Private Markets Pacing Plan

Fiscal Year 2020-2021

as of May 2020

FCERS 6-18-20

Purpose

- Seek approval of target commitment amounts (the "pacing plan") for each private markets asset class over the next fiscal year.

Valuable context:

- Report what staff did compared with what staff said in last year's pacing plan presentation.
- Acknowledge how changes in financial markets and asset allocation impact the plans' long-term private markets program.
- Highlight topics for the private markets strategy presentation and discussion at the August investment committee meeting.

Year in review

Executed previous pacing plan

- Staff expects to have completed 15 investments, totaling $107mm for Federated and $206mm for Police & Fire.
- Deployed almost exactly as anticipated:
  - Buyout will continue to deploy 70%+ of commitment to primary funds, while the remaining amount will be invested in secondary transactions and co-investments.
  - Private Debt will have 2-4 commitments over the next fiscal year. Initial focus is on stressed/distressed strategies that have a US emphasis.
  - Private Real Estate will have 2-4 commitments over the next fiscal year through a combination of likely re-ups and new managers. US-focused opportunistic real estate strategies are the top priority.
  - Private Real Assets will have 3-5 commitments over the next fiscal year. Staff believes opportunities in metals & mining and energy to be more attractive than those in infrastructure.
  - In Private Debt, Private Real Estate, and Private Real Assets, investments are likely to be only primary fund commitments. While co-investment flow remains strong, few opportunities seem attractive, and many co-investment timelines are too rapid for our governance model.

- Completed one secondary and a second in progress.
- Co-investment quality improving; missed opportunities in March.

Changes in market environment

- No longer in "late innings" of the cycle. The game is over, but no one knows the score.

Changes in asset allocation

- Federated private market reductions - Buyout:10% to 8%; Venture Capital: 5% to 4%; Private Debt: 4% to 3%.
- Police & Fire private market reductions - Buyout: 8% to 6%; Private Debt: 4% to 3%.
- Police & Fire (contingent allocation) - Buyout increases from 6% to 8%.

Current positioning versus target ahead of forecast

- The plans are much closer to target (in some cases, above target).
- Result of changing market environment, changing asset allocation.

Executed previous pacing plan

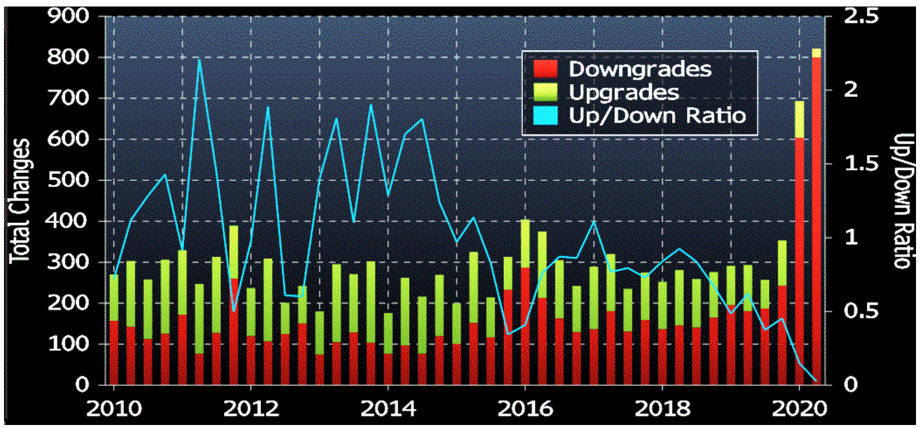
Asset Class	Federated		Police & Fire	
- Fund	**Pacing Plan**	**Actual**	**Pacing Plan**	**Actual**
Buyout	$52mm	$35mm	$80mm	$65mm
- Neuberger Berman fund-of-one		*35.0*		*65.0*
Venture Capital	-	-	$40mm	$20mm
- VC FoF (anticipated by 5/31)			(approved in December 2019)	*10.0*
- VC FoF (anticipated by 6/30)				*10.0*
Private Debt	$40mm	$32mm	$60mm	$49mm
- Secondary				*1.2*
- Arbour Lane COF II		*8.0*		*12.0*
- Crestline PFF II		*8.0*		*12.0*
- Eagle Point DIF		*8.0*		*12.0*
- Distressed (anticipated by 6/30)		*8.0*		*12.0*
Private Real Estate	$20mm	$22mm	$35mm	$39mm
- DRA X		*10.0*		*18.0*
- Rockpoint VI		*6.5*		*11.5*
- Exeter V		*5.5*		*9.5*
Private Real Assets	$18mm	$18mm	$34mm	$33mm
- Kimmeridge V		*3.8*		*7.2*
- Mining (anticipated by 6/15)		*5.0*		*9.0*
- Alt. energy (anticipated by 6/15)		*5.0*		*9.0*
- Secondary (anticipated by 6/30)		*4.1*		*7.7*

Changes in market environment

Immediate impacts are visible, but so is the uncertainty.

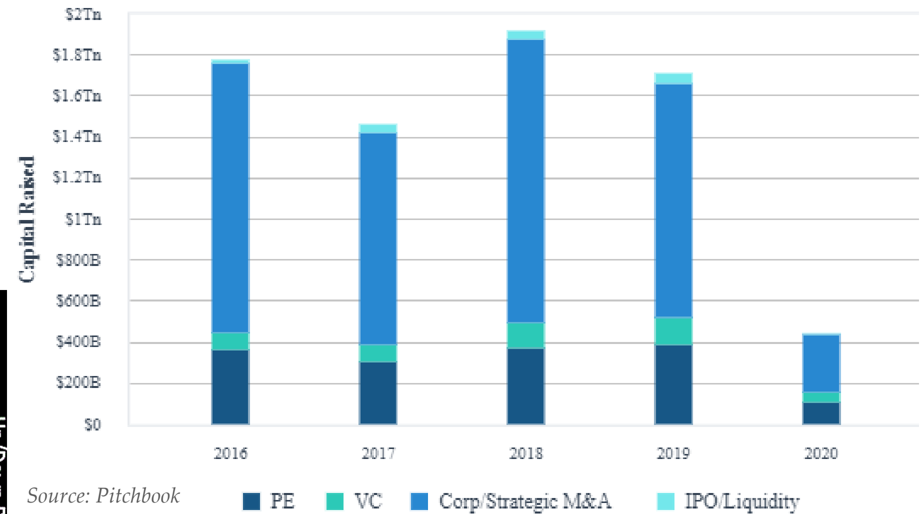
The plans have funds that, as of 3/31/20, have higher, lower, and unchanged values compared with 12/31/19.

2Q2020 S&P UPGRADE/DOWNGRADE RATIO: 0.03 (21/800)



Source: Bloomberg

CAPITAL RAISING DOWN ~75% YOY



Source: Pitchbook

Power shifts: from equity to credit, from GP to LP, from relationships to liquidity.

EXPECTED IMPACT BY VINTAGE YEAR

Source: Evercore

A younger private markets program may be accretive to performance versus peers.

Plan-level net asset value forecasts

Three significant drivers of the difference in plan-level NAV forecasts vs. previous forecast:

(a) the gap between expected plan level return and actual return (Feb./Mar 2020);

(b) higher confidence inputs in plan-level net cash outflows;

(c) use of the assumed rate of return per the asset allocation (instead of using the discount rate).

Plan-level net asset value forecasts

(in $ mm)	6/30/2019	6/30/2020	6/30/2021	6/30/2022	6/30/2023	6/30/2024	6/30/2025	6/30/2026	6/30/2027	6/30/2028	6/30/2029	6/30/2030
Federated		**2,123**	**2,270**	**2,427**	**2,592**	**2,766**	**2,951**	**3,145**	**3,350**	**3,567**	**3,795**	**4,037**
Previous NAV forecast	*2,122*	*2,178*	*2,307*	*2,440*	*2,578*	*2,720*	*2,866*	*3,019*	*3,177*			
Difference (%)		*-3%*	*-2%*	*-1%*	*1%*	*2%*	*3%*	*4%*	*5%*			
Police & Fire - *Current*		**3,615**	**3,871**	**4,141**	**4,407**	**4,685**	**4,969**	**5,264**	**5,571**	**5,889**	**6,219**	**6,553**
Previous NAV forecast	*3,623*	*3,844*	*4,080*	*4,325*	*4,560*	*4,800*	*5,058*	*5,325*	*5,541*			
Difference (%)		*-6%*	*-5%*	*-4%*	*-3%*	*-2%*	*-2%*	*-1%*	*1%*			
Police & Fire - *Contingent*		**3,617**	**3,883**	**4,166**	**4,447**	**4,741**	**5,043**	**5,360**	**5,689**	**6,033**	**6,392**	**6,758**
Difference vs. Previous (%)		*-6%*	*-5%*	*-4%*	*-2%*	*-1%*	*0%*	*1%*	*3%*			

Asset Class NAV Targets as of 6/30/2020

Federated	Target	$ million
Private Markets	*21%*	*446*
Buyout	8%	170
Venture	4%	85
Private Debt	3%	64
Private Real Estate	3%	64
Private Real Assets	3%	64

Police & Fire - *Current*	Target	$ million
Private Markets	*19%*	*687*
Buyout	6%	217
Venture	4%	145
Private Debt	3%	108
Private Real Estate	3%	108
Private Real Assets	3%	108

Police & Fire - *Contingent*	Target	$ million
Private Markets	*21%*	*759*
Buyout	8%	289
Venture	4%	145
Private Debt	3%	108
Private Real Estate	3%	108
Private Real Assets	3%	108

Change in asset allocation

Target allocations to private markets dropped by ~20% as the decrease in plan NAV versus forecast occurred simultaneous to decreases in the asset allocation target percentages, primarily to buyout and private debt.

Federated

	Previous Target %	Current Target %	At previous target % Forecast Target $	At previous target % Current Target $	Δ Due to NAV Forecast	At current NAV Forecast Target $	At current NAV Current Target $	Δ Due to Asset Allocation	Δ Total Target $	
Private Markets	*25%*	*21%*	*545*	*531*	*-14*	*531*	*446*	*-85*	*-99*	*-18%*
Buyout	10%	8%	218	212	-6	212	170	-42	-48	*-22%*
Venture	5%	4%	109	106	-3	106	85	-21	-24	*-22%*
Private Debt	4%	3%	87	85	-2	85	64	-21	-23	*-27%*
Private Real Estate	3%	3%	65	64	-2	64	64	-	-2	*-3%*
Private Real Assets	3%	3%	65	64	-2	64	64	-	-2	*-3%*

Police & Fire - *Current*

	Previous Target %	Current Target %	At previous target % Forecast Target $	At previous target % Current Target $	Δ Due to NAV Forecast	At current NAV Forecast Target $	At current NAV Current Target $	Δ Due to Asset Allocation	Δ Total Target $	
Private Markets	*22%*	*19%*	*846*	*795*	*-50*	*795*	*687*	*-108*	*-159*	*-19%*
Buyout	8%	6%	308	289	-18	289	217	-72	-91	*-29%*
Venture	4%	4%	154	145	-9	145	145	-	-9	*-6%*
Private Debt	4%	3%	154	145	-9	145	108	-36	-45	*-29%*
Private Real Estate	3%	3%	115	108	-7	108	108	-	-7	*-6%*
Private Real Assets	3%	3%	115	108	-7	108	108	-	-7	*-6%*

Police & Fire - *Contingent*

	Previous Target %	Current Target %	At previous target % Forecast Target $	At previous target % Current Target $	Δ Due to NAV Forecast	At current NAV Forecast Target $	At current NAV Current Target $	Δ Due to Asset Allocation	Δ Total Target $	
Private Markets	*22%*	*21%*	*846*	*796*	*-50*	*796*	*760*	*-36*	*-86*	*-10%*
Buyout	8%	8%	308	289	-18	289	289	-	-18	*-6%*
Venture	4%	4%	154	145	-9	145	145	-	-9	*-6%*
Private Debt	4%	3%	154	145	-9	145	109	-36	-45	*-29%*
Private Real Estate	3%	3%	115	109	-7	109	109	-	-7	*-6%*
Private Real Assets	3%	3%	115	109	-7	109	109	-	-7	*-6%*

Current positioning versus target ahead of forecast

Reasonable accuracy forecasting actual NAVs, with changing targets, brought both plans closer to target allocations.

- Federated was expected to be ~9% short of target NAV but is only ~5% short.
- Police & Fire was expected to ~6% short of target NAV but is only ~1% short.

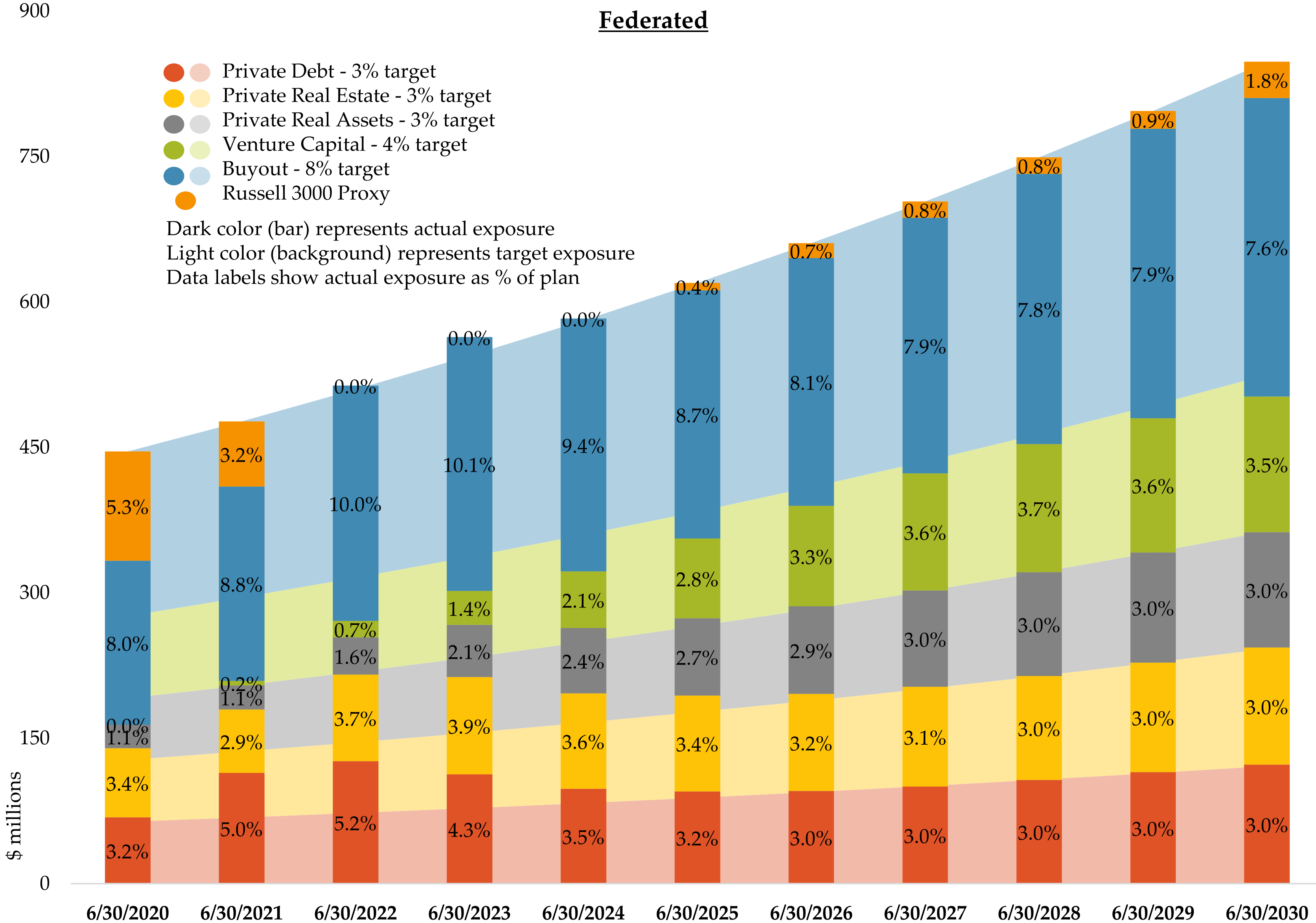
Federated

	Exp. 6/30/20 NAV				Exp. 6/30/20 Allocation		
	FY19-20 Pacing	Current Estimates	Forecast Error		FY19-20 Pacing	Current Estimates	Δ vs. Target
Private Markets	*356*	*333*	*-23*	*-7%*	*16%*	*16%*	*-5%*
Buyout + Venture	158	169	11	*7%*	7%	8%	-4%
Private Debt	81	68	-13	*-19%*	4%	3%	0%
Private Real Estate	76	71	-5	*-7%*	3%	3%	0%
Private Real Assets	41	24	-17	*-68%*	2%	1%	-2%

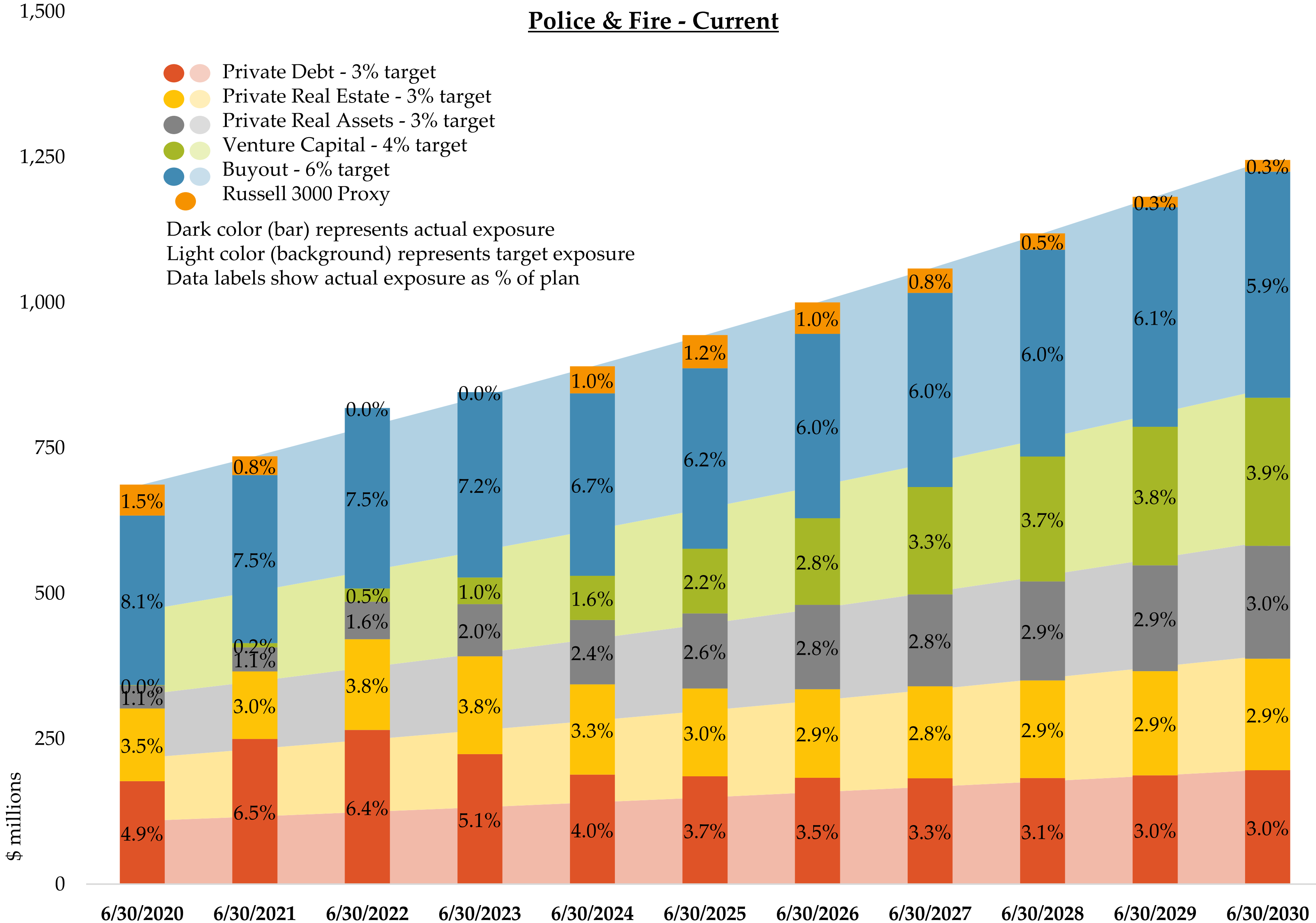
Police & Fire

	Exp. 6/30/20 NAV				Exp. 6/30/20 Allocation		*Current*	*Contingent*
	FY19-20 Pacing	Current Estimates	Forecast Error		FY19-20 Pacing	Current Estimates	Δ vs. Target	Δ vs. Target
Private Markets	*615*	*634*	*19*	*3%*	*16%*	*18%*	*-1%*	*-3%*
Buyout + Venture	291	292	2	*1%*	8%	8%	-2%	-4%
Private Debt	134	177	43	*24%*	4%	5%	2%	2%
Private Real Estate	117	125	8	*6%*	3%	3%	0%	0%
Private Real Assets	72	39	-33	*-84%*	2%	1%	-2%	-2%

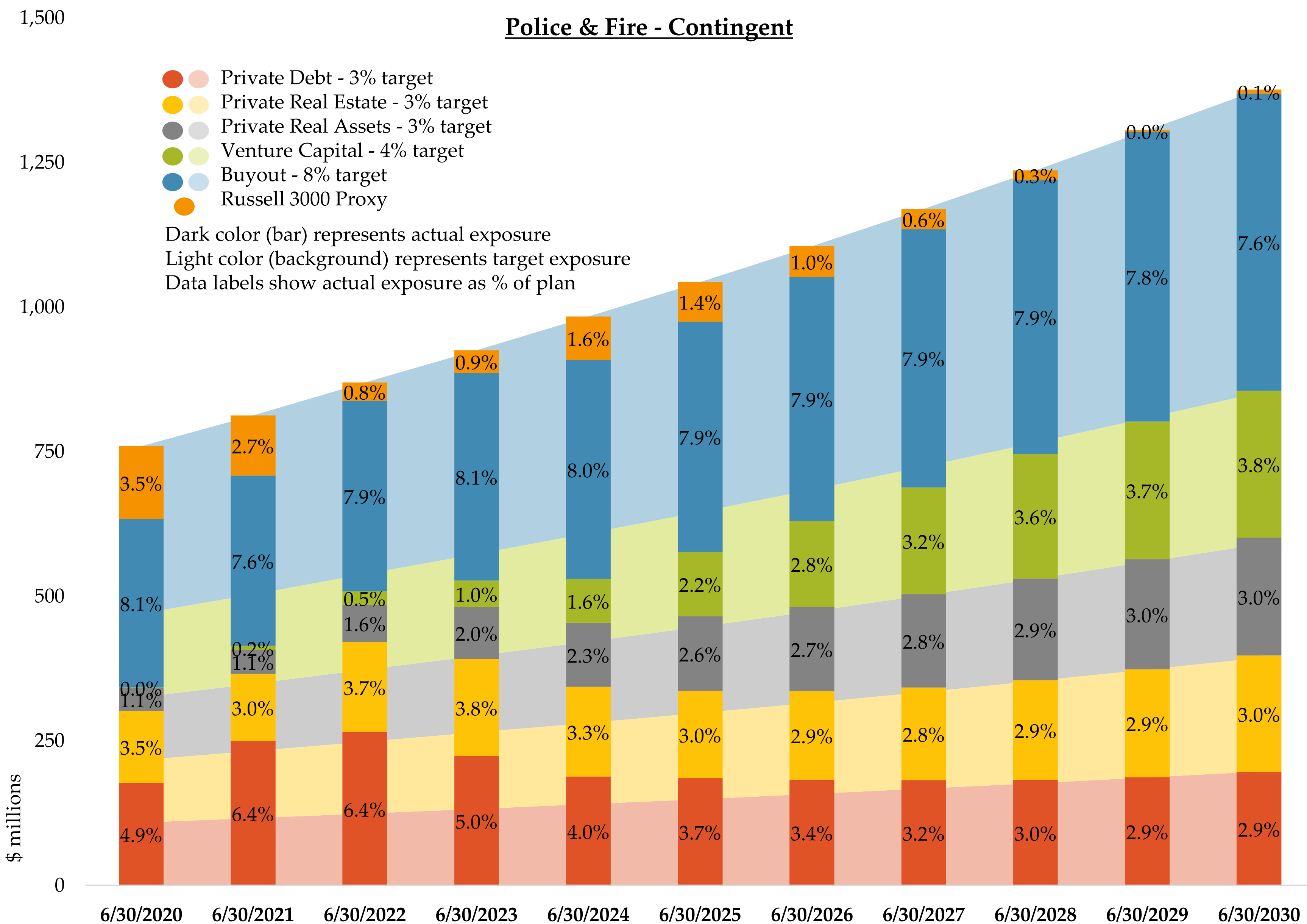
Federated forecast private markets net asset values



Police & Fire forecast private markets net asset values (i of ii)

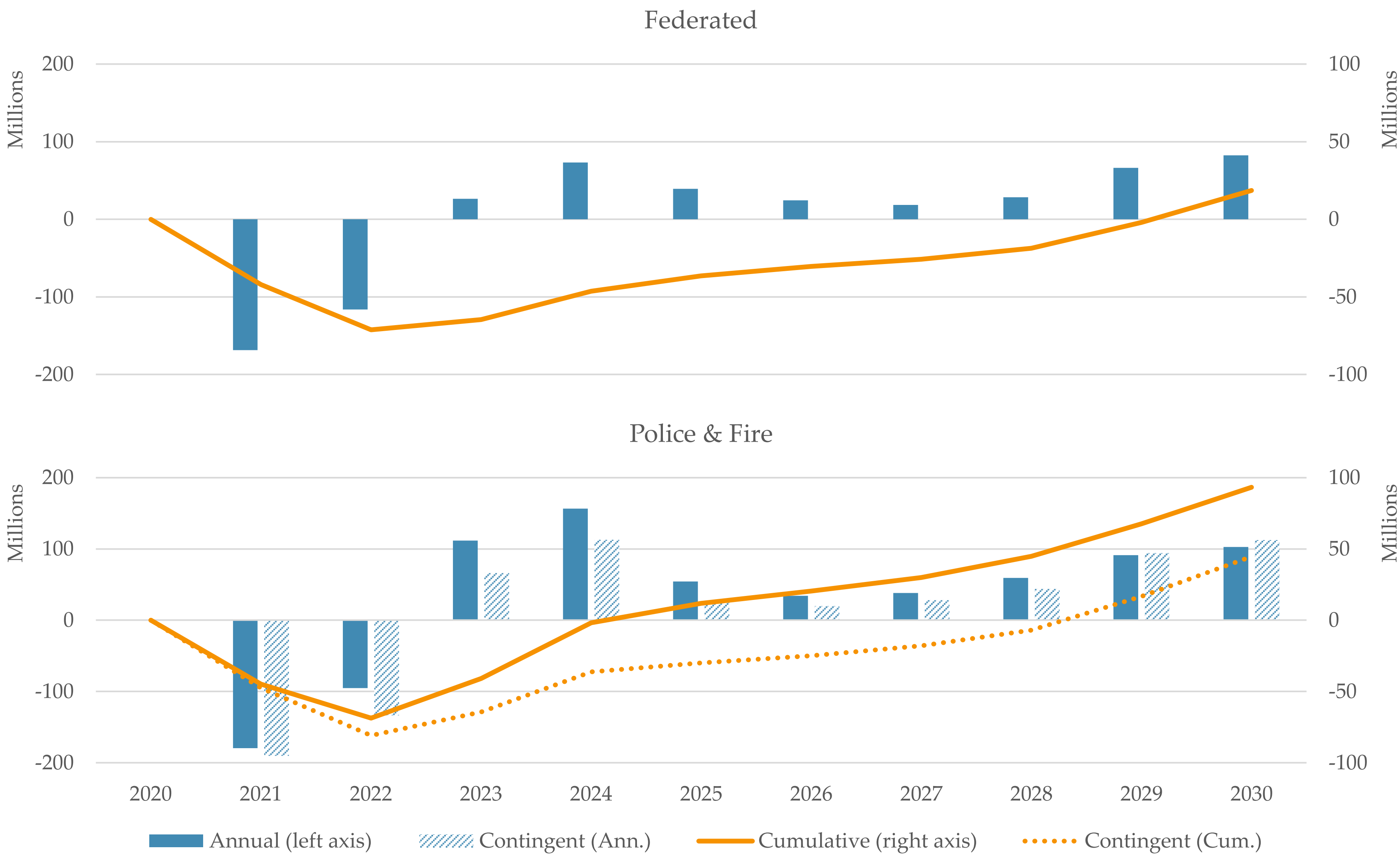


Police & Fire forecast private markets net asset values (ii of ii)



Liquidity requirements

In the private markets program, contributions are expected to exceed distributions until approximately FY22-23. At that point, the program would be self-funding and mature. The forecast is approximately 1 year earlier than previously anticipated, which is a function of lower plan-level NAV and smaller allocation to private markets.



Commitment pacing plan

Recommendation for approval.

Federated

(in $ mm)	FY 19-20		Pacing Plan				
	Pacing Plan	**Actual**	**FY 20-21**	**FY 21-22**	**FY 22-23**	**FY 23-24**	**FY 24-25**
Private Markets	*130*	*107*	*104*	*122*	*130*	*132*	*135*
Buyout	52	35	13	25	28	35	43
Venture	na	na	28	31	31	26	21
Private Debt	40	32	24	24	24	24	24
Private Real Estate	20	22	20	20	25	25	25
Private Real Assets	18	18	20	22	22	22	22

Police & Fire

(in $ mm)	FY 19-20		Pacing Plan				
	Pacing Plan	**Actual**	**FY 20-21**	**FY 21-22**	**FY 22-23**	**FY 23-24**	**FY 24-25**
Private Markets	*234*	*206*	*156*	*176*	*194*	*215*	*220*
Buyout	80	65	13	30	40	50	60
Venture	40	20	32	34	37	43	38
Private Debt	60	49	48	48	48	48	48
Private Real Estate	20	39	30	30	35	40	40
Private Real Assets	34	33	33	34	34	34	34

Police & Fire

	Pacing Plan - Contingent
	FY 20-21
Private Markets	*+15*
Buyout	+15
Venture	-
Private Debt	-
Private Real Estate	-
Private Real Assets	-

Deployment of commitments

Last year, staff was able to offer specific guidance on investment targets, including the number of commitments and strategy types for each asset class. This year is very different:

- The plans' private markets portfolios are well-positioned for the future, with a strong portfolio having ample dry powder;
- There is a lower balance of commitments to deploy and an increasing supply/demand imbalance for those commitments;
- Staff expects many secondary and co-investment opportunities to arise, with the volume of deal flow accelerating in 4Q20.

With that in mind, staff will prioritize opportunities that have one or more of the following characteristics:

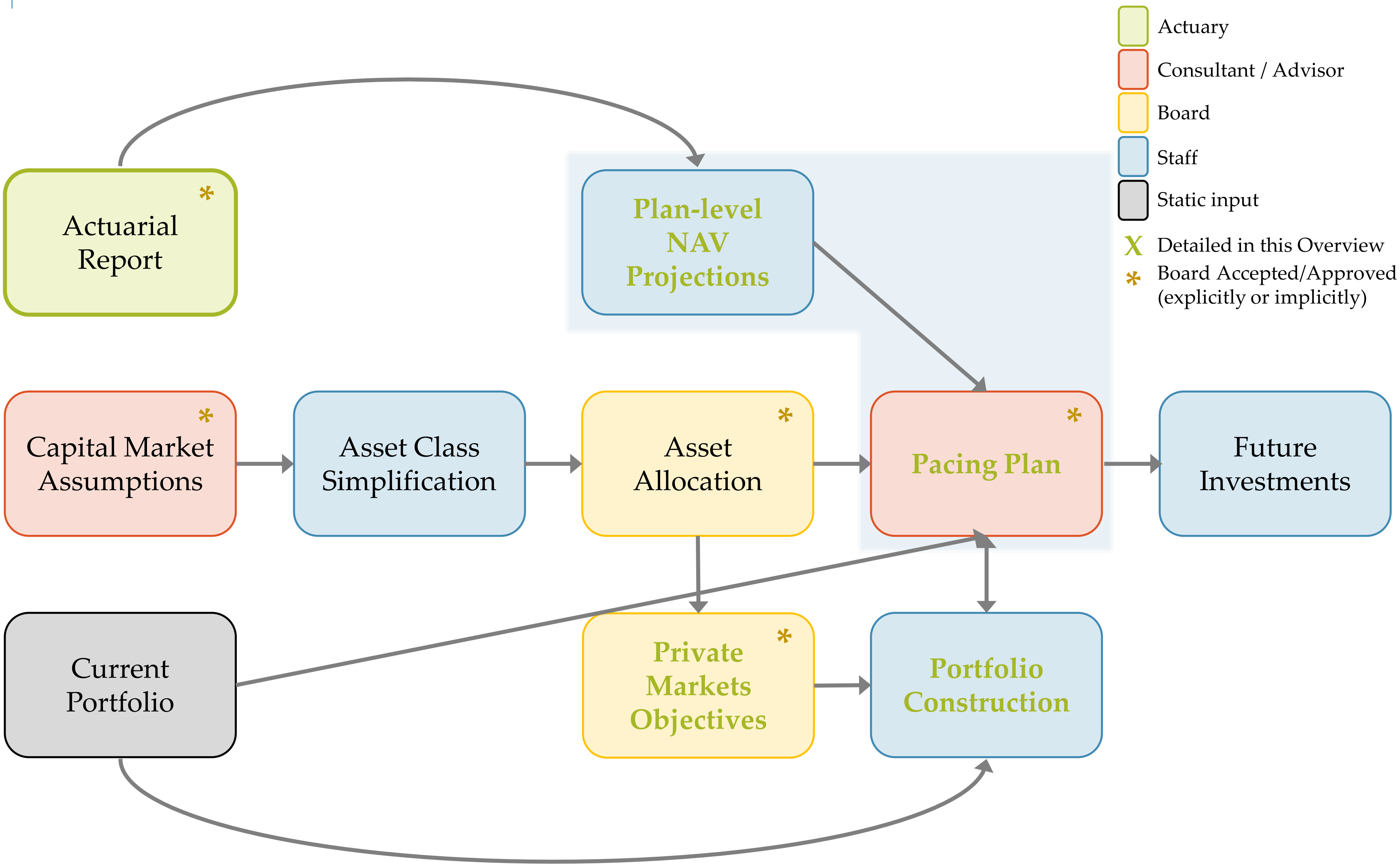
- Have identifiable assets whose expected net-of-fees returns justify the risks inherent to those assets;
- Provide the plans with the highest level of control over the future cash flows associated with the investments;
- Create genuine alignment between investment managers and the plans;
- Adhere tightly to the Institutional Limited Partners Association's Private Equity Principles, with particular emphasis on fiduciary duty and standard of care.

Appendix

Pacing plan basics

- The pacing plan models how the pension funds will reach and maintain their target allocation to private markets strategies.
- The key output is a target level of annual commitments to funds in each private market asset class.
- Many assumptions are incorporated into the pacing plan models. Because of the assumptions' high variance (actual vs. forecast), the pacing plan is revisited annually.
- Staff produces plan-level NAV targets for each private markets asset class, which are then provided to Neuberger Berman and Meketa Investment Group for detailed modeling on Buyout, Private Debt, Private Real Estate, and Private Real Assets. Staff runs the Venture Capital pacing models.
- Staff aggregates the output into a single pacing plan document to allow stakeholders to view the private markets program holistically.
- For Private Debt, Private Real Estate, and Private Real Assets, the Boards' approvals of their respective pacing plans sets the guideline for the constraints outlined in the IPS around delegation of manager selection to staff.
- For Buyout, the plans control the pacing of investments not through approval of the pacing plan, but rather by the level of commitments to the Neuberger Berman fund-of-ones. Over time, these are approximately equivalent methodologies.
- For Venture Capital, each board has adopted a distinct approval process that is not tied to the target level of commitments for the asset class.

Private markets process / data flow



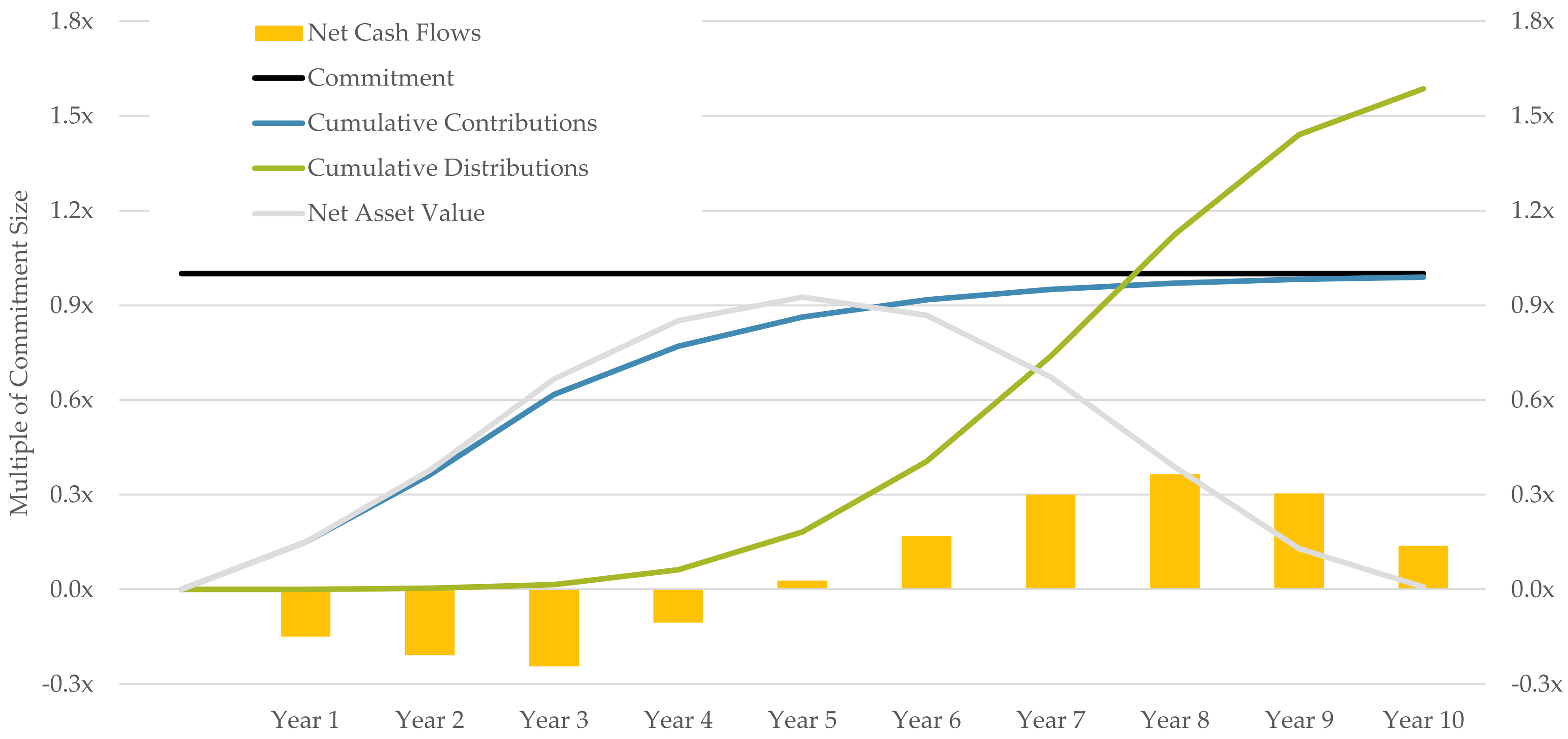
Investment projection methodology

Meketa produced an easy-to-read white paper on commitment pacing that outlines their specific methodology (PDF link). Staff has created an internal model based on the Takashi-Alexander framework, which is also the basis for the Meketa model. While the models are nuanced, the example below uses staff's model to demonstrate the assumptions and output for a particular investment.

Inputs

Fund type:	Large buyout	**Projected net return:**	12% IRR / 1.6x TVPI
Contribution rates, Year 1 / 2 / 3+:	15% / 25% / 40%	**Projected yield:**	2%
Fund term:	10 years	**Bow factor:**	3.0

Output



Venture capital pacing methodology

Each of fund-of-funds, direct funds, and co-investments are modelled according to their unique characteristics.

- Fund-of-funds

  Staff took actual cash flow and NAV data from 19 fund-of-funds from three different fund-of-funds managers between vintage years 1997 through 2017 and used normalized simple averages to establish baseline contributions, distributions, and net asset values, as a percentage of committed capital in a given vintage year.

- Direct funds

  Staff solicited the assumptions that Meketa Investment Group and Neuberger Berman utilize in their own pacing models for venture capital fund investments. The simple average of those data are the source of forecast direct fund contribution, distribution, and net asset values, as a percentage of committed capital in a given vintage year.

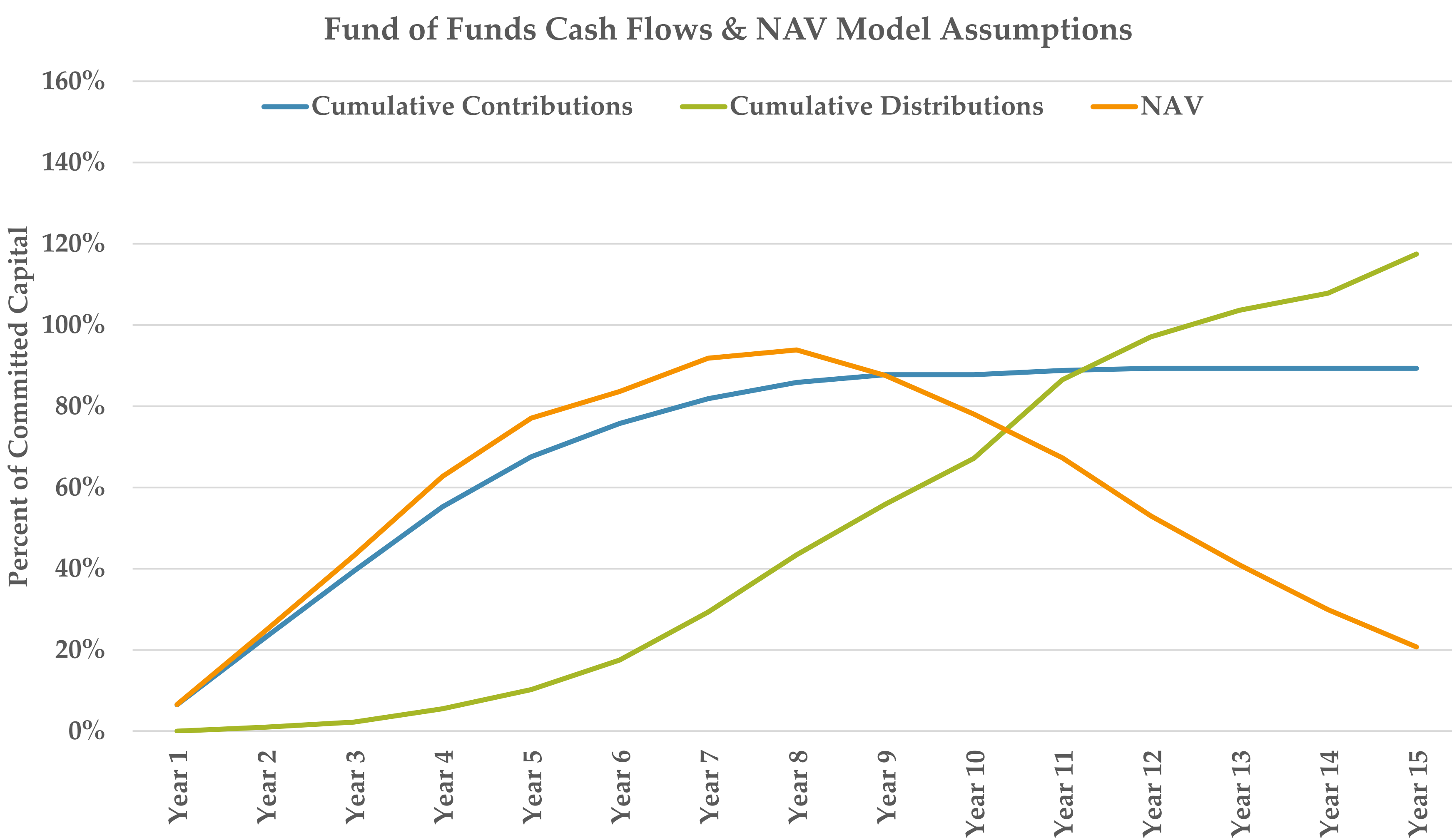
- Co-investments

  Co-investment pose a unique modeling challenge because the dispersion of outcomes is disproportionately large relative to the "expected" outcome. As such, unless hundreds of co-investments were made in each vintage year, the "expected" outcome is somewhat irrelevant. For example, the model anticipates an "average" co-investment is estimated as 3.0x and 16% IRR – however the range of successful co-investments is 9x-56x and 63%-65% IRRs, with every other co-investment being 0x and -100% IRRs.

  Staff's model anticipates a seed stage co-investment that experiences four potential decision nodes. At each decision node, either the co-investment fails (returns -100%), or raises a subsequent round of capital (except at the last node, which is modeled as an exit). Further, at each decision node where a subsequent round of capital is raised, there is a "maintain pro rata" or "be diluted" decision by the plan. Each node is modeled two years after the previous, and each subsequent round is for a standard percentage of equity at a standard uplift from the previous node valuation. All assumptions related to size of rounds, valuations, and probability of success are roughly comparable to actual observable data obtained from Pitchbook and CB Insights.

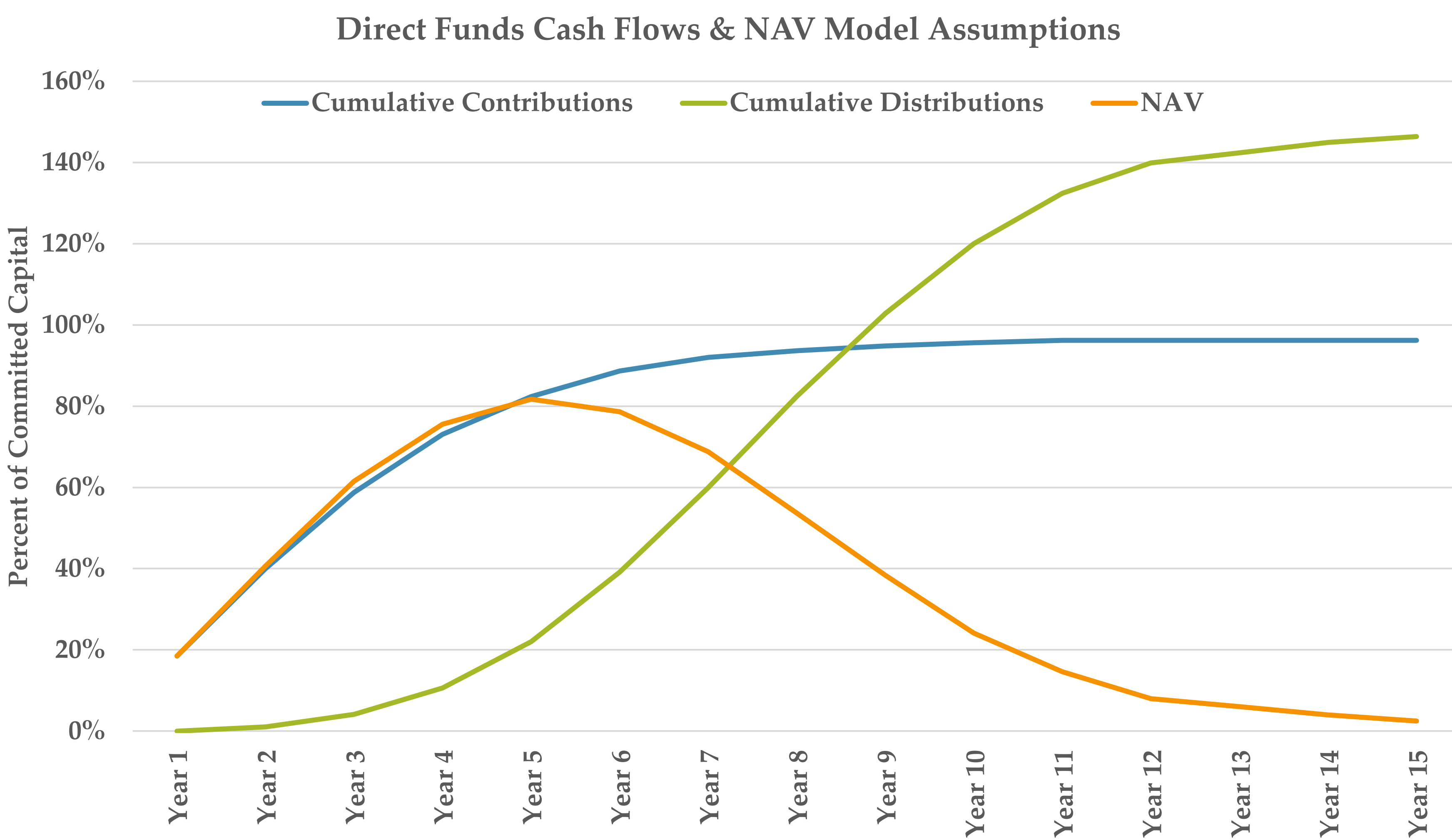
Venture capital fund-of-funds assumption graph

The following curves reflect the output of the venture capital fund-of-funds model.



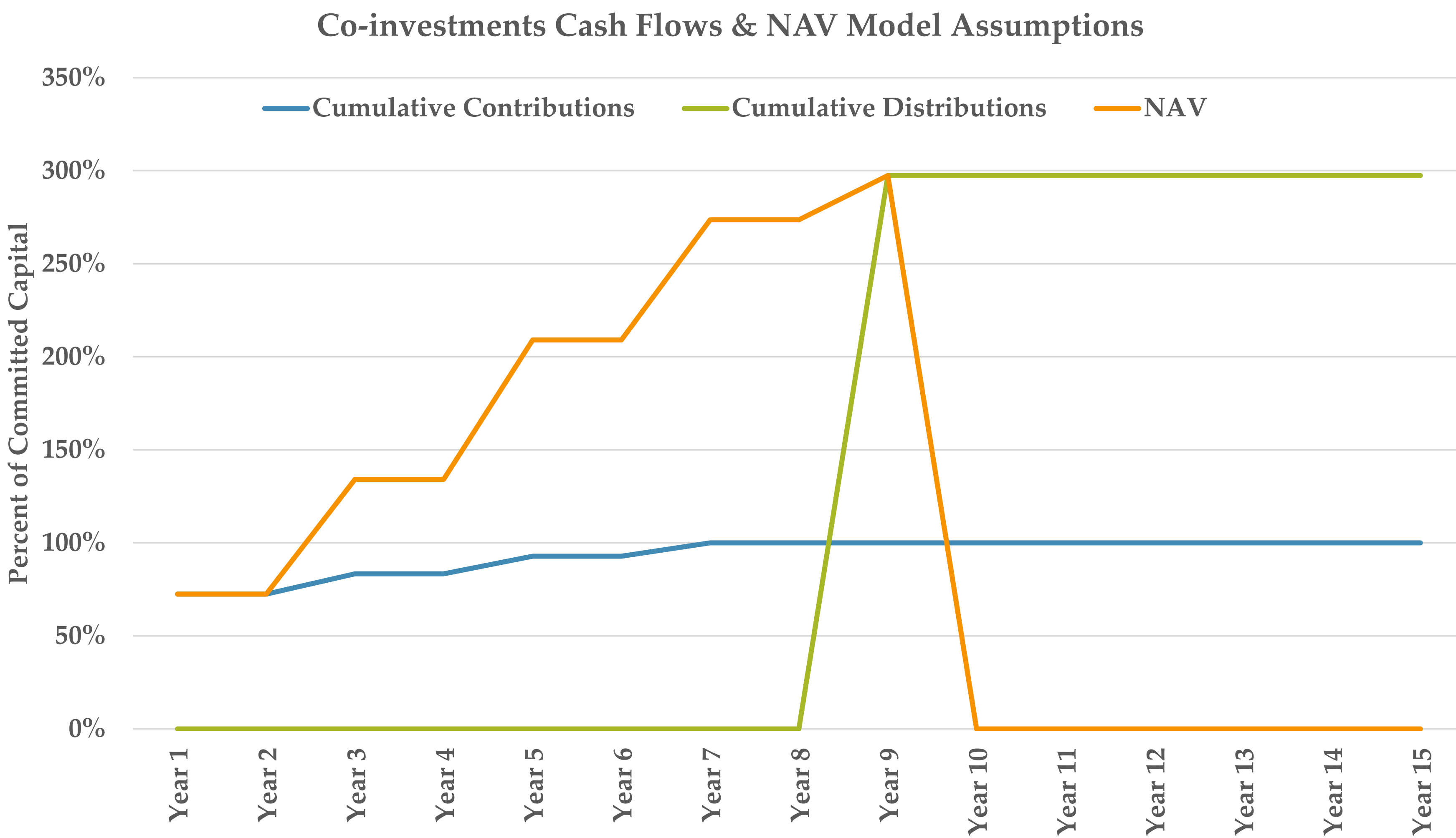
Venture capital direct funds assumption graph

The following curves reflect the output of the venture capital fund-of-funds model.



Venture capital co-investments assumption graph

The following curves reflect the output of the venture capital co-investments model.



Federated venture capital pacing plan detail

Venture Capital Sub-Allocation targets:

- 15% Fund-of-Funds / 75% Direct Funds / 10% Co-investments, achieved around Years 5-7
- 75%-125% of Target NAV, achieved around Years 7-9

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Commitments											
Fund-of-funds	8.0	5.0	5.0	-	-	5.0	-	-	5.0	-	-
Direct funds	22.0	25.0	25.0	25.0	20.0	15.0	15.0	15.0	15.0	15.0	15.0
Co-investments	-	1.2	1.2	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8
% of Venture NAV											
Fund-of-funds	11%	14%	14%	14%	14%	14%	14%	14%	14%	15%	15%
Direct funds	89%	81%	81%	80%	80%	80%	79%	77%	76%	74%	74%
Co-investments	0%	5%	5%	5%	6%	7%	7%	9%	10%	12%	12%
Net Asset Values											
Fund-of-funds	0.5	2.3	5.0	8.4	11.5	14.0	16.6	18.4	19.8	20.4	20.0
Direct funds	4.1	13.6	28.3	46.8	66.1	82.9	95.3	102.3	104.5	102.9	99.5
Co-investments	0.0	0.9	1.7	3.2	4.7	6.8	8.9	11.5	14.1	16.7	15.7
Total NAV	**5**	**17**	**35**	**58**	**82**	**104**	**121**	**132**	**138**	**140**	**135**
% of Target NAV	*5%*	*18%*	*36%*	*56%*	*74%*	*88%*	*96%*	*99%*	*97%*	*92%*	*84%*

Police & Fire venture pacing plan detail (May 2020)

Heavier initial use of fund-of-funds will provide early access, diversification, and resources to assist staff in building out internal capabilities. Ongoing pursuit of Tier 1, Tier 2, and strategic investments will anchor the implementation. Co-investment capabilities may or may not develop over time and are not anticipated in the first year.

Venture Capital Sub-Allocation targets:

- 40% Fund-of-Funds / 50% Direct Funds / 10% Co-investments, achieved around Years 5-7
- 75%-125% of Target NAV, achieved around Years 7-9

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Commitments											
Fund-of-funds	15.0	15.0	15.0	15.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0
Direct funds	17.0	17.0	20.0	25.0	30.0	25.0	20.0	20.0	20.0	20.0	22.0
Co-investments	-	1.5	2.0	2.5	3.0	3.0	3.0	2.5	2.5	2.0	2.5
% of Venture NAV											
Fund-of-funds	57%	51%	48%	46%	43%	41%	40%	38%	37%	36%	36%
Direct funds	43%	44%	46%	47%	49%	50%	50%	50%	49%	48%	48%
Co-investments	0%	5%	6%	7%	8%	9%	10%	12%	14%	16%	17%
Net Asset Values											
Fund-of-funds	4.1	11.5	21.8	34.6	47.9	60.7	73.0	82.6	89.1	92.7	93.7
Direct funds	3.1	10.1	21.1	36.0	54.7	74.6	92.6	106.8	116.6	121.8	123.9
Co-investments	0.0	1.1	2.5	5.3	8.7	13.5	19.0	25.5	32.7	39.9	43.1
Total NAV	**7**	**23**	**45**	**76**	**111**	**149**	**185**	**215**	**238**	**254**	**261**
% of Target NAV	*5%*	*15%*	*27%*	*43%*	*59%*	*75%*	*88%*	*96%*	*101%*	*102%*	*99%*

Police & Fire approved venture pacing plan (Dec. 2019)

Heavier initial use of fund-of-funds will provide early access, diversification, and resources to assist staff in building out internal capabilities. Ongoing pursuit of Tier 1, Tier 2, and strategic investments will anchor the implementation. Co-investment capabilities may or may not develop over time and are not anticipated in the first year.

Venture Capital Sub-Allocation targets:

- 40% Fund-of-Funds / 50% Direct Funds / 10% Co-investments, achieved around Years 5-7
- 75%-125% of Target NAV, achieved around Years 7-9

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Commitments											
Fund-of-funds	27.0	21.0	17.0	15.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0
Direct funds	13.0	17.0	21.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Co-investments	-	1.5	2.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
% of Venture NAV											
Fund-of-funds	42%	46%	46%	45%	43%	42%	40%	39%	38%	36%	35%
Direct funds	58%	48%	48%	48%	49%	49%	50%	50%	50%	50%	50%
Co-investments	0%	6%	6%	8%	8%	9%	10%	11%	13%	15%	15%
Net Asset Values											
Fund-of-funds	1.8	8.1	18.0	31.2	45.7	59.0	72.0	82.6	89.2	92.1	91.8
Direct funds	2.4	8.4	18.8	33.4	51.2	70.1	88.5	104.7	117.7	127.3	133.8
Co-investments	0.0	1.1	2.5	5.3	8.3	12.8	17.7	23.9	30.4	37.6	40.5
Total NAV	**4**	**18**	**39**	**70**	**105**	**142**	**178**	**211**	**237**	**257**	**266**
% of Target NAV	*3%*	*11%*	*23%*	*38%*	*55%*	*70%*	*84%*	*95%*	*104%*	*108%*	*108%*