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# A Review of Recent Actual CRO<sup>®</sup> Class Outcomes

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Over the last few years, PCA has worked closely with its clients to develop and implement a risk mitigating class entitled the Crisis Risk Offset® (CRO®) class. The class typically contains three core components (long U.S. Treasury duration, systematic trend following, and alternative risk premia) to help combat severe downturns in equity-oriented assets driven largely by economic growth while also seeking to maintain purchasing power in more benign market periods. This paper reports on the structures and results of five actual CRO® class portfolios over the last 12 months ending 6/30/2018 – the first year all five portfolios have in common. Over this relatively short period, all the CRO® class portfolios have met performance expectations.

**A**s early as 2005, PCA began discussing with its clients the importance of thinking about strategic allocation differently. These conversations came about largely because of how institutional portfolios suffered during the 2002/2003 equity bear market. After the Global Financial Crisis of 2008/2009, this issue only became more acute. Importantly, the combination of these two equity bear markets and the general maturation of retirement systems (e.g., net negative external cash flow due to high levels of retirees) has put these systems in a highly precarious position going forward. In our opinion, any strategic thinking applied to a retirement system's asset allocation needs to take these dynamics into account.

The strategic allocation framework PCA now utilizes with its clients incorporates two basic concepts. First, given both the increased spectrum and complexity of investment options in today's global investment markets, it is important to keep the strategic level decision-making process as straightforward as possible. Along these lines, PCA has introduced a portfolio framework that organizes system assets by functional and/or risk exposure profiles rather than by asset descriptions. This framework allows trustee-level decision-makers and other stakeholders to maintain

a clear understanding of the role, drivers, and purpose of each subset of a system's assets.

Second, PCA utilizes a Simulation Based Optimization (SBO) approach to determine the best combination of strategic classes for a specific system. Under the SBO approach, collaboration between PCA and a system's actuary allows for the integration of the asset behavior model and the actuarial liability behavior model. By combining these two models, decision-makers can examine a near-complete spectrum of future system-level financial projections. Absent this integration, decision-makers may lack a complete awareness of how the asset-side of their system's balance sheet impacts overall system behavior. Furthermore, examining and optimizing on both shorter-term and longer-term future outcomes allows decision-makers and stakeholders to gain a robust awareness of the potential future rewards and pitfalls associated with their specific system. Such analysis represents a "best-practices" analytical framework, as presented by the Blue Ribbon Panel of the Actuarial Standards Board and other practitioner groups.

### **CRO® Class Development**

One major outgrowth of applying the above two fundamental

A portfolio framework that combines assets by function and/or risk exposure is the first step in implementing a CRO program.

allocation concepts is the design of strategic classes that seek to accomplish specific objectives/fill specific roles. Over the course of many asset-liability studies, PCA became aware that an underfunded retirement system that experiences sizable periodic negative cash flows is highly susceptible to large dollar-value declines across a large proportion of a system's risk-oriented assets. This finding led to the development of a diversifying class we established in 2014 called the Crisis Risk Offset® class, or CRO® for short.

The CRO® class is designed to have a high-probability (albeit not certain) of producing positive returns during periods when a system's other risk-oriented assets experience significant declines. Typically, there are three assets/strategies that the CRO® class utilizes to meet this return/risk profile: (i) long duration U.S. Treasuries; (ii) systematic trend following strategies (STF), and (iii) alternative risk premia (ARP) strategies. The latter two strategies utilize long-short portfolios to capture well-documented risk premia that are either counter-cyclical (STF) or independent (ARP) of an investment portfolio's other risk-oriented strategies. There are variations of a CRO® class that may include other components. PCA's earlier paper *CRO® Class Framework* (August 2018), provides further detail on these strategies and how they may be combined to create the CRO® class.

PCA began working with clients to consider the CRO® class during asset-liability modeling studies in

2014. Over the course of the following 18 months, five of PCA's clients adopted customized versions of the CRO® class. The range of client scale in terms of assets is wide, indicating the broad applicability of the CRO® class. Specifically, working closely with PCA, CalSTRS adopted its own version of the class (termed Risk Mitigating Strategies or RMS); the ERS of Hawaii approved a CRO® class utilizing the three components discussed above; and three other smaller pension funds established customized versions of the CRO® class. As a result, the CRO® class concept has been adopted by pension plans ranging from \$225 billion in total assets to plans one-tenth of that size. As of June 30, 2018, all of these highlighted clients have invested in their version of the CRO® class for at least one year. Given the importance of translating a concept to reality and beginning to assess if the concept working as expected, we believe it is important to examine the initial results of these dynamic CRO® classes and report on their collective progress over this initial year of live performance. In light of this analysis, we also recognize that CRO® implementation and management is a long-term strategy, playing a key strategic role in a diversified portfolio.

**Several PCA clients now rely on the CRO® class solution to significantly impact total portfolio results.**

### ***CRO® Class Allocation and Structures***

In aggregate, assets allocated to the CRO® class (or its variants) across the above five client portfolios totals approximately \$25

billion. The median CRO® class size is approximately \$700 million. All plan sponsors have made material policy allocations to their versions of the CRO® class. Current policy allocations for the class range from 8% of total portfolio assets to 16% (average allocation = 13%), with several CRO® classes slated to evolve toward higher levels (e.g., 20%) over time.

These sizable allocation levels reflect, to some degree, PCA’s recommendation that strategic allocations to major classes be of significant size. At appropriate sizing, the impact on the return/risk profile of a total portfolio will be material, which is desirable. Given the dynamic nature of the CRO® class and its offsetting role in the portfolio, assigning it only a minor allocation level would likely end up adding a level of complexity without exhibiting any real benefits.

### CRO® Class Structures

As highlighted above, a CRO® class structure has three foundational components: long U.S. Treasury duration, systematic trend following (STF), and alternative risk premia (ARP). As discussed in *CRO® Class Framework*, each of these components have expected functions within the broader class: long duration should serve as a “first responder” during a deflationary market crisis; STF is a “second responder” that should appreciate materially once a crisis matures and market trends becomes evident; and ARP is expected to provide real growth in the CRO® class that is independent (i.e., isolated from) of

other risk-oriented classes. In this respect, the ARP is not necessarily expected to produce appreciation during a market crisis. Its purpose is to help the CRO® class maintain its purchasing power during non-crisis, more benign investment periods.

Given this framework backdrop, each client has structured their version of the CRO® class differently. Across the five clients listed, here are the components utilized:

**Number of CRO® Portfolios Utilizing a Specific Component**

CRO® Component	# (out of 5) of CRO® classes utilizing:
Long Duration	All 5
Systematic Trend Following	All 5
Alternative Risk Premia	2
Global Macro	1

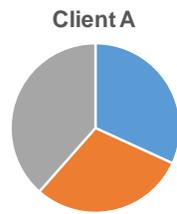
The common thread across all clients are the use of long U.S. Treasury duration and STF strategies for mitigation or offset purposes. ARP strategies are utilized in varying degrees, but for the most part, are a secondary consideration (but still critical strategy). Global Macro (GM) strategies are utilized by one client due to that client’s view that GM captures market event-related fulcrum points better than the other components.

The pie charts on the next page show the range of component capital weightings across the five clients currently utilizing the CRO® class:

While CRO® structures can vary, long duration is relied upon as a “first responder” with trend following coming in to fill gaps during an extended crisis.

### Component Breakouts Various CRO® portfolios

■ Long Dur ■ Trend ■ ARP ■ Macro



In 4 of the 5 portfolios, long duration is the largest segment, but often only modestly greater than the STF component. In all cases, the STF is the second-largest or largest component.

As we discuss below in the performance section, the interplay among these segments, particularly during the beginning point of a broad market crisis, will be critical.

Given the multi-component aspect of the CRO® class, it would be easy to see manager proliferation occur. Importantly, PCA's objective is to ensure that the CRO® class remains a systematic beta class rather than be focused on alpha. As is well understood by many practitioners, pursuing active management (if not analyzed correctly) in the name of pursuing incremental added value can simply result in a portfolio of untracked systematic betas. As a result, to manage the CRO® class in as streamlined and cost-effective manner as possible, PCA continues to explore the question: How many managers does it take to create the systematic beta exposure(s) that we are looking for? Our answer typically falls into the category of "far fewer than most might think."

### Recent CRO® Class Performance

Over the last year, the several variations of CRO® class structures, utilizing a range of manager combinations, were implemented in the actual market environment. Given this short, but informative, track record, we can begin to assess the efficacy of the CRO® concept and determine whether it is or is not meeting expectations.

Importantly, we must relate the CRO® classes' track records to the market environment that prevailed. That is, we must "take it in context."

The market environment from 7/1/2017 through 6/30/2018 exhibited several major adjustments but ended up producing relatively strong returns for risk-oriented assets, while more stable asset groups produced relatively poor results. In

other words, it turned out to be a “risk on” environment (see table below).

**Range of Market Returns  
(1 Year, ending 6/30/2018)**

Market (benchmark)	Return
Private Equity (Cambridge-1 qtr. lagged)	16.5
U.S. Equities (R3000)	14.8
Emerging Mkt. Equities (MSCI EM)	8.2
Non-U.S. Equities (MSCI ACWI ex-US IMI)	7.3
Low-rated Fixed Income (BB High Yield)	2.6
Glbl. Fixed Inc. (JPM GBI Unhedged)	1.9
1-3 Yr. U.S. Treasuries	0.0
Long U.S. Treasuries	-0.1
Core-plus Fixed Income (BB Universal)	-0.3
Core Fixed Income (BB Aggregate)	-0.4
Intermediate U.S. Treasuries	-0.7
Emerging Mkt. Fixed Income (JPM EMBI)	-2.5

Sources: Bloomberg, PIMCO, JPMorgan, Cambridge

As the table highlights, all higher-risk/equity-exposed markets (including Low-Rated Fixed Income) produced generally favorable returns, while safer investments produced low or even negative returns. So, under this market context, the premise for the CRO® class (downside protection) was, in a sense, not rewarded. In such an environment, as discussed earlier, the CRO® class is expected to roughly maintain its purchasing power (i.e., grow in-line with inflation) taking into account its relatively high volatility.

Given the full 12-month period results highlighted in the above table, there were a few key events that jolted the markets during the period:

- Over the course of June/July 2017, policy makers in the European Union indicated they would begin unwinding their easy monetary policies. This

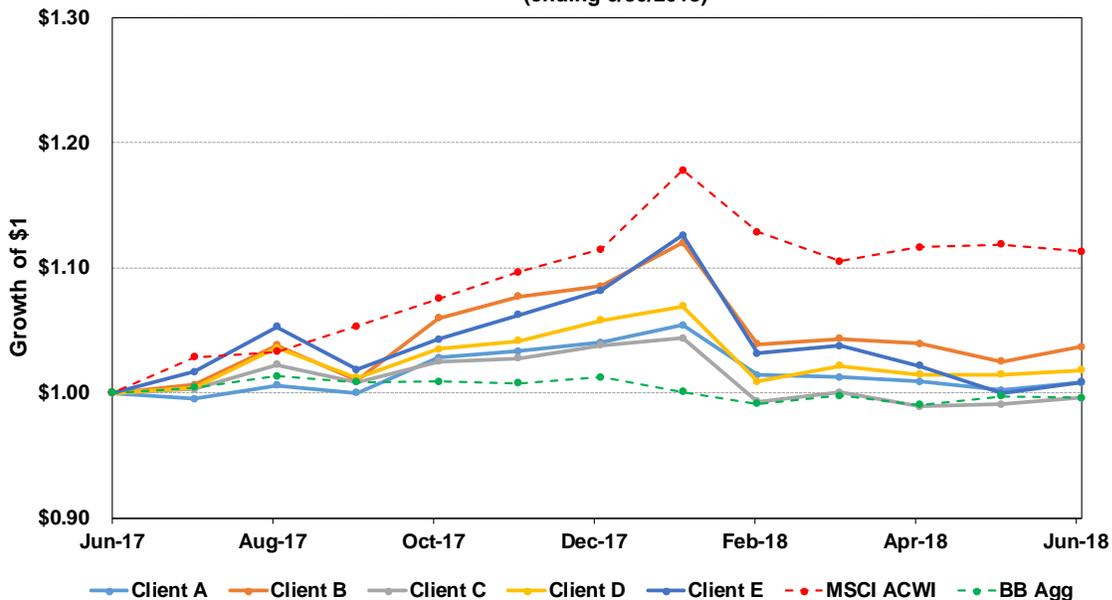
signal negatively impacted both equity and bond markets.

- Across the weeks spanning late-January through February 2018, inflation fears first triggered major adjustments in interest rate markets which then caused the first (10%) correction in global equity markets since early 2016. By the end of February all major risk markets had again recovered a significant portion of the earlier losses.
- March 2018 also saw a ramp up in volatility as the markets began to hone in on the potential impact on the recent U.S. tariff policies against several trading partners, in particular, China.

During this twelve-month journey (i.e., full-period risk-on rewards accompanied by a few significant jolts leading to short-term drawdowns), the CRO® classes performed in-line with expectations while exhibiting some tendencies that warrant further investigation.

Over the entire 12-month period, CRO® class returns ranged from -0.4% to +3.6%, with the simple average of the five portfolios being +1.35% (see on next page).

**12-Month Cumulative Performance  
5 CRO® class Portfolios  
(ending 6/30/2018)**



Sources: various custodians, PCA

Given that the role of the CRO® class is a risk mitigator and downside risk minimizer, these results proved favorable, particularly with the other safe-haven assets (i.e., investment grade fixed income) produced largely negative results over the same period (see table above).

All five CRO® class portfolios matched or outperformed a standard core fixed-income portfolio, as proxied by the BB Aggregate Index. Four of the five CRO® class portfolios produced positive returns. Of these, the average return was 1.8% during a period when the Consumers Price Index (CPI) rose by 2.9%. In addition, and arguably most importantly, over the entire period, each of the three underlying components produced results that were in-line with expectations. The long U.S. Treasury duration and STF

components were relatively volatile and produced slightly negative-to-flat returns during a “risk-on” environment (within expectations), while those CRO® class portfolios that held the ARP component at a significant proportion outperformed their counterparts that did not – indicating that during this most recent risk-benign period, the ARP component also achieved its objective.

Performance During Events

Given the relatively satisfactory outcomes of the CRO® class portfolios over the entire 12-month period, we noticed some biases in the CRO® class portfolios during the short-term event periods described earlier. While a CRO® class is not designed to capture or exploit short-term moves in the markets (or even market corrections), behavior of the CRO® portfolios during these

During fiscal 2018, PCA client CRO® portfolios performed in-line with expectations.

periods proved instructive and revealed some key risks that are evident in certain CRO® class constructs.

- During several market fulcrum-points, the CRO® components tended to move together (much like traditional asset classes).

When the event-surprise was a spike in interest rates or an upward surprise in realized inflation, during the initial phases of the event, interest-rate risk premiums and equity-premiums moved together in a significant negative direction. Many STF managers were positioned assuming a continuation of positive equity and interest rate trends and their portfolios declined in concert with long duration portfolios.

- Many of the ARP portfolios exhibited positioning that proved to be “too directional,” meaning that, instead of being exposed to highly complementary risk premiums, they too had significant exposures to the equity risk premia and interest rate risk premia that the STF managers also had. As a result, certain

ARP managers exacerbated the downside fulcrum-point moves of the other CRO® class components.

One key lesson learned is that it would likely prove beneficial from a within-CRO® portfolio context to require ARP managers to avoid exposure to the time series momentum/trend risk premia.

### **Summary**

There are now several CRO® class portfolios producing live track records. Over the last year (a relatively benign market environment) these CRO® classes met their performance expectations, matching or exceeding the returns of other stable assets (such as core fixed income) while providing ample diversification to a total portfolio containing large allocations to growth-risk assets. While modest changes are envisioned as we continue to fine-tune this evolving class, CRO portfolios are performing in-line with expectations.

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