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Bootstrap

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جدول ۱: شاخص‌های میانگین متحرک تست‌شده.

(-)		(-)	
(- -)		(- -)	
(-)		(-)	
(-)		(- -)	
(-)		(-)	
(- -)		(- -)	
(-)		(-)	
(-)		(- -)	
(- -)		(-)	
(-)		(-)	
		(-)	

$$SMA_t^n = \frac{1}{n} \sum_{i=0}^{n-1} P_{t-i} \quad ()$$

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$$\frac{1}{n} \sum_{i=0}^{n-1} P_{t-i} > \frac{1}{m} \sum_{j=0}^{m-1} P_{t-j} \quad ()$$

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$n \ m$

$m > n$

()
 s (msn α)

TRB

$P_t > P_{\max}^n$ ()

t P_t P_{\max}^n
 n

جدول ۳: باندهای بولینگر تست شده.

(s)	
(s -)	
(s)	
(s -)	
(s)	
(s -)	
(s)	
(s -)	

() TRB

جدول ۲: حدود حمایت و مقاومت تست شده.

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(RSI)

TRB

RSI

(UB)

(LB)

RSI
 RSI

LB UB

$UB = MA_n + m\sigma_n$ ()

$LB = MA_n - m\sigma_n$ ()

MA_n n

n σ_n n

RSI

()

%

RSI

m n

$RSI = 100 - \frac{100}{(1 + RS)}$ ()

$$\%D < \%K$$

$$\%D > \%K$$

$$RS = \frac{\text{Average of } n \text{ day closes Up}}{\text{Average of } n \text{ day closes Down}}$$

RS

()

جدول ۴: شاخص های RSI تست شده.

(RSI -)	
(RSI -)	
(RSI -)	
(RSI -)	

%D %K

جدول ۵: میانگین های متحرک همگرایی-واگرایی تست شده.

(KD)	
(KD)	
(s KD)	
(s KD)	

MACD -

(%K)

%K %D

MACD

$$\%K = \frac{P - L_n}{H_n - L_n} \quad ()$$

L_n H_n P
 n

MACD

%D
%K

MACD

%K

MACD

%K %D
%D

MACD

%K

()

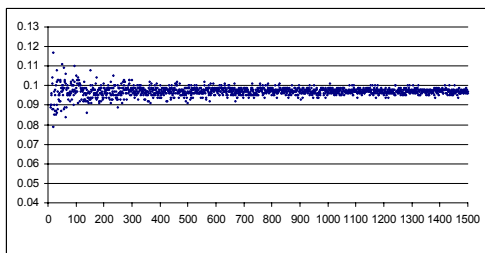
%D %K

$$r_t^h = \log(p_{t+h}) - \log(p_t) \quad ()$$

$$m_b = E(r_t^h | b_t) \quad ()$$

$$m_s = E(r_t^h | s_t) \quad ()$$

$$(E[(r_t^h - m_b)^2 | b_t])^{1/2}, (E[(r_t^h - m_s)^2 | s_t])^{1/2} \quad ()$$



شکل ۱: نتایج انجام ۱۵۰۰ مرتبه عملیات
Bootstrapping بر روی بازده‌های شرکت نفت بهران.

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() *Bootstrapping*

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N Signal

N Switch

Return

Excel

Var

Fraction >

P-value

Bootstrap

()

Bootstrap

Excel

()

()

Bootstrap

Bootstrap

LISREL 8.50

Return

Naive

Var

Minitab11

Anderson-Darling

p-Value

" "

N Switch

B-S Sell Buy

()

B - S

%

()

N Switch

Naive

Buy

Naive

جدول ۶: میانگین متحرک های بلندمدت شرکت ایران خودرو.

Iran Khodro	1-50				1-50-0.01			2-50		
	Naive	Buy	Sell	B-S	Buy	Sell	B-S	Buy	Sell	B-S
N Signal		1297	959		1180	837		1290	966	
N Swich			88			54			80	
Return	0.066259	0.210026	-0.12218	0.332206	0.193461	-0.09978	0.293238	0.189808	-0.09277	0.282581
Fraction>		1	1	1	1	1	1	1	1	1
Var	1.18262	0.492545	0.90168	1.381677	0.492917	0.904417	1.387895	0.48776	0.910387	1.38952
Fraction>		0	0.038667	0.879333	0	0.042	0.883333	0	0.045333	0.885333

Iran Khodro	1-75				2-75			1-100		
	Naive	Buy	Sell	B-S	Buy	Sell	B-S	Buy	Sell	B-S
N Signal		1279	952		1279	952		1247	959	
N Swich			62			54			56	
Return	0.066259	0.195216	-0.10753	0.302743	0.161084	-0.06167	0.222756	0.18531	-0.0988	0.284114
Fraction>		1	1	1	1	1	1	1	1	1
Var	1.18262	0.495966	0.903353	1.389044	0.532369	0.872362	1.399868	0.49389	0.905505	1.390393
Fraction>		0	0.041333	0.884667	0	0.023333	0.895333	0	0.042	0.886

Iran Khodro	1-100-0.01				2-100			1-150		
	Naive	Buy	Sell	B-S	Buy	Sell	B-S	Buy	Sell	B-S
N Signal		1203	908		1247	959		1277	879	
N Swich			38			52			64	
Return	0.066259	0.170508	-0.07878	0.249283	0.1486	-0.05107	0.199669	0.141653	-0.07051	0.212161
Fraction>		1	1	1	0.999333	1	1	0.998667	1	1
Var	1.18262	0.49369	0.908099	1.39518	0.539008	0.865659	1.400935	0.55161	0.839858	1.386642
Fraction>		0	0.042667	0.89	0	0.019333	0.895333	0	0.005333	0.882667

Iran Khodro	2-150				2-150-0.01			5-150		
	Naive	Buy	Sell	B-S	Buy	Sell	B-S	Buy	Sell	B-S
N Signal		1280	876		1217	814		1278	878	
N Swich			56			30			32	
Return	0.066259	0.118145	-0.03688	0.155029	0.110957	-0.02861	0.139569	0.101173	-0.01183	0.112999
Fraction>		0.982667	1	1	0.962	1	0.998	0.91	0.999333	0.971333
Var	1.18262	0.553508	0.840682	1.392087	0.556166	0.838603	1.393245	0.524892	0.870823	1.395138
Fraction>		0	0.006	0.887333	0	0.005333	0.888667	0	0.021333	0.89

Iran Khodro	1-200				1-200-0.01			2-200		
	Naive	Buy	Sell	B-S	Buy	Sell	B-S	Buy	Sell	B-S
N Signal		1337	769		1260	651		1335	771	
N Swich			58			28			52	
Return	0.066259	0.088678	-0.07094	0.159621	0.075911	-0.05668	0.132589	0.074819	-0.04653	0.12135
Fraction>		0.800667	1	1	0.655333	1	0.996	0.642667	1	0.986
Var	1.18262	0.504176	0.828168	1.329426	0.503966	0.829355	1.33138	0.502586	0.831059	1.332029
Fraction>		0	0.002667	0.811333	0	0.002667	0.816	0	0.002667	0.817333

MACD

Sell

Buy

Sell Buy

MACD RSI -
Naive

RSI

RSI

N Switch

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RSI

N Switch

%

ARCH

EGARCH GARCH

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