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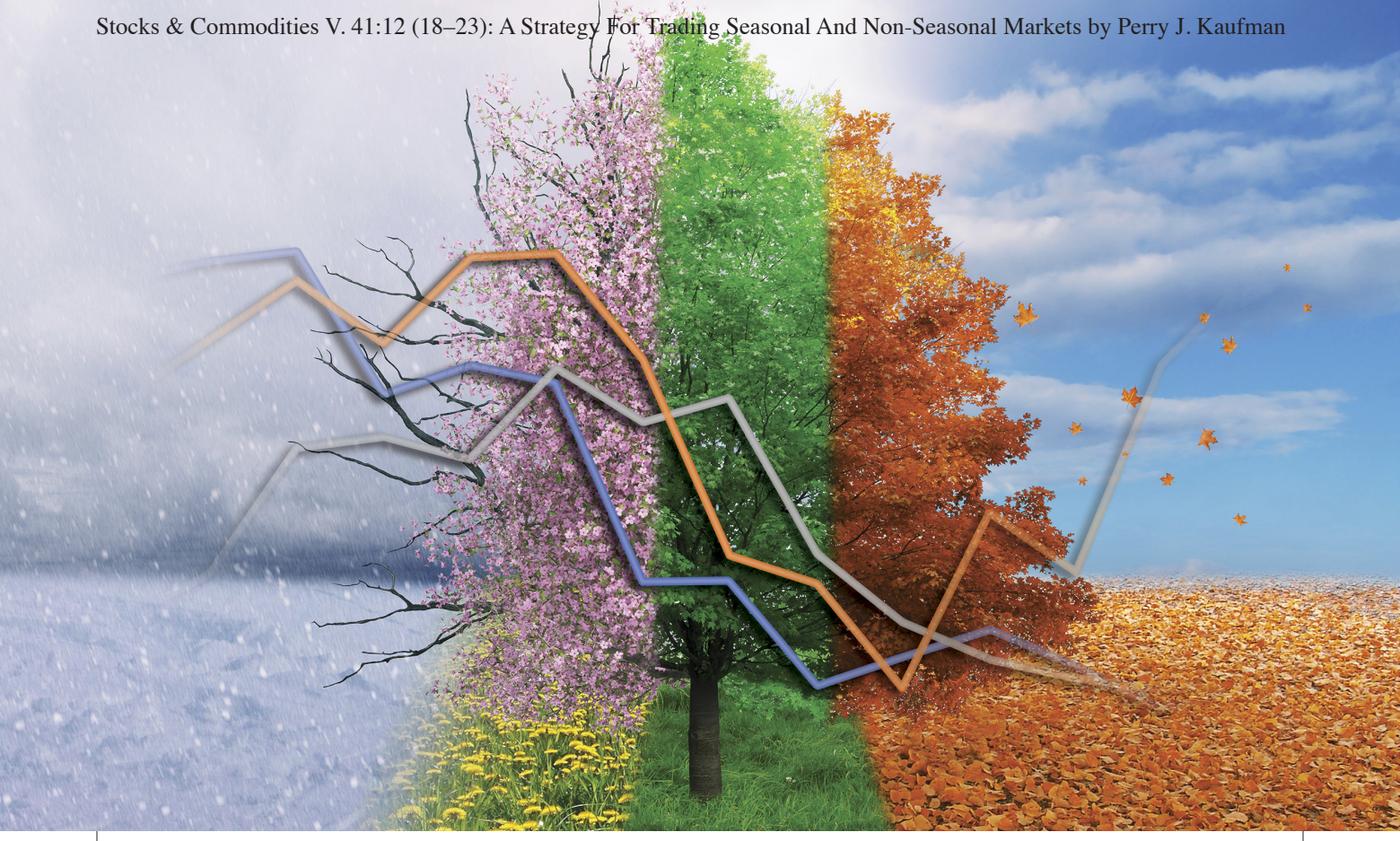
Stocks & Commodities V. 41:12 (18–23): A Strategy For Trading Seasonal And Non-Seasonal Markets by Perry J. Kaufman



Consistency And Diversification

A Strategy For Trading Seasonal And Non-Seasonal Markets

If you can see a seasonal or non-seasonal pattern, you may be able to profit from it. Here is an example of how to find and exploit patterns.

by Perry J. Kaufman

Seasonal patterns are appealing because they are real, not found by manipulating data, but by centuries of crop production modified by the evolution of agribusiness and technology. They offer consistency and diversification for traders.

Some years back, I was a partner in a large farming operation in central Illinois. I developed the opinion that grain prices rallied in the mid-summer due to "crop scares," that is, lack of rain, too much rain, bugs, and a variety of nasty things. Since then, I have taken a careful look at the price patterns and they are surprisingly different.

SOME BACKGROUND

Farmers in North America generally plant their summer crops in April and harvest in October. You can't change the season, although you can change the resilience of the crop to extreme weather—heat, drought, and rain—and the ability to store more at harvest to avoid the sales glut.

Farmers have also gotten more sophisticated, planting crops that are likely to yield higher prices, but reporting the opposite to the USDA. On the other hand, the USDA is able to estimate the extent of this misrepresentation, so it becomes a cat-and-mouse game.

Here, we'll look at seasonal and non-seasonal patterns. These patterns are influenced by weather, export agreements, and technology. Unfortunately for the farmers, technology has steadily improved the yields (using hybrids and fertilizer), so the inflation-adjusted return to them has actually declined. We haven't seen a bad crop year in quite some time.

FGC/SHUTTERSTOCK

I will limit the following seasonal strategy to the three main northern crops: corn, wheat, and soybeans. They have the same seasonality. Cotton is another U.S. crop, but it is grown in the south and has a somewhat different seasonality. You should be able to apply this strategy to cotton and smaller crops, even to energy, but I will leave that to you.

SEASONALITY OF WHEAT, CORN, AND SOYBEANS

You've seen seasonal charts, so I won't belabor this, but we need to see these patterns in order to exploit them. Figure 1 shows the seasonality of feedgrain futures, wheat, corn, and soybeans using nearest futures data for the past 20 years, through July 2022. For those of you who are not in agriculture, the wheat traded on the Board of Trade is feed, not meant for bread. That would be Kansas hard red winter wheat, among others.

I've used the method of yearly averages, which averages the month-end prices for each year, then finds each monthly return relative to its yearly average, dividing the end-of-month price by the yearly average of those month-end prices. While some methods use the average price for the month, the month-end price is more practical and avoids a lag.

The EasyLanguage code given in the sidebar, "Seasonal End-Of-Month Prices And Returns, In EasyLanguage," creates two tables, the month-end prices and the monthly returns. You can import them to an Excel file and average the returns each month, then plot the seasonal pattern from the monthly averages. It will work for any futures or stock market.

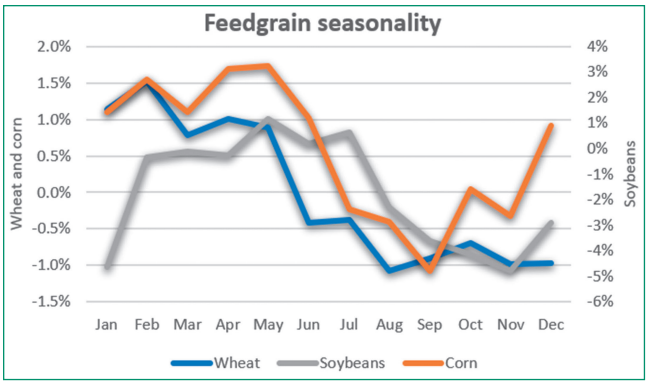
Seasonal patterns in grains

The three grains show similarity, starting high at planting and ending low at harvest, generally September and October. Soybeans show a mid-summer rally before declining into harvest, but all three grains can spike in the summer even though the averages smooth out that move.

Soybeans have slightly different dynamics because they can be planted later and harvested sooner. Farmers may switch from corn to soybeans if weather delays corn planting. Even in 2022, when prices soared, the seasonal pattern seemed to hold.

A TRADING SYSTEM

Now that we see the seasonal pattern, can we profit from it? It looks straightforward, but it's not. We will see that in most years, grain prices simply decline from spring to harvest. A few years spike in mid-summer, enough to be seen on the chart, but it is far less often than you would expect.



MICROSOFT EXCEL

FIGURE 1: SEASONALITY OF WHEAT, CORN, AND SOYBEAN FUTURES. This chart shows feedgrain seasonality, nearest futures, 20 years through August 2022.

Turning seasonal patterns into rules

We can define a "seasonal pattern" as one that starts low in the winter, increases into the summer, then declines into harvest. It uses these rules:

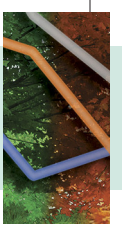
- Average the previous five years of monthly returns.
- If the end-of-April price (the month for planting) is below the 5-year average, we have a "seasonal" pattern.
- If the end-of-April price is above the 5-year average, we have a "non-seasonal" pattern.

Once we have identified the regime, we apply the rules:

- If "seasonal," then *buy* the end-of-April closing price.
- If this year's price is above the July average, we exit the long position at the end of July and go short.
- If we do not exit in July, we always exit at the end of August and go short.
- We exit all positions at the end of September.
- If "non-seasonal," we *sell* the end-of-April closing price.
- We exit at the end of September.

Using these rules, we get the results shown in Figures 2, 3, and 4.

Seasonal patterns are appealing because they are real.



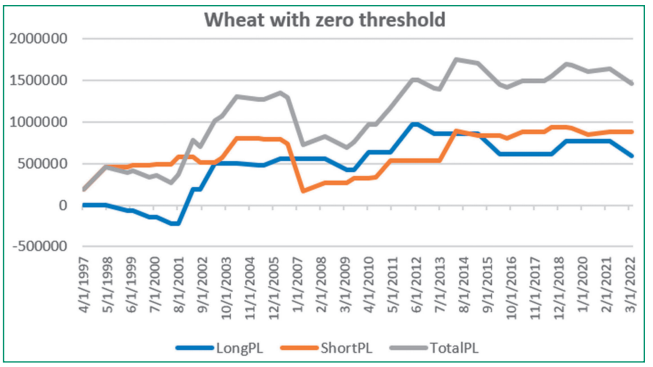


FIGURE 2: RESULTS FOR WHEAT FUTURES. This shows the returns after applying the trading strategy to wheat futures.

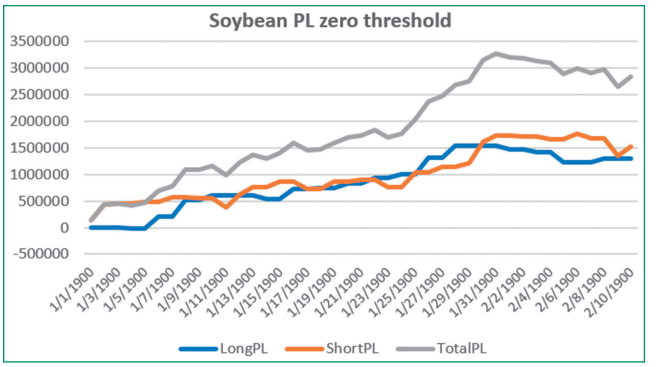


FIGURE 4: RESULTS FOR SOYBEAN FUTURES. This shows the returns after applying the trading strategy to soybean futures.

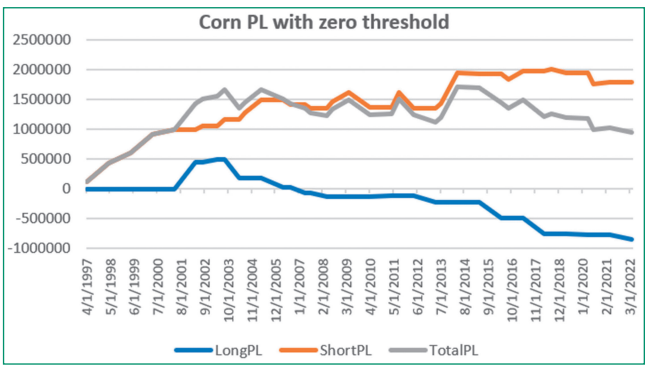


FIGURE 3 RESULTS FOR CORN FUTURES. This shows the returns after applying the trading strategy to corn futures.

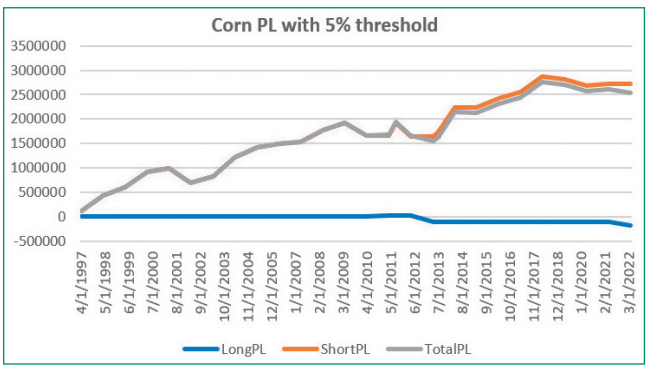


FIGURE 5: MAKING THE ENTRY CONDITION MORE RESTRICTIVE. This shows results for corn using a 5% entry threshold (that is, going long if the current monthly price is 5% lower than the average and short if it is 5% higher than the average).

MAKING THE ENTRY CONDITION MORE RESTRICTIVE

In the performance above, we went long when the monthly return was below the average and short when it was above the average. Now we can see if the results are more reliable if we only go long if the current monthly price is 5% lower than the average, and short if it is 5% higher than the average. Figure 5 shows the results for corn. The other grains were not as good with a 5% threshold, but you might want to test other levels.

NON-SEASONAL IS NORMAL

When we look at all the results, we can conclude that non-seasonal trades, where prices this year start higher than the average of the past 5 years, are the norm. That would contradict the idea of technology, because higher yields would cause lower prices. Inflation could be the cause, but that would not increase carryover stocks. We then have higher prices and more grain, an unusual combination.

The only explanation would be higher demand. Even with higher stocks, grain in storage disappears before the new crop is harvested. You can confirm this by looking at the December stocks and the stocks the following August, as shown in Figure 6.

This strategy offers a way to diversify based on the natural phenomenon of seasonality.

IMPROVING THE TIMING

Monthly data has the disadvantage of allowing large price swings with no way to respond. An ambitious developer should consider using daily data alongside the monthly signals. If the position is long (seasonal), a mid-summer exit would be better timed using a daily momentum indicator. I would suggest an RSI with Ehlers' roofing filter, which smooths out the values.

CARRYOVER STOCKS

Carryover stocks tell you if the grain supply is low or sufficient to make it through the winter to the harvest of the new crop. If carryover stocks are low, the market will be nervous and is likely to spike higher in mid-summer

SEASONAL END-OF-MONTH PRICES AND RETURNS, IN EASYLANGUAGE

The EasyLanguage code shown here compiles data so the user can look for seasonal patterns. The coding creates two tables containing month-end prices and monthly returns for selected futures or stocks. The statistics can then be imported to a spreadsheet file. In a spreadsheet, the returns can be averaged and plotted for viewing graphically.

```
// TSM Save month-end prices and calculate seasonal
returns
//  Copyright 1999,2012, 2022, 2023 P.J. Kaufman. All rights
reserved.

//  Writes 2 ASCII files:
// "c:\TradeStation\Seasonal-End-of-Month_Prices.csv"
// "c:\TradeStation\Seasonal-End-of-Month_Returns.csv"

      vars:      cmonth(0), pmonth(0), ix(0), avg(0),
firstyear(true), nmonths(0);
      array:     months[12](0), returns[12](0);

      if currentbar = 1 then begin
//  Writes an ASCII file with a name created from the data
series
print(File("c:\TradeStation\Seasonal_End-of-Month_Prices.
csv"),
                        "Year,Jan,Feb,Mar,Apr,May,Jun,Jul,A
ug,Sep,Oct,Nov,Dec,Avg");
          print(File("c:\TradeStation\Seasonal_End-of-
Month_Returns.csv"),
                        "Year,Jan,Feb,Mar,Apr,May,Jun,Jul,A
ug,Sep,Oct,Nov,Dec");
          for ix = 1 to 12 begin
               months[ix] = 0;
               end;
          end;

      cmonth = month(date);
      pmonth = month(date[1]);
      if cmonth <> pmonth and currentbar > 1 then begin
          months[pmonth] = close[1];
// if end of year then print and clear arrays
          if pmonth = 12 then begin
               avg = 0;
               nmonths = 0;
               for ix = 1 to 12 begin
                    avg = avg + months[ix];
                    if firstyear = false or months[ix] <> 0
then begin
                         nmonths = nmonths + 1;
                         end;
                    end;
               avg = avg/nmonths;
print(File("c:\TradeStation\Seasonal_End-of-Month_Prices.
csv"),
 year(date[1])+1900:4:0,",",
                    months[1]:6:3,",",months[2]:6:3,",",months
[3]:6:3,",",months[4]:6:3,",",
                    months[5]:6:3,",",months[6]:6:3,",",months
[7]:6:3,",",months[8]:6:3,",",
                    months[9]:6:3,",",months[10]:6:3,",",mont
hs[11]:6:3,",",
months[12]:6:3,",",avg:6:3);
// returns
               for ix = 1 to 12 begin
                    if months[ix] = 0 then returns[ix] = 0
                         else returns[ix] = months[ix]/avg - 1;
                    end;
          print(File("c:\TradeStation\Seasonal_End-of-
Month_Returns.csv"),
year(date[1])+1900:4:0,",",
                    returns[1]:6:3,",",returns[2]:6:3,",",returns[
3]:6:3,",",returns[4]:6:3,",",
                    returns[5]:6:3,",",returns[6]:6:3,",",returns[
7]:6:3,",",returns[8]:6:3,",",
                    returns[9]:6:3,",",returns[10]:6:3,",",returns[
11]:6:3,",",returns[12]:6:3);
// clear array
               for ix = 1 to 12 begin
                    months[ix] = 0;
                    returns[ix] = 0;
                    end;
               firstyear = false;
               end;
          end;

// if end of data output final records
     if lastbaronchart then begin
          avg = 0;
          nmonths = 0;
          for ix = 1 to pmonth begin
               avg = avg + months[ix];
               if months[ix] <> 0 then nmonths = nmonths
+ 1;
               end;
          avg = avg/nmonths;
     print(File("c:\TradeStation\Seasonal_End-of-Month_
Prices.csv"),year(date[1])+1900:4:0,",",
                    months[1]:6:3,",",months[2]:6:3,",",months
[3]:6:3,",",months[4]:6:3,",",
                    months[5]:6:3,",",months[6]:6:3,",",months
[7]:6:3,",",months[8]:6:3,",",
                    months[9]:6:3,",",months[10]:6:3,",",mont
hs[11]:6:3,",",
months[12]:6:3,",",avg:6:3);
          for ix = 1 to pmonth begin
               if months[ix] <> 0 then returns[ix] =
months[ix]/avg - 1
                    else returns[ix] = 0;
               end;
     print(File("c:\TradeStation\Seasonal_End-of-Month_
Returns.csv"),year(date[1])+1900:4:0,",",
                    returns[1]:6:3,",",returns[2]:6:3,",",returns[
3]:6:3,",",returns[4]:6:3,",",
                    returns[5]:6:3,",",returns[6]:6:3,",",returns[
7]:6:3,",",returns[8]:6:3,",",
                    returns[9]:6:3,",",returns[10]:6:3,",",returns[
11]:6:3,",",returns[12]:6:3);
          end;
```

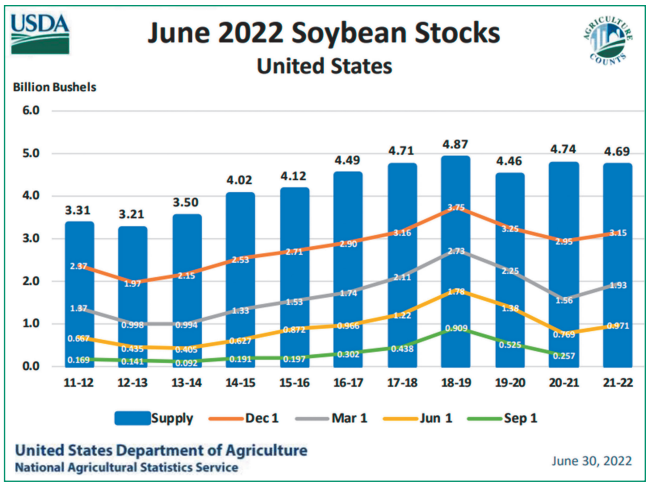


FIGURE 6: CARRYOVER STOCKS, SOYBEANS. Does supply run low or high in this agricultural product? Carryover stocks can tell you. This chart shows carryover stocks in soybeans as of July each year. We can see that the stocks for 2011–2012 are low while the stocks for 2019–2020 are high.

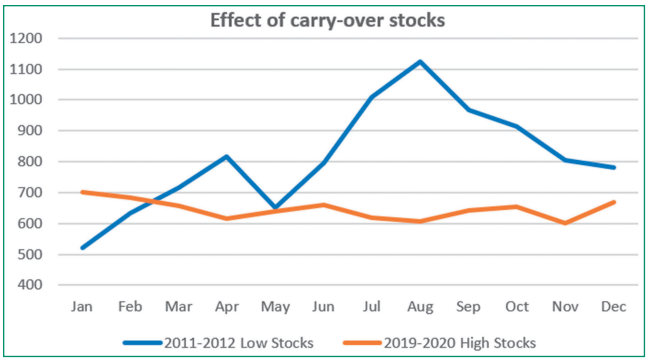


FIGURE 7: EFFECT OF CARRYOVER STOCKS, SOYBEANS. Soybean price patterns are shown here for two years: 2012 (a low number of carryover stocks) and 2020 (a high number of carryover stocks).

at the first weather scare. Large stocks will dampen those concerns.

Figure 6 shows the stocks for soybeans as of June of each year. You will need to find a similar chart for December. It used to be easy to find on the internet but seems to have disappeared, so you would need to find a similar chart as the one shown.

Looking at two of the years, the stocks for 2011–2012 are low, while the stocks for 2019–2020 are high. Figure 7 shows the price patterns for 2012 and 2020. Low stocks in 2012 caused a spike in the summer but then traded down into harvest. High stocks in 2020 resulted in very quiet, declining prices.

As for the strategy, low stocks would change a non-seasonal (selling) year into a seasonal (buying) year, anticipating a rally in the summer. The continued increase in carryover stocks should also be attributed to technology.

How to Calculate the 5-Year Average

I programmed this in a computer language that allowed me to manipulate arrays. It can be done on most programmable trading platforms, but it will be tricky. Instead, you can create the seasonal prices and the monthly return tables, then average the monthly returns for the last five years, not including the current year. You only need to do that once each year.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
2001			622	618.25	603.5	600	621.5	621.75	604	595	598.25	586.75	607.1
2002	583.75	579	574	566	579.5	590.5	604.75	614	597.5	593.5	586	580.25	587.4
2003	582.75	575.75	579	574.5	587.5	571	553.25	581	559.5	586.5	583	580.25	576.17
2004	610.5	630.25	647.25	641.5	625.25	579.5	534.25	546	513.75	510.75	502	503	570.33
2005	495.25	513	503.25	494.75	503.25	493.75	508	474	463	453.75	446.25	460.25	484.04
2006	463.25	472.5	469.75	471.5	473.75	457	450	442.5	457	515.25	568.25	568	484.06
2007	581.75	601	540	522.5	545.25	485.75	471.5	468.5	501.5	504	512.5	566.5	525.06
2008	612.25	653.75	664.5	696	683	807	656.75	635.5	538	452	399.25	440.5	603.21
2009	412.5	383.5	429.25	419.5	452.25	363	348	332.5	346.75	368.75	404.25	401.25	388.46
2010	343.25	364.75	320.75	343.75	327.5	322.25	352.25	383.25	439.75	526	473.25	558.25	396.25
2011	588.75	649.5	611.75	669	660	577	594.5	682	507	561.5	515	553.5	597.46
2012	546	561.75	547.75	548	469	582	760	747	703.5	703	696	641.5	625.46
2013	683.75	654.75	646.5	622	634	599.5	551.25	549.5	509	495.75	485.5	483	576.21
2014	495	518.25	556.75	568	514.75	473	411.25	410	366	422	421	429.25	465.44
2015	402.25	417.5	400.5	386.5	371.75	436	385	377.75	390.25	384.75	368	354.5	389.56
2016	367.75	348	342.5	378	391	347.75	316.75	289	310.25	328.25	313	316.5	337.4
2017	324.25	331.25	321.75	317.25	322.75	323.5	313.25	285.25	282.75	273.25	270.25	265.25	302.56
2018	276	288.25	294	297.75	291	247.5	260.25	238.25	229.5	236.5	239	236.25	261.19
2019	237.75	222.5	208.25	204.5	269	261.25	236.75	196.5	214.75	216.75	197.75	204.25	222.5
2020	197.75	180.75	153.25	124.75	130.5	143	117.5	145.5	166.75	186.25	206.25	264.25	168.04
2021	327.25	329	345.75	477.75	461.25	510	457.75	447	449.5	481	475.25	501	438.54
2022	533.75	601	659	726	666	624.25	611.75	670.5					636.53

FIGURE 8: CORN MONTH-END PRICES. The table shows the end-of-month prices, output from the accompanying code listing. In the last column is the average yearly price.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
2001			0.025	0.018	–0.006	–0.012	0.024	0.024	–0.005	–0.02	–0.015	–0.034	607.1
2002	–0.006	–0.014	–0.023	–0.036	–0.013	0.005	0.03	0.045	0.017	0.01	–0.002	–0.012	587.4
2003	0.011	–0.001	0.005	–0.003	0.02	–0.009	–0.04	0.008	–0.029	0.018	0.012	0.007	576.17
2004	0.07	0.105	0.135	0.125	0.096	0.016	–0.063	–0.043	–0.099	–0.104	–0.12	–0.118	570.33
2005	0.023	0.06	0.04	0.022	0.04	0.02	0.049	–0.021	–0.043	–0.063	–0.078	–0.049	484.04
2006	–0.043	–0.024	–0.03	–0.026	–0.021	–0.056	–0.07	–0.086	–0.056	0.064	0.174	0.173	484.06
2007	0.108	0.145	0.028	–0.005	0.038	–0.075	–0.102	–0.108	–0.045	–0.04	–0.024	0.079	525.06
2008	0.015	0.084	0.102	0.154	0.132	0.338	0.089	0.054	–0.108	–0.251	–0.338	–0.27	603.21
2009	0.062	–0.013	0.105	0.08	0.164	–0.066	–0.104	–0.144	–0.107	–0.051	0.041	0.033	388.46
2010	–0.134	–0.079	–0.191	–0.132	–0.174	–0.187	–0.111	–0.033	0.11	0.327	0.194	0.409	396.25
2011	–0.015	0.087	0.024	0.12	0.105	–0.034	–0.005	0.142	–0.151	–0.06	–0.138	–0.074	597.46
2012	–0.127	–0.102	–0.124	–0.124	–0.25	–0.069	0.215	0.194	0.125	0.124	0.113	0.026	625.46
2013	0.187	0.136	0.122	0.079	0.1	0.04	–0.043	–0.046	–0.117	–0.14	–0.157	–0.162	576.21
2014	0.064	0.113	0.196	0.22	0.106	0.016	–0.116	–0.119	–0.214	–0.093	–0.095	–0.078	465.44
2015	0.033	0.072	0.028	–0.008	–0.046	0.119	–0.012	–0.03	0.002	–0.012	–0.055	–0.09	389.56
2016	0.09	0.031	0.015	0.12	0.159	0.031	–0.061	–0.143	–0.08	–0.027	–0.072	–0.062	337.4
2017	0.072	0.095	0.063	0.049	0.067	0.069	0.035	–0.057	–0.065	–0.097	–0.107	–0.123	302.56
2018	0.057	0.104	0.126	0.14	0.114	–0.052	–0.004	–0.088	–0.121	–0.095	–0.085	–0.095	261.19
2019	0.069	0	–0.064	–0.081	0.209	0.174	0.064	–0.117	–0.035	–0.026	–0.111	–0.082	222.5
2020	0.177	0.076	–0.088	–0.258	–0.223	–0.149	–0.301	–0.134	–0.008	0.108	0.227	0.573	168.04
2021	–0.254	–0.25	–0.212	0.089	0.052	0.163	0.044	0.019	0.025	0.097	0.084	0.142	438.54
2022	–0.161	–0.056	0.035	0.141	0.046	–0.019	–0.039	0.053					
Average 2017–2021	**0.024**	**0.005**	**–0.035**	**–0.012**	**0.044**	**0.041**	**–0.032**	**–0.075**	**–0.041**	**–0.003**	**0.002**	**0.083**	**636.53**

FIGURE 9: CORN MONTH-END RETURNS. The table is the result of dividing the month-end price by the average of the year, minus 1, to give us the month-end returns.

The table in Figure 8 shows end-of-month prices, output from the code in the sidebar "Seasonal End-Of-Month Prices And Returns, In EasyLanguage." It also includes the average yearly price in the last column. The table in Figure 9 shows monthly returns, output from the same code.

SUMMARY

While the returns of this strategy are not as good as an optimized trend system, this strategy offers a way to diversify based on the natural phenomenon of seasonality. By including carryover stocks and daily data, the results can be improved. And, the concept can be applied to any agricultural market. It seems consistent idea that, at harvest, prices, whether in a seasonal or nonseasonal pattern, (almost) always decline at the end. Nature plays its part.

Perry J. Kaufman is a trader and financial engineer. He is the author of many books on trading and market analysis, including the sixth edition (2020) of Trading Systems and Methods *(with the first edition published in 1978 as a seminal book in the field of technical analysis), as well as* Kaufman Constructs Trading Systems *(2020), and* Learn To Trade *(2022). For questions or comments, please go to www.kaufmansignals.com.*

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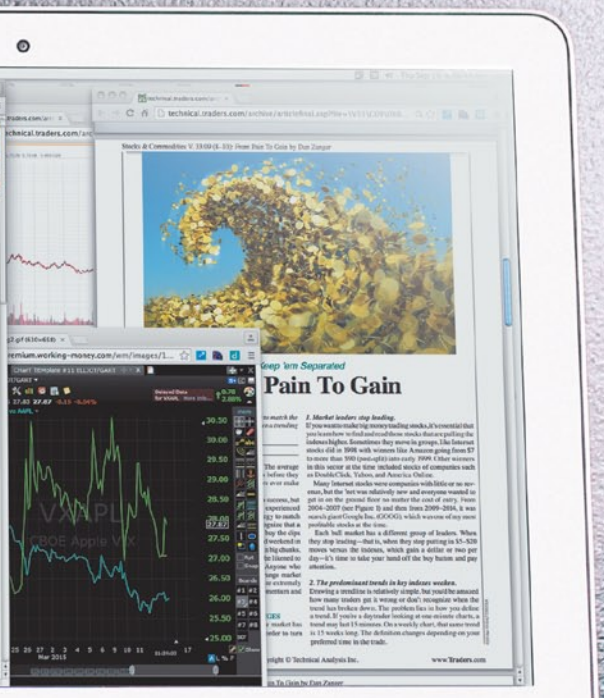

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