3Q2009 IAC Meeting Materials

IAC Meeting – November 18, 2009

Alternative Investment Presentation

Commitment Modeling

Alternative Investment Commitment Modeling

Minnesota State Board of Investment
John Griebenow and Michael McGirr

AGENDA

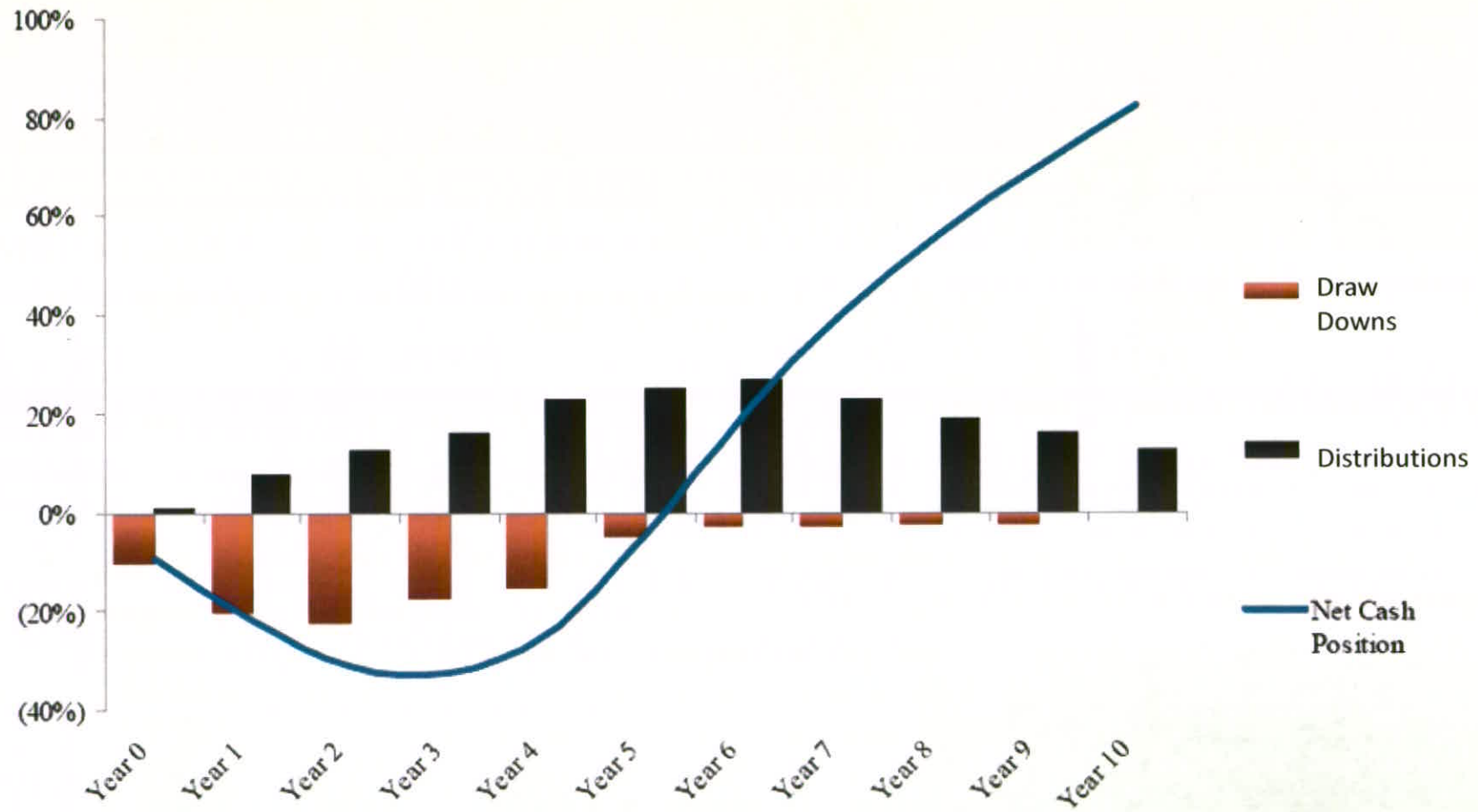**<u>Overview: Mechanics of Private Investments</u>**

Identification of Variables

Commitment Model

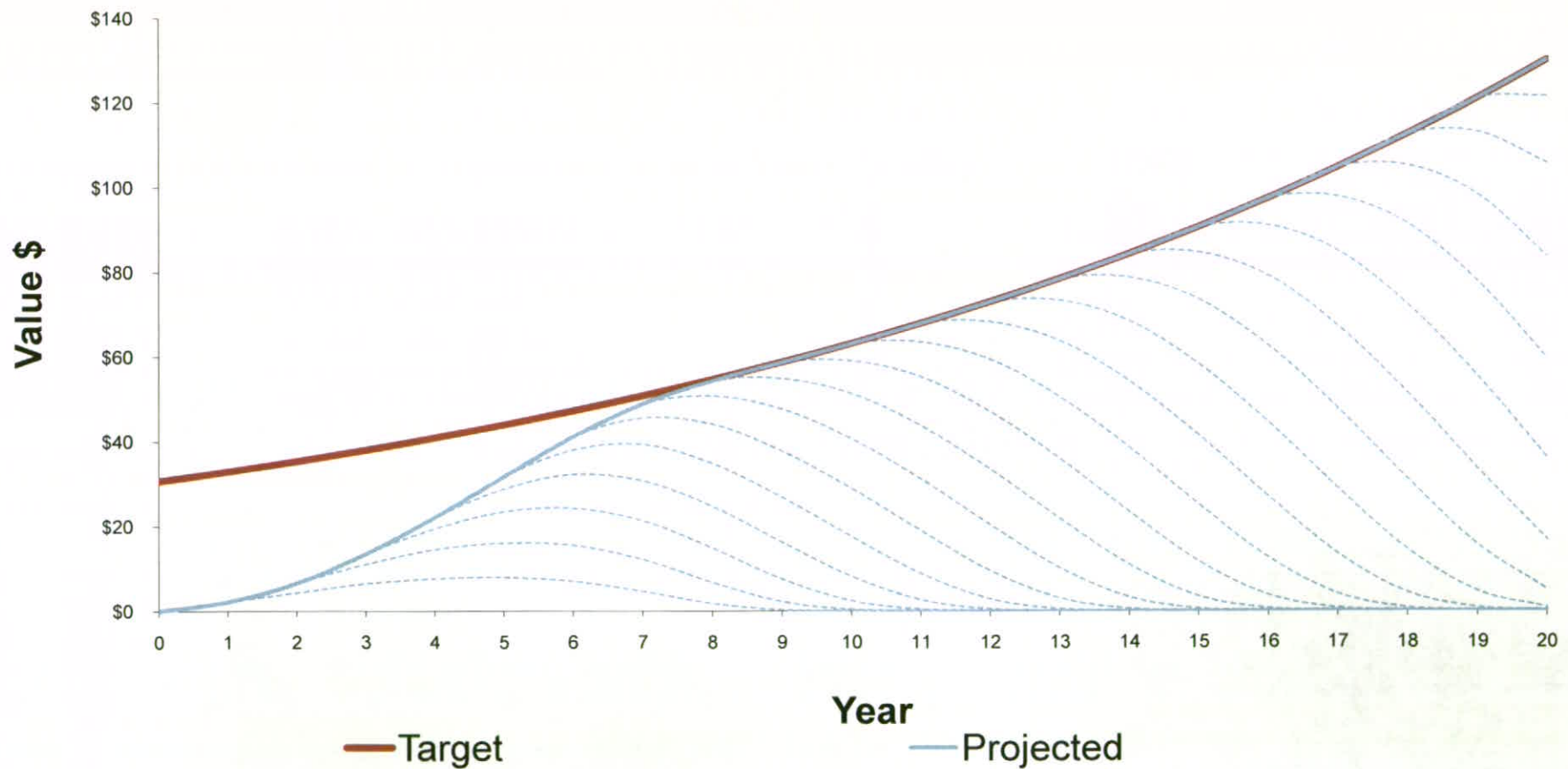Conclusions / Recommendations

Appendix

Overview: Mechanics of Private Investments

Overview: Mechanics of Private Investments

Targeted vs. Projected

Overview: Mechanics of Private Investments
6/30/09 Combined Funds = $36B

New Commitments $100M

Unfunded Commitments $3.2B

Draw Downs

Market Value $5.3B

Distributions

Distributions

$
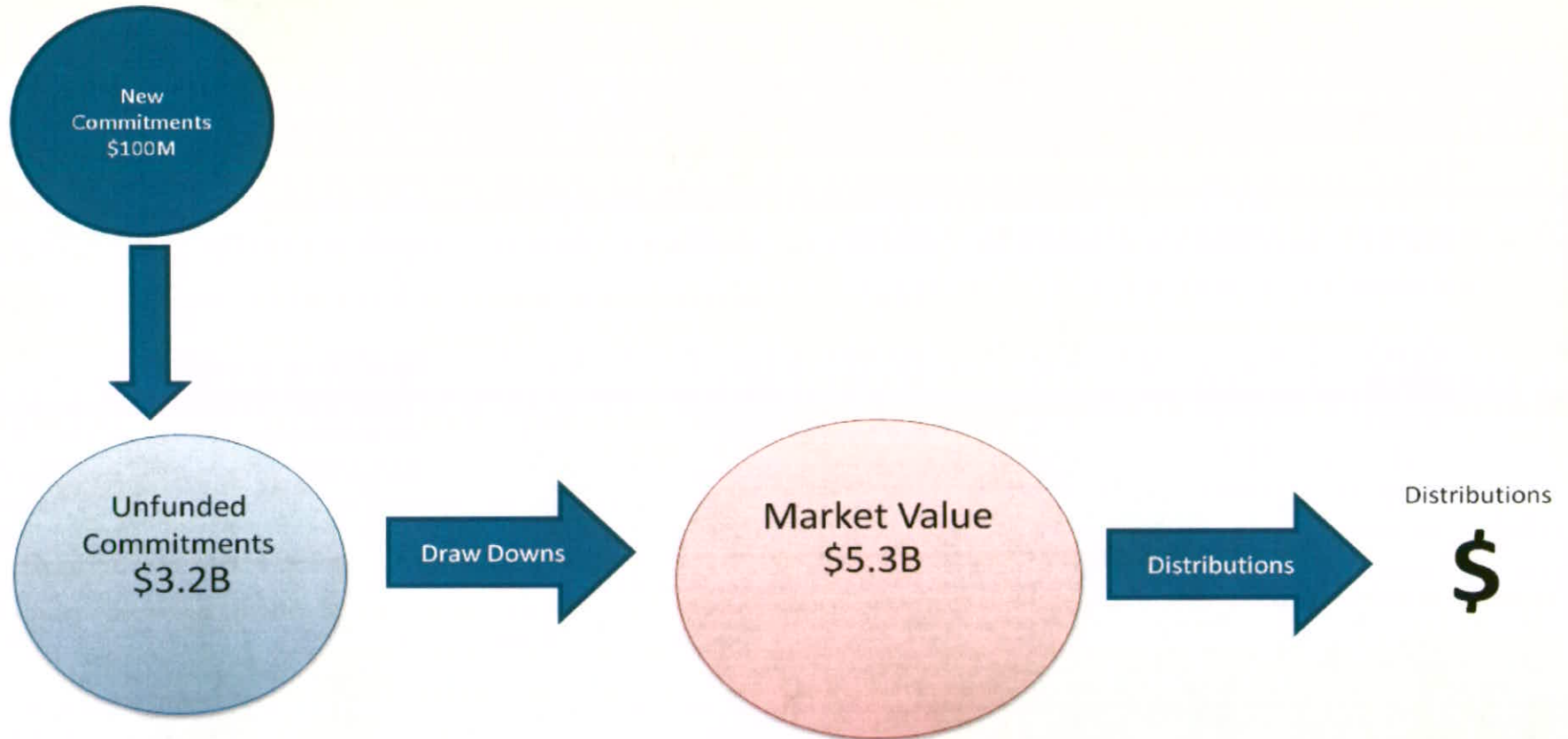
MV = 14.7%
MV + Unfunded = 23.6%

AGENDA

Overview: Mechanics of Private Investments

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Conclusions / Recommendations

Appendix

Identification of Variables

1. Draw Down Rate

2. Distribution Rate

3. Alternative Investment Rates of Return

4. Rest of Pension Fund Rates of Return

5. Net Cash Outflow to Pensioners

6. Commitment Size and Timing

AGENDA

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Commitment Model: Model Description

❑ Models growth of Combined Funds and models the SBI's existing partnerships according to the expected rates of returns used with current SBI asset allocation model (see appendix A , page 15 for details)

❑ Assumes two cash flow scenarios (see appendix B, pages 16 -18 for details):

- Historical SBI cash flow scenario
    - Average draw down and distribution rates from past and present MSBI partnerships
- Top Down cash flow scenario
    - 5 year investment period and 5 year distribution period, with approximately 3% yield on funded commitments

❑ Model solves for annual commitment level needed to achieve desired alternative investment market value in 5 years.

MSBI Commitment Model

| | GOAL: HIT 20% TARGET ALLOCATION FOR MARKET VALUE | | HIT 30% TARGET ALLOCATION FOR MARKET VALUE + UNFUNDED | |

CASH FLOW SCENARIO 1
(MSBI historical cash flows)

	ANNUAL COMMITMENT SIZE	MV %	MV + UNFUNDED %	ANNUAL COMMITMENT SIZE	MV %	MV + UNFUNDED %
BASE CASE 8.28% Growth	$2.3B	20.0%	**36.8%**	$1.5B	17.3%	30.0%
BASE CASE + 10% 18.28% Growth for 2 yr, then Base	$3.4B	20.0%	**39.5%**	$2.1B	16.4%	30.0%
BASE CASE - 10% -1.72% Growth for 2 yr, then Base	$1.2B	20.0%	**32.9%**	$1.0B	18.9%	30.0%

CASH FLOW SCENARIO 2
(Top down / 5 year draw cash flows)

	ANNUAL COMMITMENT SIZE	MV %	MV + UNFUNDED %	ANNUAL COMMITMENT SIZE	MV %	MV + UNFUNDED %
BASE CASE 8.28% Growth	$750M	20.5%	25.8%	$1.2B	**22.2%**	30.0%
BASE CASE + 10% 18.28% Growth for 2 yr, then Base	$1.6B	20.0%	28.9%	$1.7B	**20.4%**	30.0%
BASE CASE - 10% -1.72% Growth for 2 yr, then Base	$0	27.8%	27.8%	$640M	**24.6%**	30.0%

AGENDA

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Bottom Up Commitment Model

Conclusions / Recommendations

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Conclusions / Recommendations

CONCLUSIONS

1. It is difficult to precisely predict commitment sizes given our model's sensitivity to its variables

2. Maintaining targets for both MV and MV + Unfunded Commitments continues to be a valuable way to help control our risk

RECOMMENDATIONS

1. On average commit between $750 Million - $1.5 Billion annually

   (recommendation is based on averaging of base cases for cash flow scenarios 1 and 2)

2. At this time, we do not recommend changing our 20% target allocation or 30% MV + Unfunded Commitment rule

3. Review commitment modeling every 18 months, and in 18 months from now, revisit with IAC our MV + Unfunded Commitment = 30% rule

<u>Questions / Comments</u>

AGENDA

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<u>Appendix</u>

Appendix A

Growth Rate Assumptions

		Combined Funds	
		Policy Targets	Expected Return*
Equity	**60%**		9.10%	
Domestic Equity		45%		9.00%
International Unhedged		12%		9.00%
Emerging Markets		3%		11.00%
Alternative Investments	**20%**		11.50%	
Private Equity		10%		13.00%
Real Assets		5%		8.00%
Yield Oriented		5%		8.50%
Fixed Income	**20%**		5.80%	
Domestic Bonds		18%		6.00%
Cash Equivalents		2%		4.00%
Total	**100%**	100%		
Rest of MSBI Pension Plan	80%		8.28%	
Equity		60%		9.10%
Fixed Income		20%		5.80%
Alternative Investments	20%		11.50%	
Private Equity		10%		13.00%
Real Assets		5%		8.00%
Yield Oriented		5%		8.50%
Total	**100%**	100%		

Appendix B

SBI Commitment Model Cash Flow Scenarios: Future Commitments Net Cash Flow Graph

NET CASH FLOWS FUTURE COMMITMENTS

% OF TOTAL COMMITMENT

YEAR

— CASH FLOW SCENARIO 1 (SBI's historical averages since 1994)

— CASH FLOW SCENARIO 2 (5 year draw period, 5 year distribution period)

16
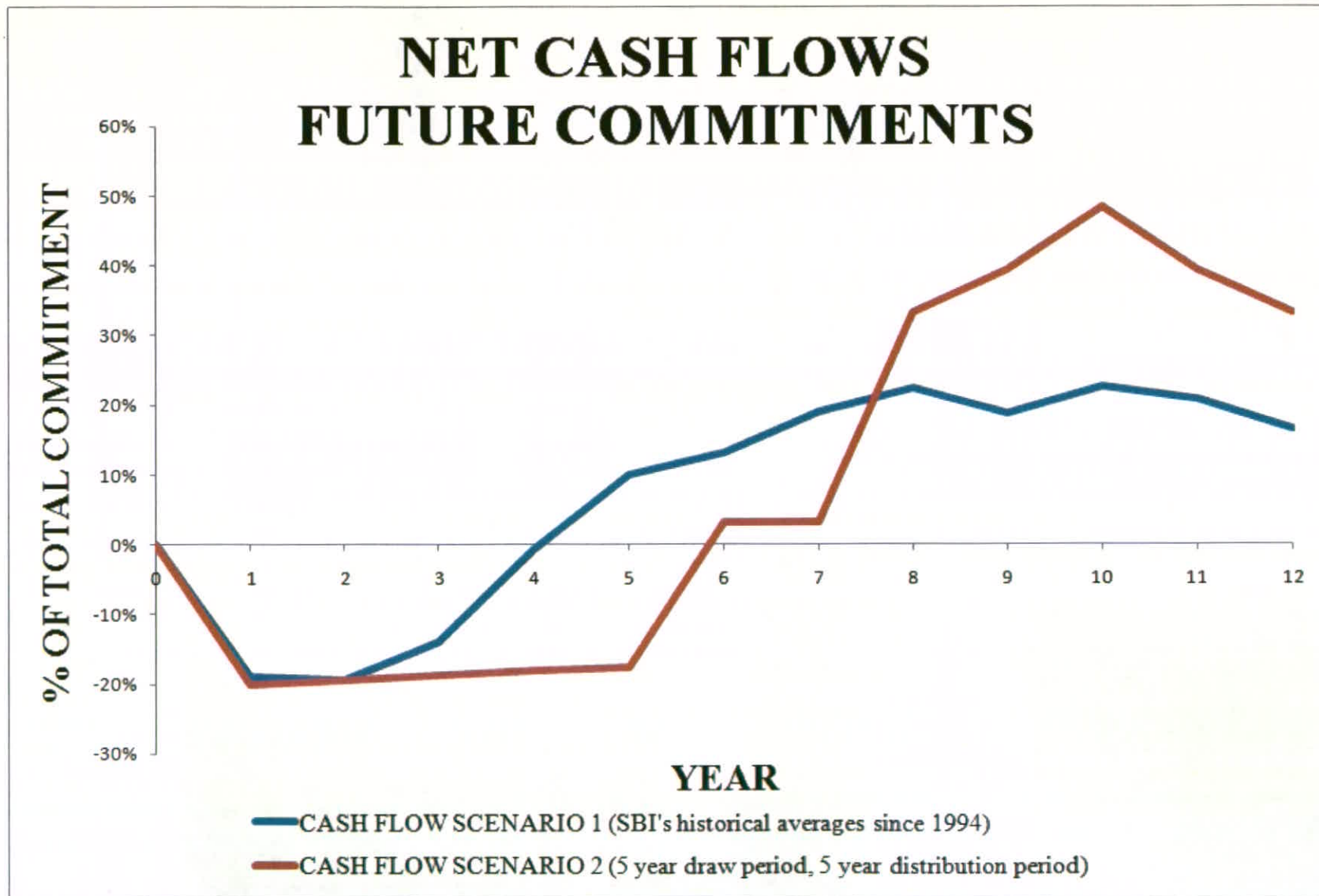
Appendix B

SBI Commitment Model Cash Flow Scenarios: Draw Dows & Distribution %'s

CASH FLOW SCENARIO 1

(MSBI historical cash flows)

	Equity Resource			Equity Real Estate			Equity Private Equity			Debt Resource			Debt Real Estate			Debt Private Equity			Future Commitments	
Year	Distributions	Draws	Year	Distributions	Draws	Year	Distributions	Draws	Year	Distributions	Draws	Year	Distributions	Draws	Year	Distributions	Draws	Year	Distributions	Draws
1	1%	-16%	1	3%	-34%	1	2%	-21%	1	0%	-19%	1	1%	-23%	1	2%	-16%	1	2%	-21%
2	3%	-19%	2	5%	-31%	2	4%	-23%	2	6%	-25%	2	6%	-32%	2	6%	-24%	2	4%	-24%
3	7%	-20%	3	7%	-21%	3	7%	-22%	3	3%	-19%	3	23%	-33%	3	11%	-20%	3	8%	-22%
4	14%	-18%	4	9%	-6%	4	10%	-14%	4	6%	-8%	4	16%	0%	4	19%	-15%	4	12%	-13%
5	31%	-4%	5	13%	-3%	5	17%	-8%	5	24%	-14%	5	10%	-1%	5	18%	-10%	5	18%	-8%
6	37%	-6%	6	12%	0%	6	22%	-6%	6	8%	-14%	6	10%	0%	6	14%	-6%	6	19%	-6%
7	20%	-3%	7	18%	0%	7	22%	-2%	7	25%	0%	7	11%	0%	7	19%	-3%	7	21%	-2%
8	22%	-1%	8	14%	0%	8	24%	-1%	8	52%	0%	8	19%	0%	8	18%	-1%	8	23%	-1%
9	42%	0%	9	21%	0%	9	16%	0%	9	61%	0%	9	17%	0%	9	7%	-1%	9	19%	0%
10	40%	0%	10	26%	0%	10	23%	0%	10	48%	0%	10	19%	0%	10	3%	0%	10	23%	0%
11	39%	0%	11	26%	-6%	11	14%	0%	11	87%	0%	11	15%	0%	11	6%	0%	11	23%	-2%
12	35%	0%	12	9%	0%	12	12%	0%	12	29%	0%	12	15%	0%	12	10%	0%	12	17%	0%

CASH FLOW SCENARIO 2

(Top down / 5 year draw cash flows)

	Equity Resource			Equity Real Estate			Equity Private Equity			Debt Resource			Debt Real Estate			Debt Private Equity			Future Commitments	
Year	Distributions	Draws	Year	Distributions	Draws	Year	Distributions	Draws	Year	Distributions	Draws	Year	Distributions	Draws	Year	Distributions	Draws	Year	Distributions	Draws
1	0%	-20%	1	0%	-20%	1	0%	-20%	1	0%	-20%	1	0%	-20%	1	0%	-20%	1	0%	-20%
2	1%	-20%	2	1%	-20%	2	0%	-20%	2	1%	-20%	2	1%	-20%	2	1%	-20%	2	1%	-20%
3	2%	-20%	3	2%	-20%	3	1%	-20%	3	2%	-20%	3	2%	-20%	3	2%	-20%	3	1%	-20%
4	2%	-20%	4	2%	-20%	4	1%	-20%	4	3%	-20%	4	2%	-20%	4	3%	-20%	4	2%	-20%
5	3%	-20%	5	3%	-20%	5	2%	-20%	5	4%	-20%	5	3%	-20%	5	4%	-20%	5	2%	-20%
6	4%	0%	6	4%	0%	6	2%	0%	6	25%	0%	6	4%	0%	6	25%	0%	6	3%	0%
7	25%	0%	7	25%	0%	7	34%	0%	7	29%	0%	7	25%	0%	7	29%	0%	7	3%	0%
8	29%	0%	8	29%	0%	8	40%	0%	8	35%	0%	8	29%	0%	8	35%	0%	8	33%	0%
9	35%	0%	9	35%	0%	9	50%	0%	9	29%	0%	9	35%	0%	9	29%	0%	9	39%	0%
10	29%	0%	10	29%	0%	10	40%	0%	10	25%	0%	10	29%	0%	10	25%	0%	10	48%	0%
11	25%	0%	11	25%	0%	11	34%	0%	11	0%	0%	11	25%	0%	11	0%	0%	11	39%	0%
12	0%	0%	12	0%	0%	12	0%	0%	12	0%	0%	12	0%	0%	12	0%	0%	12	33%	0%

Appendix B

SBI Commitment Model Cash Flow Scenarios: Net Cash Flows

CASH FLOW SCENARIO 1

(MSBI historical cash flows)

Equity Resource		Equity Real Estate		Equity Private Equity		Debt Resource		Debt Real Estate		Debt Private Equity		Future Commitments	
Year	Net Cash Flows	Year	Net Cash Flows	Year	Net Cash Flows	Year	Net Cash Flows	Year	Net Cash Flows	Year	Net Cash Flows	Year	Net Cash Flows
1	-15%	1	-32%	1	-19%	1	-19%	1	-23%	1	-14%	1	-19%
2	-15%	2	-26%	2	-19%	2	-19%	2	-26%	2	-18%	2	-19%
3	-13%	3	-14%	3	-16%	3	-15%	3	-10%	3	-9%	3	-14%
4	-4%	4	3%	4	-4%	4	-2%	4	16%	4	4%	4	-1%
5	27%	5	10%	5	9%	5	10%	5	10%	5	8%	5	10%
6	31%	6	12%	6	16%	6	-5%	6	10%	6	8%	6	13%
7	17%	7	18%	7	20%	7	25%	7	11%	7	15%	7	19%
8	21%	8	14%	8	22%	8	52%	8	18%	8	17%	8	22%
9	41%	9	21%	9	15%	9	61%	9	16%	9	7%	9	19%
10	40%	10	26%	10	23%	10	48%	10	18%	10	3%	10	23%
11	39%	11	20%	11	14%	11	87%	11	15%	11	5%	11	21%
12	35%	12	9%	12	12%	12	29%	12	15%	12	10%	12	16%

CASH FLOW SCENARIO 2

(Top down / 5 year draw cash flows)

Equity Resource		Equity Real Estate		Equity Private Equity		Debt Resource		Debt Real Estate		Debt Private Equity		Future Commitments	
Year	Net Cash Flows	Year	Net Cash Flows	Year	Net Cash Flows	Year	Net Cash Flows	Year	Net Cash Flows	Year	Net Cash Flows	Year	Net Cash Flows
1	-20%	1	-20%	1	-20%	1	-20%	1	-20%	1	-20%	1	-20%
2	-19%	2	-19%	2	-20%	2	-19%	2	-19%	2	-19%	2	-19%
3	-18%	3	-18%	3	-19%	3	-18%	3	-18%	3	-18%	3	-19%
4	-18%	4	-18%	4	-19%	4	-17%	4	-18%	4	-17%	4	-18%
5	-17%	5	-17%	5	-18%	5	-16%	5	-17%	5	-16%	5	-18%
6	4%	6	4%	6	2%	6	25%	6	4%	6	25%	6	3%
7	25%	7	25%	7	34%	7	29%	7	25%	7	29%	7	3%
8	29%	8	29%	8	40%	8	35%	8	29%	8	35%	8	33%
9	35%	9	35%	9	50%	9	29%	9	35%	9	29%	9	39%
10	29%	10	29%	10	40%	10	25%	10	29%	10	25%	10	48%
11	25%	11	25%	11	34%	11	0%	11	25%	11	0%	11	39%
12	0%	12	0%	12	0%	12	0%	12	0%	12	0%	12	33%

Appendix C

Models Used and Considered

- ## MSBI Commitment Model
  - Described in presentation.

- ## "Realized Model"
  - Description of Model: Uses the MSBI's historical quarterly averages for draw downs and distributions.
  - Data & Key Assumptions: Distributions as a % of Market Value = 7.2%. Draw Downs as a % of Unfunded Commitments = 9.1%. High quarterly variability for draw down % and distribution %.
  - Conclusions: Commit $1.9B – $2.2B annually for next 5 years.

- ## "Rule of Thumb Model"
  - Description of Model: Rule of Thumb: Invest 20%-25% of your Target Allocation each year for a mature plan.
  - Model was obtained during 2009 Fall ILPA conference.
  - Target Allocation = 20% of $38B plan
  - Conclusions: Commit $1.5B - $1.9B annually for the next five years.

- ## "Goldman Sach's Model"
  - Description of Model: Same as the MSBI Commitment Model as described in this presentation. Models every current investment partnership based on expected draw down and distribution rates.
  - Data & Key Assumptions: Goldman Sach's uses their own cash flow scenario.
  - Conclusions: Commit $1.7B - $1.75B annually for the next 5 years.
  - MSBI Hits 30 % target for MV + Unfunded prior to hitting 20% MV target.

Appendix D

Literature Review: Studies, Meetings, & Research Papers

Commitment Modeling 101, Presentation at ILPA by Allen Waldrop and Craig Mitchell, LP Capital Advisors, Chicago IL, 1:30 – 3:00 pm September 30th 2009.

Murphy, Daniel. "A Practical Guide to Managing Private Equity Commitments". Goldman Sachs Asset Management – Strategic Research. June 2007.

Murphy, Daniel. "Understanding the J-Curve: A Primer on Interim Performance of Private Equity Investments". Goldman Sachs Asset Management – Strategic Research. December 2006.

Alexander, Seth and Takahaski, Dean. "Illiquid Alternative Asset Fund Modeling". The Journal of Portfolio Management. Winter 2002, pp. 90-100.

Long, Austin and Nickels, Craig. "Alternative Asset Allocation Using Monte Carlo Simulation". The University of Texas System for Presentation to Symposium on Mezzanine Finance '95. May 18-19, 1995.

McIntire, Conner, & Nevins. "A Portfolio Management Approach to Determining Private Equity Commitments". The Journal of Alternative Investments. Spring 2004, pp. 32-46.

Cardie, Cattanach, & Kelly. "How Large Should Your Commitment to Private Equity Really Be?". The Journal of Wealth Management. Fall 2000, pp. 39-45.

Schweizer, David. "Portfolio Optimization with Alternative Investments". Paper for Presentation at the International Business Research Conference 8th Annual Meeting, Dubai, UAE. February 2008.

Cao, Dan & Teiletche, Jerome. "Reconsidering Asset Allocation Involving Illiquid Assets". http://ssrn.com/abstract=1113019.

Bekker, Doeswijk, & Lam. "Strategic Asset Allocation: Determining the Optimal Portfolio with Ten Asset Classes". http://ssrn.com/abstract=1368689

Groot, & Swinkels. "Incorporating uncertainty about alternative assets in strategic pension fund asset allocation". http://ssrn.com/abstract=1146410