

Easy and Successful Macroeconomic Timing

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Abstract

When the economy takes a turn for the worse, employment declines, right? Well, not *all* employment. Certainly, full-time employment declines during recessions, but concurrently part-time employment rises strongly during economic downturns. An adept fiduciary can contrast the two types of employment, as well as a variety of other data, and get good broad brush investment timing decisions before an official determination of a Recession.

Using the described method enables an investor to seriously reduce drawdowns and greatly improve the reward-to-risk ratio. This works well as a stand-alone improvement to Buy & Hold or as an initial screen prior to other fundamental or technical analysis.

Decisions can be made monthly, weekly or even daily for those willing to do a bit more work.

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What are the implications of recessions on investments?

A good rule for investment success is to avoid buying equities at the beginning of a recession. Since 1920 the National Bureau of Economic Research has identified 17 recessions, during the worst of which equities declined over 88 percent. Despite that, the Dow Jones Industrial Average has grown at a compound annual rate of 5.85 percent. If an investor could have known about the recessions and avoided them, his investment return would have been 10.12 percent p.a. with a max drawdown of 38.23 percent.

DJIA 1920 - 2017

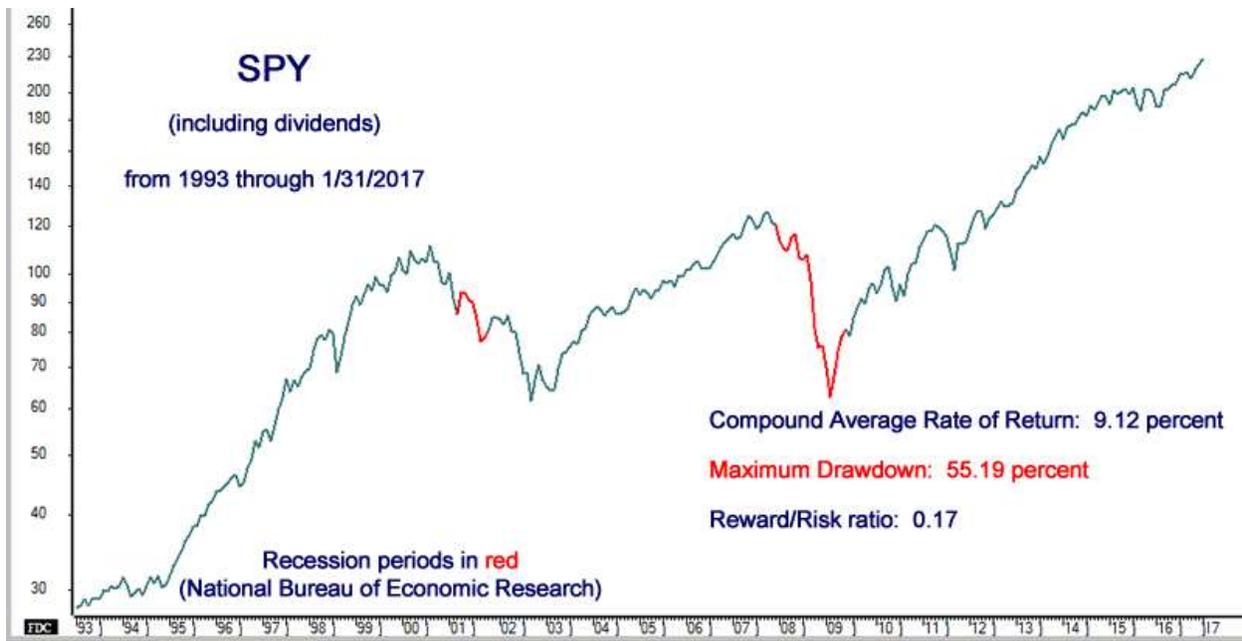
Buy & Hold

Overall Performance	
Comp. Ann. ROR (%)	5.85
Ave 12Mo ROR (%)	7.25
Ave. Monthly ROR (%)	0.61
Stdv Monthly ROR (%)	5.19
Max Drawdown (%)	88.74
Profitable Months (%)	58

Avoiding Recessions

Overall Performance	
Comp. Ann. ROR (%)	10.12
Ave 12Mo ROR (%)	10.18
Ave. Monthly ROR (%)	0.88
Stdv Monthly ROR (%)	3.88
Max Drawdown (%)	38.23
Profitable Months (%)	68

Of course that foreknowledge is not possible, but an alternative plan is even more effective. Moving on to the current period, we see the recent recessions highlighted on the market:

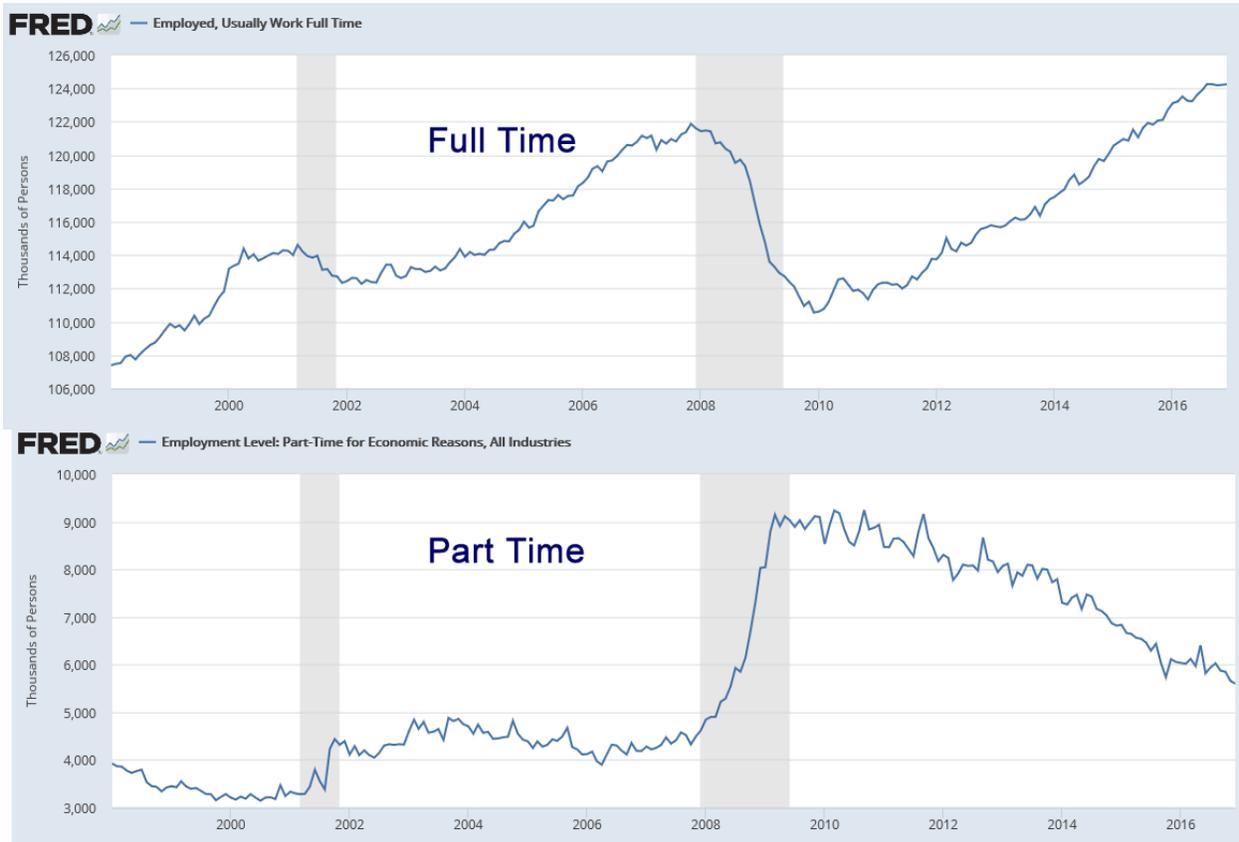


If you could have had the recession dates¹ in advance and navigated between SPY and T-bills since SPY existed you would have increased your return to 11.6% per annum and reduced the maximum drawdown to 39%. Without that prior knowledge the benchmark return was 9.2% p.a. with the max drawdown of 55%. All results are tabulated in the spreadsheet in the Appendix. Pay particular attention to the column “Reward to Risk Ratio” on the right side.

The official identifications of recessions frequently come long after they begin, so they are difficult to avoid. Agreement on their dates is not universal, and may be in some part political. However one can easily identify the dangerous recessionary periods by following the trail left by various economic datasets. Timing is then quite easy.

In a recession, the standard measures of economic growth decline: Full Time Employment, Auto Sales, Commercial & Industrial Loans, Housing Starts, Electricity Usage and Payroll Tax Receipts growth, to name a few. Naturally, at the end of a recession they all rebound.

On the other hand, recessions see increases in the Unemployment Rate and various measures of unemployment, Part-time Employment and Institutional Money Funds. The following monthly Federal Reserve charts² illustrate:



The above data of employed workers illustrate the monthly decline of full-time workers and the rise of part-time workers with the recessionary periods shaded. Of course their orders of magnitude are different, but by taking their rates of growth you make them comparable, a process referred to as normalization. It should be no surprise that employment data has a strong relationship to good and poor economic activity; the United States is predominantly a service economy.

The methodology is straightforward. Identify data that mimics the economy on a growth basis as well as data that does the reverse. The data does not have to lead the economy – coincident indicators are in many cases better because they are less prone to give false signals than the leading indicators. Ideally the data chosen should exhibit robust changes during recessionary periods. Then take the difference of their moving annual rates of change, or an even better method of comparison: their slopes. Essentially this becomes a two-factor model for predicting recessionary activity, and by extension for successful investing. If you are a Buy & Hold investor, this would be “Buy & Hold with holidays” a first step towards active investment. If you are already a more active investor, this should be your first screener.

But can you forecast recessionary activity?

The first two candidates mentioned (full-time vs. part-time employees) can be researched back to 1969. During those 48 years there have been seven named recessions. Buying and holding the S&P500 index over that period would have resulted in a 6.65 percent p.a. gain with a maximum drawdown of 49.3 percent (looking at month-ends). Avoiding the seven recessions netted 8.21 percent p.a. with a 32.43 percent drawdown. Note, however that is with perfect knowledge.

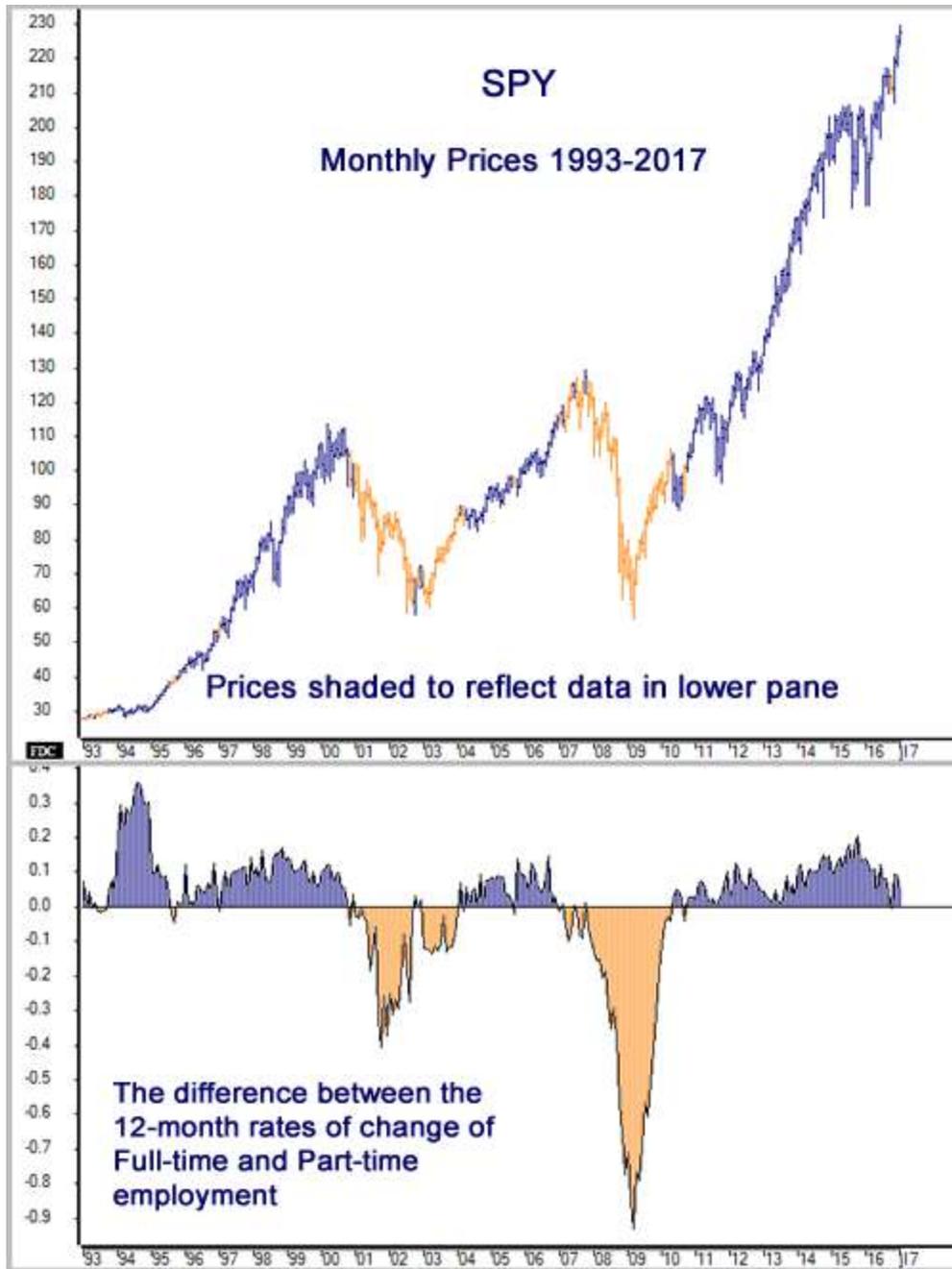
Using the simplest of comparison tools (a 12-month rate-of-change) of the two types of employment, the profitability over the period is 7.27 percent p.a., and the max drawdown has been reduced to just 31.15 percent. The drawdown is frequently more important because it is that number that determines whether or not the client will stay in the program. A client who quits during a drawdown will never get to experience the long term growth of the asset.

If you take the simple step of smoothing the data (reducing its “noise”) by comparing slopes, results rise to 8.3 percent p.a. with the same 31.15 percent drawdown. That is, by using a simple two-factor model (without foreknowledge) we are able to improve upon a program that had perfect look-ahead bias. And it is completely tradeable; the results here were acted upon in the month after they were known.

Those results are over the last half-century, and we all know that performance is frequently dependent upon the starting date. So what has happened recently – is it still tradeable?

Most certainly. Below is the chart of SPY prices shaded to reflect the recessionary conditions indicated by the normalized difference of full-time and part-time employment. Using employment characteristics to identify recessionary periods is what most economists would expect. Payrolls are important; the bulk of the tax revenue taken in by the U.S. government is in the form of Payroll Tax Receipts.

This is not a forecast of recessions, but a forecast of recessionary activity. The former is hard to nail down in real time, whereas the latter is easily identified.



As long as the growth rate of Full-time employment exceeds that of Part-time employment, own equities. Should the growth rate of the part-timers exceed that of the full-timers, assume a coming recessionary period and exit equities. The purpose here is to enable the investor or his fiduciary to “first, do no harm.”

Trading SPY on the monthly differences looked thus:

SPY
1993 - 2017
Buy & Hold w/divs

Overall Performance	
Comp. Ann. ROR (%)	9.12
Ave 12Mo ROR (%)	10.21
Ave. Monthly ROR (%)	0.81
Stdv Monthly ROR (%)	4.15
Max Drawdown (%)	55.19
Profitable Months (%)	63

SPY, T-bills
Avoiding
Recessions

Overall Performance	
Comp. Ann. ROR (%)	11.62
Ave 12Mo ROR (%)	11.36
Ave. Monthly ROR (%)	0.98
Stdv Monthly ROR (%)	3.57
Max Drawdown (%)	39.05
Profitable Months (%)	69

SPY, T-bills
full v. part time
12 month roc

Overall Performance	
Comp. Ann. ROR (%)	10.33
Ave 12Mo ROR (%)	10.19
Ave. Monthly ROR (%)	0.87
Stdv Monthly ROR (%)	3.05
Max Drawdown (%)	16.22
Profitable Months (%)	75

Spy, T-bills
full v. part time
12 month slope

Overall Performance	
Comp. Ann. ROR (%)	11.11
Ave 12Mo ROR (%)	10.66
Ave. Monthly ROR (%)	0.93
Stdv Monthly ROR (%)	3.03
Max Drawdown (%)	16.22
Profitable Months (%)	76

The results from comparing full-time vs. part time employment using SPY and T-bills are achievable and are perfectly realistic. Spreadsheet programs as well as market software can calculate both rates of change and slopes. Slopes have the advantages of greater smoothness, significantly less lag, and being relatively immune to subsequent data revisions. However there is **one** item which would prevent such a program from being adopted by most fiduciaries. That one thing is very easily illustrated in the equity curve:



Those relatively flat lines on the blue curve represent the periods when the assets are in Treasury bills. Despite the fact that the fiduciary might have saved the client’s retirement funds from significant drawdown, clients have been known to get frustrated with a portfolio consisting of 100 percent Treasury bills. Investors react negatively to paying for the privilege of owning T-bills for an extended period of time, despite any obvious benefit. Philosophically speaking, the client is correct: because T-bills are so liquid, they really do not fit the definition of “investment” (i.e. investment and liquidity are mutually exclusive). However, there is a solution, and it turns out to be a win-win.

Instead of holding T-bills for extended periods, the logical substitute asset is “IEF”, the 7-10 year Treasury bond ETF. Although this ETF has not existed for as long as SPY, the historical rates of return of IEF are symmetrical with that of the Dow Jones Chicago Board of Trade Treasury Index³, and they are included here.

SPY and IEF switching to T-bonds

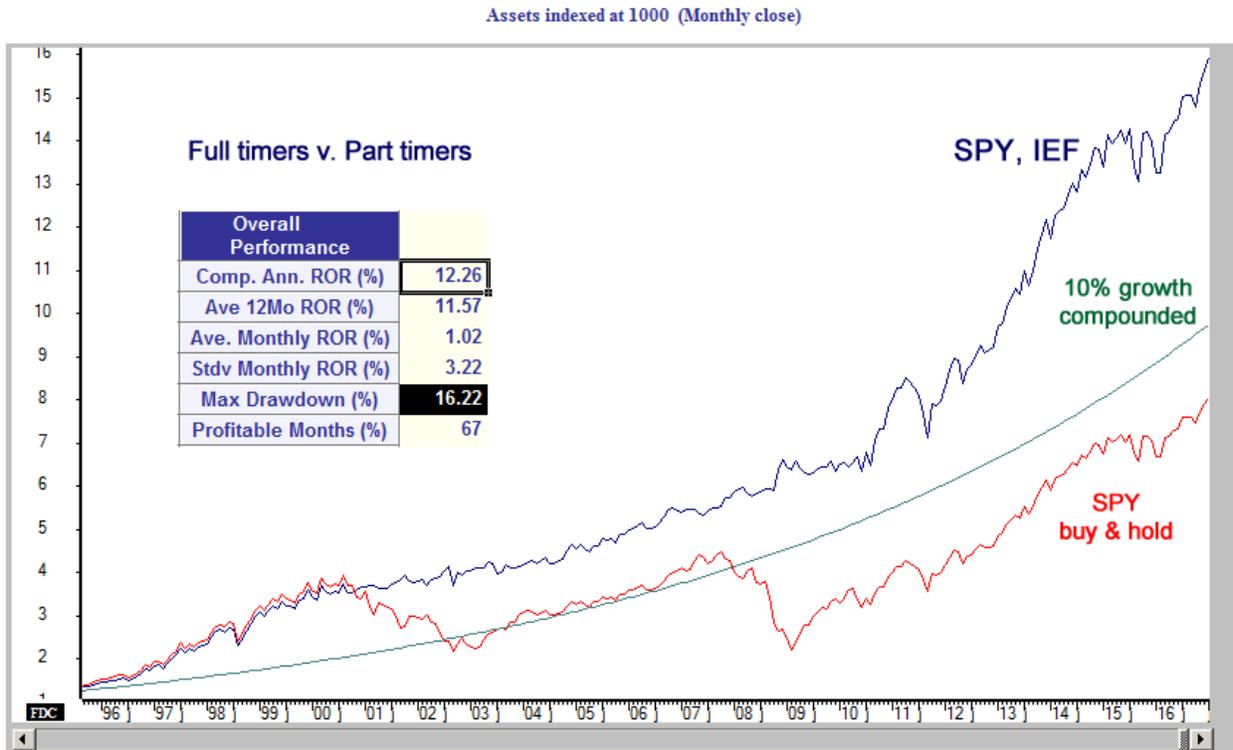
12 month rates of change

Overall Performance	
Comp. Ann. ROR (%)	11.38
Ave 12Mo ROR (%)	10.61
Ave. Monthly ROR (%)	0.95
Stdv Monthly ROR (%)	3.19
Max Drawdown (%)	16.22
Profitable Months (%)	66

12 month moving slopes

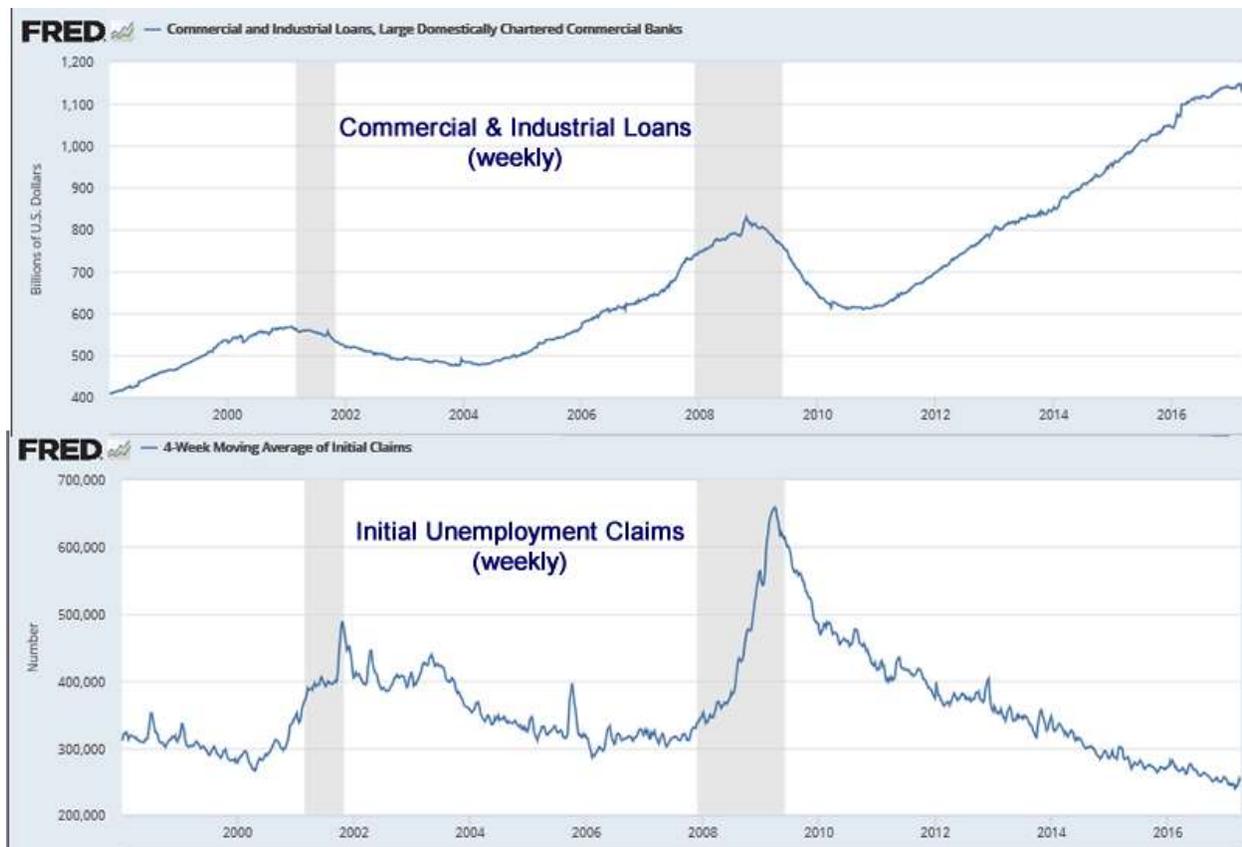
Overall Performance	
Comp. Ann. ROR (%)	12.26
Ave 12Mo ROR (%)	11.57
Ave. Monthly ROR (%)	1.02
Stdv Monthly ROR (%)	3.22
Max Drawdown (%)	16.22
Profitable Months (%)	67

The result is that the investor has a larger return and we have removed the problems of owning Treasury bills. The equity curve chart makes that point:



What are the implications of getting more granular? Very good macroeconomic data exists on a weekly basis. Of course the releases lag the actual data by a few weeks, but using it still gives an edge over monthly data with regard to identifying recessionary periods.

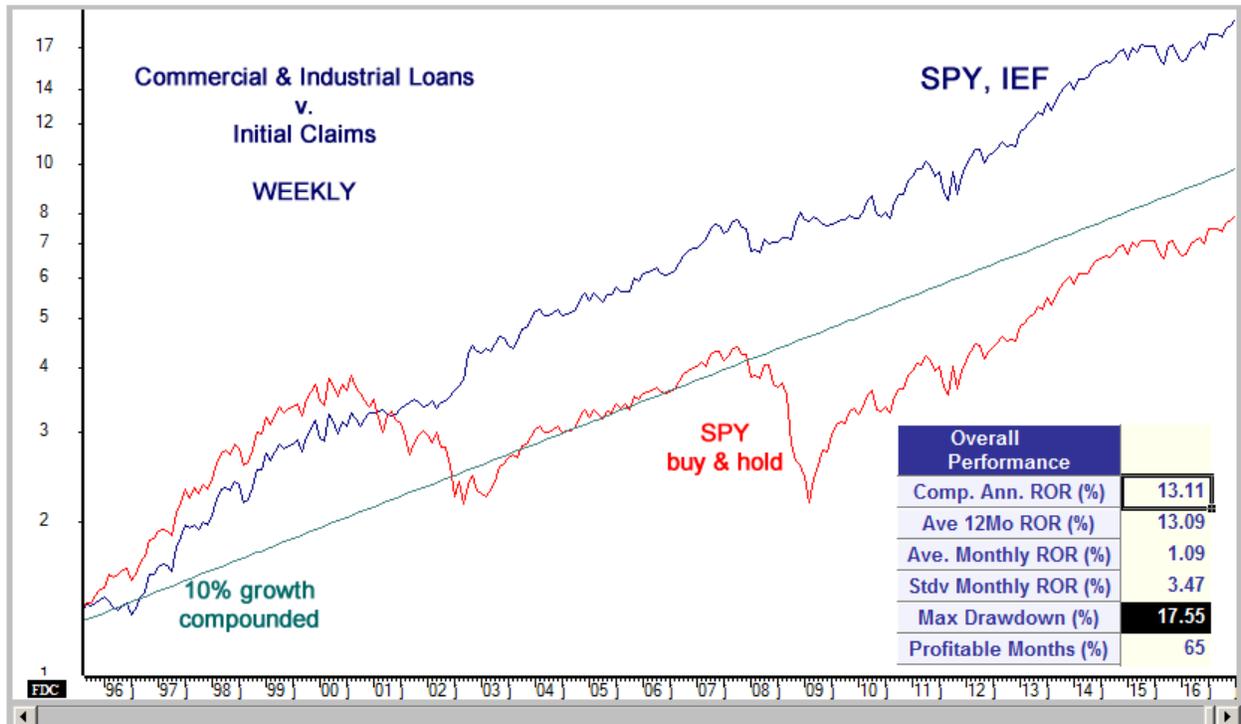
For example, Initial Unemployment Claims (Fed codes “ICSA” and “IC4WSA”) are released weekly and correspond well with monthly Part Time Employment (“LNS12032197”). The Civilian Workforce (“COVEMP”) is a good weekly surrogate for the monthly Full Time Employees (“LNS12500000”). Additionally, Commercial & Industrial Loans by large banks (“CIBOARD”) mimics the overall economy very well. The purpose is to measure the good side of the economy as well as the poor side, and CIBOARD (loans) measures the good side very effectively. All of the mentioned datasets are available (for free) in seasonally adjusted variations which make the practitioner’s job considerably easier.



Consequently the decision-maker gets to pick the frequency with which he wants to decide. Note that the changeover from a growth period to one of recession is a robust move. Thus, using weekly data does not mean the investor will be trading weekly, just that weekly data will theoretically give a decision two weeks before monthly data. Note also that Payroll Tax Receipts (not seasonally adjusted) are available daily, providing even more granularity.

When your focus switches from comparing monthly ending data to weekly ending data you will notice that the maximum drawdown increases. That is purely a function of the measuring period. The larger drawdowns were always there, but the intra-month volatility was hidden by taking month-end closes. The gains in the rates of return however are real and a function of more timely identification of economic activity.

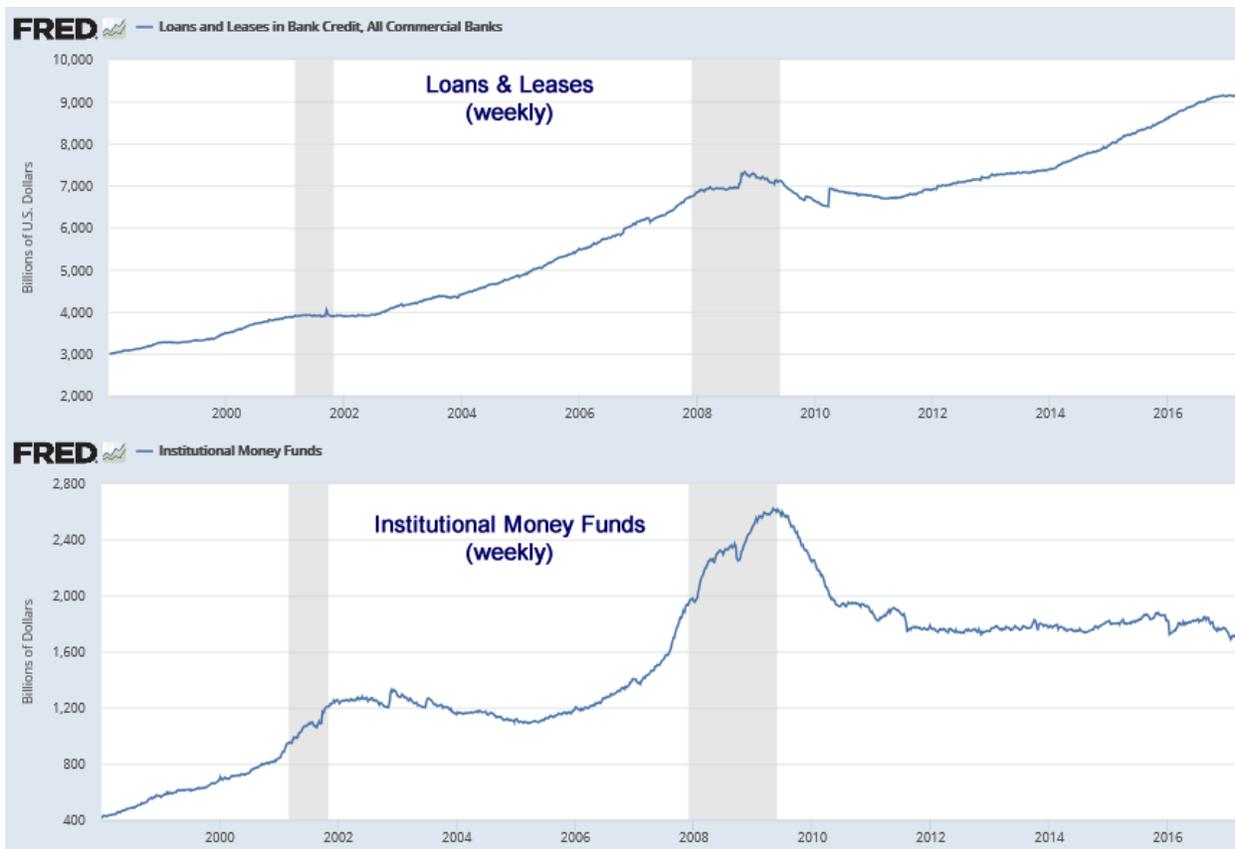
Assets indexed at 1000 (Monthly close - Log scale)



The above chart in log scale illustrates the use of Initial Claims vs. Commercial & Industrial Loans, both of which are available weekly. The default asset is SPY with IEF used during recessionary activity.

If two indicators work well, will more indicators work better?

Illustrated is a two-factor model with the choice of the two input variables being somewhat open-ended. This could be expanded to include more indicators. However note that if you use enough variables you can model the past behavior of anything to a high degree, but that does not give it any predictive value. For example, there are several regional Federal Reserve Branches that have created indicators using over a hundred inputs. Their indications are largely ignored by the investment community. Likewise, it has occasionally been anecdotally stated that the accuracy of a model is inversely proportional to the number of input variables. Occam’s razor works. That is, the simple approach of a difference between two somewhat opposing variables is better than multiple conditions of multiple variables.



Which data are better indicators?

In considering all the possible variables, there tends to be safety in large numbers. That is, results are more reliable when large numbers of individuals (or loans) are counted, rather than a (possibly politically-determined) single number like the Unemployment Rate. The goal is to measure actual activity, not politics.

Below you will find a table listing a large number of tested datasets. Their starting dates reflect the longest possible period, given the data. That is, if the first data is available in 1955, a 12-month rate of change is not available until 1956. In all cases the classical macroeconomic comparison period was chosen, i.e. a year. It is always possible that a different period would outperform. The results all support the basic points: identifying the periods of recessionary activity is critically important, highly beneficial and operationally possible for investors or their fiduciaries.

None of the mentioned data is “non-standard”. They are all circulated by the Federal Reserve, although much of the data comes originally from other sources, such as the Department of Labor, or Treasury. The imprimatur of the Fed is an important fact for a fiduciary.

Why are the critical factors? Why has this not been shown before?

Researchers have analyzed employment data for decades, knowing it has an obvious connection to the economy and the equity markets. But the results of that research have not been significant. The first critical factor here is the normalization of the data (putting them on the same scale). The two datasets chosen for comparison have to be viewed as separate (independent) events. This was not done before. The second key factor is the use of a sophisticated measurement tool such as the rate of change of the slope rather than the rate of change of the data itself. Details tend to make significant differences.

Why not just use a moving average of the price?

Equity prices can fluctuate without any economic reason. Macroeconomic variables are both logical and work well. Because the data studied here is macroeconomic it cannot be traded or arbitrated away, as could happen with a market-derived or technical indicator. These data measure economic truths rather than trading positions.

How statistically reliable is this forecasting of recessionary activity?

Despite the fact that the method described here (without look-ahead bias) has duplicated or outperformed all of the officially defined recessions (that had look-ahead bias), the sample size is small. What do statisticians do when confronted with a perfect record and a small sample size? They add additional “pseudodata”, two additional observations with one positive and one negative outcome. For example, if after adding the pseudodata to 8 successes you have 10 observations, then your record becomes 9 out of 10. This is known as **Laplace’s Rule of Succession**⁴ in which the estimate of success is the number of observed successes plus 1, divided by the number of observations plus 2.

Using the largest number of observations (from 1956) there have been 9 successful forecasts of recessionary activity. The Rule of Succession would calculate the subsequent estimate of success at 10/11 or 91 percent.

Perhaps the better position to take is that changes in the labor participation described here operationally define a recession, although not officially. By using this method a fiduciary would be identifying recessionary behavior before the (possibly political) definition of “Recession” is made.

Conclusion

It has been shown that the timing of recessionary periods has a major impact on investment performance. Avoiding the recessions produce a major improvement over a Buy & Hold strategy. The problem is that the client or his fiduciary never has the “Recession” defined when it is needed. However with the simple use of a choice of only two inputs, recessionary activity can easily be identified and substantial investment losses avoided.

Employment differences should model the economy, something the stock market rarely agrees with. However in this case the employment differences seem to do a good job with the market. And this approach also works well with other macroeconomic data, such as banking data as opposed to labor data.

How well did this work in the *long, long* run? Going back as far as the data permits (1956), every one of the named recessions (by the National Bureau of Economic Research) was identified. And the outcome was that anyone using this method outperformed the perfect knowledge benchmark.

There has always been a desire among market gurus to discover a program that works in both good and bad markets. Most have failed. Experts have long counseled “Don’t fight the tape.” And history shows that the tape is bearish in recessionary periods. One implication of this research is there will be less fighting the tape if identification of recessionary activity is the first screening performed. This is not difficult and should be an arrow in the quiver of every investor or fiduciary.

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Appendix

Asset Traded	Decisions	Frequency	Start Date	Raw or Smooth	CAROR (%)	Max Drawdown	Reward/Risk Ratio
DJIA	Buy & Hold	Monthly	1/1/1920	raw	5.85	88.74	0.07
DJIA/T-bills	Avoid Recessions	Monthly	1/1/1920	raw	10.12	38.23	0.26
DJIA	Buy & Hold	Monthly	6/29/1956	raw	6.28	49.3	0.13
DJIA/T-bills	Avoid Recessions	Monthly	6/29/1956	raw	7.7	32.43	0.24
DJIA/T-bills	Workforce v. Part-time	Monthly	6/29/1956	raw 12 mth roc	6.44	31.15	0.21
DJIA/T-bills	Workforce v. Part-time	Monthly	6/29/1956	12 mth slope	7.22	31.15	0.23
DJIA	Buy & Hold	Monthly	2/29/1969	raw	6.65	49.3	0.13
DJIA/T-bills	Avoid Recessions	Monthly	2/29/1969	raw	8.21	32.43	0.25
DJIA/T-bills	Full v. Part-time	Monthly	2/29/1969	raw 12 mth roc	7.27	31.15	0.23
DJIA/T-bills	Full v. Part-time	Monthly	2/29/1969	12 mth slope	8.3	31.15	0.27
SPX	Buy & Hold	Weekly	1/22/1972	raw	7.09	56.02	0.13
SPX/T-bills	Avoid Recessions	Weekly	1/22/1972	raw	10.05	37.75	0.27
SPX/T-bills	COVEMP v. Init. Claims	Weekly	1/22/1972	raw 52 wk roc	8.55	32.75	0.26
SPX/T-bills	COVEMP v. Init. Claims	Weekly	1/22/1972	52 wk slope	8.17	32.75	0.25
SPX	Buy & Hold	Weekly	4/5/1986	raw	7.62	56.02	0.14
SPX/T-bills	Avoid Recessions	Weekly	4/5/1986	raw	10.01	38.38	0.26
SPX/T-bills	C&I Loans v. Init. Claims	Weekly	4/5/1986	raw 52 wk roc	9.48	32.75	0.29
SPX/T-bills	C&I Loans v. Init. Claims	Weekly	4/5/1986	52 wk slope	9.56	32.75	0.29
SPY (total return)	Buy & Hold	Monthly	2/26/1993	raw	9.12	55.19	0.17
SPY (total return) / T-bills	Avoid Recessions	Monthly	2/26/1993	raw	11.62	39.05	0.3
SPY (total return) / T-bills	Full v. Part-time	Monthly	2/26/1993	raw 12 mth roc	10.33	16.22	0.64
SPY (total return) / T-bills	Full v. Part-time	Monthly	2/26/1993	12 mth slope	11.11	16.22	0.68
SPY (total return) / T-BONDS	Full v. Part-time	Monthly	2/26/1993	raw 12 mth roc	11.38	16.22	0.7
SPY (total return) / T-BONDS	Full v. Part-time	Monthly	2/26/1993	12 mth slope	12.23	16.22	0.75
SPY (total return) / T-bills	C&I Loans v. Init. Claims	Weekly	2/5/1993	raw 52 wk roc	12.48	17.55	0.71
SPY (total return) / T-BONDS	C&I Loans v. Init. Claims	Weekly	2/5/1993	raw 52 wk roc	13.11	17.55	0.75

Footnotes

¹NBER Business cycle dates: <http://www.nber.org/cycles/cyclesmain.html>

²Full time employed: <https://fred.stlouisfed.org/series/LNS12500000>

Part time employed: <https://fred.stlouisfed.org/series/LNS12032194>

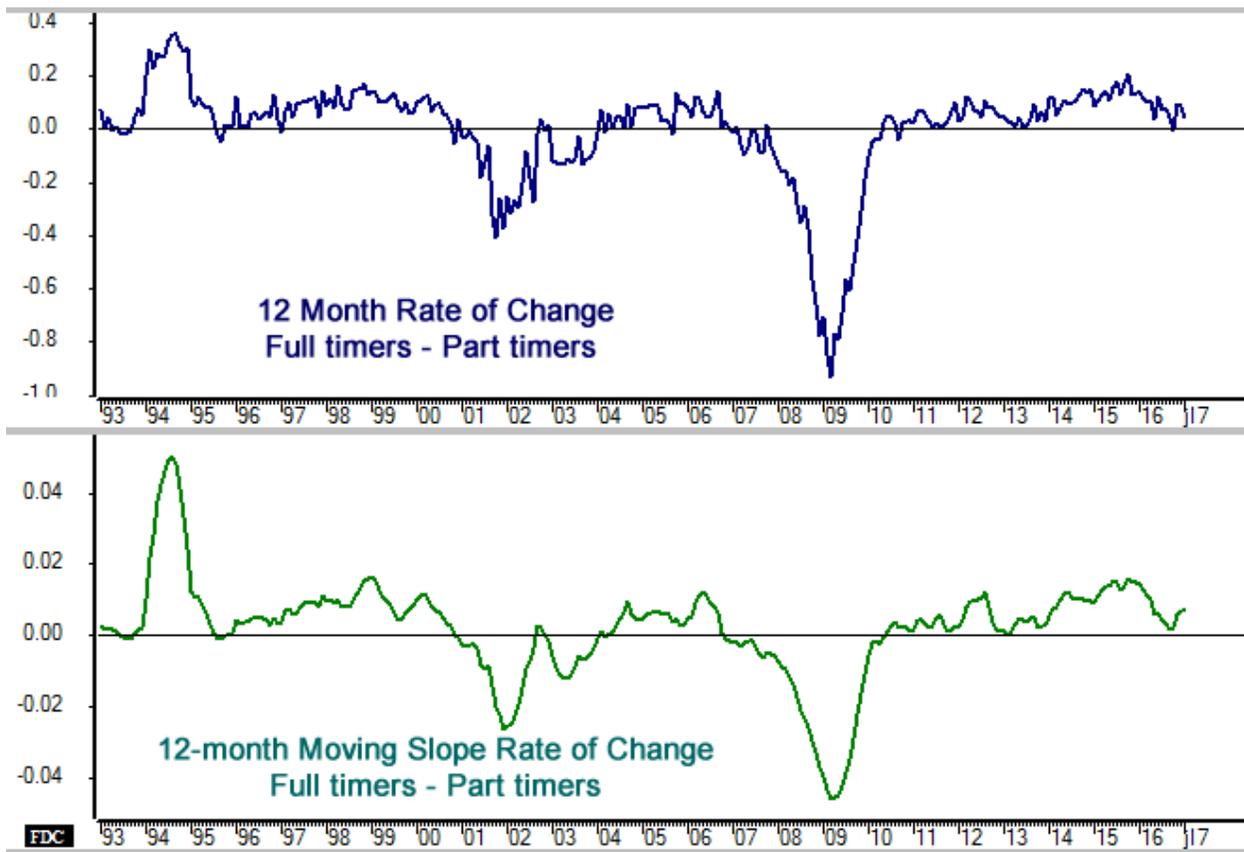
³I have to illustrate the past as it was, and no tradable bond ETF existed for the time prior to the start of IEF or TLT (2002). Hence the use of T-bills. However since I am recommending future investment in a longer maturity debt ETF, I must also illustrate how a surrogate for IEF would have behaved. Fortunately an index was created which measures the price performance of 7-

10 year Treasury Bonds. That price series (the Dow Jones Chicago Board of Trade Treasury Index) has data going back to 1988. The moving correlation between the 12-month rates of return of IEF and DJCBTI vary from .9795 to .9975, much closer than IEF and TLT for example, and making it an excellent surrogate for IEF.

⁴Laplace Rule of Succession: https://en.wikipedia.org/wiki/Rule_of_succession

This is also referred to as the “Sunrise Problem”, or the calculation of the probability that the sun will rise tomorrow.

Illustration of Data Smoothing



Both a rate of change and moving slope rate of change are calculable in most spreadsheet programs for any period. The latter is smoother than the former without introducing lag or erratic results. For a further discussion, see:

Rafter, William, Two Moving Function Hybrids, Stocks & Commodities V. 23:9. September 2005