SCALABILITY OF A METHODOLOGY FOR GENERATING TECHNICAL TRADING RULES WITH GAPS BASED ON RISK-RETURN ADJUSTMENT AND INCREMENTAL TRAINING

Syllabus

- Introduction
- Motivation and goals
- Proposal
- Experiments and results
- Conclusions

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San Sebastián

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Introduction

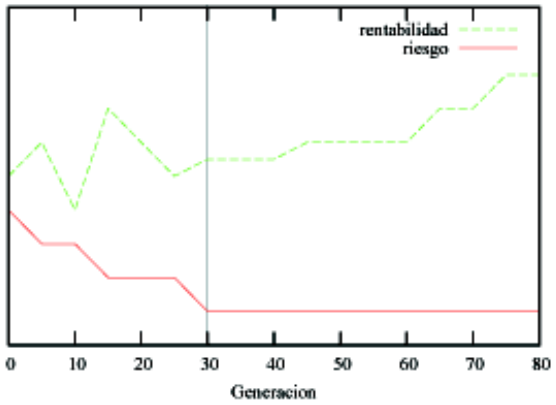
- Market Investor/trader
  - Long term
    - Lower risk limits due to the lower expectations
    - Fundamental analysis (of the balance, the sector, among others)
  - Short term
    - The higher the risk the higher the expectations
    - Technical analysis (charts and reports, technical indexes, etc.)
- Trading
  - Buying/Selling stocks (assets, indexes, derivates) according to the market evolution
  - Trading Systems
    - Speculation tool
    - Set of rules to Buy and/or to Sell
    - Automatic Trading Systems
  - Risk is measure using the Sharpe Ratio

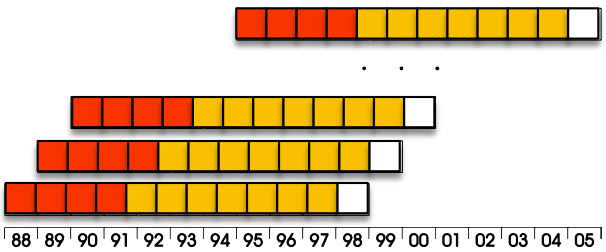
Motivations and goals

- Fernandez2008 proposed a GAP-based methodology for trading rule learning
  - The results showed this methodology **outperforms** the rest of approaches in the literature for the Standard & Poors 500 (S&P500)
- This work extends the previous work, validating its results in different markets, as the Madrid Market IBEX35.

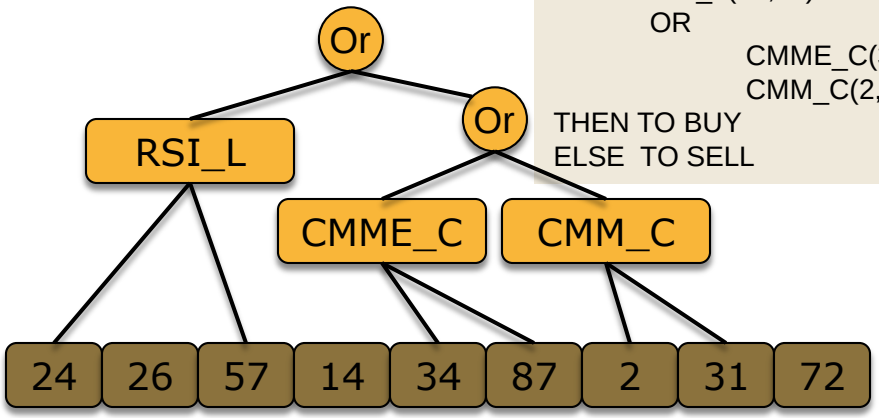
Methodology

- Three remarkable aspects
  - Multi-Objective schema
    - Risk bounding and Returns optimization
  - Train-Test experimentation
    - 10 + 1 years period
  - Grammar based
    - Knowledge and validity
    - Condensed operators





IF OR
RSI_L(24,57)
OR
CMME_C(34,87)
CMM_C(2,31)
THEN TO BUY
ELSE TO SELL



Experiments and Results

- Previous work analyses S&P500.
- In this work, the Madrid IBEX35 assests from Telefónica (IT company), BBVA and BSCH (Financial companies) are analysed.
  - Training and Test period:1998-2005
- Also, MP_3 versus Buy&Hold

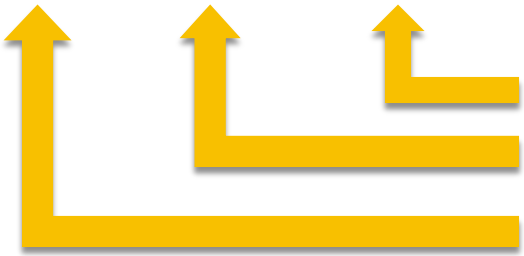
Method	Schema	Grammar	Fitness
MC_1	Return+whole period	complete	Return
MC_2	Risk+whole period	complete	Risk
MP_1	Risk+incremental training	complete	Risk
MP_2	Risk+incremental training	condensed	Risk
MP_3	Return-Risk+incre. training	condensed	Return-Risk

Experiments and Results

S&P500, 1998-2005

Meth	Train			Test			OF
	r^+	SR	RMA	r^+	SR	RMA	SE
MC_1	100	0.55	27.68	60.00	-6.09	-6.09	1.22
MC_2	100	2.34	7.54	40.00	-14.46	-14.46	2.91
MP_1	100	1.62	10.33	58.80	3.12	26.87	0.69
MP_2	100	1.86	9.43	70.00	4.92	46.21	0.47
MP_3	100	1.92	11.33	68.75	7.30	72.30	0.36

$$SE = \frac{RMA_{TRAIN}}{RMA_{TEST}}$$



Annual mean return

Sharpe Ratio

Percentage of profitable rules

$$R = \frac{FinalFunds - InitialFunds}{InititalFunds} * 100$$

$$SR = \frac{E[R - R_0]}{\sigma[R - R_0]} = \frac{E[R]}{\sigma[R]} = \frac{RMA}{\sigma_{RMA}}$$

Experiments and Results

Telefónica S=10, R=20

Meth	Train			Test			OF
	r^+	SR	RMA	r^+	SR	RMA	SE
MC_1	100	0.47	88.48	40.00	-0.65	-0.65	1.01
MC_2	100	1.52	7.59	10.00	-4.14	-4.14	1.54
MP_1	100	1.44	27.39	50.00	5.60	40.14	0.79
MP_2	100	1.36	29.47	47.14	6.30	42.70	0.78
MP_3	100	1.24	36.52	52.86	7.21	53.54	0.80

BBVA S=30, R=10

Meth	Train			Test			OF
	r^+	SR	RMA	r^+	SR	RMA	SE
MC_1	100	0.48	140.25	0.00	-5.55	-5.55	1.03
MC_2	100	1.26	24.75	80.00	2.15	2.15	0.91
MP_1	100	1.37	21.84	51.43	3.19	22.06	0.85
MP_2	100	1.35	20.25	50.00	3.73	26.47	0.81
MP_3	100	1.31	22.40	50.00	6.04	45.22	0.73

Experiments and Results

BSCH S=20, R=30

Meth	Train			Test			OF
	r^+	SR	RMA	r^+	SR	RMA	SE
MC_1	100	0.57	136.40	0.00	-6.07	-6.07	1.04
MC_2	100	1.09	18.16	90.00	4.61	4.61	0.74
MP_1	100	1.22	28.87	50.00	3.70	19.91	0.87
MP_2	100	1.45	19.11	58.57	4.63	34.93	0.75
MP_3	100	1.47	28.53	62.50	6.76	64.14	0.76

Buy & Hold comparative

Asset	B&H	MP_3
S&P500	27.10%	72.30%
TEF	**100.41%**	53.54%
BBVA	23.45%	45.22%
BSCH	53.28%	64.14%

Conclusions & Future Works

- The increase in the performance is mainly due to the condensed grammar.
- Some problems could arise choosing the number of iterations in the schema risk-return.
- Application to assets from the derivative market (futures in IBEX35).
  - Derivates have several advantages which make them ideal for trading:
    - lower operational costs
    - possibility of obtaining return in bear markets
    - less leverage
- Adapt the methodology to a GFRBS using MOGUL.

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Thank you

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