

Apie viską po truputi

raudys.com/kursas

Dr. Aistis Raudys

Vilnius 2018

Atsiliepimas

- Prieš egzaminą parašykite
- Po egzamino išsiųskite
- Kaip patiko mano kursas
- Kas buvo blogai
- Kas buvo gerai
- Ko daugiau reiktu įdėti
- Ko mažiau reiktu
- Komentarai

Moksliniai straipsniai

- Aistis Raudys, Edmundas Malčius, and Vaidotas Lenčiauskas, Moving Averages for Financial Data Smoothing, Communications in Computer and Information Science series, 2013, volume (0403), Springer. ISSN 1865-0929, pp 34-45
- Aistis Raudys, Lukas Sirvydis and Karol Lisovskij (2012). Synthetic history for exchange traded funds. Lecture Notes in Business Information Processing Volume 117, 2012, pp 224-235 ISSN 1865-1348, Print ISBN 978-3-642-30358-6, Online ISBN 978-3-642-30359-3
- Norit atlikti tyrimų ir publikuoti. Gal doktorantūra?

Turiny

- Kaip panaudoti markowitz portfeliui kurti
- Kaip panaudoti empiriką portfeliui kurti ..
- “Zero lag” filtrai (slenkantys vidurkiai)
- Krizė 1987
- Krizė 2007-2011

Techninės problemos prekyboje

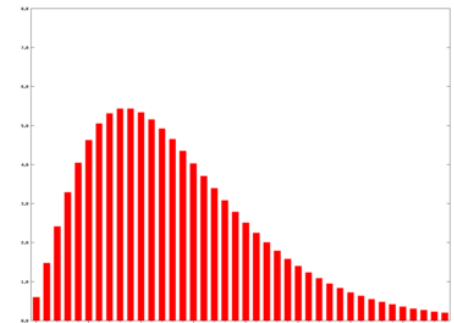
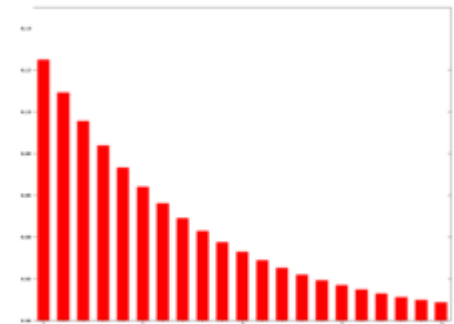
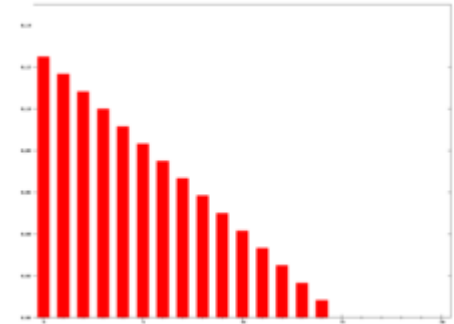
- Automatizuota prekyba nėra visiškai automatizuota nes kartais :
 - Dingsta duomenys
 - Duomenys vėluoja
 - Sandoriai nesuveikia nes birža būna uždaryta
 - Nėra ryšio su prekybos serveriu
 - Negali nutraukti išsiųsto sandorio, nežinai ar sandoris buvo įvykdytas
 - Brokeris turi problemų ir nevykdo sandorių
 - Krizinėmis dienomis serveris nesugeba apdoroti duomenų pakankamai greitai

Sistemų kūrimas

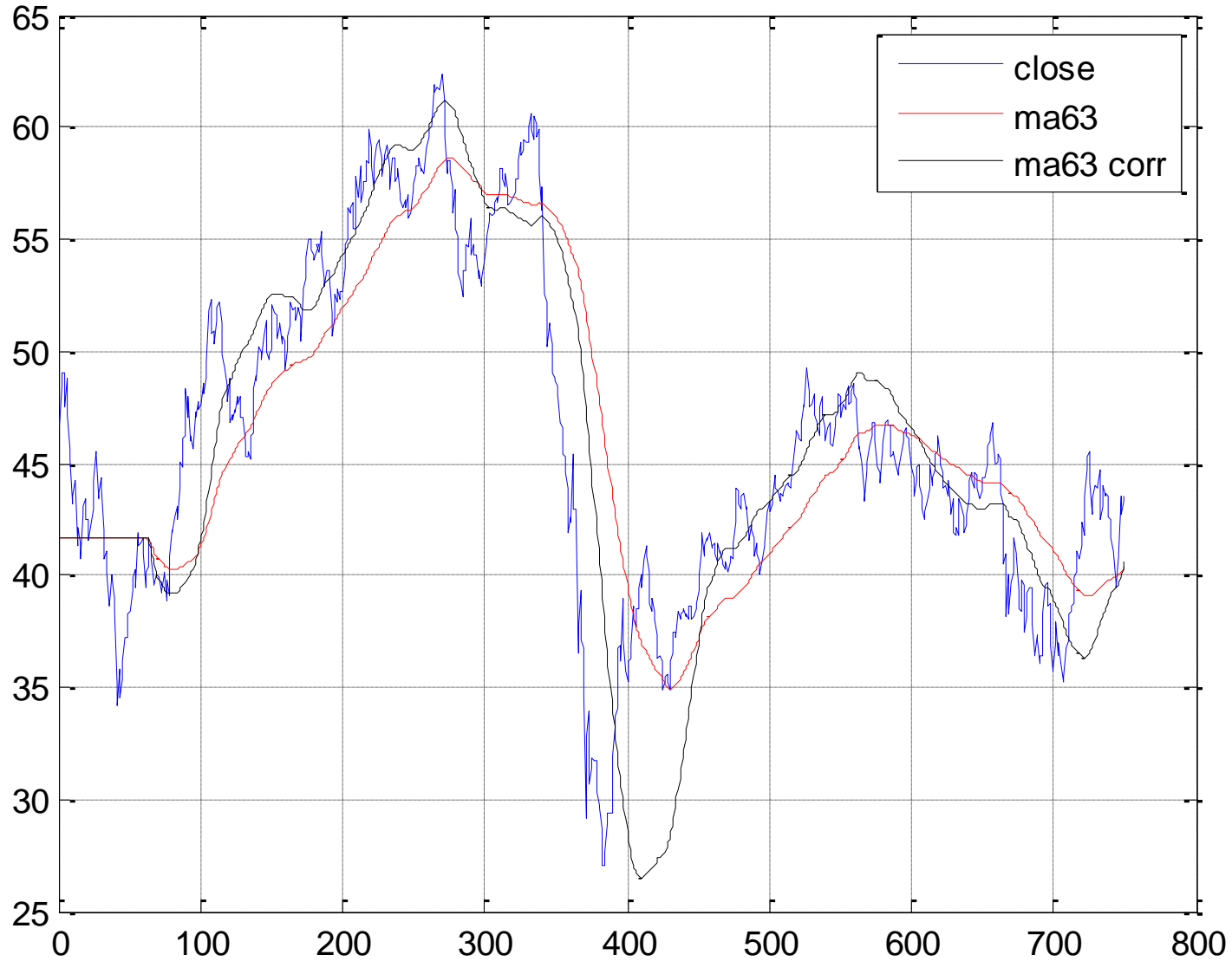
- Pamatai pasikartojantį rinkos elgesį
- Pabandai jį surasti grafike
- Pabandai jį suprogramuoti
- Pabandai optimizuoti kad rasti gerus parametrus
- Pabandai pakartoti daug kartų ir sudėlioti portfelį

Save koreguojantys slenkantys vidurkiai

- Paprasti slenkantys vidurkiai suglotnina duomenis
- Naudoja skirtingus svorius skirtingom dienom
- Duomenys būna suglotninti
- Bet atsiranda uždelsimas
- Galima atlikti korekcija kad uždelsimo nebūtų



BP, 01-Jan-2009 to 05-Dec-2011



MA su korekcijom

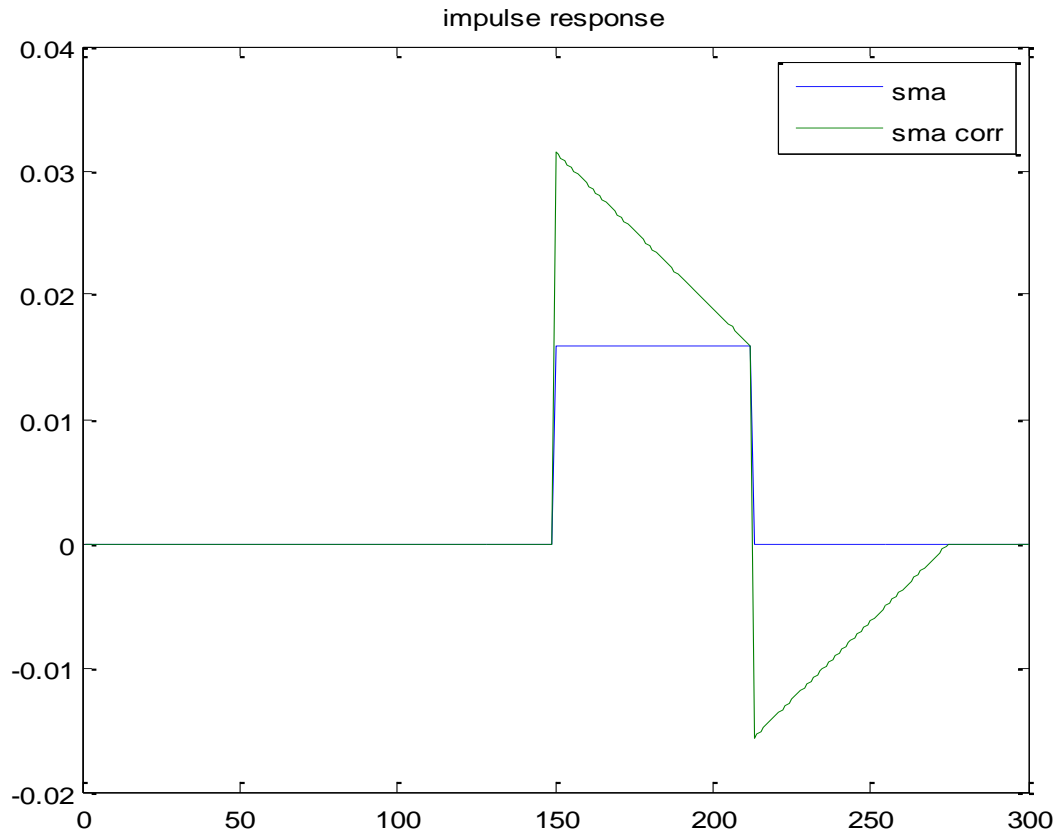
- Labiau atitinka duomenis, bet
- Kai pasikeičia trendo kryptis smarkiai nukrypsta

```
%% correction
ma1 = mavg(d1.close,63,'first');
ma2 = ma1 + mavg(d1.close-ma1,63);

figure(2);clf;plot(d1.close);hold on;plot(ma1,'r');plot(ma2,'k');grid on;
legend({'close','ma63','ma63 corr'});

title(['BP, ' datestr(min(d1.date)) ' to ' datestr(max(d1.date))])
```

SMA vs. SMA Corrected



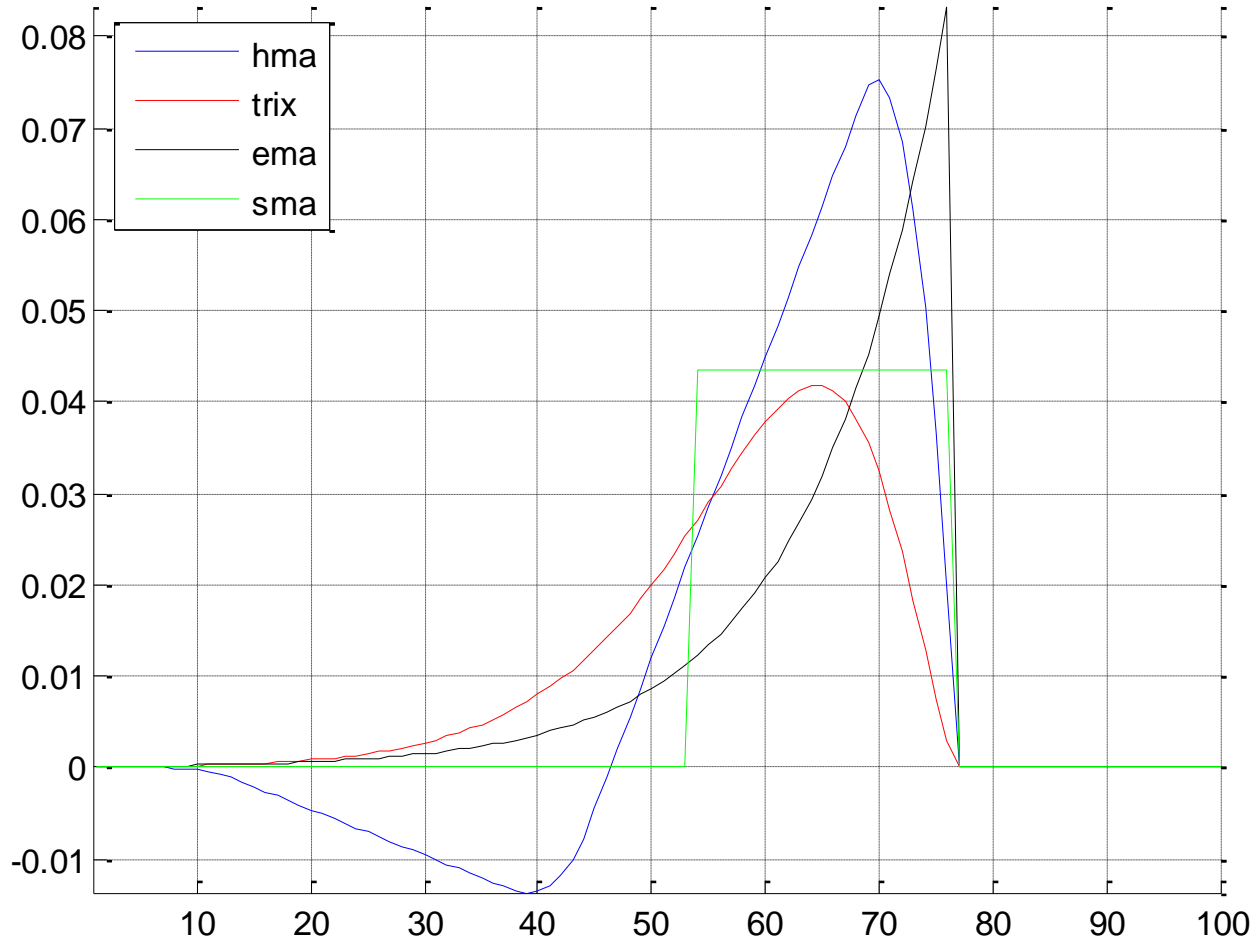
```
%% impulse response  
z = zeros(1,300);  
z(150) = 1; p = 5;  
ma1 = mavg(z,63);  
ma2 = ma1 + mavg(z-ma1,63);  
figure(3);plot([ma1;ma2]');  
legend({'sma', 'sma corr'});  
title('impulse response')
```

Hull Moving Average

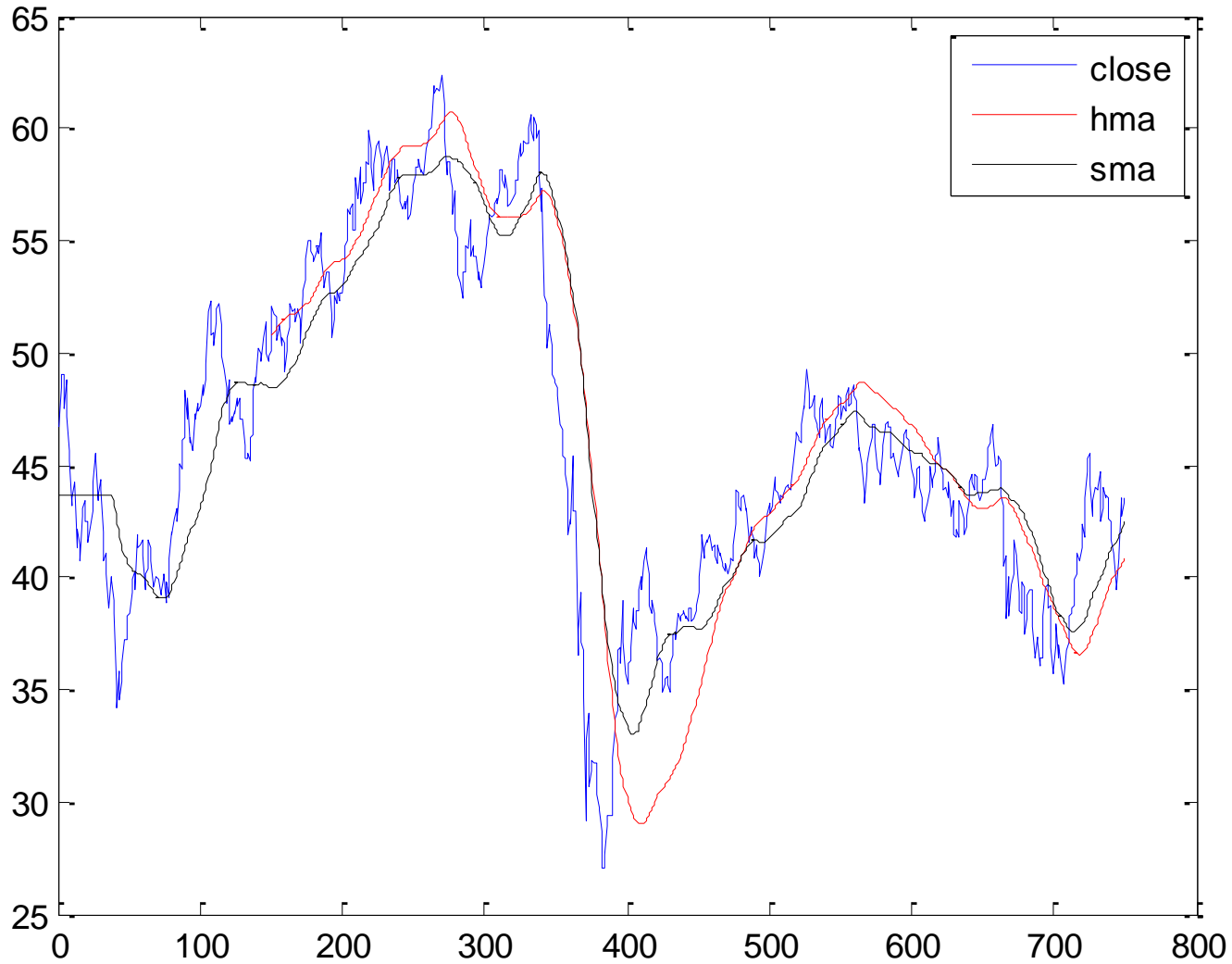
$$\text{HMA}(n) = \text{WMA}(2 * \text{WMA}(n/2) - \text{WMA}(n), \text{sqrt}(n))$$

- Pirma dalis: $2 * \text{WMA}(n/2) - \text{WMA}(n)$
- Antra dalis: $\text{WMA}(\dots, \text{sqrt}(n))$

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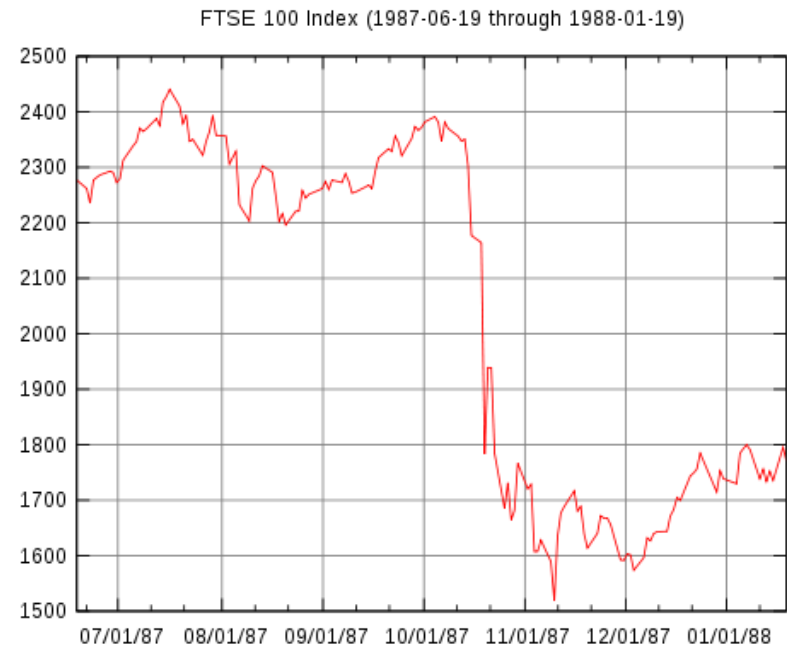
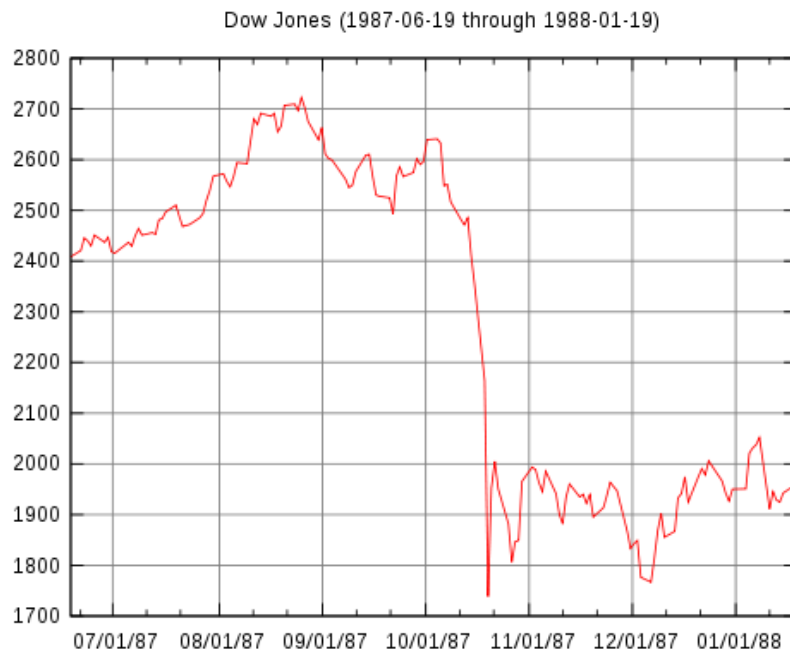


Kalmano filtrai panašiai elgiasi

- <http://credentiality2.blogspot.com/2010/08/simple-kalman-filter-example.html>
- <http://bilgin.esme.org/BitsBytes/KalmanFilterforDummies.aspx>

Black Monday (1987)

- Spalio 19, 1987



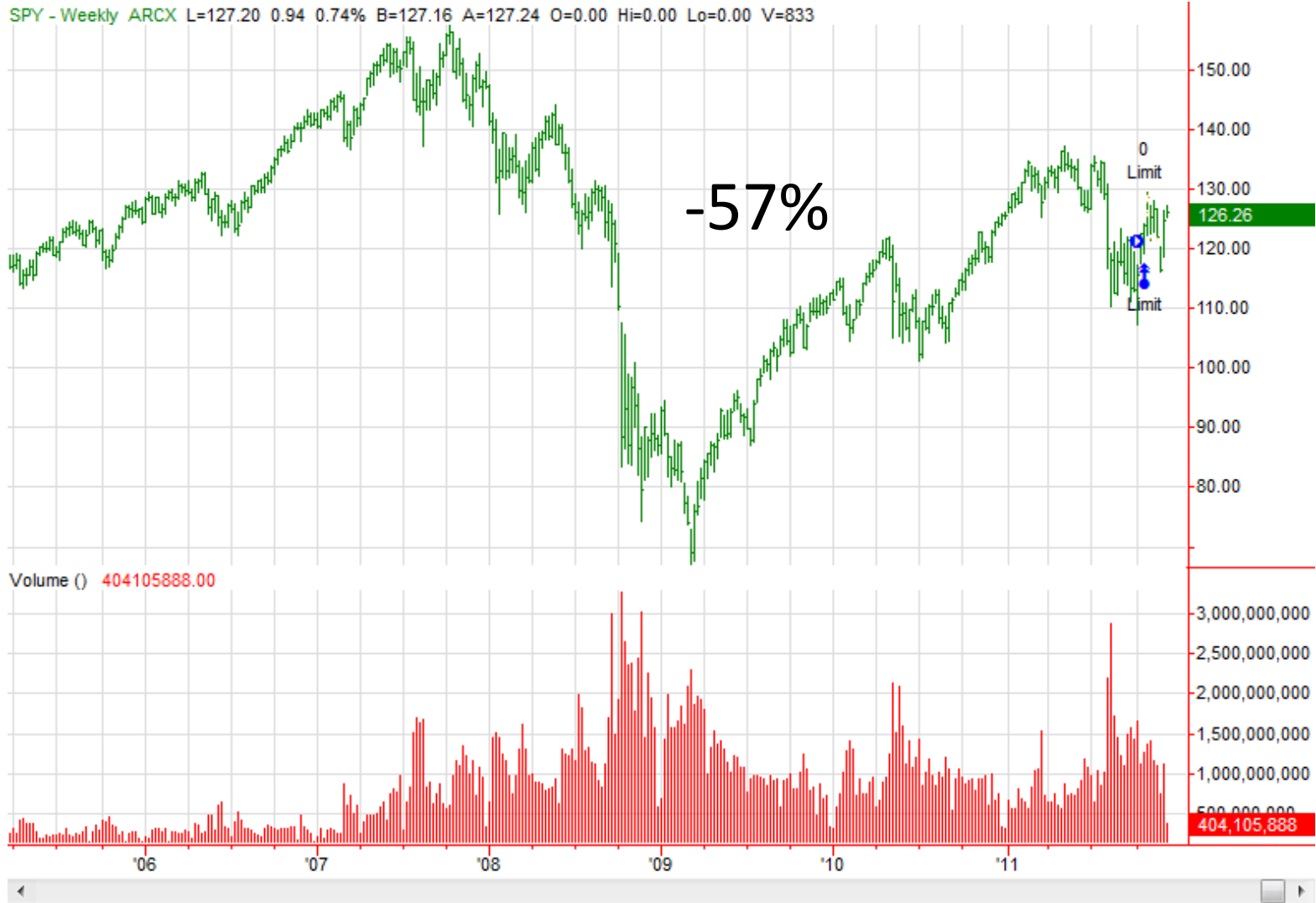
Black Monday (1987)

- Maksimalus kritimas per kelias dienas 33 %
- Vienos dienos kritimas 22.6%
- Atsistatinėjo 2 metus
- Kaltė suverčiama:
 - Program trading
 - Tai įvairūs stop'ai kurie rinkai krentant suveikė ir padidino kritimą
 - Portfolio insurance
 - Apsaugo portfelį nuo didelių kritimų

Black Monday (1987)

- Portfolio insurance
 - Draudimo firmos parduodavo apsaugą portfeliui kad jis nenukris daugiau kaip 10 proc.
 - Kai rinka krito draudimo firmoms reikėjo pašortinti portfelių akcijas ir tai inicijavo masinį pardavimą akcijų
- Nuo to laiko į akcijų prekybą yra įmontuoti stabdžiai, kurie stabdo prekybą jeigu rinka krenta per greitai

Krizè 2007-2011



Krizė 2007-2011

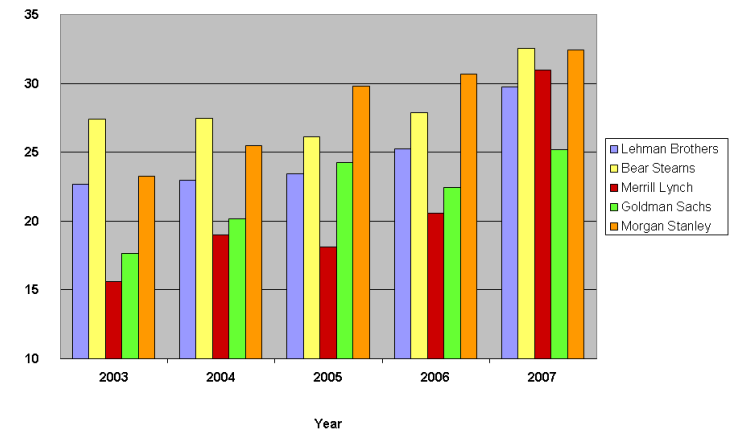
- Kas sukėlė krizę?
 - Kubilius? 😊
- CDS – pradžia
- Aukšas svertas visur
- Vėliau lavinos efektas
 - Kai pradeda trūkti pinigų parduodama viskas
 - StatArb sistemos



Source: Philippon, 2008

Leverage Ratios For Major Investment Banks

The leverage ratio is a measure of the risk taken by a firm; a higher ratio indicates more risk. It is calculated as total debt divided by stockholders equity. Each firm's ratio increased between 2003-2007.



Source Data: Company Annual Reports (SEC Form 10K)

THE THEORY OF HOW THE FINANCIAL SYSTEM CREATED AAA-RATED ASSETS OUT OF SUBPRIME MORTGAGES

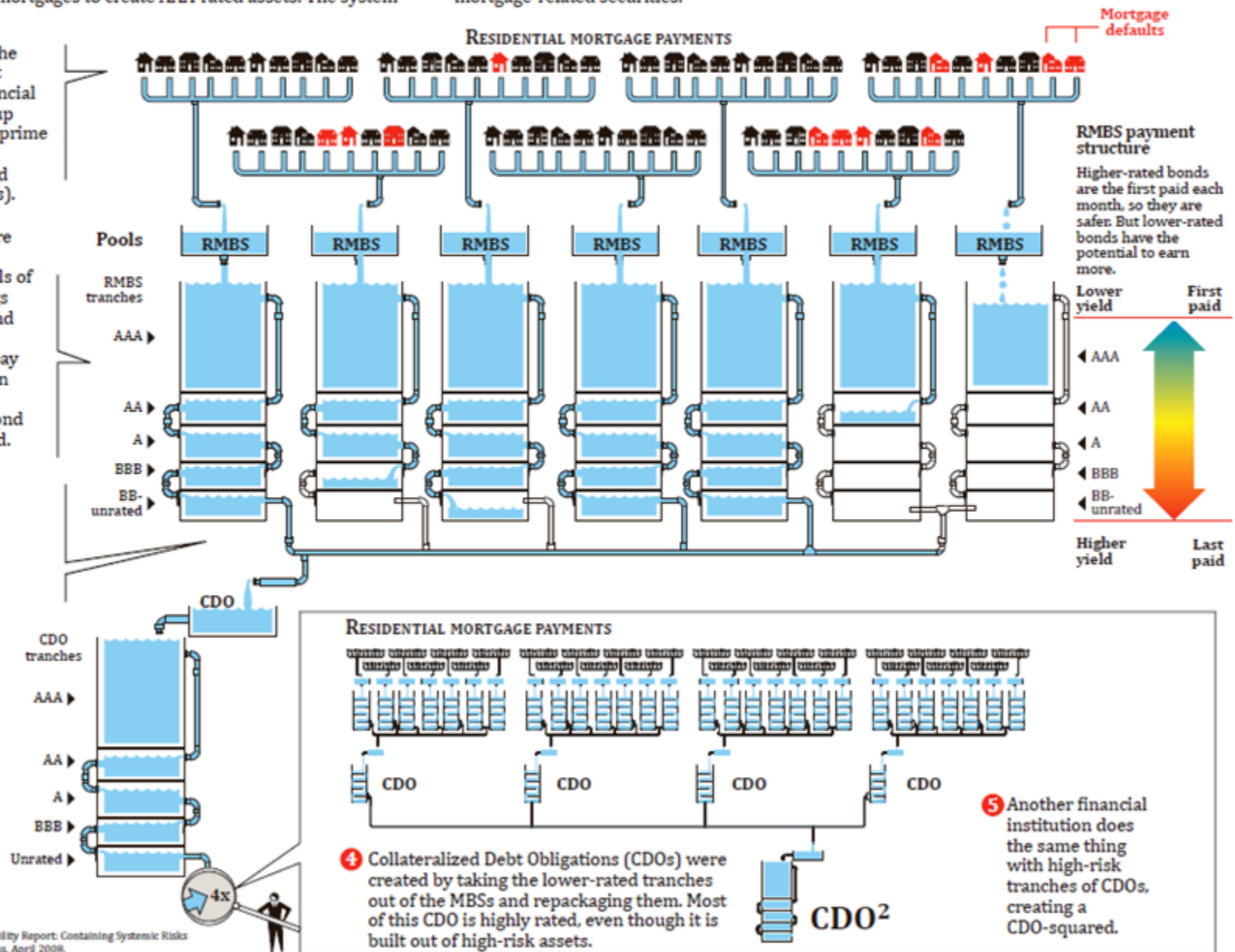
In the financial system, AAA-rated assets are the most valuable because they are the safest for investors and the easiest to sell. Financial institutions packaged and re-packaged securities built on high-risk subprime mortgages to create AAA-rated assets. The system

worked as long as mortgages all over the country and of all different characteristics didn't default all at once. When homeowners all over the country defaulted, there was not enough money to pay off all the mortgage-related securities.

1 People all over the country take out mortgages. Financial institutions group hundreds of subprime mortgages into Mortgage Backed Securities (MBSs).

2 The securities are grouped into tranches by levels of risk and earnings potential for bond holders. When everybody can pay their mortgage in full each month, each group of bond holders gets paid.

3 The mortgage payments are collected by a financial institution and payments distributed to bond holders. Higher rated tranches are paid first. When monthly mortgage payments are not made, payments may not reach holders of lower-rated tranches.



4 Collateralized Debt Obligations (CDOs) were created by taking the lower-rated tranches out of the MBSs and repackaging them. Most of this CDO is highly rated, even though it is built out of high-risk assets.

5 Another financial institution does the same thing with high-risk tranches of CDOs, creating a CDO-squared.

Source: IMF, Global Financial Stability Report: Containing Systemic Risks and Restoring Financial Soundness, April 2008.

Kaip sukurti pasyvų portfelį

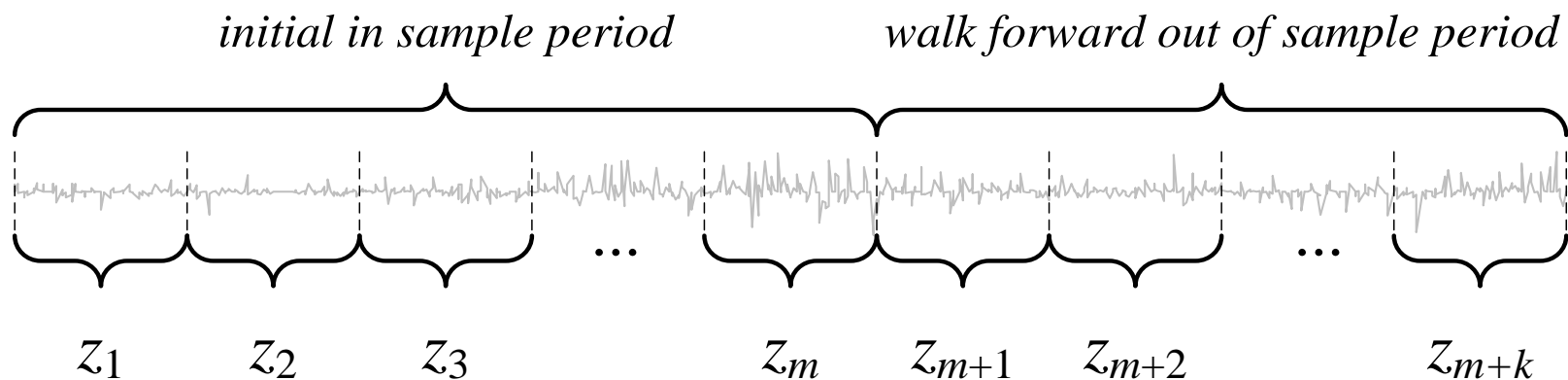
- Norime investuoti pasyviai į instrumentus
- Galima naudoti ateities sandorius bet jie brangūs ir juos reikia “rulovinti”
- Patogiausi ETF nes jie nedaug kainuoja
- Kaip sukurti portfeli:
 - Rankinis – rankomis parinkti nekoreliuotus instrumentus
 - Markowitz – naudojant mean/variance optimizaciją
 - Empyrinis – sudedant skirtingus instrumentus kartu

Likvidžių ETF koreliacijos

0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70	0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------

Važiuojanti į priekį analizė

(rolling forward/walk forward)



- Mokoma ir testuojama daug kartų
- Kiekvieną kartą mokymo ir testavimo periodai perslankami
- Sudėjus visus testavimo periodus gaunamas vienas ilgas periodas

Važiuojanti į priekį analizė

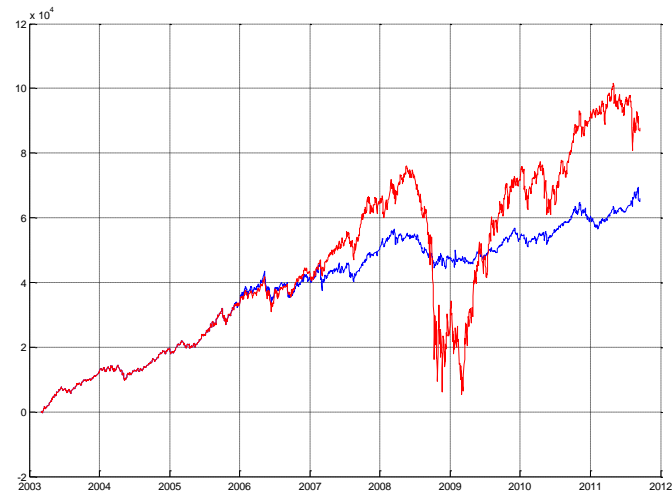
(rolling forward/walk forward)

- Pats geriausias metodas pažiūrėti kaip veikia investavimas arba strategija
- Optimizuojam daug kartų ir imamas oos periodas

All in sample

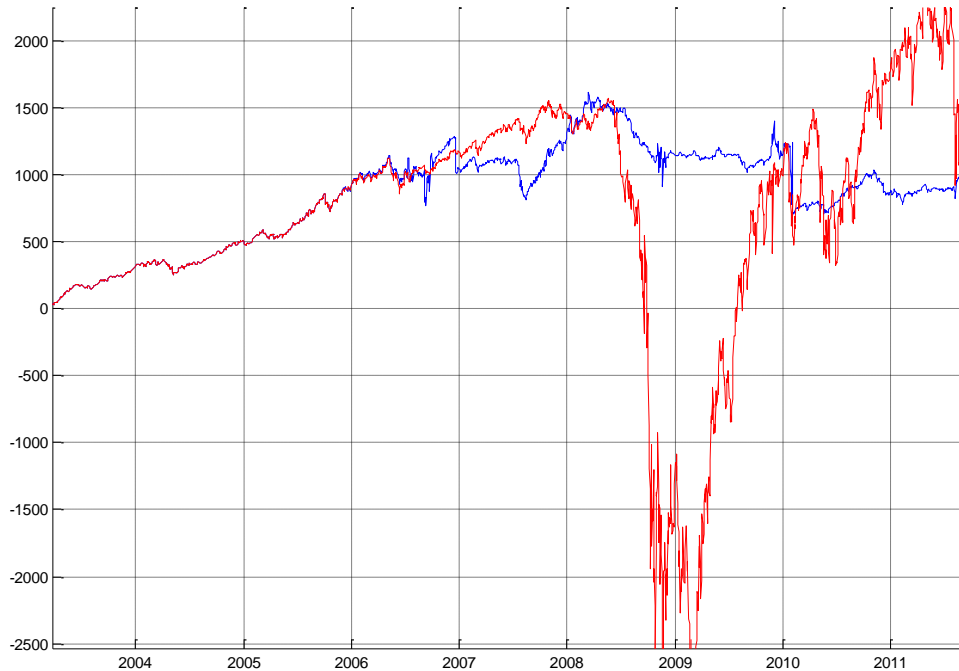


Rolling forward 21d



pratybos013.m

- Labai svarbu yra apribojimai
- Štai kas gaunasi jeigu nėra apribojimų



Sy...	Description	Exch	Last	A_AnyLine		Sy...	Description	Exch	Last	A_AnyLine		Sy...	Description	Exch	Last	A_AnyLine	
1	SPY	S&P Dep Receipts	ARCX	166.71	109913544	43	SH	ProShares Trust Short S&P 500	ARCX	28.70	2913049	85	IJH	iShares CORE S&P Midcap	ARCX	119.94	481828
2	XLF	S&P Sel Financial Spdr Fund	ARCX	19.95	47944568	44	EWG	iShares MSCI Germany Index Fd	ARCX	26.29	2274128	86	ILF	iShares S&P Latin Am 40 Index	ARCX	42.59	475552
3	EWJ	iShares MSCI Japan Index Fd	ARCX	12.05	37892113	45	PFF	iShares S&P US Prfd Stk Idx Fd	ARCX	40.94	2067525	87	ELD	WisdomTree EM Local Debt	ARCX	53.00	461905
4	EEM	iShares MSCI Emerg Mkt Index F	ARCX	43.42	37786087	46	MDY	S&P Midcap Dep Receipts	ARCX	220.52	2052856	88	SHY	iShares Leh 1-3yr Treas Bd Fd	ARCX	84.45	460285
5	IWM	iShares Russell 2000 Index Tr	ARCX	99.05	35679327	47	VEA	Vanguard MSCI EAFE ETF	ARCX	38.69	1845777	89	CIU	iShs Lehman Intermediate Crdt	ARCX	111.07	443123
6	QQQ	PowerShares QQQ Trust Series 1	NASD	74.12	27253366	48	VNQ	Vanguard REIT ETF	ARCX	77.65	1717682	90	VEU	Vanguard Intl FTSE World ex US	ARCX	48.61	430842
7	GDX	Market Vectors Gold Miners ETF	ARCX	26.32	23635462	49	IVW	iShares Russell 1000 Gwth Inde	ARCX	76.13	1654211	91	IWW	iShares S&P 500/Barra Gwth Ind	ARCX	87.99	414999
8	GLD	SPDR Gold Trust	ARCX	131.00	20349768	50	SDY	SPDR S&P Dividend	ARCX	70.08	1608365	92	DJP	iPath DJ-AIG Commodity ETN	ARCX	38.72	402135
9	XLK	S&P Sel Technology Spdr Fund	ARCX	32.20	17189512	51	EWY	iShs MSCI S Korea Cap Idx	ARCX	58.17	1570058	93	IEF	iShares Leh 7-10yr Treas Bd Fd	ARCX	107.50	365779
10	XLE	S&P Sel Energy Spdr Fund	ARCX	82.08	14658823	52	VTI	Vanguard Total Stock Mrkt ETF	ARCX	86.10	1540283	94	BIL	SPDR Barclays 1-3 Month T-Bill	ARCX	45.81	363144
11	XLI	S&P Sel Industrial Spdr Fund	ARCX	44.20	14377283	53	PGX	PwrShrs Preferred Portfolio	ARCX	14.95	1531887	95	VCSF	Vangd Short Term Bd ETF	NASD	80.54	347255
12	VWO	Vanguard FTSE Emerging Markets	ARCX	43.88	13544161	54	DVY	iShares DJ Select Divid Index	ARCX	66.99	1400481	96	RWX	SPDR DJ Wilshire Intl Real Est	ARCX	45.63	332629
13	EFA	iShares MSCI EAFE Index Tr	ARCX	63.05	12925640	55	VYM	Vanguard High Div Yield ETF	ARCX	58.36	1389772	97	VB	Vanguard Small-Cap ETF	ARCX	96.29	325067
14	SLV	iShares Silver Trust	ARCX	20.88	11595263	56	VTV	Vanguard Value ETF	ARCX	69.56	1167357	98	VGT	Vanguard Info Tech ETF	ARCX	77.04	303204
15	IYR	iShares DJ US R/E Index Tr	ARCX	75.12	11377710	57	EWI	iShares MSCI Hong Kong Idx Fd	ARCX	20.80	1152440	99	IVE	iShares S&P 500/Barra Val Ind	ARCX	78.49	299903
16	IAU	iShares Gold Trust	ARCX	13.16	11330420	58	DBC	DB Commodity Index Tracking Fd	ARCX	26.18	1141430	100	IGE	iShs GS Natural Resources Fd	ARCX	40.55	284620
17	UNG	United States Natural Gas Fund	ARCX	22.22	10581635	59	EPP	iShares MSCI Pac Index Fd	ARCX	49.86	1063580	101	VPL	Vanguard FTSE Pacific ETF	ARCX	61.73	251717
18	SDS	UltraShort S&P 500 ProShares	ARCX	38.43	9727996	60	DBA	PowerShares DB Agriculture Fd	ARCX	25.38	1034681	102	MINT	PIMCO Enh Shrt Maturity ETF	ARCX	101.61	227688
19	XLP	S&P Sel Consum Staples Spdr Fu	ARCX	41.93	9368095	61	MVN	iShares Russell 2000 Val Index	ARCX	87.69	963152	103	VBR	Vanguard Small-Cap Value ETF	ARCX	86.30	216495
20	FXI	iShares FTSE China 25	ARCX	38.06	9276517	62	BND	Vanguard Total Bond Market ETF	ARCX	83.52	920880	104	MWV	iShares Russell 3000 Index Tr	ARCX	99.29	211711
21	XLV	S&P Sel Health Care Spdr Fund	ARCX	49.10	9246613	63	LQD	iShares iBoxx \$ InvesTop Inv	ARCX	120.09	909471	105	SHV	iShs Lehman Short Treasury Bd	ARCX	110.24	201924
22	XLU	S&P Sel Utilities Spdr Fund	ARCX	40.30	9051742	64	IWO	iShares Russell 2000 Gth Index	ARCX	113.46	886373	106	SGOL	ETFS Gold Trust	ARCX	133.95	195095
23	TLT	iShares Leh 20+ Yr Treas Bd Fd	ARCX	117.08	7435806	65	VIG	Vanguard Div Appreciat ETF	ARCX	68.83	880052	107	VO	Vanguard Mid-Cap ETF	ARCX	99.00	194521
24	XLB	S&P Sel Materials Spdr Fund	ARCX	41.28	7047207	66	IWD	iShares Russell 1000 Val Index	ARCX	86.17	840003	108	MOO	Market Vectors-Agribusiness	ARCX	54.87	188270
25	BWT	iShares MSCI Taiwan Index Fd	ARCX	14.17	6839575	67	TIP	iShares Lehman TIPS Bond Fd	ARCX	119.52	835339	109	BIV	Vanguard Intermediate-Term Bd	ARCX	87.42	185196
26	BWZ	iShares MSCI Brazil Cap Index	ARCX	54.55	6767008	68	EMB	iShs JPMorgan USD Emerging Mkt	ARCX	119.58	822831	110	SCZ	iShs MSCI EAFE Sm Cap Inx Fd	ARCX	46.01	183182
27	FAS	Financial Bull 3x Shares	ARCX	69.80	6324986	69	MBB	iShares Tr Lhman MBS Fx Bnd Fd	ARCX	107.39	703785	111	VV	Vanguard Large Cap ETF	ARCX	76.44	175053
28	XLY	S&P Sel Consum Discretion'y Sp	ARCX	57.55	5974680	70	ACWI	iShrs MSCI ACWI Idx Fd	NASD	53.64	667379	112	ICF	iShares Cohen & Steers Rity Ma	ARCX	90.47	168870
29	USO	United States Oil Fund LP	ARCX	34.21	5677850	71	VBK	Vanguard Small-Cap Growth ETF	ARCX	105.29	665178	113	BWX	SPDR Barclays Intl Treas Bond	ARCX	57.53	168721
30	IVV	iShares CORE S&P 500	ARCX	167.80	5641605	72	IWS	iShares MidCap Value Index Tr	ARCX	60.40	651551	114	IEI	iShs Lehman 3-7 Year Treasury	ARCX	123.53	165689
31	DIA	SPDR DJ Industrial Average ETF	ARCX	153.13	5503197	73	AGG	iShares CORE Total US Bond Mkt	ARCX	110.29	621763	115	RWR	SPDR DJ Wilshire REIT	ARCX	85.13	164107
32	EWS	iShares MSCI Singapore(Free)In	ARCX	14.41	5347304	74	AAAX	iShrs MSCI Asia ex Japan Idx	NASD	60.86	599706	116	IWR	iShares Russell Midcap Index	ARCX	135.29	149785
33	TBT	UltraShrt Lhman 20+ Yr Trea	ARCX	65.32	5296656	75	BSV	Vanguard Short-Term Bond ETF	ARCX	80.92	592240	117	MUB	iShs S&P National Municipal Bd	ARCX	110.91	133310
34	EWA	iShares MSCI Australia Index F	ARCX	26.59	4996295	76	OEF	iShares S&P 100 Index Fd	ARCX	75.06	567737	118	JS	iShares S&P SmallCap 600/Barra	ARCX	95.21	131744
35	SSO	ProShares Ultra S&P 500	ARCX	82.79	4740648	77	IJR	iShares CORE S&P Small Cap	ARCX	92.07	561168	119	JT	iShares S&P SmallCap 600/Barra	ARCX	99.12	111958
36	OIH	Mkt Vectors Oil Services ETF	ARCX	44.97	4490293	78	DEM	WisdomTree Emerging Markets	ARCX	56.27	558755	120	GSG	iShs GSCI Commodity-Indexed Tr	ARCX	31.55	111574
37	HYG	iShares iBoxx \$ High Yield	ARCX	95.46	4313210	79	IWB	iShares Russell 1000 Index Tru	ARCX	91.92	557169	121	IWP	iShares Russell Midcap Growth	ARCX	74.65	109870
38	GDXJ	Mrkt Vectors Junior Gold Miner	ARCX	10.35	3705406	80	CSJ	iShs Lehman 1-3 Year Credit Bd	ARCX	105.57	555644	122	VDE	Vanguard Energy ETF	ARCX	116.94	90421
39	EWC	iShares MSCI Canada Index Fd	ARCX	27.93	3692812	81	RSP	Guggenheim S&P 500 EqJ Wght	ARCX	63.14	553736	123	VMP	SPDR DB Intl Gov Inflation Pro	ARCX	61.40	86068
40	JNK	SPDR Barclays Hi Yld Bd ETF	ARCX	41.56	3636559	82	AMJ	JPMorgan Alerian MLP ETN	ARCX	47.41	545434	124	IJJ	iShares S&P Midcap 400/Barra V	ARCX	104.82	62286
41	RSX	Market Vectors - Russia	ARCX	26.92	3368302	83	PGF	Pwrshrs Financial Prfd Portf	ARCX	18.65	526778	125	IJK	iShares S&P Midcap400/Barra Gt	ARCX	136.14	55335
42	VGK	Vanguard FTSE Europe ETF	ARCX	52.51	3154522	84	VUG	Vanguard Growth ETF	ARCX	82.34	485733	126					

S&P Dep Receipts	ARCX	166.71	109913544	VIG	Vanguard Div Appreciat ETF	ARCX	68.83	880052
S&P Sel Financial Spdr Fund	ARCX	19.95	47944568	IWD	iShares Russell 1000 Val Index	ARCX	86.17	840003
iShares MSCI Japan Index Fd	ARCX	12.05	37892113	TIP	iShares Lehman TIPS Bond Fd	ARCX	119.52	835339
iShares MSCI Emerg Mkt Index F	ARCX	43.42	37786087	EMB	iShs JPMorgan USD Emerging Mkt	ARCX	119.58	822831
iShares Russell 2000 Index Tr	ARCX	99.05	35679327	MBB	iShares Tr Lhman MBS Fx Bnd Fd	ARCX	107.39	703785
PowerShares QQQ Trust Series 1	NASDAQ	74.12	27253366	ACWI	iShrs MSCI ACWI Idx Fd	NASDAQ	53.64	667379
Market Vectors Gold Miners ETF	ARCX	26.3	23635462	VBK	Vanguard Small-Cap Growth ETF	ARCX	105.29	665178
SPDR Gold Trust	ARCX	131	20349768	IWS	iShares MidCap Value Index Tr	ARCX	60.4	651551
S&P Sel Technology Spdr Fund	ARCX	32.2	17189512	AGG	iShares CORE Total US Bond Mkt	ARCX	110.29	621763
S&P Sel Energy Spdr Fund	ARCX	82.08	14658823	AAXJ	iShrs MSCI Asia ex Japan Idx	NASDAQ	60.86	599706
S&P Sel Industrial Spdr Fund	ARCX	44.2	14377283	BSV	Vanguard Short-Term Bond ETF	ARCX	80.92	592240
Vanguard FTSE Emerging Markets	ARCX	43.88	13544161	OEF	iShares S&P 100 Index Fd	ARCX	75.06	567731
iShares MSCI EAFE Index Tr	ARCX	63.05	12925640	IJR	iShares CORE S&P Small Cap	ARCX	92.07	561168
iShares Silver Trust	ARCX	20.88	11595263	DEM	WisdomTree Emerging Markets	ARCX	56.27	558755
iShares DJ US R/E Index Tr	ARCX	75.12	11377710	IWB	iShares Russell 1000 Index Tru	ARCX	91.92	557169
iShares Gold Trust	ARCX	13.16	11330420	CSJ	iShs Lehman 1-3 Year Credit Bd	ARCX	105.57	555644
United States Natural Gas Fund	ARCX	22.22	10581635	RSP	Guggenheim S&P 500 Eql Wght	ARCX	63.14	553736
UltraShort S&P 500 ProShares	ARCX	38.43	9727996	AMJ	JPMorgan Alerian MLP ETN	ARCX	47.41	545434
S&P Sel Consume Staples Spdr Fu	ARCX	41.93	9368095	PGF	Pwrshrs Financial Prfd Portf	ARCX	18.65	526778
iShares FTSE China 25	ARCX	38.06	9276517	VUG	Vanguard Growth ETF	ARCX	82.34	485733
S&P Sel Health Care Spdr Fund	ARCX	49.1	9246613	IJH	iShares CORE S&P Midcap	ARCX	119.94	481828
S&P Sel Utilities Spdr Fund	ARCX	40.3	9051742	ILF	iShares S&P Latin Am 40 Index	ARCX	42.59	475552
iShares Leh 20+ Yr Treas Bd Fd	ARCX	117.08	7435806	ELD	WisdomTree EM Local Debt	ARCX	53	461905
S&P Sel Materials Spdr Fund	ARCX	41.28	7047207	SHY	iShares Leh 1-3yr Treas Bd Fd	ARCX	84.45	460285
iShares MSCI Taiwan Index Fd	ARCX	14.17	6839575	CIU	iShs Lehman Intermediate Crdt	ARCX	111.07	443123
iShares MSCI Brazil Cap Index	ARCX	54.55	6767008	VEU	Vanguard Intl FTSE World ex US	ARCX	48.61	430842
Financial Bull 3x Shares	ARCX	69.8	6324986	IVW	iShares S&P 500/Barra Gwth Ind	ARCX	87.99	414999
S&P Sel Consum Discretion'y Sp	ARCX	57.55	5974680	DJP	iPath DJ-AIG Commodity ETN	ARCX	38.72	402135
United States Oil Fund LP	ARCX	34.21	5677850	IEF	iShares Leh 7-10yr Treas Bd Fd	ARCX	107.5	365779
iShares CORE S&P 500	ARCX	167.8	5641605	BIL	SPDR Barclays 1-3 Month T-Bill	ARCX	45.81	363144
SPDR DJ Industrial Average ETF	ARCX	153.13	5503197	VCSH	Vangd Short Term Bd ETF	NASDAQ	80.54	347255
iShares MSCI Singapore(Free)In	ARCX	14.41	5347304	RWX	SPDR DJ Wilshire Intl Real Est	ARCX	45.63	332629
UltraShrt Lhman 20+ Yr Trea	ARCX	65.32	5296656	VB	Vanguard Small-Cap ETF	ARCX	96.29	325067
iShares MSCI Australia Index F	ARCX	26.59	4996295	VGT	Vanguard Info Tech ETF	ARCX	77.04	303204
ProShares Ultra S&P 500	ARCX	82.79	4740648	IVE	iShares S&P 500/Barra Val Ind	ARCX	78.49	299903
Mkt Vectors Oil Services ETF	ARCX	44.97	4490293	IGE	iShs GS Natural Resources Fd	ARCX	40.55	284620
iShares iBoxx \$ High Yield	ARCX	95.46	4313210	VPL	Vanguard FTSE Pacific ETF	ARCX	61.73	251717
Mrkt Vectors Junior Gold Miner	ARCX	10.35	3705406	MINT	PIMCO Enh Shrt Maturity ETF	ARCX	101.61	227688
iShares MSCI Canada Index Fd	ARCX	27.93	3692812	VBR	Vanguard Small-Cap Value ETF	ARCX	86.3	216495
SPDR Barclays Hi Yld Bd ETF	ARCX	41.56	3636559	IWW	iShares Russell 3000 Index Tr	ARCX	99.29	211711
Market Vectors - Russia	ARCX	26.92	3368302	SHV	iShs Lehman Short Treasury Bd	ARCX	110.24	201924
Vanguard FTSE Europe ETF	ARCX	52.51	3154522	SGOL	ETFS Gold Trust	ARCX	133.95	195095
ProShares Trust Short S&P 500	ARCX	28.7	2913049	VO	Vanguard Mid-Cap ETF	ARCX	99	194521
iShares MSCI Germany Index Fd	ARCX	26.29	2274128	MOO	Market Vectors-Agribusiness	ARCX	54.87	188270
iShares S&P US Pfd Stk Idx Fd	ARCX	40.94	2067525	BIV	Vanguard Intermediate-Term Bd	ARCX	87.42	185196
S&P Midcap Dep Receipts	ARCX	220.52	2052856	SCZ	iShs MSCI EAFE Sm Cap Inx Fd	ARCX	46.01	183182
Vanguard MSCI EAFE ETF	ARCX	38.69	1845777	VV	Vanguard Large Cap ETF	ARCX	76.44	175053
Vanguard REIT ETF	ARCX	77.65	1717682	ICF	iShares Cohen & Steers Rlty Ma	ARCX	90.47	168870
iShares Russell 1000 Gwth Inde	ARCX	76.13	1654211	BWX	SPDR Barclays Intl Treas Bond	ARCX	57.53	168721
SPDR S&P Dividend	ARCX	70.08	1608365	IEI	iShs Lehman 3-7 Year Treasury	ARCX	123.53	165689
iShs MSCI S Korea Cap Idx	ARCX	58.17	1570058	RWR	SPDR DJ Wilshire REIT	ARCX	85.13	164107
Vanguard Total Stock Mrkt ETF	ARCX	86.1	1540283	IWR	iShares Russell Midcap Index	ARCX	135.29	149785
PwrShrs Preferred Portfolio	ARCX	14.95	1531887	MUB	iShs S&P National Municipal Bd	ARCX	110.91	133310
iShares DJ Select Divid Index	ARCX	66.99	1400481	IJS	iShares S&P SmallCap 600/Barra	ARCX	95.21	131744
Vanguard High Div Yield ETF	ARCX	58.36	1389772	IJT	iShares S&P SmallCap 600/Barra	ARCX	99.12	111958
Vanguard Value ETF	ARCX	69.56	1167357	GSG	iShs GSCI Commodity-Indexed Tr	ARCX	31.55	111574
iShares MSCI Hong Kong Idx Fd	ARCX	20.8	1152440	IWP	iShares Russell Midcap Growth	ARCX	74.65	109870
DB Commodity Index Tracking Fd	ARCX	26.18	1141430	VDE	Vanguard Energy ETF	ARCX	116.94	90421
iShares MSCI Pac Index Fd	ARCX	49.86	1063580	WIP	SPDR DB Intl Gov Inflation Pro	ARCX	61.4	86068
PowerShares DB Agriculture Fd	ARCX	25.38	1034681	IJJ	iShares S&P Midcap 400/Barra V	ARCX	104.82	62286
iShares Russell 2000 Val Index	ARCX	87.69	963152	IJK	iShares S&P Midcap400/Barra Gt	ARCX	136.14	55335
Vanguard Total Bond Market ETF	ARCX	83.52	920880				26	
iShares iBoxx \$ InvesTop Inv	ARCX	120.09	909471					
iShares Russell 2000 Gth Index	ARCX	113.46	886373					

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