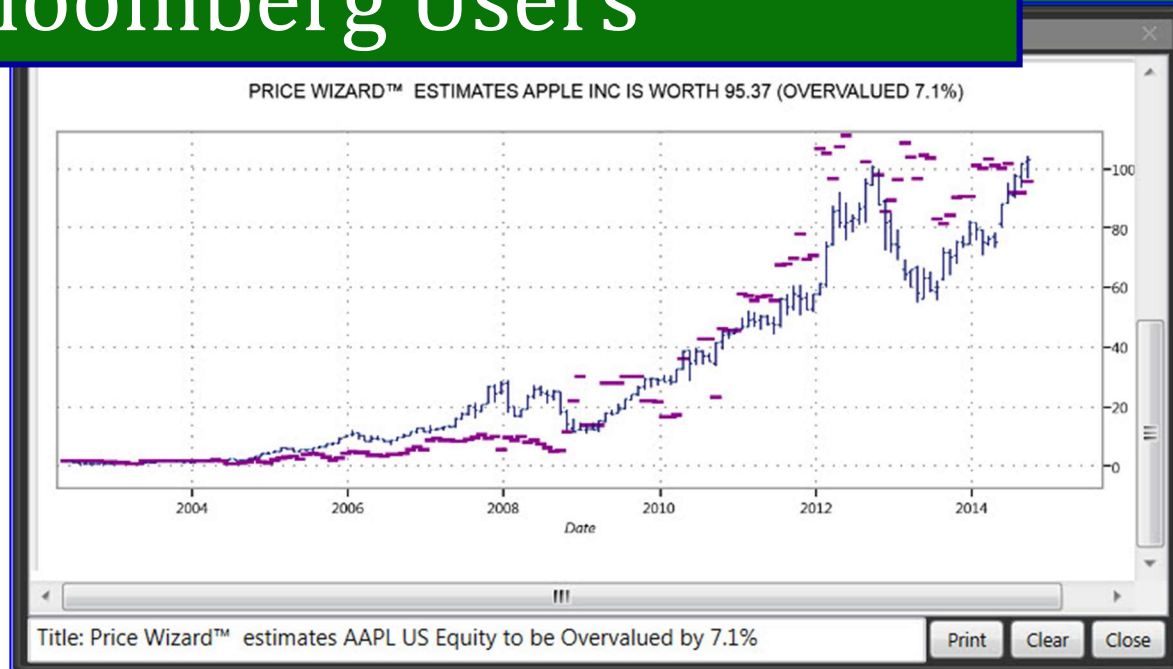




Price Wizard™ Scanner Guide for Bloomberg Users



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What is Price Wizard?

Price Wizard is a suite of industry-scoped multi-factor neural network equity models that were pre-trained to convert company fundamentals into a current estimated market price. It uses no future growth expectations, analyst estimates, or price momentum. In fact, Price Wizard input factors do not include price in any form, past or present. This program automatically performs an appraisal by simultaneously using common stores of value – like earnings, cash flow, book, and dividends – along with critical modifiers like industry, margins, debt, interest rates, and inflation. All these factors are taken in to determine an estimated valuation price.

Its History and Success

Price Wizard was first invented in 1990 to estimate the pre-offering value of IPOs and has since been incorporated in several money management programs. To our surprise, stocks that were undervalued by some amount tended to **drift toward value at 400-500 basis points per year** in excess of the overall market. Marquee Millennium Capital Management used Price Wizard to manage its large cap value portfolios from 1991-2008 and achieved those numbers.

Price Wizard uses Bloomberg Data

Price Wizard version 5 is a powerful equity valuation tool, pulling high quality data from Bloomberg's global databases. In one example backtest, Price Wizard was run against the Russell 3000 stock holdings. Over an 11-year period ending Sep-2013, the Russell had a 21.57% average annual return (of rolling monthly portfolios for all stocks) and a risk (annualized standard deviation) of 19.87%. Portfolios constructed using the top 10% of Price-Wizard-ranked stocks showed a return of 41.28% with a risk of 23.41%, for an excess return of **1971 basis points** and a Return/Risk ratio of **1.76** (see Pages 17-18).

The Price Wizard application empowers users to value equities on any global exchange. Results are displayed on monthly scale charts. Following valuation, we have several analysis methods included. Factors can be viewed and varied for "what if" scenarios. Specific price estimates can be analyzed regarding factor sensitivity. Portfolio aggregate valuations, performance back testing, and portfolio construction tools are also available.

Superior Equity Valuation by using Neural Networks (machine learning)

Price Wizard uses neural network technology, and through extensive training on examples, has learned how to price stocks using fundamental factors that do not contain a market price. Machine learning gives Price Wizard an edge because it can spot interrelationships between fundamental factors, ones that aren't so obvious using simpler models. Because our model is generated by processing a vast amount of historical data and its relationship to the fundamental factors, our evaluations have consistency that you can rely on.

Neural networks are explained in more detail on the next page.

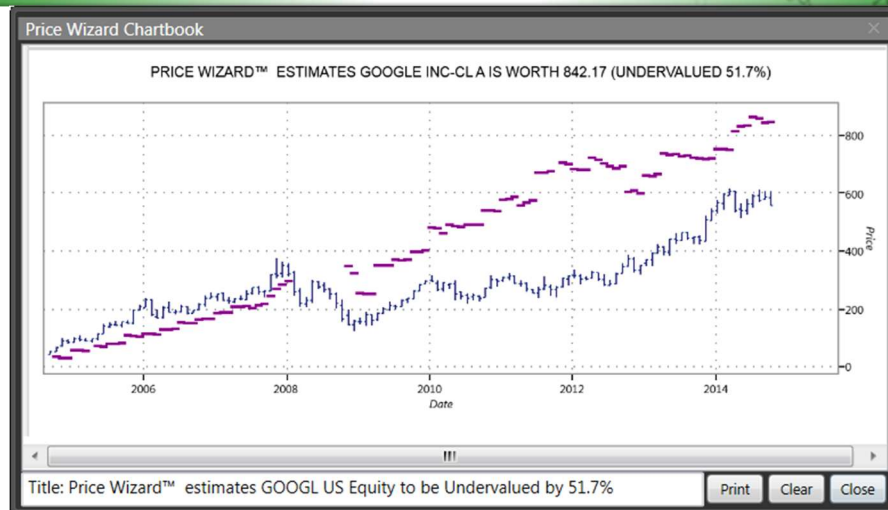


Figure 1. This is an example of valuations (dark magenta) on a monthly chart of Google

Neural Networks

A neural network is a mathematical modeling tool which has the capacity to learn by example. This is a powerful ability, especially in financial modeling. Inputs & outputs in stock trading are usually well documented, and there are countless examples. Networks are “trained” by being presented with thousands of facts, each fact consisting of inputs and corresponding outputs. Through a unique feedback process, the network learns how those inputs are related to the outputs and develops a general model to describe the relationship.

In our case, fundamentals were fed in, and the corresponding current stock price was used as the output. We also dealt with challenges of data error and significant sources of bias. Through our proprietary data preparation, training, and price reconstruction steps, we were able to make the model an even greater success.

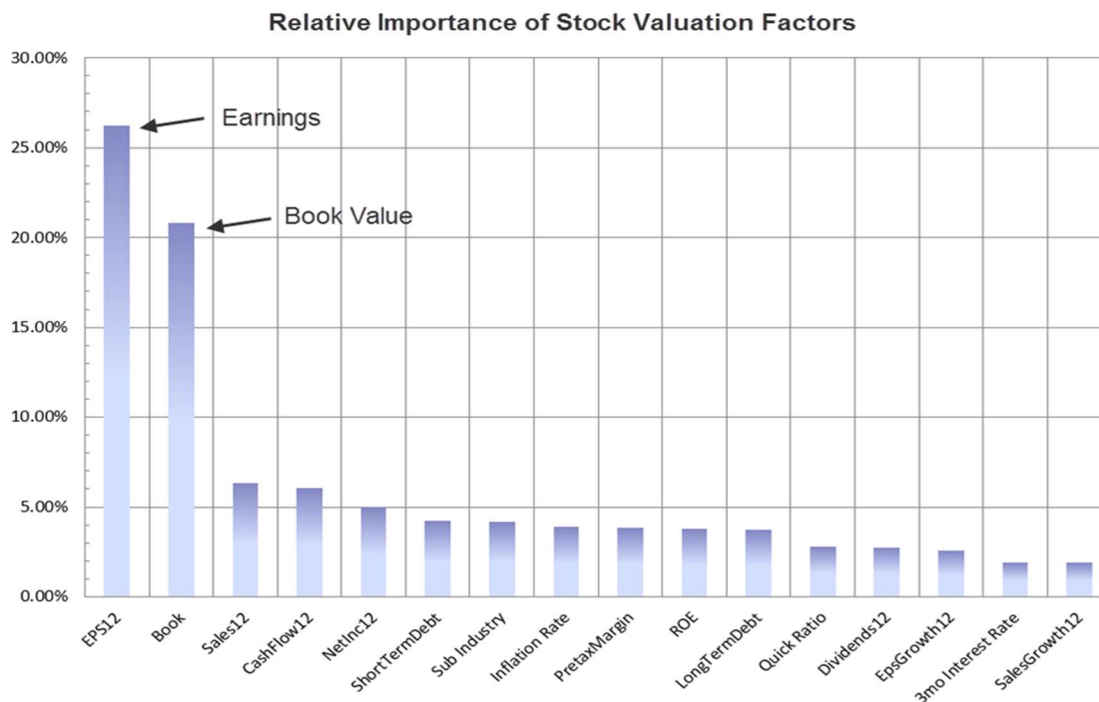
The training data for Price Wizard Version 5.0 mostly ended in 2000, except for two industry groups that needed retraining in 2020, and a GICS code change in 2018 that required splitting out the real estate sector. There are 15 trained networks in all, one for each economic sector or industry group. Once trained, the model is used to evaluate data beyond its training set.

Factors Used in Price Wizard

The following fundamental factors are used in Price Wizard, to determine price evaluation:

- Earnings
- Book Value
- Sales
- Cash Flow
- Net Income
- Long- and Short-Term Debt
- Industry Group
- Inflation Rate
- Margins
- Return on Equity
- Quick Ratio
- Dividends
- Earnings per Share Growth
- Interest Rate
- Sales Growth

Here is the relative importance of each factor used in collectively by all sectors in Price Wizard version 5:



Note that earnings and book value dominate, just as predicted by Benjamin Graham in his “Graham Model”

When to Use Price Wizard

The efficient market theory would have us believe that stocks are always at or very near fair value. We don't see that. The cycles of optimism and pessimism regularly cause price to swing away from value. Our other product, ExtremeHurst (APPS EHURST<go>), attempts to detect the crowd effect, while Price Wizard attempts to bring us a value that is absent any crowd expectations or biases.

The chart below represents a new way to judge risk and reward in your portfolios. The amount that a stock is overpriced IS the downside risk, while the amount which is underpriced, is the potential reward.

The best way to use Price Wizard is to modify your portfolios to stay on or near the side of value. Long term portfolios will benefit from higher potential reward, while with short portfolios you'll likely prefer higher risk.

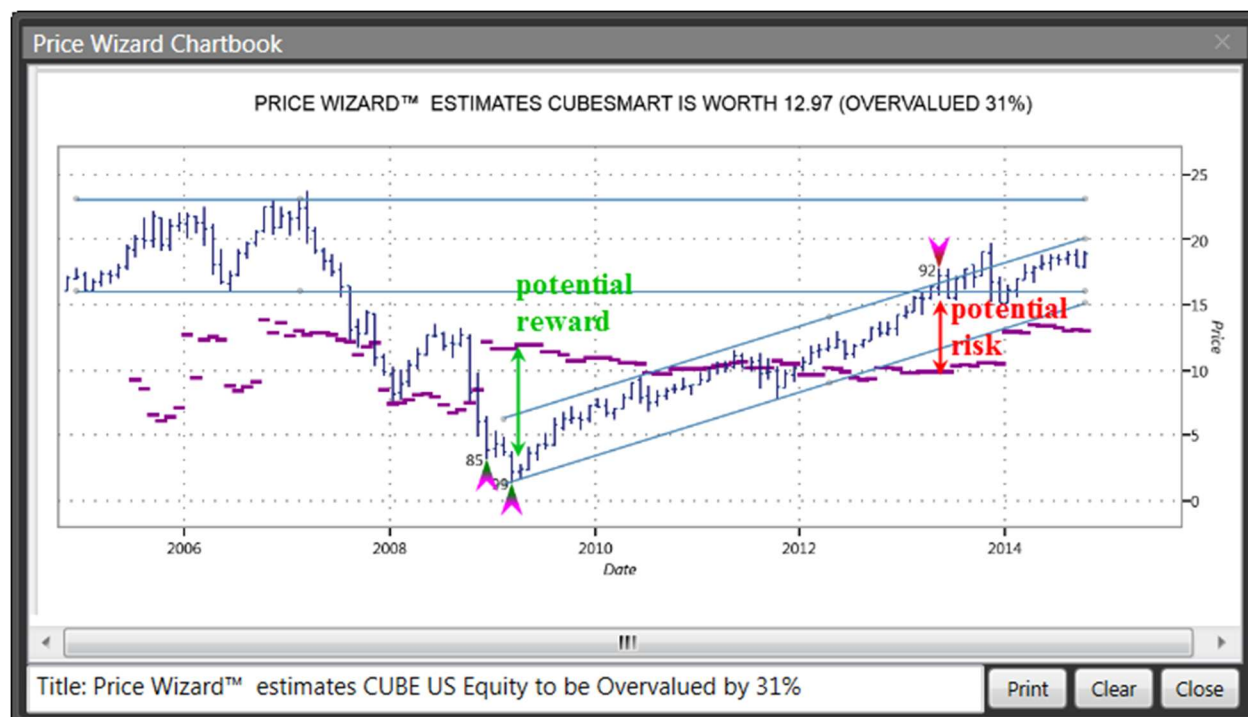


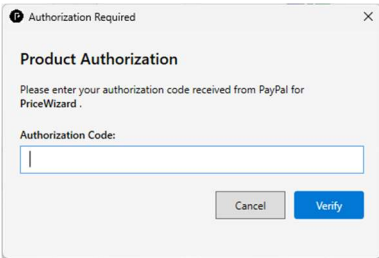
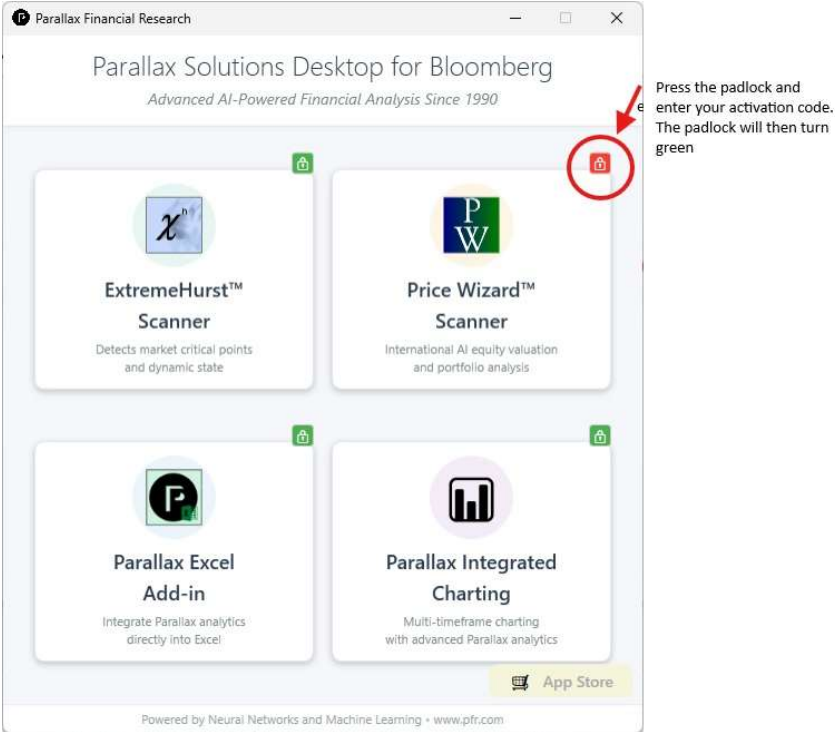
Figure 2. Price Wizard redefines risk and reward.

A Note for Money Managers

It is recommended that managers use Price Wizard to at least rank stocks in their universe and reduce the holdings of the most overvalued ones. We recognize that most managers must match their holdings to a benchmark, so it isn't usually possible to exclude an entire sector just because it's overvalued. In this case, you can use Price Wizard to at least pare down exposure to the poorest ranked stocks.

Using the Price Wizard Scanner

To start Price Wizard, use the Parallax Solutions Desktop launching application from your PC desktop or apps list. Be sure to use the activation code from your purchase email to unlock each tool. Press the padlock and enter your code.



After the activation code is entered, the padlock should turn green. Then just press the Price Wizard panel button and the scanner application will open



The main scanner window looks like this:

Annotations:

- Banner:** Points to the top header area.
- Security Group Selection:** Points to the SOURCE, MODE, SECTORS, and FILTERS dropdown menus.
- Valuation Progress:** Points to the 'Perform Valuation' button and progress bars.
- Valuation Results List:** Points to the table of results.
- Selected Chart:** Points to the 'Valuation Chart' area.
- Zoom Output Options:** Points to the 'Chart Zoom' slider and the bottom toolbar.

Security	Sector	MktCap	Last	YY%	PW Price	PW YY%	PW Diff%	As of
NG/ LN EQUITY	Utilities	65.798	13.23	33.6	12.41	-4	-6.2	1900-01-01
REL LN EQUITY	Industrials	45.932	25.25	-32.7	28.45	7.9	12.7	1900-01-01
LSEG LN EQUITY	Financials	45.492	89.2	-18.9	78.35	-10.5	-12.2	2026-03-26
CPG LN EQUITY	Consumer Discretionary	39.359	22.0450	-10.3	15.11	7.1	-31.5	2025-11-25
AAL LN EQUITY	Materials	38.97	33.08	84.9	17.65	-33.9	-46.7	2026-03-03
STAN LN EQUITY	Financials	35.742	15.91	70.9	18.41	37.7	15.7	2026-03-26

General Notes

Price Wizard App Window

As you can see above, the window is divided into seven horizontal sections from top to bottom, which correspond to the workflow sequence. We will go through the workflow later in this guide.

Getting Help

You can press the “Help” button for more information on how to use Price Wizard or to contact sales/technical support.

CPU Usage

Price Wizard performs millions of mathematical calculations, including running pre-trained embedded neural networks, during each run. You will notice a sharp increase in CPU usage during searches.

Important: Bloomberg Data Limits

Bloomberg clients have monthly data usage limitations. We recommend that you carefully select a security universe and run valuations as needed. Price Wizard reads about thirty data time series for each symbol that makes it through the filters.

Workflow

Step 1: Security & Filter Selection



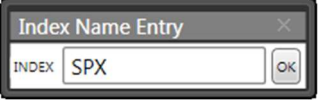
Within the security and filter selection area, there are four color-coded sections: Source, Mode, Sectors, and Filters.

Step 1a: Source, Scale, and Mode

The first two sections are connected. First go to the yellow “Mode” section and select whether you want to value equities or portfolios.



If you select Equities (in the yellow Equity section), you have the following options for valuation, in the green Source section:

Single Security	Value a single equity. Be sure to enter the full name (e.g., “MSFT US Equity”)
Securities List	Value a list of securities. Do this by inputting a text file (.txt) with your list of securities in it. This file can be created using NotePad or other text editors. Type out a list of securities, one per line, in the following format: “[security name] [exchange code] [yellow-key]”. For example: <pre>AH US Equity KAR US Equity MSFT US Equity IBM US Equity</pre>
Index or ETF Holdings	Search just the securities that make up an equity index or ETF by typing the Bloomberg name at the prompt. For example, SPX INDEX or SPY US EQUITY for the S&P 500 index: 

Portfolio (PRTU) Bloomberg offers clients the ability to keep portfolios on their system using PRTU <go>. If you wish to search only your portfolio securities, then enter your portfolio name at the prompt. It should be in the following format: "U[Bloomberg UUID]-[portfolio number]", like so:



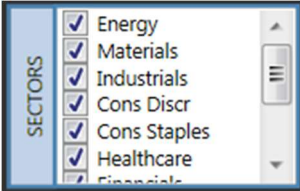
Or if you select Portfolios (in the yellow Mode section), you'll have these options, in the green Source section:



Single ETF	Value a single ETF
Single Index	Value a single Index

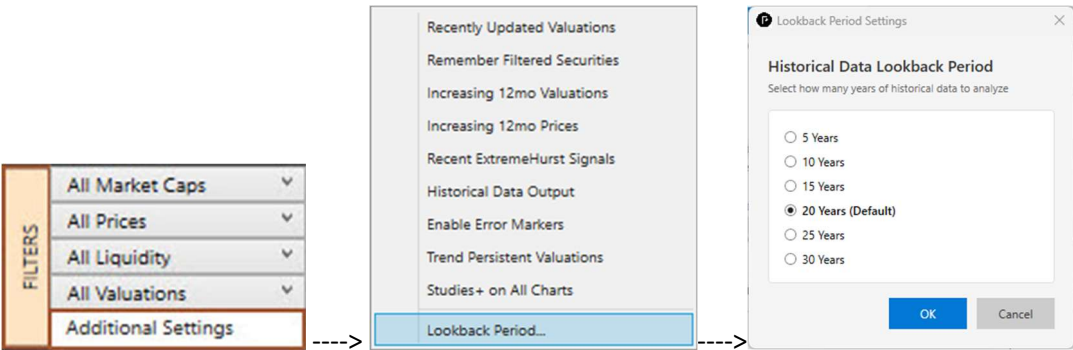
Step 1b: Sectors

Select which GICS economic sectors to process. By default, all are selected.



Step 1c: Filters and Filter Settings

Here you can filter your valuation search results in a variety of ways:



Main Filters:

Market Cap Filter	Limit by selected market capitalization range. Passes stocks through according to their size.
Price Filter	Limit by selected minimum allowable equity price.

Liquidity Filter	Limit by selected minimum average dollar volume. Ensures that securities with volume have volume on every trading day and trade enough dollar volume on an average day.
Valuation Filter	Limit by selected valuation threshold.

Additional Settings:

Recently Updated Valuations	Check this option to search for new signals only. If it is unchecked the search will find all signals that are still active, but it will take longer.
Remember Filtered	Check this option for the program to remember all the securities that have been filtered out. This memory will persist even when the program is closed.
Increasing 12mo Valuations	Select this option to find only signals that have the highest possible quality.
Increasing 12mo Prices	This is our recommended setting for finding signals.
Recent ExtremeHurst™ Signals	Select this option to limit valuations to only those equities that have active ExtremeHurst signals. For more information on ExtremeHurst, type APPS EHURST <go> on your Bloomberg terminal.
Historical Data Output	Check this option to enable all of the valuation history to be saved to CSV. If unchecked, only the most recent valuations will be saved to file.
Enable Error Markers	Places standard deviation error bars (+/- one standard deviation) above and below the price estimate.
Enable Prior Version	Select this if you were a client for Version 3 of Price Wizard (on another platform) and wish to read in that valuation history. Contact Parallax for further information.
Trend Persistent Valuations	Check this to search for stocks that have trend-persistent valuations over a number of years. This is determined by whether or not the Hurst Exponent applied to the valuation series is greater than 0.52.
Studies+ on All Charts	Check this if you would like to overlay quantitative studies on all charts in the list when "Studies+" is pressed
Lookback Period	Vary the historical valuation range from 5 to 30 years (default is 20)

Step 2: Performing Valuation



Buttons:

Perform Valuation	Press the “Perform Valuation” button to download historical price & fundamental data from Bloomberg. It does this for the selected equities, and then process that data for Price Wizard valuations. The download procedure first checks that the average daily dollar volume is greater than the limit before requesting additional data. Look at the “Filtered” section below the STOP button to find out how many securities passed your filters and have finished being run through the processor. In the example above, we show the search section before and during a search of Nasdaq 100 stocks. Note that the “Perform Valuation” button is grayed-out until all downloading and calculations are complete.
STOP	The search procedure gathers data in chunks and then processes that data before gathering the next chunk. Press STOP to break the cycle and stop the processor from gathering additional data. It will, however, complete the valuation using the data that was already downloaded.

Notes:

CPU Usage	During each run, Price Wizard performs millions of complex mathematical calculations including neural network math. You will notice a sharp increase in CPU usage.
Data Usage	Bloomberg clients have monthly data usage limitations. We recommend that you carefully select a security universe and then perform valuations as needed when the fundamental data changes. If you hit your limit you’ll see a message.
Data Warning	<p>If you ask for more than 1000 securities then this message comes up. As an example, In the US, the almost 20,000 listed equities are cut down to less than 2,000 by even modest filter settings. If you are unsure, press the STOP button part way through, or just make a security list in a text file and read it in.</p>

Step 3: Price Wizard Results List

Valuation results are listed in the window as the search progresses. The list has one equity per line. Use the scroll bars to move through the signal list. Right click on any equity to see more menu options. You may also sort each column by clicking the column header.

Security	Sector	MktCap	Last	YY%	PW Price	PW YY%	PW Diff%	As of
AHT LN Equity	Industrials	8.01	15.91398	67.4	15.65	24.5	-1.6	2014-09-03
LEG GR Equity	Financials	2.305	43.53012	22.4	42.83	36.8	-1.6	2014-08-12
RAND NA Equity	Industrials	55.462	307.93271	-5.4	306.06	94.8	-0.6	2014-08-01
SU FP Equity	Industrials	27.896	47.80224	-13.7	47.85	-0.6	0.1	2014-07-30
GXI GR Equity	Health Care	1.755	55.89	23.3	56.16	-2.9	0.5	2014-07-15
LG FP Equity	Materials	12.645	43.97775	-0.8	44.37	-17.8	0.9	2014-07-28
ZOT SM Equity	Industrials	3.412	7.84532	-18.5	7.93	-29.3	1	2014-07-30
LRE LN Equity	Financials	1.18	6.23	-17.9	6.3	-13.3	1.1	2014-07-24

Each equity listed is described by the following:

Security	The Bloomberg symbol for this security
Sector	The GICS sector name for the stock
MktCap	Market Capitalization in billions
Last	Last market price (PX_LAST)
YY%	year-over-year %change in market price
PW Price	Price Wizard price estimate based only on the fundamentals reported through Bloomberg
PW YY%	year-over-year %change in Price Wizard's price estimate
PW Diff%	Percent difference between the last market price and Price Wizard's price.
As of	This is the Date of the last Bloomberg fundamental database update or the last valuation, whichever is older

Step 4: Price Wizard Output Options

There are eight output-related buttons across the bottom, with an additional help button:

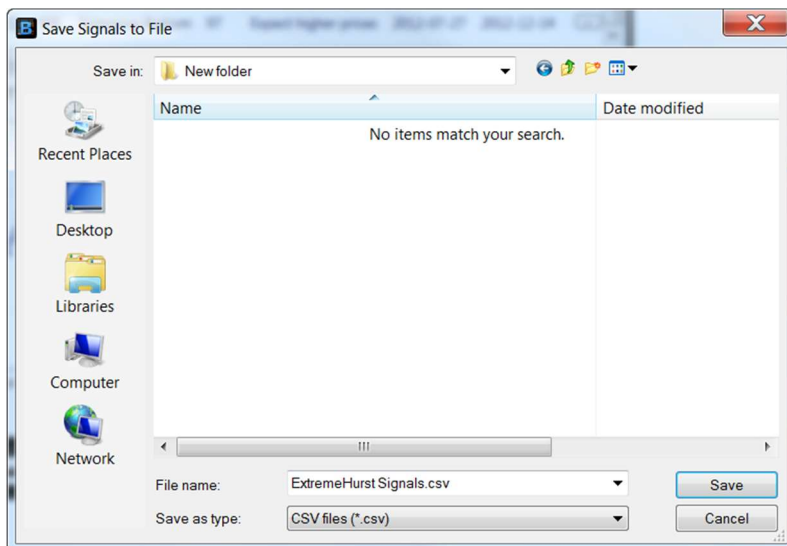


Save List	Allows the user to write the signals to a CSV file.
Copy List	Places the results data in the clipboard, so it can be pasted into a spreadsheet or other compatible document.
Clear List	Wipes the results list clean.
Print Screen	Sends an image of the current dialog box to the printer.
Copy Screen	Sends an image of the current dialog box to the clipboard.

Analysis	Performs extra functions such as aggregate valuation and past performance analysis. <div style="border: 1px solid gray; padding: 5px; margin-top: 5px;"> <p>Examine Factors</p> <p>Aggregate Valuation</p> <p>Sector Heatmap</p> <p>State Heatmap</p> <p>Country Heatmap</p> <p>Create Portfolios</p> <p>Past Performance</p> </div>
Studies +	Adds other Parallax technical studies to the current chart. Note that these studies are available individually from the Bloomberg APP store.
Chartbook v	Accumulates the user's favorite chart images for later printing either one at a time or all of them automatically
Help	Opens help screen

Details:

Save List Press this button to save the signal list to a comma delimited text file.



Here is the CSV file format:

Header	Description	Example	Bloomberg Fields Used-1	Bloomberg Fields Used-2
Record No	Signal counter starting at 0	7		
Run Date	Database query date (for histories this will reflect point in time)	5/15/2021		
Security	Full security name	MSFT US EQUITY	TICKER	
Description	Security description	MICROSOFT CORP	NAME	
Sector	Company economic sector	Information Technology	GICS_SECTOR_NAME	
Industry	Company industry sub-group	Systems Software	GICS_SUB_INDUSTRY_NAME	
Region	Geographic region	United States		
Country	Security description	US	COUNTRY_ISO	
State	Economic sector from GICS code	WA	STATE_CODE	
Exchange Info	Economic sub industry from GICS code	NASDAQ GS	PRIMARY_EXCHANGE_NAME	
TypeName	Security type	COMMON STOCK	SECURITY_TYP	
Symbol	Security symbol	MSFT		
Exchange	Common exchange code	US		
Type	Bloomberg "Yellow key"	EQ		
ADR Underlying	ADR underlying security (blank if none)	none	ADR_UNDL_TICKER	
MktCap	Market Capitalization = Shares X Price (billions)	1870		
Last Price	Market last price as of run date	248.15	PX_LAST	
PriceYYPct	Year over year percent change in market price	35.5	CHG_PCT_1YR	
PriceHurst	Hurst exponent approximation for past 3 years of market prices	0.507729286		
Plot Scale	Valuation sampling frequency	MO		
Signal	not used	PW Valuation		
PWRank	Neural net fundamental rank	31		
Forecast	Undervalued or Overvalued	Overvalued		
AsOf	Most recent Bloomberg database update date	4/28/2021	FUNDAMENTAL_DATABASE_DATE	
PrcVsPWCorrel	r-value of price vs valuation series over past 36 months	0.957578333		
PWPrice	Price Wizard estimated security price (valuation) using AI	175.65		
PWError	Std deviation of valuation price	24.91		
PWPrcYYPct	Year over year percent change in valuation price	8.1		
PWDiffPct	Percent change required for market price to reach valuation	-29.2		
PWDiffZ	distance from valuation to market price expressed in std deviations (Z)	-2.9		
PWValueGrowth	Annual valuation growth rate over the past 3 years	13.6		
PWHurst	Hurst exponent approximation for 3 years of valuation prices	0.527627856		
PWValueAccel	Quarterly change in valuation growth rate	-1.538961039		
Action	used for color coding	0		
GICS	Full GICS code	45103020	GICS_SUB_INDUSTRY	
Shares	Shares outstanding in millions	7534	EQY_SH_OUT	BS_SH_OUT
Book	Book value	17.8531	BOOK_VAL_PER_SH	
Dividends12	Dividends per share over 12 months	2.14	DVD_SH_12M	
EPS12	Earnings per share over last 12 months	7.2595	TRAIL_12M_EST_COMPARABLE_EPS_ADJ	T12M_DIL_EPS_BEF_XO
EPSQtr	Earnings per share for quarter	1.95	IS_COMP_EPS_ADJUSTED	IS_DIL_EPS_BEF_XO
LongTermDebt	Long term debt	9.368197505	BS_LT_BORROW	
ShortTermDebt	Short term debt	9.582293602	BS_CUR_LIAB	BS_ST_BORROW
PretaxMargin12	Pretax margin for trailing 12 months	40.7073	T12_PRETAX_MARGIN	
CashFlow12	Cash flow for trailing 12 months	9.6175	TRAIL_12M_CASH_FLOW_PER_SH	
NetInc12	Net income for trailing 12 months	7.352667905	TRAIL_12M_EST_COMP_NET_INC_ADJ	
Sales12	Sales for trailing 12 months	21.1619	TRAIL_12M_SALES_PER_SH	
QuickRatio	Quick Ratio	2.1335	QUICK_RATIO	CUR_RATIO
IntRate3m	3 month treasury rate (*varies by country)	-0.0025	USGG3M*	
Inflation	Inflation rate (*varies by country)	4.2	CPI YOY*	

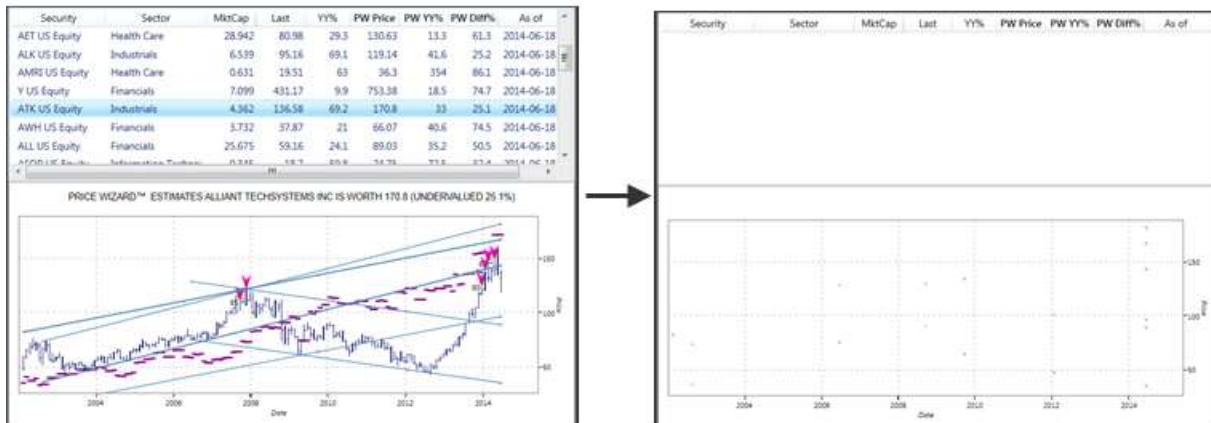
Copy List

Press the "Copy List" button to save the signal list to the Windows clipboard. Below is the signal list pasted into EXCEL.

Security	Date	Description	Sector	Industry	MktCap	LastPrice	PWPrice	DiffPct	PriceYYPct	PWPrcYYPct
AAPL UW Equity	7/18/2014	APPLE INC	Information Technology	Technology Hardware Storage &	569.381	94.43	76.49	-19	53.1	0
AAPL UW Equity	6/18/2014	APPLE INC	Information Technology	Technology Hardware Storage &	555.815	92.18	87.22	-5.4	49.4	-8.2
AAPL UW Equity	5/18/2014	APPLE INC	Information Technology	Technology Hardware Storage &	514.684	85.3586	88.96	4.2	37.9	-7
AAPL UW Equity	4/18/2014	APPLE INC	Information Technology	Technology Hardware Storage &	468.241	74.9914	97.47	30	33.9	11.2
AAPL UW Equity	3/18/2014	APPLE INC	Information Technology	Technology Hardware Storage &	474.003	75.9143	104.32	37.4	16.6	8.5
AAPL UW Equity	2/18/2014	APPLE INC	Information Technology	Technology Hardware Storage &	487.017	77.9986	100.04	28.3	18.6	-0.9
AAPL UW Equity	1/18/2014	APPLE INC	Information Technology	Technology Hardware Storage &	482.515	77.2286	101.24	31.1	8.1	6.3
AAPL UW Equity	12/18/2013	APPLE INC	Information Technology	Technology Hardware Storage &	495.549	78.6814	83.74	6.4	3.1	5.8
AAPL UW Equity	11/18/2013	APPLE INC	Information Technology	Technology Hardware Storage &	466.649	74.0929	83.74	13	-1.7	9.8

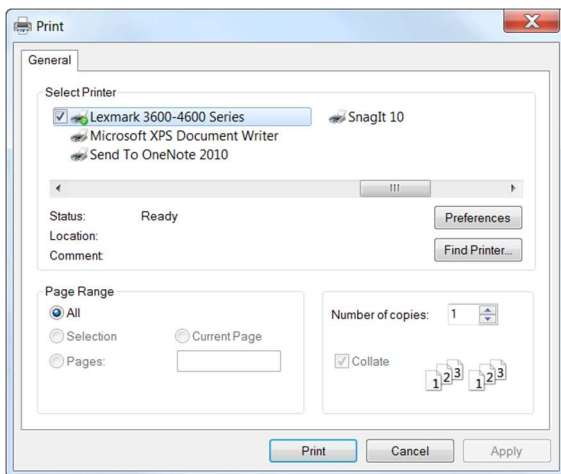
Clear List

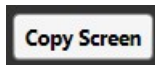
Press the “Clear List” button to clear the results list and chart.



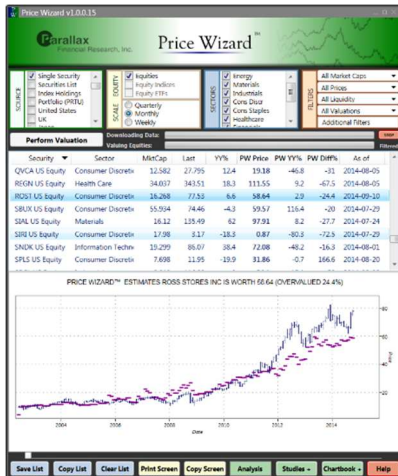
Print Screen

Press the “Print Screen” button to print a copy of the screen image.





Press the “Copy Screen” button to copy an image of the screen to the windows clipboard. This allows you to paste the image in a report or email.









Press the “Studies +” button to add additional studies to the selected chart. Once pressed, we run ExtremeHurst (Custom Study “PFEH”), SmartChannel (Custom Study “PFSC”) and Price-Volume Crossover (Custom Study “PFPVC”) studies. These studies are available through the Bloomberg app store at either APPS EHURST <go> or APPS CS:PFR <go>.

Chart with Parallax Studies added via “Studies +”

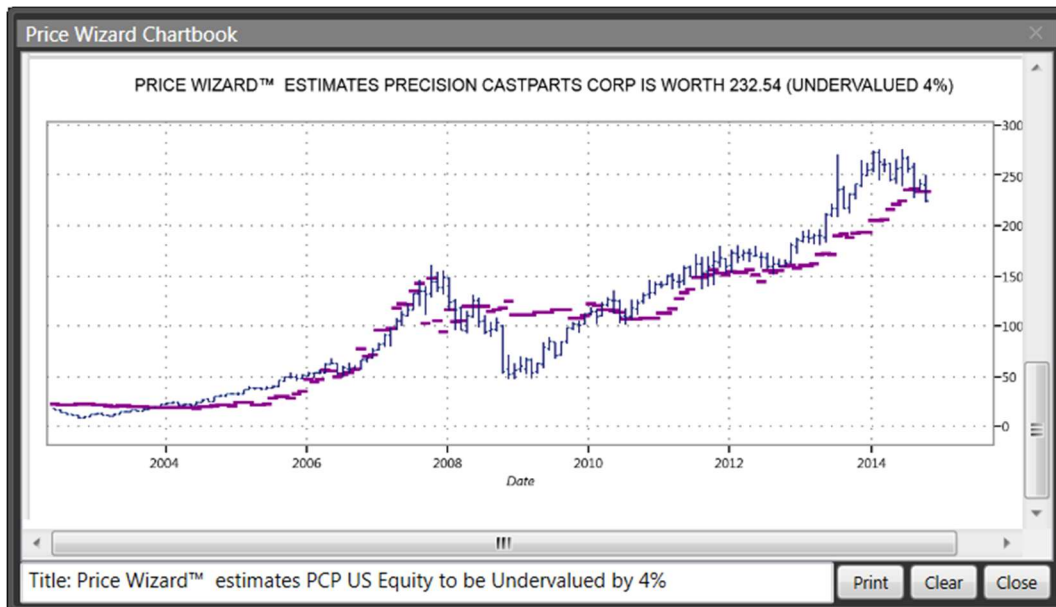


Explanation of “Studies +” Symbols:

Study Marker Name	Symbol	Purpose	Float over
ExtremeHurst Extension Top marker		Marks the end of an uptrend for up to 20 bars. Optimal spot to redeploy capital, especially if overvalued	ExtremeHurst {APPS EHURST<go>} Date: 11/18/2007 Time: 4:00 PM Type: Extension Top Price: 120.9 Rank: 83 Scale: monthly Mc: 7
ExtremeHurst Compression marker		Marks the start of a new trend either up or down that may persist for up to 20 bars. Option straddles are recommended	ExtremeHurst {APPS EHURST<go>} Date: 9/3/2011 Time: 4:00 PM Type: Compression Price: 23.73225 Rank: 91 Scale: monthly Mc: 6.8
ExtremeHurst Extension Bottom marker		Marks the end of a downtrend for up to 20 bars. Optimal spot to begin allocating capital, especially if undervalued	ExtremeHurst {APPS EHURST<go>} Date: 11/3/2008 Time: 4:00 PM Type: Extension Bottom Price: 12.5 Rank: 98 Scale: monthly Mc: 6.8
Price Volume Cross Sell		Marks a short-term top that may persist for up to 5 bars	PV Cross Sell {APPS CS:PFR<go>} Date: 7/3/2014 Time: 4:00 PM Type: PVX Price: 23.21 Rank: 94 Scale: monthly
Price Volume Cross Buy		Marks a short-term bottom that may persist for up to 5 bars	PV Cross Buy {APPS CS:PFR<go>} Date: 11/18/2008 Time: 4:00 PM Type: PVX Price: 197.935 Rank: 41 Scale: monthly
SmartChannel Lines		Marks support and resistance	

Chartbook +

Press this button to save the current chart image to a book for later printing and review.



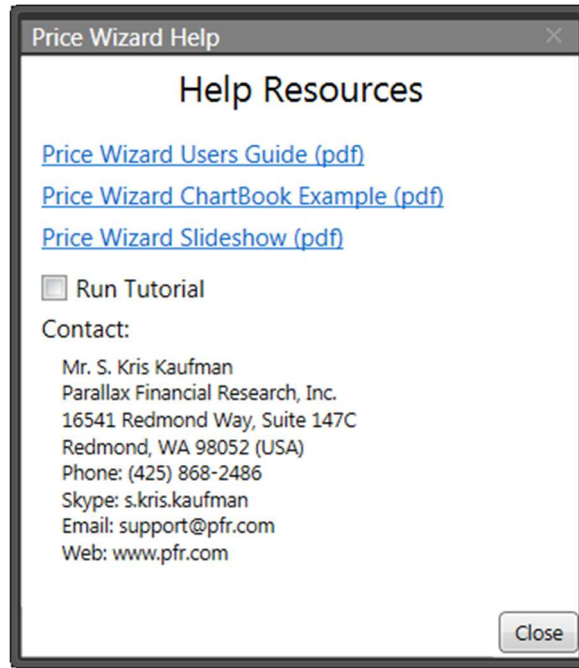
On the chartbook printout, we also include current fundamental data:

Chart #3, Date: 10/12/2014, Price Wizard™ estimates PCP US Equity to be Undervalued by 4%



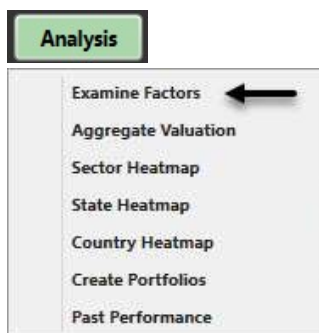
Help

Our Help screen is shown below:



Parallax Financial Research, Inc. is a small scientific research boutique in Redmond, WA. The firm empowers professional money managers with a distinct edge through its unique fundamental and quantitative stock and commodity models. Our models are composed of individual "predictors" which are based on the financial application of both chaos and complexity theories and presented in clear visualizations. These predictors are blended into forecasting models using genetically enhanced neural networks. Our careful application of these mathematical modeling techniques yields unique and powerful solutions to enhance manager performance. Visit our website at www.pfr.com

Last Step: Results Analysis

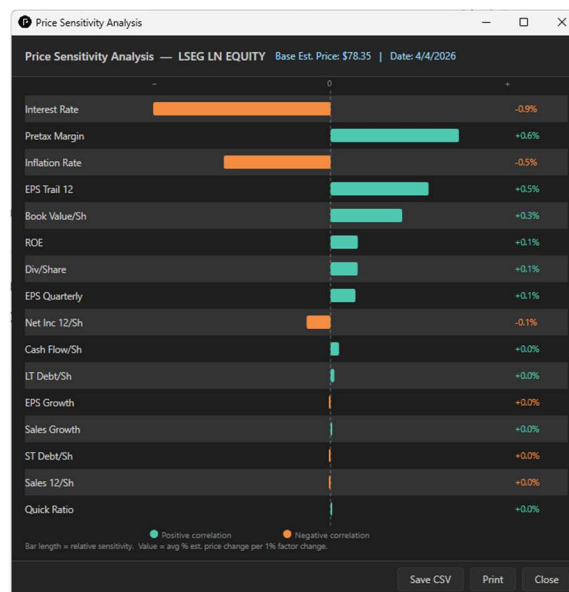


Press this button to analyze the list of equities that you have valued.

The first menu option is called **“Examine Factors”** and brings up a box with all factors that were used to estimate price:

Symbol	Date List		
ACN US EQUITY	10/29/2021		
Company Name	Industry		
ACCENTURE PLC-CL A	IT Consulting & Other Services		
EPS Qtr	EPS Trail 12	Book Value/Sh	Div/Sh
2.195	8.945	30.872	3.61
Pretax Margin	Net Inc 12/Sh	Sales 12/Sh	Cash Flow 12/Sh
15.358	8.829	79.614	14.138
Cur Liab/Sh	LT Debt/Sh	Quick Ratio	Shares Out (m)
23.919	4.188	1.08	656.739
Inflation Rate	Interest Rate	ROE	Last Update
5.4	0.043	29.69	2021-10-15
EPS Growth	Sales Growth	P/E	Estimate P/E
17.694	14.001	39.84	16.41
Price	\$	356.32	
Estimated Price	\$	146.8	

This is also an interactive tool: try editing one of the factors and press **“Estimate”** to see what effect your change had on price. The **“Date List”** also allows you to see the factors from past periods. The **“Sensitivity”** button provides a comma delimited (EXCEL) report on how much estimated price changes by varying each factor individually by 30%



The second menu option is called **“Aggregate Valuation”**. Choose this to see the valuation of all the listed stocks together if they were equally weighted, cap-weighted, or just get the median valuation.

Aggregate Valuations on Monday, May 24, 2021 from OEX Index

Current Valuation

Equity Group	Count	Ave%	CapWAVE%	Median%
All Stocks	99	-27.98	-35.9	-26
Energy	3	-6.88	-13.27	25.2
Materials	3	-53.76	-64.4	-44.5
Industrials	12	-30.79	-31.31	-20.2
Cons Discr.	11	-50.15	-53.67	-28.1
Cons Staples	11	15.5	35.86	20.6
Healthcare	15	-25.81	-25.77	-31.4
Financials	13	-2.11	-10.94	-11.8
Technology	16	-50.37	-54.09	-50.7
Telecomm Svcs	9	-24.16	-19.11	-23.4
Utilities	4	-6.15	-17.99	4.1
Real Estate	2	-32.12	-38.78	-15.6
Large Cap (above 10B)	99	-27.98	-35.9	-26

Print Save Copy Close

Next are the three **“Heatmap”** options. They’re a great time saver for finding selections quickly. We have three different heatmaps available: by sector, on a US map, or on a world map. Just hover your cursor over a region to see individual stocks or aggregate valuations by region.



Next is the **“Create Portfolios”** option. It allows you to search your list of stocks for those matching selected criteria.

Create Portfolios on Monday, May 24, 2021 from OEX Index

Portfolio Type	Size	Min Price			
Long	30	5			
	Percentile	Value Limit%			
Found 7 of 99	100	20			
Sector%	Min	0	Max	20	
Mkt Cap	Min	0	Max	999999	
Growth%	Min	10	Max	100	
Industry%	Min	0	Max	20	

Persistent Valuations Persistent Price
 Has Dividends Fundamental Rank
 Low Debt Low Variance Valuations

Symbol	L/S	Price	PWPrice	Value%	Growth%
COST US EQU	L	383.527	905.52	136.1	13
WMT US EQU	L	141.98	328.55	131.4	15.1
GS US EQUITY	L	366.88	749.64	104.3	14
TMO US EQUI	L	463.355	865.7	86.8	21.6
TGT US EQUIT	L	226.2992	362.99	60.4	17.9
PG US EQUITY	L	138.26	204.63	48	18.7
MET US EQUIT	L	65.06	94.87	45.8	12.6

← Create either Long or Short portfolios with a given max size and min price

← Limit the holdings either by valuation percentile or the actual valuation percentage

← Limit the holdings by Sector

← Limit the holdings by Market Cap

← Limit the holdings by Valuation Growth rate

← Limit the holdings by industry

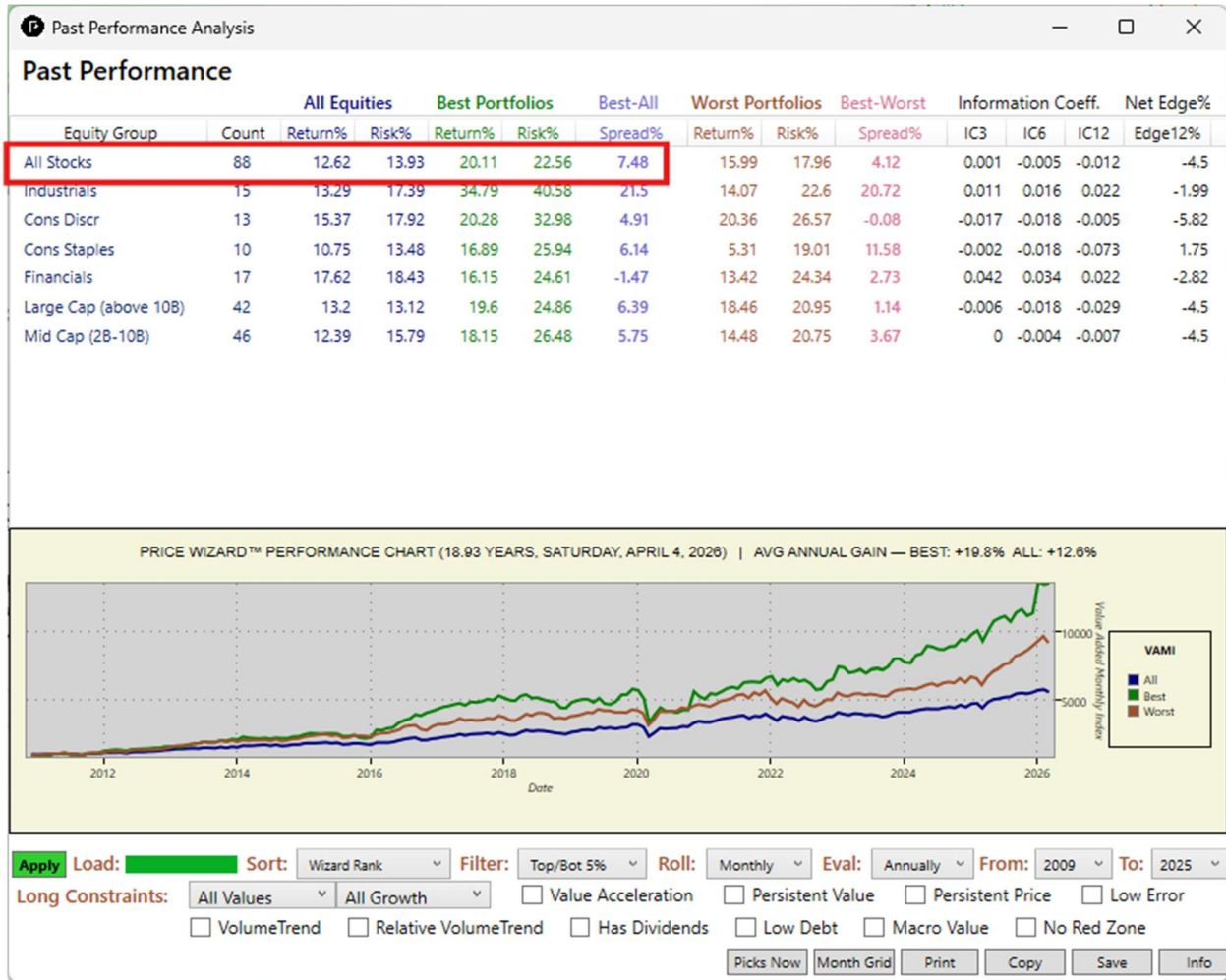
← Additional attributes

← List of stocks that passed all the filters after pressing "Create"

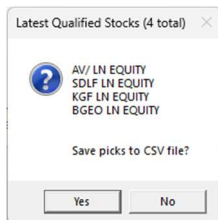
← Create and then save results

Last is the “Past Performance” option. This is our back test module. It is a great way to visualize how different valuation factors affect performance.

As an example, here is the UKX (FTSE 100) list, sorted by our overall Wizard Rank, and then picking the top 5% each month for annual holding periods. We get a nice outperformance of 748 basis points:

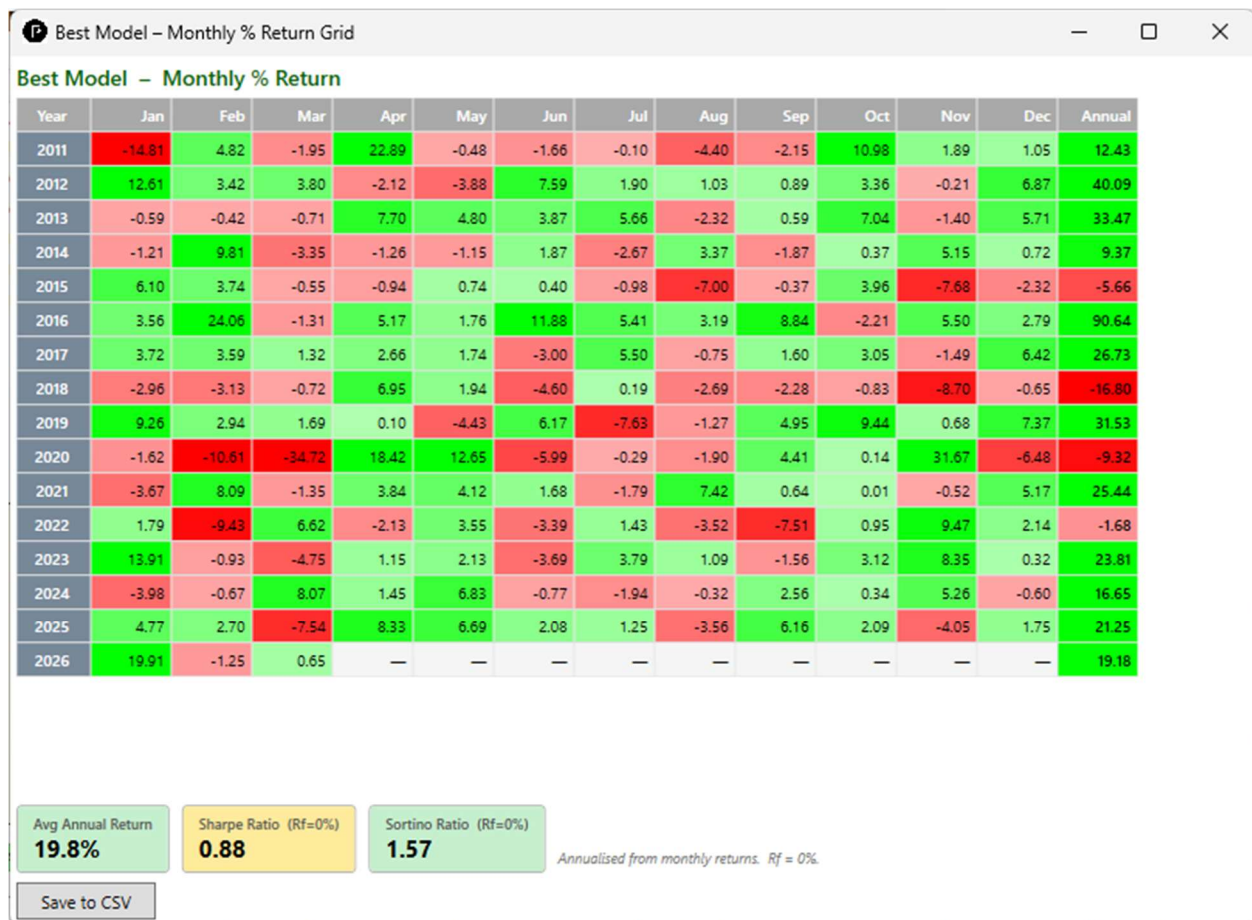


If we select the “Picks Now” button, we get the latest list of stocks matching the backtest settings:



as of 4/4/2026

We also provide a monthly grid display with several common measures:



These examples were run in 2026 over an almost 19-year period.

Detailed Explanation of our testing procedure:

We selected a monthly scale when running valuations, so we have 18.9 years of historical valuations to use for past portfolio construction. We assume that a new portfolio is constructed each month following the chosen strategy. We list the average annual total return% for all these portfolios in each equity grouping that had enough stocks for analysis. We also show the standard deviation risk%, which is derived from annualizing the standard deviation of monthly total returns over the year.

Note that portfolios constructed in this manner are survivor-biased in that the list of stocks obtained today is not the same as those that existed in the past. The results are therefore hypothetical and should be used for information purposes only. We also list the 3, 6, and 12-month information coefficient

numbers.

We show below that for the past 11.35 years ending in September 2013, portfolios constructed from the top 10% of the current Russell 3000 stocks produced an average annual total return of 41.28% with a risk of 23.41%. Contrasting that with the performance of the portfolios that were in the bottom 10%. They returned an average annual total return of 19.34%, with a 21.25% risk. The spread between the top and all possible portfolios in this test was 1971 basis points. The spread between the top and bottom decile in this test was 2194 basis points. Our Information Coefficient for a 12-month holding period over the test years was 0.176, where anything over 0.07 is considered exceptional.

Price Wizard Results for top 2500 US Stocks

(using Russell 3000 Index holdings on Aug 19, 2014 – about 2500 had recent valuations)

Top 5%:

Price Wizard Past Performance (11.35 years)

Past Performance		All		Best Portfolios		Best to All	Worst Portfolios		Best to Worst	Information Coefficient			
Equity Group	Count	Return%	Risk%	Return%	Risk%	Spread%	Return%	Risk%	Spread%	IC1	IC3	IC6	IC12
All Stocks	2487	21.57	19.87	54.05	26.11	32.48	19.89	22.8	34.16	0.091	0.124	0.156	0.176
Energy	161	32.03	29.58	73.81	52.45	41.77	14.56	36.79	59.24	0.085	0.129	0.164	0.25
Materials	135	24.78	23.73	54.06	43.19	29.27	19.56	32.53	34.5	0.085	0.124	0.144	0.132
Industrials	363	23.78	22.15	58.32	31.9	34.53	22.53	27.21	35.79	0.076	0.108	0.137	0.141
Cons Discr	365	26.03	23.52	65.21	33.07	39.17	20.85	27.55	44.36	0.094	0.131	0.16	0.187
Cons Staples	100	13.89	12.9	32.46	31.07	18.57	14.28	26.83	18.19	0.099	0.144	0.166	0.211
Healthcare	275	29.56	21.42	54.91	28.74	25.35	25.42	28.06	29.49	0.064	0.09	0.131	0.158
Financials	578	14.74	18.76	40.29	29.03	25.55	14.61	21.18	25.68	0.098	0.127	0.173	0.187
Technology	410	25.51	24.35	54.1	31.98	28.59	21.39	30.21	32.71	0.113	0.139	0.159	0.166
Telecomm Svcs	29	26.14	24.56	97.23	38.89	71.1	0.31	41.24	96.92	0.13	0.166	0.199	0.228
Utilities	71	8.54	13.29	13.63	16.64	5.09	5.2	17.81	8.43	0.062	0.108	0.141	0.166
Large Cap (above 10B)	391	19.54	16.94	35.16	23.08	15.62	25.46	23.04	9.71	0.074	0.11	0.142	0.179
Mid Cap (2B-10B)	735	21.73	19.44	45.05	26.47	23.32	19.51	22.13	25.54	0.088	0.122	0.154	0.169
Small Cap (300M-2B)	1057	23.8	22.6	55.05	29.26	31.25	20.24	24.4	34.82	0.094	0.123	0.157	0.174
Micro Cap (50M-300M)	304	22.78	21.15	84.78	35	62	17.25	32.69	67.53	0.11	0.147	0.175	0.195

Loading... Strategy: Top/Bottom 5% From: 2002 To: 2013 Print Copy Close

Top 10%:

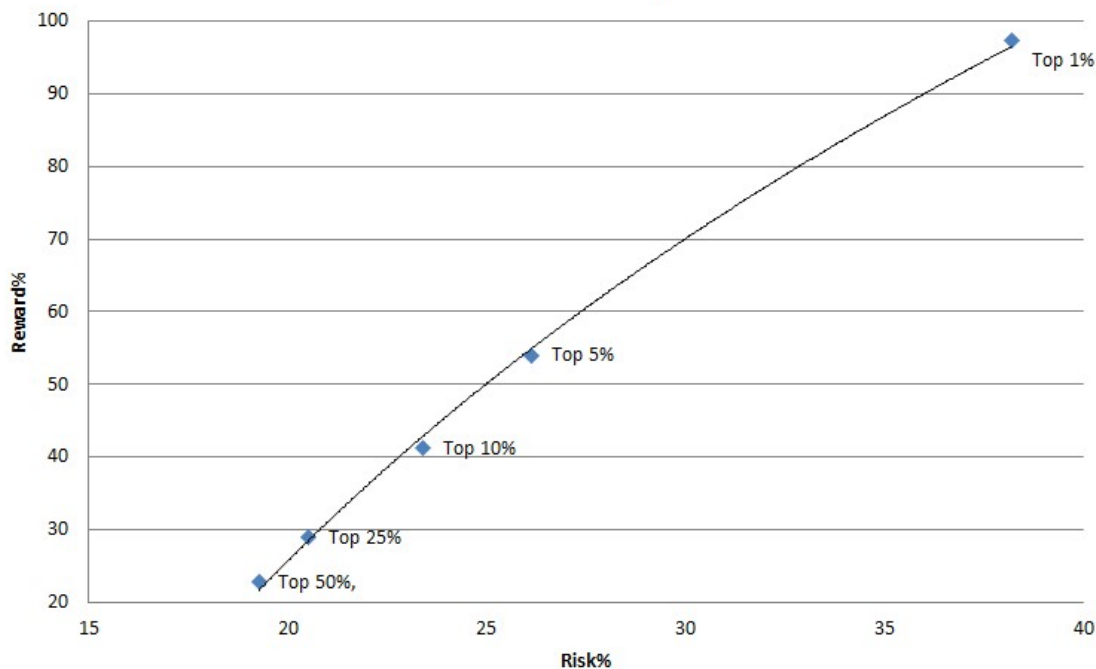
Price Wizard Past Performance (11.35 years)

Past Performance

Equity Group	Count	All		Best Portfolios		Best to All	Worst Portfolios		Best to Worst	Information Coefficient			
		Return%	Risk%	Return%	Risk%	Spread%	Return%	Risk%	Spread%	IC1	IC3	IC6	IC12
All Stocks	2487	21.57	19.87	41.28	23.41	19.71	19.34	21.25	21.94	0.091	0.124	0.156	0.176
Energy	161	32.03	29.58	58.89	39.04	26.86	19.66	31.14	39.23	0.085	0.129	0.164	0.25
Materials	135	24.78	23.73	53.16	36.19	28.38	17.29	25.26	35.87	0.085	0.124	0.144	0.132
Industrials	363	23.78	22.15	45.89	27.81	22.11	21.49	23.76	24.4	0.076	0.108	0.137	0.141
Cons Discr	365	26.03	23.52	47.7	29.51	21.67	20.97	24.75	26.73	0.094	0.131	0.16	0.187
Cons Staples	100	13.89	12.9	37.24	24.5	23.34	11.88	19.65	25.35	0.099	0.144	0.166	0.211
Healthcare	275	29.56	21.42	42.34	22.6	12.78	24.97	25.87	17.37	0.064	0.09	0.131	0.158
Financials	578	14.74	18.76	28.44	23.72	13.7	11.54	19.43	16.9	0.098	0.127	0.173	0.187
Technology	410	25.51	24.35	43.43	28.68	17.92	24.74	27.22	18.69	0.113	0.139	0.159	0.166
Telecomm Svcs	29	26.14	24.56	50.36	31.17	24.22	6.52	34.74	43.84	0.13	0.166	0.199	0.228
Utilities	71	8.54	13.29	11.38	15.3	2.84	4	19.93	7.39	0.062	0.108	0.141	0.166
Large Cap (above 10B)	391	19.54	16.94	28.55	20.46	9.01	23.26	20.24	5.29	0.074	0.11	0.142	0.179
Mid Cap (2B-10B)	735	21.73	19.44	35.18	22.83	13.45	18.42	20.35	16.76	0.088	0.122	0.154	0.169
Small Cap (300M-2B)	1057	23.8	22.6	43.27	26.24	19.47	19.37	22.74	23.9	0.094	0.123	0.157	0.174
Micro Cap (50M-300M)	304	22.78	21.15	59.15	26.97	36.37	18.92	28.92	40.23	0.11	0.147	0.175	0.195

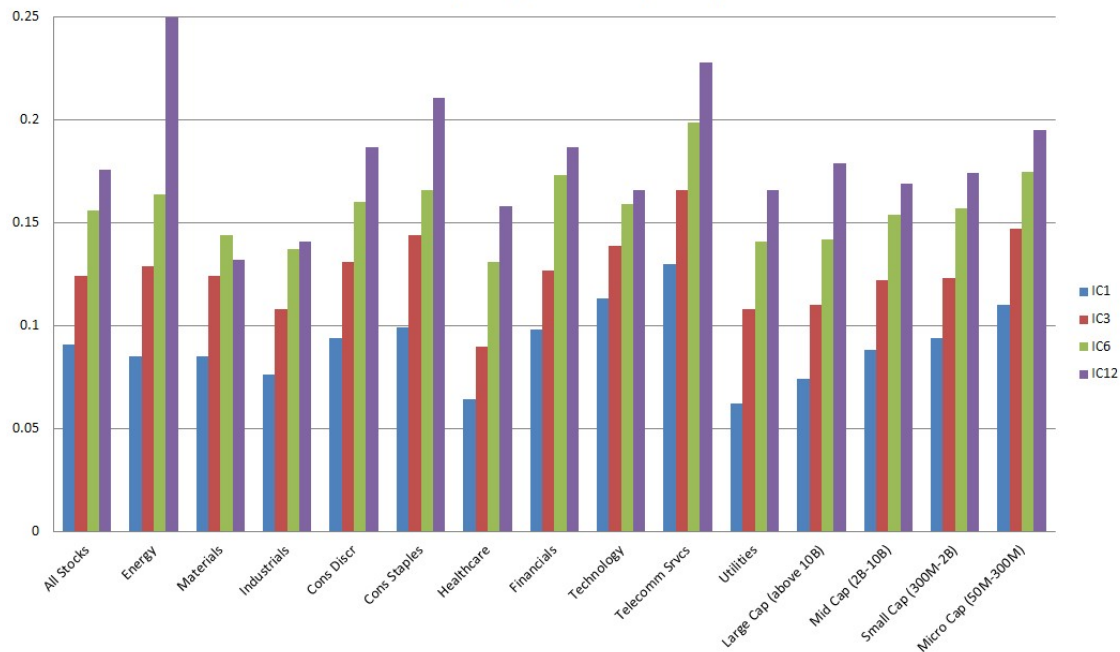
Loading... Strategy: Top/Bottom 10% From: 2002 To: 2013 Print Copy Close

Reward% vs Risk% for Price Wizard Top Valuation Percentiles

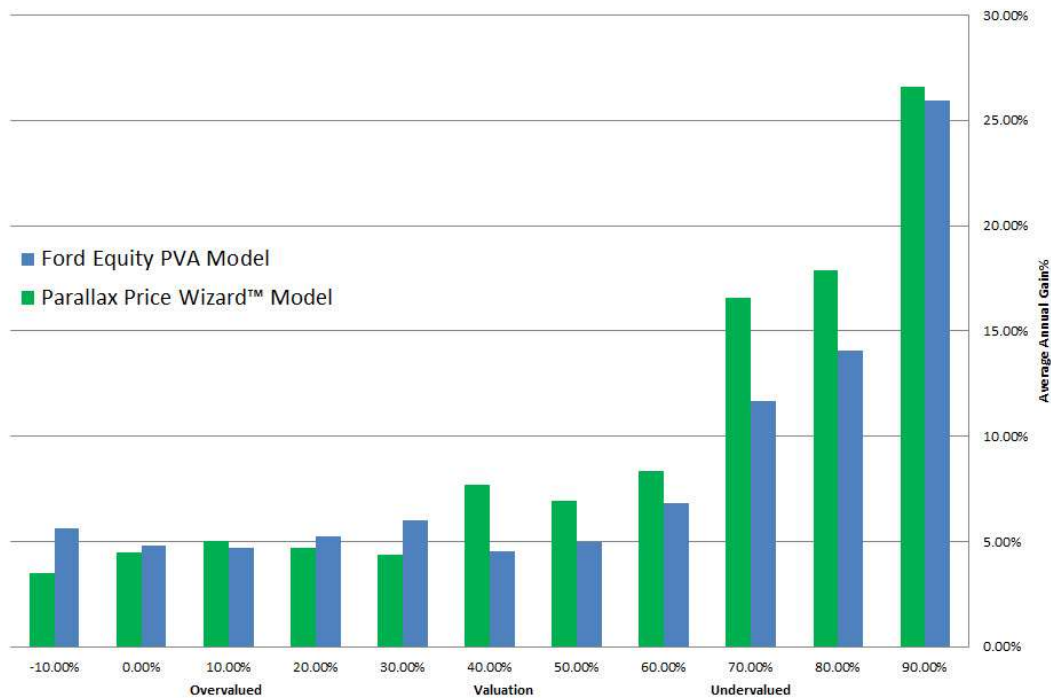


The picture below is a graph of the information coefficient from the table on the last page:

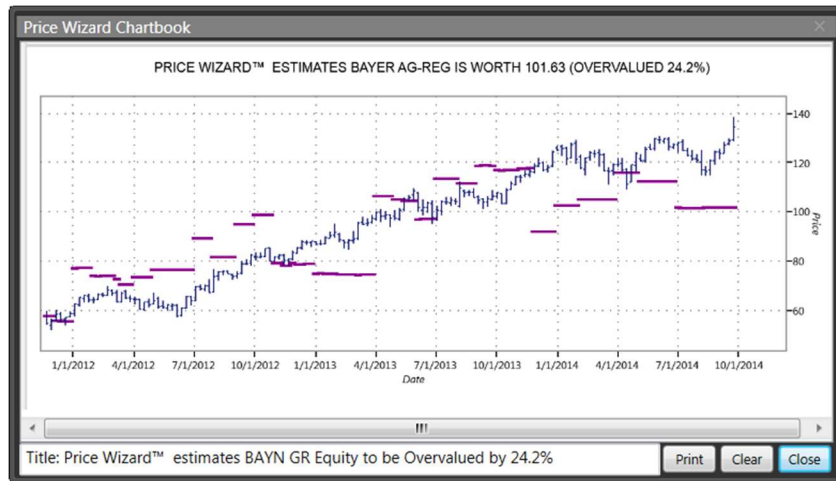
Information Coefficient at 1,3,6, and 12 month periods for Price Wizard v4.0-ranked Portfolios over 11.35 years (2002 to Sep 2013) on Russell 3000 stock list



Annual Average Gain using Parallax Price Wizard or Ford Valuation Models from 2002 to 2013 vs. Valuation Level (29K samples)



Price Wizard™ is International



Price Wizard works world-wide too! Below are analyses of several international stock groupings that were run on Sept 23th, 2014:

European Stocks (SXXP Index since 2008)

Price Wizard Past Performance (1.84 years)

Past Performance

Equity Group	Count	All		Best Portfolios		Best to All	Worst Portfolios		Best to Worst	Information Coefficient			
		Return%	Risk%	Return%	Risk%	Spread%	Return%	Risk%	Spread%	IC1	IC3	IC6	IC12
All Stocks	324	46.65	12.59	94.53	23.99	47.88	30.92	9.77	63.61	0.095	0.117	0.127	0.177

Loading... Strategy: Top/Bottom 10% From: 2011 To: 2013

Japanese Stocks (NKY Index since 2008)

Price Wizard Past Performance (1.84 years)

Past Performance

Equity Group	Count	All		Best Portfolios		Best to All	Worst Portfolios		Best to Worst	Information Coefficient			
		Return%	Risk%	Return%	Risk%	Spread%	Return%	Risk%	Spread%	IC1	IC3	IC6	IC12
All Stocks	93	83.19	19.75	105.29	21.85	22.09	56.38	23.69	48.91	0.178	0.226	0.242	0.246

Loading... Strategy: Top/Bottom 10% From: 2011 To: 2013

Canadian Stocks (SPTSX Index since 2008)

Price Wizard Past Performance (11.34 years)

Past Performance

Equity Group	Count	All		Best Portfolios		Best to All	Worst Portfolios		Best to Worst	Information Coefficient			
		Return%	Risk%	Return%	Risk%	Spread%	Return%	Risk%	Spread%	IC1	IC3	IC6	IC12
All Stocks	211	7.11	20.22	10.52	21.81	3.41	9.43	21.93	1.1	0.097	0.114	0.128	0.152

Loading... Strategy: Top/Bottom 10% From: 2008 To: 2013

Chinese Stocks (SHCOMP Index since 2008)

Price Wizard Past Performance (11.34 years)

Past Performance

All Best Portfolios Best to All Worst Portfolios Best to Worst Information Coefficient

Equity Group	Count	Return%	Risk%	Return%	Risk%	Spread%	Return%	Risk%	Spread%	IC1	IC3	IC6	IC12
All Stocks	747	40.61	31.48	43.74	32.71	3.14	27.83	38.97	15.92	0.128	0.188	0.222	0.233

Loading... Strategy: From: To:

India Stocks (CNX500 Index)

Price Wizard Past Performance (11.35 years)

Past Performance

All Best Portfolios Best to All Worst Portfolios Best to Worst Information Coefficient

Equity Group	Count	Return%	Risk%	Return%	Risk%	Spread%	Return%	Risk%	Spread%	IC1	IC3	IC6	IC12
All Stocks	211	53.72	31.47	91.6	54.29	37.87	46.67	34.59	44.93	0.093	0.124	0.18	0.229

Loading... Strategy: From: To:

Price Wizard FAQs & Tips

What does Price Wizard do?	It finds the most reasonable market price for a company's stock, given the reported fundamentals, based on many years of training.
Why does it work?	Unlike other methods, Price Wizard considers <u>all the sources of corporate value at the same time, and in the context of the specific industry</u> . A company with negative earnings may be very valuable, but conventional methods might exclude it from investment searches.
I already have a stock valuation process, so why do I need Price Wizard?	Price Wizard's approach is very different from standard methods. It provides another opinion of value, and our research shows that the top decile, ranked by Price Wizard, significantly outperforms.
How can I test Price Wizard?	We have two ways you can do testing. First run valuations for your stock universe. Then, under "Additional Settings", check the "Historical Data Output" and save/copy the list to a file. All of the historic valuations will be available to you for testing. In addition we have an "Analysis" button which will run a number of simple portfolio construction strategies and report annual test results.
How long do signals last?	Fundamental valuation is a long-term utility, meaning 6-12 months. Stocks that are significantly undervalued tend to move toward value over time. Company fundamentals tend to move slowly, and are only released quarterly.
Which securities work best?	Any stock should work as long as the required fundamentals have been reported accurately.
Where does it run?	Price Wizard runs locally on your computer using your CPU unless you use Bloomberg Anywhere on the web, which runs on Bloomberg servers.
Less CPU impact	Price Wizard is compute-intensive and will spike your CPU. Run it at night or when few other programs are running or consider running it over the web at https://bba.bloomberg.net/
Use fewer securities	Hone your universe to only the securities that you need and either place them in a Bloomberg portfolio, use the holdings of an index, or use our security file format where each line contains one security: <div style="float: right; border: 1px solid black; padding: 2px; font-size: small;"> AH US Equity KAR US Equity MSFT US Equity IBM US Equity </div>
Can I see Price Wizard valuations on Bloomberg charts?	Not yet. Perhaps it will be possible in the future
How well does it work?	<p>Universe: Russell 3000 Index stocks from 2002-mid 2014</p> <ul style="list-style-type: none"> ✓ Top 10% Long-only average annual gain= 41.28% with Rew/Risk of 1.76 ✓ Top/Bottom decile spread return is 21.94% ✓ Ave 1 month IC of 0.091 <p>After 2014, value has underperformed growth, but we have found if you use the valuation growth rate as a search criterion, performance remains excellent. Note that using ExtremeHurst, we have a strong indication that as of the end of 2020 value was poised to overtake growth.</p>
Why is it so expensive?	The signals are highly predictive and will increase your portfolio performance....or you can cancel. Subscriptions are month-to-month.

Can you extend my trial period?	Yes, if you are serious about purchasing and are willing to have a one-on-one walkthrough to make sure that you know exactly how it might fit in your workflow. Contact us.
Why are some valuations missing?	Either some data item was missing or our methodology failed to converge on a price. Usually this happens if the fundamentals contain too many negatives.
Why do some valuations appear to jump up or down sometimes?	Either some data items are in error, such as earnings at 120.0 instead of 12.0, or our methodology has converged on an alternate acceptable solution. To check the fundamental inputs, just save the list of valuations with the History option checked.
How does Price Wizard compare to Ford and Holt?	We have done head-to head tests at client request and Price Wizard exceeds both Holt's and Ford's performance.
Can I request some additions to your application?	Yes, we welcome all comments and requests. It helps us plan for upgrades
Can I search BB Monitor Lists?	Not at this time, but we have requested this functionality