# *Navigating Unpredictable Waters: Negotiating the Joint Venture Waterfall*

A More "Scientific" Look at Joint Venture Terms Between Institutional Money Partners and Managing Partners in Real Estate Development

David Geltner

MIT Center for Real Estate

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Example Project:
Typical mid-scale mixed-use (condo/office/retail) development…
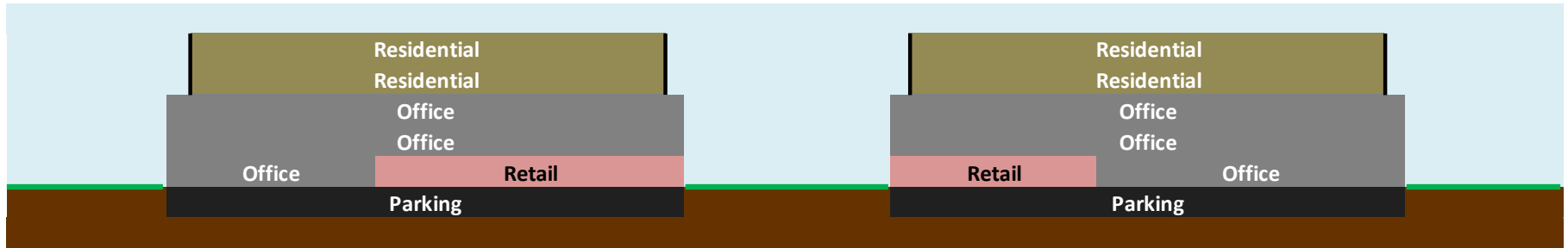
| Development Program:		Gross SF	Net SF
Residential		115,000	100,000
Office		172,500	150,000
Retail		34,500	30,000
Total		**322,000**	**280,000**

- Total development budget: $104.0 M ($371/NSF)
- Mini-Perm Loan (80% of Hard Cost) @ 6%: $ 62.0 M ($222/NSF)

Revenue projection assumptions:

Residential Condominium Sales Prices & Sell-out			
Unit Sales Prices PSF - Pre-Sales			$525
Unit Sales Prices PSF - Remaining Units			$550
Pre-Sale %			20%
Unit Sale % - Year 1			40%
Unit Sale % - Year 2			40%
Unit Sale % - Year 3			0%

Commercial Space Rental Rates & Lease-up			
Office Space			$33.00
Retail Space			$42.00
Pre-Lease %			20%
Lease-up % - Year 1			40%
Lease-up % - Year 2			40%
Lease-up % - Year 3			0%

Disposition Assumption (Yr 6):		
Capitalization Rate to Estimate Sale Price		7%

Project Base Case Cash Flow Projections (JV entity level):

Unlevered IRR = 11.2%
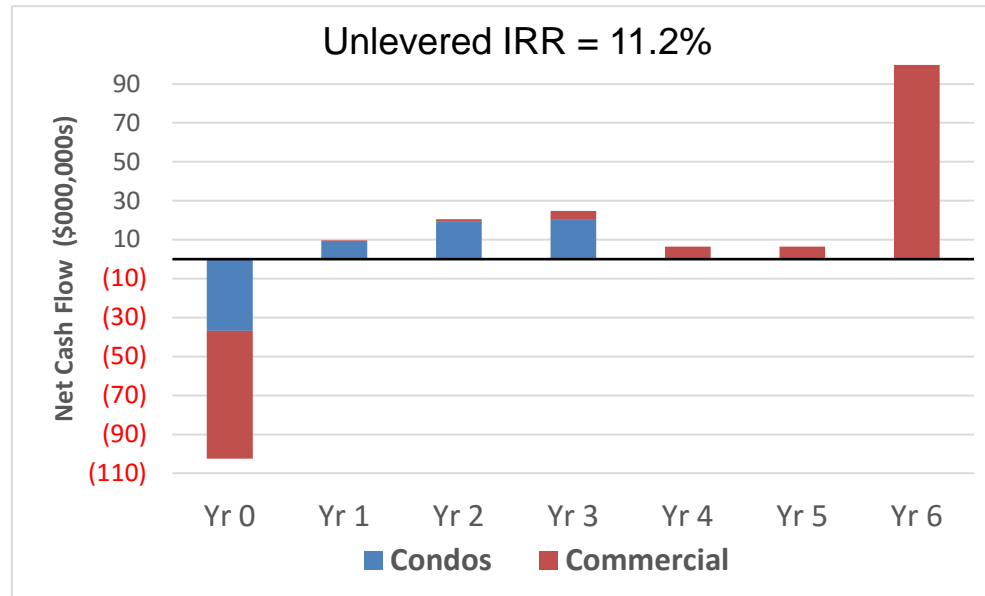
Reflects:
Condos: 16.4%
Commercial: 10.0%

Legend: ■ Condos   ■ Commercial

Levered IRR = 18.0%
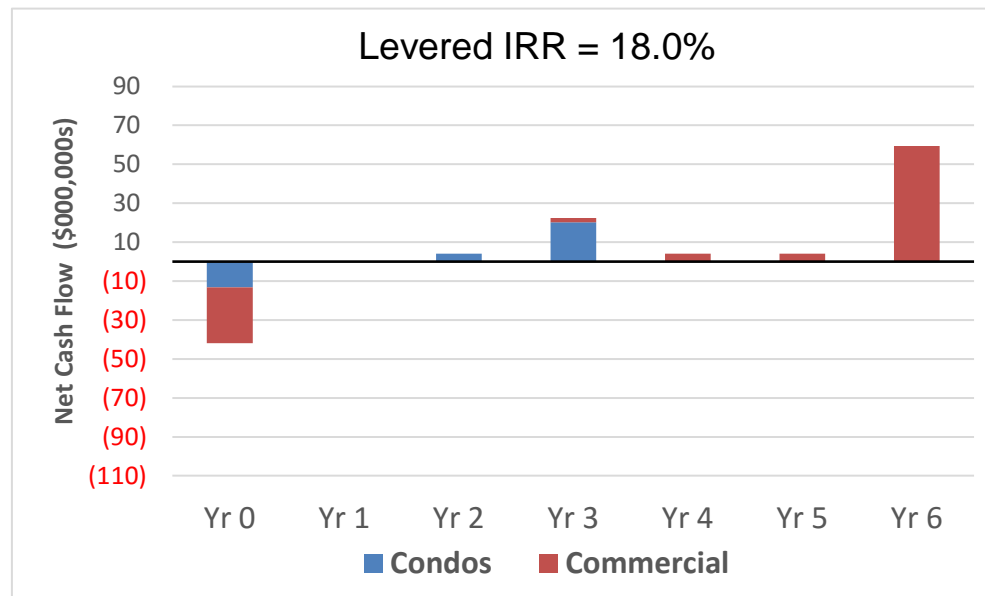
Reflects:
Condos: 29.6%
Commercial: 15.0%

Legend: ■ Condos   ■ Commercial

Overall going-in **IRRs**: **11.2%** unlevered, **18.0%** as levered by mini-perm loan.
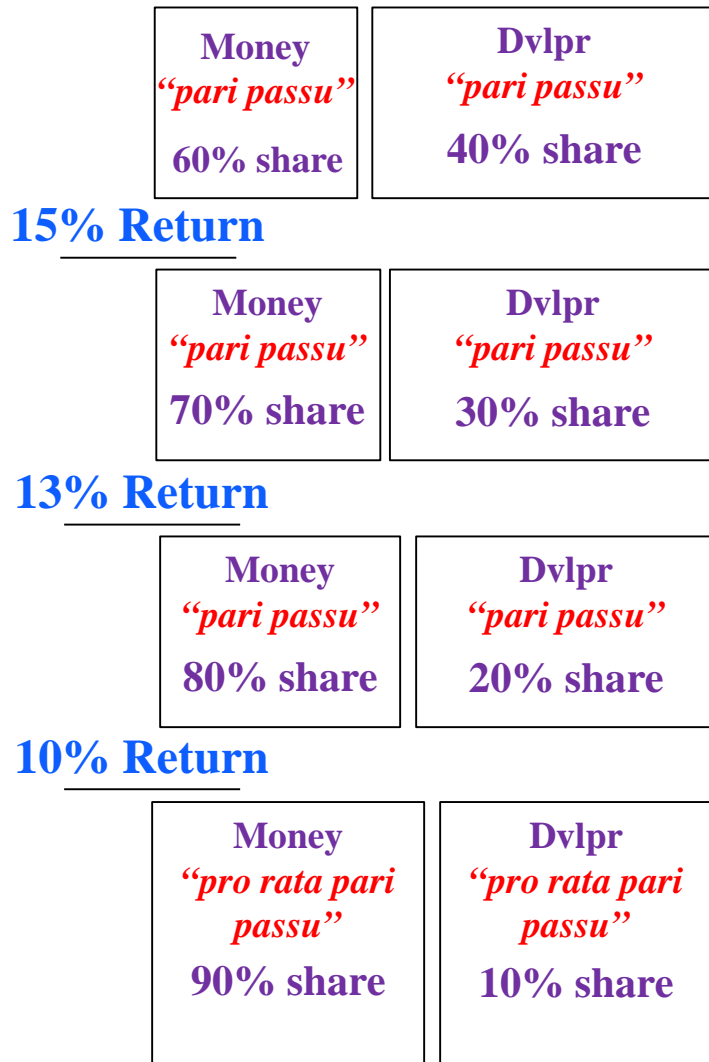
JV Partnership Agreement ("waterfall"):
Two partners: "Manager" (developer), & "Money Partner"…

- Capital contributions split **90/10** Money/Dvlpr;

- Pro Rata Pari Passu to 1st hurdle at **10%**, then 80/20, <u>except</u>:

- Development <u>cost overruns</u> (& savings) split **50/50** (with catch-up after Money meets 1st hurdle);

- Subsequent hurdles (for Money Partner) at **13%** & **15%** with cash flow splits thereafter **70/30** & **60/40**…

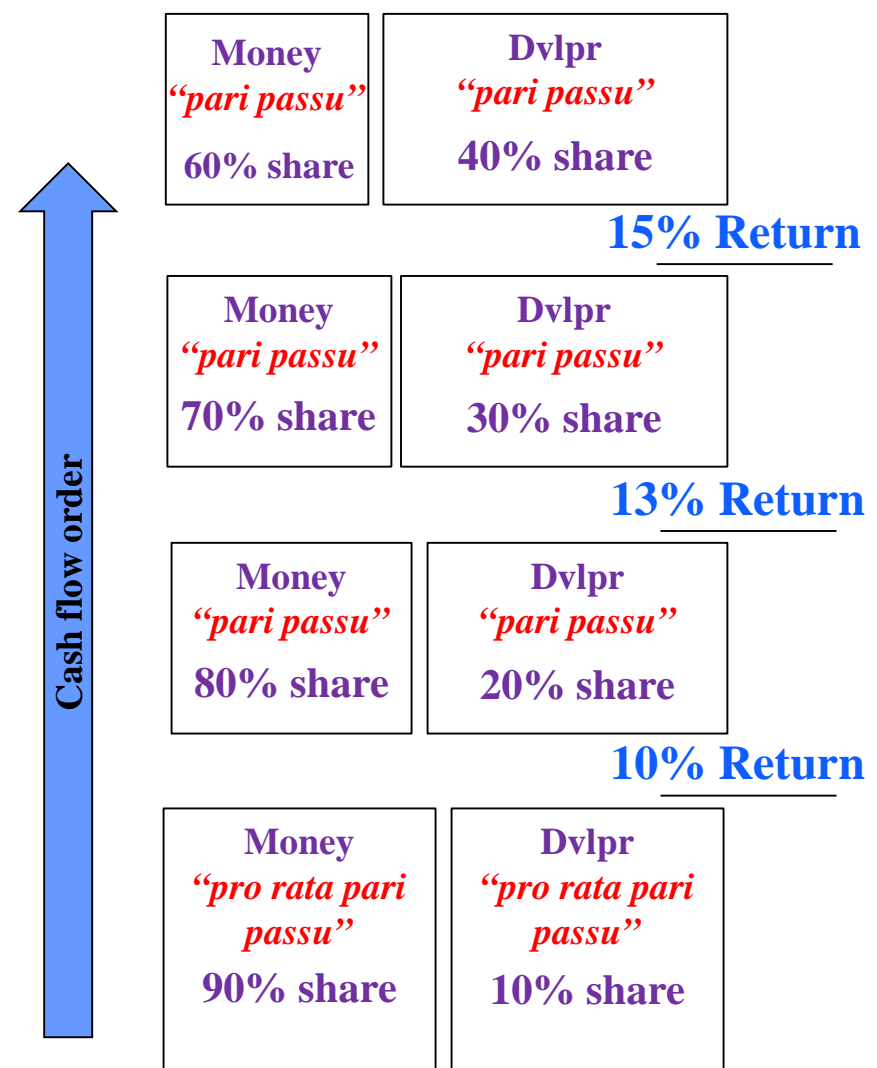- Condo sales revenue treated as capital proceeds.

Return Hurdles & Cash Flow Distributions			
1st Hurdle	*2nd Hurdle*	*3rd Hurdle*	
Pref. for	*Investor*	*Investor*	
Both to	*Member to*	*Member to*	
10.0%	**13.0%**	**15.0%**	***Thereafter***
90.0%	**80.0%**	**70.0%**	**60.0%**
10.0%	**20.0%**	**30.0%**	**40.0%**

Equity JV Waterfall, Return of & on Capital Contribution 90% Money/10% Dvlpr:

Operating Cash Flows: *"Return On"*

Money *"pari passu"* 60% share	Dvlpr *"pari passu"* 40% share

15% Return

Money *"pari passu"* 70% share	Dvlpr *"pari passu"* 30% share

13% Return

Money *"pari passu"* 80% share	Dvlpr *"pari passu"* 20% share

10% Return

Money *"pro rata pari passu"* 90% share	Dvlpr *"pro rata pari passu"* 10% share

Cash flow order →

Capital Cash Flows: *"Return Of & On"*

Money *"pari passu"* 60% share	Dvlpr *"pari passu"* 40% share

15% Return

Money *"pari passu"* 70% share	Dvlpr *"pari passu"* 30% share

13% Return

Money *"pari passu"* 80% share	Dvlpr *"pari passu"* 20% share

10% Return

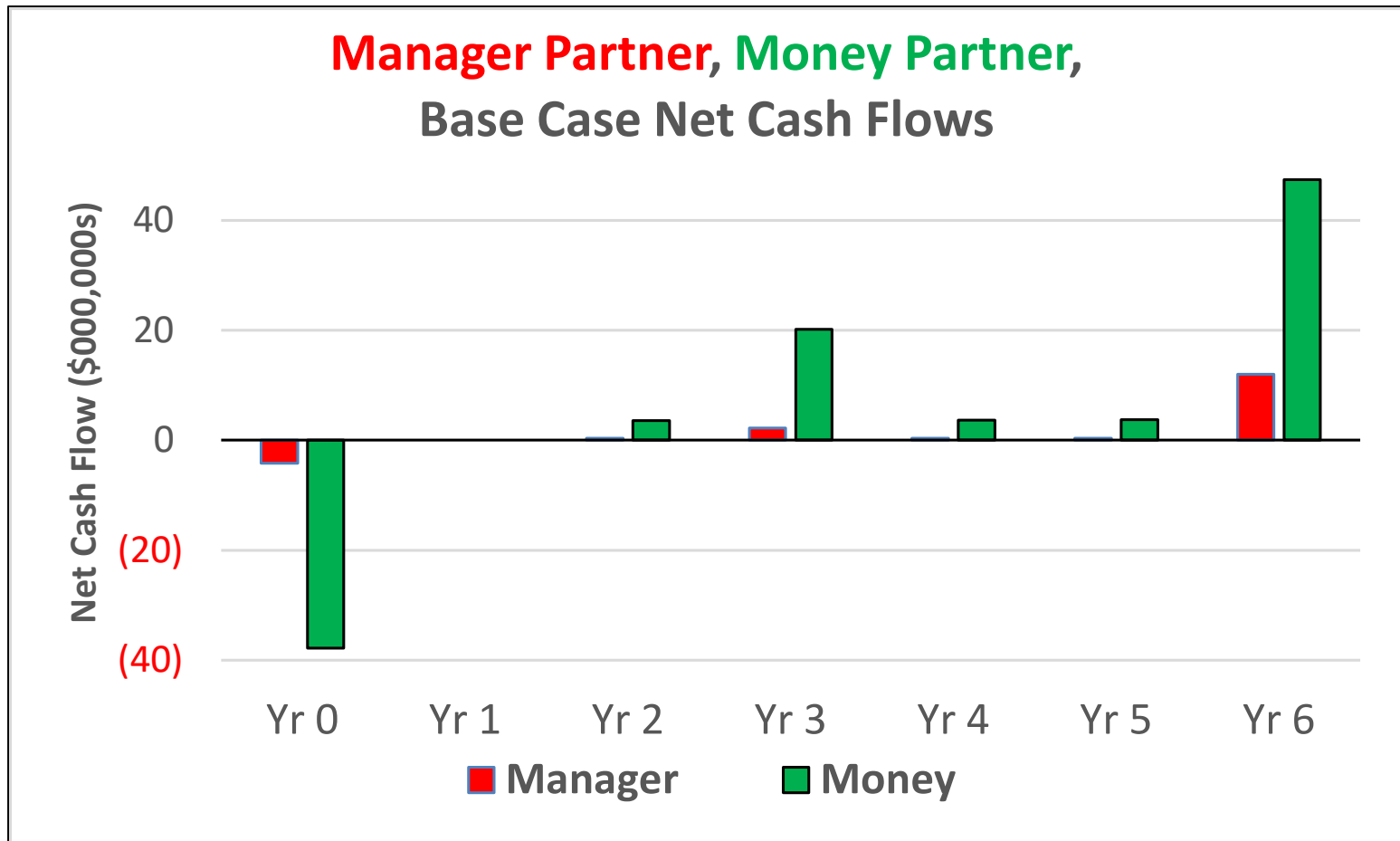| Money *"pro rata pari passu"* 90% share	Dvlpr *"pro rata pari passu"* 10% share

Cash flow order →

And: Dvlpr/Money 50/50 on construction cost overrun/savings…

JV Partnership Agreement ("waterfall"): Base Case Cash Flow & Return Projections…

Manager Partner, Money Partner,
Base Case Net Cash Flows

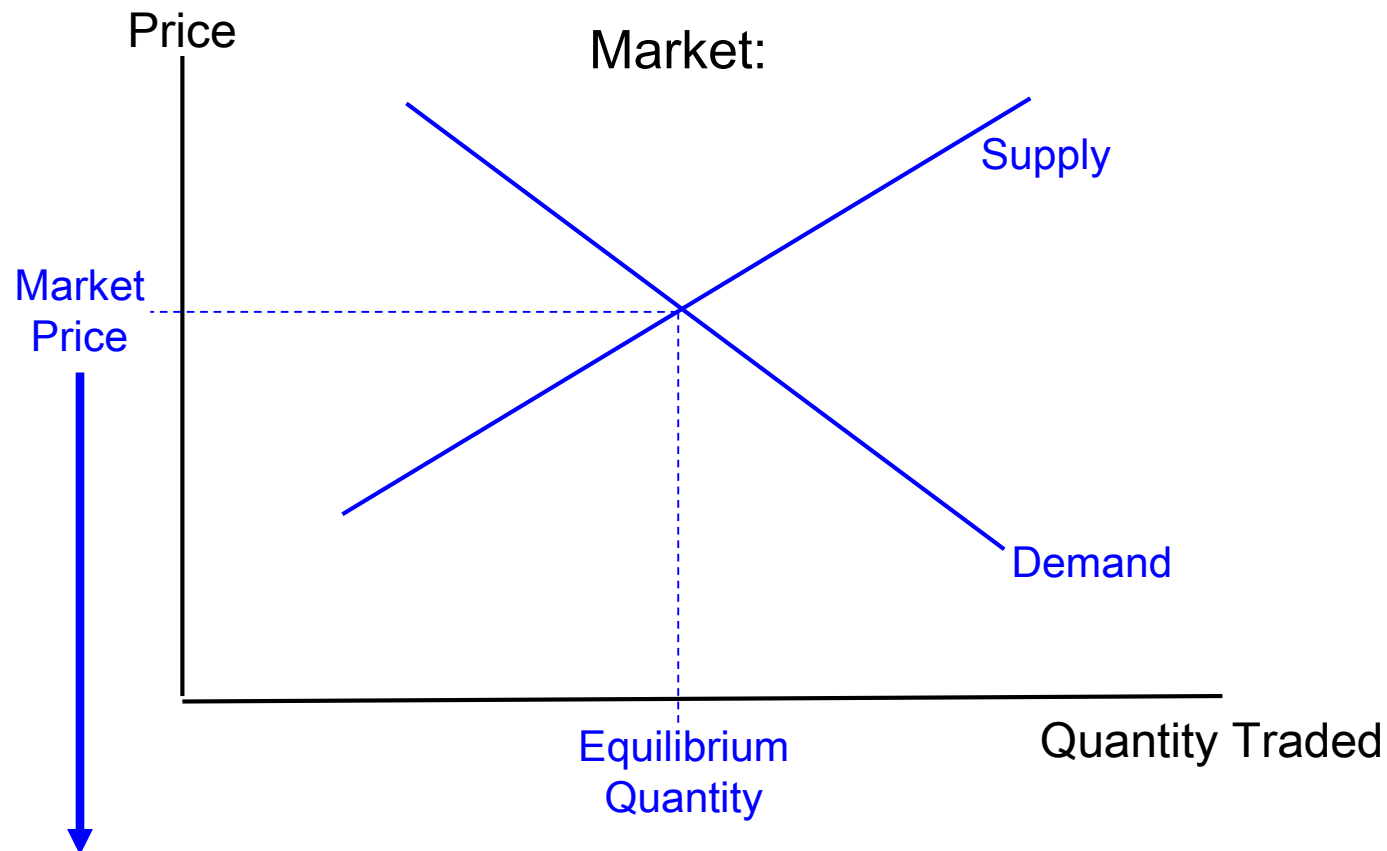Overall going-in IRRs: 28.7% Manager, 16.8% Money Partner.

Is this fair?...

Overall going-in IRRs: **28.7%** Manager, **16.8% Money Partner**.

Is this fair?...

Academic Perspective:

Use basic capital market theory to provide a normative framework & starting point to answer this question…


*The Market Price provides the "opportunity cost" of trading.*

What is the Capital Market?...

Fundamentally, the capital market is a market that trades <u>risk</u> in investment assets.

Thus, the capital market determines the market <u>price of risk</u> in terms of the going-in <u>expected return risk premium</u> (over riskless investment returns) <u>per unit of investment risk</u> (as the capital market perceives and cares about such risk). This provides the "**opportunity cost of capital**" (OCC) for any investment or claim (what the investor could expect to earn from alternative investments of similar risk).

Expected
Return

Asset Market: SML

RP

Riskfree
Rate

Risk

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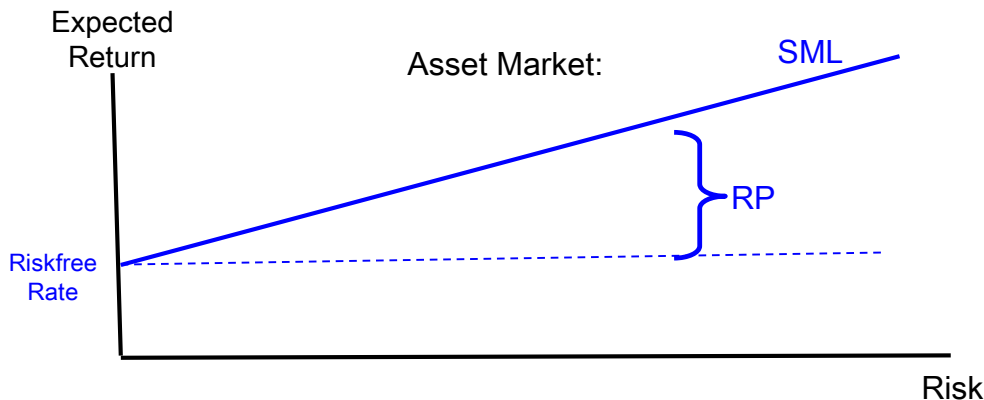
The capital market determines the "price of risk" as the slope of the "Security Market Line" (SML), the expected return risk premium per unit of risk in any given investment priced at market value (mkt RP/Risk):

Expected Return

Asset Market:

SML

Security Market Line

Risk Premium (RP)

Riskfree Rate
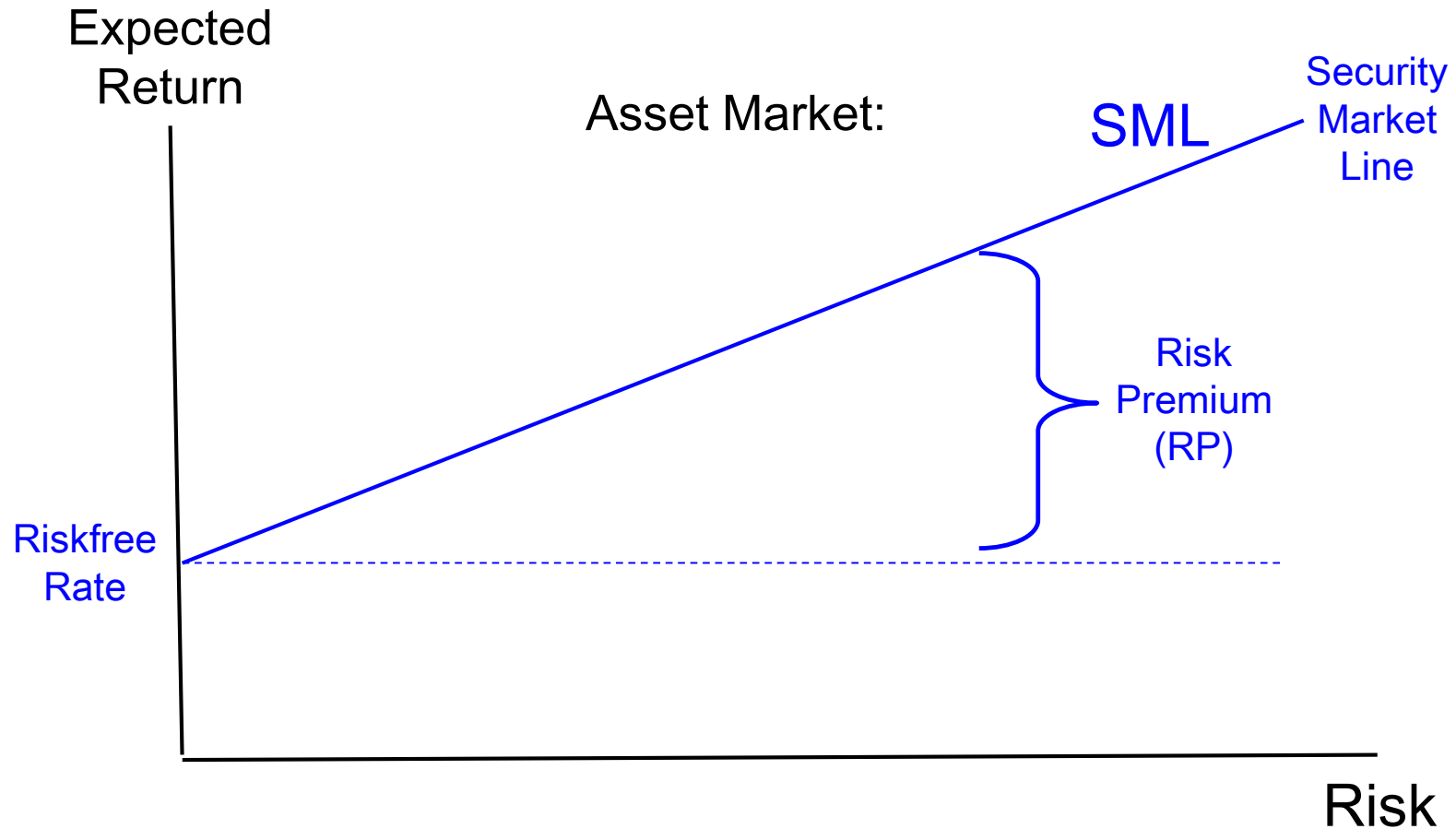
Risk

Any asset or claim priced at fair market value (providing a "fair" expected return given the amount of investment risk in the asset) must lie on the SML, i.e., must have the same RP/Risk ratio (the mkt price of risk)…

Expected Return

Asset Market:

SML

Security Market Line

RP(B)

RP(A)

Riskfree Rate
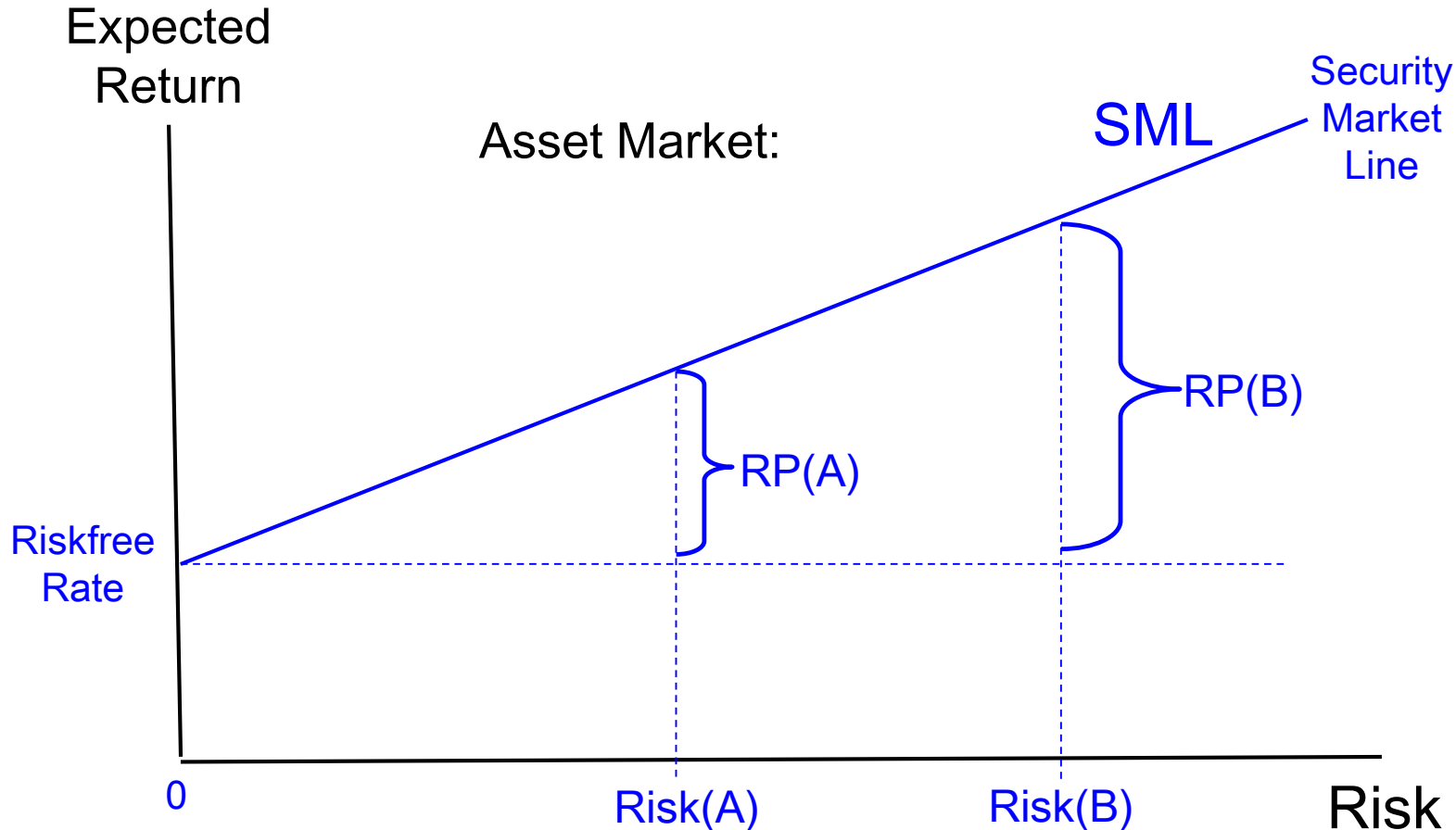
0   Risk(A)   Risk(B)   Risk

For any two claims (A, B), the ratio of the going-in expected return risk premia (RP) must equal the ratio of the going-in expected risks:

$$RP(A)/RP(B) = Risk(A)/Risk(B).$$

If the devlpt project is priced at fair market value, then it will lie on theSML.
If the debt is priced at fair market value, then it too will lie on the SML.
If both the above, then the levered equity JV entity will lie on the SML.
In that case, both partners' claims must have the **same RP/Risk ratio** in order for them both to lie on the SML…
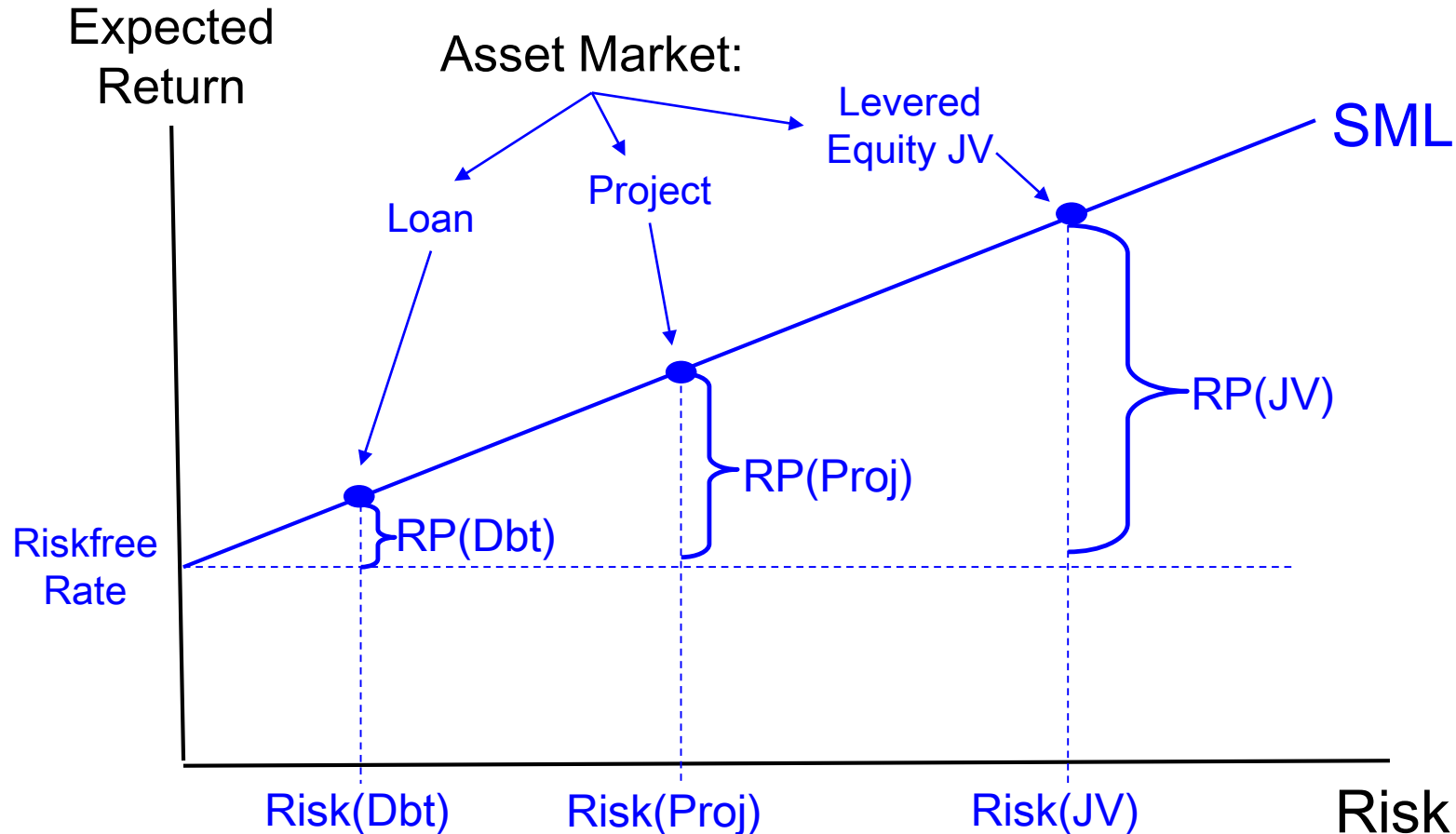
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The **RP/Risk ratio** of a claim is labeled its **"Treynor Ratio."**
If the levered JV entity lies on the SML (fair market value), then the
Treynor Ratios of each partner's claim should be equal. Otherwise the
one with the lower Treynor Ratio will lie below the SML and not be
receiving a "fair" expected return for the amount of investment risk born.
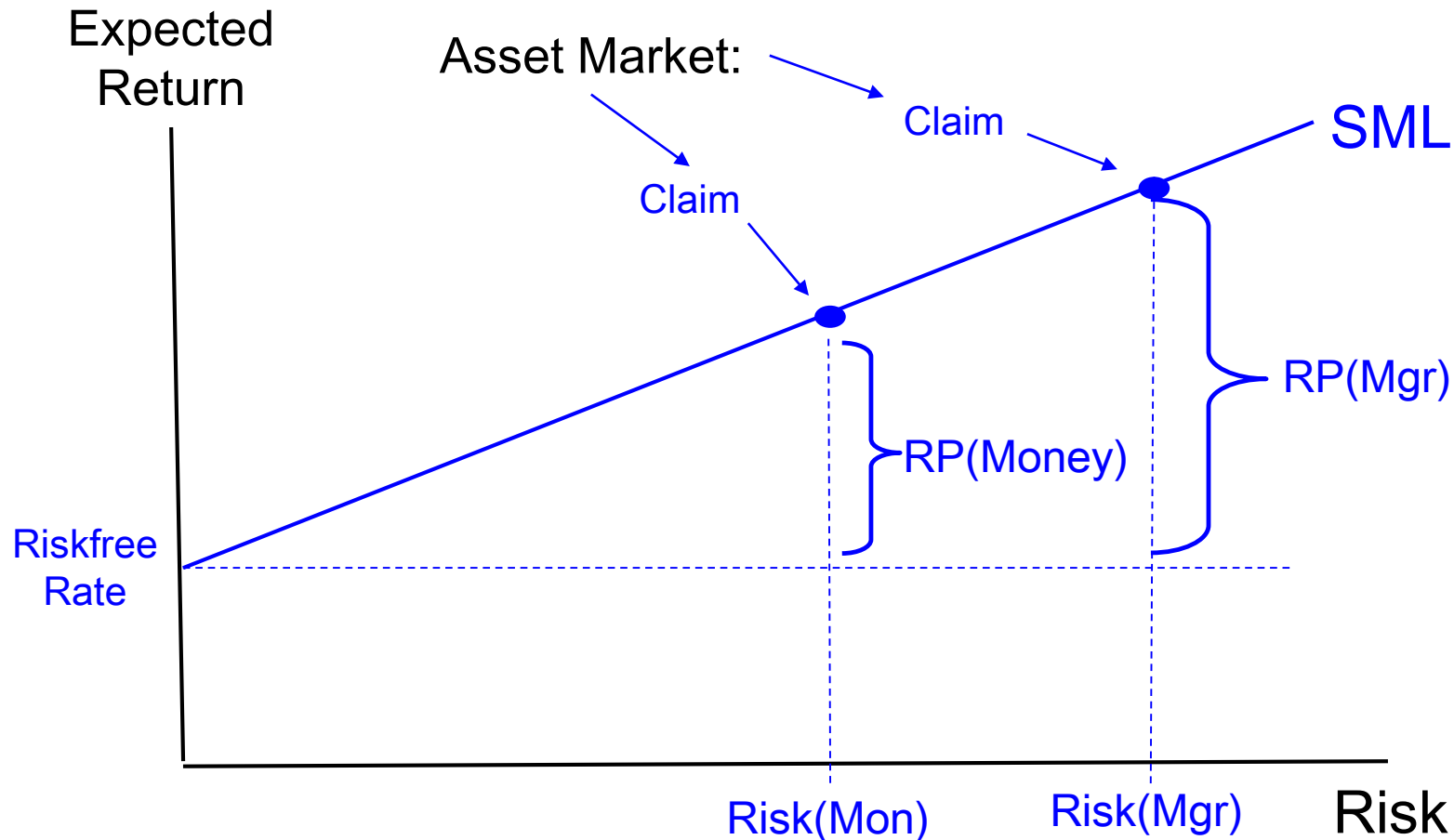
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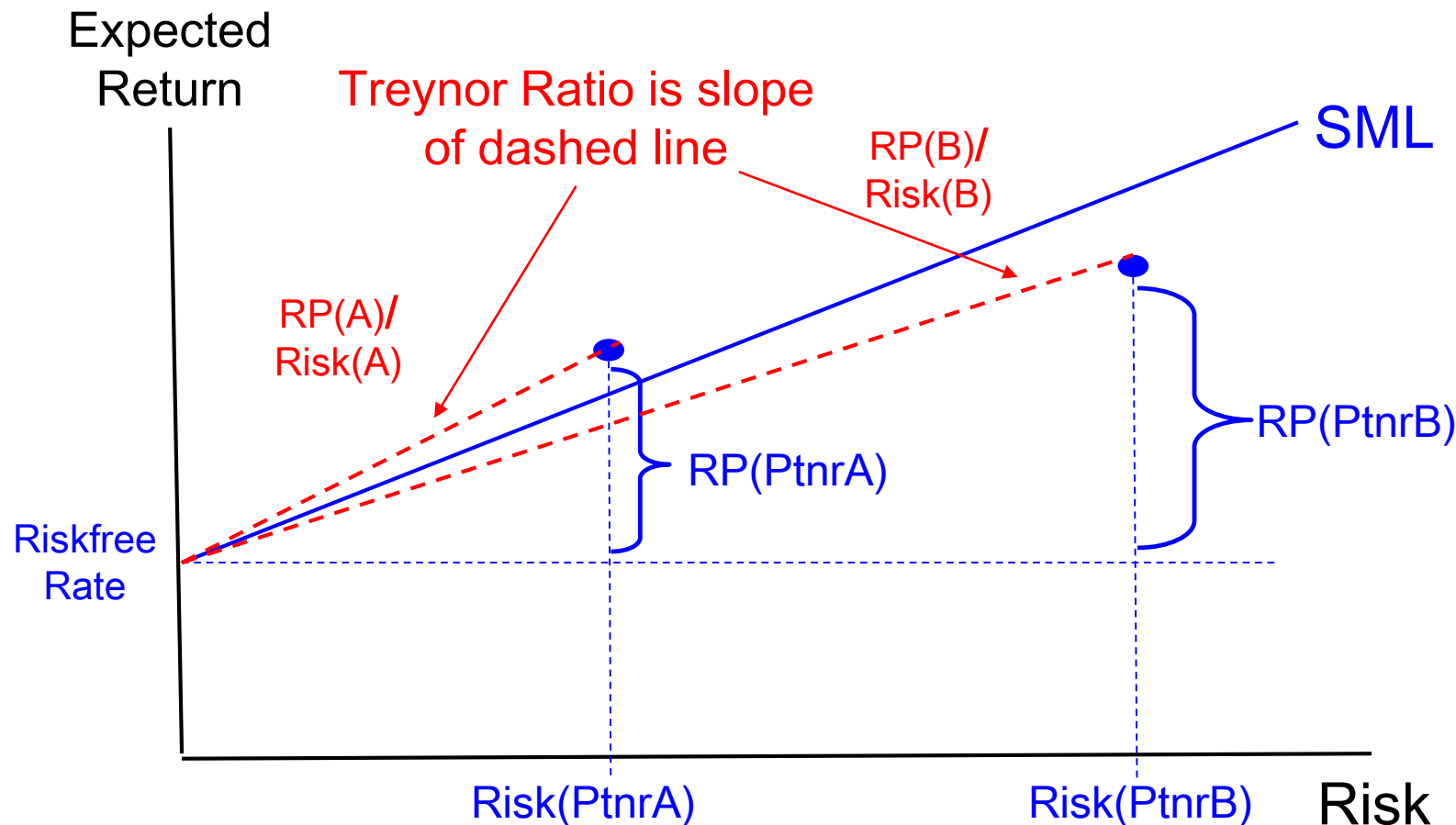
Here, Partner B is not getting a "fair" return (ex ante).

How to measure the "Risk" faced by each partner?...

- We only need to measure the *relative* risk (the *ratio* of the two risks).

- A simple way to do this is by *"Scenario Analysis"*.

- The simplest form of scenario analysis is *"Binomial"* :

    - Construct an upside ("Optimistic") scenario above the Base Case, and

   - A downside ("Pessimistic") scenario below the Base Case

(The scenarios should have IRRs approximately symmetric around the Base Case IRR, at the underlying unlevered project level. Each scenario should have about a 10% chance of happening – meaning, subjectively, about 1 in 10 chance result could turn out to be that extreme or more so in that direction.)

- Define the "expected" return as the Base Case IRR

- Define the risk (for relative or ratio purposes) as the *range* between the Optimistic minus the Pessimistic IRRs

- Do this for each partner. Then…

- Each partner's Treynor Ratio is their RP/Risk*:

(Expected IRR – Riskfree Rate) / (Outcome IRR Range).

*Note: In real estate applications "Treynor Ratio" in this context will be same as "Sharpe Ratio," but in principle it is the Treynor Ratio we're using because it measures risk as market price of risk.

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Let's apply this framework to our Example Project & JV. Recall…

Manager Partner, Money Partner, Base Case Net Cash Flows
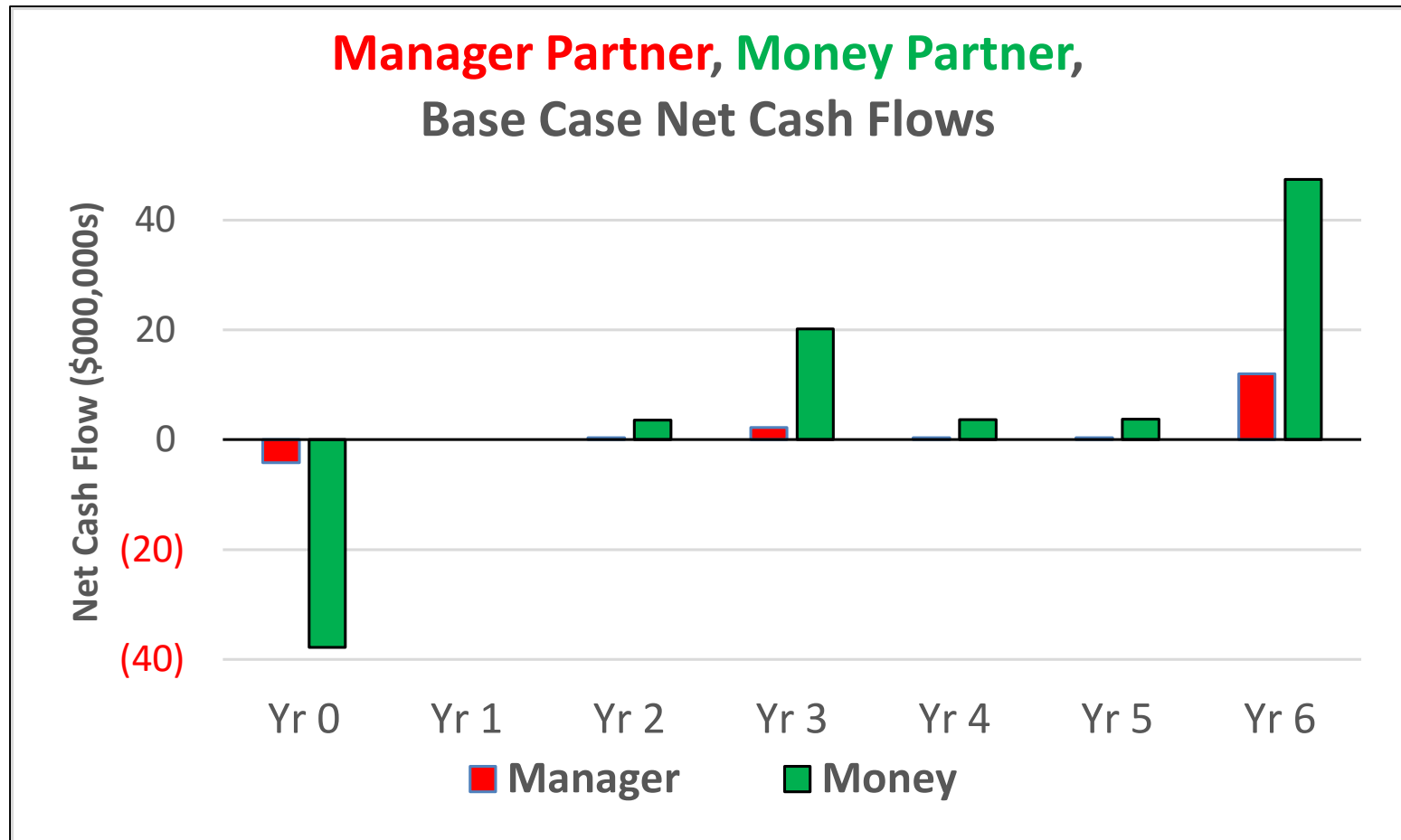
Overall going-in IRRs: **28.7%** Manager, **16.8% Money Partner**.

Is this fair?...

Optimistic Scenario:

Defined as Base Case altered as follows (for example):

- 25% <u>Higher</u> initial revenue projections (sale prices, rents, per SF), and
- 2% per year <u>faster</u> growth trend in those revenues over time.

Pessimistic Scenario:

Defined as Base Case altered as follows (for example):

- 25% <u>Lower</u> initial revenue projections (sale prices, rents, per SF), and
- 2% per year <u>slower</u> growth trend in those revenues over time.
- 5% development cost <u>overrun</u> (50/50 contribution).

These scenarios result in projected IRRs near the 10th & 90th percentiles of the IRR outcome probability distribution based on empirically calibrated modeling of typical real estate risk (volatility, trends, cycles, noise), based on analysis of Real Capital Analytics (**MIT**/CRE Partner Company) data.

Pessimistic Scenario:

Manager Partner, **Money Partner**,
Pessimistic Scenario Net Cash Flows
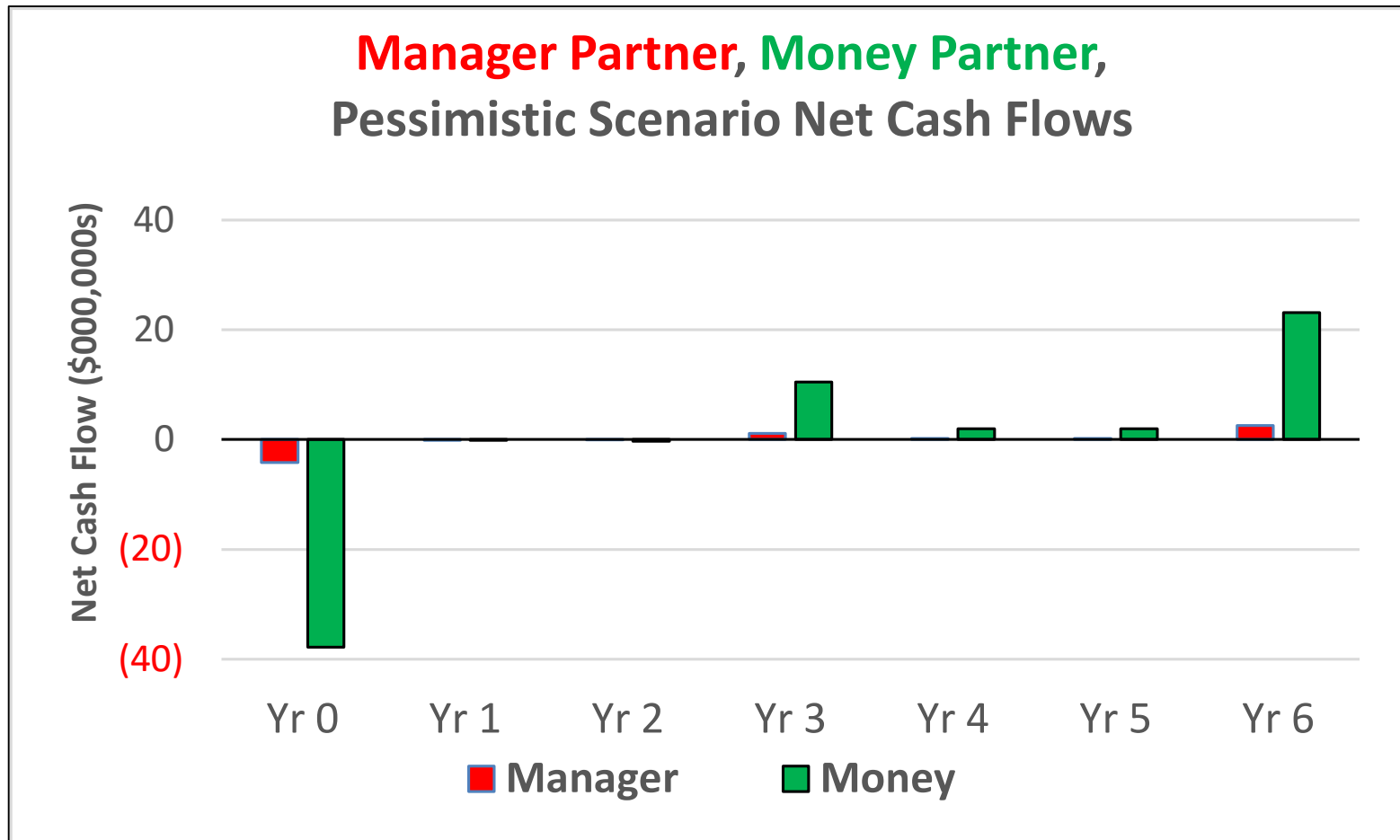
Ex post realized levered IRRs: -1.0% Manager, -0.4% Money Partner.
Underlying project (unlevered) realized IRR = 2.6% (8.6 pts below Base Case)

Optimistic Scenario:

Manager Partner, **Money Partner**, **Optimistic Scenario Net Cash Flows**
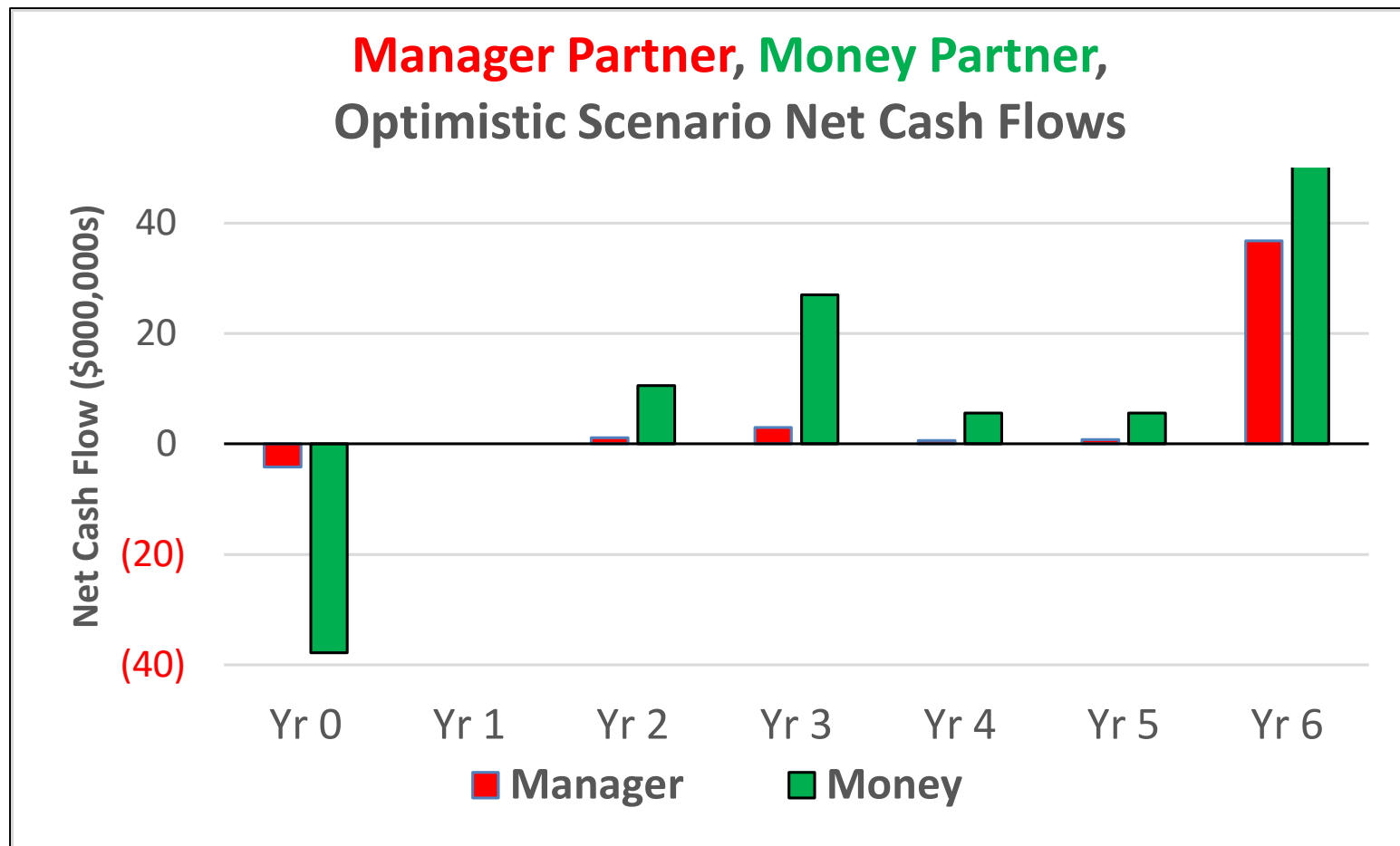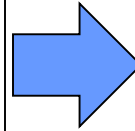
Ex post realized levered IRRs: 54.8% Manager, 27.7% Money Partner. Underlying project (unlevered) realized IRR = 19.8% (8.6 pts above Base Case)

Computing the "fairness metric"…

Developer:

Expected IRR	28.7%
Optimistic IRR	54.8%
Pessimistic IRR	-1.0%

Treynor Ratio RP/Risk:

$$\frac{28.7\% - 1.0\%}{54.8\% - (-1.0\%)} = \mathbf{0.50}$$

Money Ptnr:

Expected IRR	16.8%
Optimistic IRR	27.7%
Pessimistic IRR	-0.4%
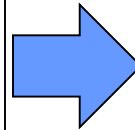
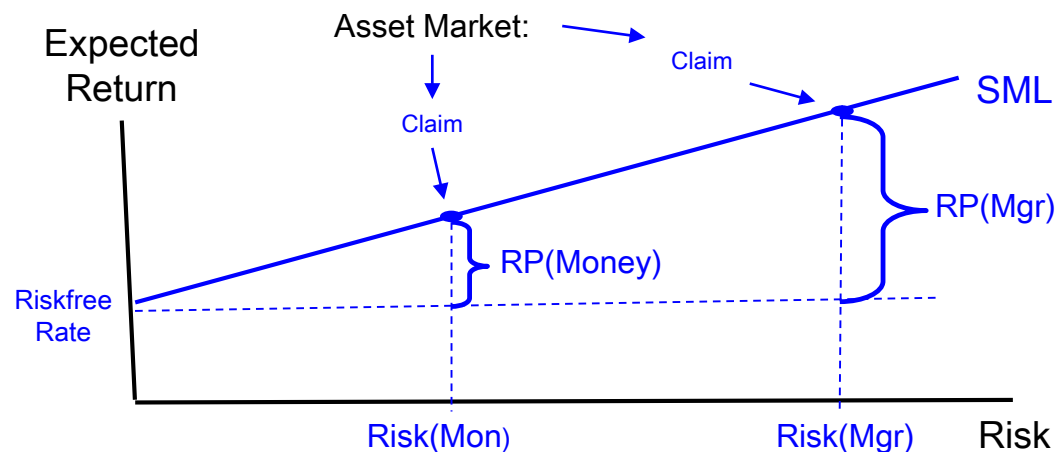$$\frac{16.8\% - 1.0\%}{27.7\% - (-0.4\%)} = \mathbf{0.56}$$

Riskfree Rate: 1.0%

EQUAL ?

Manager Partner & Money Partner have pretty similar Treynor Ratios, thus implying "fair" JV claim terms per the capital market Opportunity Cost of Capital (in this example)…

Manager Partner & Money Partner have very similar Treynor Ratios*, thus implying "fair" JV claim terms per the capital market OCC (in this example)…

Claim	Base Case IRR	T-bond	IRR Risk Prem	Opt Scen	Pes Scen	Range	Comp	Trey-nor Ratio
Mgr	28.7%	1.0%	27.7%	54.8%	-1.0%	55.8%	27.7 /55.8	0.50
Money	16.8%	1.0%	15.8%	27.7%	-0.4%	28.1%	15.8 /28.1	0.56

Expected Return

Asset Market:

Claim

Claim

SML

RP(Mgr)
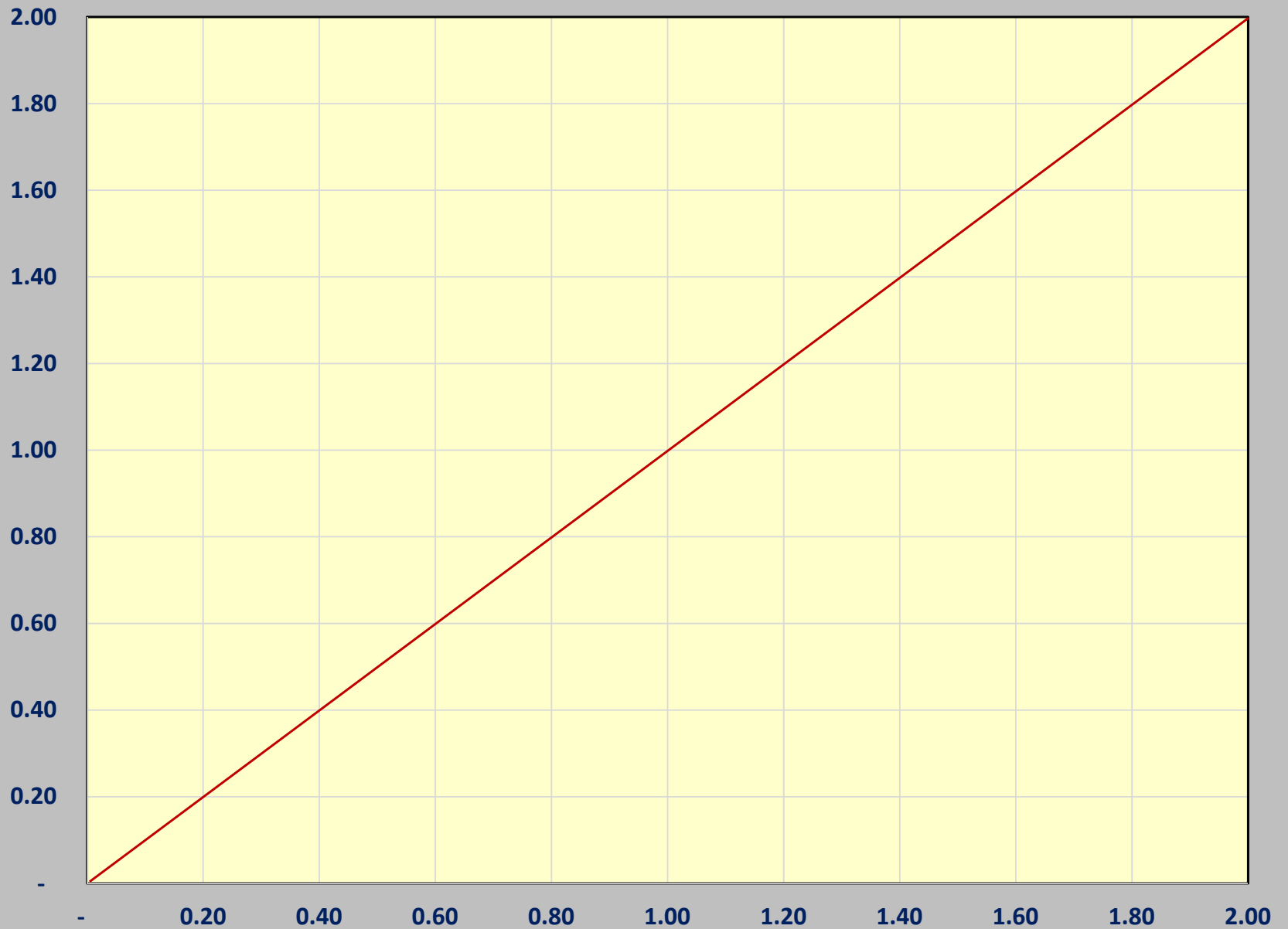
RP(Money)

Riskfree Rate

Risk(Mon)   Risk(Mgr)   Risk
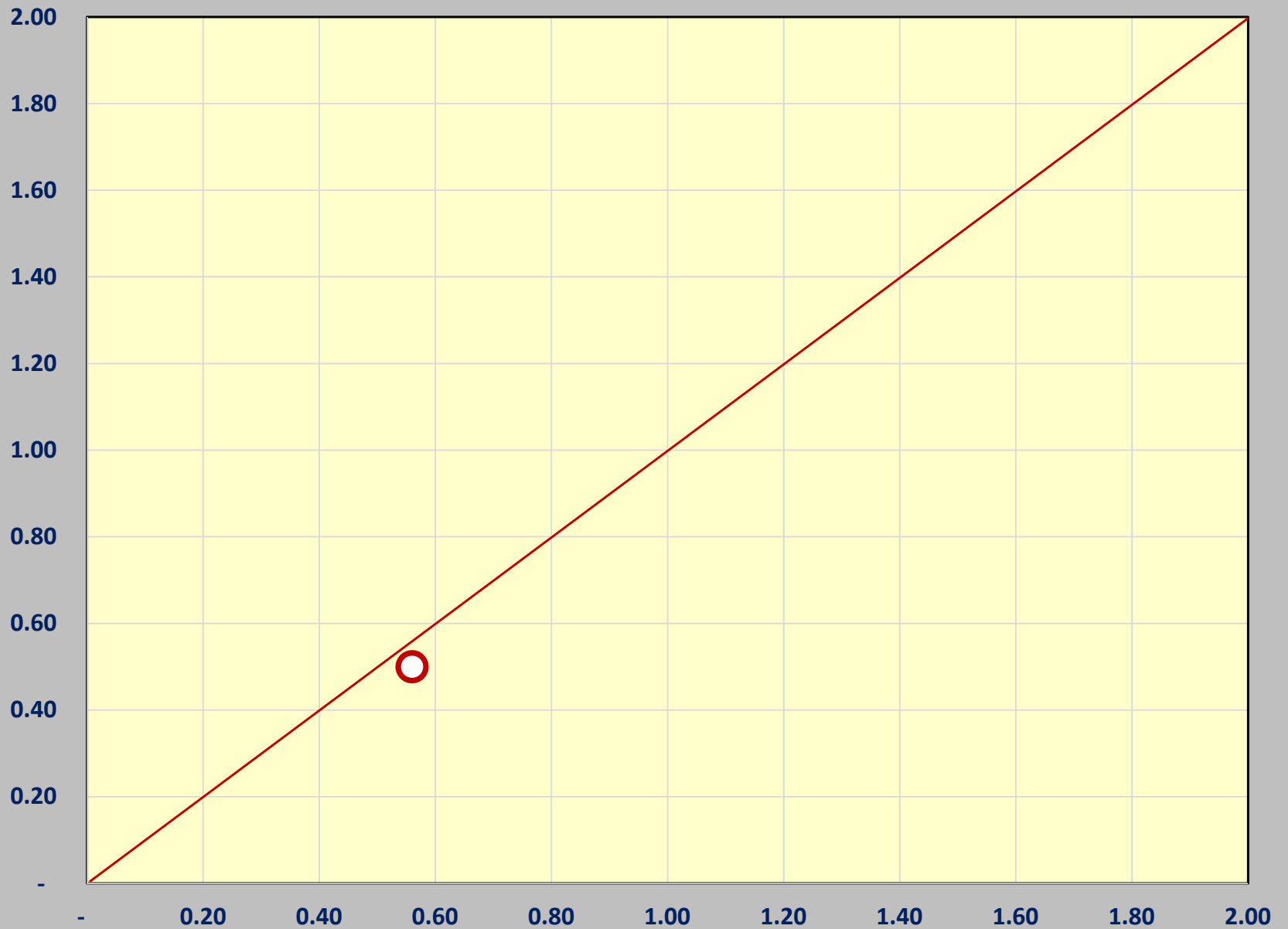
Treynor Ratios: Real World Results

Developer / Manager / Sponsor

Money Partner / Investor Member

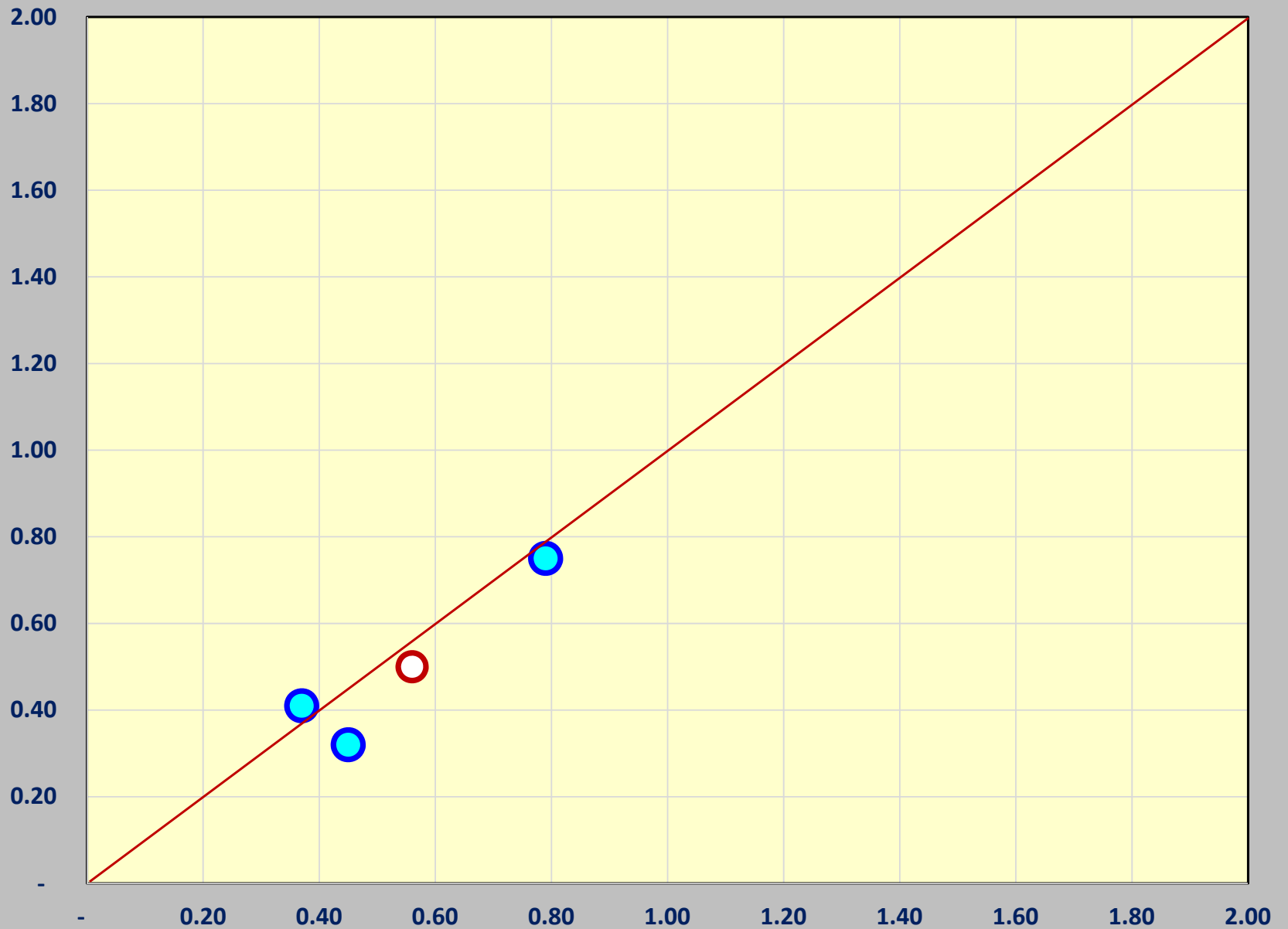**Treynor Ratios: Real World Results**

Developer / Manager / Sponsor

○ Hypothetical Mixed-Use

Money Partner / Investor Member

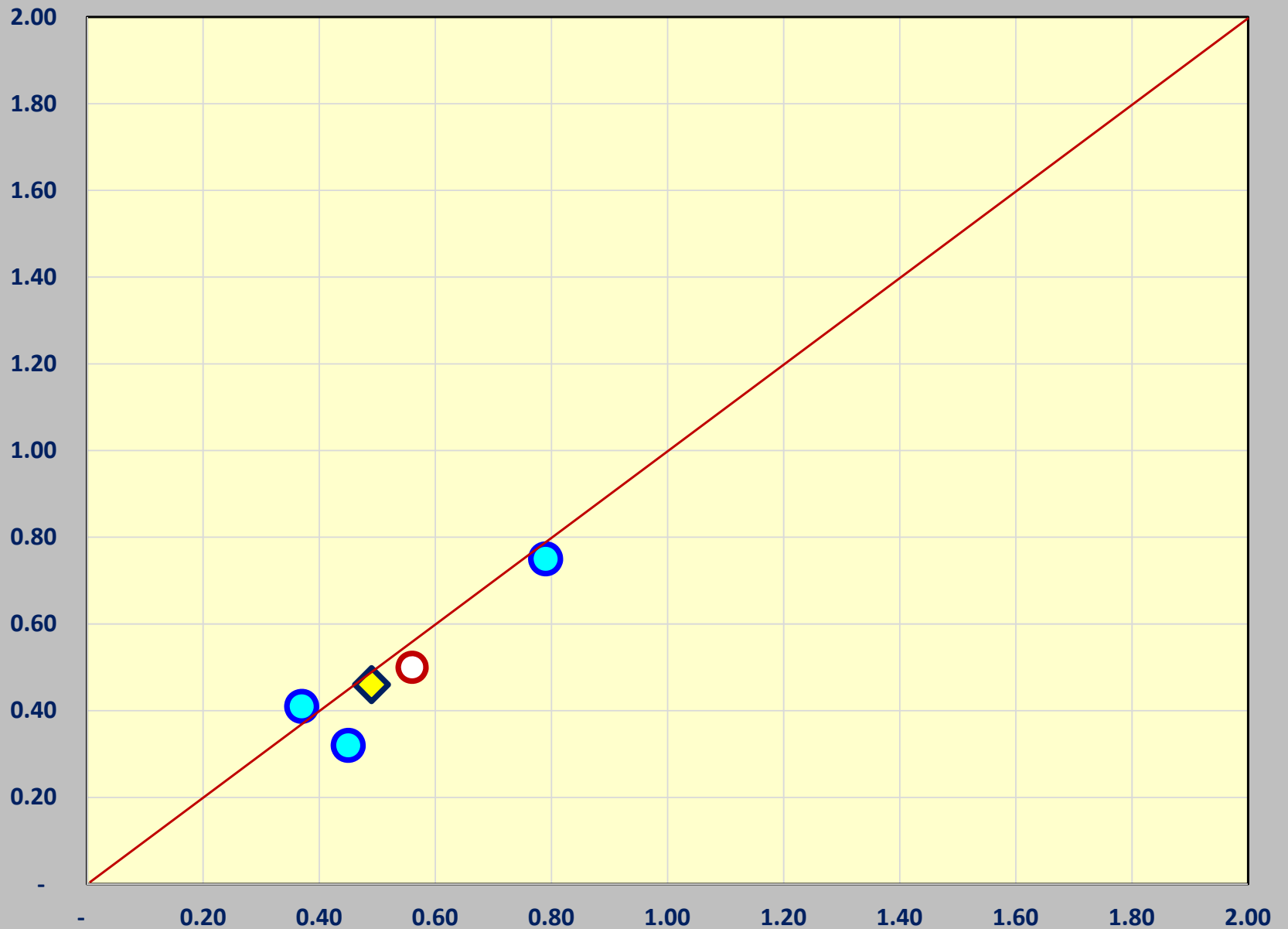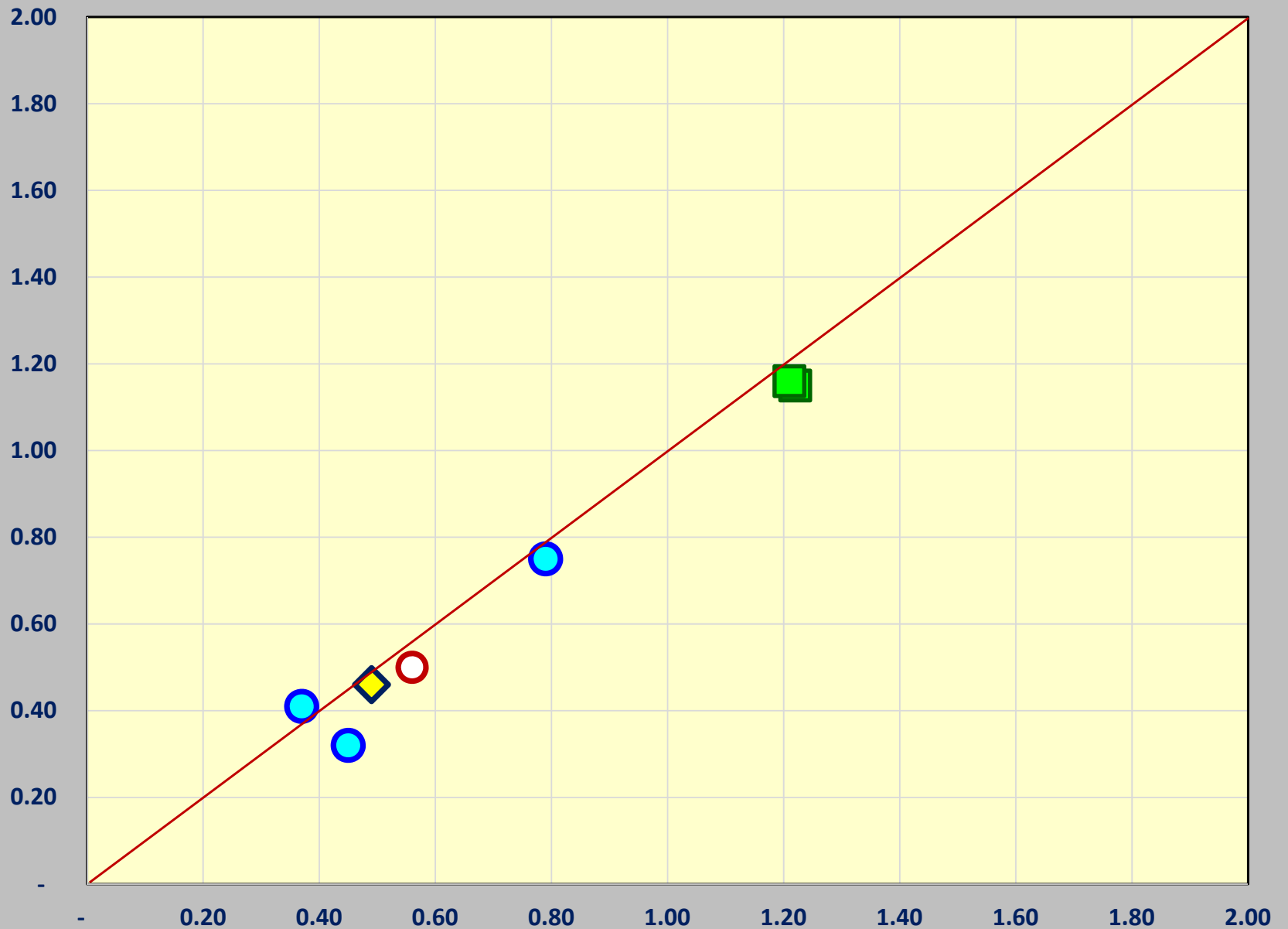**Treynor Ratios: Real World Results**

Developer / Manager / Sponsor

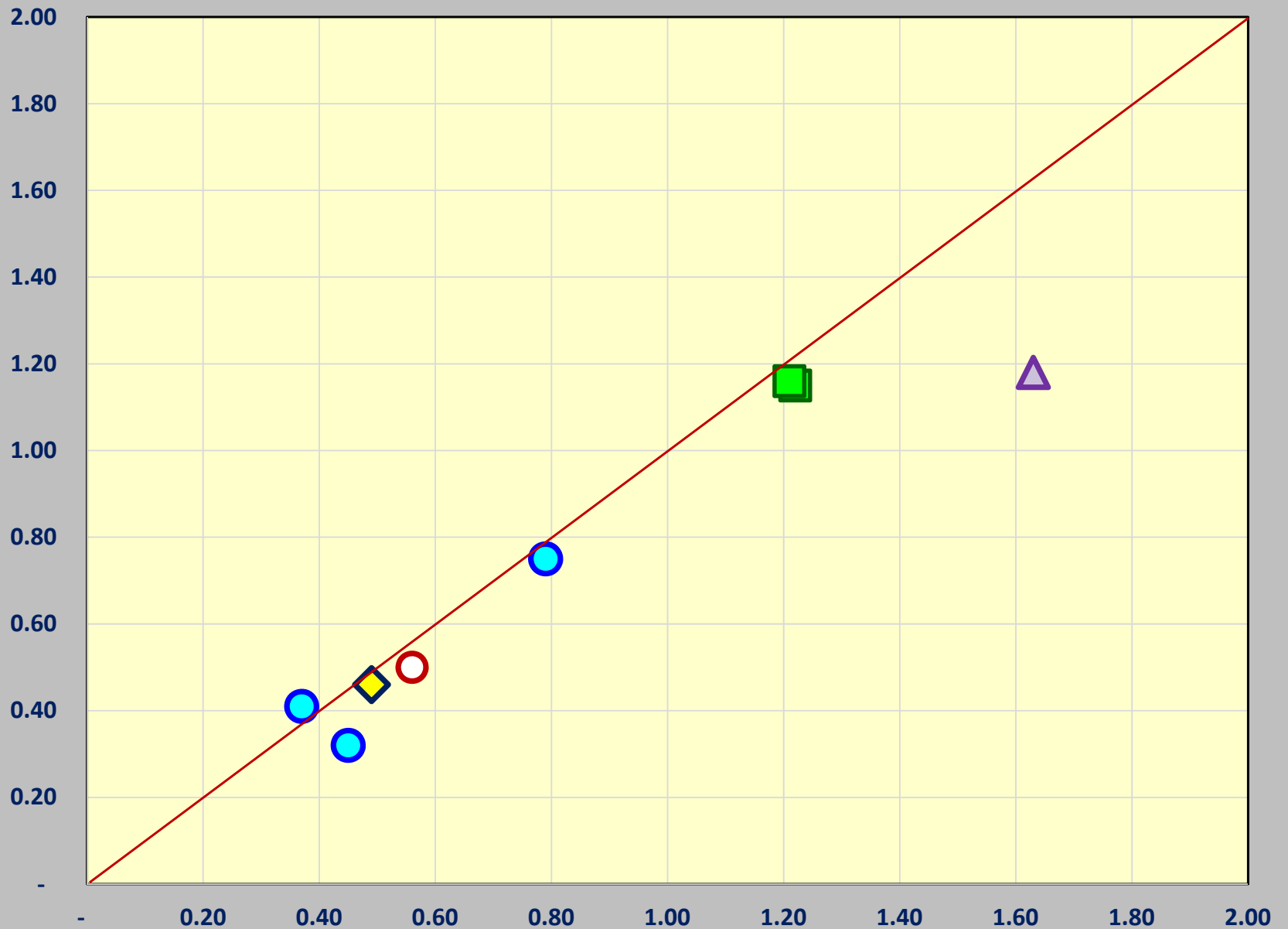Money Partner / Investor Member

○ Hypothetical Mixed-Use   ○ Condos

Treynor Ratios: Real World Results

Developer / Manager / Sponsor

Money Partner / Investor Member

○ Hypothetical Mixed-Use　○ Condos　◇ Apartment

Treynor Ratios: Real World Results

Developer / Manager / Sponsor (vertical axis)

Money Partner / Investor Member (horizontal axis)

Legend: ○ Hypothetical Mixed-Use ○ Condos ◇ Apartment ■ Office

Treynor Ratios: Real World Results

Developer / Manager / Sponsor (y-axis)

Money Partner / Investor Member (x-axis)

Legend:
- ○ Hypothetical Mixed-Use
- ○ Condos
- ◇ Apartment
- ▢ Office
- △ Industrial

Treynor Ratios: Real World Results

Developer / Manager / Sponsor (y-axis)
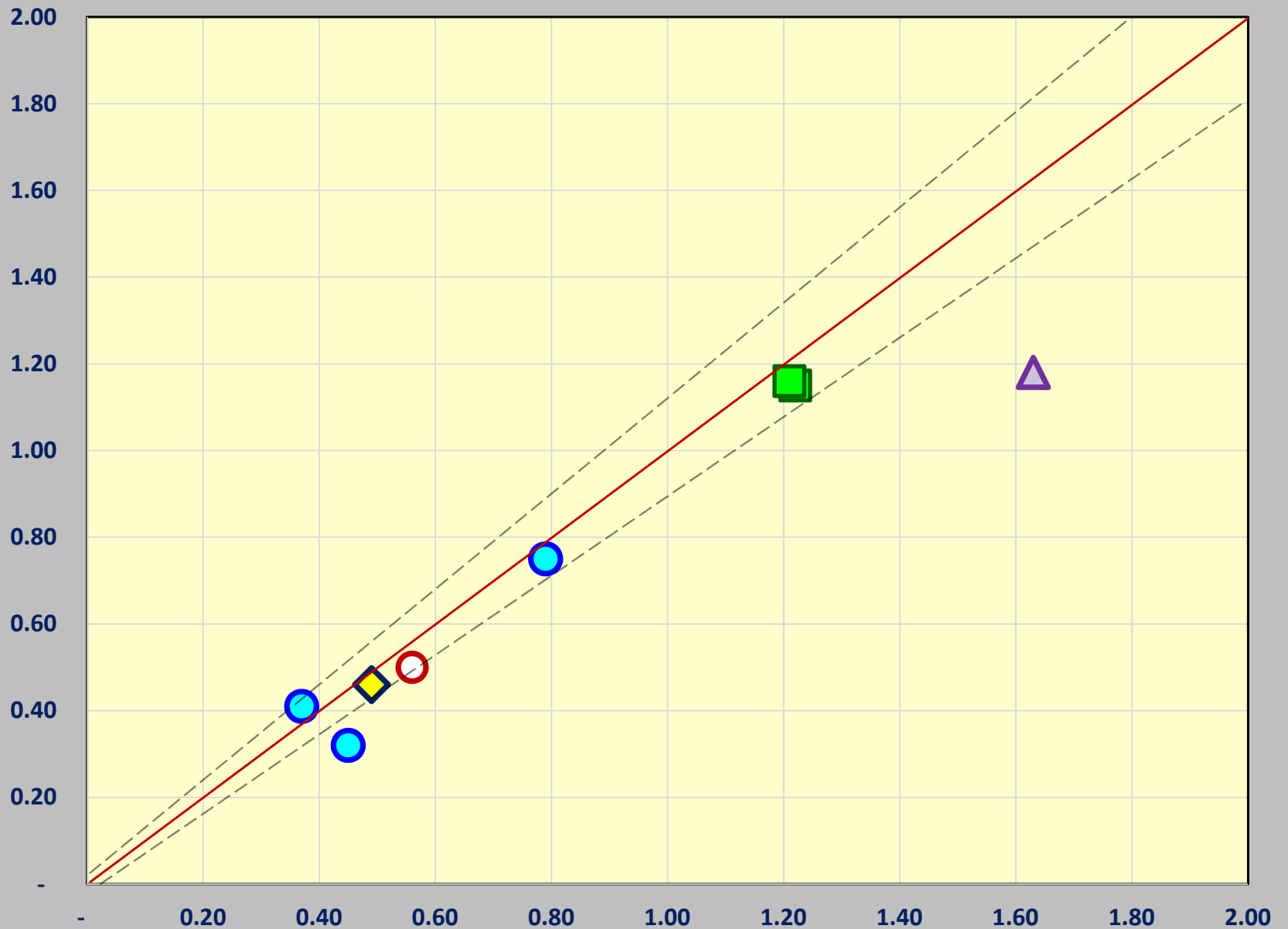
Money Partner / Investor Member (x-axis)

Legend: ○ Hypothetical Mixed-Use ○ Condos ◇ Apartment ☐ Office △ Industrial

Treynor Ratios: Real World Results

where **risk** in the denominator = the downside (pessimistic) deviation only

Developer / Manager / Sponsor
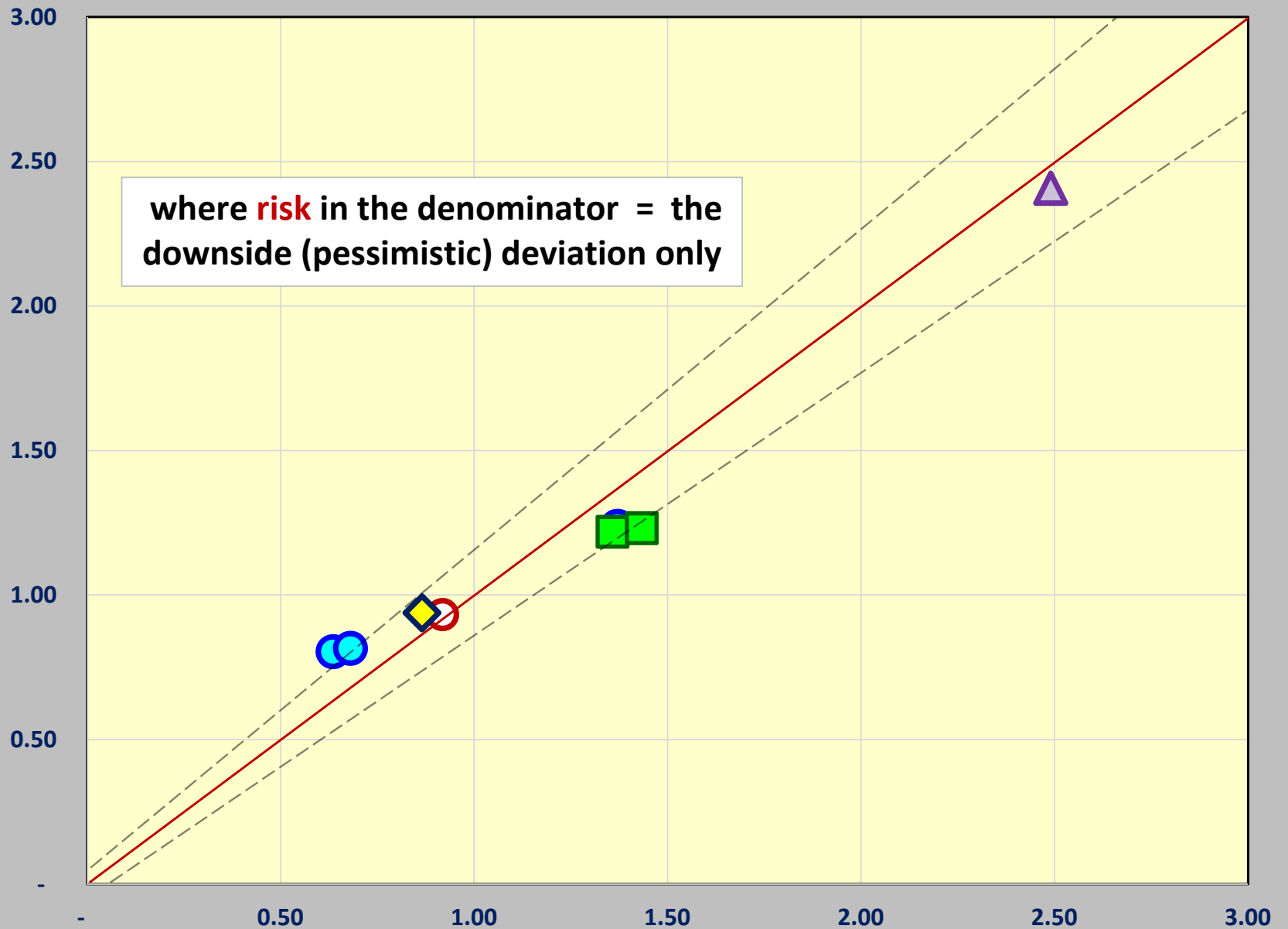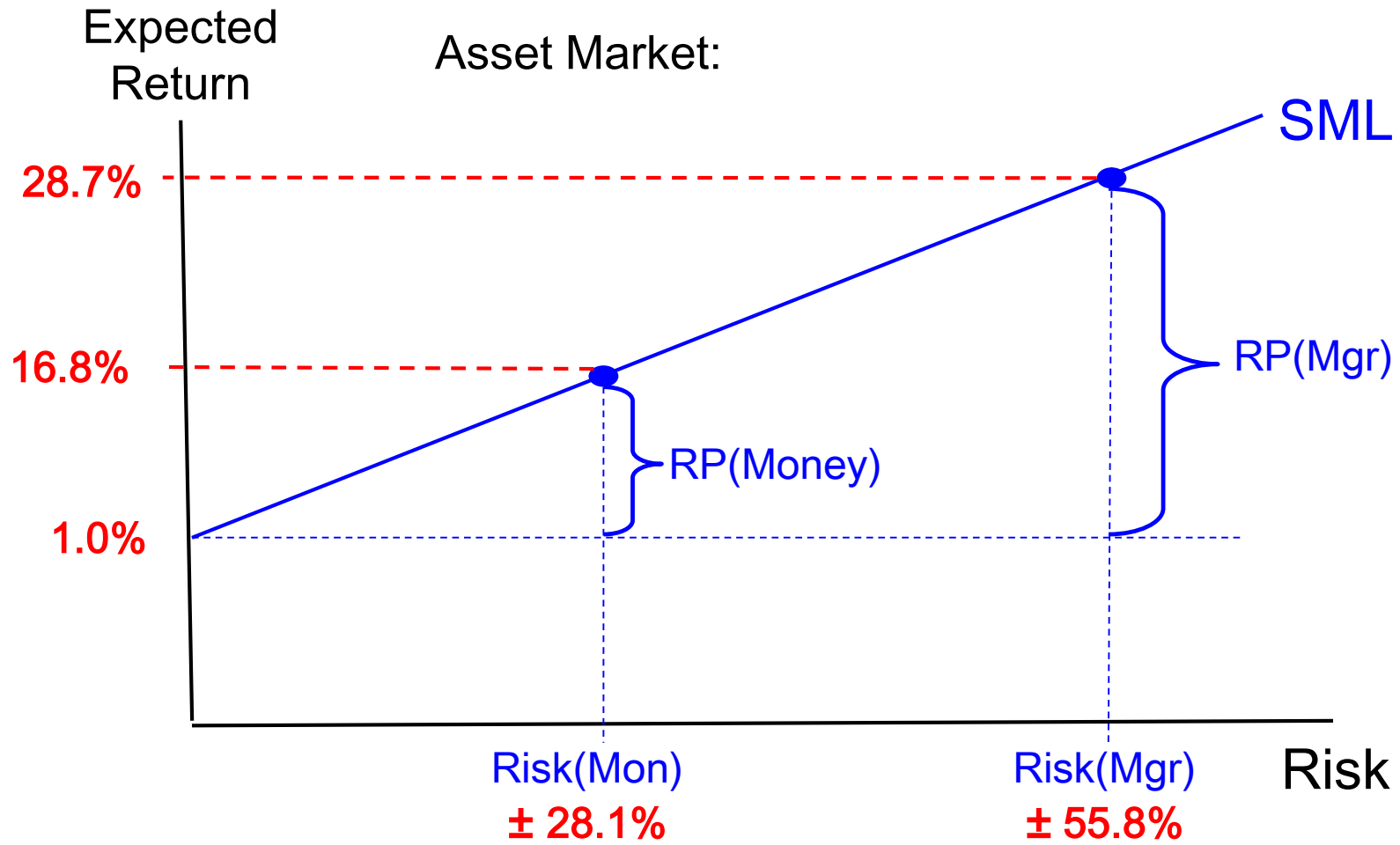
Money Partner / Investor Member

○ Hypothetical Mixed-Use ● Condos ◆ Apartment ■ Office △ Industrial
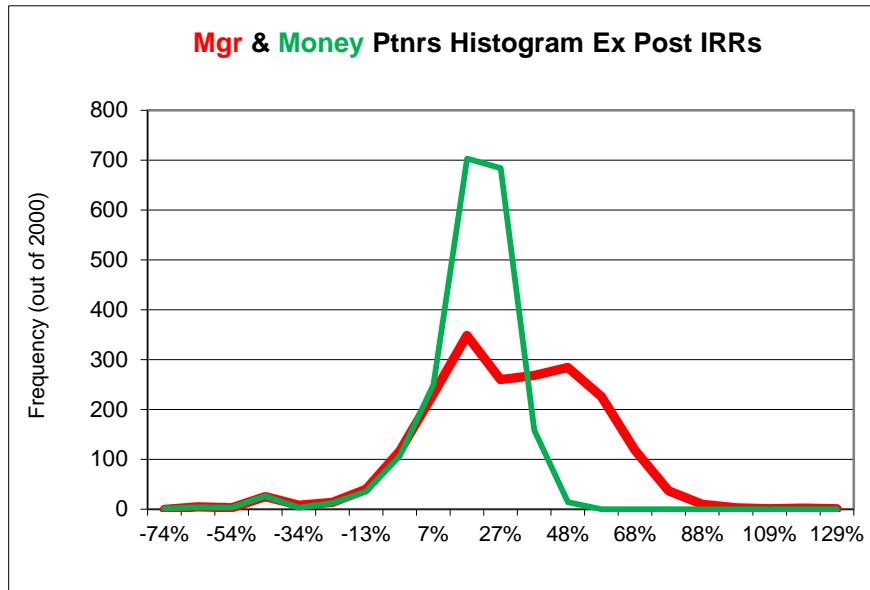
Approximately equal Treynor Ratios…

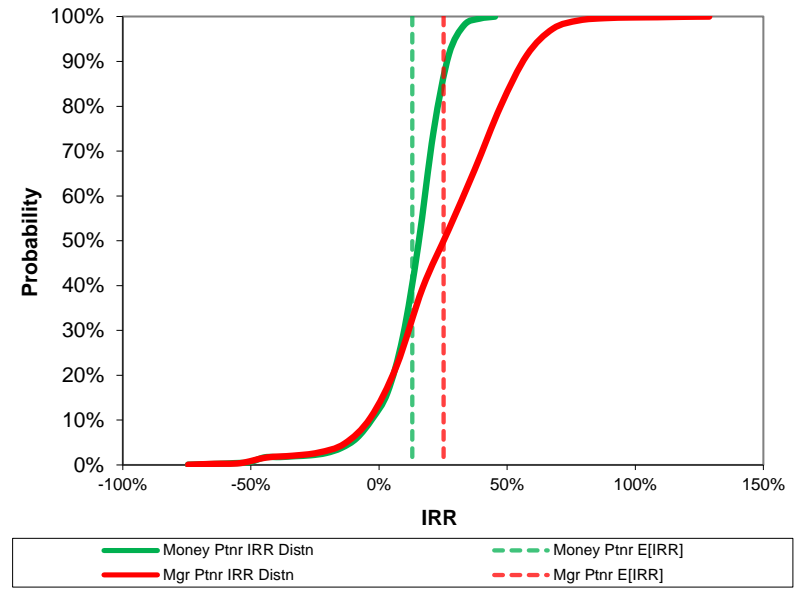

→ *"Fair" JV cash flow splits arrangement.*

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More sophisticated and in-depth analysis can be done with **Monte Carlo simulation**, modeling <u>entire probability distribution</u> of outcome IRRs…

Histogram (frequency)

Cumulative probability over IRR achieved

How can we do this?...

Empirical data (e.g., RCA) now enables us to rigorously _simulate_ the behavior of real estate asset prices over time.

Random simulation of 10 properties around market:
Annual Frequency; Mkt=Moody's/REAL CPPI =1.0 at 4Q00;
Property Buy(4Q00) & Sell(2Q10) with Random Price Dispersion Normal Distn Actual Resids Price Intercept StdDev; Property Idiosyncratic Drift Random Walk

Replace "unknown unknowns" with "known unknowns", replace "uncertainty" with "risk"…

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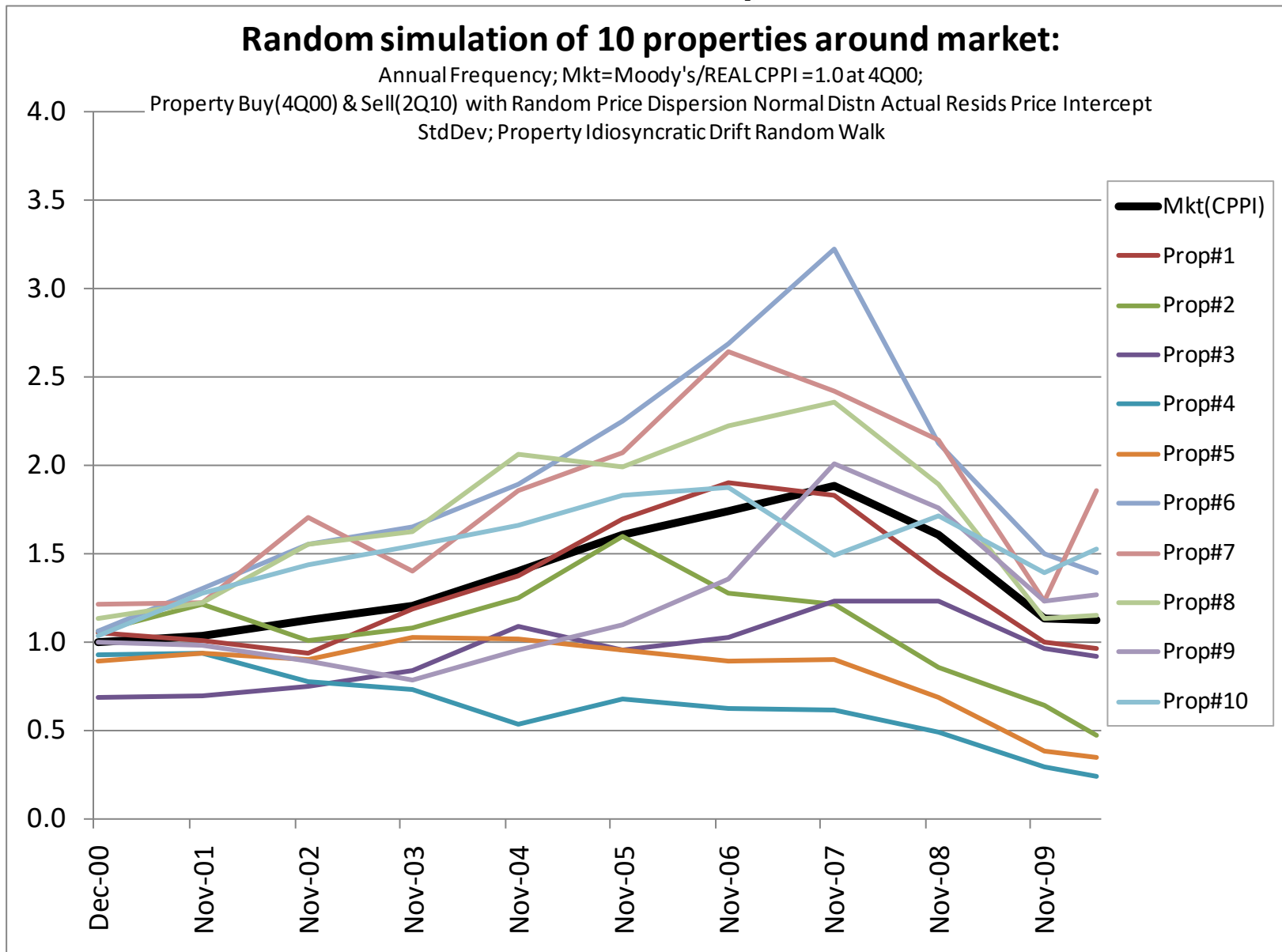
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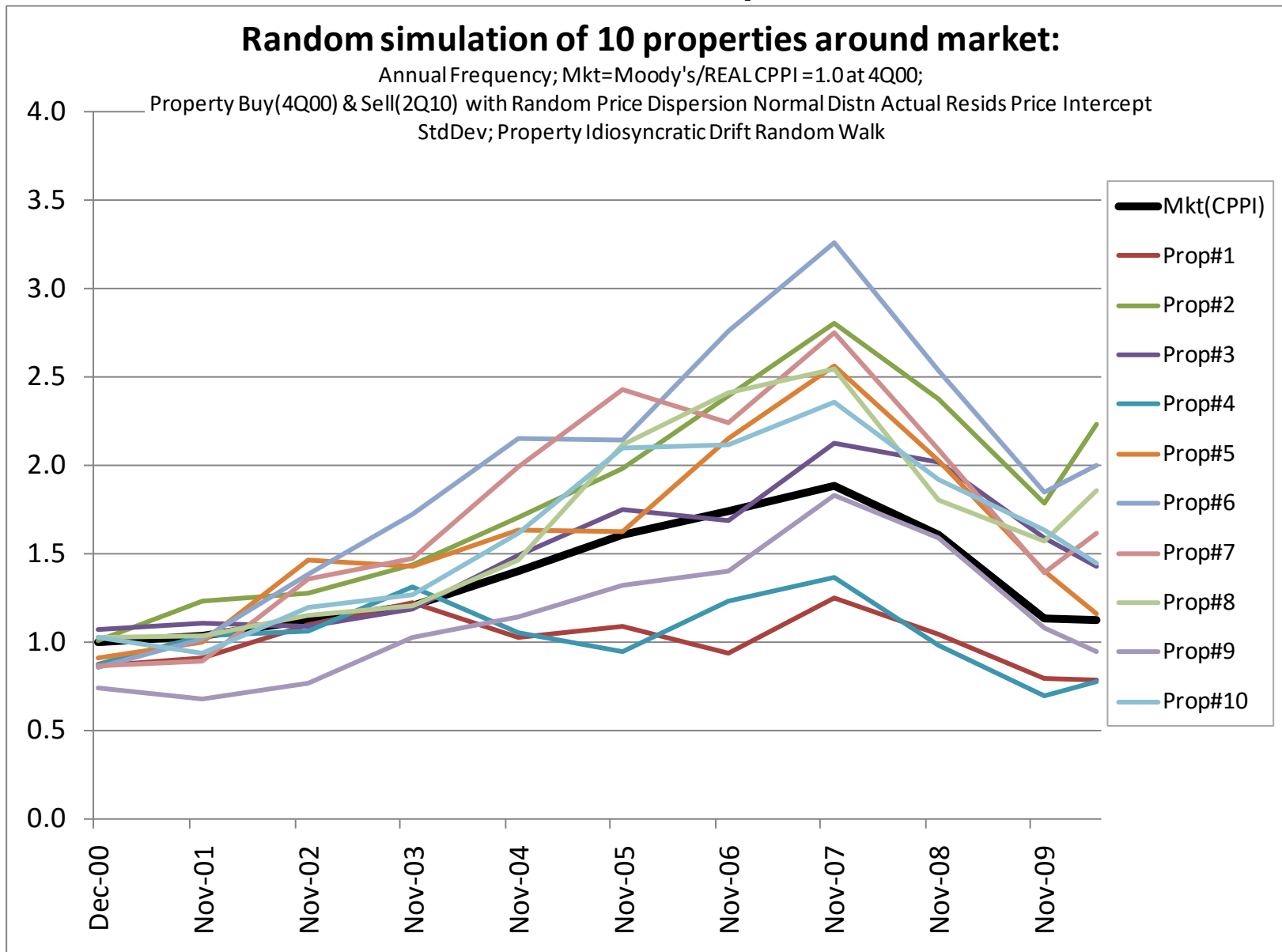
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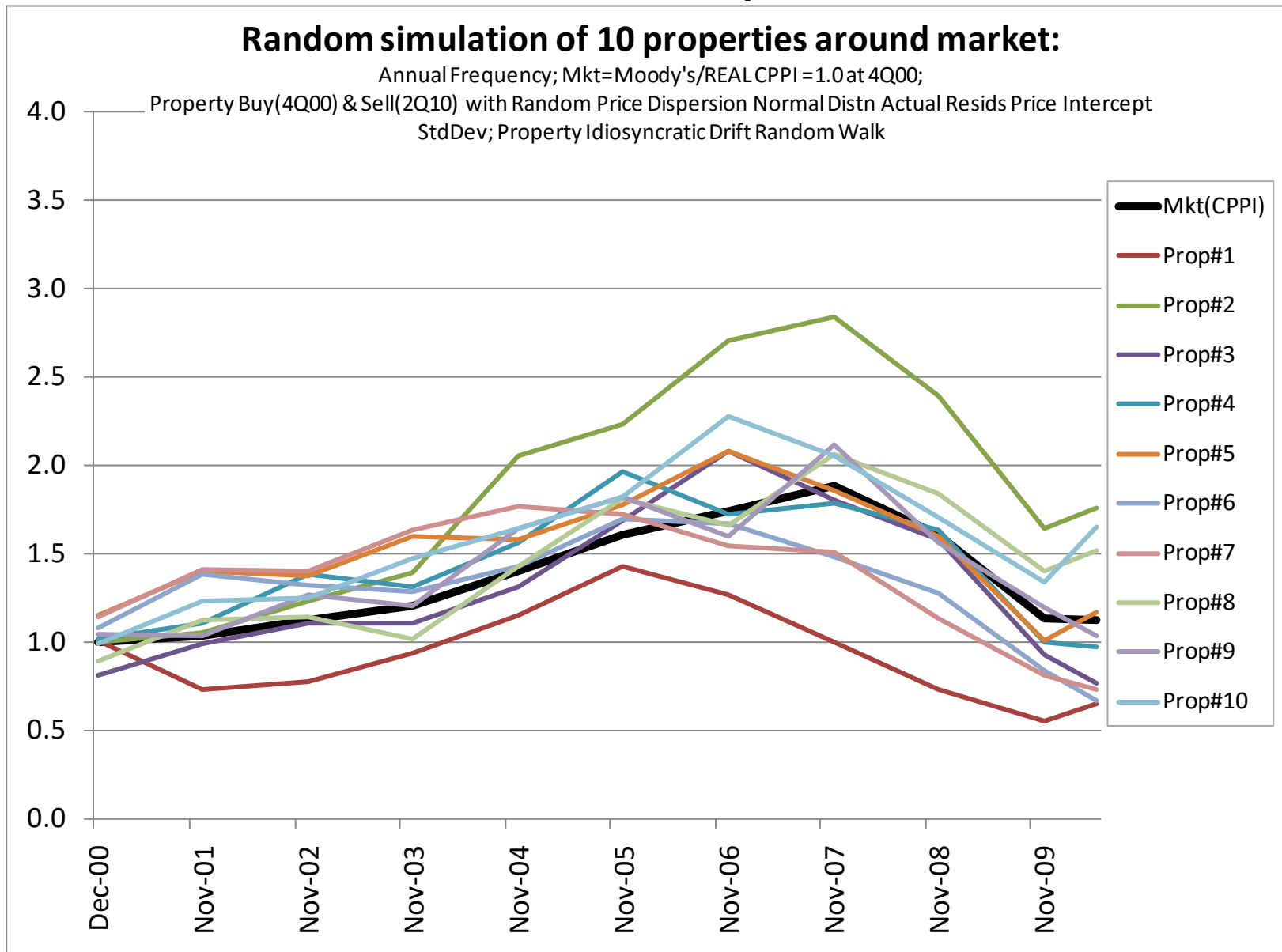

Random simulation of 10 properties around market:

Annual Frequency; Mkt=Moody's/REAL CPPI =1.0 at 4Q00;
Property Buy(4Q00) & Sell(2Q10) with Random Price Dispersion Normal Distn Actual Resids Price Intercept
StdDev; Property Idiosyncratic Drift Random Walk

Legend: Mkt(CPPI), Prop#1, Prop#2, Prop#3, Prop#4, Prop#5, Prop#6, Prop#7, Prop#8, Prop#9, Prop#10

Replace "unknown unknowns" with "known unknowns", replace "uncertainty" with "risk"…

Empirical data (e.g., RCA) now enables us to rigorously _simulate_ the behavior of real estate asset prices over time.
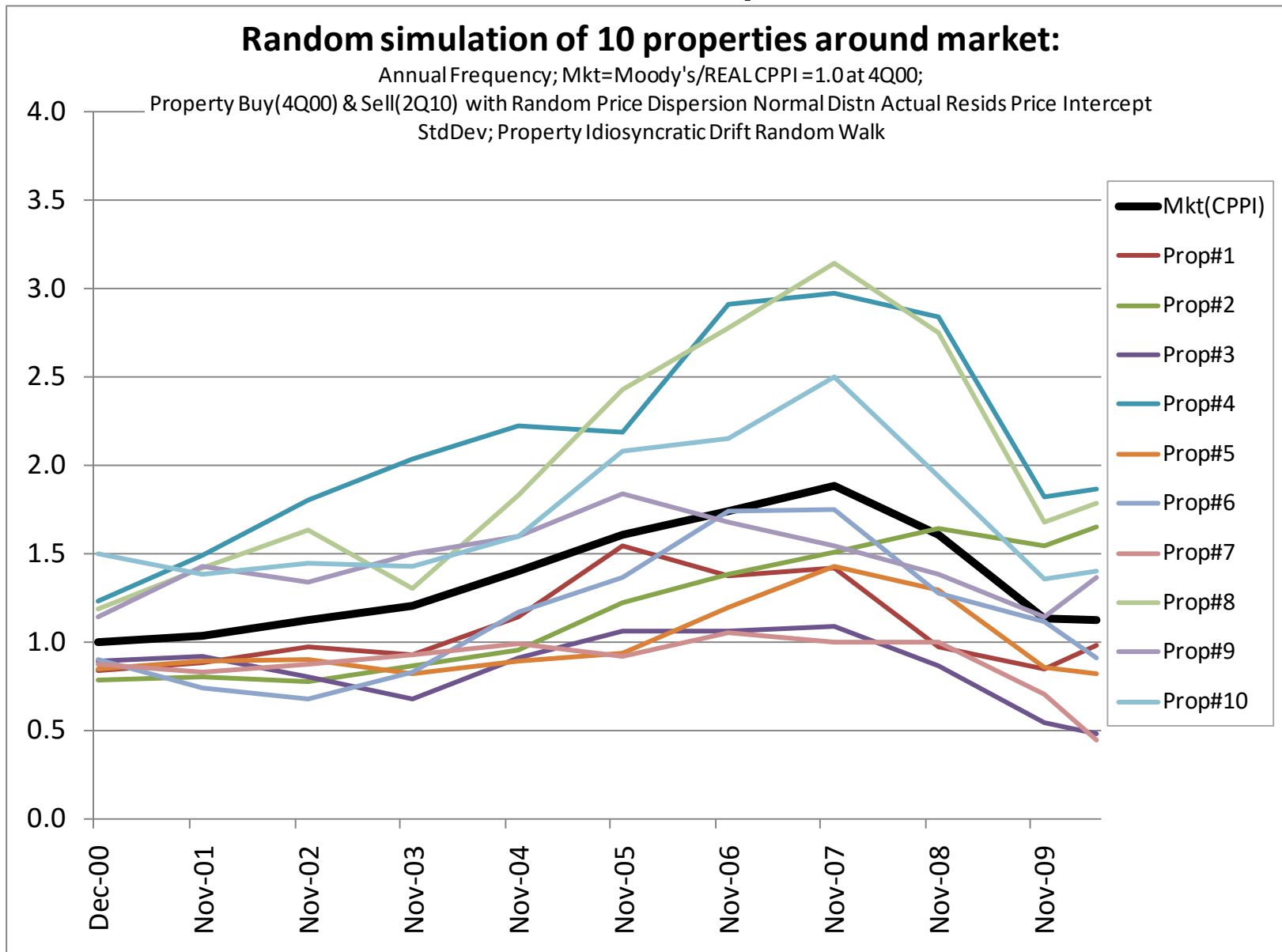
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StdDev; Property Idiosyncratic Drift Random Walk

**Replace "unknown unknowns" with "known unknowns",
replace "uncertainty" with "risk"…**

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Using this new quantitative knowledge about real estate price dynamics, we **simulate** the **entire probability distribution** of outcome IRRs for our development project JV…

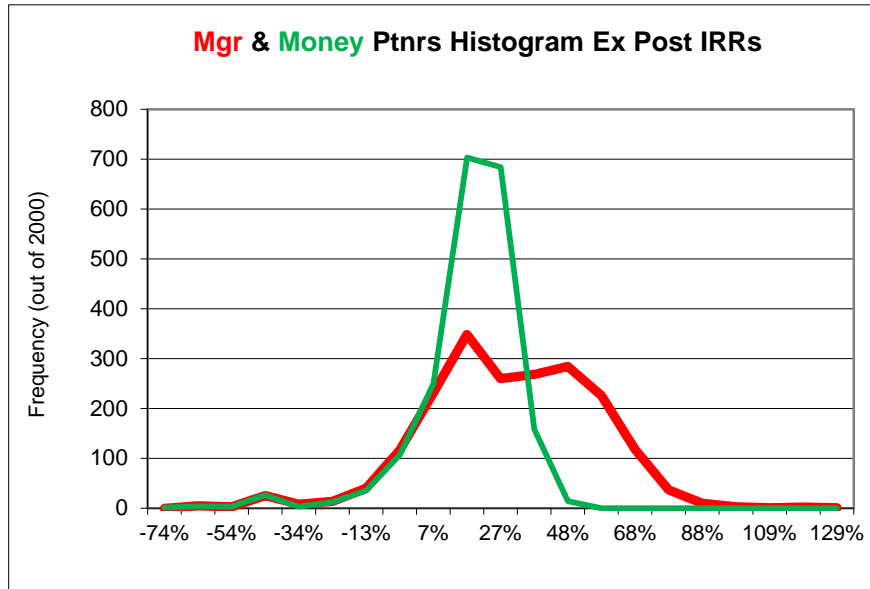**Mgr & Money Ptnrs Histogram Ex Post IRRs**
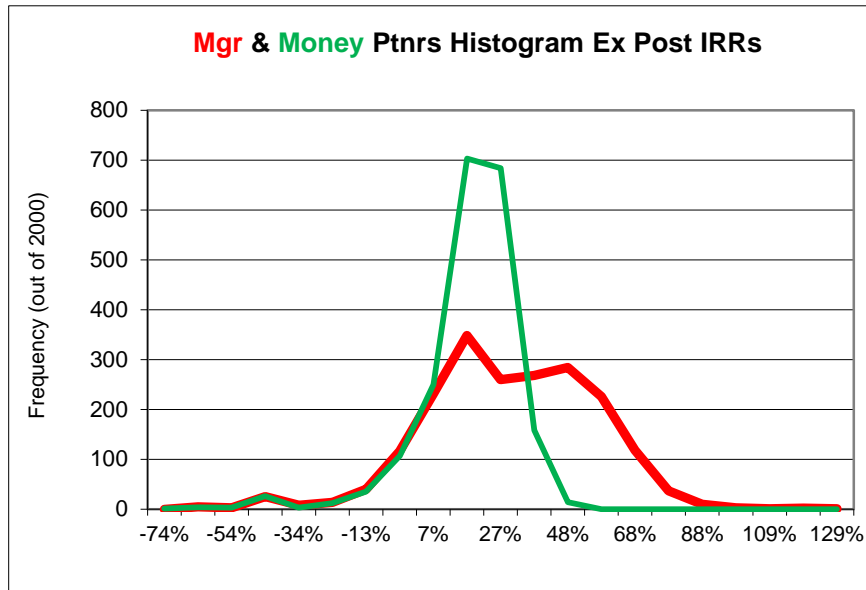
Histogram (frequency)

Cumulative probability over IRR achieved

For example, this is the type of outcome probability distribution we get for the Mgr & Money partners' IRRs under the given JV arrangement terms. You can graphically see the **tails** and **shapes** and the probabilities of various outcomes.

Cumulative Distn Fcn: ex post IRRs
(across simulation runs)

Money Ptnr IRR Distn   Money Ptnr E[IRR]
Mgr Ptnr IRR Distn   Mgr Ptnr E[IRR]

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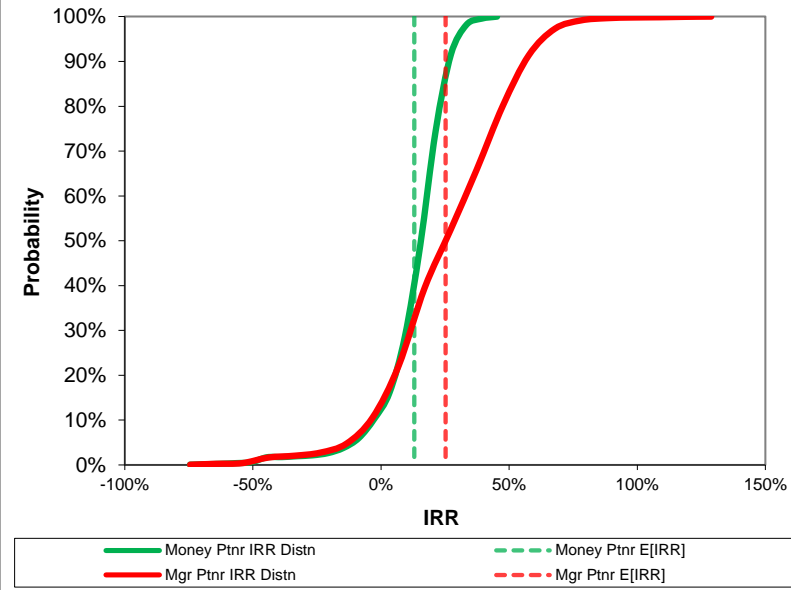
We can relate the Monte Carlo analysis to the previously described capital market theory based Treynor Ratio analysis of JV terms "fairness" defining "risk" either by the standard deviation of the IRR outcome probability distribution, or by the downside half-deviation.
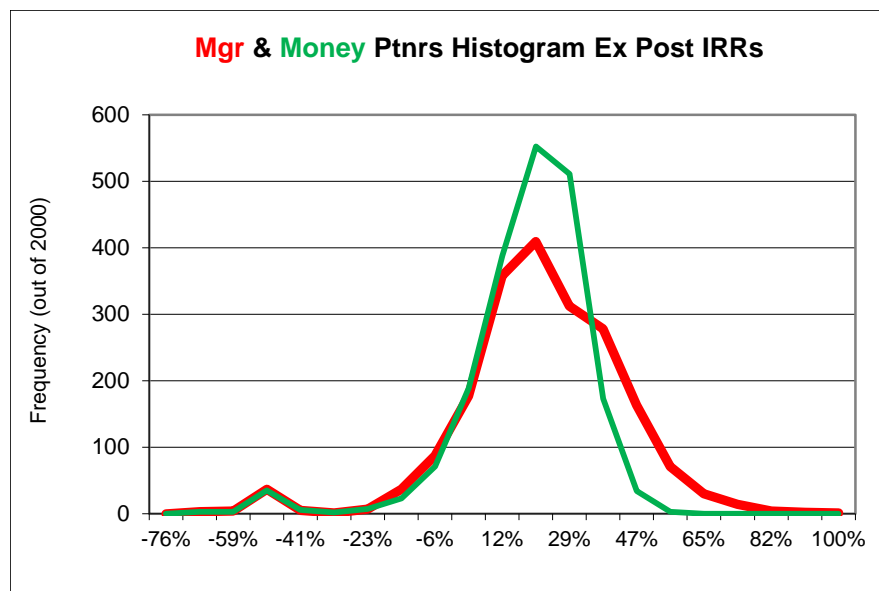

Mgr & Money Ptnrs Histogram Ex Post IRRs

Treynor Ratios:	/StdDev	/Downside
Development Partner	0.96	1.32
Money Partner	0.84	0.99

Based on the Monte Carlo simulation (entire probability distribution), the developer's Treynor Ratio appears a bit better than the Money partner's. The Money partner also faces a more negative skew and larger kurtosis (relatively fatter tails): Mgr not sharing enough upside with Money partner, or Money exposed to too much downside.

Cumulative Distn Fcn: ex post IRRs
(across simulation runs)

29
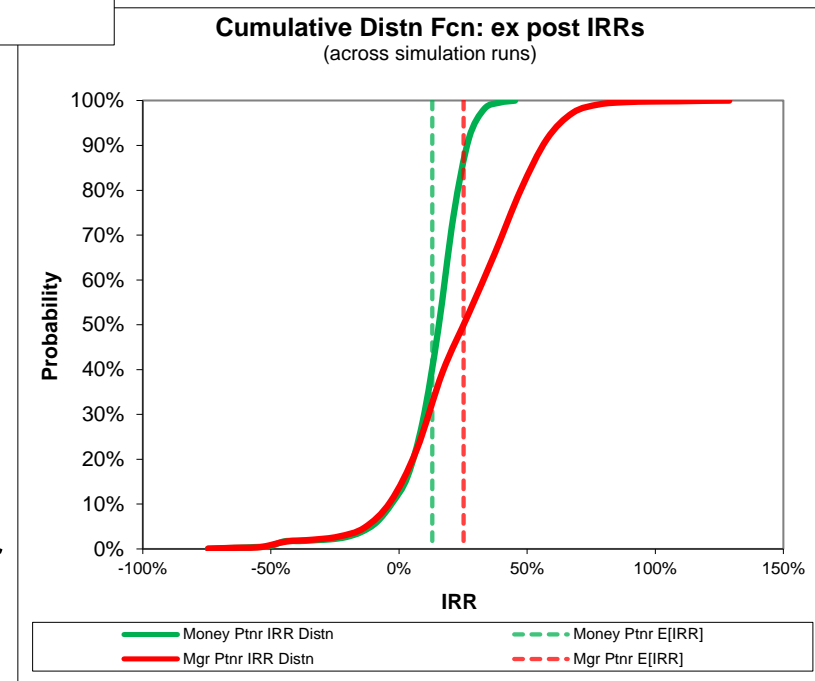
Exploring effect of **changes** in the JV terms…

Here only **one hurdle**, at **18%**, then **80/20**.

(Base Case was three hurdles at 10%, 13%, 15% and splits of 80/20, 70/30 & 60/40.)

Mgr & Money Ptnrs Histogram Ex Post IRRs

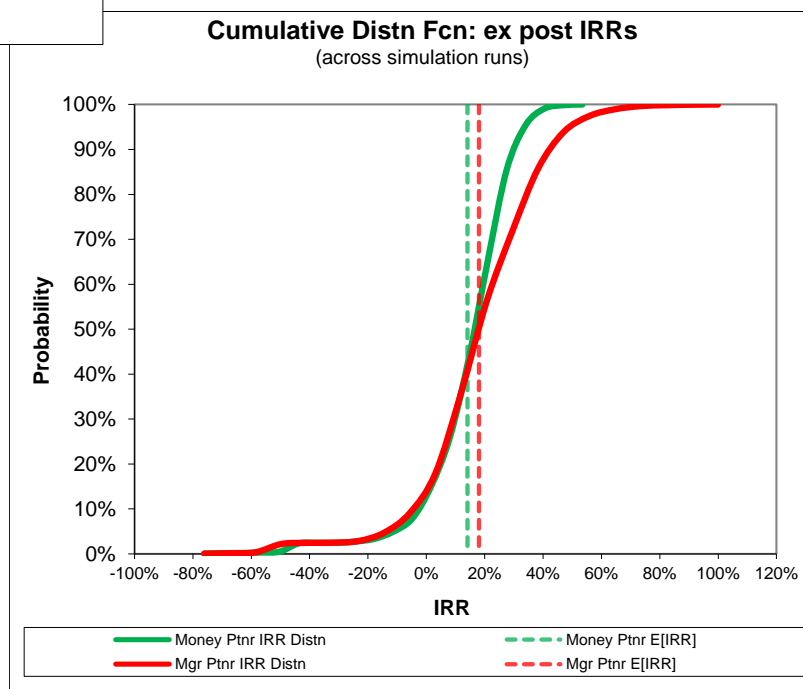| Treynor Ratios:	/StdDev	/Downside
Development Partner	0.82	1.10
Money Partner	0.82	0.99

Here we've substantially changed the hurdle & splits structure in **favor** of the **Money** Partner. ("Tight money" environment.) This results in nearly equal Treynor Ratios for the two partners (Money still has a little worse downside) …

Cumulative Distn Fcn: ex post IRRs
(across simulation runs)

Legend: Money Ptnr IRR Distn — Money Ptnr E[IRR] — Mgr Ptnr IRR Distn — Mgr Ptnr E[IRR]
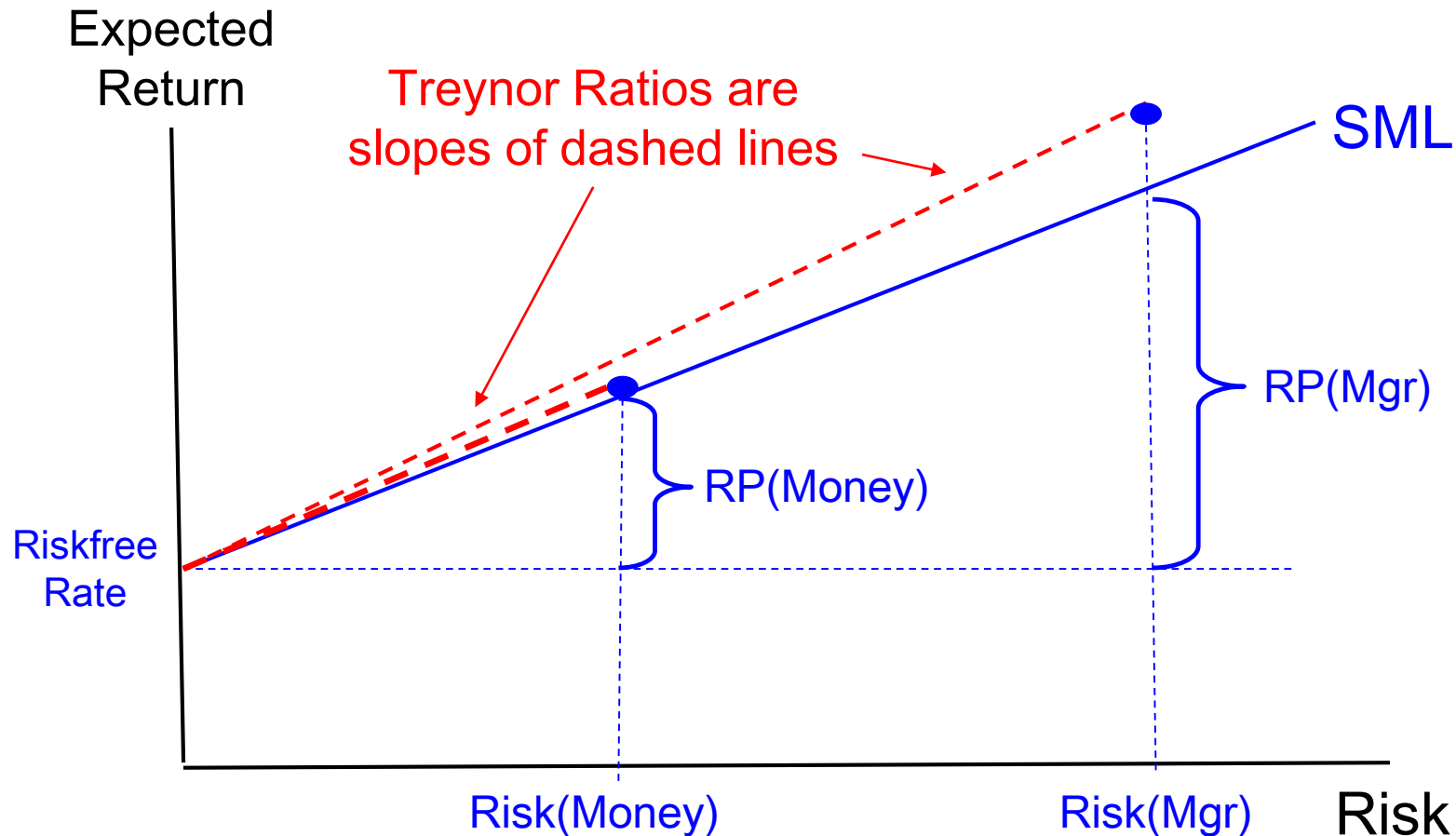
30

Thus, the Monte Carlo analysis suggests (unlike the simple scenario analysis) that the originally proposed JV terms may not be giving a "fair" deal to the Money partner relative to the Developer, based on the capital market risk/return criterion. However, there could be several reasons justifying this:

1. Development fees don't fully cover developer's project mgt & overhead costs?

2. Project control & operational incentives considerations.

3. Developer sourced the project and may be allowing Money partner to come in at historical cost of land rather than higher current opportunity cost of land (what it would sell for as assembled & permitted).
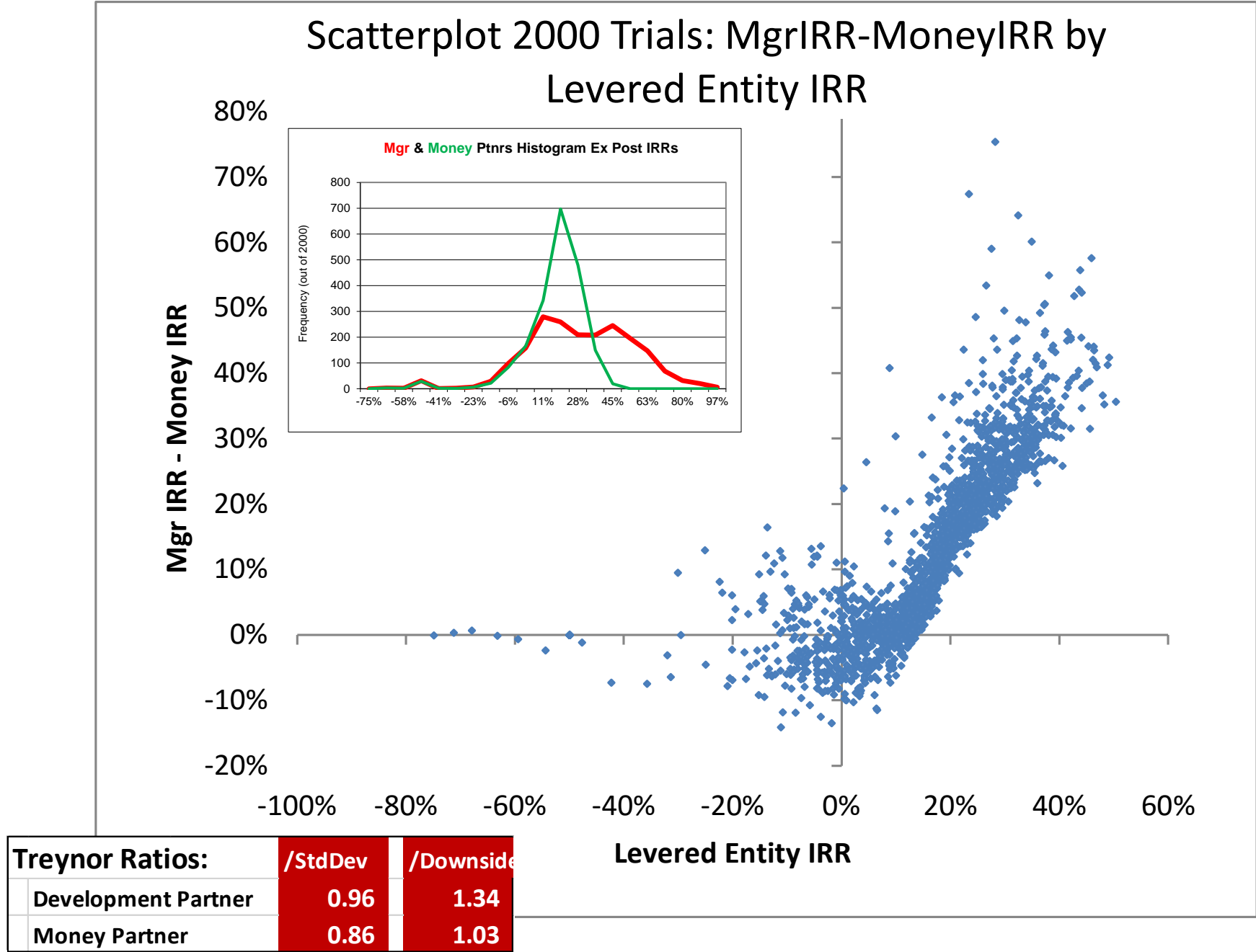
Point (3) would allow Money partner to face a fair market risk/return prospect even though a lower Treynor than Mgr…

Based on historical land cost…

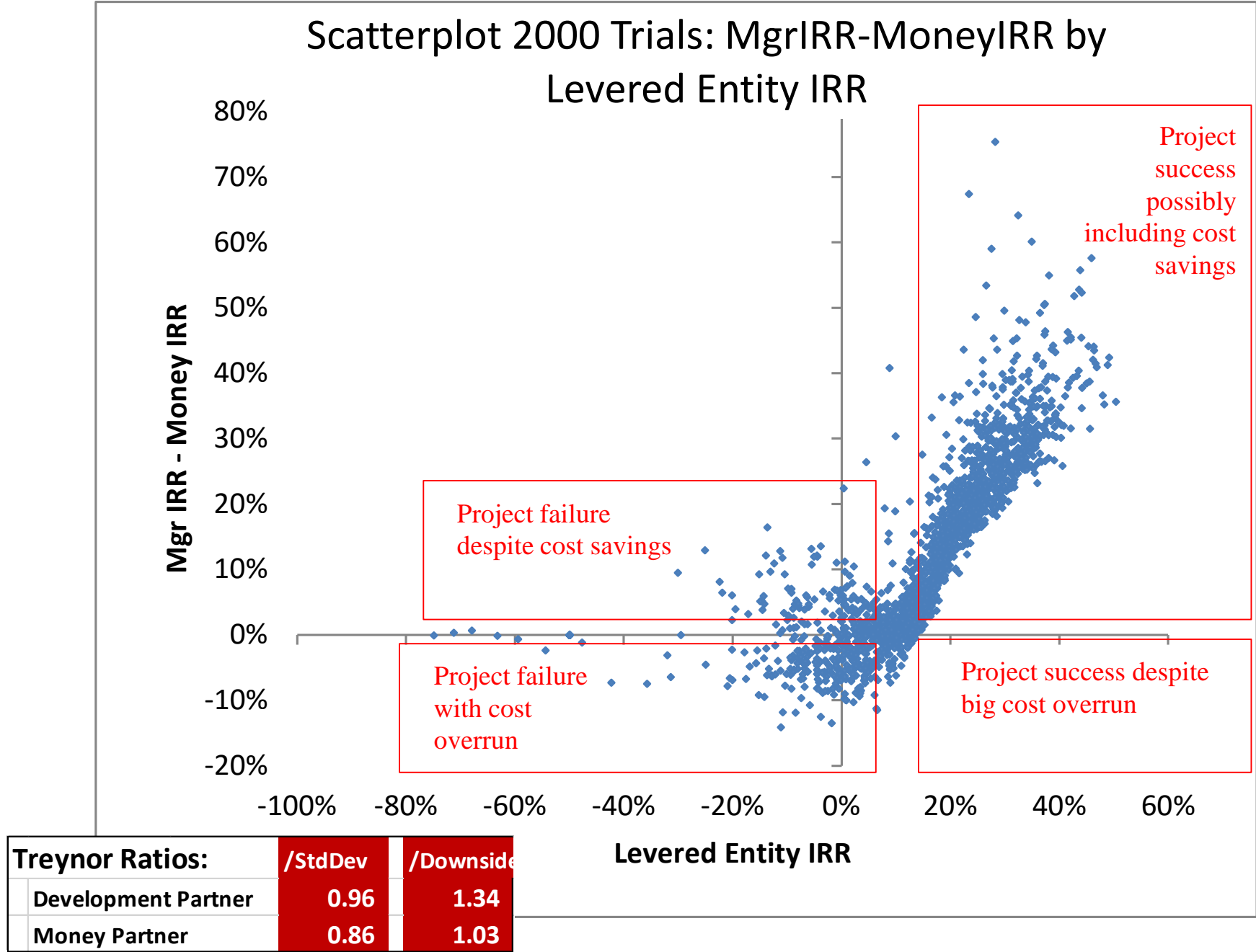Here, Money partner receives "fair" expected return (>=SML) even though lower Treynor than Developer…

Expected Return

Treynor Ratios are slopes of dashed lines

SML

RP(Mgr)

RP(Money)

Riskfree Rate

Risk(Money)   Risk(Mgr)   Risk

Base Case terms: 10%, 13%, 15%; 90/10, 80/20, 70/30, 60/40; 50/50 cost overrun/savings:

Scatterplot 2000 Trials: MgrIRR-MoneyIRR by Levered Entity IRR

Mgr & Money Ptnrs Histogram Ex Post IRRs

Treynor Ratios:	/StdDev	/Downside
Development Partner	0.96	1.34
Money Partner	0.86	1.03

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Scatterplot 2000 Trials: MgrIRR-MoneyIRR by Levered Entity IRR

Treynor Ratios:	/StdDev	/Downside
Development Partner	**0.96**	**1.34**
Money Partner	**0.86**	**1.03**

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50/50 cost overrun/savings with one hurdle: pro rata to 18%, then 80/20:

Scatterplot 2000 Trials: MgrIRR-MoneyIRR by Levered Entity IRR

- Project success possibly including cost savings
- Project failure despite cost savings
- Project success despite big cost overrun
- Project failure with cost overrun

X-axis: Levered Entity IRR
Y-axis: Mgr IRR - Money IRR

Treynor Ratios:	/StdDev	/Downside
Development Partner	0.94	1.27
Money Partner	0.96	1.17

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50/50 cost overrun/savings with one hurdle: pro rata to 18%, then 80/20:

Scatterplot 2000 Trials: MgrIRR-MoneyIRR by Levered Entity IRR

Mgr & Money Ptnrs Histogram Ex Post IRRs
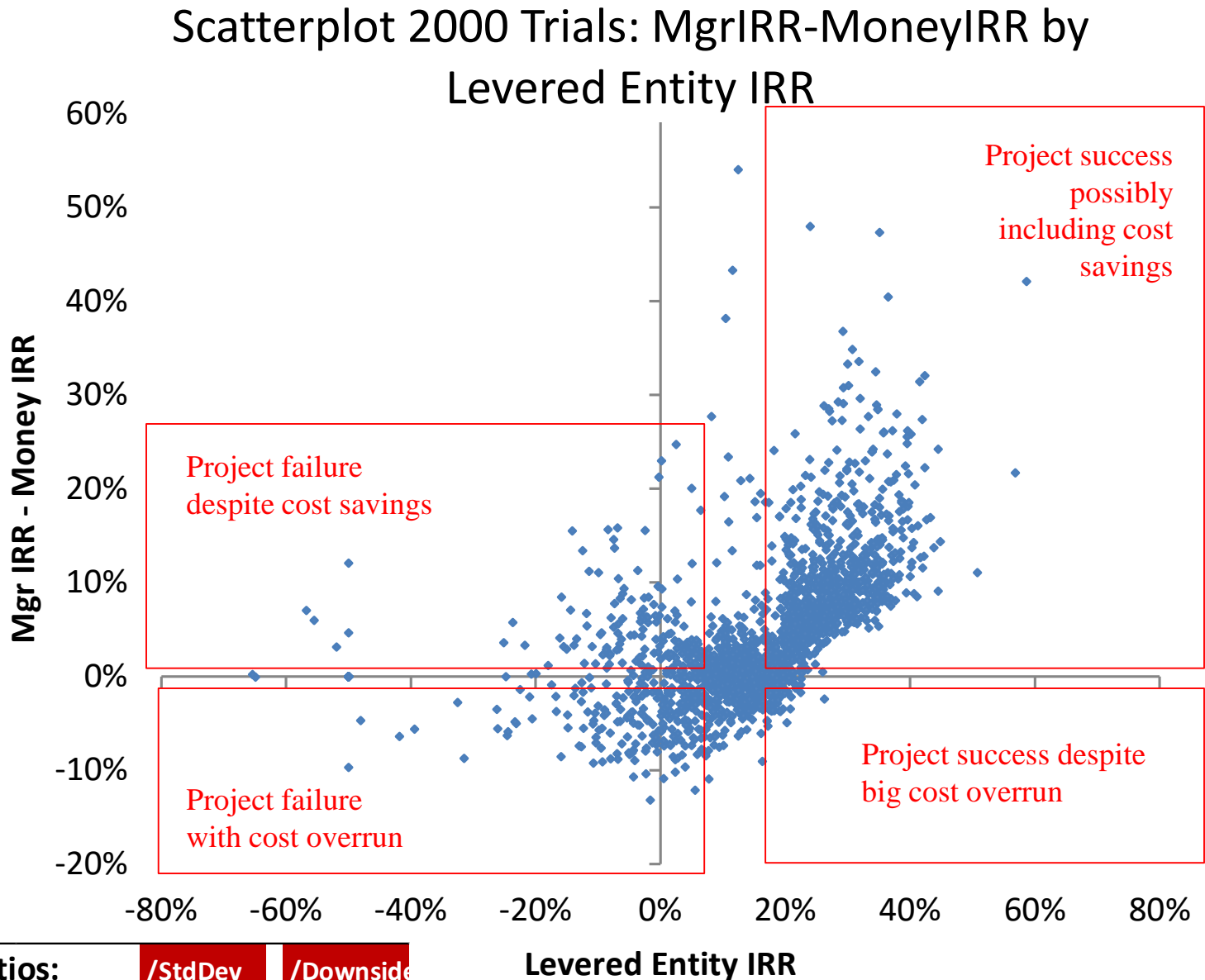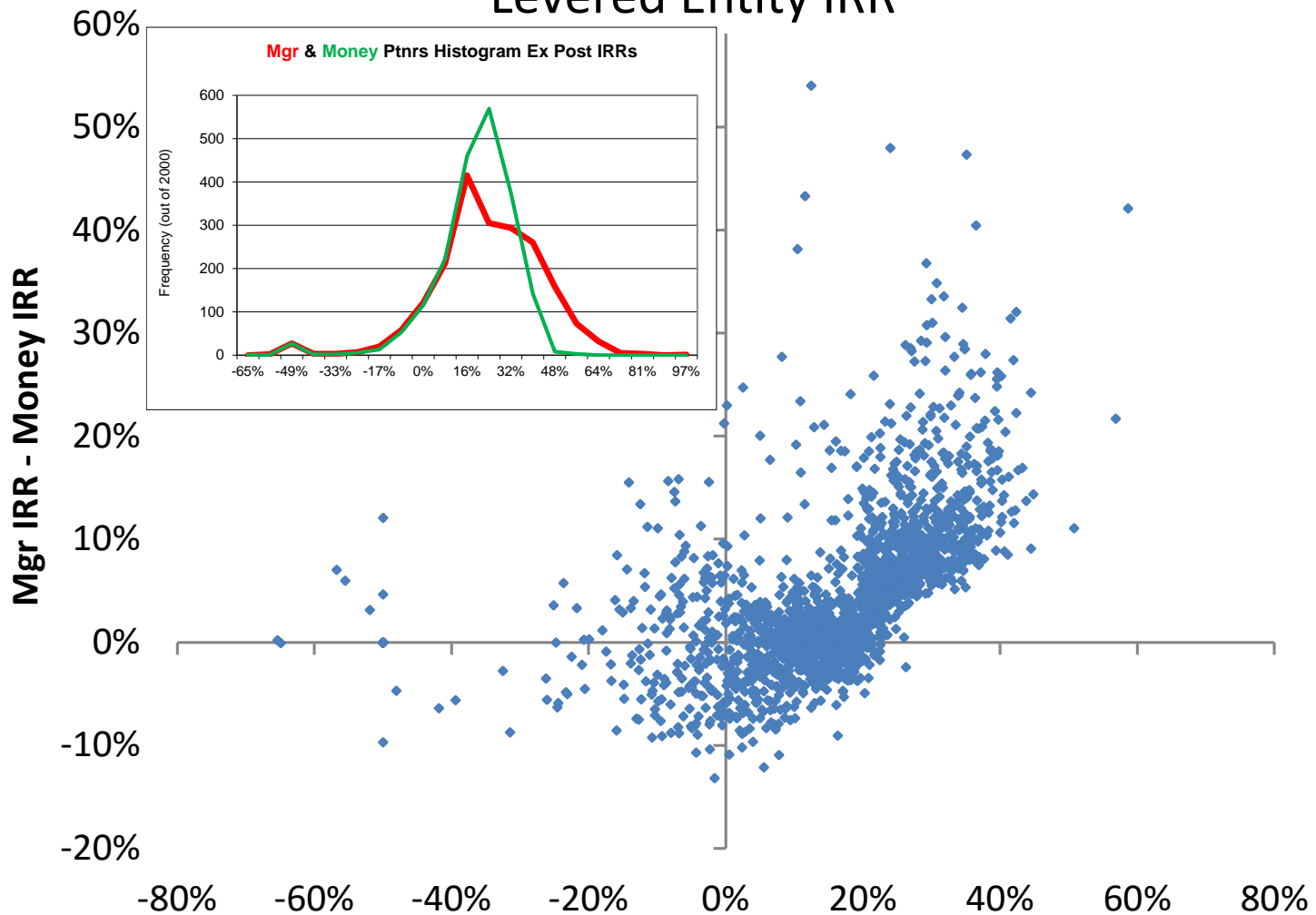
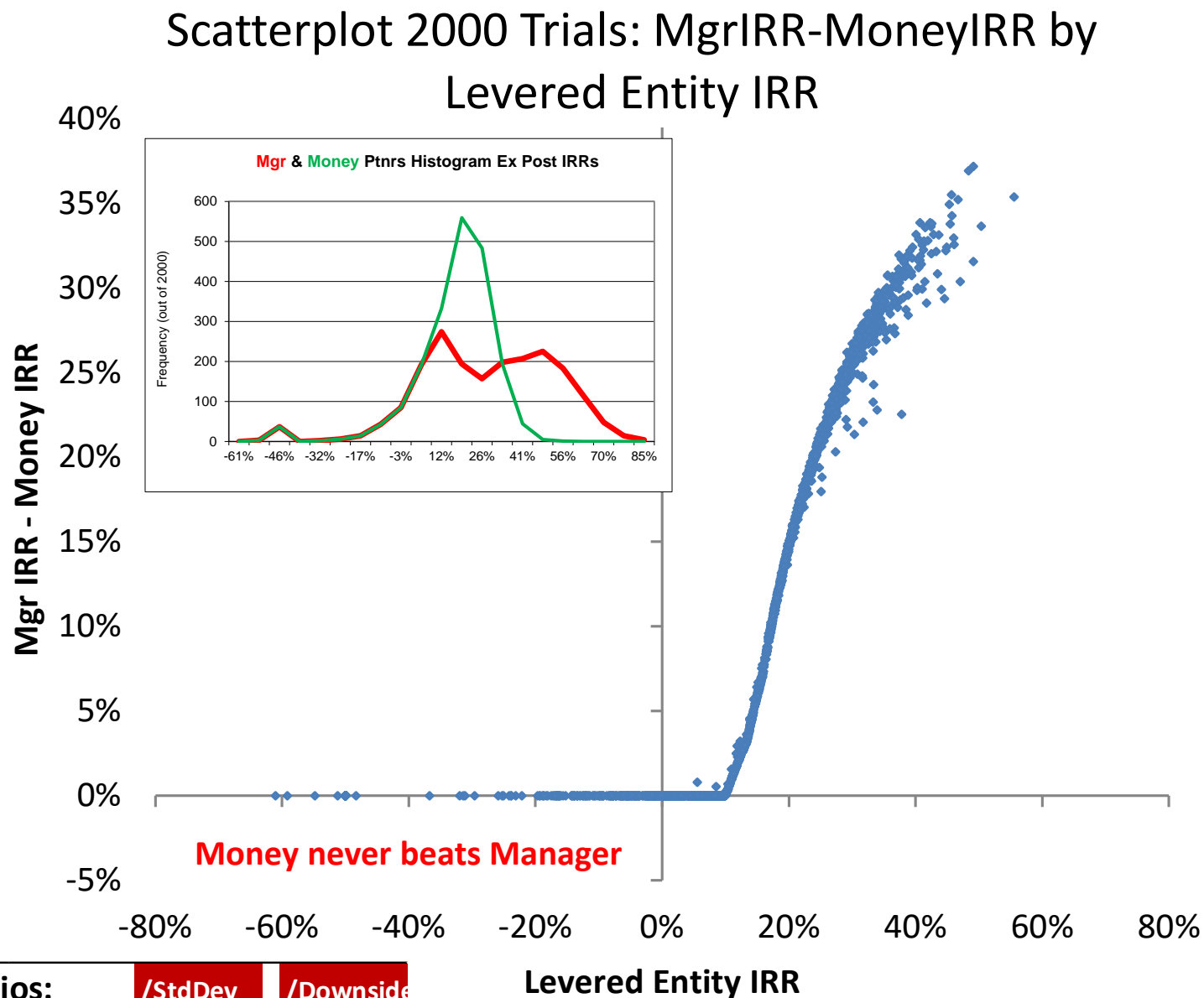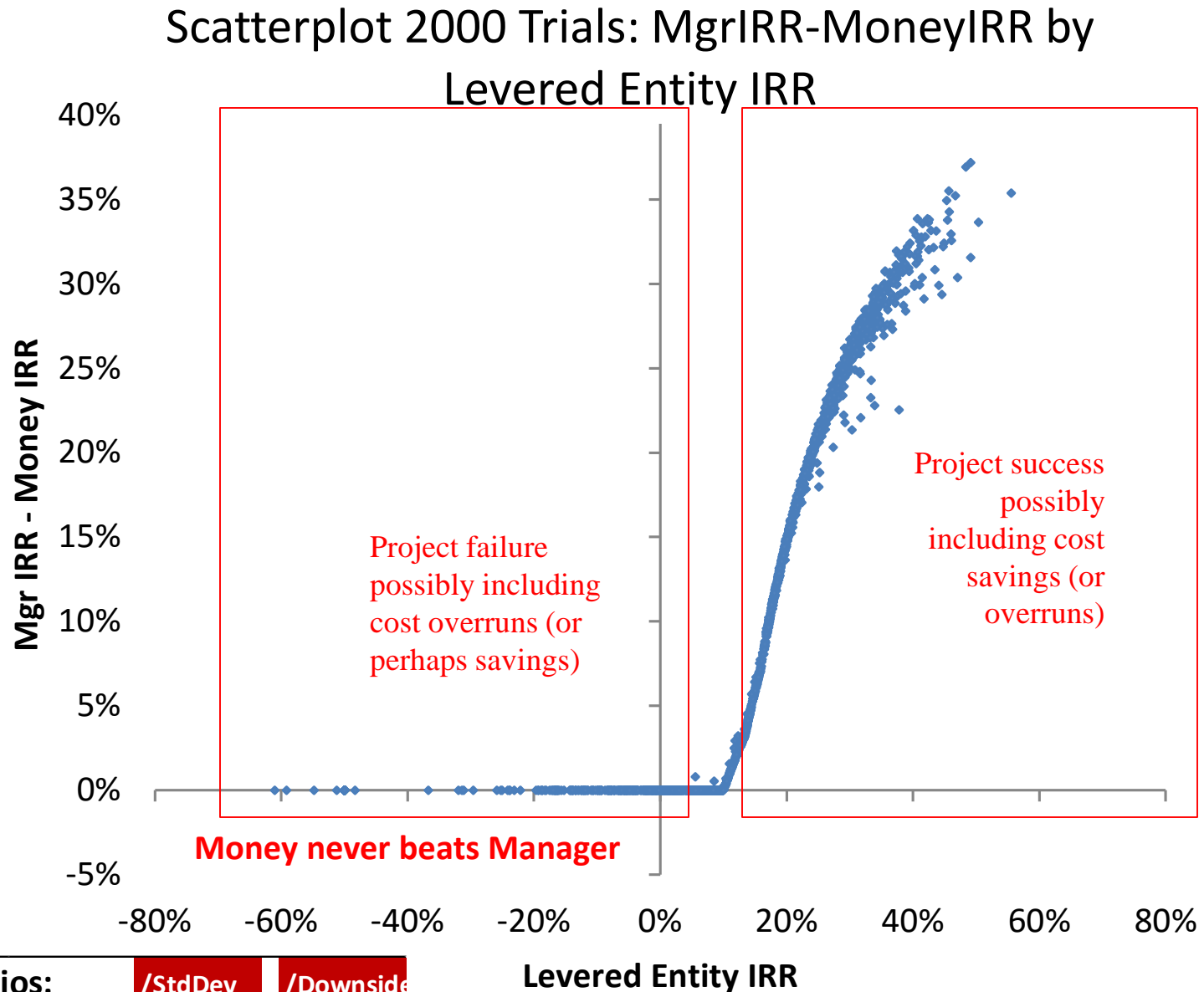| Treynor Ratios:	/StdDev	/Downside
Development Partner	0.94	1.27
Money Partner	0.96	1.17

Pro Rata on Costs: 10%, 13%, 15%; 90/10, 80/20, 70/30, 60/40; 90/10 cost overrun/savings:

Scatterplot 2000 Trials: MgrIRR-MoneyIRR by Levered Entity IRR

Mgr & Money Ptnrs Histogram Ex Post IRRs

Money never beats Manager

Treynor Ratios:	/StdDev	/Downside
Development Partner	0.99	1.34
Money Partner	0.84	1.01

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Pro Rata on Costs: 10%, 13%, 15%; 90/10, 80/20, 70/30, 60/40; 90/10 cost overrun/savings:

Scatterplot 2000 Trials: MgrIRR-MoneyIRR by Levered Entity IRR

Treynor Ratios:	/StdDev	/Downside
Development Partner	0.99	1.34
Money Partner	0.84	1.01

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