



BOARD OF TRUSTEES RISK WORKSHOP
Telephonic

November 5, 2020

8:30 - 11:00 a.m.

Webinar Access (click link to join webinar)

Join via WebEx and enjoy the ability to listen on your computer and follow presentations:

<https://apfc.webex.com/apfc/onstage/g.php?MTID=e67b8fe2de1af7e50dc2a77adafb5adf7>

Event Password: APFC1105

Teleconference Option

*If you are unable to join in-person or via webinar, please contact us at
(907) 796-1519 to receive a teleconference number.*

AGENDA

THURSDAY, NOVEMBER 5, 2020

- 8:30 a.m. CALL TO ORDER
- SCHEDULED APPEARANCES AND PUBLIC PARTICIPATION
- 8:45 a.m. RISK APPETITE AND RELATED TOPICS (Information)
- 9:50 a.m. BREAK
- 10:00 a.m. RISK PRESENTATION CONTINUED
- 10:50 a.m. TRUSTEE COMMENTS
- 11:00 a.m. ADJOURNMENT

SUBJECT: Risk Workshop

ACTION: _____

DATE: November 5, 2020

INFORMATION: X

BACKGROUND:

This special session on risk management, based on trustee requests, was scheduled with the objective of focusing on risk aspects, and risk appetite in particular.

STATUS:

The presentation is structured as six sections, starting with (1) outlining the goal of risk management, then (2) touching on APFC's evolution/transformation into a more complex organization, followed by (3) providing an overview of historical performance and potential risks, which leads into (4) the need for defining risk appetite and a proposed risk appetite format. The next section (5) summarizes the challenges with modeling private asset risk, and various perspectives that show an approximate trend, since this is an important input into risk measures and risk appetite. Finally, (6) highlights operational risks, in light of the APFC's 5-year plan and evolving asset mix.



ALASKA PERMANENT
FUND CORPORATION

Risk Management Workshop

Sebastian Vadakumcherry
November 05, 2020

Key Topics Covered

1. Goal of Risk Management
2. APFC: Evolution & Transformation
3. Investment Objectives: Risk & Return
4. Risk Appetite
5. Private Equity Risk Measurement
6. Non-Investment / Operational Risks



1. Goal of Risk Management

APFC is in the business of taking risk

- APFC has to take risks in order to achieve its return objectives
- The goal of risk management is not to avoid risks, it is to:
 - ✓ know and understand the risks taken,
 - ✓ measure, monitor and report these risks, and
 - ✓ manage risks to acceptable levels, and review whether returns are commensurate
- The risk management effort is not owned by or the responsibility of a single team or department. It is a collective responsibility, including all staff and trustees
- The risk function primarily aims to:
 - ✓ provide a different perspective (*mostly: what can go wrong? How much can we lose?*),
 - ✓ constructively challenge assumptions,
 - ✓ measure and provide a complete and aggregated 'risk picture', including external indicators



2. APFC: Evolution & Transformation

Context & background

Alaska Permanent Fund Corporation (APFC)

- Value adding & worthy purpose
- Excellent performance track record
- Strong leadership and culture
- Passionate & high caliber team
- Proven business model
- Continuous support & guidance from BOT

APFC has made considerable progress since its inception, a reflection of prudence, strength and resilience

.....the success has also resulted in the transformation of the organization

Evolution & transformation

Growth not just in fund size

- Increased diversity & complexity of asset classes
- Transaction volumes have multiplied
- Number, diversity & remoteness of counterparts have expanded
- Technology has taken over almost every facet of business conduct

Besides these *internal* trends continuing, the operating environment is rapidly changing as well

- Cyber & technology crime
- Fraud and malpractices
- Climate change
- Legal & regulatory frameworks

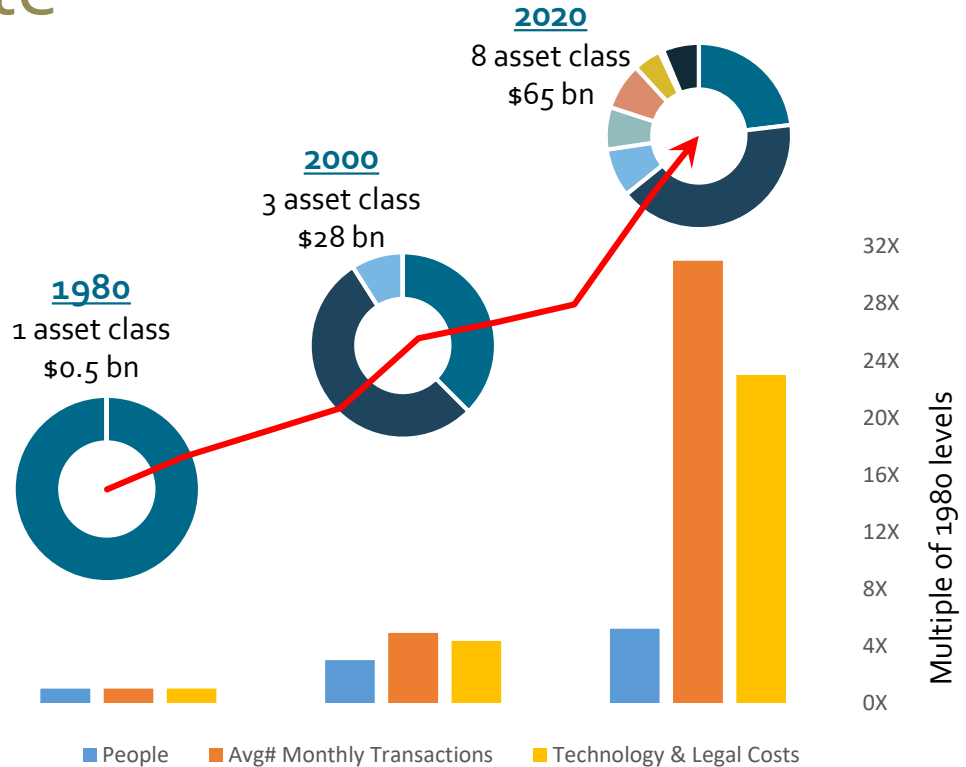
	Size (\$bn)	#Asset Classes	People	Avg Int'l #Monthly Transactions	Legal & Electronic Srvs Costs
1980	0.5	1		n/a	
1985	7	3	11	16	299
1990	11	3	18	n/a	356
1995	15	3	25	n/a	861
2000	28	3	33	79	1,297
2005	31	5	35	n/a	1,160
2010	34	7	37	66	2,158
2015	46	7	38	224	2,141
2020	65	8	58	494	6,979

Numbers in above table are approximate and in some cases derived. The objective was to identify & highlight broad trends

Aligning to future state

It is vital to recognize the transformation and align APFC to the future

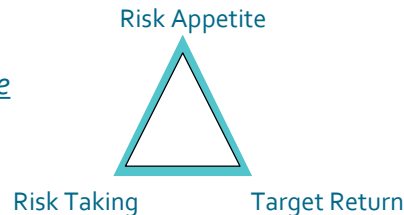
- We should expect the Fund to reach the \$90 - \$100 billion mark in around 10 years
- Types, complexity and velocity of risks have significantly increased, due to both internal transformation and external factors. The trend is likely to continue, if not accelerate
- The need to expand resources, mature and strengthen control frameworks, in line with growth, is real



Risks: Changed landscape

- While 'investment risks' entailed in our portfolio have increased, the rise in exposure to 'non-investment risks' – like operational, technology, legal, reputational – is more profound. (Note: 'non-investment' is merely a naming convention used here. 'Non-investment' risks can also potentially result in significant financial loss)
- The "How" is as important as the "What" in terms of our business activities. It is vital that we are adequately aware of such non-investment risks and take steps to mitigate them
- While, a robust GRC (**G**overnance **R**isk and **C**ompliance) capability is the ultimate goal, the first step in the journey is to strengthen and formalize the risk management aspect – particularly risk appetite

Aligning the 3 is a key objective





3. Investment Objectives: Risk & Return

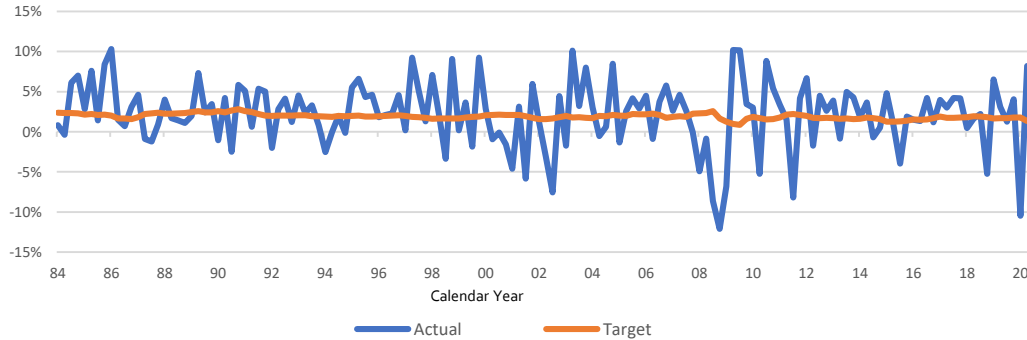
Important aspects to consider

- What is the appropriate time horizon for APFC, in terms of performance measurement? And consequently, risk measurement and asset allocation / portfolio optimization?
- How has APFC fared in terms of performance relative to benchmark – in the long term?
- How would performance be impacted by extreme events similar to the 2008 recession? What is our risk appetite? Should / can it be different for Long Term (vs) Short Term?
- Should different asset classes be treated differently: in terms of risk appetite and portfolio construct?

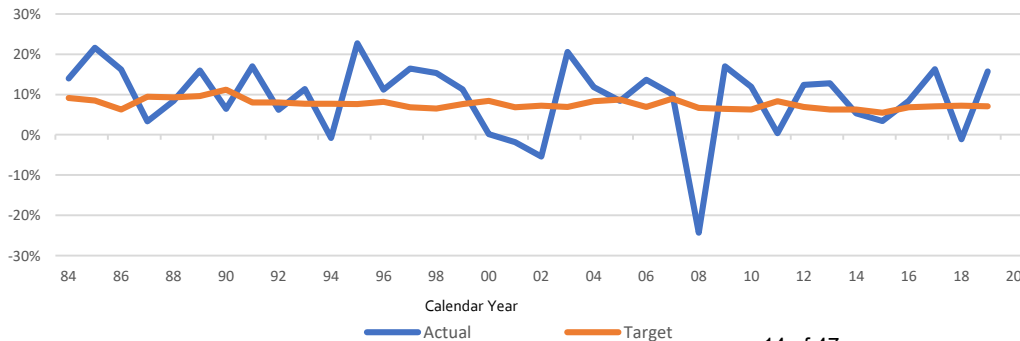
The analysis in Part 3 is based on data as of June 30th 2020

Time Horizon: important when measuring relative performance

Long Term Target = CPI+5%

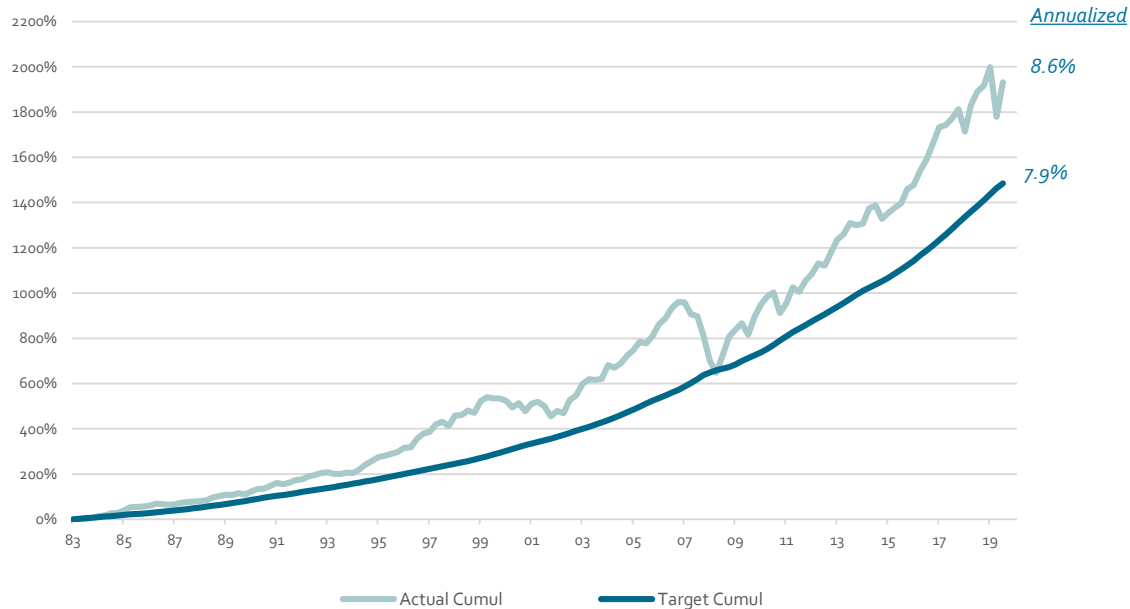


- Quarterly Return Comparison
Quarters below LT target = 45%



- Annual Return Comparison
Years below LT target = 39%

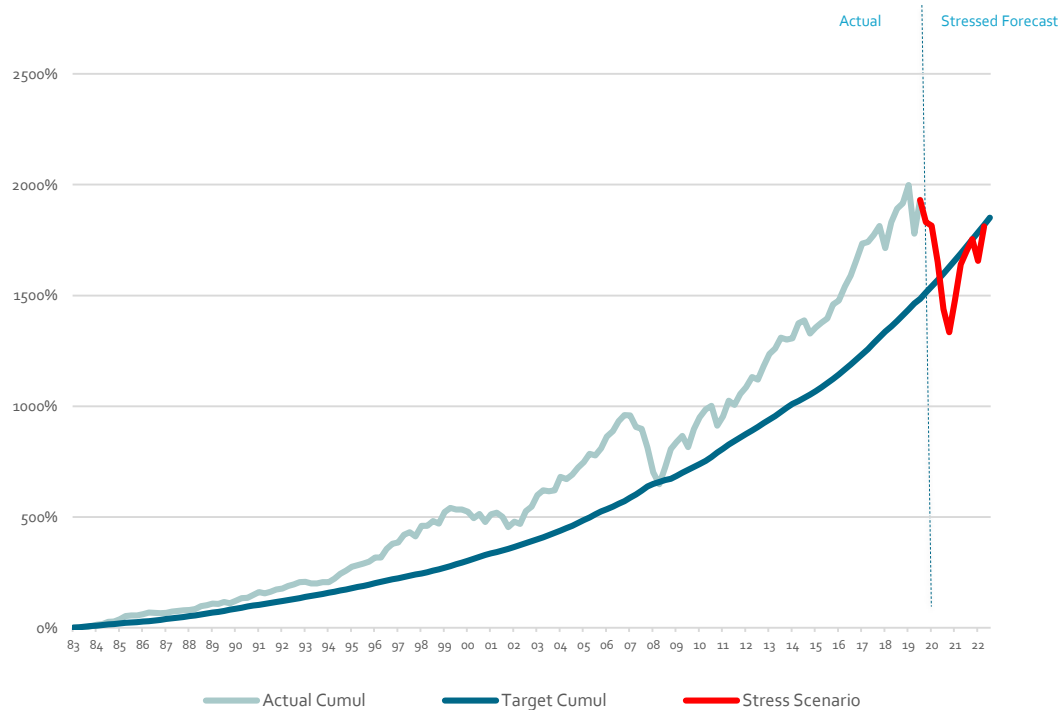
Actual (Vs) LT Target: inception to Q2/2020



Cumul = cumulative compounded quarterly returns

- Long Term (LT) Target: CPI+5%
- On a cumulative basis, returns exceeded the LT benchmark most of the time
- An exception was during the 2007-2009 crisis, when APFC recorded 6 consecutive negative quarters for an aggregate ~30% decline
- APFC bounced back to above LT target levels in the first quarter after the drawdown
- Currently, APFC has a ***seemingly*** comfortable buffer of excess returns = over 30%

Performance (Vs) LT Target: Stress Scenario



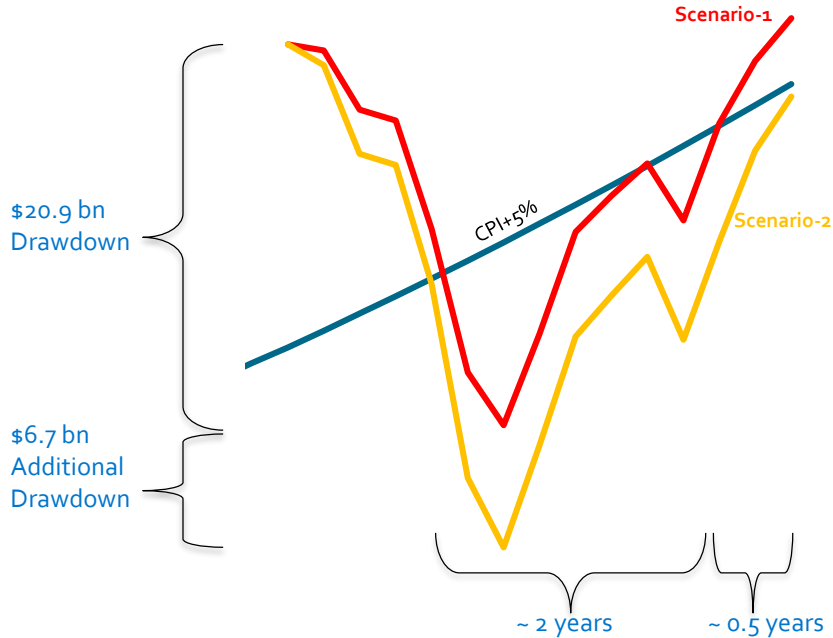
Stress Scenario: 2008 recession

Drawdown: assuming same % of quarterly returns Q4/07 to Q1/09

Recovery: assuming same % of quarterly returns Q2/09 to Q1/11

- A repeat of the 2007-09 period would result in cumulative returns falling well below LT target
- This is assuming the same % quarterly returns registered by APFC in 2007-09
- Unlike previously, in a repeat scenario, it would take ~ 6 quarters to return to LT target (previously, it took just one quarter)
- Essentially, this would imply that for close to 8 quarters, performance would be below LT target.

Stress Impact: ...a 50% drop requires a 100% rise to even out.....



Scenario-1: 2008 Repeat

Applying the same % returns as experienced by APFC during the 2008 crisis and immediately after

- Potential drawdown of almost 32% (~\$20.9 bn), with recovery (i.e. return to CPI+5%) taking almost 8 quarters

Scenario-2: 2008 Repeat with scaled down Fixed Income

Scenario-1 layered on with an assumption that Fixed Income is scaled down to 5% of total fund

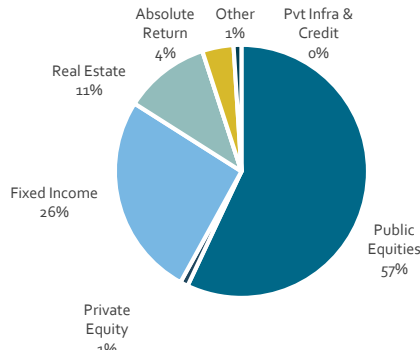
- Potential drawdown of over 42% (~\$27.6 bn), with recovery (i.e. return to CPI+5%) taking almost 10 quarters

Notes:

1. Several additional simplifying assumptions have been made including: that the quality / nature of portfolios is the same as in 2008, the estimates of inflation, etc.
2. Scenario-2 assumes a scaling down of fixed income just prior to crisis, with proportionate increase in public equities.
3. In a 2008 recession scenario, the Aladdin system estimates a drawdown of almost 48% for the fund with current asset allocation, compared to a 44% decline for the benchmark.

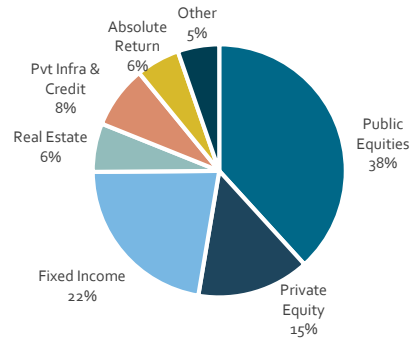
Asset Allocation & Riskiness: 2007 Vs Current

2007 Asset Allocation



VaR* = 24.6%

Current Asset Allocation

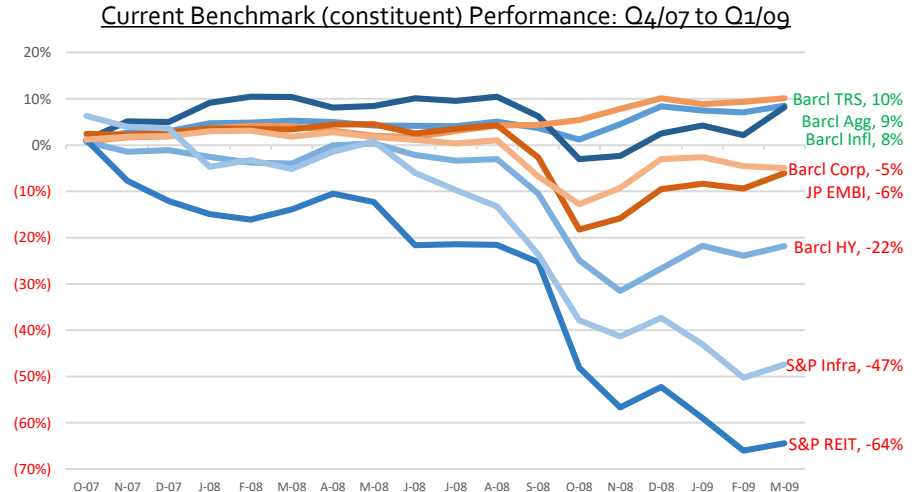
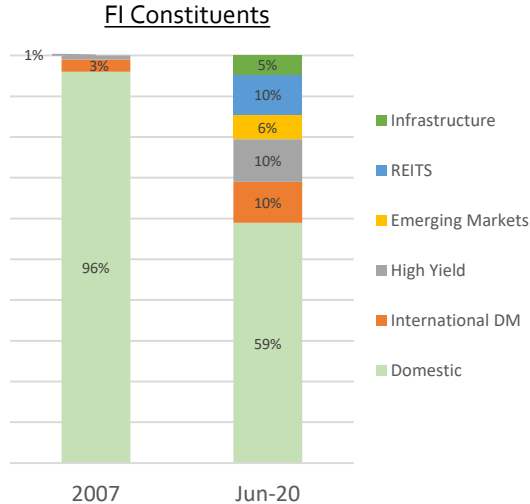


VaR* = 27.2%

*VaR was measured changing only the exposures and not underlying market data (i.e. keeping the same volatility & correlation data sets)

- The current asset pie 'seems' more diversified than just before the 2007 crisis. Is it really less risky?
- From a VaR perspective, perhaps not. The current asset mix entails a higher VaR % than in early 2007.
- Reasons for a higher VaR %, for the current allocation, include:
 - In early 2007, fixed income and real estate, which are relatively less correlated to equities, was almost 37% of the pie, compared to just 28% currently.
 - Growth of the private equity portfolio, which entails a higher VaR and has a high correlation to public equities
 - Addition of REITs and Infrastructure holdings, combined with higher exposures to High Yield and Emerging Market debt, resulted in a 'riskier' Fixed Income (Plus) portfolio

Fixed Income Portfolio: risk transformation



- While in 2007 the 'fixed income' portfolio predominantly contained high quality domestic bonds, the current portfolio includes more volatile components. These 'higher risk' components experienced deep drawdowns during the 2008 recession.
- Given the changed construct, this portfolio is likely to be worse-off in the event of a future market downturn, compared to the 2008 recession.

In summary

- Historically, APFC's long term performance has consistently exceeded its long term benchmark.
- If the 2008 recession scenario were to repeat, APFC is likely be worse off than in 2008. The underperformance relative to long term benchmark would be protracted and deep.
 - especially given that the fund has added on 'riskier' components to the portfolio mix
 - In the past, fixed income had a dampening effect on drawdowns

Risk Appetite

- It is prudent to establish a risk appetite for APFC



4. Risk Appetite

Risk: is as important as 'Return' in formulating investment strategy

- Defining a performance target in terms of 'returns' alone is not only incomplete but could also lead to inaccurate inferences and undesired outcomes.
- Ignoring or not factoring the risks entailed in generating a return can be a costly a mistake.
- The flaw is more pronounced if comparative performance (say, versus peers) is measured solely in terms of returns. **The same return can be achieved by taking varying levels of risk.**
- The objective should be to: achieve target return by taking the lowest level of risk; or maximize the return for a desired risk level.

“A more sophisticated lens will always focus first upon risk appetites rather than simply returns” — N.P. Narvekar, CEO Harvard Management Company

Risk Appetite: articulates the risk threshold

- Most of our discussions so far have been around defining and achieving a target return. Discussions on the appropriate level of risk have been limited and less definitive.
- The desired level of risk or 'Risk Appetite' can be defined as: the allowable risks and, importantly, levels of such risks that APFC is permitted to entail, in pursuing its objectives.
- Risk appetite involves both qualitative and quantitative aspects, this presentation focuses on defining the quantitative risk threshold * – **i.e. the allowable quantum of investment / portfolio risk that APFC can entail in pursuing its return objective.**
- The method suggested in the following pages is meant to be a foundation, that will likely require further calibration and enhancement as it evolves.

** While the aim is to ultimately develop a comprehensive Risk Appetite Statement, defining the quantitative investment risk appetite was deemed a priority and essential first step.*

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APFC Risk Appetite: proposed methodology

- The proposal is to define risk appetite *primarily* in terms of a 'Risk Tolerance Portfolio' (RTP). The RTP sets risk thresholds in terms of a portfolio comprising of public Equities and Bonds, in defined proportions.
- The allowable maximum risk level or risk appetite would be defined in terms of the following risk metrics (volatility and drawdowns as applied for the RTP):

Volatility

- Volatility (VaR): estimated annual standard deviation

Drawdown

- Drawdown-1: estimated drawdown applying '2007 credit crisis' stress scenario
- Drawdown-2: estimated drawdown applying '2008 crash' stress scenario
- Drawdown-3: estimated drawdown applying '2008/9 recession' stress scenario

Liquidity

- In addition to capturing volatility and drawdown risks, liquidity risk also needs to be addressed. An additional threshold for minimum proportion of liquid assets is defined.

Risk Appetite: defined in terms of a Risk Tolerance Portfolio (RTP)

- The recommended public equity/bond mix for the Risk Tolerance Portfolio is: 75/25. 85/15
- That is, risk appetite is defined as the risk level of a conventional 75% equity + 25% bond portfolio.
- To further nuance the RTP definition: 85% 15%

85%

- 75% equity: represented by the MSCI ACWI index

15%

- 25% bond: represented by a composite - Barclays US Agg (40%); Barclays US Corp (40%); Barclays Global Treasury EX US (20%)

- Additionally, the following liquidity thresholds would also be part of risk appetite:

45%

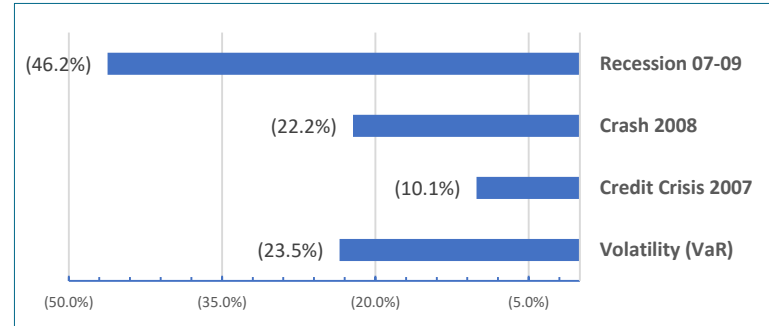
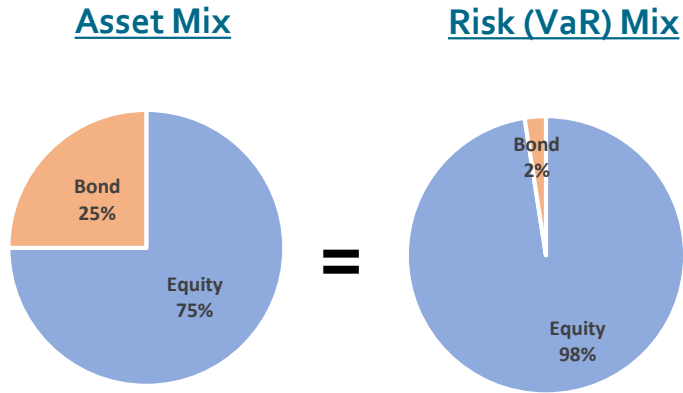
- Minimum 55% of total fund NAV in liquid assets (*defined as: publicly listed equities, IG rated bonds, and Cash & Cash equivalents*)

?

- Minimum 2% of the Fund NAV in Liquidity Pool (*defined as: IG bonds with less than 18 months to final maturity, cash & cash equivalents*)

Risk Tolerance Portfolio (RTP): thresholds

The estimated drawdown and volatility levels for the 75/25 RTP, as computed by BlackRock Aladdin, are provided below

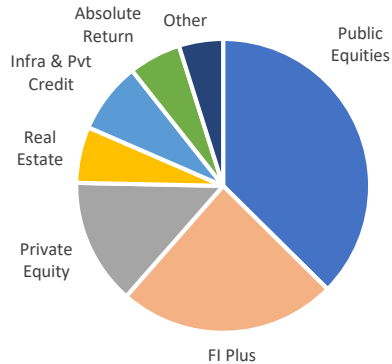


Based on 6/30/2020 MV of Fund of \$65.3 bn	In \$ billions
Volatility (VaR)	(15.3)
Credit Crisis 2007	(6.6)
Crash 2008	(14.5)
Recession 07-09	(30.)

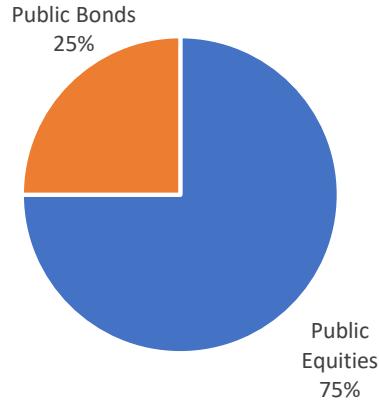
Note: the drawdown and VaR quantum are not absolute static numbers, they are dynamic and would vary based on market data of computation date

Risk Appetite: how it works

Risk of Actual Portfolio



Risk of RTP

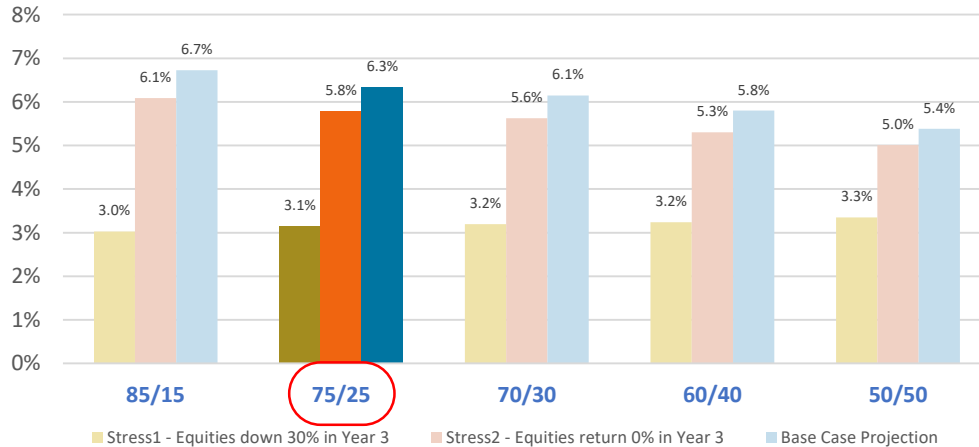


The actual APFC portfolio can have any type and mix of asset classes subject to:

- ✓ Drawdowns \leq that of RTP, when the same 3 drawdown stresses are applied
- ✓ VaR (volatility) \leq that of RTP
- ✓ Liquid Assets \geq 55% of NAV 45%
- ✓ Liquidity Pool \geq 2% of NAV ?

Risk Tolerance Portfolio (RTP): 10 year return estimates

Annualized return projections for various equity/bond mixes



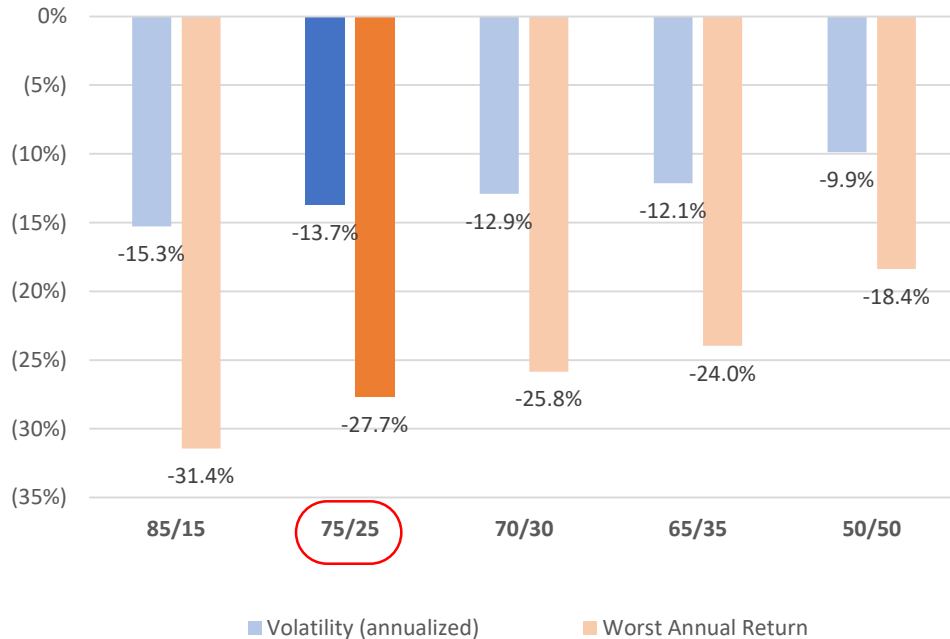
- As expected, there is a tradeoff between risk and expected return.
- The projected return for 75/25 is second to the 'riskier' 85/15 combination in the base case, but better than it in Stress-1 scenario.

Assumptions:

- Projections computed for the 10 year period 2020 – 2029
- Callan projected geometric return used for each asset category (equity: 7.3% & blended bond: 3.5%)
- For Stress1: equity return in year 3 assumed to be negative 30%, bond return constant at 3.5%
- For Stress2: equity return in year 3 assumed to be flat 0%, bond return constant at 3.5%

Risk Tolerance Portfolio (RTP): Loss estimates

Volatility and Actual Drawdowns for the various equity/bond mixes



- The chart is based on actual historical index returns since 1987

Risk Tolerance Portfolio (RTP): optimal choice?

Risk-Return diagram for various equity/bond mixes: ranging from 50/50 to 85/15
(based on actual historical index returns since 1987)



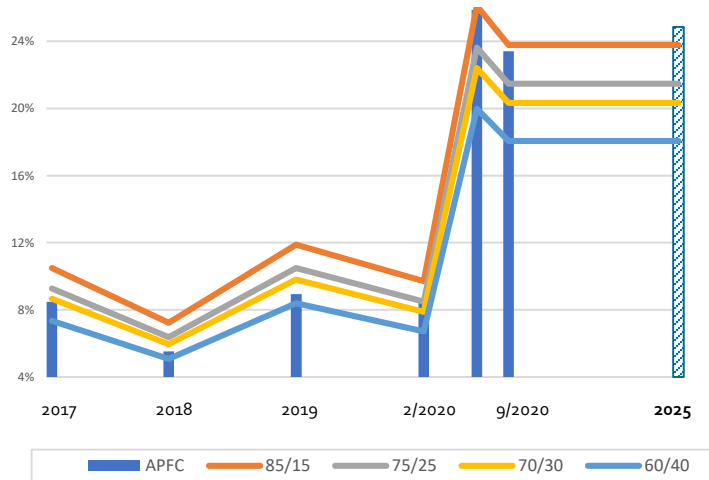
Orange: Risk-Return points as per actual historical returns of relevant indices

Blue: Risk-Return points as per Callan's projections of relevant indices

APFC (Vs) RTP: VaR for various combinations

Value at Risk (VaR): APFC Vs various RTP combinations

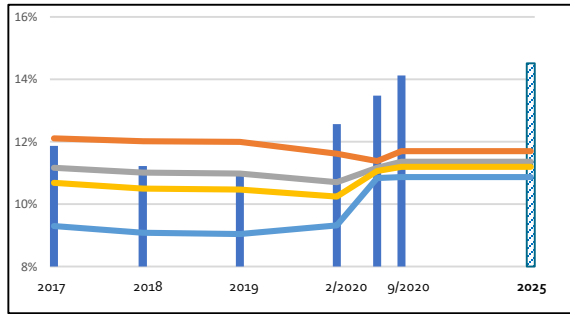
Jan/2017 to Sep/2020, with 2025 projections



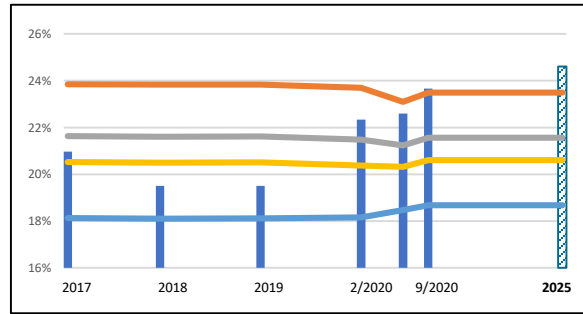
- Risk levels have gradually increased over the last ~4 years
- Current APFC VaR is higher than the 75/25 level and just below the 85/15 level
- Based on projected asset allocation in 2025, APFC risk levels are expected to be higher than 85/15 level

APFC (Vs) RTP: Loss estimates for various combinations

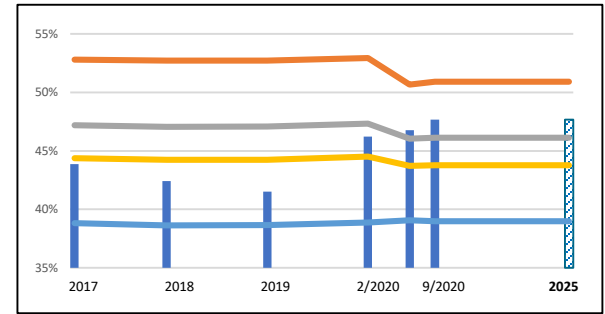
Drawdown-1: 2007 Credit Crisis



Drawdown-2: 2008 Crash



Drawdown-3: '07-'09 Recession

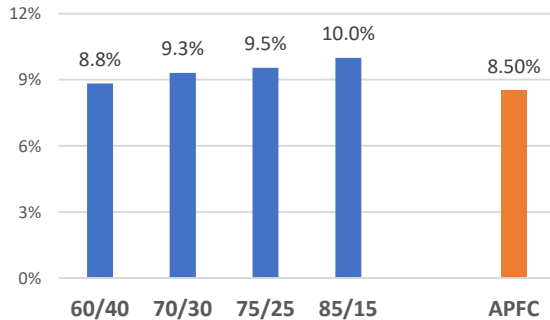


Jan/2017 to Sep/2020, with 2025 projections

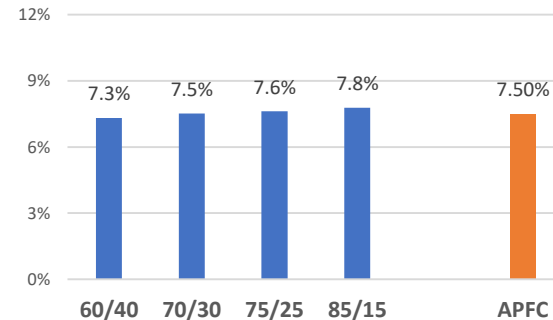
- Loss estimates in all 3 stress events have increased over the last few years
- Current estimates of loss for APFC exceed the 85/15 levels for two of the scenarios
- In the most extreme scenario (Drawdown-3), APFC loss estimates exceed the 75/25 level, but is within the 85/15 level

APFC (Vs) RTP: Actual Annualized Return levels

Jan/2017 to Aug/2020 (annualized)



Jan/2017 to Jun/2020 (annualized)



- The above charts plot the actual annualized returns for two different time periods, both beginning in Jan 2017.
- Comparing actual Returns with risk levels on the previous slide may not always be appropriate, given:
 - ✓ the time period (<4 years) may be too short to reflect impact of longer gestation assets
 - ✓ this time window may also not be representative of target time horizon

Risk Appetite: key points

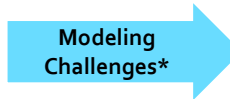
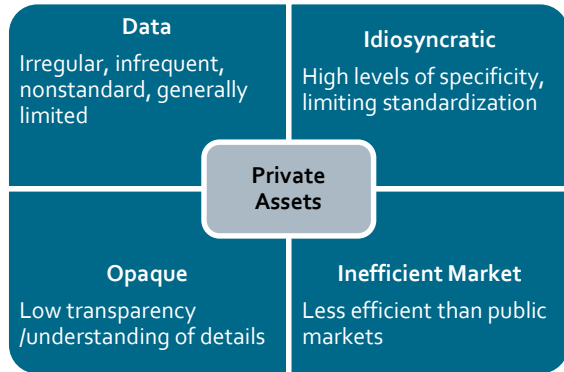
- In formulating investment strategy based on a target return, defining risk thresholds are equally important
- By defining risk appetite in terms of a 'Risk Tolerance Portfolio' (RTP) comprising of a combination of public equities and bonds we are able to measure the Board's tolerance for risk. The equity/bond mix recommended is 75/25. **85/15**
- The actual APFC portfolio can contain any number and combination of asset classes, subject to being within the defined risk parameters when applied on the RTP: the risk parameters include estimated volatility and drawdowns, in addition to minimum liquidity levels.
- **The expectation is that, relative to the RTP, a more diversified portfolio will ensure risks are within thresholds while providing an opportunity for higher returns.**



5. Private Equity Risk Measurement

Private Assets: risk measurement challenges

- Most forward looking risk estimation methodologies utilize information from historical data
- The accuracy of estimates depends on: timely, clean, comprehensive and regularly available data



Difficulty in

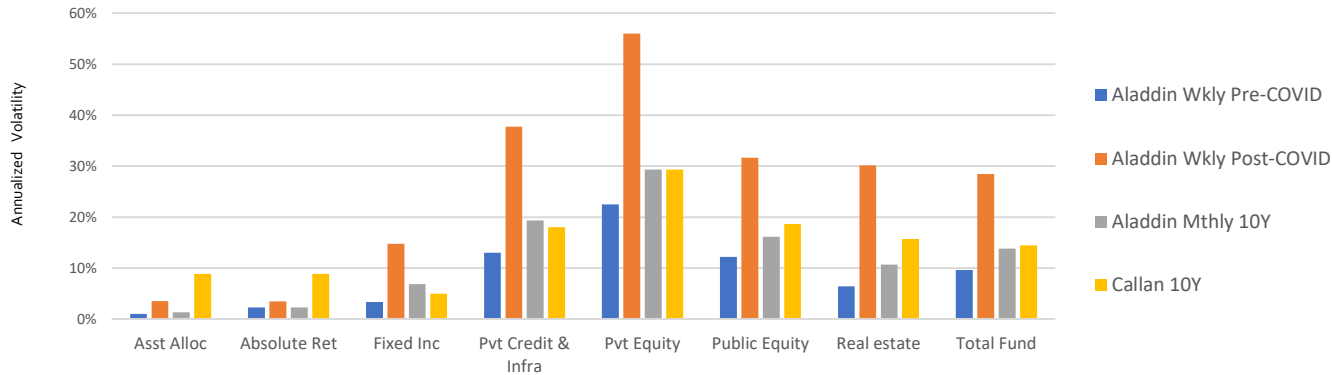
- quantifying risk for Private assets
- Aggregating and obtaining a 'complete' multi-asset picture of risk

- Improved modeling techniques, better technology, enhanced data sources and expanded resource allocation has led to significant progress in risk measurement for private assets – an evolving space with much more to come.

* These characteristics possibly contribute to potential return premiums as well, for the differentiated investor
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Private Assets: risk measure comparisons - *absolute*

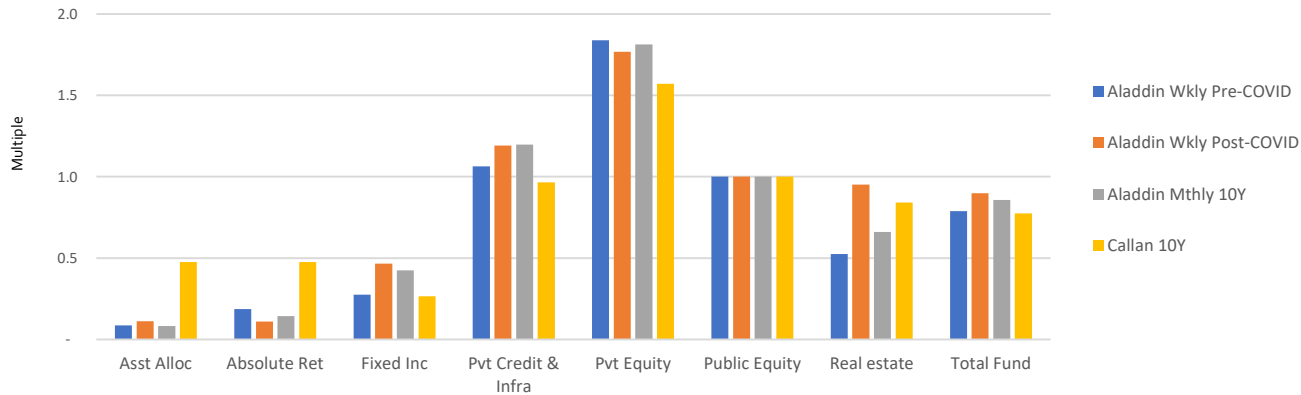
Annualized Volatility levels for APFC asset classes: [Aladdin](#) and [Callan](#)



- Choice of relevant historical period has material impact on risk (VaR) measures
- Essentially, Aladdin's risk (volatility) measures match that of Callan's quite closely, when time horizon is aligned
- Notably, private equity measures are almost exactly the same (~30%)

Private Assets: risk measure comparisons - *normalized*

'Normalized' volatility - expressed as a multiple of Public Equity volatility: [Aladdin](#) and [Callan](#)



- The similarity in risk (volatility) numbers are more explicit when using a normalized scale – in this instance as a multiple of 'Public Equity'
- Such a relative measure helps normalize variations due to different time horizons and other configurations
- As an example, relative risk measures for Private Equity all range between 1.6X and 1.8X of Public equity

Private Assets: risk measure comparison – various perspectives

Volatility: different approaches
private equity (or proxy) expressed as a multiple of public equity

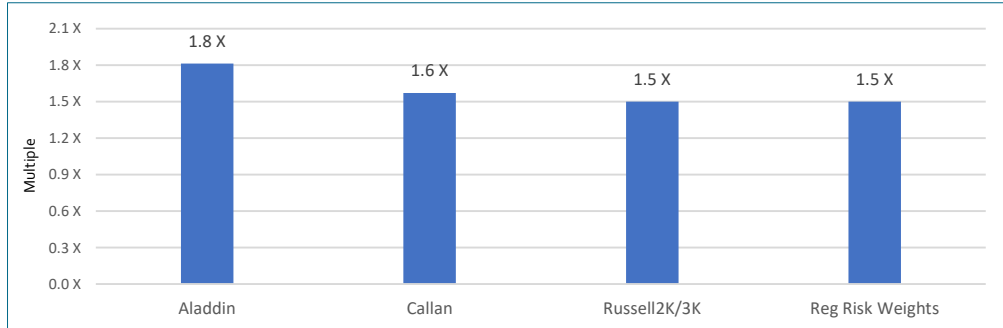


Chart: X-axis label definitions

- Aladdin** : ratio of private equity volatility to public equity volatility
- Callan** : ratio of private equity volatility to public equity volatility
- Russell2K/3K** : ratio of Russell 2000 index volatility to Russell 3000 index volatility
- Reg Risk Weights** : ratio of risk weights for private equity to risk weight for public equity, per FDIC & Basel norms (as applicable to APFC based on assumptions)

- Key message: (1) private equity is 'riskier' than public equity and (2) by about 1.5 times

Note: the Russell 2000, comprising the smallest 2000 companies of the Russell 3000, is considered a proxy for private equity, when the Russell 3000 is a proxy for public equity

Private Assets Risk: key points

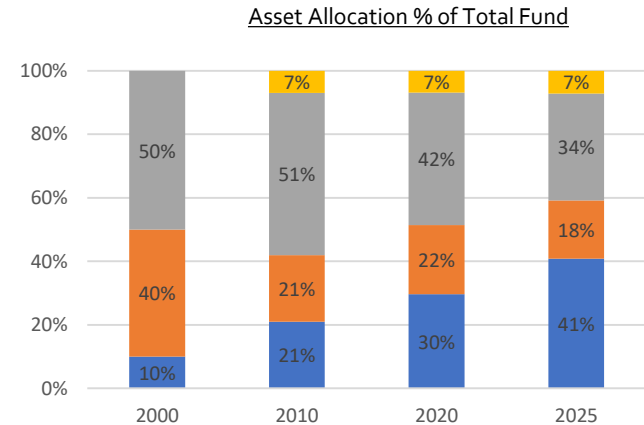
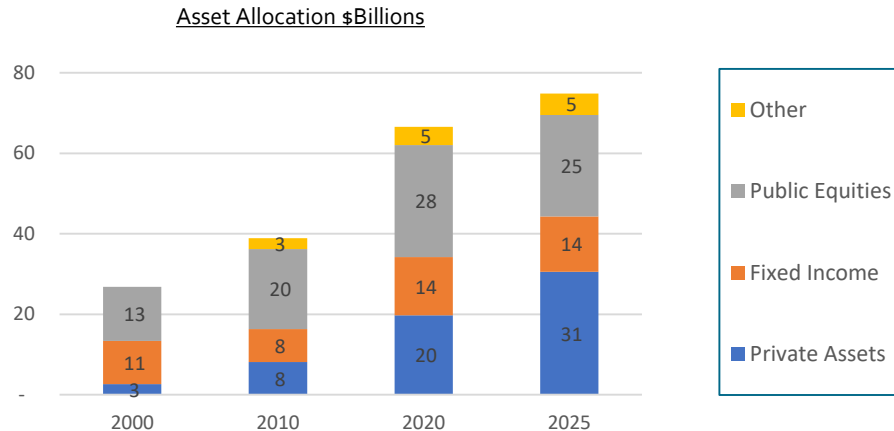
- With expanding allocation to private assets, measuring and aggregating private asset risk has become vital in obtaining a 'complete picture of risk'
- Private Assets, inherently, pose risk modeling challenges. However, over the years, methodologies/systems/markets have evolved offering reasonably sound approximations of risk
- More importantly, when used as a relative measure versus benchmarks and or other asset classes, the model predictions are more accurate and lead to better inferences
- In standalone or absolute terms, Aladdin's risk estimate for private equity closely matches that of Callan's. In terms of a public equity multiple as well Aladdin and Callan estimates are aligned. These multiples are also approximately in line with regulatory capital adequacy norms
- **The risk estimates are even more aligned when measured on a relative basis.** Almost all of APFC's risk measures are relative to respective benchmarks – in such a context, the same 'measuring scale' is used to measure risk of both the portfolio and its benchmark: i.e. configuration variations have little impact
 - An exception to this is the proposed Risk Tolerance Portfolio (RTP) risk appetite definition, which excludes private assets and has only 2 asset classes: public equities and public bonds



6. Non-Investment / Operational Risks

Asset Allocation Changes: projected 2025 risk levels

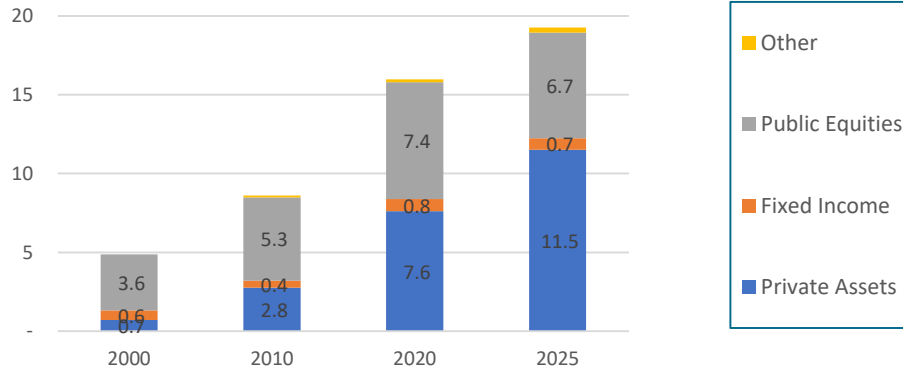
- Private Assets (Private Equity, Private Infra & Credit, Real Estate) are expected to grow by ~\$10 billion or about 50% by 2025, reaching approximately 41% of total fund
- A significant portion of this expected growth is within private equity



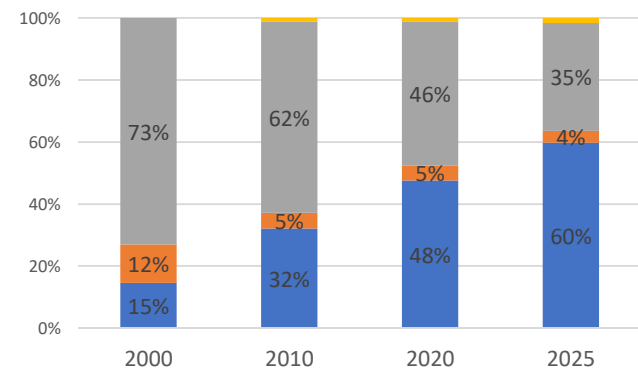
.....Impact on investment Risk numbers

- In terms of investment risk (VaR), total fund VaR is projected to increase by 20% in \$ terms to about \$19 billion by 2025.
- More importantly, the private asset risk will be a larger slice of the overall risk pie, reaching about 60% by 2025

Value at Risk (VaR) \$Billions



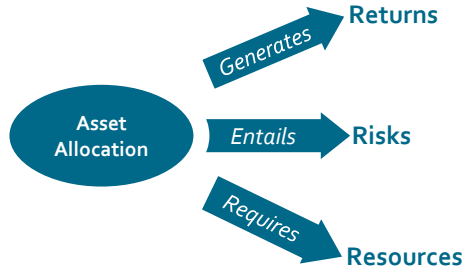
Contribution % to total Value at Risk (VaR)



.....operational & other risks

- The private equity portfolio's projected expansion is significant. The combined Private Equity & Private Income allocation is projected to be just under 30% of the total Fund.
- In addition, the Real Estate portfolio is expected to reach its target allocation of 12%, almost doubling from current levels.
- Besides quantitative investment risks, the significant expansion in these **private asset portfolios** potentially entail material **operational risks**:
 - **HR risks**: retention and expansion of talent (*across investment, analytics and support functions*)
 - **System risks**: adequate & appropriate systems and data to record, analyze and monitor
 - **Process risks**: strengthen investment, divestment and monitoring process
- Existing resources / infrastructure are barely adequate for current levels of such activity
- Proactive enhancement of infrastructure is essential for successful expansion of private assets portfolios

Asset Allocation: has multi-dimensional implications



- Asset allocation should not be driven solely by Return considerations. Return is just one of the aspects
- Risk (appetite) should be the other key driver
- Besides investment/financial risk, operational risks should be considered:
 - Adequacy of Resources (operational risk) should be a key sub-consideration. Aspirations and Capabilities should be aligned
 - Capability requirements, and consequently infrastructure costs, vary based on asset class type, in addition to volume, size and dispersion – a \$1 private asset investment requires a different (possibly higher) resource requirement compared to \$1 public equity investment
 - **Budgetary constraints are likely to conflict with asset allocation aspirations – an appropriate balance should be achieved**

Key Takeaways

- Asset allocation should not be driven solely by Return considerations. Return is just one of the aspects. Risk (appetite) should be the other key driver

Investment Risks are projected to increase:

- The current risk levels are above the 75/25 RTP levels.
- The adopted 2025 asset allocation is expected to take risk levels to and over the 85/15 level

Operational risks should be also considered:

- Adequacy of Resources (operational risk) should be a key sub-consideration. Aspirations and Capabilities should be aligned
- Current infrastructure and capability set need to keep pace for planned asset allocation (expansion of private assets)
- Budgetary constraints are likely to conflict with asset allocation aspirations – an appropriate balance should be achieved
- ***For APFC, appetite for loss resulting from inadequate or failed internal processes, people and systems (operational risk) should be very low – operational risk is not the intended driver of returns***



Additional Q&A