

## WHITE PAPER Hedge Fund Portfolio Pricing Best Practices

The recent recommendations put forward in April 2008 by two private-sector committees established by the President's Working Group on Financial Markets (PWG) call for much needed changes to valuation policies, disclosure, and accounting practices within the hedge fund industry. Industry experts agree that change is both necessary and imminent, but recognize the significant challenges when it comes to implementing a consistent, transparent and fair pricing methodology throughout the alternative investment management sector.

Hedge fund pricing has always been, at best, a highly inconsistent and unreliable process. The hedge fund industry has never been required to adopt a standard policy for valuing securities, especially the private, illiquid, and over-the-counter asset classes. However, recent market volatility and mounting pressure from institutional investors has forced hedge fund managers to focus on the adoption of a standardized pricing and valuation methodology. More recently, the issue of pricing and valuation has escalated to Washington. The PWG has specifically issued recommendations for pricing hard-to-value assets and has further recommended a formal pricing policy including increased disclosure, risk management guidelines, and operational best practices.

The PWG recommendation does raise the question as to whether hedge fund regulation is imminent or whether the recommendations are just another attempt to nudge managers toward a more institutionalized standard. Regardless, the recommendations fall well short in addressing the deeper industry conflicts in the handling of asset pricing and valuation. The institutional and individual investor communities have also stepped in and are now demanding improved transparency of hedge fund pricing and valuation. Hedge fund managers who do not comply will hurt their ability to attract capital.

The current methodology is clearly flawed. Today, any two hedge funds can price the same portfolio differently, and in both cases, the approach can be considered fair and accurate. This pricing inconsistency is a huge dilemma that must be addressed in order to demonstrate a good faith effort to provide transparency and pricing standardization to investors and regulators. This challenge is further complicated by the need for robust technology and operational processes to accurately and consistently value these securities across the industry.

This paper explores the hedge fund pricing dilemma in more detail and the need for transparency. This paper identifies the need for a collaborative effort amongst hedge funds, fund administrators, prime brokers, data vendors, and technology providers to define, implement, support and police an industrywide pricing solution. We predict that the hedge fund industry will join together in a constructive and helpful manner to define a consistent pricing and valuation process which will be accepted by both investors and regulators.

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## The Pricing Challenge

The root cause of the pricing and valuation dilemma within the hedge fund industry is the lack of any consistent pricing standards. Despite numerous methods of valuation and the existence of sophisticated pricing models, there remains a high degree of variance in the application and selection of pricing methodologies amongst hedge fund managers.

Today, there are three basic pricing methodologies: mark-to-market, mark-to-broker, or mark-to-model. Inconsistencies exist within each methodology; however, the model-based pricing is most problematic. Model-based pricing is most typically used to value illiquid or over the counter instruments that are not exchange traded and therefore do not have a reported market price. Since there are no established techniques or best practices for valuing illiquid securities, most funds either rely on their counterparty for pricing or have developed in-house proprietary valuation models. By their very nature, proprietary models will differ from one hedge fund to another especially given that the same model can be interpreted differently based on assumptions or can have multiple variations for the same asset.

The establishment of a consistent methodology will be extremely challenging. Illiquid instruments such as collateralized notes, credit swap derivatives, trade claims, and collateralized debt obligations (CDOs) have unique structures and are thinly traded which makes it very difficult to determine and accurate value. As a result, hedge funds attempt to value these instruments using proprietary mathematical models or if possible request prices from several brokers and take an average of the quotes. This of course begs the question as to how the brokers come up with a value, but in the end, the valuation of similar instruments differs widely from fund to another.

The inconsistency of pricing methodology creates a significant risk management problem for hedge fund managers that may ultimately result in legal action. If daily or monthly pricing is inaccurate or inconsistent, not only is it difficult for a fund to measure exposure, but it is difficult to accurately measure a funds historical performance. Investors can be subject to overpayment for units in a fund, increased losses on a sale, or payment of inflated performance fees, all of which can result in legal action and increase the likelihood of regulatory involvement.

In response, some of the larger hedge funds have attempted to document a formal pricing and performance reporting policy; however, fund managers have expressed concern that a valuation document could reveal proprietary trading strategies. To the contrary, a best-practice pricing policy is about the transparency of a firm's pricing methodology, not its portfolio holdings. If a standard pricing methodology is published and a formal disclosure process is agreed to across all asset classes, a fund's intellectual trading strategy will be protected since valuation reporting will not be fund specific. Without an industry standard across all asset classes, it could be argued that holdings information could be compromised.

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The pricing initiative will become more pressing as investors demand greater transparency in light of the recent market volatility. Traditionally, investors have accepted a lack of operational and pricing transparency taking comfort that the hedge fund principals and partners have significant equity and personal deferred compensation at risk. However, as more funds have announced negative returns and closings, both investors and regulators are urgently addressing this pricing and valuation issue.

### The Need for Operational Transparency

Portfolio pricing is probably one of the most challenging, yet arguably the most important task of any hedge fund operations department. Being able to accurately price the portfolio on a timely basis allows buy-side institutions to properly calculate exposures, forecast fees, report NAV, measure risk, evaluate margin requirements, and most importantly, to calculate performance. Today, the complex, multi-strategy hedge funds with sizable fixed income and OTC portfolios spend days, and sometimes weeks trying to calculate an accurate NAV. With the emergence of more comprehensive data feeds and third party valuation services as well as the existence of some newer enterprise-wide pricing applications, hedge funds have the necessary tools to make the pricing process more standardized and transparent.

Despite the availability of advanced portfolio valuation tools and specialized pricing services, the complexity of hedge fund trading strategies and asset classes has also increased. As hedge funds try to remain competitive, managers are taking on more risk and trading exotic OTC securities and illiquid assets such as parking ticket pools, race horses (“Big Brown,” coined as a “hedge fund horse,” just won the Kentucky Derby), surplus inventory of Nike sneakers, art, precious gems, antique violins, and Hollywood blockbuster movies. Even with all the available data from prime brokers, executing brokers, market data vendors, and valuation service providers, the ability to value a complete portfolio especially one with illiquid assets is extremely challenging and subjective. One can’t help but wonder how these investments get priced, and more importantly how does the pricing logic on those investments get explained if most of them are rarely traded, if at all? These illiquid investments expose investors to significant risk, and in many cases, investors are unaware or cannot quantify the risk. Illiquid securities can drop significantly in value overnight, and, thus, there needs to be transparency and a standard for valuing these investments.

The good news is that most hedge funds do make a concerted effort to conduct accurate portfolio pricing. Most hedge funds are still using spreadsheets to document their pricing processes, with no database or electronic workflow to highlight the process by which prices are obtained and calculated. While spreadsheets are the most inexpensive and flexible tool to utilize for modeling, pricing, and “what-if” scenarios, they do not store and organize a historical audit trail showing how prices have been derived over time. The ability to centrally collect multiple sources of data in a robust manner, determine an ultimate pricing calculation, and report this information on a timely basis requires specialized technology and skilled staff and is therefore rarely achieved. Some hedge funds have hired a Chief Risk Officer (CRO) to focus specifically on the implementation and oversight of a standard pricing policy. In many cases, the fund’s Chief Financial Officer simply accepts prices offered by the traders for valuation, which presents a clear conflict of interest. The CRO

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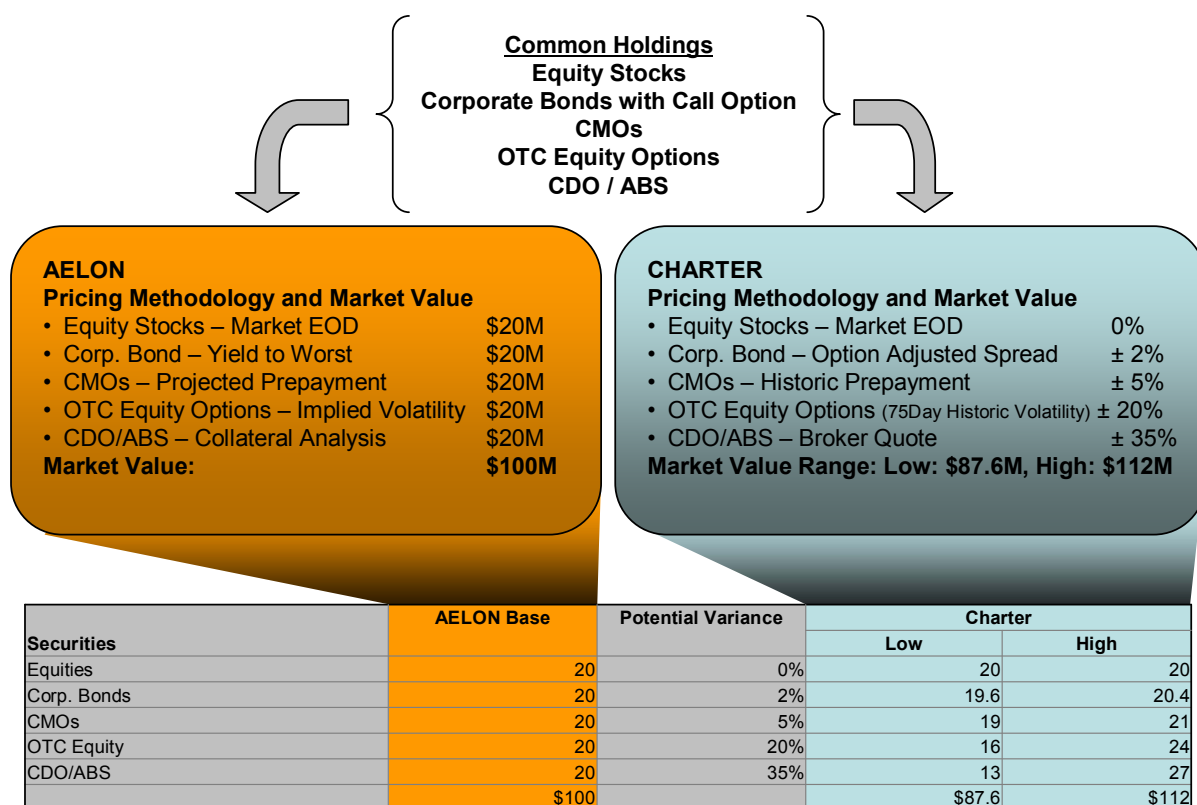
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can be empowered to be the final authority on pricing and can arbitrate between the front- and back-office on valuation issues.

For now, without a transparent process and consistent operational approach, hedge funds don't have a way to prove to investors that their pricing is reliable and market conforming. However, given the availability of new pricing technology, data providers, pricing service providers, and the emergence of the CRO role, the industry is finally in a position to work together to establish a pricing standard and may be able to preempt strict regulatory oversight which seems to be imminent.

## Case Study: \$100 Million Fund

As discussed, the core of the pricing issue is the existence of multiple pricing methodologies for the same asset classes. The following example illustrates how two identical funds can be valued differently based on their selected pricing methodologies. Consider two hedge fund managers, Aelon and Charter, each holding exactly the same basket of securities. Based on the application of different pricing methodologies and the potential variance in the price used for valuation, the two funds can report very different market values.



Numbers in Millions

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Neither fund value is incorrect; however, one could argue one methodology is “more accurate” than another for pricing a certain security type. Which methodology is the right one to use? Investors are demanding an answer to this question and are looking to the industry for answers. In the following sections, we explain the role of prime brokers, fund administrators, data vendors, and technology providers to push the industry toward pricing standardization.

### The Role of Fund Administrators

Fund administrators play an important but often misunderstood role with respect to pricing. The administrator’s responsibility to value a portfolio is determined by the individual administrator’s agreement with its hedge fund client, and not by any industry standard. Based on the offering memorandum, which is a fund specific document, any pricing policy is subject to the discretion of the hedge fund directors and their advisors.

Given the nature of the administrator/hedge fund relationship, the fund administrator often has difficulty getting the “last word” on pricing. Anytime there’s a discrepancy with the administrator, the hedge fund manager has the final say on prices. From a contractual perspective, there are clear-cut reasons for this. First, the private placement memorandums (PPMs) of most hedge funds usually do not contain specifics around valuation, due to legal limitations. As a result, the hedge fund manager’s agreement with its fund administrator is similarly vague about valuation, and in many cases does not closely coincide with the PPM. As such, if a hedge fund values itself at \$550 million, and a fund administrator values it at \$500 million, the fund administrator has no way to defend its pricing methodology or to prevail. With the ultimate legal responsibility for pricing falling to the hedge fund, many fund administrators may be all too ready to absolve their responsibility.

The administrator/hedge fund relationship is two-way and requires collaboration from both parties, as well as from the prime broker. For instance, while hedge funds are ultimately responsible for the content of their PPMs, the fund administrator could provide feedback on the PPM about pricing and ensure that adequate attachments are included. It is in the administrator’s best interest to push for clear objective pricing standards. Ideally, an administration agreement should be a mirror image to what the hedge fund manager has told investors about valuation, and should specify what processes the administrator will use to provide independent valuation. General, “catch-all” paragraphs about valuations cannot accurately reflect the specific valuation processes of a particular fund, which, as noted above, can differ markedly from that of other hedge funds. The agreement also needs adequate language that covers future trading intentions of the fund or defines what process will be implemented as new security types are added to the fund.

Hedge funds should also take more responsibility in this process. Within the PPM, a hedge fund should provide detailed specifics about pricing, taking into account the procedures or valuation hierarchy it will use to ensure an accurate valuation of the fund. The PPM can, for instance, specify that it will make use of

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independent pricing committees, outside expertise and representation from industry bodies to cover instruments that are traded at the outset, or will be traded in future. This could provide the basis for the fund administration relationship.

Based on interviews with fund administrators, it appears as though hedge fund and administrator documents are becoming increasingly vague. To gain transparency for investors, this trend must be reversed. At the same time, fund administrators must establish pricing policies of their own to allow them to assert influence over their hedge fund clients. A pricing policy should clearly state how all asset classes will be valued. Administrators should be enabled with clearly defined and agreed upon pricing methodologies and policies to ensure consistent valuations, more accurate and verifiable audits, etc. Without standardized methodology, administrators cannot assume the pricing liability and the situation will only worsen. The situation is especially challenging for smaller administrators.

### The Role of Prime Brokers/Counterparties

Prime brokers and counterparties are responsible for valuing instruments they trade, hold on their books, or have exposures to. Their buy-side clients typically rely on this information for internal valuation. Despite the existence of independent pricing sources, the use of counterparty valuations is still a common practice for hedge funds and asset managers especially when working with OTC, exotic, and illiquid securities. The main reason for this widespread practice is that the pricing is “free” to the buy side customer. However, industry scrutiny and publicity around pricing policies are forcing firms to revisit their valuation approach.

There are a number of inherent problems with using a single counterparty price. First, counterparty pricing is perceived to be biased. Although counterparties may use the most complex and sophisticated methodology to price OTC securities, the valuation is “somewhat biased,” because the organization’s exposures and performance are tied into the price. Further, the primary reason why prime brokers value a hedge fund’s holdings is to calculate collateral financing which could be a conflict of interest. To make matters worse, the prime broker often relies on their internal trading desk for a price, which again has inherent conflict. There even exists the perception that smaller prime brokers / counterparties are not forcefully controlling “Chinese walls,” which could result in information leakage between conflicting areas of the firm. More significantly, as the reliance on counterparty and dealer quotes becomes more prevalent, counterparties are having a difficult time keeping pace with valuing these complex instruments in a timely manner. As a result, hedge funds are in many cases receiving stale pricing from the sell side. For all of these reasons, the investor and regulatory community construe the single counterparty-based pricing practice as irresponsible and inaccurate, no matter how strict the processes and controls are on the sell side.

Given the fact that the use of broker supplied prices by the buy-side is inevitable, there are a few practices that hedge funds can use to mitigate pricing risk. In some cases, hedge funds use multiple prime brokers for pricing as well as independent valuation services and will compare sources to determine an asset’s value. The goal of the CFO or CRO should be to collect as many prices as possible from various sources including

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broker quotes, data vendors, traders, internal models, and independent valuation services and then to apply a consistent arbitration model or averaging formula to produce a conservative and transparent valuation. This practice does require experienced staff and specialized technology to collect, analyze, store, and report historical pricing information. But once the pricing infrastructure has been established, the addition of new sources, valuation rules, security types, etc. is a small marginal effort. By using multiple sources and arbitrating between them, buy-side organizations can demonstrate a consistent and proper approach which should be well received by investors.

Prime brokers can do their part to help the industry solve this problem by providing more transparency around their pricing methodologies. Prime brokers need to alleviate the concerns that investors have concerning biased pricing. In some cases, prime brokers have established independent valuation services for their customers, which would greatly benefit the industry if the practice could become more widespread. At the same time, buy-side operations professionals should be cognizant of “independency” requirements during the portfolio valuation process, and would be well advised to leverage pricing technology and to use multiple prime brokers and multiple sources of pricing information.

### The Role of Data Vendors

Market data vendors vary widely from one another in terms of asset specialization and delivery of information. The selection of a data vendor is usually determined by a hedge fund's trading strategy. The trading strategy dictates the type (by asset classes such as equity or fixed income), frequency (static, delayed, real-time, or historical) and manner in which pricing data is sourced and utilized for valuation. In some cases, managers rely on data vendors for real-time, low-latency data to fuel their algo-based investment decision engines, real-time P&L tools, and execution and order management systems, especially for listed securities. On the other hand, data vendors provide independent pricing for derivatives and hard-to-price and/or thinly traded securities for valuations.

Beyond simply providing a price, the data vendor's role is also to develop the most accurate pricing models based on sound analytical methods for the complex derivatives and structured securities typically held in hedge funds. As such, data vendors face significant challenges. First, data vendors must initially develop comprehensive pricing models and then continually fine tune these models based on observable transactions that provide indicative market prices for these hard-to-price security types. Data vendors must collect and apply ratings provided by issuer ratings agencies to appropriately establish the most accurate security pricing. Many securities including debt obligations and highly structured instruments require complete deal level detail to appropriately model the cash flows related to underlying securities and pools of instruments. Since there are always exceptions and variability based on the pricing methods and models employed, data vendors are also obligated to provide pricing desk support for valuation-related issues. These challenges should always be based on leveraging additional information to enable more precise securities valuations and pricing, thus tuning the prices to be as accurate as possible.

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Many vendors such as Thomson Reuters' DataScope, Bloomberg, CMA, FitchPricing (formally Lombard), Markit, and SuperDerivatives are hard at work in an effort to improve the pricing challenges. NYSE Euronext has recently introduced Prime Source, a Web-based pricing system that aims to help buy-side firms place market valuations on their complex structured products and illiquid securities. Together these data vendors service hedge fund managers and provide the prices and analytics as well as the pricing support services for accurate valuation.

In an effort to streamline the pricing process and to develop consistent pricing standards, the data vendors must continue to respond to the highly complex and diverse appetite of the investment community. They must continue to work with industry forums, clients, and partners to develop new pricing capabilities. There needs to be an increased focus on the acquisition of domain and securities-specific expertise and delivery of industry leading technologies to enable fund administrators and hedge fund managers' access to the most comprehensive pricing methods to meet their valuation needs. Again, the industry needs to address this problem on its own. Regulatory changes are coming such as FAS 157 which requires multiple sources in the pricing of illiquid, hard-to-price and thinly traded securities.

## The Role of Analytics Software Vendors

The use of computer models is a key component to establishing valuation best practices. Historically, the sophisticated computer models necessary to value illiquid and hard-to-price instruments were only available to the largest sell-side institutions with large development budgets. As the industry pushes toward transparency, hedge funds (and their counterparties) must look to leverage outside software vendors for access to model-based pricing.

The decision to select an analytics software vendor is critical, whether the fund chooses to run the software in-house, or to outsource pricing via a service provider. In the latter case, hedge funds should conduct a careful evaluation of their providers' analytics software vendor choices. The best packages cover a full range of instruments across multiple asset classes and are available with different interfaces. The leading vendors' offerings enable institutions to reliably value securities in the front, middle and back office – from trading to risk management and operations.

When evaluating analytics software vendors, hedge funds should consider:

- ▶ The package's ability to support new instruments and adapt to changing market conditions,
- ▶ The package's capacity to support different roles at the firm, from traders to risk managers to back office staff, and
- ▶ The analytics vendor's independence and freedom from influence from dealer banks and system and/or data vendors.

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As hedge funds evaluate analytical software vendors, they should focus on a few specific areas of functionality. First, an analytics package should be able to represent financial instruments using data-driven technology. This means that the package should be able to price different products solely through a description of a security without having to write new code to support new products. The analytics must support instruments with exposure to different asset classes and hybrids as well as embedded derivatives such as caps, floors and other options. In addition, the package should provide a large variety of configurable industry-standard pricing models that can be easily set up with reproducible and auditable results. An analytics package should provide user interfaces and developer application programming interfaces (APIs) that are applicable to different usage models at the institution. Interfaces including Excel for the traders, complete graphical user interface (GUI) applications for the middle and back office, and risk management and software developers' kits for programmers. The analytical software should integrate tightly with the trading system to ensure that the system works "out of the box" with the models from the analytics software vendor. This means that the APIs for the analytics should be easily "plugged in" to the trading system – possibly pre-built and in production use by the fund's buy-side peers and the sell side.

There are clear advantages of working with an independent analytics software provider including the ability to leveraging collective industry experience across asset classes, instruments and models, sharing the cost of quantitative analysts required to develop the models, obtaining support for multiple market data vendors, and having freedom from external influence. Given these advantages, we expect analytical software to become increasingly prevalent within hedge funds and it particular within those funds trading hard to price asset classes.

### Technology as an Enabler

As analytics providers and technology vendors evolve their product offerings to help hedge funds standardize their pricing and valuation and enhance transparency, hedge funds need a repository to collect, store, and analyze pricing and market data. Products that provide functionality to collect data from third-party pricing vendors, broker files, web sites, spreadsheets, text files, and emails by utilizing a comprehensive toolset of web site crawlers, file and email scrapers, and parsing tools -- without manual intervention -- are a significant step in the direction of providing pricing transparency. These tools should also provide a flexible user interface for analyzing pricing data (e.g., time series price variance), comparing price sources, and creating custom pricing rules based on firm-wide pricing policies and compliance requirements.

The value of a technology that provides a full audit trail of historical reporting, customizable views of market data, and a rule-based engine for analyzing price variances, price exceptions, and determining a "best source" is not to be underestimated. This type of technology significantly improves the efficiencies of the back office in pricing their portfolio and offers a consistent database for CFO's and CRO's to cost effectively address pricing transparency issues from investors and regulators. In the world of hedge funds, any solution

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to address pricing transparency, that does not have an onerous cost structure attached to it, is extremely appealing and today there are a few products in the marketplace that cost-effectively address the pricing concerns of regulators, hedge fund managers, and investors.

## The Move Toward an Industry Standard

The first step toward resolving inconsistent pricing and valuation is for the industry to take on the task of defining consistent pricing policies and methodologies that would be applied universally and, in effect, become law. These standards should be led by the industry and not by regulators. In our view, this call for action is not only the responsibility of the hedge funds. The prime brokers, fund administrators, data, technology, and software vendors all have a role to play in developing these de-facto pricing standards. Hedge funds that are seeking to move toward best-practice standards can look to industry associations and working groups for guidance, as well as leaders in the space. Working groups with representatives from prime brokerage, analytic and data vendors, administrators, auditors and investors will define the standards to be implemented by compliance officers within hedge funds.

The PWG<sup>1</sup> has recommended that managers should establish a comprehensive and integrated valuation framework to provide for clear, consistent valuations of all the investment positions in the fund's portfolio, while minimizing potential conflicts that may arise in the valuation process.

### In summary, they recommend the following framework:

- ▶ A governance mechanism, such as a Valuation Committee or other responsible body; this body should have ultimate responsibility for (i) establishing and reviewing compliance with the Manager's valuation policies and (ii) providing consistent and objective oversight and implementation of the Manager's valuation policies and procedures;
- ▶ The development by the Manager of well-documented valuation policies, as well as guidelines to evaluate exceptions and to test and review compliance with policies and procedures; and
- ▶ Sufficiently knowledgeable and independent personnel supported by adequate resources that are separate from and do not report to the trading or portfolio management function and that are responsible for the valuation of the fund's investment positions and for implementing the Manager's policies and procedures.

### But, we believe some additional, near-term actions could also be taken by the industry, including:

- ▶ Agreed consensus on the need for "best practices" in the application of pricing methodologies for valuation;
- ▶ Specifics for agreeing on the use of pricing methodologies including standard language for disclosing the valuation method;

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- ▶ Established and written pricing procedures and valuation hierarchies at fund administrators, prime brokers and broker-dealers;
- ▶ Appointment of a compliance officer or Chief Risk Officer who is in charge of overseeing and implementing the pricing policy;
- ▶ Increased use of independent analytics and third-parties to value the portfolio; Agreed improvements across all operational aspects of hedge fund business practice; and
- ▶ Specific detailed disclosures on the implementation of pricing and valuation policies to investors on NAVs and balance sheets and annual reports.

It's not just the hedge fund manager's responsibility to identify and adhere to valuation and pricing standards, methodologies and consistent best practices. Counterparties, service providers, data and technology vendors and software analytics providers should all participate in a concerted effort to effect achievable change across the industry. This goes beyond the PWG's recommendations which, while sound, put the onus back on the hedge fund managers.

## Conclusion

The first step to solving the pricing dilemma is standardizing pricing methodologies across asset classes, with fund managers' agreement on the methodology whether or not they hold that asset class in their portfolio of securities. These standards -- combined with written pricing policies at hedge funds and backed by documented procedures and valuation hierarchies by third-party independent fund administrators -- will lay the proper pricing foundation for the industry. Well-documented and communicated operational and pricing methodology, supported by sufficient infrastructure and operational process, will benefit hedge funds and the industry at large and take the mystery out of pricing. Ultimately investors will allocate more capital to hedge funds and the industry will benefit as a whole.

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NumeriX is the award-winning, independent leader in pricing and risk analytics for fixed income, credit, foreign exchange, hybrids, cross currency, commodities, inflation rate and equity derivatives. NumeriX has a financial engineering and quantitative team composed largely of PhDs on the same scale as the very largest of financial institutions. More than 300 clients across 25 countries rely on NumeriX for speed and accuracy in valuing their structured products and derivatives. Trading and risk platform vendors leverage NumeriX analytics to gain a time-to-market advantage by embedding the power of NumeriX into their systems. Founded in 1996, the company is privately held and has offices in New York, London, Singapore, Hong Kong and Tokyo. For more information visit [www.numerix.com](http://www.numerix.com).



## Additional Resources

1. To read the recommendations put forward by the President's Working Group on Financial Markets, visit <http://www.amaicmte.com/>.
2. The Alternative Investment Management Association, Guide to Sound Practices for Hedge Fund Valuation - <http://www.aima.org/uploads/ExecSummaryAIMAGuideSPforHFValuation2007.pdf>. The AIMA guide provides 15 recommendations on sound practices for hedge fund governance, transparency, processes and methodology, as they relate to the valuation of portfolios. One of its big initiatives is a template for a hedge fund valuation policy document.
3. International Organisation of Securities Commissions, Principles for the Valuation of Hedge Fund Portfolios. - <http://www.afm.nl/registers/default.ashx?DocumentId=8919>. An IOSCO committee -- including US, UK, French, German, Hong Kong and Spanish regulators, as well as hedge funds and investors -- proposed nine principles of valuation. The main suggestions were that hedge funds should draw up policies for valuing investments, ensure they are used properly and applied as independently as possible. Valuation methods should also be made clear to investors.

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