
CARR FUTURES
CRÉDIT AGRICOLE INDOSUEZ

Understanding drawdowns

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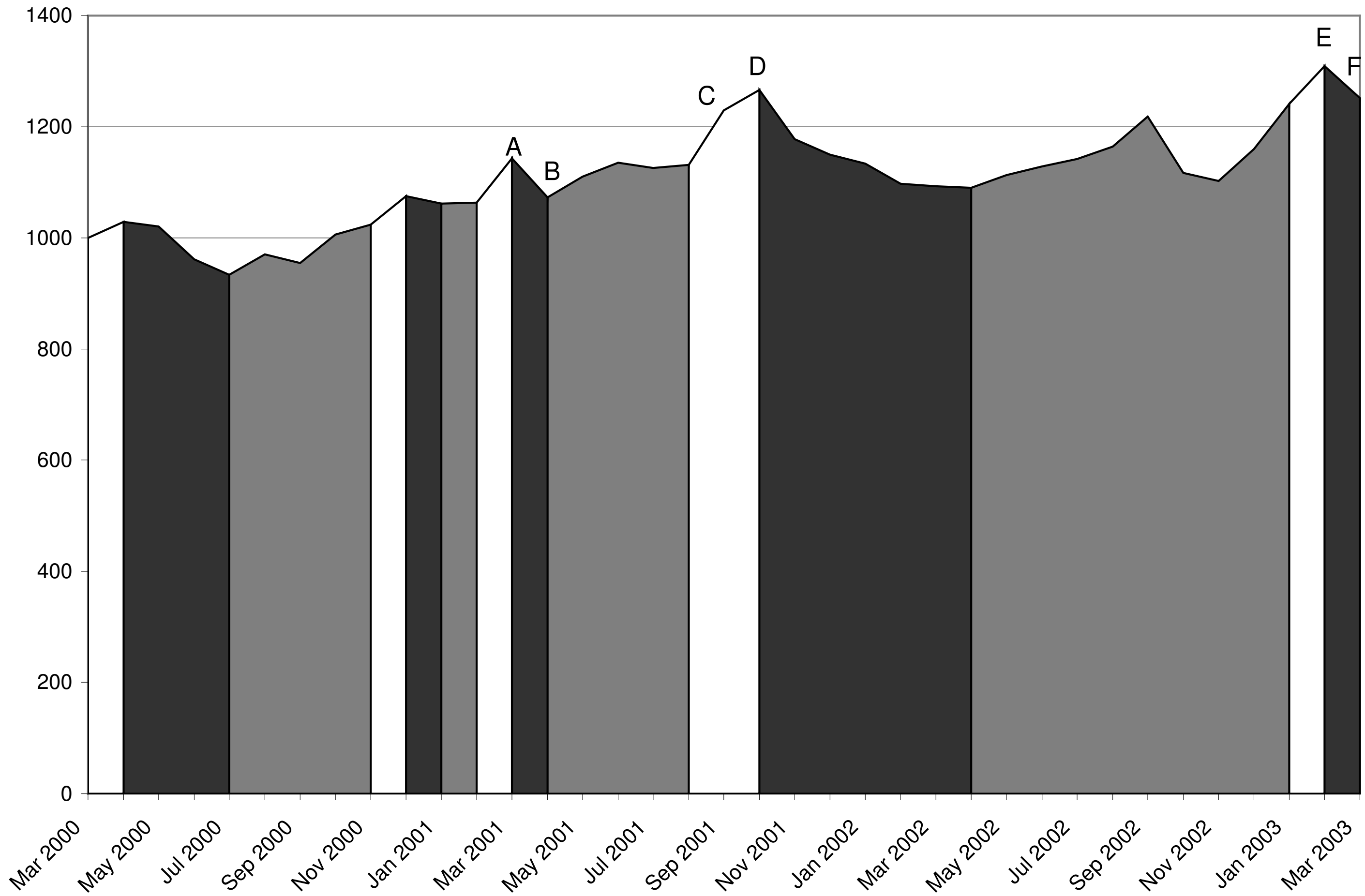
PRMIA Seminar

Chicago, 11 December 2003

Drawdown distributions

- All drawdowns
- Maximum drawdowns
- Manager evaluation report

Defining drawdowns



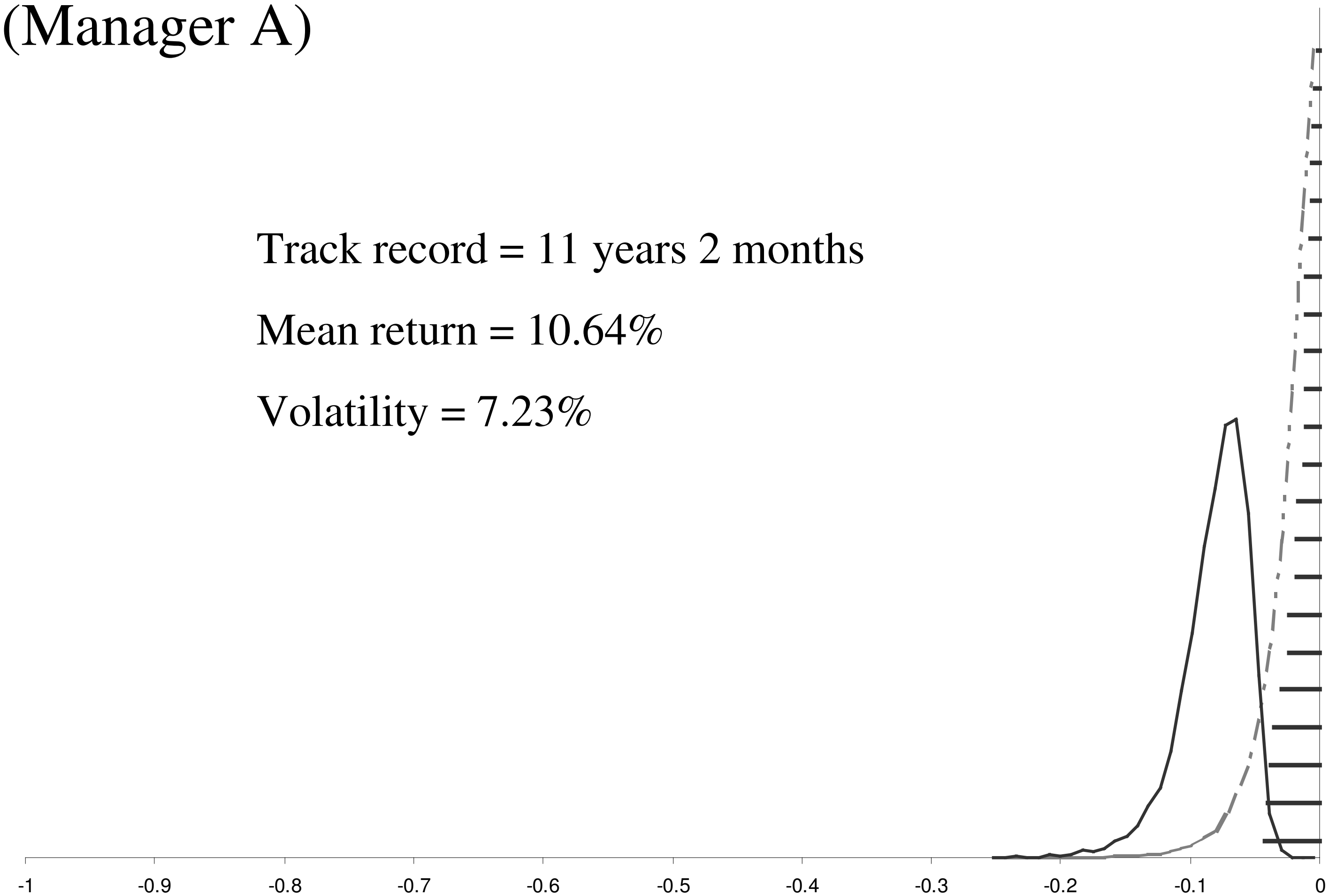
Expected drawdown analysis

(Manager A)

Track record = 11 years 2 months

Mean return = 10.64%

Volatility = 7.23%



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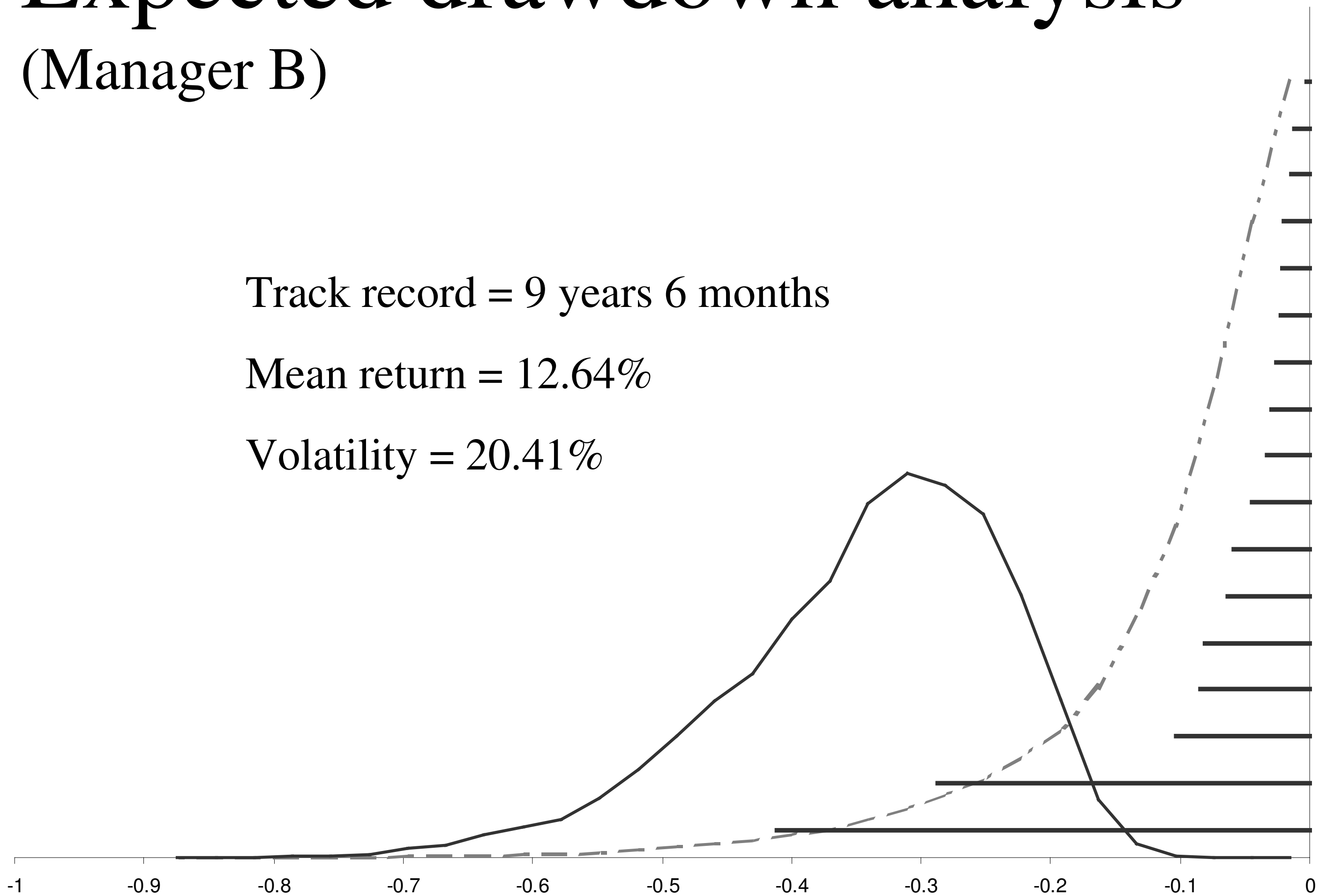
Expected drawdown analysis

(Manager B)

Track record = 9 years 6 months

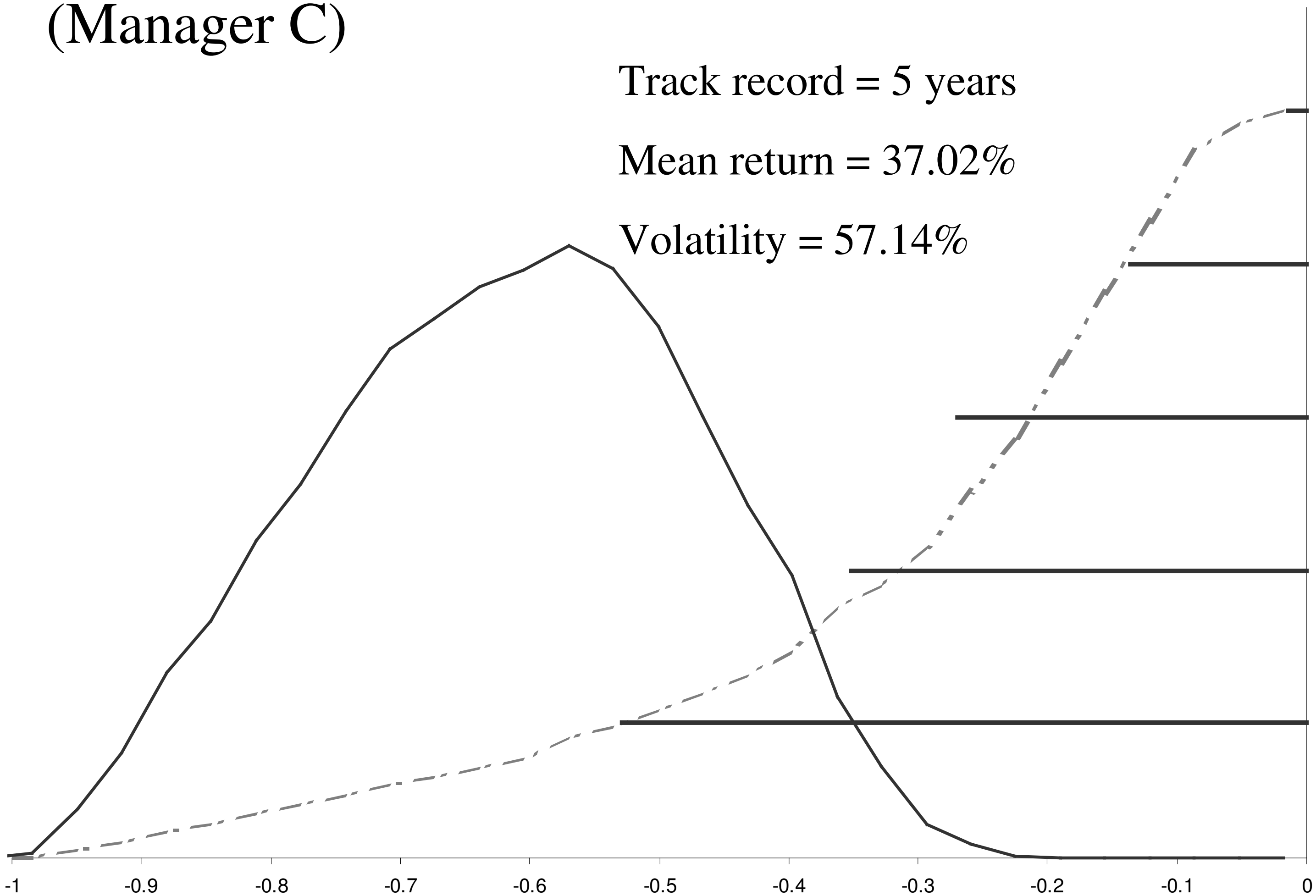
Mean return = 12.64%

Volatility = 20.41%



Expected drawdown analysis

(Manager C)

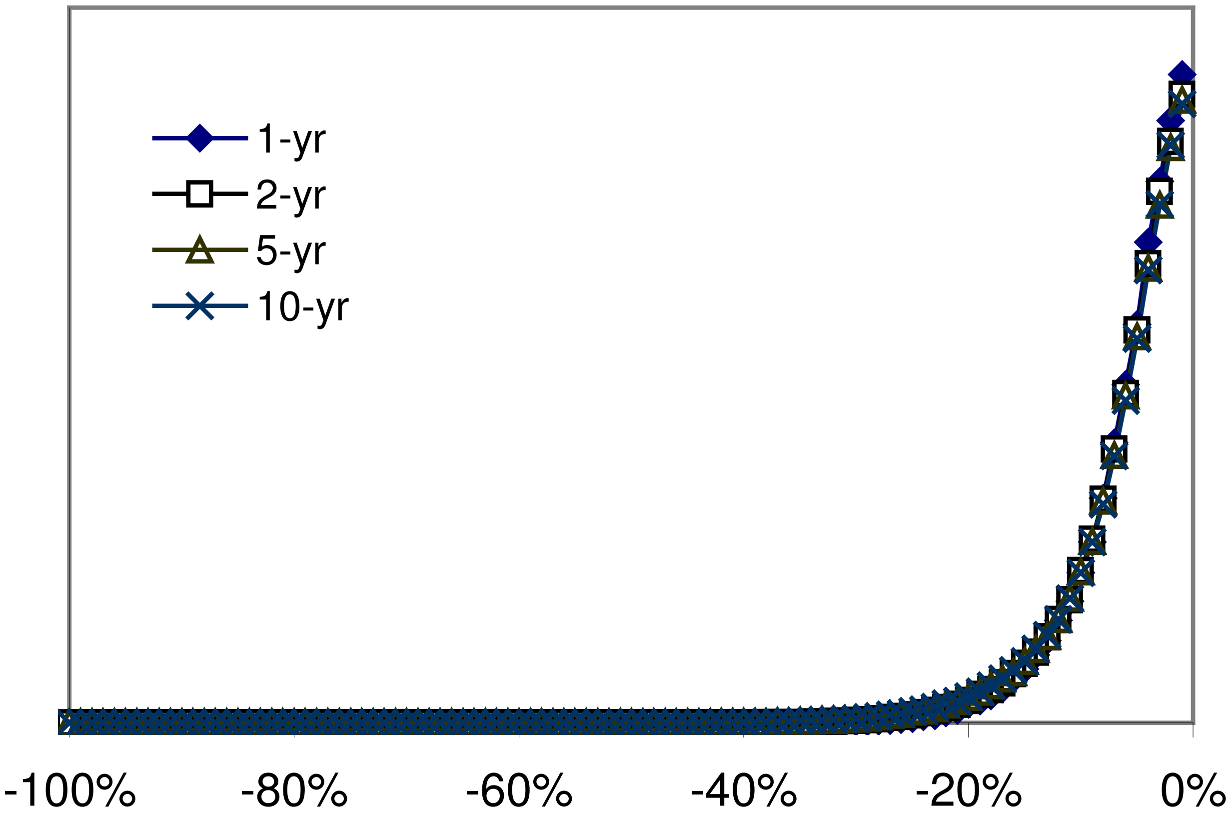


Things that influence drawdowns

- Length of track record
- Volatility of returns
- Mean return
- Skewness
- Kurtosis
- Deleveraging
- Survival

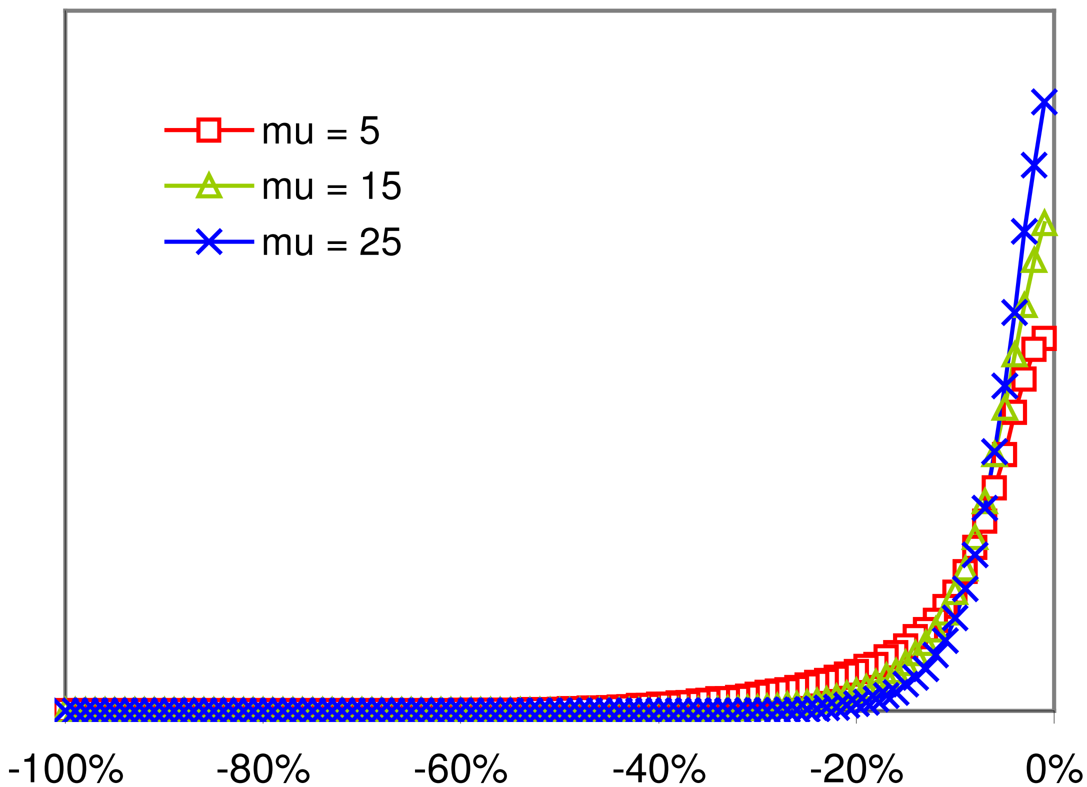
What does the distribution of all drawdowns look like?

Drawdown depth distribution
(mu = 15%, vol=15%, skew=0, xk = 0)



What does the distribution of all drawdowns look like?

Drawdown depth distribution
(nYear =5, vol=15%, skew=0, xk = 0)



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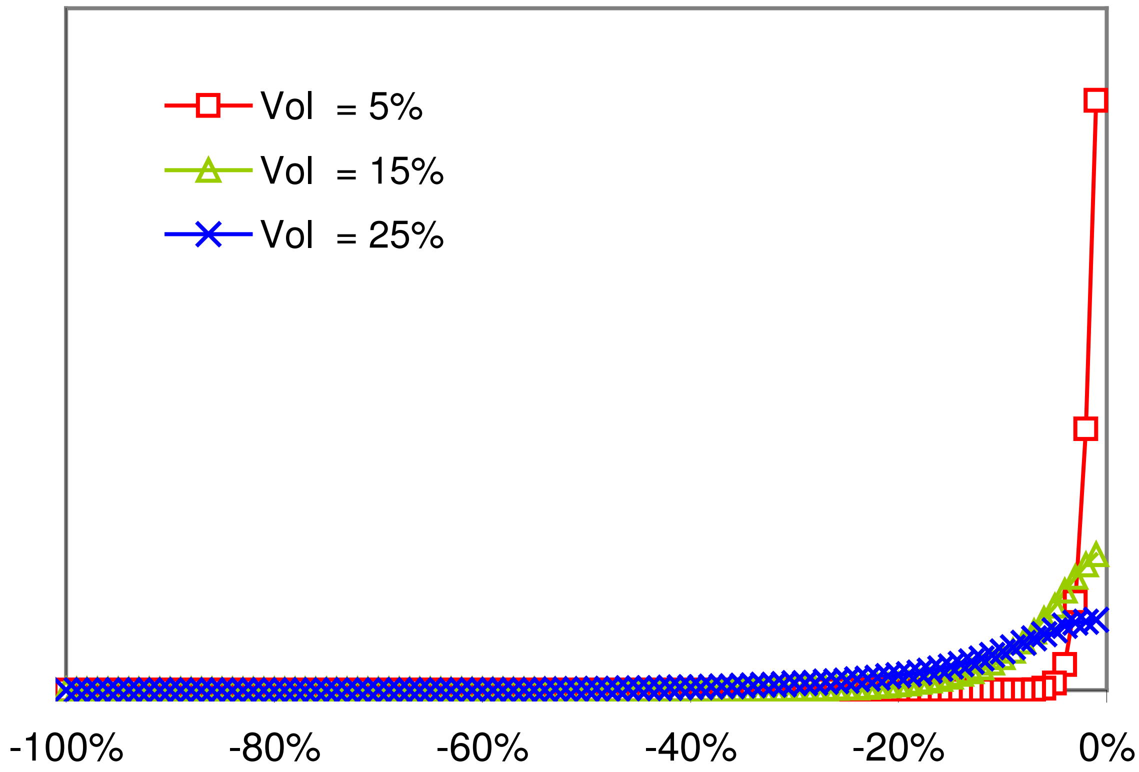

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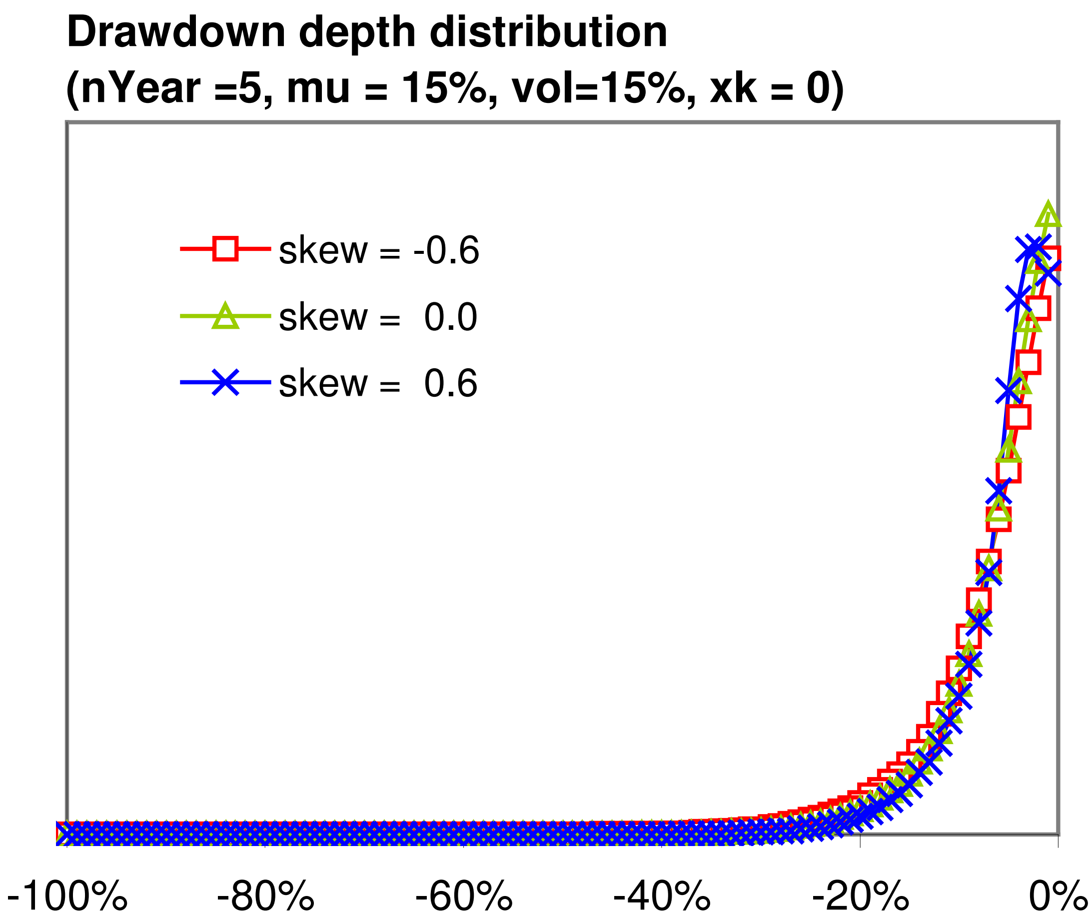

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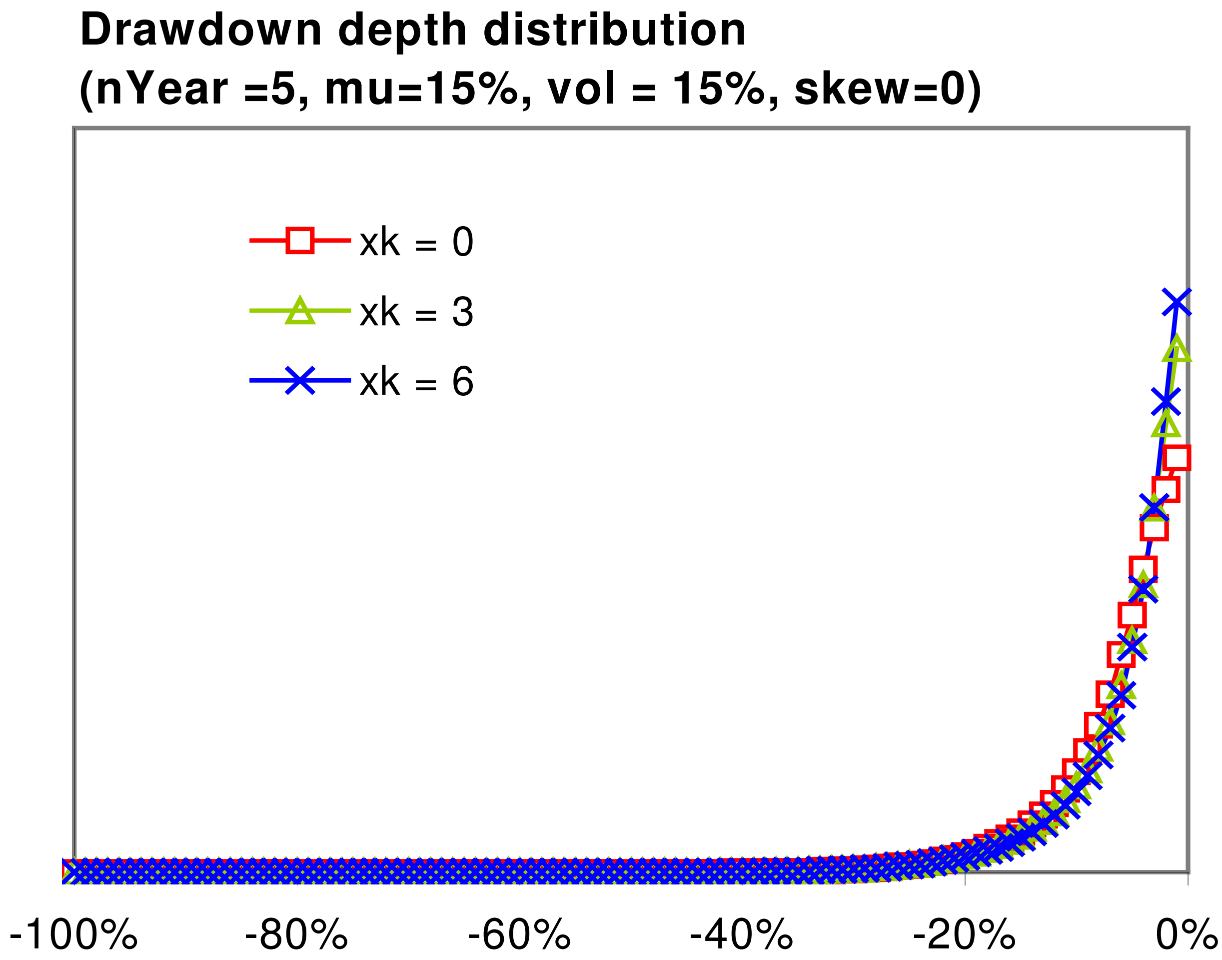
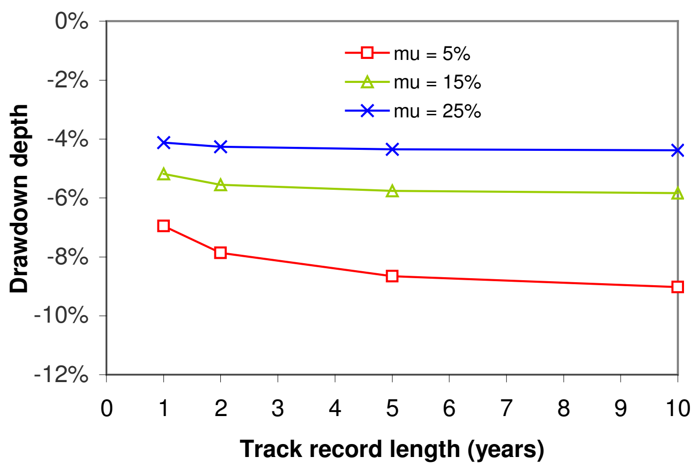
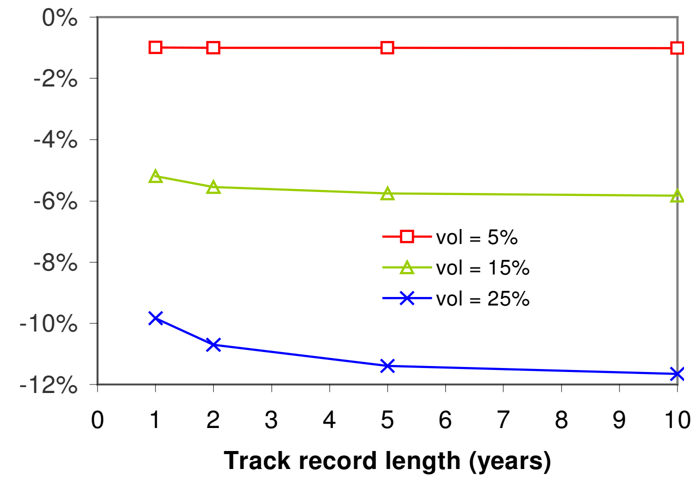
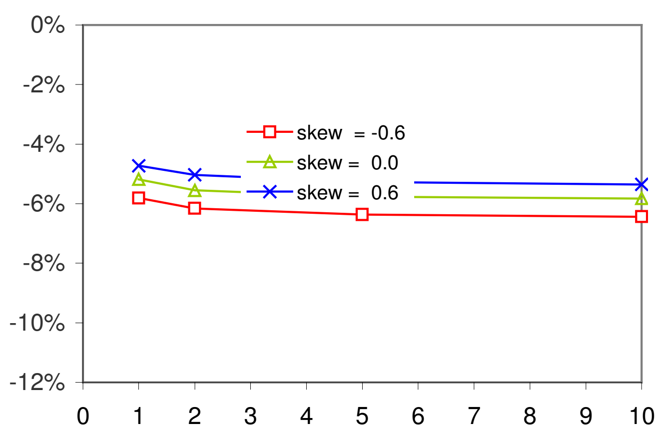
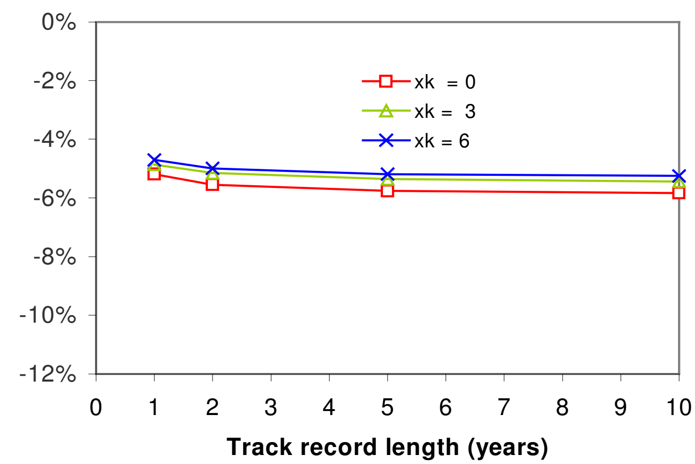


Volatility and mean return are most important (avg dd depth)



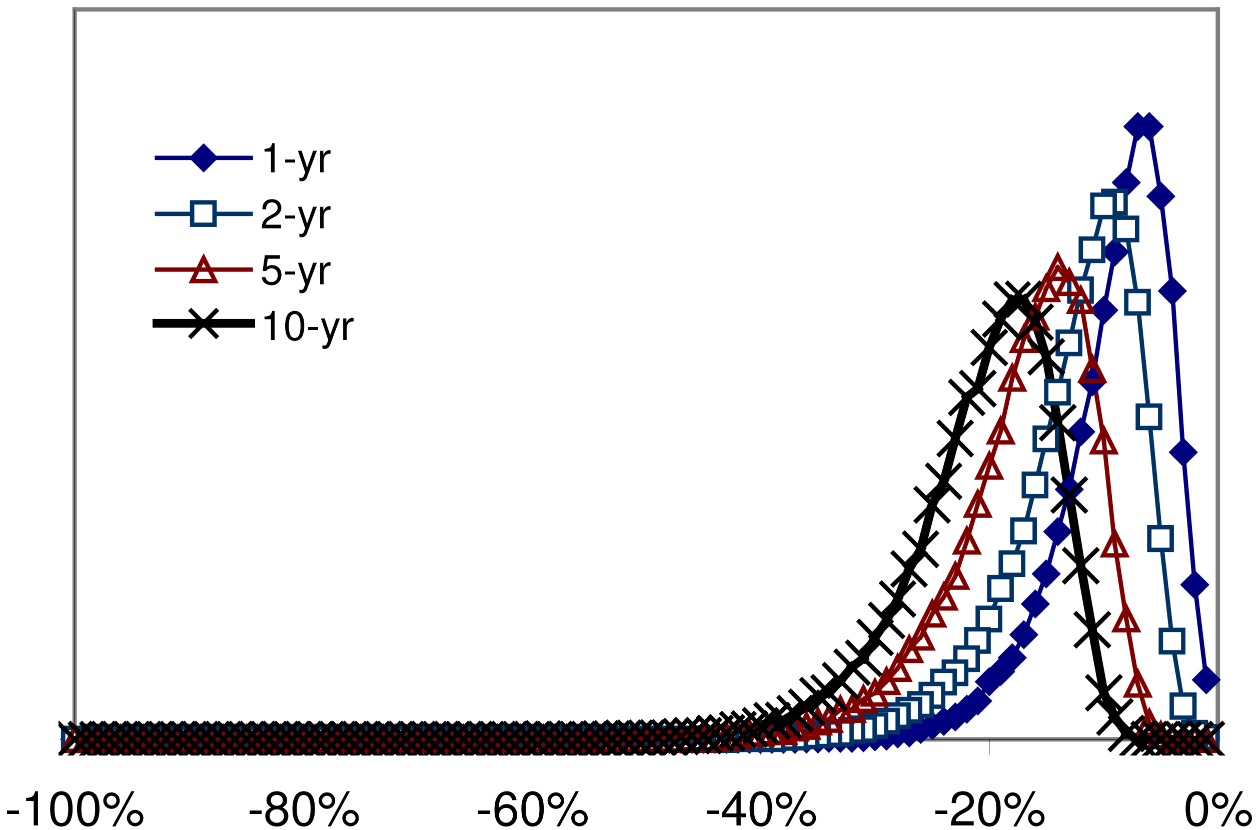






Distributions of maximum drawdowns

Maximum drawdown depth distribution
(mu = 15%, vol=15%, skew=0, xk = 0)



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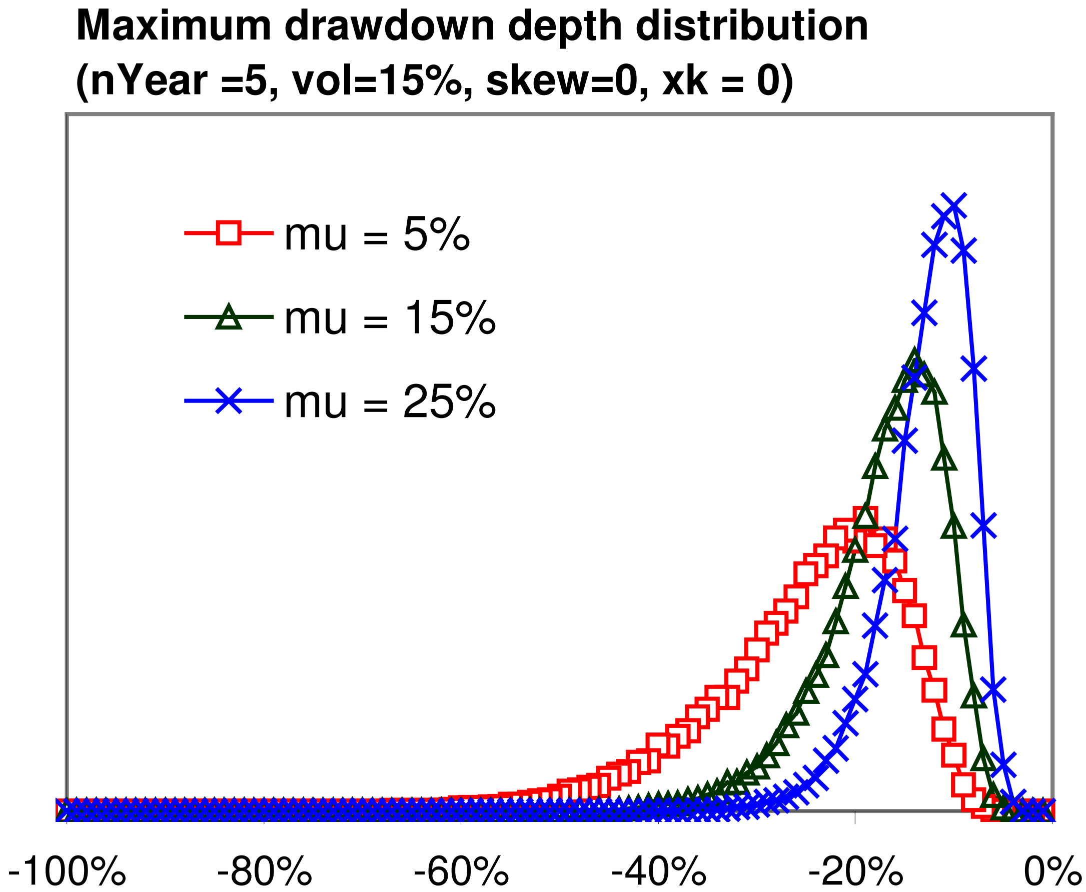
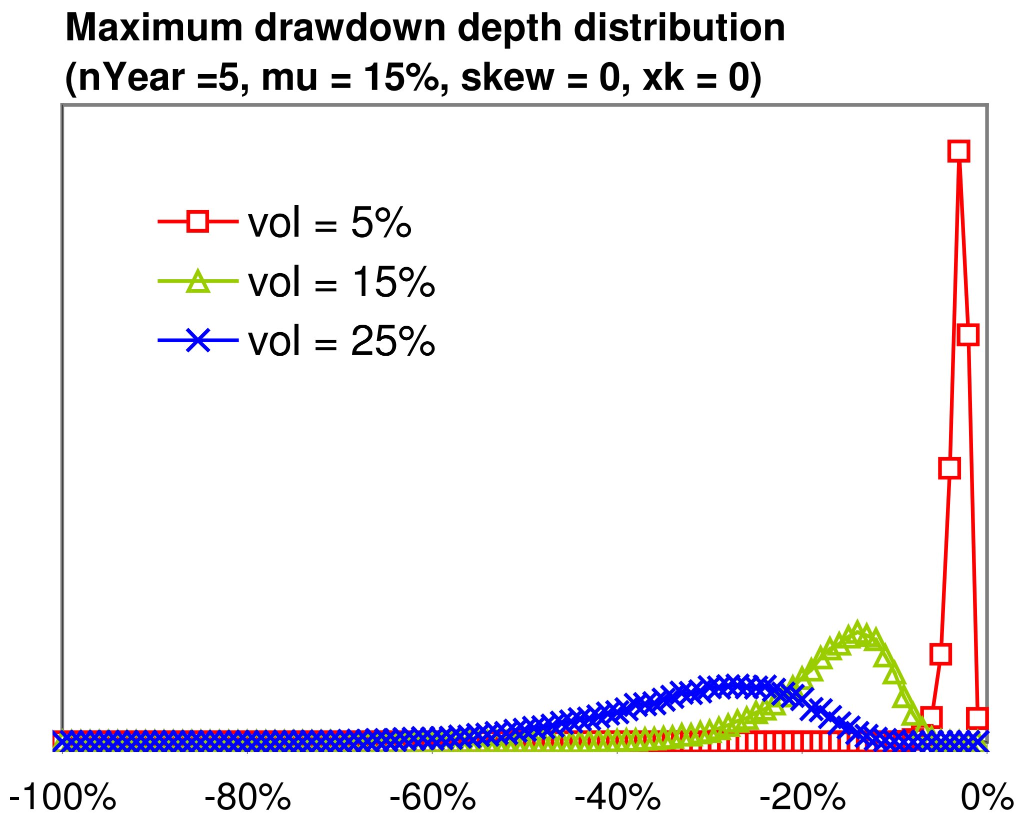


Distributions of maximum drawdowns



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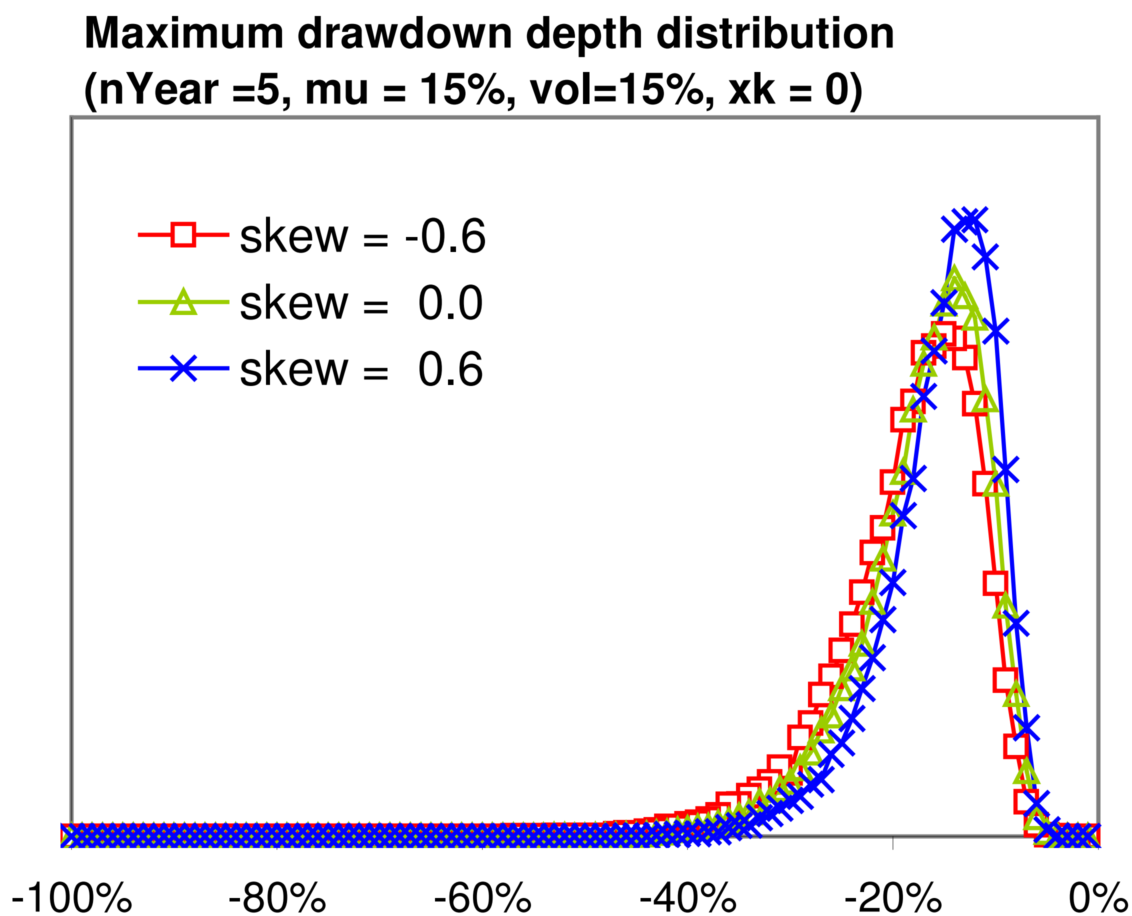

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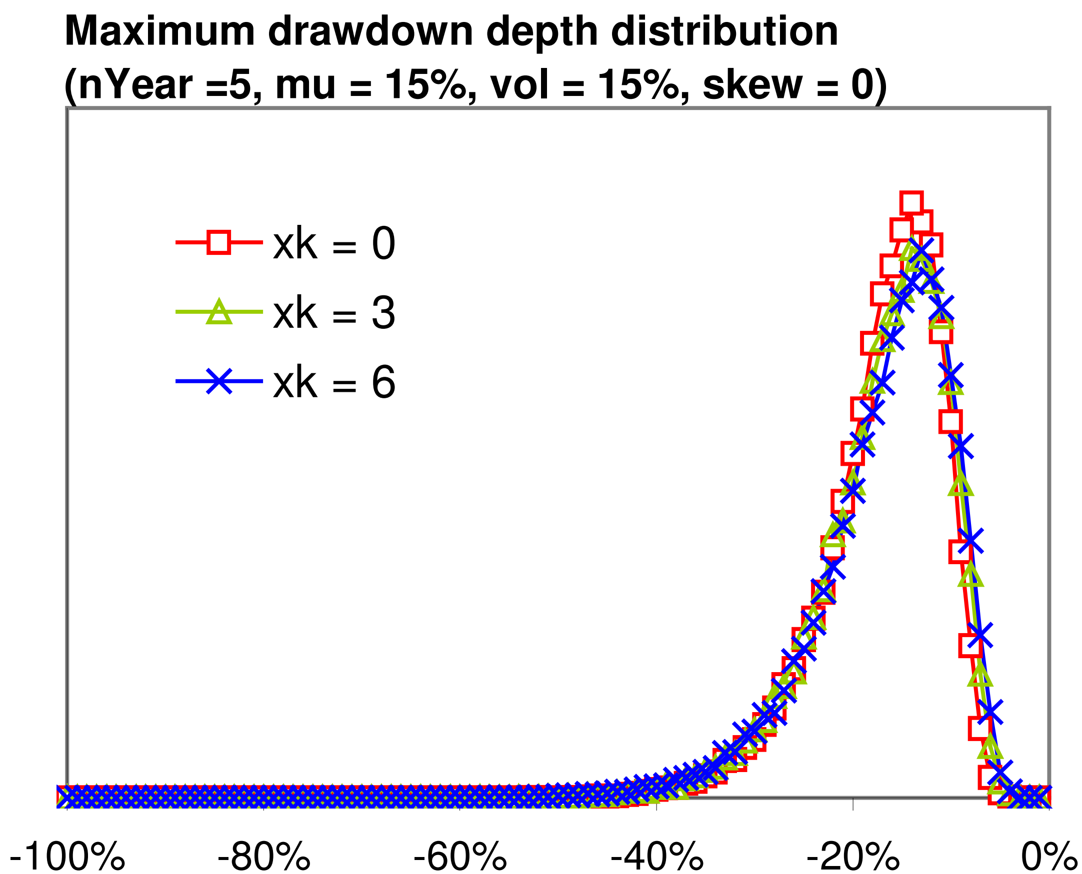
Distributions of maximum drawdowns



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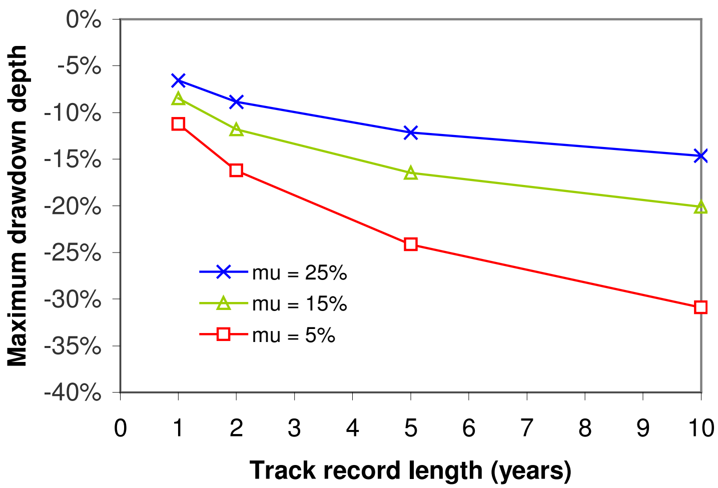
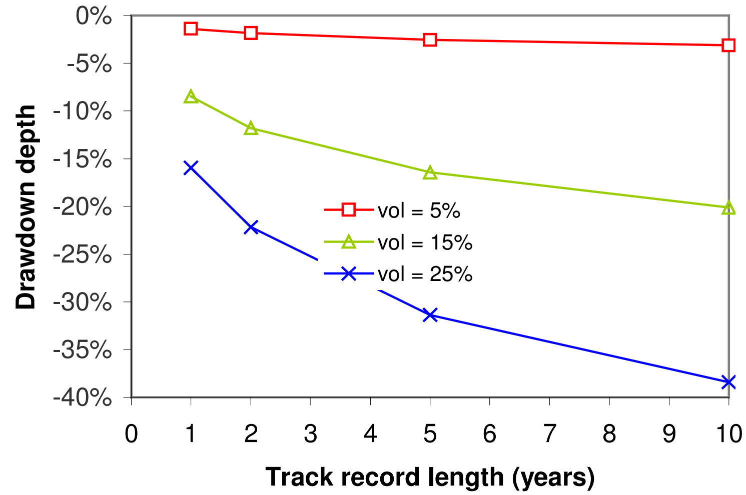
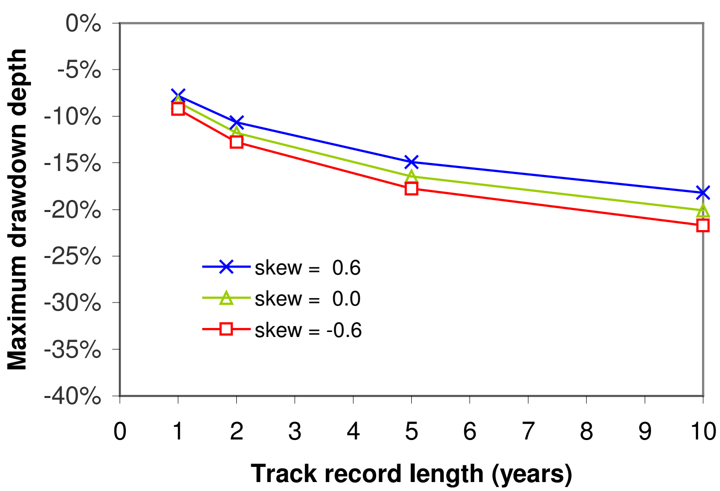
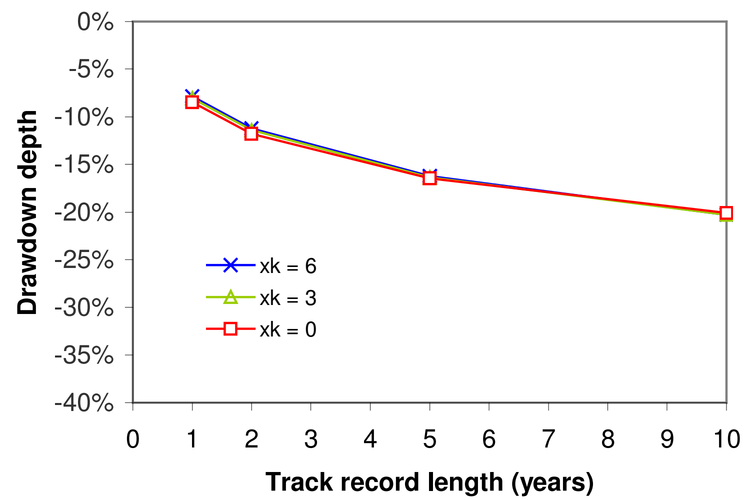
Mean return and volatility matter most

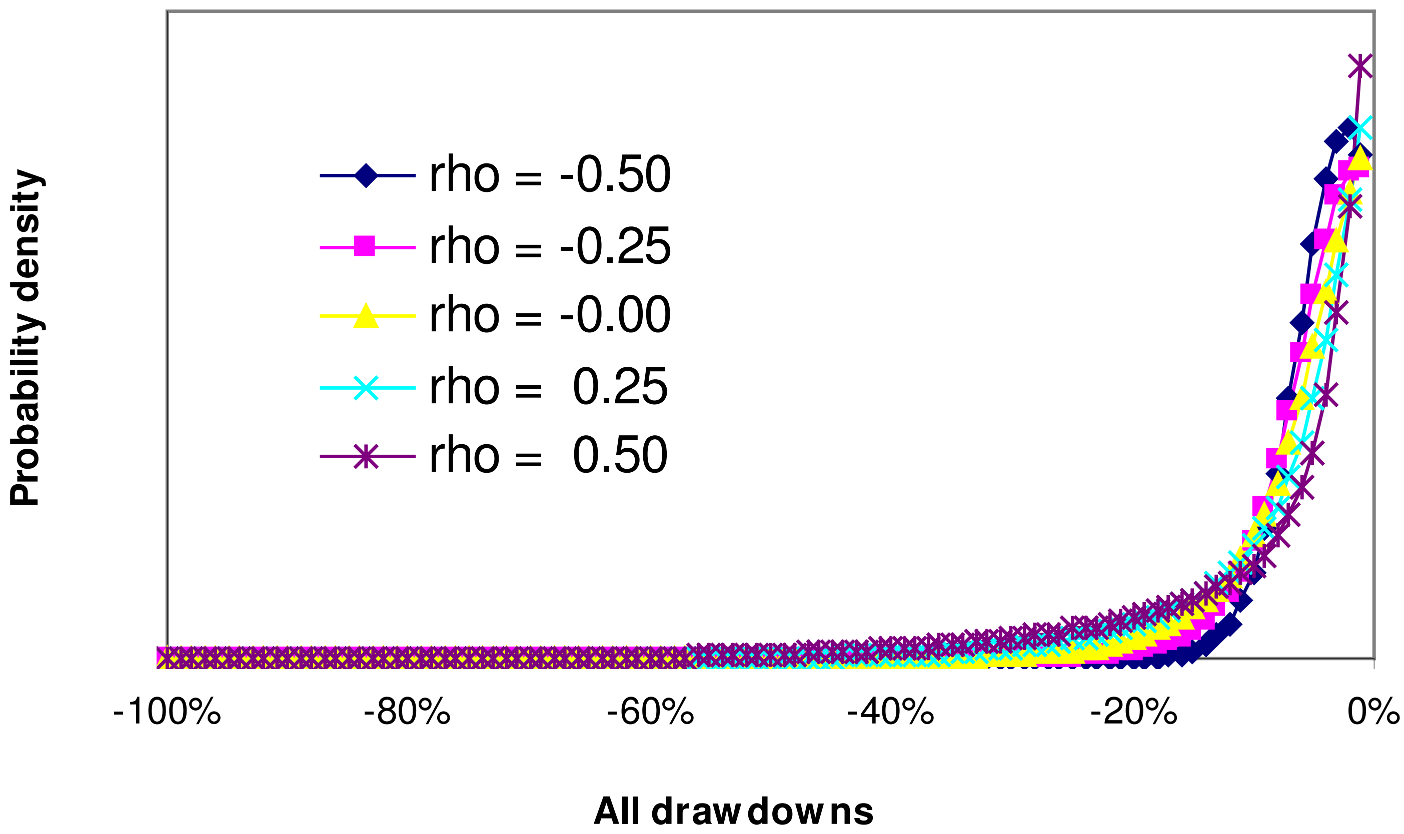








Effect of serially correlated returns on drawdown distributions



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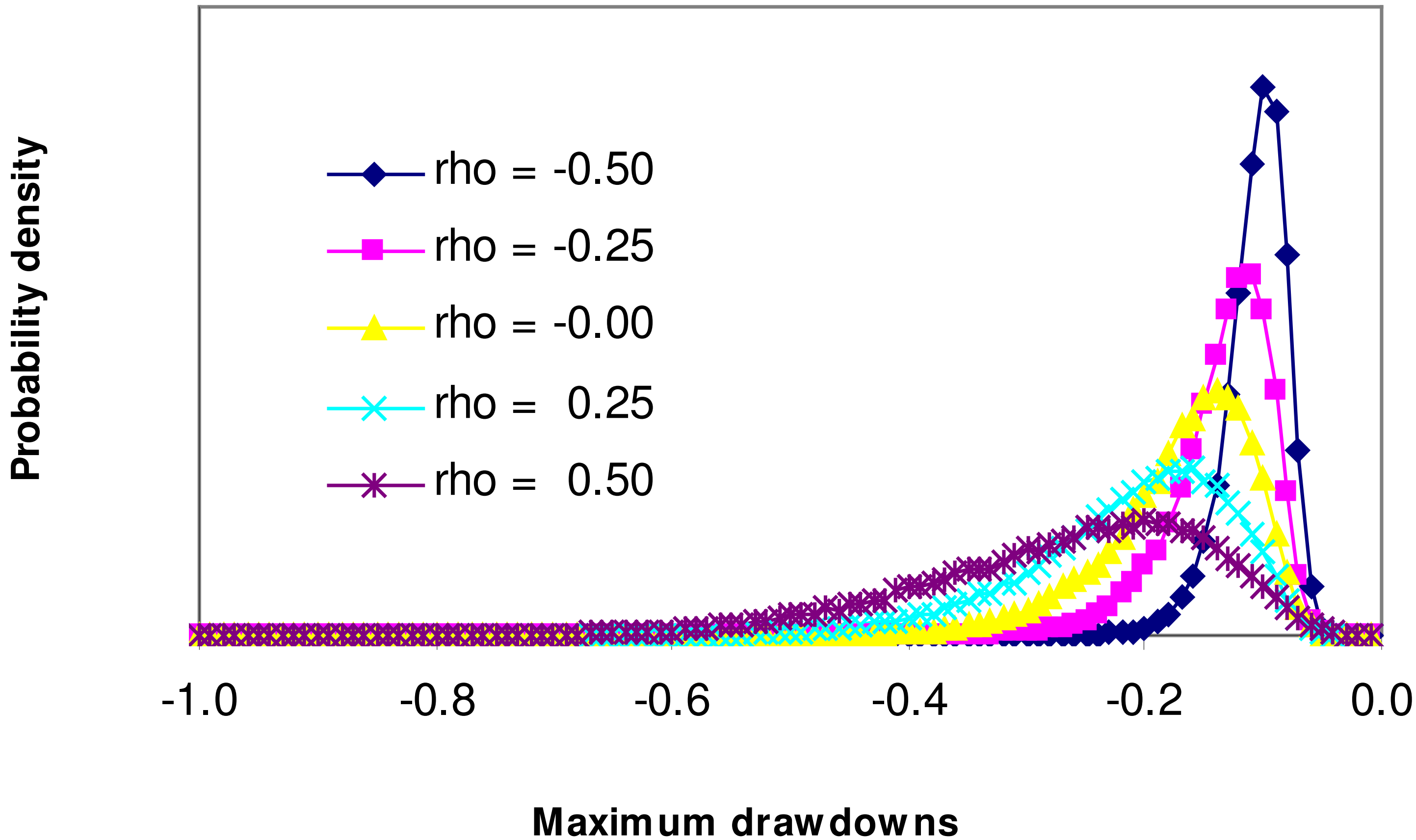


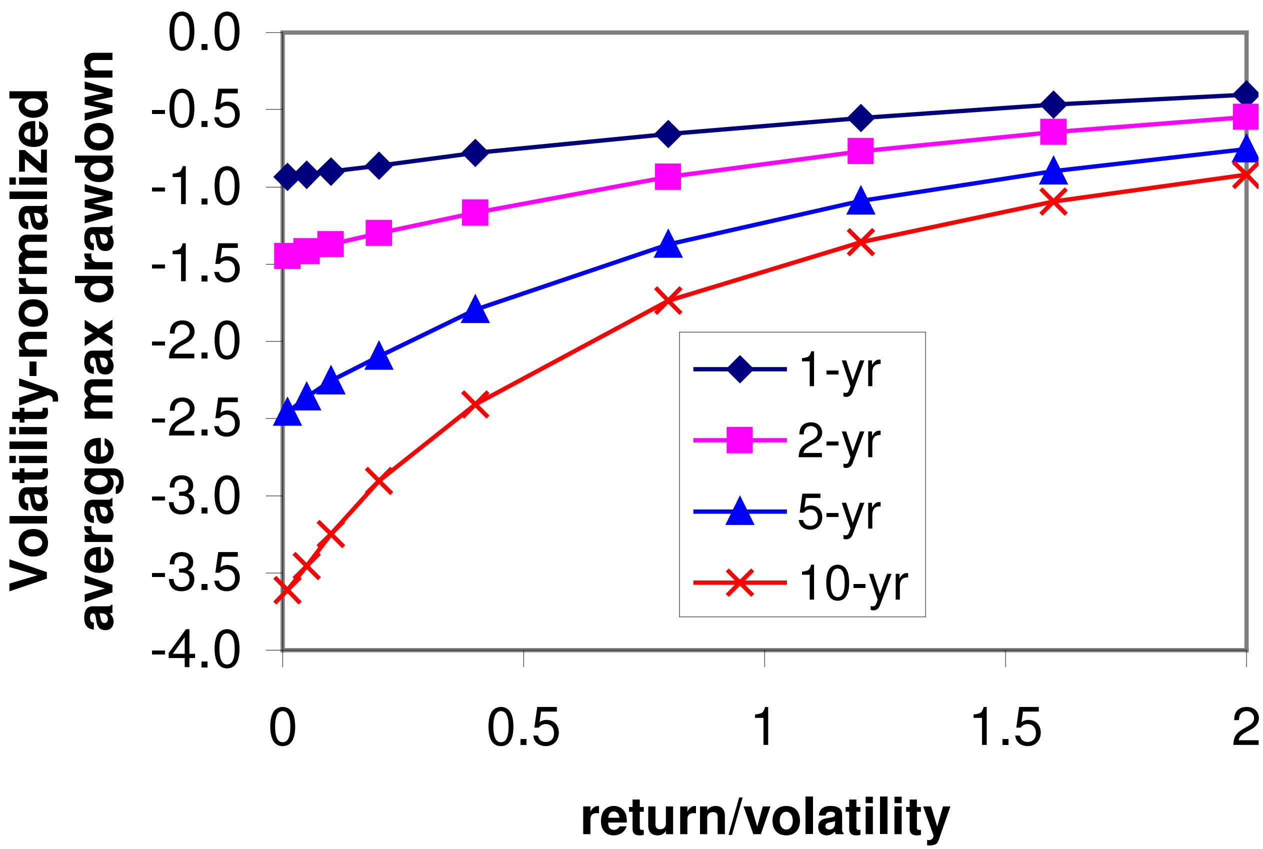
Relative importance of the 4 moments for expected max dd

Moment	Potential effect		
	partial effect* (%)	standard deviation of moment	combined effect (%)
Mean	68.0	0.139	9.5
Standard deviation	-191.0	0.133	-25.4
Skewness	2.7	1.035	2.8
Kurtosis	0.1	5.914	0.4

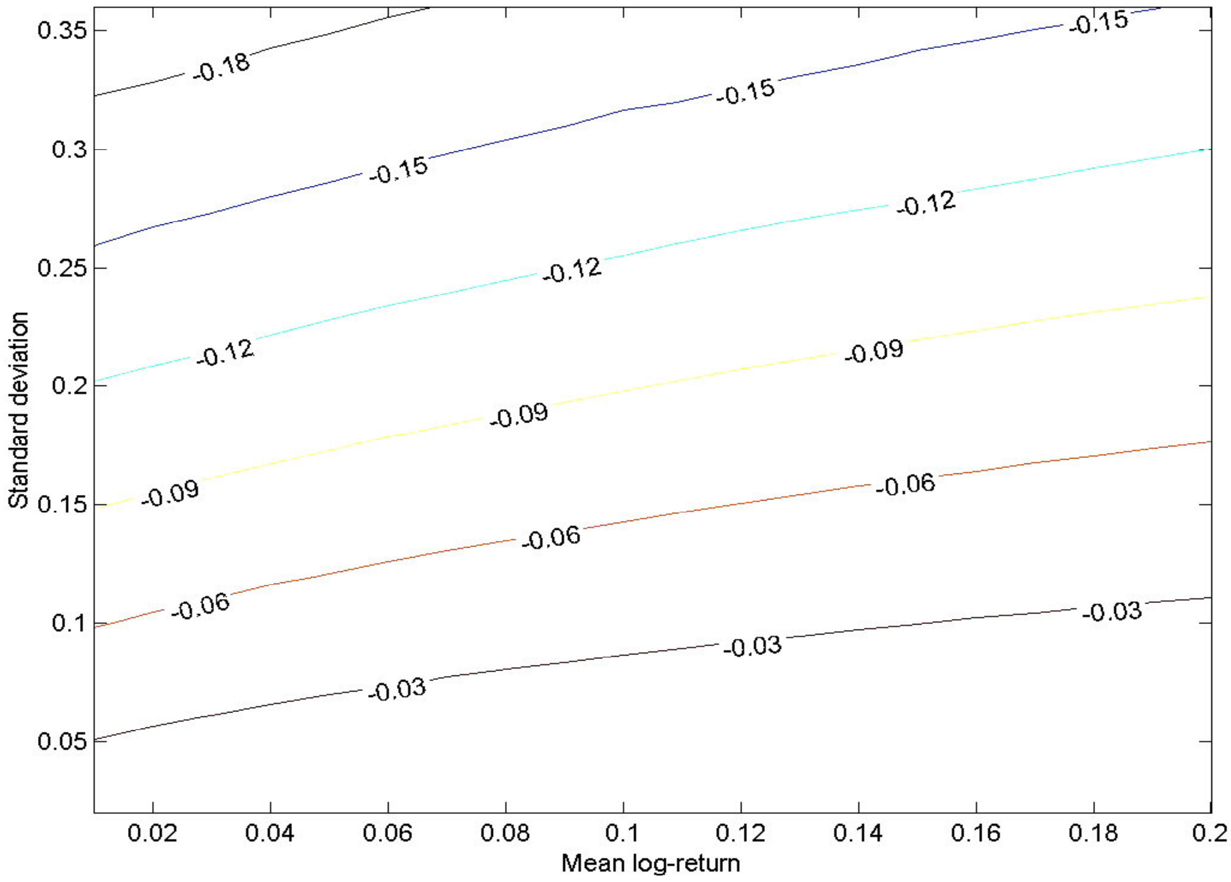
local partial of expected maximum drawdown wrt each moment

Drawdowns, risks, and returns

($DD/\sigma = F(\mu/\sigma)$, where $DD = \ln(LWM/HWM)$)



Returns and volatilities that produce the same drawdown



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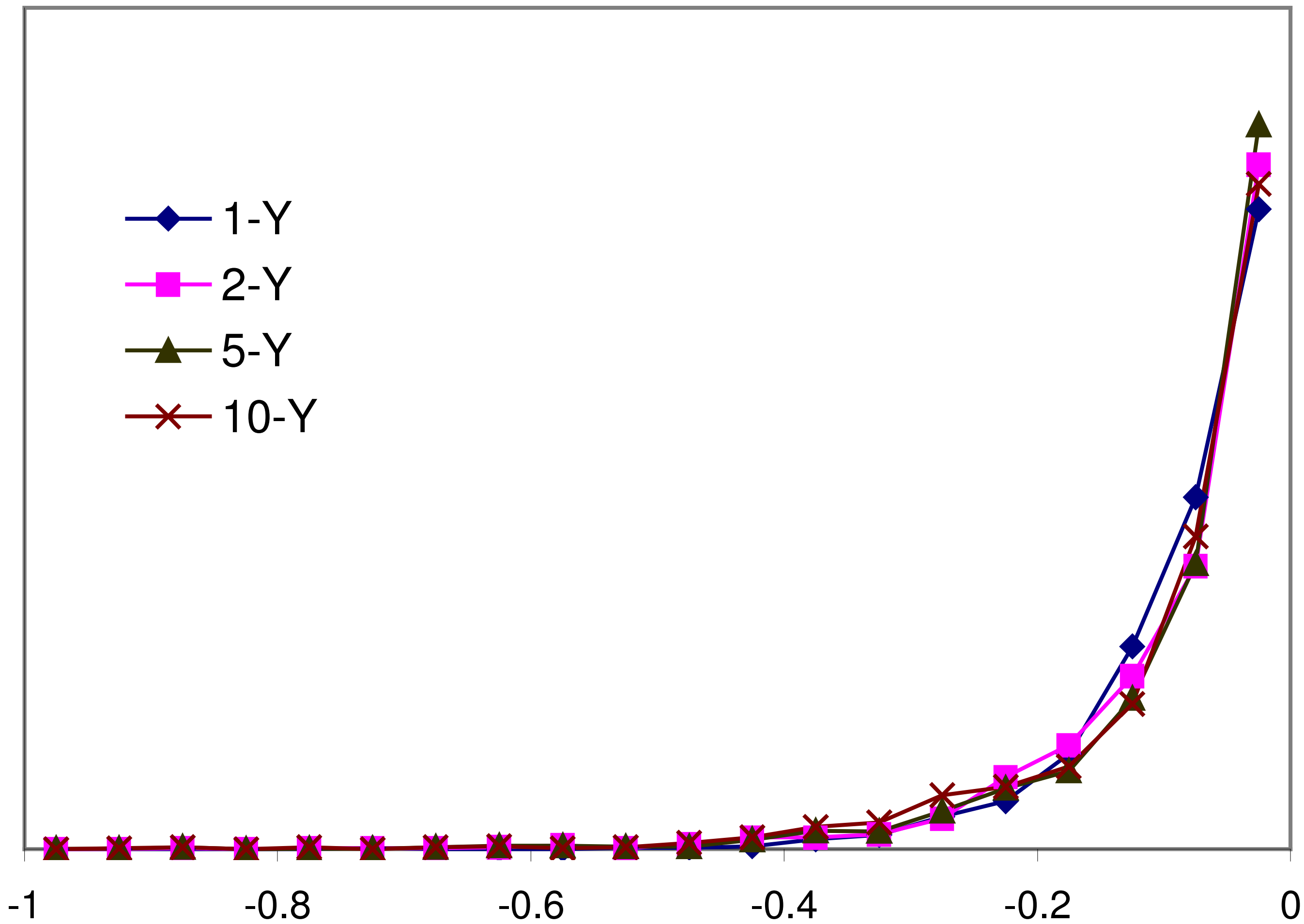
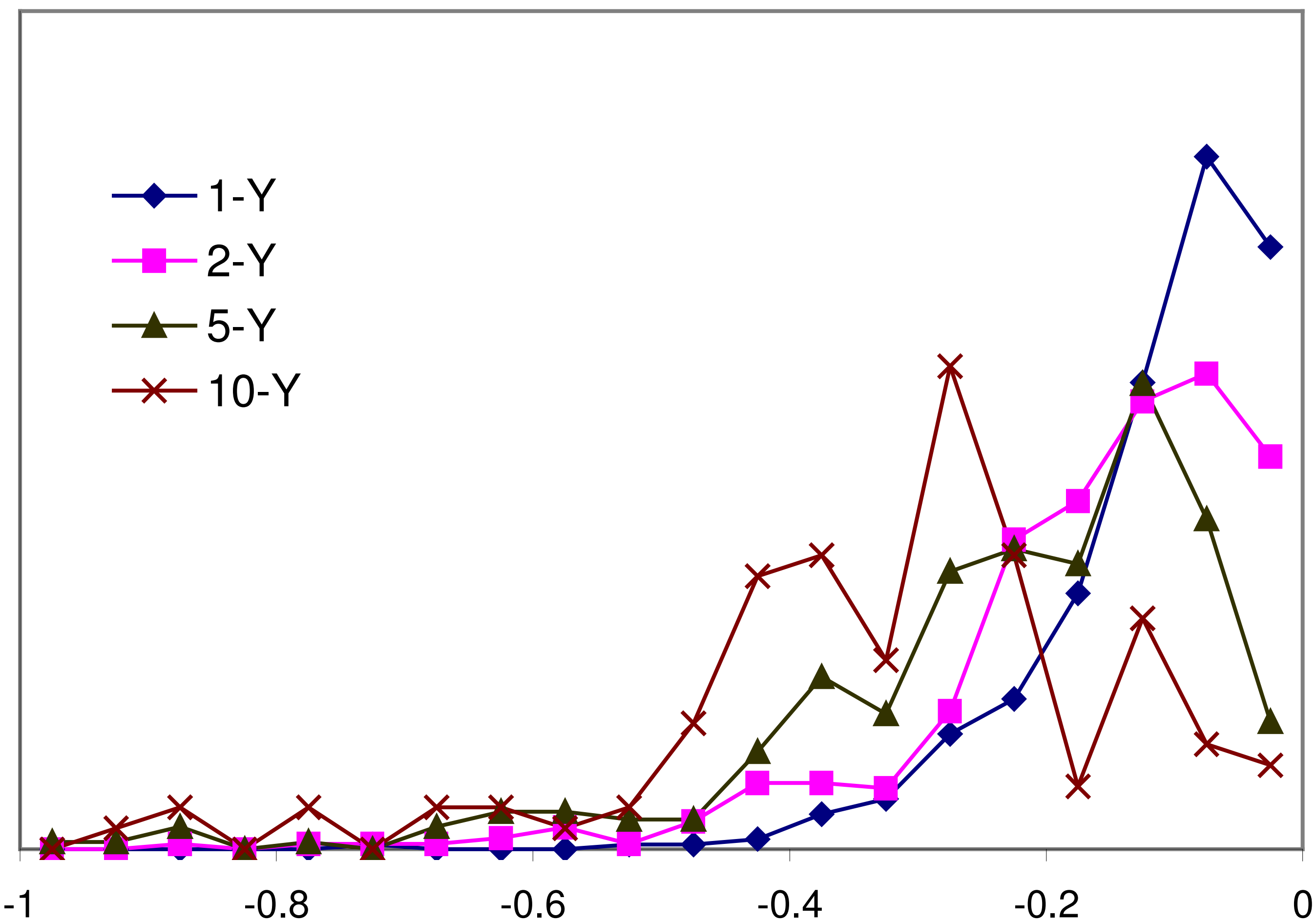
Observed drawdown distributions

(all)



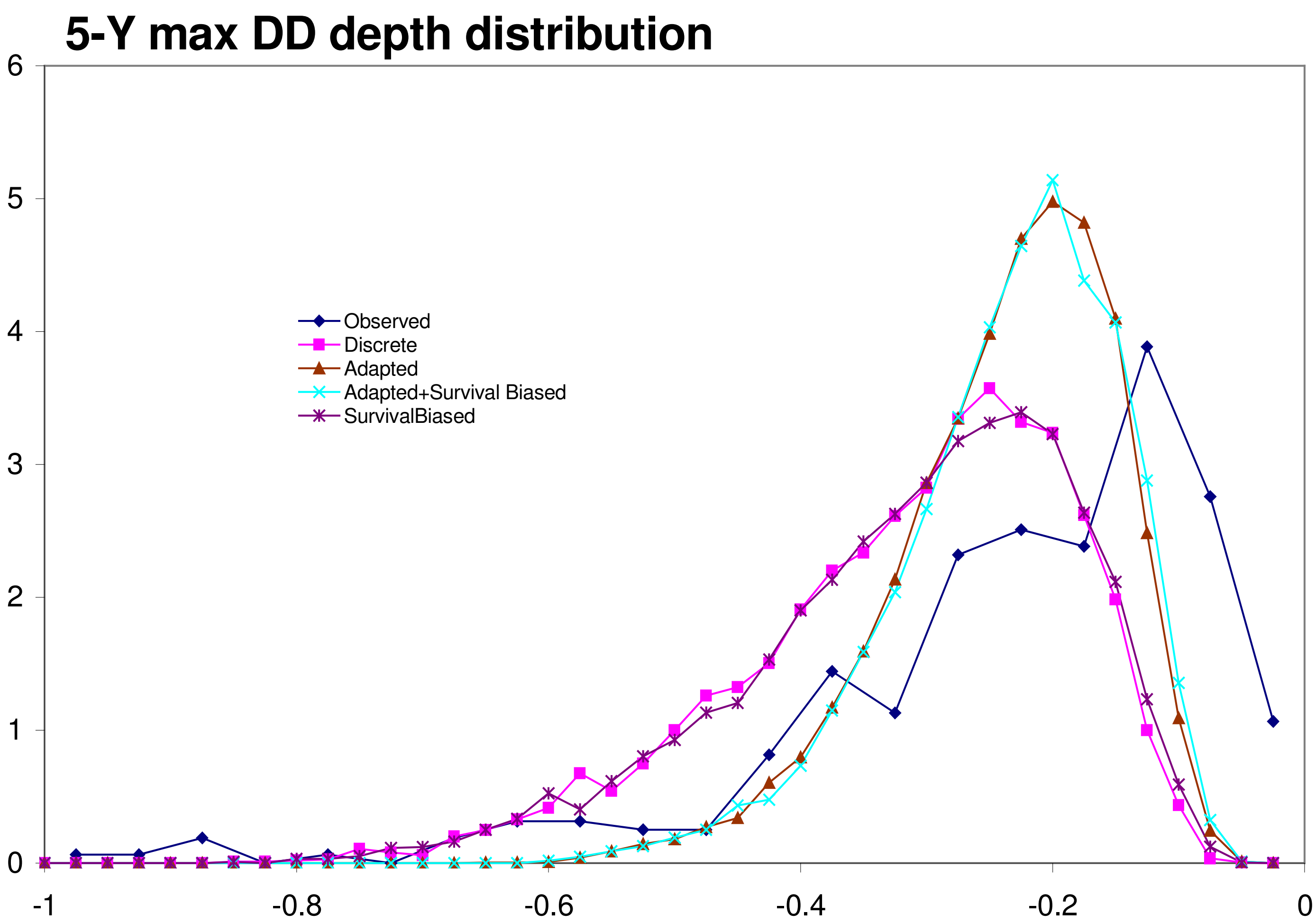
Observed drawdown distributions

(maximum)



Observed drawdown distributions

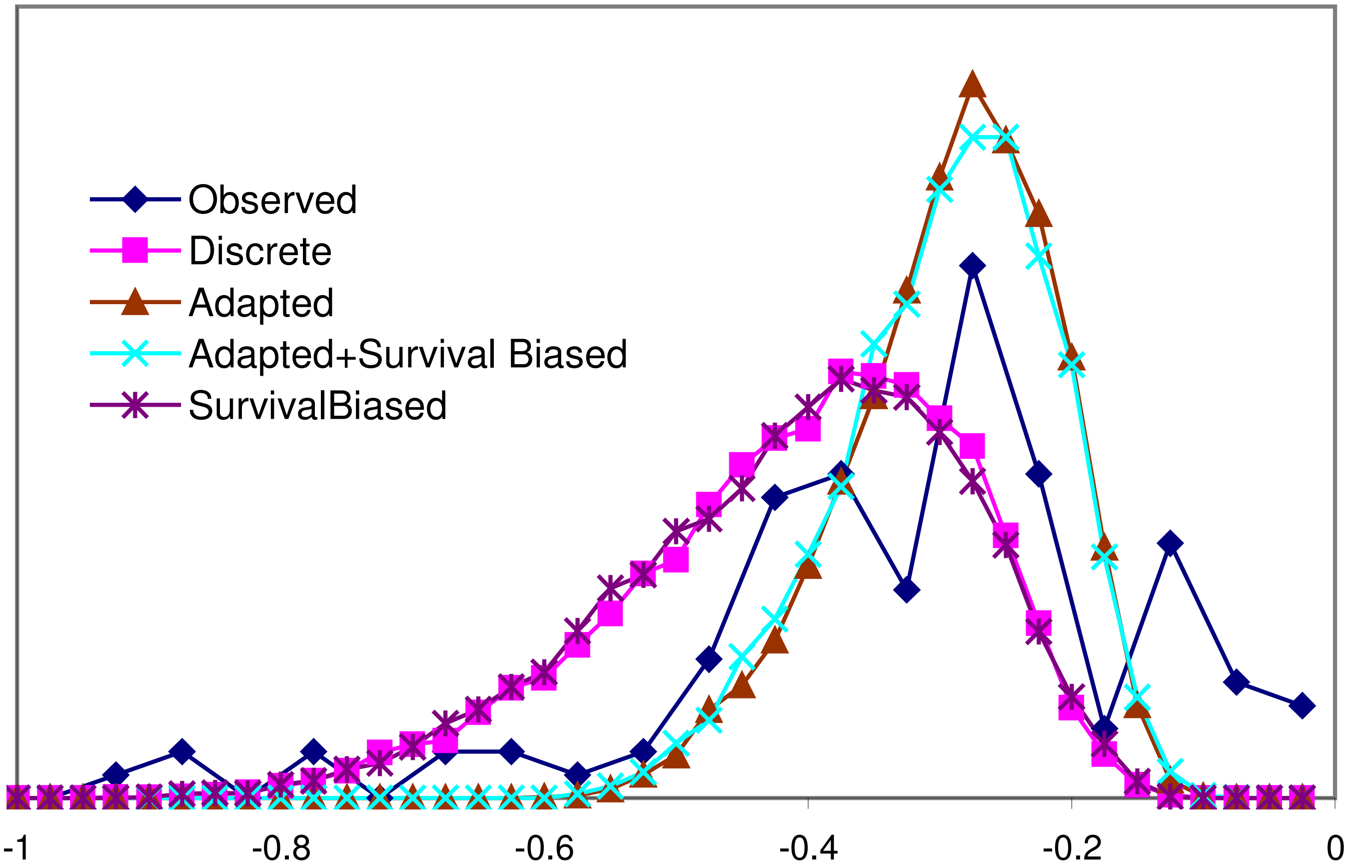
(maximum, observed and theoretical)



Observed drawdown distributions

(theoretical and modified)

10-Y max DD depth distribution



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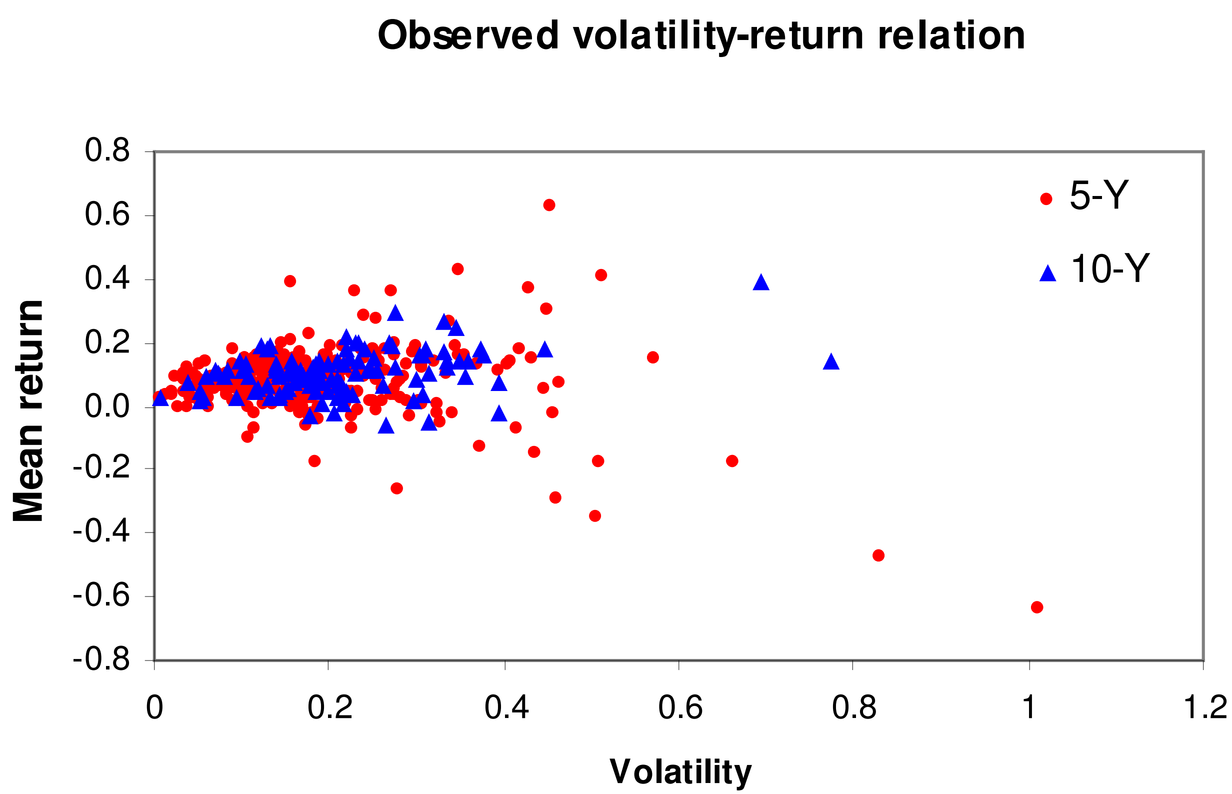
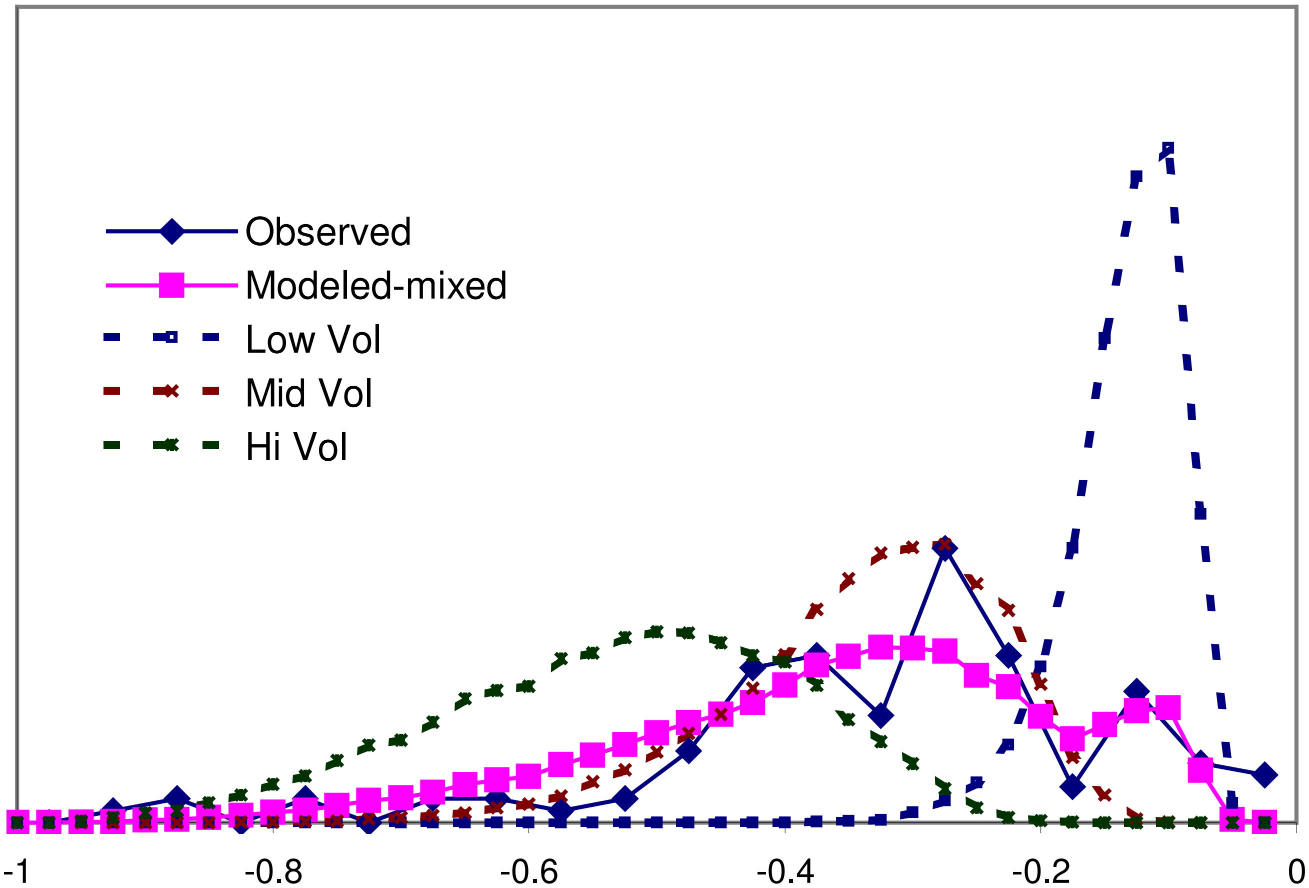
Distribution of volatilities



Managers grouped by return and volatility

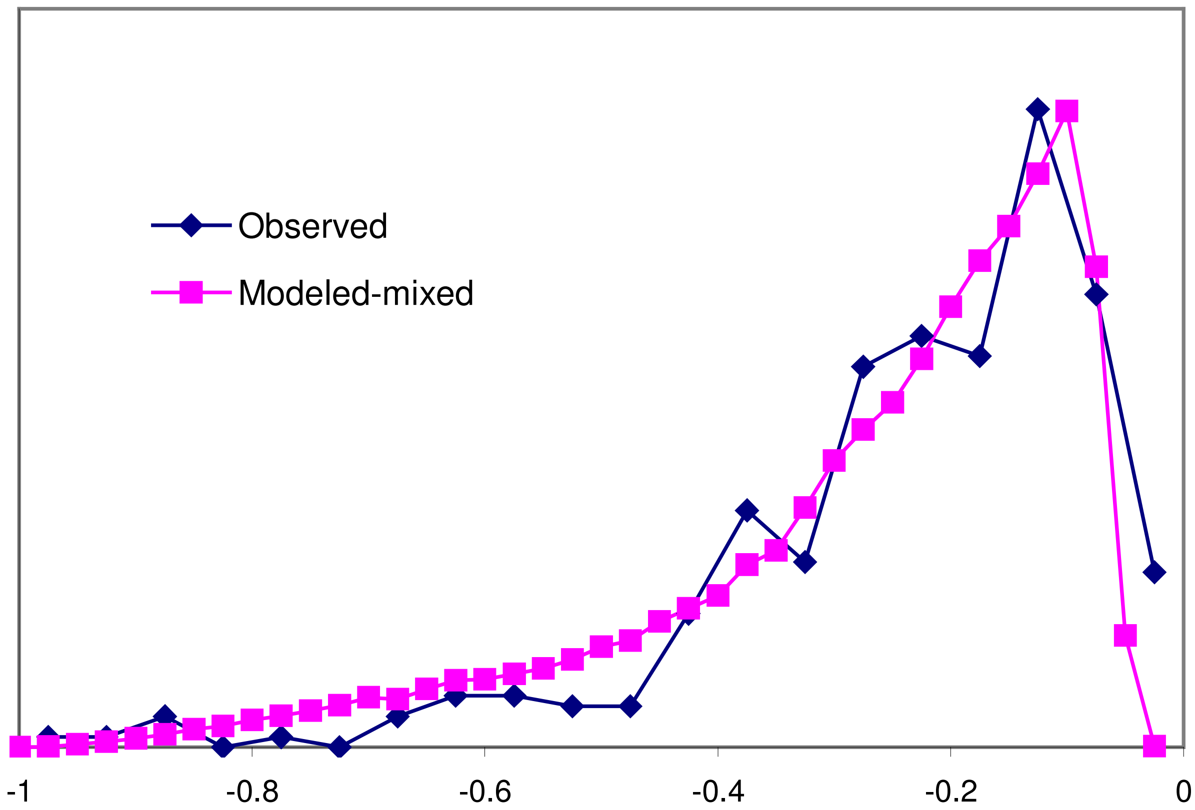
Track record	Volatility	Number of managers	Group return	Group volatility
5-Y	0.0% ~ 12.5%	115	6.7%	8.6%
	12.5% ~ 25.0%	147	8.6%	18.0%
	25.0% ~ 100%	67	7.2%	38.8%
10-Y	0.0% ~ 12.5%	19	8.3%	8.6%
	12.5% ~ 25.0%	64	9.4%	18.8%
	25.0% ~ 50.0%	29	12.3%	32.4%

Observed maximum drawdown distributions (5-year track record, 3 volatility levels and combined distribution)

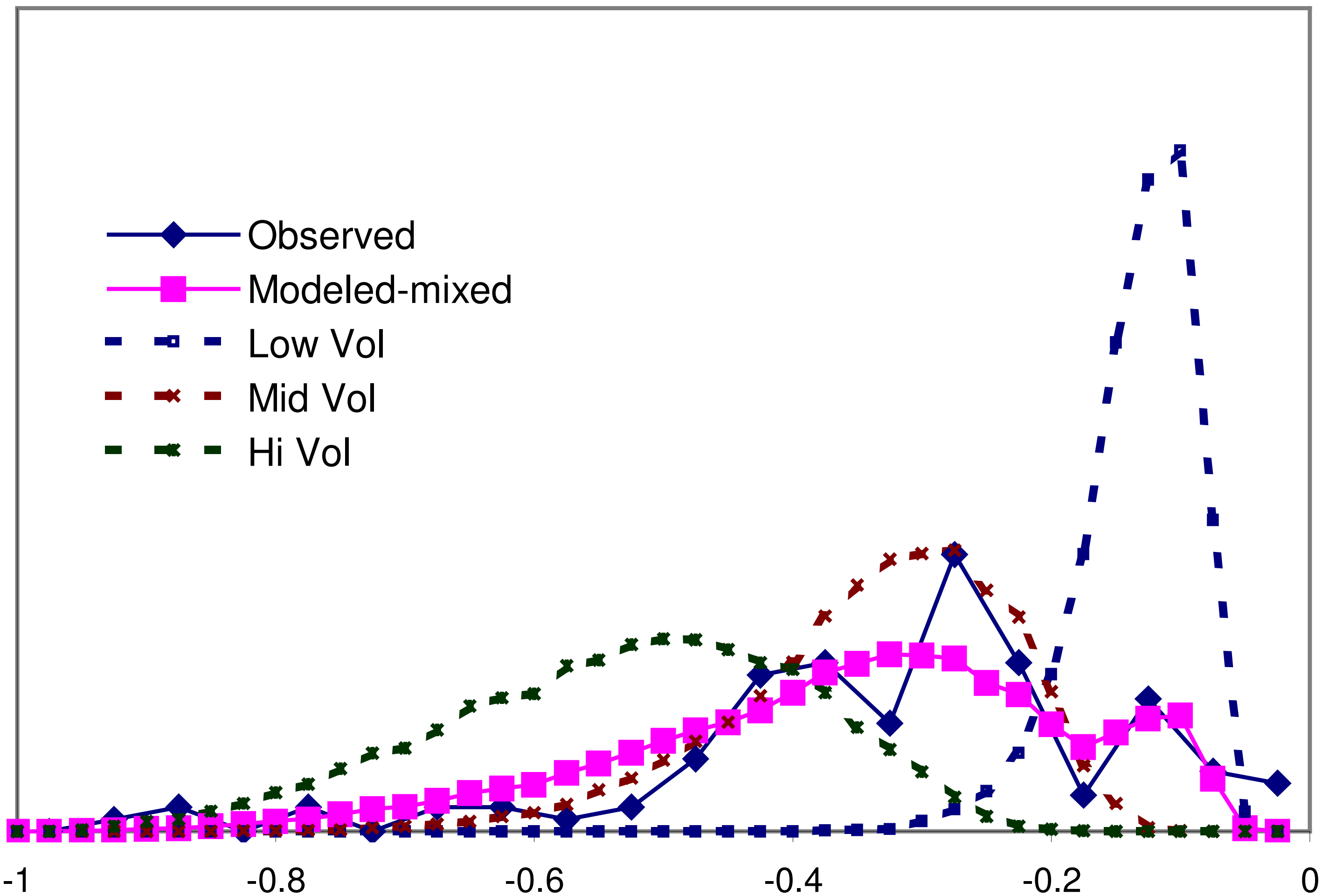


Observed drawdown distributions

(5-year track record, combined distribution)



Observed maximum drawdown distributions (10-year track record, 3 volatility levels and combined distribution)



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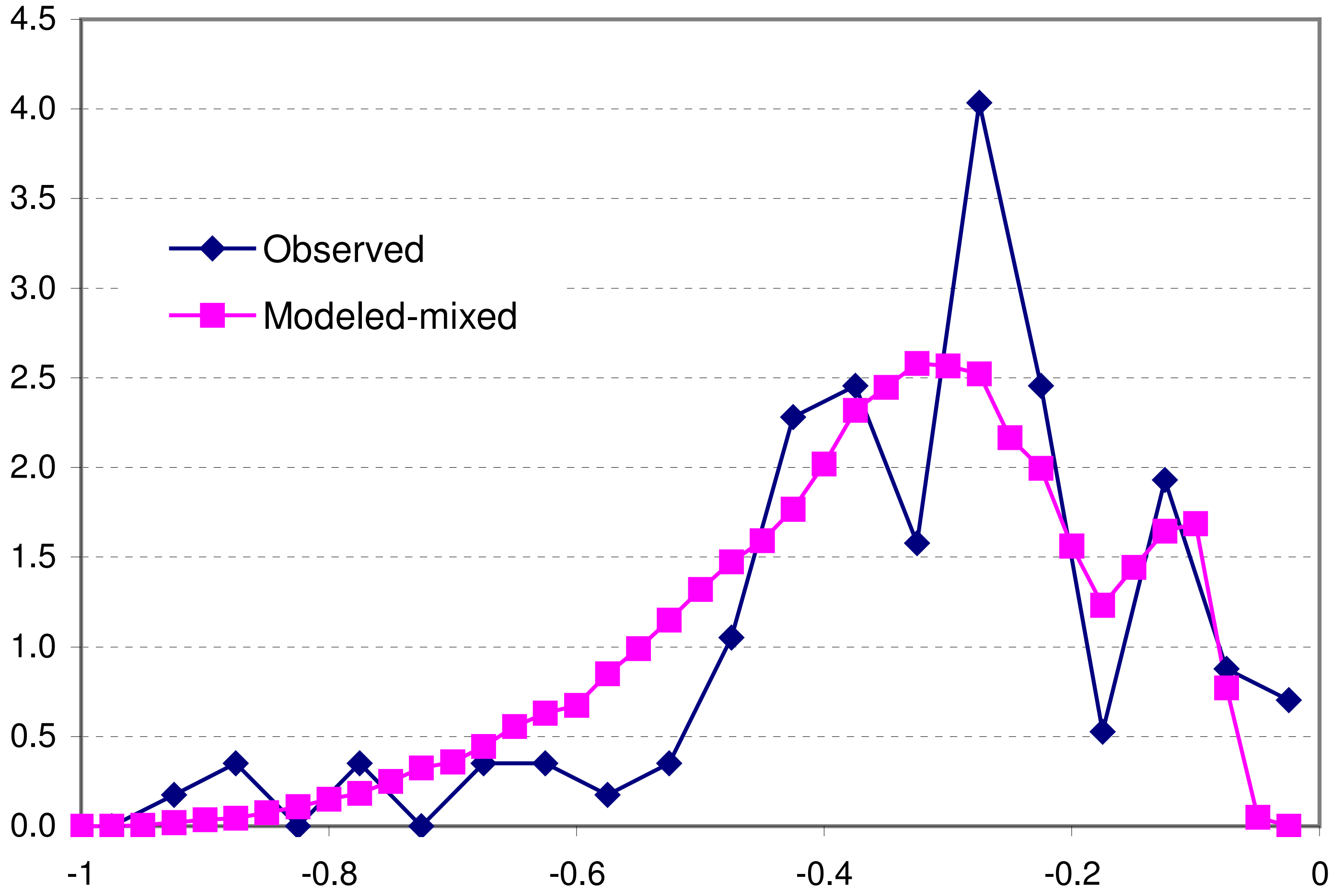
Observed drawdown distributions

(10-year track record, combined distribution)



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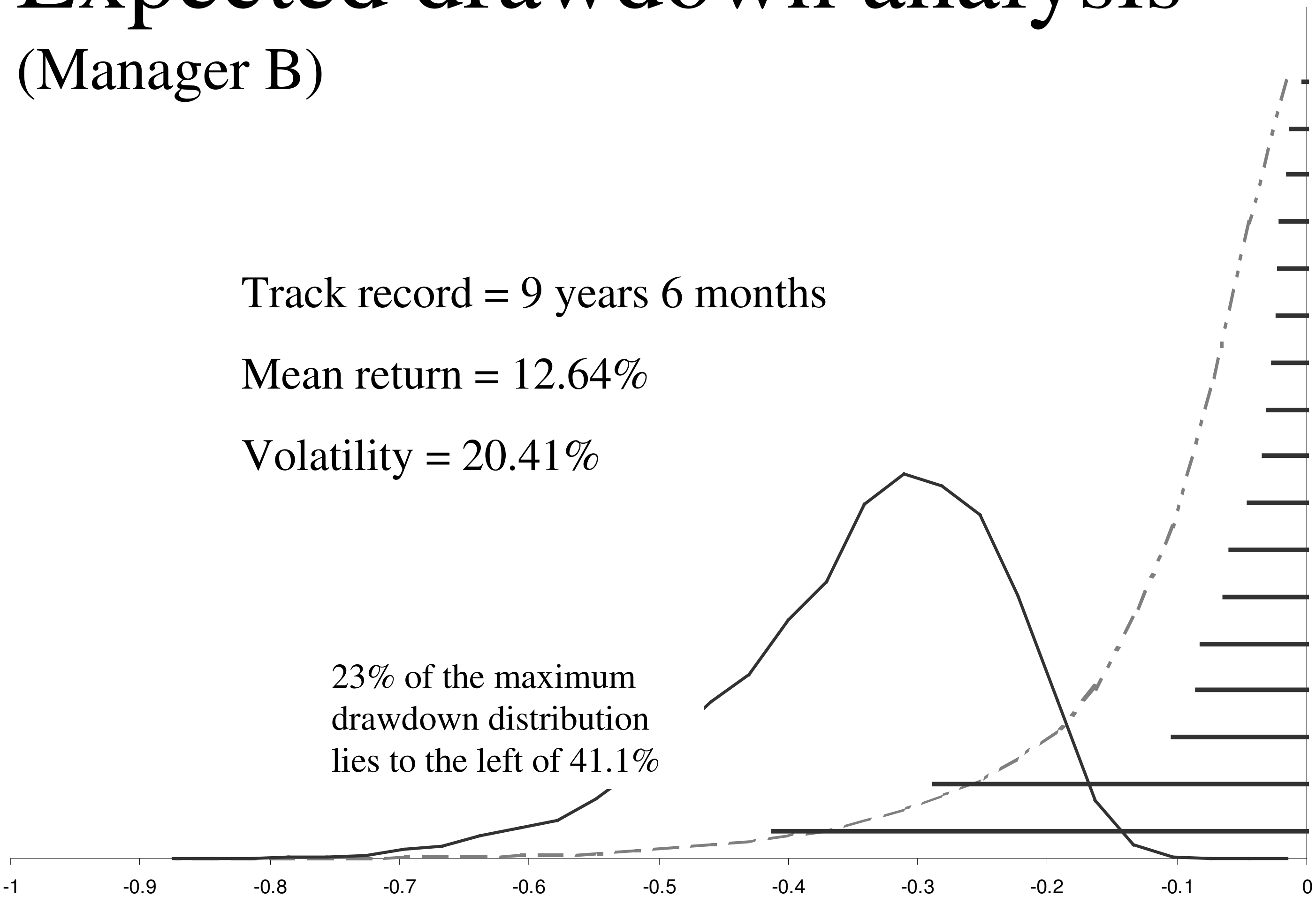
Expected drawdown analysis

(Manager B)



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How much worse can it get?

(Manager B)

Investment horizon (years)	Probability of a drawdown worse than 41.1%	Expected drawdown if worse than 41.1%
1	0.1%	-44.1%
2	1.7%	-45.8%
3	4.2%	-47.1%
4	7.0%	-47.3%
5	9.9%	-47.8%
6	13.0%	-48.2%
7	15.6%	-48.4%
8	18.3%	-48.8%
9	21.6%	-49.1%
10	23.0%	-49.0%

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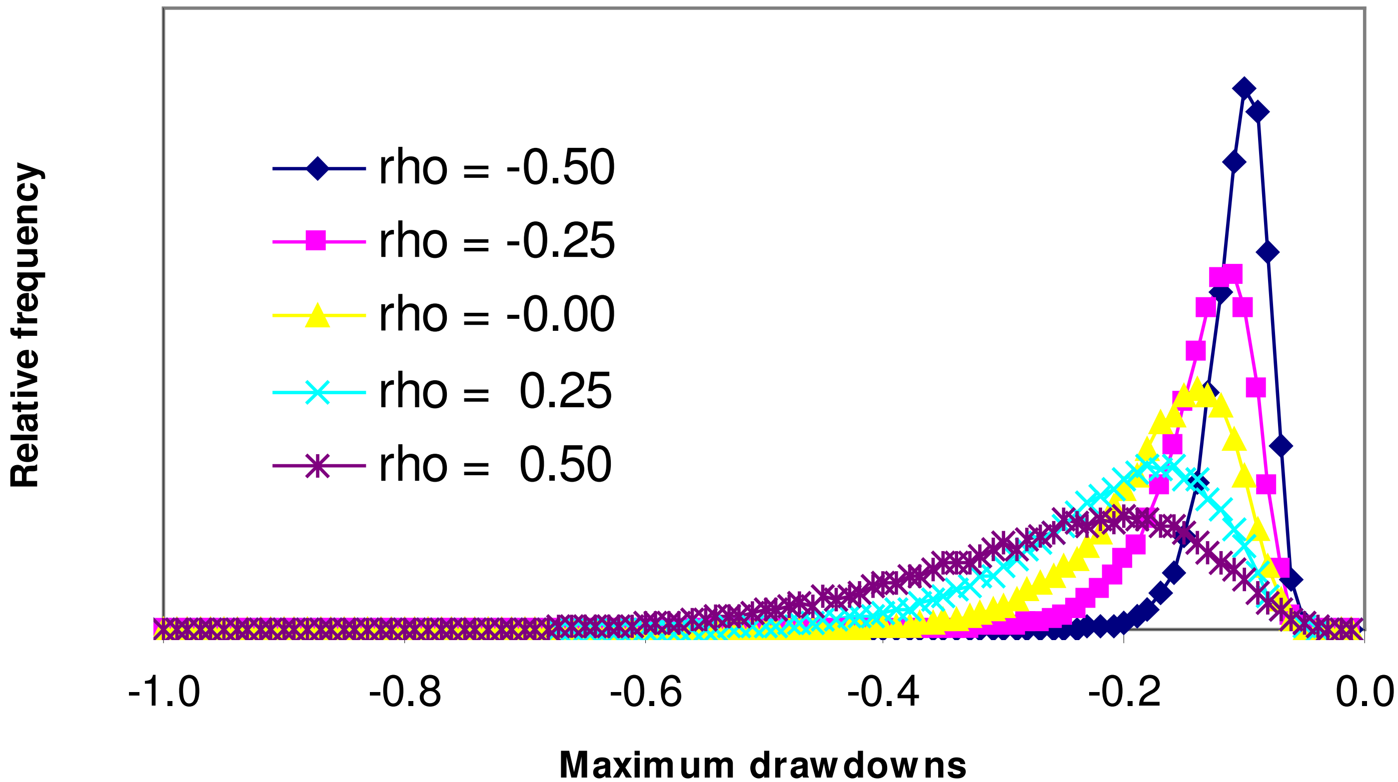
Effect of serial correlation



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Global Representation

[1] *THROUGH AN AFFILIATED ENTITY OF CRÉDIT AGRICOLE INDOSUEZ*

[2] *IN PARTNERSHIP WITH BANCO BILBAO VIZCAYA ARGENTARIA S.A.*