.44	4.43	3.75	0.00	0.00	0.01	0.00	2.53
Consumer Services	2.01	0.97	0.39	2.49	2.01	1.98	0.00	0.00	0.00	0.00	0.10
Financials	4.23	(4.03)	(3.77)	5.25	4.23	4.24	0.00	0.00	0.01	0.00	1.26
Health Care	10.99	0.01	(5.95)	14.73	10.99	7.15	0.00	0.00	0.06	0.00	4.92
Industrials	10.09	5.80	6.00	12.44	10.09	8.32	3.74	0.00	0.00	0.00	0.00
Not Applicable	33.52	9.97	21.43	40.51	33.52	29.09	9.14	0.00	0.02	0.00	1.16
Not Found	21.68	8.70	14.58	26.22	21.68	21.68	0.00	0.00	0.00	0.00	0.00
Oil & Gas	0.55	(0.10)	(0.07)	0.68	0.55	0.22	0.00	0.00	0.00	0.00	0.56
Technology	130.66	90.09	113.02	161.46	130.66	130.85	0.00	0.00	0.01	0.00	0.47
Utilities	0.28	(0.17)	(0.00)	0.37	0.28	0.29	0.00	0.00	0.00	0.00	0.02

RiskMetrics Group

TIER IV VAR 99% CONFIDENCE

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

	99%, 1 Day VaR (bps)				99%, 1 Day VaR by Risk Type (bps)						
	VaR	MVaR	IVaR	EXP SF	Total	Equity	FX	CMDTY	Int Rates	Spread	Vol
Security Type	**198.27**	**198.27**	**198.27**	**231.75**	**198.27**	**204.65**	**17.43**	**0.00**	**0.10**	**0.00**	**8.84**
Cash & Cash Equivalents	0.02	(0.01)	0.00	0.02	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Available Cash	0.02	(0.01)	0.00	0.02	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Money Market	(0.00)	(0.00)	(0.00)	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity	197.23	195.14	198.86	232.30	197.23	204.65	20.14	0.00	0.09	0.00	8.96
Common Share	27.54	(8.70)	(2.67)	32.69	27.54	27.54	0.00	0.00	0.00	0.00	0.00
Convertible Bond	22.94	5.33	12.05	27.47	22.94	22.94	0.00	0.00	0.00	0.00	0.00
Depository Receipt	6.73	0.88	0.01	7.67	6.73	6.73	0.00	0.00	0.00	0.00	0.00
Equity Option	20.29	(9.71)	(2.04)	21.78	20.29	31.22	0.00	0.00	0.09	0.00	8.95
Exchange Traded Fund	0.51	0.04	(0.17)	0.56	0.51	0.51	0.00	0.00	0.00	0.00	0.00
Preferred Share	3.20	0.30	1.68	3.83	3.20	3.20	0.00	0.00	0.00	0.00	0.00
Private Equity	48.94	11.60	23.83	52.99	48.94	39.42	15.06	0.00	0.00	0.00	0.00
Restricted Common Share	188.19	125.67	161.63	204.10	188.19	188.19	0.00	0.00	0.00	0.00	0.00
Warrant	11.32	(0.76)	4.53	12.53	11.32	8.24	5.08	0.00	0.00	0.00	0.03
Fixed Income	1.09	(0.07)	0.58	1.23	1.09	1.09	0.00	0.00	0.00	0.00	0.00
Corporate Bond	1.09	(0.07)	0.58	1.23	1.09	1.09	0.00	0.00	0.00	0.00	0.00
Foreign Exchange	3.46	1.12	(1.17)	3.98	3.46	0.00	2.45	0.00	0.02	0.00	1.58
FX Option	3.46	1.12	(1.17)	3.98	3.46	0.00	2.45	0.00	0.02	0.00	1.58
Currency	**198.27**	**198.27**	**198.27**	**231.75**	**198.27**	**204.65**	**17.43**	**0.00**	**0.10**	**0.00**	**8.84**
AUD	0.02	(0.01)	0.01	0.02	0.02	0.00	0.02	0.00	0.00	0.00	0.00
CAD	0.02	(0.01)	(0.00)	0.02	0.02	0.00	0.02	0.00	0.00	0.00	0.00
CHF	0.00	(0.00)	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUR	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GBP	0.00	(0.00)	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HKD	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
KRW	19.52	(1.68)	6.90	22.61	19.52	5.47	17.41	0.00	0.01	0.00	1.58
MXN	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEK	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SGD	0.00	0.00	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TWD	0.00	(0.00)	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
USD	199.97	178.87	191.40	225.01	199.97	203.95	0.00	0.00	0.09	0.00	8.96
Credit Rating	**198.27**	**198.27**	**198.27**	**231.75**	**198.27**	**204.65**	**17.43**	**0.00**	**0.10**	**0.00**	**8.84**

RiskMetrics Group

TIER IV VAR 99% CONFIDENCE

RMG Sample Convert Arb Fund
Portfolio as of December 31, 2010

NAV: 929,369,018 PROCESSED: Feb-08-2011 21:09 GMT
FUND COMPANY: RMG Fund of Fund BASE CURRENCY: USD POSITIONS: 795

	99%, 1 Day VaR (bps)				99%, 1 Day VaR by Risk Type (bps)						
	VaR	MVaR	IVaR	EXP SF	Total	Equity	FX	CMDTY	Int Rates	Spread	Vol
Not Applicable	198.27	198.27	198.27	231.75	198.27	204.65	17.43	0.00	0.10	0.00	8.84
Industry Sector	**198.27**	**198.27**	**198.27**	**231.75**	**198.27**	**204.65**	**17.43**	**0.00**	**0.10**	**0.00**	**8.84**
Basic Materials	13.88	(3.80)	(5.44)	15.34	13.88	13.90	0.00	0.00	0.00	0.00	0.03
Consumer Goods	5.96	0.48	3.77	7.19	5.96	5.10	0.00	0.00	0.01	0.00	3.31
Consumer Services	2.72	1.28	0.31	3.11	2.72	2.77	0.01	0.00	0.00	0.00	0.15
Financials	5.93	(0.70)	(3.92)	6.54	5.93	5.92	0.00	0.00	0.01	0.00	1.85
Health Care	17.05	(16.13)	(1.78)	19.31	17.05	11.09	0.00	0.00	0.09	0.00	6.88
Industrials	14.04	4.61	5.69	17.23	14.04	12.37	5.07	0.00	0.00	0.00	0.00
Not Applicable	45.54	12.47	22.67	49.84	45.54	39.42	12.35	0.00	0.02	0.00	1.58
Not Found	29.32	6.49	15.45	34.60	29.32	29.32	0.00	0.00	0.00	0.00	0.00
Oil & Gas	0.76	(0.25)	(0.00)	0.85	0.76	0.37	0.00	0.00	0.01	0.00	0.80
Technology	187.46	122.25	161.59	206.11	187.46	187.47	0.00	0.00	0.01	0.00	0.73
Utilities	0.46	0.06	(0.06)	0.50	0.46	0.46	0.00	0.00	0.00	0.00	0.03

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Exhibit 3

RiskMetrics Group

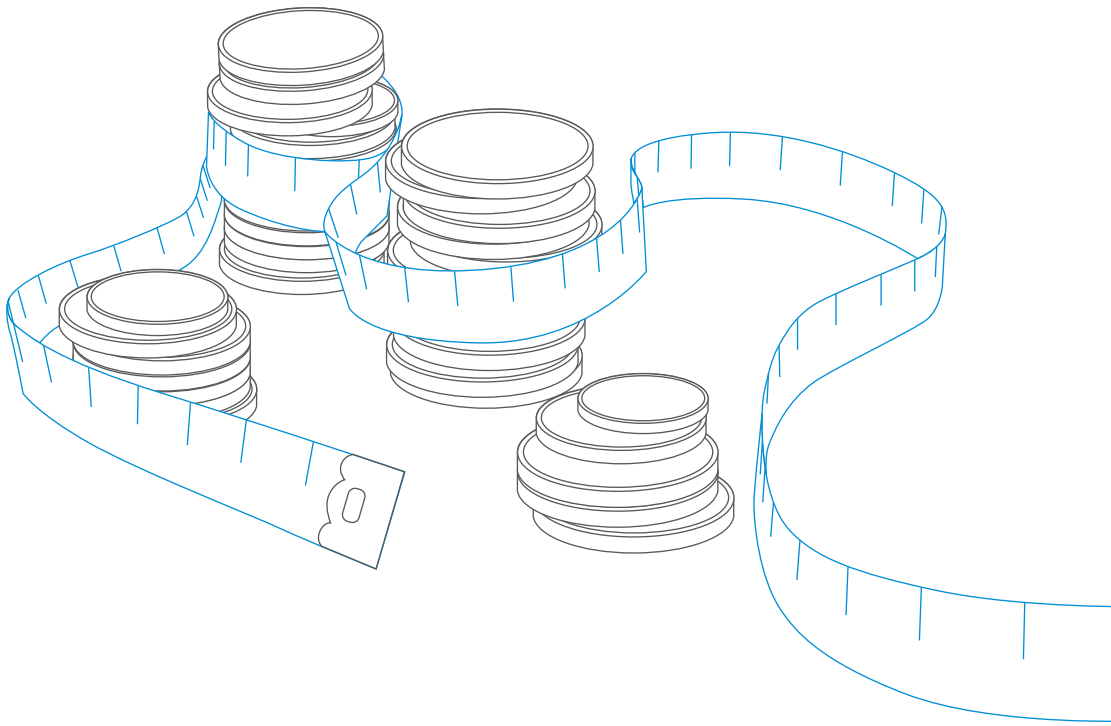
RBC DEXIA INVESTOR SERVICES

Your ambition. Our purpose.™

The value of liquidity

Can it be measured?

June 2010



Carlo Acerbi
RiskMetrics Group

Christopher Finger
RiskMetrics Group

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Foreword

The notion of liquidity has never been more relevant or as frequently referenced as it is today. But what precisely does liquidity entail and why is it so important? Theoretically, it is the ability to readily access funds when needed at a minimal cost. Practically, however, it is much more complex to define and is a broad concept that affects us all in one form or another (e.g., the availability of loans at affordable (yet risk adjusted) rates, the ability to fund transactions, free movement of cash flows, inter-bank loans and inter-country borrowing). The latter, in the wake of the current European sovereign debt crisis, has reached new dimensions with a EUR 750 bn bailout to help struggling countries meet their obligations and ensure monetary stability. Without this injection of liquidity, there could be far reaching economic and social consequences that would transcend national boarders. However, it remains to be seen if these measures are sufficient, as recent economic indicators suggest that liquidity may still be constricting, particularly within the "PIIGS" countries.

Looking at the concept of liquidity through the lens of the asset owner, liquidity is simply the ability to buy and sell assets on the markets at "fair" prices within a given timeframe. Indeed, there is little else of greater importance to ensure the smooth functioning of capital markets than sufficient liquidity. Liquidity can be regarded as a barometer of overall economic well-being.

The credit crunch was in essence a liquidity crisis where major stock market selloffs led to a freeze in liquidity. In particular, after the Lehman Brothers default in 2008 some markets ceased trading altogether increasing investor panic and putting further pressure on financial markets. In early 2010, there were signs of economic recovery and stability. Yet bid-offer spreads have recently started to increase again, in response to the current Eurozone sovereign debt crisis.

From a monitoring perspective in Europe, the UCITS framework lays out requirements for asset managers to monitor and prove optimal liquidity to investors. This very notion is embedded in the acronym "UCITS" where "TS" stands for "transferrable securities". The UCITS brand attracts large numbers of institutional and retail investors who need to be able to subscribe or redeem fund units at any time. Prior to 2008, asset liquidity under the UCITS framework was more or less guaranteed and investors expressed little concern. However, in the wake of events throughout 2008 and 2009 this paradigm has shifted.

Investors and regulators globally have become more focussed on measures to ensure investor protection and are re-evaluating risks related to liquidity within asset pools. There is a call for greater transparency and increased disclosure of the various risks in the marketplace and increasingly those which measure liquidity risk.

In this context, I am pleased to introduce "The Value of Liquidity" by Christopher Finger and Carlo Acerbi from RiskMetrics a paper designed to provide valuable insights into the notion of liquidity against the backdrop of the liquidity constraints faced by asset managers. The framework articulates key areas of consideration for portfolio managers to better understand and manage liquidity risk.

We trust you will find this paper both insightful and thought-provoking and look forward to your comments and feedback.

Fay Coroneos
Head, Risk & Investment Analytics
Product and Client Segments
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Introduction

While liquidity–both too much and too little–has arguably been central to most financial crises, a concrete definition remains elusive. As a result, it is not surprising that measuring, managing and controlling liquidity is still a challenge. This paper endeavours to describe the various notions of liquidity, and then introduces a new framework under which liquidity can be valued and managed, while reflecting the specific liquidity needs of the institution in question. We then present an example portfolio, and characterise the nature of the results afforded by the model.

Defining liquidity

Part of what makes liquidity an elusive concept to model is that it takes on many forms, making the definition of one's "liquidity problem" a less than trivial task. Nonetheless, we begin by distinguishing two classic notions of liquidity: funding liquidity and asset (or market) liquidity.

Funding liquidity refers to the ability of an institution to raise funds in order to support its normal business activities. Simply put, it is the ability of an institution to borrow money. For banks, liquidity comes from the deposit base, from short and long-term debt in the capital markets, from committed credit lines from other banks and from short-term collateralised borrowing, such as repurchase agreements. Liquidity risk, consequently, derives from the potential depletion of these sources of funding. For example, depositors withdraw their funds, capital markets do not support further issuance, or lenders are unwilling to roll over short-term repurchase agreements. To control these risks, the Basel Committee has proposed two funding ratios. The first is a ratio of very high quality funding to the estimated cash needs in a severe one month stress scenario and the second is a ratio of available to required stable long-term funding.

In a fund management context, funding liquidity comes in slightly different guises. One element of funding comes from the investors themselves; the risk being that investors redeem in greater numbers or more quickly than the funds' assets can support. Indeed, just as banks may suffer a "run" when their depositors withdraw quickly, a fund can suffer adverse shocks to its NAV in trying to meet heightened redemptions. The case of the Reserve Fund in 2008 now serves as a chilling reminder of this. A second element comes from margin or other transaction level financing, which is typically used to achieve leverage on behalf of the investors.

Asset liquidity, on the other hand, relates to the depth of financial markets and the ease with which a security or portfolio may be converted to cash. Under most circumstances, a large cap equity or a large, widely held bond issue may be sold relatively quickly and large orders are likely to attract roughly the same price as small ones. For more lightly traded securities, the market may support only relatively small trades, or large trades may only be possible at a significantly discounted price. Of course, markets are unpredictable, leading to the asset liquidity risk that a formerly deep market suddenly becomes shallow.

While it is important to distinguish the two basic notions of liquidity and liquidity risk, it is equally important to recognise that they are closely linked. Heavy redemptions (funding liquidity risk) at an inopportune time may force a fund manager to sell otherwise healthy securities into a thinning market (asset liquidity risk), realising a loss that would otherwise not have been necessary. Likewise, the market for a bond, or even an entire class of bonds (as in the case of structured finance in 2008) may dry up (asset liquidity), making those bonds less attractive, or altogether useless as collateral for short-term borrowing (funding liquidity).

Based on this simple discussion, two problems become apparent. First, while we may have succeeded in defining liquidity conceptually, we still have not quantified its value or risk. Second, we cannot address the two types of liquidity in isolation. Endogenous effects–the funding needs of a bank or investment fund–drive exposure to exogenous risks–the depth or thinness of financial markets. As a result, a formalism is required that both prices liquidity and acknowledges that firm specific constraints play a significant role in determining liquidity risks.

Introducing the approach

To align these concepts, we present an approach that values portfolios based on the exogenous liquidity of the portfolio constituents and the endogenous constraints to which the portfolio owner is subject. In order to motivate the valuation approach, we consider two extremes.

The first extreme is where the portfolio owner has no constraints, liquidity or otherwise. In other words, there are no circumstances under which the owner would be forced to sell large or even small positions. Thus, the investor's holdings are not exposed to the depth (or lack thereof) of the markets, nor to changes therein. In this case, it is prudent to value the portfolio according to the best available bid (or ask) prices, that is, according to standard mark-to-market.

At the other extreme is an investor who faces the prospect of having to definitively liquidate his portfolio within some short time frame. It would be irresponsible to value this portfolio according to the best market quotes, knowing that the investor will shortly be liquidating, and likely not realising these best prices. Rather, the investor should value the portfolio according to the expected proceeds from the forthcoming liquidation. This valuation scheme is referred to as *mark-to-exit* (or mark-to-liquidation). We can say with certainty that the mark-to-exit value for a portfolio cannot exceed its mark-to-market value.

Realistically, the portfolio owner will be subject to some liquidity constraints, meaning that the mark-to-market view gives an overly optimistic view of valuation. At the same time, those constraints are not likely to always require immediate liquidation. The mark-to-exit value is thus, at best, an interesting stress scenario, but as a valuation policy it overstates the portfolio's exposure to liquidity concerns. We propose a valuation framework that fits between the two extremes and more accurately reflects the investor's actual constraints.

The first element in the valuation framework is information about the exogenous liquidity of the portfolio constituents. Beyond simply the best bid or offer in the market, we require information (or at least a hypothesis) for the price we can expect to realise for transactions of any given size. From a technical perspective, there are a variety of ways to express such information. Our approach utilises marginal supply-demand curves (MSDCs). In the middle of the curves are the best bid and offer prices–the prices we assume we can realise for small transactions–and further out on the curves is information about the price at which we could liquidate our entire holding. This is considered exogenous information, in that it is a property of the market itself, and every investor faces the same MSDC for a given security. With the MSDCs in hand, we can calculate the two extreme valuations: mark-to-market and mark-to-exit.

The second element is a new concept: *the liquidity policy* (LP). The LP accounts for the endogenous constraints to which a particular portfolio owner is subject. A simple LP might be "Be prepared to raise 1M in cash within one week's time." We refer to an LP of this form as a pure cash policy. It is important to note that the LP is not intended to impose that the portfolio always holds 1M in cash; rather, it is meant to convey that the portfolio manager must be at all times prepared to meet a 1M cash demand within a short time frame. This scenario might apply to a fund manager who has committed to meet a certain expected level of redemptions, or to a bank that must be prepared to cover for depositor withdrawals or the inability to roll over some amount of funding.

But generally, the fund manager will not face full redemption, nor will the bank face a catastrophic run or liquidity crisis. Even after raising the required cash, there is still a portfolio to manage, investment guidelines to meet and business to conduct. As a result, we cannot expect to raise the required 1M by any means. Rather, we must raise the 1M while

maintaining a desirable portfolio structure. A more realistic LP therefore includes additional constraints (e.g., "Be prepared to raise 1M in cash while maintaining the desired sector allocations and limiting risk to an acceptable level."). This can be further extended to require that specific hedge ratios or position offsets be maintained as well.

With the two elements in place–security-level exogenous MSDCs and the endogenous liquidity policy–the liquidity-adjusted value of the portfolio can be defined. If the portfolio already satisfies the LP–that is, it holds 1M in cash and complies with the other constraints–then its value is simply its mark-to-market. If the LP is not currently satisfied, then it is necessary to calculate the cost of bringing the portfolio into compliance. There will be multiple ways to do this, each entailing a different cost, depending on the MSDCs and precisely how much of each security is to be sold. Across these different strategies, we identify the most efficient one–the one that achieves the LP at the lowest possible liquidity cost. The *mark-to-liquidity* value of the portfolio then is the mark-to-market less the optimal cost of achieving the LP. This optimal cost is referred to as the portfolio's *liquidity impact*.

Again, we are not imposing the constraint that the portfolio manager actually performs the trades that achieve the LP: the manager simply needs to be prepared to do so. In this respect, the approach is very similar to a fund manager who commits to provide liquidity to the fund's investors: he does not always carry cash sufficient to meet all possible future outflows, but does commit to raise sufficient cash to meet outflows as they arise. The mark-to-liquidity framework provides us with the implicit cost of this commitment.

Before proceeding to an example of the framework, we make one important technical observation. The definition of the mark-to-liquidity value involves an optimisation: the discovery of the best way to achieve the LP. As with any optimisation, there are two important questions. First, does the optimal solution exist, and second, is the search for the optimum practical. In this respect, as long as the MSDCs behave in a reasonable way (e.g., larger trades touch thinner markets and result in less favorable pricing), and subject to some technical constraints on the LP (none of which will prove restrictive in our treatments here), the optimisation problem is convex. While not necessarily related to the financial intuition behind the framework, this fact has the important implication that the optimum strategy exists, and moreover, that the search for this optimum is feasible, even with large portfolios and complex constraints.[1]

[1] See Acerbi and Scandolo (2008) for a detailed explanation of the mark-to-liquidity framework.

Case study

To illustrate some of the features of the mark-to-liquidity framework, consider a sample equity portfolio with the majority of the positions in large capitalisation (LC) stocks, and some portion in emerging market (EM) stocks (refer to Table 1). In this example, we consider versions of this same portfolio with different total size, while maintaining the relative allocations presented in the table.

The first step is to characterise the exogenous liquidity of the portfolio. To distinguish liquid from illiquid stocks, we examine a variety of liquidity indicators or proxies, such as the bid-offer spread, the average trading volume and the total shares outstanding. These indicators are also presented in Table 1. By any of these indicators, not surprisingly, the EM equities appear most illiquid. Approximately 16% of the portfolio lies in the more illiquid EM positions. But this does not translate into a quantitative statement of the economic meaning of these differences in apparent liquidity.

To quantify the exogenous liquidity, we estimate the *liquidation* cost for each position. We define this cost between the best mark-to-market (the entire position valued at the best bid available in the market) and the mark-to-exit (the expected proceeds from closing the entire position). To estimate the liquidation cost, we rely on the aforementioned MSDCs.

In the equity market, there is rich literature on market impact and the effect on a security's price due to a large sale. We draw on one study in particular, Almgren et al. (2005). Almgren et al. examine a large cross-section of US stocks, and show that the relationship between the price a trader can realise and the size of the position being traded depends on two categories of factors: security specific factors such as the total shares outstanding, the average daily trading volume, and the recent volatility and a number of universal coefficients, which Almgren et al estimate from their cross section of data. In the end, we have a distinct MSDC for each security in our portfolio. The MSDC for one of the stocks is presented in Figure 1. This figure tells us, for instance, that to sell 20,000 shares, we would hit prices between 114.9 and 114.75, with an average price between these two levels. We may view the market risk in this stock as the potential shifts in the curve up or down and liquidity risk as the potential changes in the shape of the curve.

With the MSDCs in hand, we can calculate the liquidation cost for each position in the portfolio. One important note is that the liquidation cost does not scale linearly with the position size: as a proportion of position size, there will be a greater cost to exit a large position than a small one on the same stock. This is illustrated in Figure 2. For a total portfolio size of 1M, all of the liquidation costs are modest, even for the illiquid stocks, and the overall liquidation cost is only 20bp. As the portfolio increases in size, assuming the same relative allocations, we experience the downward slope of the MSDCs, and suffer greater costs; for a total portfolio of 1B, the liquidation cost is very significant, at just under 15% of the value.

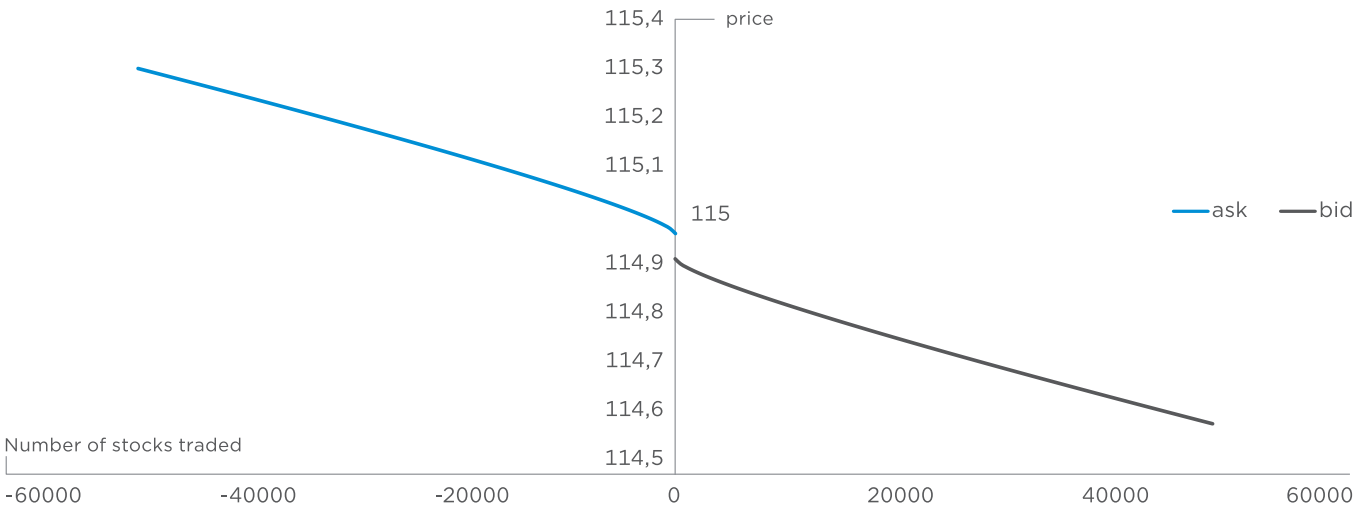
It is apparent that the valuation in the face of liquidity depends on the portfolio in a way that conventional mark-to-market does not. But as discussed previously, it is in most cases overly conservative to value the portfolio at the mark-to-exit, in that most investors are not subject to constraints that will actually require them to liquidate everything in a short time. This is where the liquidity policy (LP) enters.

As mentioned earlier, the LP is a set of constraints that the portfolio manager must always be prepared to satisfy. Assuming that the portfolio does not currently satisfy these constraints, the mark-to-liquidity value is calculated by finding the optimal way to satisfy the LP.

Table 1

	Weight	% bid-ask spread	Outstanding shares	Market cap	Average daily volume	Average daily turnover	Volume (120d)
Large cap stocks	7.53%	0.06%	2,063,073,000	35,959,362,390	20,268,490	0.98%	29.4%
	4.69%	0.01%	4,721,273,000	315,239,398,210	26,911,172	0.57%	18.1%
	4.04%	0.01%	526,251,100	92,088,679,989	12,049,916	2.29%	29.3%
	3.75%	0.02%	2,345,093,000	122,859,422,270	14,971,182	0.64%	20.8%
	3.48%	0.05%	5,524,000,000	117,550,720,000	58,714,996	1.06%	25.1%
	3.34%	0.02%	2,904,593,000	183,976,920,620	11,600,728	0.40%	14.3%
	3.32%	0.01%	2,008,353,000	148,136,117,280	11,068,801	0.55%	18.7%
	3.22%	0.03%	8,770,461,000	256,711,393,470	58,483,480	0.67%	21.1%
	4.82%	0.03%	1,939,515,000	65,381,050,650	12,511,876	0.65%	22.1%
	3.09%	0.02%	1,299,003,000	166,246,403,940	6,256,818	0.48%	17.8%
	3.09%	0.07%	1,821,688,000	25,558,282,640	20,741,216	1.14%	33.1%
	2.86%	0.02%	1,552,643,000	84,712,202,080	7,511,824	0.48%	15.4%
	2.09%	0.02%	1,486,838,000	76,884,392,980	10,415,717	0.70%	22.8%
	2.00%	0.10%	141,711,300	4,072,782,762	905,777	0.64%	27.9%
	1.81%	0.02%	2,751,927,000	176,591,155,590	11,543,674	0.42%	11.6%
	1.59%	0.04%	1,241,889,000	29,805,336,000	16,501,162	1.33%	27.1%
	1.56%	0.04%	135,071,200	3,826,567,096	2,230,985	1.65%	37.6%
	1.40%	0.03%	913,331,500	31,847,869,405	9,927,372	1.09%	22.9%
	1.25%	0.09%	49,804,910	1,708,308,413	339,286	0.68%	24.0%
	1.22%	0.06%	438,600,000	14,320,290,000	9,856,374	2.25%	35.3%
	1.24%	0.01%	446,800,000	31,494,932,000	4,094,013	0.92%	30.7%
	1.22%	0.03%	1,195,634,000	77,214,043,720	14,510,407	1.21%	31.0%
	1.20%	0.05%	90,274,800	5,003,932,164	274,979	0.30%	18.3%
	1.15%	0.04%	5,902,074,000	151,152,115,140	29,494,558	0.50%	15.8%
	1.15%	0.04%	811,956,000	66,401,761,680	5,524,251	0.68%	26.7%
	1.12%	0.06%	1,400,202,000	22,851,296,640	22,158,914	1.58%	25.6%
	1.10%	0.04%	31,559,070	3,628,030,687	507,083	1.61%	32.6%
	3.33%	0.07%	625,501,600	9,132,323,360	10,756,028	1.72%	44.3%
	6.67%	0.06%	237,356,600	3,773,969,940	5,634,384	2.37%	62.6%
	3.33%	0.03%	310,448,000	12,213,024,320	2,663,270	0.86%	23.3%
	1.67%	0.12%	798,521,000	13,199,552,130	3,396,161	0.43%	30.2%
Emerging market stocks	5.00%	1.74%	55,156,870	64,533,538	213,438	0.39%	81.2%
	3.33%	4.00%	2,633,500	17,117,750	9,000	0.34%	61.6%
	5.00%	0.67%	19,623,420	237,050,914	12,040	0.06%	54.3%
	1.67%	0.72%	19,280,060	53,984,168	23,954	0.12%	78.6%
	1.67%	0.49%	26,984,740	613,902,835	1,109,209	4.11%	84.5%

Figure 1 - Marginal supply-demand curve



To continue the example, we fix the overall value of the portfolio at 100M, the level at which the liquidation cost is roughly 11%. As a first case, we consider a cash liquidity policy: one that stipulates that the portfolio must be able to raise a certain amount of cash, but is not subject to any other restrictions. Clearly, the portfolio does not satisfy such a policy in its current state, so we need to transact in some of the portfolio holdings in order to raise this cash. The results of the cash LP example are reported in Table 3.

We first consider a cash LP where we must be prepared to raise 10M, or 10% of the portfolio, in cash. To raise this amount, the liquidity impact incurred is only 303, insignificant relative to the portfolio or even the cost of liquidating the entire portfolio. As the cash amount required is increased, there is a greater impact, but the level is still immaterial relative to the portfolio, and the mark-to-liquidity value is barely different from the mark-to-market.

This result is not surprising: the portfolio has ample liquidity in the form of the LC stocks and is not required to experience shallow markets even in raising 85M. Most of the liquidity impact is experienced by selling the EM stocks and these represent only 16% of the portfolio. There is a concerning effect though. Consider the Value-at-Risk (VaR) of the remaining portfolio, that is, what remains after the cash has been raised. As the portfolio raises more cash, its risk markedly increases and doubles by the time the cash reaches 85M. This is sensible, as the optimal way of raising the cash is to sell the most liquid stocks, which in our case are also the least volatile ones. The portfolio can achieve the cash policy at relatively little cost, but is completely transformed in the process from a diverse set of holdings to a concentrated set of positions in illiquid and volatile stocks.

These results bring us back to our earlier remarks about the portfolio not simply being a source of cash but requiring ongoing management. Thus, it is not realistic to only require that the portfolio be able to generate cash. Rather, the portfolio should be able to generate cash as required, while maintaining an investment profile that is suitable for the future. To continue this example, in addition to the cash constraints, we stipulate that the portfolio VaR be no greater than 7.5% (its original value recall is 7.08%) and that the positions in EM stocks sum to no greater than 20% (the original allocation to EM is 16%).

We now repeat the exercise, examining the effects of different levels of required cash and see that the liquidity impact is material. Please refer to Table 4. For example, if we require that the portfolio be able to generate 50M in cash, while complying with the risk and allocation constraints, then the liquidity impact is almost 2% of the portfolio. If the portfolio manager is committed to providing this level of potential liquidity, while maintaining the desired investment profile, the portfolio valuation should reflect that impact.

The explanation for this now material liquidation cost is straightforward. In order to stay within the risk and allocation limits, the portfolio manager cannot simply sell the most liquid stocks. Rather, he must sell at least some of the EM stocks and in so doing experience the impact of the steepest MSDCs in the portfolio.

Figure 2 - Liquidation cost (%)

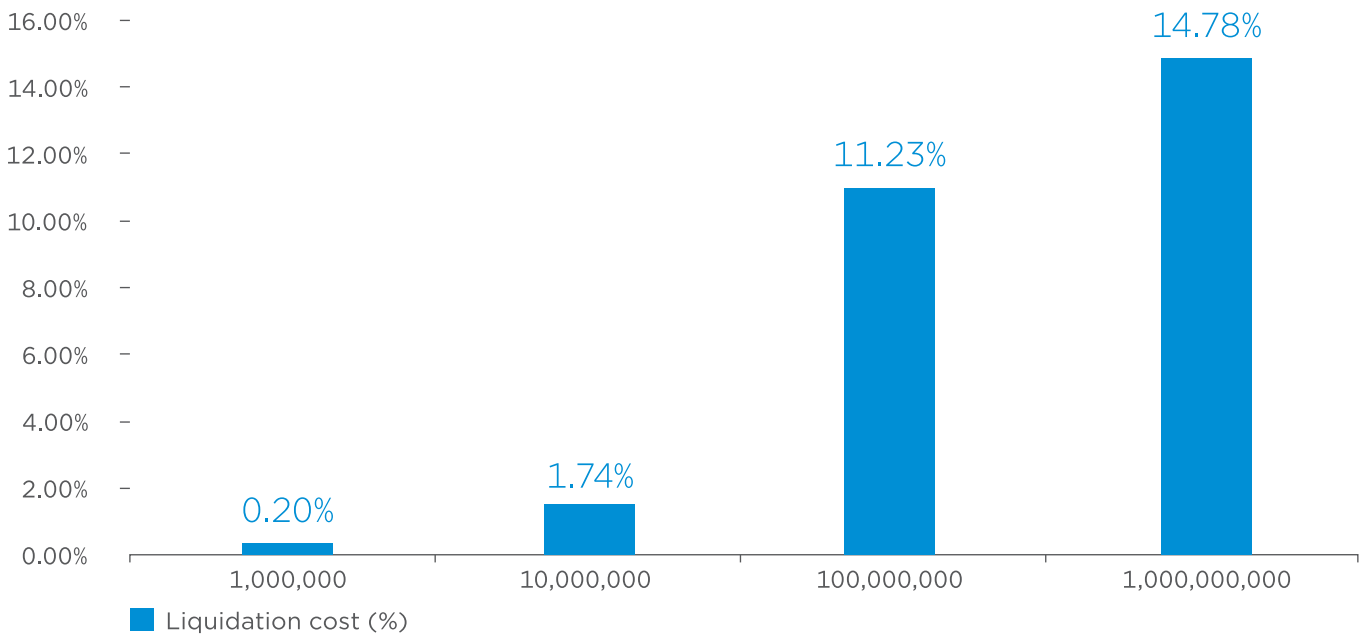


Table 3

Cash only LP

Cash limit	10,000,000	50,000,000	75,000,000	80,000,000	85,000,000
Mark-to-market	99,848,267	99,848,267	99,848,267	99,848,267	99,848,267
Mark-to-liquidity	99,847,964	99,843,832	99,830,741	99,821,612	99,806,320
Mark-to-exit	88,616,568	88,616,568	88,616,568	88,616,568	88,616,568
Liquidity impact	303	4,435	17,526	26,655	41,947
VaR %	7.39%	9.60%	12.50%	13.11%	14.23%

Table 4

Cash + VaR + linear LP

Cash limit	10,000,000	50,000,000	75,000,000	80,000,000	85,000,000
Mark-to-market	99,848,267	99,848,267	99,848,267	99,848,267	99,848,267
Mark-to-liquidity	99,847,602	97,867,301	92,029,258	90,779,706	89,524,001
Mark-to-exit	88,616,568	88,616,568	88,616,568	88,616,568	88,616,568
Liquidity impact	665	1,980,966	7,819,009	9,068,561	10,324,266
VaR %	7.40%	7.50%	7.50%	7.50%	7.50%

Applications of the framework

Perhaps the most obvious application of the mark-to-liquidity framework is not the valuation at all, but the set of transactions that arise from the optimisation process. In the fund management context, when redemptions actually occur, the framework provides guidance on what of the portfolio to sell, all the while adhering to the investment guidelines that will apply for the remaining portfolio. Similarly, if we were faced with the need to partially liquidate a margin portfolio to cover counterparty obligations, the framework would provide the most efficient liquidation strategy, possibly in this case without regard for the composition of the portfolio after liquidation.

Applied in this way, however, the mark-to-liquidity framework does not truly change investors' behavior in the face of liquidity constraints. The optimisation gives us a means to react more efficiently to the need to liquidate, but we are only reacting and not planning. This brings us back to the notion of liquidity policies and our emphasis that in all our examples, those policies began with the words "Be prepared".

By doing nothing more than stating the liquidity policy explicitly, we are already moving beyond the reactive posture to liquidity. The liquidity policy can act as a plan, or even more strongly, as a commitment for a portfolio. We acknowledge that the portfolio will be used to generate cash to meet investor redemptions, to pay traders, or to fund other operations. And rather than bearing the cost of these commitments when they arise, the mark-to-liquidity framework leads us to assess and value them beforehand. Acknowledging that liquidity is valuable, and then placing a specific value on it, has profound implications.

In a fund management setting, managers typically commit to providing liquidity to investors, subject to a certain notice period. The period may be a short as a single day (as for most mutual funds) or a matter of months, in the case of many hedge funds. In a narrow sense, more liquidity (meaning shorter notice periods) is positive for an investor; however, the fact that other investors might redeem as well is a cause for concern. What level of redemptions can a manager support before his ability to maintain a desirable investment profile is compromised, or he is forced to suspend further redemptions altogether? An investor with otherwise no need or desire to redeem may in fact choose to redeem because of the fear of other investors' actions. This dynamic can lead ultimately to the "run on the fund" scenario, with investors rushing away from the fund simply because they do not want to be last.

Through the lens of mark-to-liquidity, this dynamic is a result of the failure to place a value on the liquidity promised to the investors. The earliest investors to redeem are the ones that realise the benefit of the liquidity commitment, with the investors remaining left to bear the true liquidity cost. By estimating upfront the cost of providing liquidity it can then be assessed to all investors, regardless of when they redeem. This could take the form, for instance, of a NAV based on mark-to-liquidity using the fund's liquidity commitment and investment profile as the liquidity policy. Such a liquidity-adjusted NAV would diminish the incentive to redeem out of fear only and ultimately lead to a more stable investor base. Less controversial would be to maintain the current NAV policy, but for the fund manager to track the cost of the liquidity commitment, and to manage the portfolio in such a way as to limit the cost.

From valuation to risk

Remembering that the "V" in VaR stands for value, we can view risk in the context of mark-to-liquidity. It is by now common knowledge that while the classical VaR measures may provide useful indications of portfolio risk in liquid markets, they do not address risk in the presence of less than perfect market liquidity nor portfolio liquidity constraints. Thus far, the regulatory response to this–both in the banking sector (through the BIS) and in the fund management sector (primarily through UCITS)–has been to maintain the existing VaR applications, and then ask that institutions address the possibility of liquidity risk (as well as other previously neglected risks) separately through stress tests. Mark-to-liquidity has the potential to both expand the scope of VaR and to provide a framework for liquidity stress tests.

In a sense, we may view the failure of classical VaR to address liquidity as a result of its reliance on mark-to-market for valuation. A first step to address this is to apply the statistical tools from VaR to the portfolio's mark-to-liquidity value. In the simplest case, we can assume that the exogenous liquidity–taken as the shape of the MSDCs–is constant, while market risk–represented as the level of the MSDCs–evolves according to our VaR assumptions. This is far from a trivial model, in that even with static market liquidity, we already admit the possibility of interactions between market risk and liquidity. In our example portfolio, a significant market loss on one of our LC stocks may cause us to rely on the EM stocks for liquidity, forcing us to sell securities onto a steeper MSDC. A market move that would only impact the portfolio by 1% in mark-to-market terms could in this case impact the mark-to-liquidity by more. This interaction then magnifies the portfolio VaR.

This approach can be seen as reflecting the state of today's market liquidity in the VaR measure–already an important step forward. To address stressed market liquidity, we can shock the shapes of the MSDCs, defining a scenario where market depth decreases for all securities. Of course, such a scenario has no explicit effect on the portfolio mark-to-market, but does impact the mark-to-liquidity. So beyond assessing the cost of our liquidity commitments, we can examine the effect of a liquidity shock on this cost.

Ultimately, we may anticipate a model where we describe both the market and liquidity effects, and their interactions, statistically, and reflect all of these in the portfolio mark-to-liquidity. Such a model may be years away, but we should not let that frustrate us, nor distract us from the more immediate and practical applications above.

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