FINM 35500 **Mark Hendricks**
Spring 2022

Homework #8

Due on Monday, May 23, at 6:00pm CT.

This homework uses Harvard Business Case, **Oregon Public Employees Retirement Fund**.

1 Considering Strategy

You do not need to submit this section.

1. At the time of the case, who are the largest allocators to Private Equity funds? Comment on any patterns or implications regarding these LPs?

   Per Exhibit 3, the largest allocators to PE tend to be public retirment funds, (average of top 3 is over 20% with a max of 24.3%.). Interestingly, the private sector retirement funds show markedly lower allocations, (average of top 3 is just over 8% with max at 13%.) Endowments and insurance companies round out most of the rest.

   The aggressive allocations by public retirement systems could be due to many reasons, including institutional, legal, and strategic. On the financial side, the long horizons may make it easier to take on the significant illiquidity risk.

   Whatever the case, Oregon Public is no exception; per footnote 8, their allocation to PE is around 20%.

2. What is the most frequently assessed management fee? What is the frequency of deal-by-deal carry?

   Per Exhibit 6, the mode of the distribution is at 2%, which is also close to the median. Since 2008, these fees have continued to trend downward and some recent studies put the median closer to 1.5%. This trend is foreshadowed by the references in footnote 15 and Exhibit 12.

3. In what ways do the management fee and carry align the interests between the GPs and LPs? And in what way do they cause conflicts of interest?

   The management fees incentivize the GPs to be thorough in searching out attractive investments and carrying out due diligence. In fact, charging this management fee on the committed capital instead of the invested capital further incentivizes the GPs to not rush into investments for short-run compensation.

   The carry obviously rewards GPs for upside to investments, which aligns them with the LPs desire for finding projects with significant upside. LPs do not want to take on PE-level risks, illiquidity and fees to simply chase low and steady returns.

   Nonetheless, these fees also present conflicts of interest. The carry acts like a call option, which is more valuable to the GPs with increased volatility. Thus we cannot expect GPs to be aligned with LPs in regard to the right level of risk in the investments.

4. How much of TPG VI was funded by the GPs? Why is the ILPA asking for more GP capital to be invested in future deals?

   TPG invested $500 million, per footnote 9. This is only 2.5% of the committed capital, which is within the norm of GP contributions. Some funds such as Bain Capital have historically had much larger GP contributions. Of course, more GP equity capital means their incentives are more aligned with LPs regarding risk, as they have something to lose. The 2009 ILPA statement in Exhibit 12 is requesting more such alignment. It also notes that this alignment is weaker if GP capital comes from waived management fees, such an arrangement still leaves GPs very little downside.

5. Why is TPG proposing a new fee structure and a reduction in commitments?

   TPG saw a deteriorating market as soon as it closed the fund in Feb 2008, and the interim 10 months have made it clear that the market will not be supporting many IPO's any time soon. Thus, TPG is facing a poor investment opportunity set, with even poorer opportunities for exiting investments. Accordingly, TPG is trying to keep LPs agreeable given that the expected cash flows have gone down, and the expected time-to-exit has increased.

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2 Calculating Value

Make the following assumptions

- Committed capital is exactly $20 billion. Simplify by assuming it is all LP capital.
- The fund has a 10-year life.
- The capital is called in five equal installments, at the beginning of the first five years of the fund.
- The management fee is 1.5% of committed capital, payable in advance at the beginning of the year.
- The GP "carry" is 20% of profits, (beyond repaying the committed capital.)
- The fund's invested assets grow at a constant 20% per year.
- At the end of Year 5 through Year 9, 25% of the investment portfolio's current asset balance is liquidated, and the proceeds are available for distribution to LPs and GPs.
- At the end of Year 10, 100% of the portfolio's assets are liquidated for distribution.
- Assume a discount rate of 15%. (We are assuming no debt funding, so there is no distinction here between asset and equity discount rates of the investment cash flows.)

The solutions below assume that the management fee is only charged during the investment period, without any management fee during the harvest period. One could reasonably assume the management fee is charged throughout, in which case your numbers will differ.

1. What is the value of the asset cash flows, the LP cash flows, and GP cash flows? And the IRR?

   See the Tables for detailed calculations. Several assumptions are needed for calculation. Most are explicitly given in the homework. In addition, we assume that the management fee is...

   - charged on the committed (not contributed) equity (not debt) capital.
   - only charged during the investment period, not during the harvest period.

   A few general observations...

   - Asset cash flows have an IRR of **20%**, given the assumption of this constant return.
   - IRR cannot be calculated for the GP interests given that there is no capital contribution. Without accounting for the value of the GPs' effort, this is an infinite return.

- The value of the NPV depends importantly on this (completely) assumed discount rate. Given that it generates a **20%** return on assets without risk, it is strange to discount by anything other than the risk-free rate. Furthermore, it is immediately clear that the assets will have substantial NPV given the spread in the constant return versus the discount rate.
- Given that all cash flows are discounted at the same rate, the asset NPV is cleanly divided between the LPs and GPs.

A few specifics to this scenario...

- The equity is "made whole" in year 8.
- The GPs capture **roughly 75%** of the deal's total NPV.
- The NPV measure is sensitive to this arbitrary discount rate, and the IRR and TVPC are undefined for the GP.

2. How do these values change under TPG's proposed reduction of the management fee to 1.35%?

   TPG's proposed reduction of the fee to **1.35% increases the LP NPV and IRR.**.

   Note that the asset NPV is constant across every scenario we explore in this problem—except this scenario. Why is the asset NPV slightly higher here, yet the IRR stays the same? The asset NPV goes up slightly because the lower management fee paid at initializing the project, year 0, means that the opportunity is scaled to a slightly larger initial capital base. Thus, the IRR does not change, nor does the asset TVPC. But the NPV grows slightly.

3. Would OPERF derive more value from this fee reduction, or reducing TPG's carry from 20% to 15%?

   OPERF would get much more value from reducing the GP carry.

4. How would these options compare to imposing an 12% per year hurdle (preference)? And with a GP catch-up attached to the hurdle rate?

   The **12%** preference is slightly better than the reduced carry.

   However, under this scenario of strong, constant asset returns, the investment will pay significant profits. Thus, including the GP catchup wipes out most of the gain of the preference and simply adds a small time-value-of money to the LPs by accelerating some of their eventual profit into preference. Of course, this preference plus catchup is also shifting substantial risk onto the GPs in the case that there is enough distribution to pay preference but not enough to pay catch-up. But that does not happen in this scenario.

5. OPERF is considering the offer to reduce its commitment to TPG by 10%. Suppose that this 10% of capital is never deployed; that is, re-do the calculation where at the start of year 5, TPG calls 10% of the committed capital and leaves 10% unused at a risk-free rate of 0%, $R_f = 1$. How much does leaving this 10% unemployed reduce the IRR of the fund in the baseline assumptions?

   Leaving 10% of the committed capital in reserve obviously reduces total NPV given the assumed constant asset return is higher than the discount rate. Note that it leaves Asset IRR the same. It actually slightly raises the Asset TVPC given that this measure does not account for timing, and the late-stage investment has less time to generate returns. Thus on a capital-in versus capital-out basis such as TVPC, this late capital is below average in generating total returns. This quirk is a limitation of using a non-timed metric.

3 Volatility

You do not need to submit this section.
Above we assumed the invested asset returns were constant 20%. Let's consider invested asset return volatility.

1. Qualitatively, how does this change the value of the investment cash flows, GP cash flows, and LP cash flows?

   Following what is often seen in practice, the scenarios above have been considering constant returns. Note that this is not the same as considering risky returns and assuming 20% is the average. The nonlinear payoffs to the LPs and GPs are asymmetric and and impacted by volatility. In other words, the payoff schedule of the mean is not the mean of the payoff schedule.

   - The valuation to the asset cash flows will not change unless the discount rate changes accordingly. Does the volatility correspond to increased systematic or idiosyncratic risk.
   - The LP equity is similar to a call option struck at the value of the debt. Thus the expected LP cash flows increase with volatility, though this is only salient in cases with high leverage or low asset returns.
   - The expected cash flows will increase with volatility, and will show more sensitivity (at least in relevant ranges) to volatility.

2. How do these relationships change if the expected asset returns are significantly above or below the hurdle rate?

   The GP claim is similar to a call option struck at the value of the LP preference. Thus, the profits portion will have a stronger relationship to volatility at this hurdle strike. (This is slightly complicated by the management fee which is prioritized just after debt.)

   The LP claim is similar to a call option struck at the value fo the debt; thus, it is increasing with volatility but is less sensitive in the range of the hurdle. (It would be very sensitive in the range of the debt repayment.)

3. How might this fact impact the GP's selection of capital deployed in the late stages of the investment phase of the fund?

   GPs will value upside, even when it is pure volatility. As they pass the hurdle, their preference for volatility will lessen, and it could lead to safer investments.

4. Qualitatively, how would a deal-by-deal carry agreement change the valuation to LPs and GPs?

   Exhibit 6 shows just over 25% of funds had deal-by-deal profit allocation. This clearly gives value to the GPs at the expense of the LPs. (Portfolio of options versus an option on a portfolio!) This is because the optionality stays at the higher volatility of the individual projects, not the diversified fund.

   So why might LPs agree to this? This structure keeps the GPs open to high risk investments, even as the rest of the portfolio stabilizes to project well above the hurdle rate. Of course, whether this is valuable depends on the price of including this deal-by-deal provision, the investment opportunity set, the GP incentive alignment, etc.

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Table 1: BASELINE

Parameters

Drate	wtGP	GPrateInv	GPrateHarv	carry	pref	catch	DintCommit	GPfeeCommit
5.00	0.00	1.50	0.00	20.00	0.00	0.00	0.00	100.00

Valuation

	Assets	Debt	LPs	GPs	Assets	Debt	LPs	GPs
IRR(%) ‖ Total-Value-to-Paid-In	20.00	-	16.19	-	2.88	-	2.33	-
Discount Rate (%) ‖ NPV	15.00	5.00	15.00	15.00	3,904.32	0.00	902.16	3,002.16

Capital

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Assets	-	3,700	8,140	13,468	19,862	27,534	24,781	22,302	20,072	18,065	16,259	-
Capital Gains	0	740	1,628	2,694	3,972	5,507	4,956	4,460	4,014	3,613	3,252	34,836
Called Capital	4,000	4,000	4,000	4,000	4,000	0	0	0	0	0	0	20,000
Distributions	300	300	300	300	300	8,260	7,434	6,691	6,022	5,420	19,510	54,836
Net Assets	3,700	8,140	13,468	19,862	27,534	24,781	22,302	20,072	18,065	16,259	0	-

Debt

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Debt	-	0	0	0	0	0	0	0	0	0	0	-
New Borrowings	0	0	0	0	0	0	0	0	0	0	0	0
Principal Paid	0	0	0	0	0	0	0	0	0	0	0	0
Debt Outstanding	0	0	0	0	0	0	0	0	0	0	0	-

Equity

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Equity	-	4,000	8,000	12,000	16,000	20,000	11,740	4,306	0	0	0	-
Equity Contributed	4,000	4,000	4,000	4,000	4,000	0	0	0	0	0	0	20,000
Equity Preference	0	0	0	0	0	0	0	0	0	0	0	0
Equity Repaid	0	0	0	0	0	8,260	7,434	4,306	0	0	0	20,000
Equity Outstanding	4,000	8,000	12,000	16,000	20,000	11,740	4,306	0	0	0	0	-

Distributions

	0	1	2	3	4	5	6	7	8	9	10	Sum
Distributions	300	300	300	300	300	8,260	7,434	6,691	6,022	5,420	19,510	54,836
Debt Prin & Int	0	0	0	0	0	0	0	0	0	0	0	0
Mgt Fee	300	300	300	300	300	0	0	0	0	0	0	1,500
Eqty Face & Pref	0	0	0	0	0	8,260	7,434	4,306	0	0	0	20,000
Catchup	0	0	0	0	0	0	0	0	0	0	0	0
LP Profits	0	0	0	0	0	0	0	1,908	4,817	4,336	15,608	26,669
GP Profits	0	0	0	0	0	0	0	477	1,204	1,084	3,902	6,667

Table 2: MGMTFEE

Parameters

Drate	wtGP	GPrateInv	GPrateHarv	carry	pref	catch	DintCommit	GPfeeCommit
5.00	0.00	1.35	0.00	20.00	0.00	0.00	0.00	100.00

Valuation

	Assets	Debt	LPs	GPs	Assets	Debt	LPs	GPs
IRR(%) ‖ Total-Value-to-Paid-In	20.00	-	16.34	-	2.88	-	2.35	-
Discount Rate (%) ‖ NPV	15.00	5.00	15.00	15.00	3,935.97	0.00	1,022.31	2,913.67

Capital

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Assets	-	3,730	8,206	13,577	20,023	27,757	24,981	22,483	20,235	18,211	16,390	-
Capital Gains	0	746	1,641	2,715	4,005	5,551	4,996	4,497	4,047	3,642	3,278	35,119
Called Capital	4,000	4,000	4,000	4,000	4,000	0	0	0	0	0	0	20,000
Distributions	270	270	270	270	270	8,327	7,494	6,745	6,070	5,463	19,668	55,119
Net Assets	3,730	8,206	13,577	20,023	27,757	24,981	22,483	20,235	18,211	16,390	0	-

Debt

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Debt	-	0	0	0	0	0	0	0	0	0	0	-
New Borrowings	0	0	0	0	0	0	0	0	0	0	0	0
Principal Paid	0	0	0	0	0	0	0	0	0	0	0	0
Debt Outstanding	0	0	0	0	0	0	0	0	0	0	0	-

Equity

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Equity	-	4,000	8,000	12,000	16,000	20,000	11,673	4,178	0	0	0	-
Equity Contributed	4,000	4,000	4,000	4,000	4,000	0	0	0	0	0	0	20,000
Equity Preference	0	0	0	0	0	0	0	0	0	0	0	0
Equity Repaid	0	0	0	0	0	8,327	7,494	4,178	0	0	0	20,000
Equity Outstanding	4,000	8,000	12,000	16,000	20,000	11,673	4,178	0	0	0	0	-

Distributions

	0	1	2	3	4	5	6	7	8	9	10	Sum
Distributions	270	270	270	270	270	8,327	7,494	6,745	6,070	5,463	19,668	55,119
Debt Prin & Int	0	0	0	0	0	0	0	0	0	0	0	0
Mgt Fee	270	270	270	270	270	0	0	0	0	0	0	1,350
Eqty Face & Pref	0	0	0	0	0	8,327	7,494	4,178	0	0	0	20,000
Catchup	0	0	0	0	0	0	0	0	0	0	0	0
LP Profits	0	0	0	0	0	0	0	2,053	4,856	4,371	15,735	27,015
GP Profits	0	0	0	0	0	0	0	513	1,214	1,093	3,934	6,754

Table 3: CARRY

Parameters

Drate	wtGP	GPrateInv	GPrateHarv	carry	pref	catch	DintCommit	GPfeeCommit
5.00	0.00	1.50	0.00	15.00	0.00	0.00	0.00	100.00

Valuation

	Assets	Debt	LPs	GPs	Assets	Debt	LPs	GPs
IRR(%) ‖ Total-Value-to-Paid-In	20.00	-	16.76	-	2.88	-	2.42	-
Discount Rate (%) ‖ NPV	15.00	5.00	15.00	15.00	3,904.32	0.00	1,363.57	2,540.74

Capital

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Assets	-	3,700	8,140	13,468	19,862	27,534	24,781	22,302	20,072	18,065	16,259	-
Capital Gains	0	740	1,628	2,694	3,972	5,507	4,956	4,460	4,014	3,613	3,252	34,836
Called Capital	4,000	4,000	4,000	4,000	4,000	0	0	0	0	0	0	20,000
Distributions	300	300	300	300	300	8,260	7,434	6,691	6,022	5,420	19,510	54,836
Net Assets	3,700	8,140	13,468	19,862	27,534	24,781	22,302	20,072	18,065	16,259	0	-

Debt

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Debt	-	0	0	0	0	0	0	0	0	0	0	-
New Borrowings	0	0	0	0	0	0	0	0	0	0	0	0
Principal Paid	0	0	0	0	0	0	0	0	0	0	0	0
Debt Outstanding	0	0	0	0	0	0	0	0	0	0	0	-

Equity

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Equity	-	4,000	8,000	12,000	16,000	20,000	11,740	4,306	0	0	0	-
Equity Contributed	4,000	4,000	4,000	4,000	4,000	0	0	0	0	0	0	20,000
Equity Preference	0	0	0	0	0	0	0	0	0	0	0	0
Equity Repaid	0	0	0	0	0	8,260	7,434	4,306	0	0	0	20,000
Equity Outstanding	4,000	8,000	12,000	16,000	20,000	11,740	4,306	0	0	0	0	-

Distributions

	0	1	2	3	4	5	6	7	8	9	10	Sum
Distributions	300	300	300	300	300	8,260	7,434	6,691	6,022	5,420	19,510	54,836
Debt Prin & Int	0	0	0	0	0	0	0	0	0	0	0	0
Mgt Fee	300	300	300	300	300	0	0	0	0	0	0	1,500
Eqty Face & Pref	0	0	0	0	0	8,260	7,434	4,306	0	0	0	20,000
Catchup	0	0	0	0	0	0	0	0	0	0	0	0
LP Profits	0	0	0	0	0	0	0	2,027	5,118	4,607	16,584	28,336
GP Profits	0	0	0	0	0	0	0	358	903	813	2,927	5,000

Table 4: PREF

Parameters

Drate	wtGP	GPrateInv	GPrateHarv	carry	pref	catch	DintCommit	GPfeeCommit
5.00	0.00	1.50	0.00	20.00	12.00	0.00	0.00	100.00

Valuation

	Assets	Debt	LPs	GPs	Assets	Debt	LPs	GPs
IRR(%) ‖ Total-Value-to-Paid-In	20.00	-	17.33	-	2.88	-	2.48	-
Discount Rate (%) ‖ NPV	15.00	5.00	15.00	15.00	3,904.32	0.00	1,826.76	2,077.56

Capital

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Assets	-	3,700	8,140	13,468	19,862	27,534	24,781	22,302	20,072	18,065	16,259	-
Capital Gains	0	740	1,628	2,694	3,972	5,507	4,956	4,460	4,014	3,613	3,252	34,836
Called Capital	4,000	4,000	4,000	4,000	4,000	0	0	0	0	0	0	20,000
Distributions	300	300	300	300	300	8,260	7,434	6,691	6,022	5,420	19,510	54,836
Net Assets	3,700	8,140	13,468	19,862	27,534	24,781	22,302	20,072	18,065	16,259	0	-

Debt

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Debt	-	0	0	0	0	0	0	0	0	0	0	-
New Borrowings	0	0	0	0	0	0	0	0	0	0	0	0
Principal Paid	0	0	0	0	0	0	0	0	0	0	0	0
Debt Outstanding	0	0	0	0	0	0	0	0	0	0	0	-

Equity

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Equity	-	4,000	8,480	13,498	19,117	25,411	20,201	15,190	10,323	5,540	785	-
Equity Contributed	4,000	4,000	4,000	4,000	4,000	0	0	0	0	0	0	20,000
Equity Preference	0	480	1,018	1,620	2,294	3,049	2,424	1,823	1,239	665	94	14,705
Equity Repaid	0	0	0	0	0	8,260	7,434	6,691	6,022	5,420	879	34,705
Equity Outstanding	4,000	8,480	13,498	19,117	25,411	20,201	15,190	10,323	5,540	785	0	-

Distributions

	0	1	2	3	4	5	6	7	8	9	10	Sum
Distributions	300	300	300	300	300	8,260	7,434	6,691	6,022	5,420	19,510	54,836
Debt Prin & Int	0	0	0	0	0	0	0	0	0	0	0	0
Mgt Fee	300	300	300	300	300	0	0	0	0	0	0	1,500
Eqty Face & Pref	0	0	0	0	0	8,260	7,434	6,691	6,022	5,420	879	34,705
Catchup	0	0	0	0	0	0	0	0	0	0	0	0
LP Profits	0	0	0	0	0	0	0	0	0	0	14,905	14,905
GP Profits	0	0	0	0	0	0	0	0	0	0	3,726	3,726

Table 5: CATCHUP

Parameters

Drate	wtGP	GPrateInv	GPrateHarv	carry	pref	catch	DintCommit	GPfeeCommit
5.00	0.00	1.50	0.00	20.00	12.00	100.00	0.00	100.00

Valuation

	Assets	Debt	LPs	GPs	Assets	Debt	LPs	GPs
IRR(%) ‖ Total-Value-to-Paid-In	20.00	-	16.46	-	2.88	-	2.33	-
Discount Rate (%) ‖ NPV	15.00	5.00	15.00	15.00	3,904.32	0.00	1,099.77	2,804.55

Capital

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Assets	-	3,700	8,140	13,468	19,862	27,534	24,781	22,302	20,072	18,065	16,259	-
Capital Gains	0	740	1,628	2,694	3,972	5,507	4,956	4,460	4,014	3,613	3,252	34,836
Called Capital	4,000	4,000	4,000	4,000	4,000	0	0	0	0	0	0	20,000
Distributions	300	300	300	300	300	8,260	7,434	6,691	6,022	5,420	19,510	54,836
Net Assets	3,700	8,140	13,468	19,862	27,534	24,781	22,302	20,072	18,065	16,259	0	-

Debt

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Debt	-	0	0	0	0	0	0	0	0	0	0	-
New Borrowings	0	0	0	0	0	0	0	0	0	0	0	0
Principal Paid	0	0	0	0	0	0	0	0	0	0	0	0
Debt Outstanding	0	0	0	0	0	0	0	0	0	0	0	-

Equity

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Equity	-	4,000	8,480	13,498	19,117	25,411	20,201	15,190	10,323	5,540	785	-
Equity Contributed	4,000	4,000	4,000	4,000	4,000	0	0	0	0	0	0	20,000
Equity Preference	0	480	1,018	1,620	2,294	3,049	2,424	1,823	1,239	665	94	14,705
Equity Repaid	0	0	0	0	0	8,260	7,434	6,691	6,022	5,420	879	34,705
Equity Outstanding	4,000	8,480	13,498	19,117	25,411	20,201	15,190	10,323	5,540	785	0	-

Distributions

	0	1	2	3	4	5	6	7	8	9	10	Sum
Distributions	300	300	300	300	300	8,260	7,434	6,691	6,022	5,420	19,510	54,836
Debt Prin & Int	0	0	0	0	0	0	0	0	0	0	0	0
Mgt Fee	300	300	300	300	300	0	0	0	0	0	0	1,500
Eqty Face & Pref	0	0	0	0	0	8,260	7,434	6,691	6,022	5,420	879	34,705
Catchup	0	0	0	0	0	0	0	0	0	0	3,676	3,676
LP Profits	0	0	0	0	0	0	0	0	0	0	11,964	11,964
GP Profits	0	0	0	0	0	0	0	0	0	0	2,991	2,991

Table 6: UNUTILIZED

Parameters

Drate	wtGP	GPrateInv	GPrateHarv	carry	pref	catch	DintCommit	GPfeeCommit
5.00	0.00	1.50	0.00	20.00	0.00	0.00	0.00	100.00

Valuation

	Assets	Debt	LPs	GPs	Assets	Debt	LPs	GPs
IRR(%) ‖ Total-Value-to-Paid-In	20.00	-	16.13	-	3.00	-	2.40	-
Discount Rate (%) ‖ NPV	15.00	5.00	15.00	15.00	3,728.16	0.00	818.92	2,909.24

Capital

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Assets	-	3,700	8,140	13,468	19,862	25,534	22,981	20,682	18,614	16,753	15,078	-
Capital Gains	0	740	1,628	2,694	3,972	5,107	4,596	4,136	3,723	3,351	3,016	32,962
Called Capital	4,000	4,000	4,000	4,000	2,000	0	0	0	0	0	0	18,000
Distributions	300	300	300	300	300	7,660	6,894	6,205	5,584	5,026	18,093	50,962
Net Assets	3,700	8,140	13,468	19,862	25,534	22,981	20,682	18,614	16,753	15,078	0	-

Debt

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Debt	-	0	0	0	0	0	0	0	0	0	0	-
New Borrowings	0	0	0	0	0	0	0	0	0	0	0	0
Principal Paid	0	0	0	0	0	0	0	0	0	0	0	0
Debt Outstanding	0	0	0	0	0	0	0	0	0	0	0	-

Equity

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Equity	-	4,000	8,000	12,000	16,000	18,000	10,340	3,446	0	0	0	-
Equity Contributed	4,000	4,000	4,000	4,000	2,000	0	0	0	0	0	0	18,000
Equity Preference	0	0	0	0	0	0	0	0	0	0	0	0
Equity Repaid	0	0	0	0	0	7,660	6,894	3,446	0	0	0	18,000
Equity Outstanding	4,000	8,000	12,000	16,000	18,000	10,340	3,446	0	0	0	0	-

Distributions

	0	1	2	3	4	5	6	7	8	9	10	Sum
Distributions	300	300	300	300	300	7,660	6,894	6,205	5,584	5,026	18,093	50,962
Debt Prin & Int	0	0	0	0	0	0	0	0	0	0	0	0
Mgt Fee	300	300	300	300	300	0	0	0	0	0	0	1,500
Eqty Face & Pref	0	0	0	0	0	7,660	6,894	3,446	0	0	0	18,000
Catchup	0	0	0	0	0	0	0	0	0	0	0	0
LP Profits	0	0	0	0	0	0	0	2,207	4,467	4,021	14,474	25,170
GP Profits	0	0	0	0	0	0	0	552	1,117	1,005	3,619	6,292

Table 7: LEVERED

Parameters

Drate	wtGP	GPrateInv	GPrateHarv	carry	pref	catch	DintCommit	GPfeeCommit
5.00	0.00	1.50	0.00	20.00	0.00	0.00	0.00	100.00

Valuation

	Assets	Debt	LPs	GPs	Assets	Debt	LPs	GPs
IRR(%) ‖ Total-Value-to-Paid-In	20.00	5.00	26.58	-	2.91	1.44	3.41	-
Discount Rate (%) ‖ NPV	15.00	5.00	20.00	20.00	3,921.22	(-0.00)	2,244.64	1,927.17

Capital

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Assets	-	3,850	8,370	13,694	19,983	27,429	24,686	22,218	19,996	17,996	16,197	-
Capital Gains	0	770	1,674	2,739	3,997	5,486	4,937	4,444	3,999	3,599	3,239	34,884
Called Capital	4,000	4,000	4,000	4,000	4,000	0	0	0	0	0	0	20,000
Distributions	150	250	350	450	550	8,229	7,406	6,665	5,999	5,399	19,436	54,884
Net Assets	3,850	8,370	13,694	19,983	27,429	24,686	22,218	19,996	17,996	16,197	0	-

Debt

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Debt	-	2,000	4,000	6,000	8,000	10,000	10,000	10,000	10,000	10,000	10,000	-
New Borrowings	2,000	2,000	2,000	2,000	2,000	0	0	0	0	0	0	10,000
Principal Paid	0	0	0	0	0	0	0	0	0	0	10,000	10,000
Debt Outstanding	2,000	4,000	6,000	8,000	10,000	10,000	10,000	10,000	10,000	10,000	0	-

Equity

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Equity	-	2,000	4,000	6,000	8,000	10,000	2,271	0	0	0	0	-
Equity Contributed	2,000	2,000	2,000	2,000	2,000	0	0	0	0	0	0	10,000
Equity Preference	0	0	0	0	0	0	0	0	0	0	0	0
Equity Repaid	0	0	0	0	0	7,729	2,271	0	0	0	0	10,000
Equity Outstanding	2,000	4,000	6,000	8,000	10,000	2,271	0	0	0	0	0	-

Distributions

	0	1	2	3	4	5	6	7	8	9	10	Sum
Distributions	150	250	350	450	550	8,229	7,406	6,665	5,999	5,399	19,436	54,884
Debt Prin & Int	0	100	200	300	400	500	500	500	500	500	10,500	14,000
Mgt Fee	150	150	150	150	150	0	0	0	0	0	0	750
Eqty Face & Pref	0	0	0	0	0	7,729	2,271	0	0	0	0	10,000
Catchup	0	0	0	0	0	0	0	0	0	0	0	0
LP Profits	0	0	0	0	0	0	3,708	4,932	4,399	3,919	7,149	24,107
GP Profits	0	0	0	0	0	0	927	1,233	1,100	980	1,787	6,027

Table 8: FULL

Parameters

Drate	wtGP	GPrateInv	GPrateHarv	carry	pref	catch	DintCommit	GPfeeCommit
5.00	10.00	1.50	0.50	20.00	12.00	100.00	0.00	100.00

Valuation

	Assets	Debt	LPs	GPs	Assets	Debt	LPs	GPs
IRR(%) ‖ Total-Value-to-Paid-In	20.00	5.00	26.67	87.71	2.91	1.44	3.40	38.03
Discount Rate (%) ‖ NPV	15.00	5.00	20.00	20.00	3,921.22	(-0.00)	2,038.22	2,133.59

Capital

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Assets	-	3,850	8,370	13,694	19,983	27,429	24,686	22,218	19,996	17,996	16,197	-
Capital Gains	0	770	1,674	2,739	3,997	5,486	4,937	4,444	3,999	3,599	3,239	34,884
Called Capital	4,000	4,000	4,000	4,000	4,000	0	0	0	0	0	0	20,000
Distributions	150	250	350	450	550	8,229	7,406	6,665	5,999	5,399	19,436	54,884
Net Assets	3,850	8,370	13,694	19,983	27,429	24,686	22,218	19,996	17,996	16,197	0	-

Debt

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Debt	-	2,000	4,000	6,000	8,000	10,000	10,000	10,000	10,000	10,000	10,000	-
New Borrowings	2,000	2,000	2,000	2,000	2,000	0	0	0	0	0	0	10,000
Principal Paid	0	0	0	0	0	0	0	0	0	0	10,000	10,000
Debt Outstanding	2,000	4,000	6,000	8,000	10,000	10,000	10,000	10,000	10,000	10,000	0	-

Equity

	0	1	2	3	4	5	6	7	8	9	10	Sum
Prior Equity	-	2,000	4,240	6,749	9,559	12,706	6,565	480	0	0	0	-
Equity Contributed	2,000	2,000	2,000	2,000	2,000	0	0	0	0	0	0	10,000
Equity Preference	0	240	509	810	1,147	1,525	788	58	0	0	0	5,076
Equity Repaid	0	0	0	0	0	7,665	6,873	537	0	0	0	15,076
Equity Outstanding	2,000	4,240	6,749	9,559	12,706	6,565	480	0	0	0	0	-

Distributions

	0	1	2	3	4	5	6	7	8	9	10	Sum
Distributions	150	250	350	450	550	8,229	7,406	6,665	5,999	5,399	19,436	54,884
Debt Prin & Int	0	100	200	300	400	500	500	500	500	500	10,500	14,000
Mgt Fee	150	150	150	150	150	64	33	2	0	0	0	849
Eqty Face & Pref	0	0	0	0	0	7,665	6,873	537	0	0	0	15,076
Catchup	0	0	0	0	0	0	0	1,269	0	0	0	1,269
LP Profits	0	0	0	0	0	0	0	3,485	4,399	3,919	7,149	18,952
GP Profits	0	0	0	0	0	0	0	871	1,100	980	1,787	4,738

4 Blaine Reconsidered

Suppose that a private equity fund has targeted Blaine for a buyout. The fund will acquire Blaine with the same mix of excess cash [1] and new debt that we examined in the earlier analysis of Blaine for the "large" buyback.[2] The fund will additionally contribute LP capital to buy out the remaining equity. The terms are in Table 10.

Acquisition Price (2006)	959,595
LP Equity Funding	602,095
Excess Cash Funding	164,309
Debt Funding	193,191
Sale Price (2010)	1,029,597

Table 9: PE Buyout Details

Management Fee	0.00
LP Preference (cumulative)	0.08
GP Carry	0.30
GP Catchup	0.00

Table 10: PE Fund Claims

Note the following:

- Since the deal is structured like the Large Buyback, it has the same capital structure; thus you can re-use the betas and free-cash-flows you already computed.
- Note that Table 10 gives a sell price at the end of 2010, so no need to calculate a terminal value.
- Do not reconsider real-option value or cost of financial distress for Blaine.

1. Calculate the FCF-to-debt, keeping in mind that this includes repaying the principal upon selling the asset. Report the NPV to debt holders, using the debt discount rate $\overline{R}_D$.

   See Solution Table 1 and Solution Table 2. Note that the NPV to debt holders is strongly positive given that the yield is considerably larger than the debt discount rate. Furthermore, the cash flows are sufficient to completely repay debt holders and pay all interest on time.

2. Calculate the FCF-to-equity, showing the distribution to GPs and LPs.

   See Solution Table 1 and Solution Table 2. Note that the FCF-to-equity is almost entirely distributed to LPs, given their large (and cumulating) preference.

[1] When we speak of using Blaine's own excess cash to help purchase Blaine, we really mean the PE fund will borrow short-term debt equal to the excess cash, acquire Blaine, and immediately pay off the short-term debt using Blaine's excess cash.

[2] Table 10 shows excess cash as a funding source of the transaction—it is not a retained asset. After the buyout, there is zero excess cash, and the capital structure is exactly as was determined in the earlier analysis for the Large Buyback.

3. Report the IRR to LPs. Using the equity discount rate, $\overline{R}_E$, report the NPV to LPs and GPs.

   See Solution Table 2. The NPV to GPs is positive even though they receive little distribution; this is because they do not invest any capital, so any capital received leads to a positive NPV. LPs have a substantially negative NPV which comes from the fact that they have a relatively high discount rate, which is not matched by the somewhat lower LP preference, nor is made up for by the very small amount of LP profits delivered upon exit.

□

	2006	2007	2008	2009	2010
FCF-to-Assets (LOOP)		44,045	48,753	53,401	57,879
Tax Shields		3,895	3,895	3,895	3,895
Sale Proceeds					1,029,597
FCF-to-Debt	(-193,191)	12,982	12,982	12,982	206,173
FCF-to-Equity	(-602,095)	34,957	39,665	44,313	885,198
FCF-to-LP	(-602,095)	34,957	39,665	44,313	823,934
FCF-to-GP	0	0	0	0	61,264

Solution Table 1

	Discount	IRR	NPV
Asset & Sale	8.83	12.90	97,759.54
Debt	6.22	6.72	2,951.73
Equity	9.66	14.67	90,176.69
LP	9.66	12.79	54,951.28
GP	9.66		35,225.42

Solution Table 2