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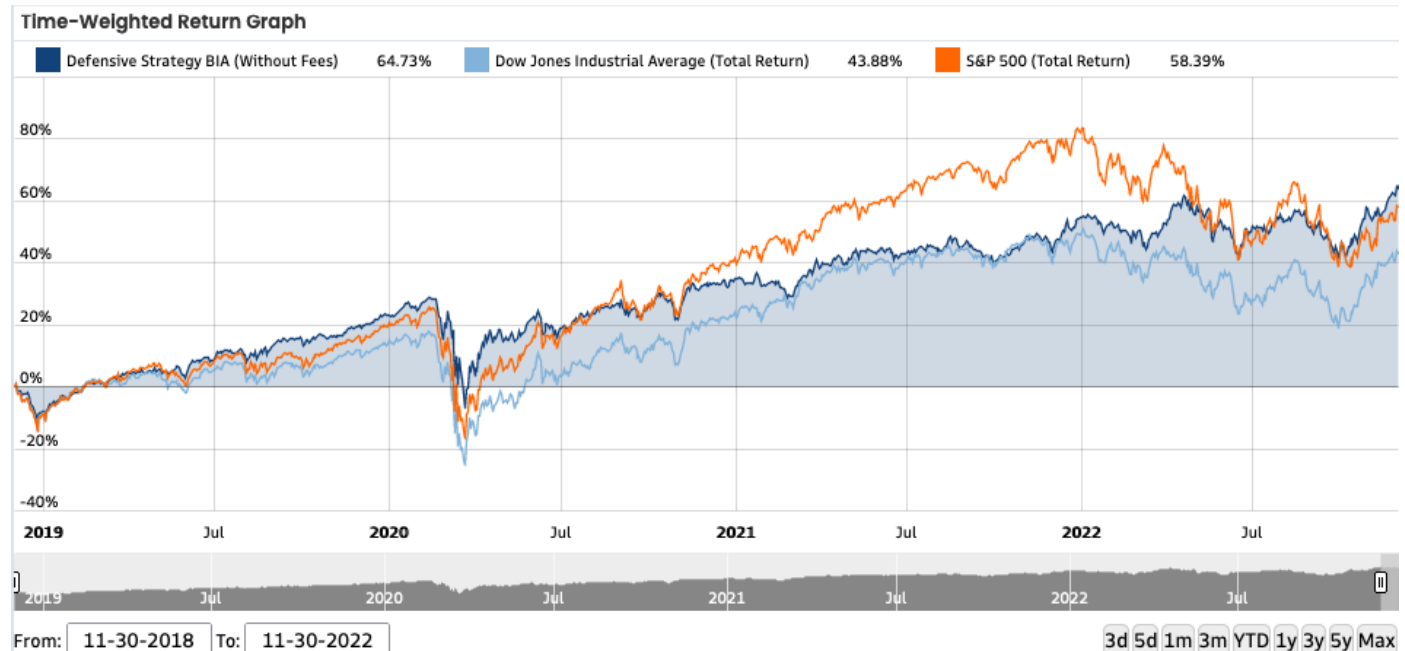
## Investment Newsletter – December 2022

### Executive Summary

As of the 4<sup>th</sup> anniversary of the Defensive Equity strategy, it has outperformed the overall market with less risk. Defensive positioning is wise for 2023 as we face huge uncertainty about interest rates, inflation, and the economy. The Fed says it will raise rates enough to cause a recession if needed to hit its inflation goal. Yet there are reasons they may not raise rates that high for any sustained period. In 2022 higher rates reduced buyers' purchasing power, sending house prices down. In 2023, income inflation is likely to arrest the housing decline.

### Defensive Equity Strategy and Performance

In November 2018 we created the Defensive Equity strategy based on a model portfolio from Folio Institutional. The goal of this portfolio is to provide long term returns comparable to the overall market but with lower volatility and draw down risks. Here are the model returns over the first 4 years for the strategy, ignoring fees, as calculated by Folio Institutional (now part of Goldman Sachs):



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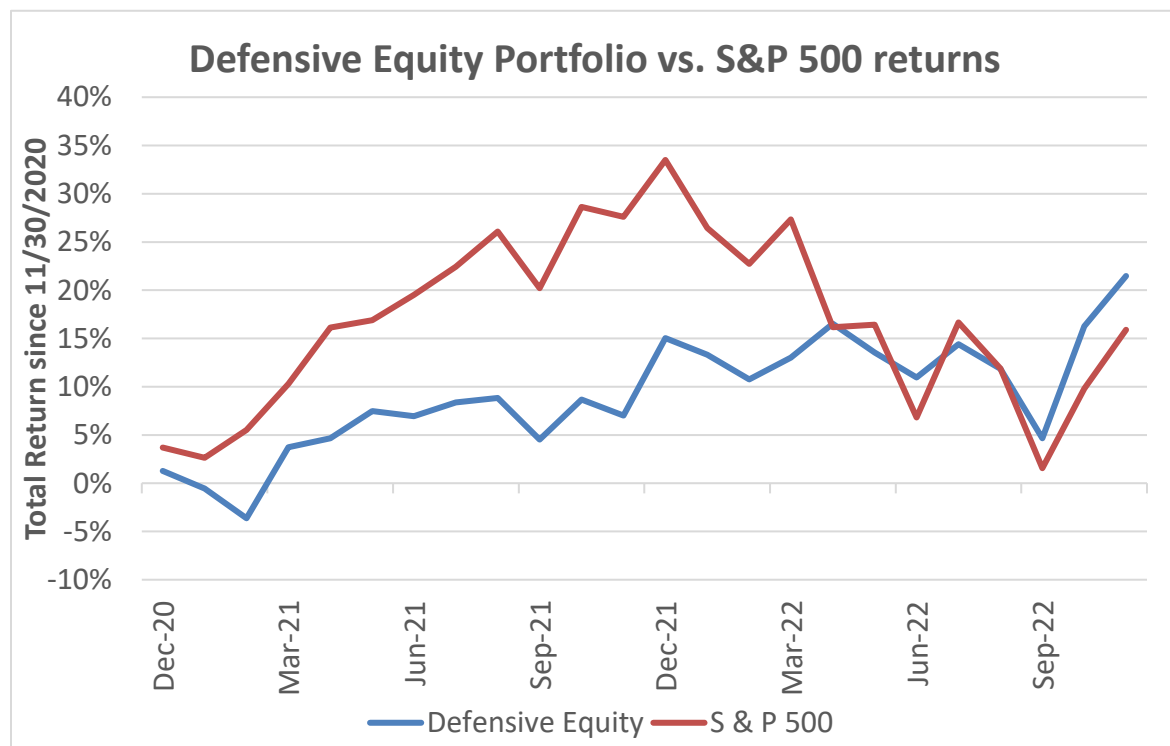
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This graph shows cumulative returns at a daily frequency. It shows that the portfolio outperformed the S&P 500 index by 6.34% over the 4 years, before accounting for fees. Assuming account management fees of 1.25%, the Defensive Equity portfolio would have provided net returns of approximately 3.16% more than the S&P 500. This is a nice result, but the more remarkable and significant aspect is the significantly lower risk of the strategy, as we'll discuss next.

In order to compare risk metrics, I recalculated returns at a monthly frequency. Using this data, the standard deviation in monthly returns (which measures how much they vary from their average) was 4.4% for Defensive Equity versus 5.7% for the S&P 500 (as implemented in an exchange traded fund).

My preferred measure of risk is called draw-down risk. This is the percentage decline from the highest value reached. This is important because draw-downs are what scare people into abandoning their investment discipline at the worst possible time – after the market has already gone down. Using monthly returns for 11/30/2018 to 11/30/2022, the maximum draw-down for the Defensive Equity portfolio was 14.7% - which was observed at 3/31/2020. For the S&P 500 index, the maximum draw-down was 23.9% over this same period. This level was reached at 9/30/2022.

As described in the December 2020 newsletter, this strategy was reformulated at November 30, 2020 to further reduce its risk level relative to the first two years of the strategy. The goal was to keep returns close to the market over the long run by reducing losses in down markets. Let's take a look at the results over these last 2 years for an actual client account invested in this reformulated strategy. The actual portfolio returns below are reduced by 1.25% annual fees which applies to accounts between \$500,000 and \$1 million.



The reduction in risk caused the portfolio to lag behind the S&P 500 until April 2022. The pandemic environment and zero interest rates drove technology stocks to abnormal highs during this period. Such speculative environments typically lead to large under-performance of boring but safe stocks as are held in Defensive Equity. On the other hand, as the Federal Reserve moved to shift interest rates to a more normal environment, current earnings became more important than distant speculative earnings, and the bubble in technology shares deflated, thus allowing our Defensive Equity portfolio to catch up. As interest rates go higher and the Covid stimulus spending wears off, the likelihood of recession in 2023 has increased. As the market has shifted towards risk aversion, Defensive Equity has pulled ahead of the S&P 500.

The lesson here is that patient investors who can maintain discipline when speculation runs rampant, are rewarded with higher returns in the long run. At least that's the lesson I take from it and I hope you do as well. That said, I think there is room to adjust the portfolio as we move through the (potential) recession, so as to capture more upside when the business cycle turns back up.

### **The 2023 Market Environment**

As we move into 2023, we are facing an economic context not seen in 40 years. Inflation is still far above the Federal Reserve's 2% target and it's very unlikely we will get back to that level in 2023. In fact, given the changes in world trade arrangements, the Covid wave of retirements, and the declining working age population in China, it's possible that we may never go back to 2% inflation in our lifetime. Or, if we do get there, it may prove to be a transitory low before demand growth once again outstrips supply growth.

The Federal Reserve is now projecting they'll raise short term rates above 5% in 2023 (compared with a 2023 median forecast of 1.625% 1 year ago). Given that inflation is currently above that level, this level will not have a big effect on most of the economy. It is high enough, however, to blow up a big chunk of unprofitable start-ups and curtail the wild hiring sprees of the big tech companies. The most speculative investments will go away, but the Fed will probably need to go to higher rates to induce a recession if they want to get inflation down quickly.

Judging by current market prices, it seems most market participants don't believe they have the will to raise rates that high. I am also skeptical. My reasoning remains the same as stated in last December's newsletter. As I explained, there are several reasons for the government to prefer lower interest rates. I think probably the most important reason is that the government and the Federal Reserve both have too much debt now to realistically raise rates above the inflation rate by any significant amount for more than a short period.

In 2023, for the first time in history, the Federal Reserve will spend more money on interest than it receives. Technically what they are doing is prohibited by the constitution of the U.S. as only congress is supposed to be able to authorize spending of taxpayer money. Since they are hiding their losses with their own special accounting, it is not clear that anyone else in Washington realizes how much money they are losing (likely at least \$100 billion in 2023). Still, as the gusher of remittances from the Fed to the treasury dries up, politicians are likely to notice something has changed.

Thus I think there's a reasonable chance that interest rates won't go much higher and inflation will continue to be elevated. But there is also the possibility that short term rates go high enough to cause a recession that is deep enough to bring inflation down faster. If this happens, and long term interest rates fall back again, longer term bonds will do well. I think investors should consider all the possibilities and invest with humility by not discounting any of the possible outcomes. The weightings assigned to strategy allocations should correspond with our views of the probabilities for the various scenarios.

## **Estimating Housing Appreciation for San Francisco Area**

The March 2022 newsletter explained how the rise in mortgage rates would reduce purchasing power for home buyers and lead to a slowdown or decline in house prices. Given the very significant run up in mortgage rates since then, let's examine the historical relationships between income, interest rates, and home prices. Then we can use these relationships to set expectation for the likely path of house prices in the near term.

Our hypothesis is that house prices are driven by the ability of the region's residents to buy a house by saving 10% to 20% of the purchase price and qualifying for a mortgage for the rest.<sup>1</sup> Based on my analysis of the data, I've decided to model this budget constraint using a hypothetical buyer. This representative buyer is a couple, each of whom earns 119% of the per capita income for the San Francisco-Oakland-Hayward metropolitan statistical area (MSA). This level of income is consistent with the idea that you must have above-average income to buy a house in the Bay Area. I've chosen this exact percentage so as to fit average buying power to median house prices for the period for which I have median prices – 1989 to 2021.

In my buying power model, the buyer saves a 10% down payment over 5 years by saving 10% of income each year. They then qualify for a mortgage for 90% of purchase price using conforming mortgage requirements at the current interest rate. This set of assumptions means that the loan amount is the constraint on bidding up until 2009. After that, in the subsequent era of very low mortgage rates, down payment savings become the constraint.

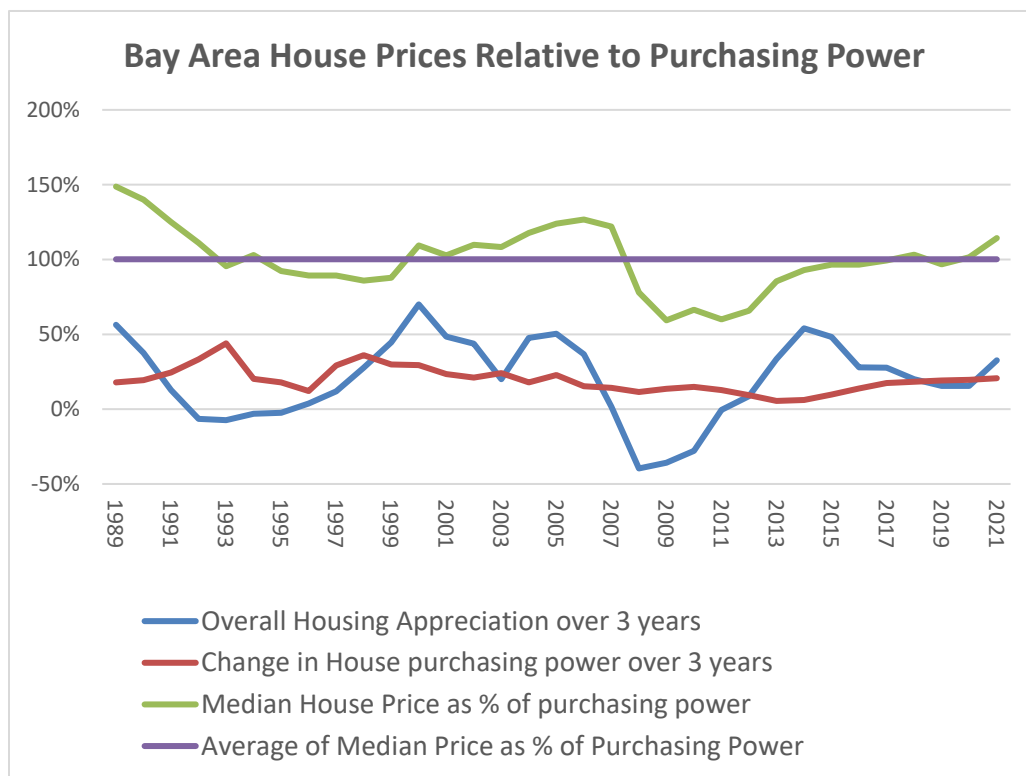
By design the purchasing power of my assumed buyers' income corresponds to the average of median bay area house prices from 1989 to 2021. Year to year, the actual ratio of house prices to purchasing power varies depending on market conditions. In 1989 median house prices were 177% of average buying power, as compared to 71% of average purchasing power in 2009 during the foreclosure spike that followed the bursting housing bubble.

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<sup>1</sup> While there are always buyers with a larger portion of cash, the incremental demand from borrowers is what determines the direction of overall prices.

Unlike the stock market, the housing market moves slowly, and it moves after changes in the underlying economic variables rather than anticipating such changes. Thus we should see house prices move over a period of years to the levels indicated by changes in purchasing power of buyers.

In the graph below, I've included two separate but related comparisons. At the top of the graph, the purple line represents a constant 100% of the representative buyer's purchasing power for the entire period 1989 to 2021. We compare this to the green line which shows the current year's ratio of the Median Home Price to purchasing power. This gives us an indication of where we are in the housing cycle. When the green line is above the purple line, houses are expensive relative to historical average and vice-versa. So, in a year where houses are relatively expensive, we should expect future appreciation to be below growth in purchasing power.



The second comparison in the graph is the bottom two lines. Here we are comparing the rates of change over the trailing 3 years. The blue line is housing appreciation as measured by the Case-Shiller San Francisco metro area index of repeat sales. This index is more accurate (than median prices) for measuring changes because it is looking at changes in price for identical properties across time.<sup>2</sup> We compare that to the red line, which shows the

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<sup>2</sup> Note that we cannot use the index to compare directly to the level of purchasing power because it is not a price. It is only used to measure changes relative to another point in time.

change in purchasing power over the last 3 years. Over the long run housing appreciation should roughly match the change in purchasing power.

The graph shows that in the late 1980s house prices rose far above normal but then spent a large part of the 1990s falling back in line with purchasing power before spiking in the dot-com bubble. Then, as the government promoted more home ownership through loose financing policies, the housing bubble inflated, pushing appreciation far ahead of sustainable purchasing power. Again, we needed a substantial part of a decade to return to normal as house prices overshot to the downside and then raced back up to line up with purchasing power.

There are many things going on in the short run beside changes in purchasing power of the population, but clearly, in the long run, prices move towards an equilibrium dictated by what the population can afford. While there will always be a lot of variation around the trend, we can estimate how the key underlying variables will impact the trend of appreciation.

In my model of house prices, two main factors influence house price changes: changes in income (which increase purchasing power in the long run), and the last observed median price percent difference versus buying power (in the near term). In order to quantify this model of price dynamics I used a regression analysis to calculate the magnitude of the yearly reversion of price towards purchasing power. The regression shows that on average 22.3% of the difference is closed per year. This means it takes around 5 years to revert to normal.

At the end of 2021 for example, the median price was 14% higher than buying power. Thus we expect this deviation to revert downward towards 0 in 2022 by about 3.1% ( $=14\% * 22.3\%$ ). In addition, the change in buying power in 2022 will also come into play in determining the path of prices.

As of November 2022 income is rising at 4.1% in 2022. Combining this with the November mortgage rate of 6.5% I calculate buying power will decline by 1.8% in 2022. During 2022 the constraint on my representative buyer's purchasing power changed from the down payment savings to the amount of mortgage they qualified for based on income. This is why purchasing power declined even as income increased.

Combining the two factors implies prices should decline in 2022 by roughly 4.8%.<sup>3</sup>

The actual decline for year to date at 10/31/22 is -1.6% according to the Case Shiller Index. The average monthly decline since May is 2.3%; so I expect the actual result will be somewhere in the range of -4.8% to -6.1%.

Looking forward to 2023, now that mortgages are the constraint on buying power, inflation driven gains in current income will directly increase

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<sup>3</sup> Calculated as  $(1-.031)*(1-.018)-1 = -.048$

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purchasing power (for a given mortgage rate). If we assume incomes rise 4% and, more importantly, that mortgage rates in 2023 average 6.42% (which is the average for the week ended 12/29/22), this will increase average purchasing power during 2023 by about 4.8% relative to 2022. If this happens, it will be enough to overcome the reversion towards purchasing power (which I estimate at 2.5%) so that house prices can rise by about 2.2% in 2023. A lot of assumptions went into that and it's unlikely they will all prove correct. It's my best estimate given what we know right now.

In conclusion, my analysis indicates that inflation can compensate for over-priced houses in 2023 so long as mortgage rates don't go (much) higher. However, in the current environment, a .1% change in mortgage rates will change buying power by about 1.1% in the opposite direction of the change. Therefore, if mortgage rates do move significantly higher in 2023 I would expect another year of decreasing home prices as buyer's purchasing power takes another hit.

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