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# Price Volatility or Inflation?

Zach Riddle – March 17, 2021

## Introduction

As a response to the economic impact of the COVID-19 pandemic and subsequent economic shutdowns, U.S. Lawmakers, the Federal Reserve, and the U.S. Treasury have implemented a combination of fiscal and monetary policies aimed at assisting households and companies in bridging the financial gap as the economy screeched to a halt. While the policy response is still ongoing, the initial responses have already taken an unprecedented form. The Great Financial Crisis (GFC) monetary policy play book was quickly mobilized and expanded upon. The Federal Funds target rate was lowered by 150 bps to 0-0.25% and the Federal Reserve introduced facilities to support the flow of credit backed by the U.S. Treasury using funds earmarked under the CARES Act. The credit facilities (alternatively referred to as asset purchases) cast a much wider net than during the GFC period to help unfreeze credit markets. Fiscal policy measures have come in large waves and have generally been funded by government borrowing and an expansion of the monetary base. As of March 11, 2021, there have been six bills that were signed into law and executive orders addressing expirations of certain coronavirus reliefs provided by previous legislation costing approximately \$5.8 Trillion<sup>1,2</sup>. While this policy response has mitigated a shock to the economy and deflationary event, the question going forward is does this unprecedented increase in the monetary base lead to broad inflation?



The objective is not to predict the timing, magnitude, or path of inflation going forward. Rather, the objective is to differentiate broad monetary inflation, changes in the relative price level, and price volatility. We also focus on disinflationary structural changes, the importance of the base value when calculating periodic inflation rates, and the risks to over hedging for inflation, and the relationship with foreign currency exchange rates.

## Defining Inflation

What is inflation? In the simplest of terms, it is an increase in the price level of all goods and services in an economy. This can stem from many sources, but at the most fundamental level, it is expected that inflation stems from an increase in the quantity of money in an economy. This view stems from the quantity theory of money where the general price level is directly linked to the quantity of money, or the monetary base, and does not have an impact on the output of real goods. The relationship is commonly described by the Fisher equation below:

$$MV = PQ$$

In this equation:

- M stands for money.
- V stands for the velocity of money (or the rate at which people spend money)
- P stands for the general price level.
- Q stands for the quantity of goods and services produced.

The basic premise of the quantity theory of money is that increasing the money supply does not lead to an increase in real output, it simply leads to an increase in nominal incomes and the price level. Said differently, increasing the quantity of money in an economy should not lead to long term increases in the quantity of goods and services produced by an economy, and therefore the general price level must increase to balance the equation. This relationship also assumes that the velocity of money remains constant. It is worth noting that this theory as presented above does not explain short term price changes well but is more generally accepted as a relationship over long time horizons. While the above theory provides a basic framework for the relationship between the quantity of money and the general price level, it is only one of many competing explanations of the relationship.

Because we are looking at inflation from the perspective of the recent increases in the quantity of money in the US economy, it is worth defining what constitutes inflation and what constitutes changes in relative price level and price volatility. Inflation is a persistent increase in the general price level of goods and services, and not just on one time increase in the price of some goods or services. Changes in the relative price level of goods and services are defined as changes due to shifting supply and demand and changes in consumer preferences. This does not meet the above definition for inflation because increasing prices for one category may be offset by deflationary pricing pressures in another. Finally, we define price volatility as changes in the price level of goods and services from a low base level back to a long-term average. This does not meet the above definition of inflation because the magnitude of the change is unlikely to be persistent.

## Structural Changes and Demographics

Structural changes to the economy and changing demographics create disinflationary pressures that may be counteracting the inflationary effects of expansive monetary and fiscal policy. International trade, automation, global labor pools, technology, and aging demographics all interact to develop the general price level.

Increasing automation and continued globalization is a headwind to wage growth. Automation and increasingly global labor pools create headwinds to inflation because both effectively increase the available supply of labor over time. This means that even when domestic labor markets are near full employment, companies now have a greater ability to substitute international labor or increase the use of automation to avoid rising wage costs. This reduces inflationary pressure on the supply (labor input costs) and demand (consumer spending). If labor costs aren't rising for a company, then they are able to keep prices low to stay competitive with other firms while maintaining profit margins.

In addition to automation and globalization, many of the largest firms today have business models that are less reliant on increasing their labor force to grow. For example, a company that provides custodial services has limited ability to improve efficiencies and generally needs to grow their labor force proportionately to growth in the business. On the other end of the spectrum, a video game company may be able to develop and sell their software to a near unlimited number of customers without the need for a large increase in their workforce. As a larger number of companies adopt the latter business model, companies will be able to grow without putting pressure on wages.

Products and services produced internationally also work against inflation if the prices of imports are lower than domestically produced goods and services. This increases supply and forces domestic producers to find ways to keep prices competitive and gives consumers the ability to substitute lower cost international goods for higher cost domestic goods. This increase in supply and competition makes price increases difficult even when faced with increasing costs.

An increased proportion of consumer and business spending on "network-able" consumption that benefits from scale is also deflationary. This is because of the low variable costs associated with offering these services. Companies that offer software, data, social networking, etc. are able to provide their services in virtually unlimited quantities without incurring proportional increases in costs. To expand on the earlier example, a custodial company needs to find additional workers and supplies for each new job, a video game company can copy the game software unlimitedly to fulfil consumer demand.

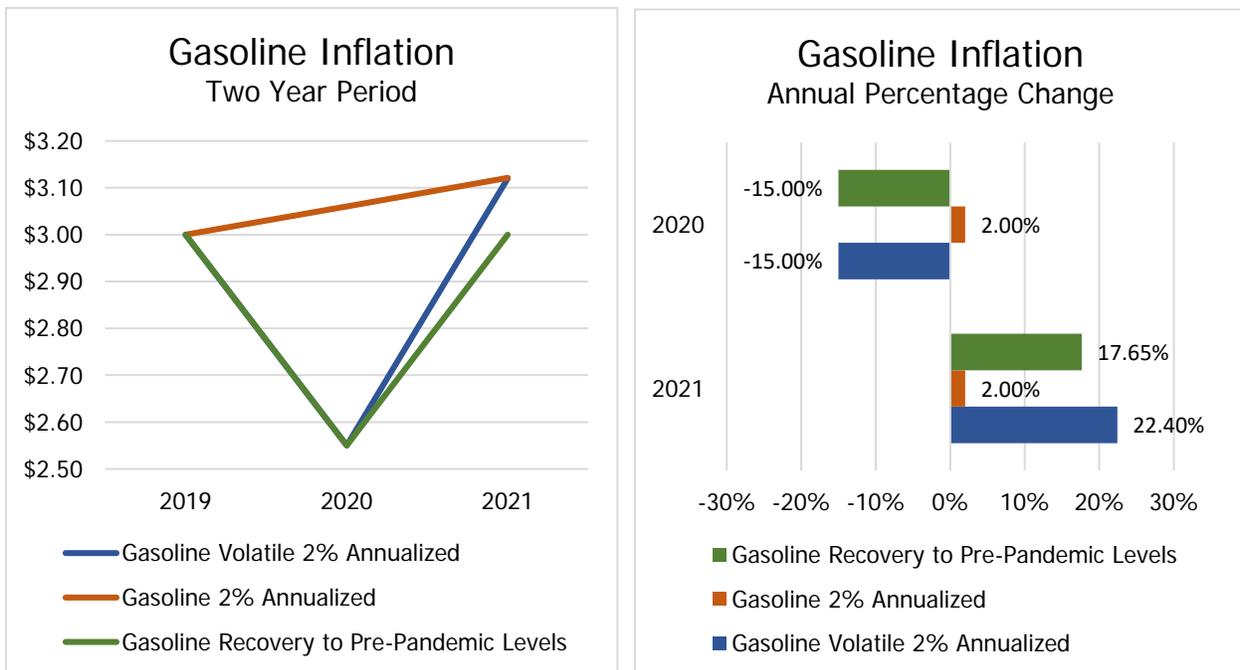
Finally, an under saved aging population leads to wage growth pressures and reduced demand. Wage growth pressures come from people remaining in their jobs and working longer. The trend of people working longer likely stems from a general lack of retirement savings and increasing longevity. When people stay in their jobs longer it impairs younger workers ability to continue to move up and replace retiring workers in generally higher paying roles. This slows the pace of wage growth. Reduced demand comes as workers retire. Because of increasing

longevity and low savings levels, many retirees don't spend as much compared to when they were working. This decrease in demand grows as the population gets older leaving a gap in demand that may or may not be filled by younger generations.

## A Technical Case for Inflation

The forecasts for a rise in inflation in the second half of 2021 are likely based on predictions that prices will recover to pre pandemic levels. The components of CPI that were disproportionately affected by the pandemic mitigation efforts now have a low base to recover from. The example below demonstrates that calls for above average inflation may be based on technicalities because of the low base and the ensuing upward bias in the numbers.

First, we consider the volatility in gasoline prices that we have experienced because of the sharply reduced demand caused by the onset of the pandemic and reduced travel. Looking at the chart below, Gasoline Volatile 2% Annualized refers to a situation where gasoline prices deflate by 15% in 2020 then recover to an assumed 2% annualized trend inflation rate in 2021. Gasoline 2% Annualized ends at the same value but takes a symmetrical path with prices increasing 2% in 2020 and 2021. Finally, Gasoline Recovery to Pre-Pandemic Levels refers to a situation where gasoline prices simply recover to where they started. This situation outlines an example where inflation would fall short of the 2% annual inflation target. All examples start with a base value of \$3.00 per gallon at the end of 2019.



There are two conclusions that can be drawn from the above example. First, even if there is no inflation over the two-year period (Gasoline Recovery to Pre-Pandemic Levels) the year-over-year number for 2021 would correctly indicate that prices increased by 17.65%. While this data is correct, it fails to consider the low base and preceding deflation in 2020. Second, this

example shows that there are multiple routes to the same outcome. Looking at the steady inflation situation (Gasoline 2% Annualized) compared to the more realistic volatile situation (Gasoline Volatile 2% Annualized) you can see that while prices ultimately inflated at a reasonable 2% annualized rate in both scenarios, the volatile scenario paints a very different picture when the data is looked at over shorter time frames.

The above example demonstrates that context is important when evaluating data. A large percentage increase from a low base value is not enough information on its own to draw a strong conclusion about higher-than-expected levels of inflation in the future.

## Risks to Over Hedging

In an ideal world it would be possible to hedge against all risks while still earning returns high enough to reach investment objectives. Unfortunately, investing carries risks. This leads to the natural questions of how much and which risks can be taken and which need to be mitigated.

While it is common to look at inflation from the point of view of asset owners, to gain a more holistic view of risk exposures it is important to also look at the liability side of the equation. While inflation can impact assets purchasing power over time, it also decreases the burden of nominal liabilities (liabilities that are not indexed for inflation). If assets and liabilities are equally exposed to inflation risks, then the reduced purchasing power will be offset by the reduced real liability burden. In situations where liabilities are linked to inflation, even if not explicitly linked, real returns become a more central focus.

The risks posed by hedging generally come in the form of opportunity costs. In the United States Treasury Inflation Protected Securities (TIPs) are commonly used to hedge against unexpected inflation. TIPs mechanism for adjusting to inflation is an adjustment to the principal resulting from a change in the Consumer Price Index. Coupons are paid at a fixed rate, but the value of the payments adjusts based on the changes in the principal value. While this provides a hedge against decreases in purchasing power due to inflation, the current low interest rate environment has left TIPs with negative and near negative yields. This is because TIPs are priced based on the yield of a similar nominal pay Treasury and inflation expectations. The difference in yields is referred to as breakeven inflation.

Nominal Pay Treasuries and TIPS Yields and Breakeven Inflation as of 2/26/2021 <sup>3</sup>			
	5 Year	10 Year	30 Year
Nominal Pay Treasuries	0.75%	1.44%	2.17%
TIPs	-1.64%	-0.71%	0.06%
Break Even Inflation	2.39%	2.15%	2.23%

Looking at the above table you can see that you now have to pay for inflation protection for the shorter 5- and 10-year securities. That means that if held to maturity the expected return would be less than inflation. In addition to low expected real returns, TIPs carry interest rate risk if rates were to rise, which has historically been common during periods of rising inflation. While

interest rate risk can be mitigated if the security is held to maturity, selling the security prior to maturity can negatively impact returns.

While inflation is typically discussed by news outlets in terms of individual investors, whose future liabilities are generally linked to inflation, institutional investors generally have a more complex relationship with inflation. In the case of investors with nominal liabilities with matched exposure to inflation, the cost of hedging may outweigh the benefits.

## Falling US Dollar Exchange Rate

Finally, it's worth exploring the relationship between Dollar exchange rates and inflation. First it is worth circling back to the definition of inflation that we are using for the purposes of this analysis. Inflation can be defined as the persistent increase in the general price level of goods and services (priced in the U.S. Dollar). This means that inflation occurs across all, or nearly all, goods and services, and that inflation persists over a long period of time. Because a change in exchange rate is likely to only effect the price level of imports, it is difficult to draw the conclusion that there is a causal relationship between depreciation in the U.S. Dollar and general price inflation of all goods and services.

While looking at the Consumer Price Index as a measure of changes in the general price level does show aggregate change in prices, it may be skewed up or down by swings in a subset of components caused by changes in the exchange rate. For example, a depreciating U.S. Dollar would make produce imported from South America more expensive in Dollar terms. This would increase the fruits and vegetables component of the index and pressure the aggregate CPI value upwards. While this change may look like inflation, assuming that the price didn't rise on a constant currency basis, in our view it may be better to define it as price volatility.

Another important factor to note is that it is generally accepted that foreign exchange rates reflect expectations about the future and do not simply reflect past information. This would imply that changes in the Dollar exchange rate would be more of a product of realized and expected inflation, among other things<sup>4</sup>, and less of a source of inflation.

While it may not be a cause of inflation, it is worth noting that countries with higher rates of inflation typically have weaker currencies relative to countries with lower more stable rates of inflation. This, and the earlier points lead to the conclusion that exchange rates are dictated by inflation rates in a country, and not the other way around.

## Conclusion

While an increase in the quantity of money would imply inflation at its most basic level, at least in the short to medium term, there are counteracting forces to consider. Structural changes to the economy and changing demographics create disinflationary pressures that may be counteracting the inflationary effects of expansive monetary and fiscal policy. Although high rates of inflation can meaningfully erode purchasing power over time, explicit inflation hedges such as TIPS pose their own unique risks if above trend inflation materializes or not. It is probable that we experience price volatility as the economy reopens and gets back on track, but

a more persistent increase in prices from a more normal base value would be needed to confirm the presence of above trend inflation.

Endnotes:

<sup>1</sup>“Policy Responses to COVID19.” 2021. IMF. January 7, 2021.  
<https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19#U>.

<sup>2</sup>“Text - H.R.1319 - 117th Congress (2021-2022): American Rescue Plan Act of 2021,”  
Congress.gov, March 11, 2021, <https://www.congress.gov/bill/117th-congress/house-bill/1319/text>.

<sup>3</sup> “Daily Treasury Yield Curve Rates.” 2020. Treasury.gov. February 22, 2021.  
<https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yield>.

<sup>4</sup>While there are numerous factors that affect currency exchange rates; interest rate differentials, current account deficit or surplus, public debt levels, economic performance, future expectations, and geopolitical stability are some additional factors.

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