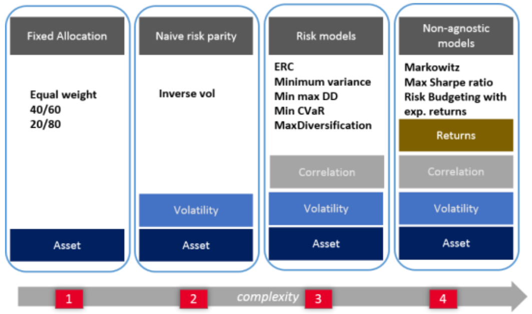
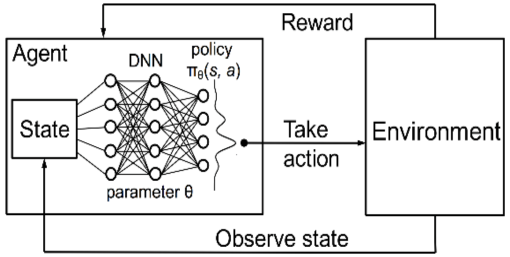
Bridging the gap btw Markowitz planning and deep RL

Main result:

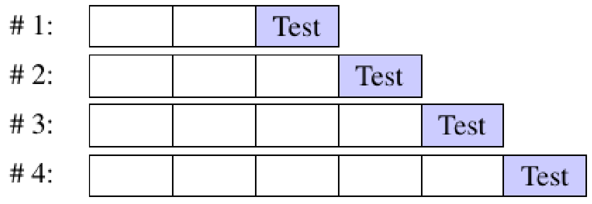
DRL relates dynamically states to actions, hence can better time than traditional financial portfolio planning method like Markowitz, Min Variance, Max diversification, etc...



vs



with

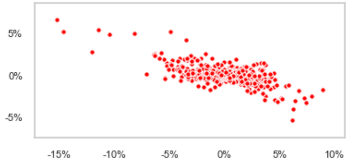


walk forward analysis

Application: Allocation of hedging strategies

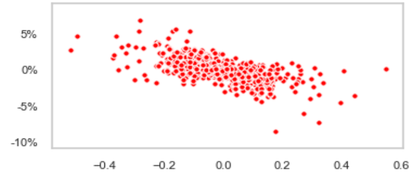
Directional hedges

EuroStoxx puts funded by Crossover vs. MSCI World



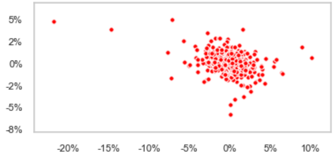
Gap risk hedges

Rates trend following vs. US 10y yield



Proxy hedges

Strong vs. weak balance sheet vs. US High Yield



Rates duration

Synthetic down variance vs. MSCI World

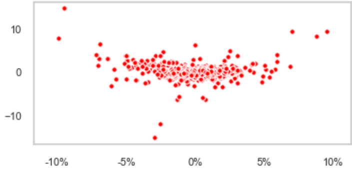
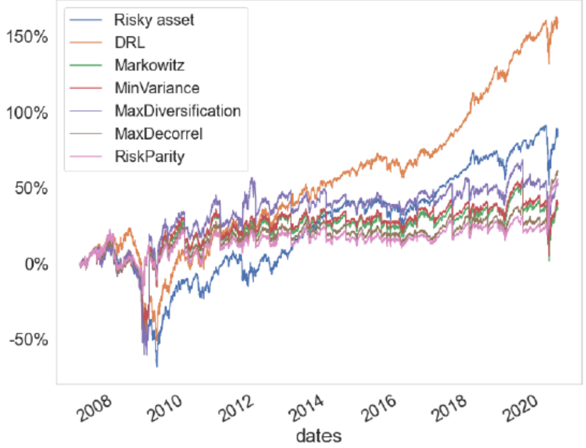


Table 1: Models comparison over 2 and 5 years

	return	Sortino	Sharpe	max DD
2 Years				
Risky asset	8.27%	0.39	0.36	- 0.34
DRL	**20.64%**	**0.94**	**0.96**	- 0.27
Markowitz	-0.25%	- 0.01	- 0.01	- 0.43
MinVariance	-0.22%	- 0.01	- 0.01	- 0.43
MaxDiversification	0.24%	0.01	0.01	- 0.43
MaxDecorrel	14.42%	0.65	0.63	- 0.21
RiskParity	14.17%	0.73	0.72	**-0.19**
5 Years				
Risky asset	9.16%	0.57	0.54	- 0.34
DRL	**16.95%**	**1.00**	**1.02**	- 0.27
Markowitz	1.48%	0.07	0.06	- 0.43
MinVariance	1.56%	0.08	0.06	- 0.43
MaxDiversification	1.77%	0.08	0.07	- 0.43
MaxDecorrel	7.65%	0.44	0.39	- 0.21
RiskParity	7.46%	0.48	0.43	**-0.19**



E. Benhamou, D. Saltiel,
S. Ungari, A. Mukhopadhyay

AI CONNECT · SOCIETE GENERALE · Dauphine | PSL UNIVERSITÉ PARIS · LISIC · icaps

PRL workshop October, 23rd 2020