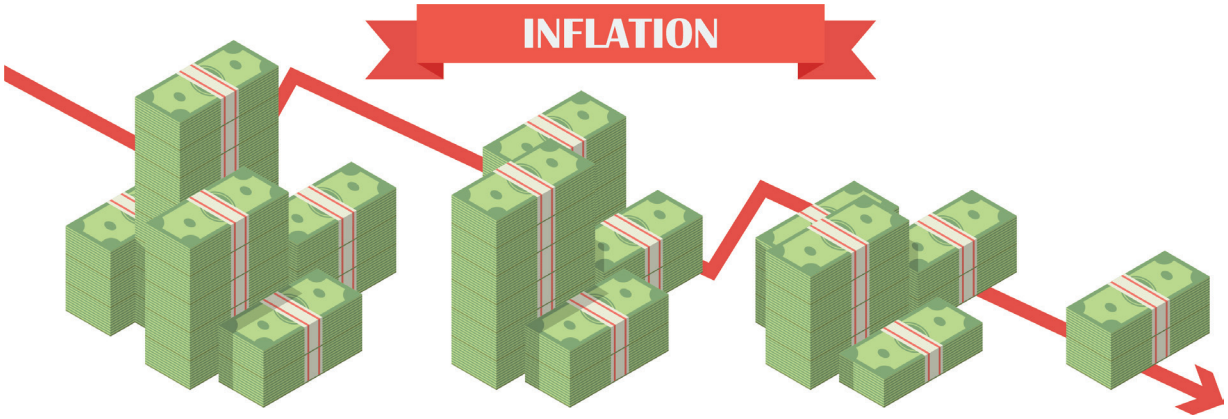

What is Inflation and Why do we Care?

By Barbara Wagner, Chief Economist

The price of gas spikes to $4.00. Banana prices fall $0.10 per pound. The price for heating fuels ticks up a few cents, but then declines. The prices of consumer goods is tracked by the Bureau of Labor Statistics (BLS) for the purpose of providing inflation information to businesses and consumers. All of the price changes add up to the overall inflation experienced by consumers and tracked by price indexes. But why put all this effort into measuring prices? Why does it matter? And what exactly is inflation anyway?

Why the BLS tracks prices – Real Wage Growth

One important reason to track prices is to compare the rate of price changes to wage gains. Real wage gains – or wage growth greater than the rate of inflation – allows workers to buy more goods and services with their wages than in the past, thus allowing them to increase their standard of living. Real wage growth is critical to a healthy economy because wages help spread the benefits of economic activity to a wider group of people in the economy, rather than the benefits being received only by the owners of capital. There are also other reasons to track prices, including economic planning and information for businesses so they can appropriately price their products. But for the average person, the importance of measuring prices is to compare them to their wages to see if they are getting ahead.

In Montana, workers have been experiencing real wage growth for most of the last decade, as shown in **Figure 1**. The real Montana wage in 2015 dollars is shown on the left hand axis, with real wage growth on the right hand side. With inflation at only 0.1% for 2015, Montana recorded wage gains of 2.9% in 2015, which is the fastest gain in real wages ever recorded since the data series began in 1990. Real wage gains are increases that occur above the rate of inflation, which signal that Montana workers can afford more goods and services with their wage than ever before, increasing the standard of living in our state.

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You keep mentioning inflation. I've heard of that...

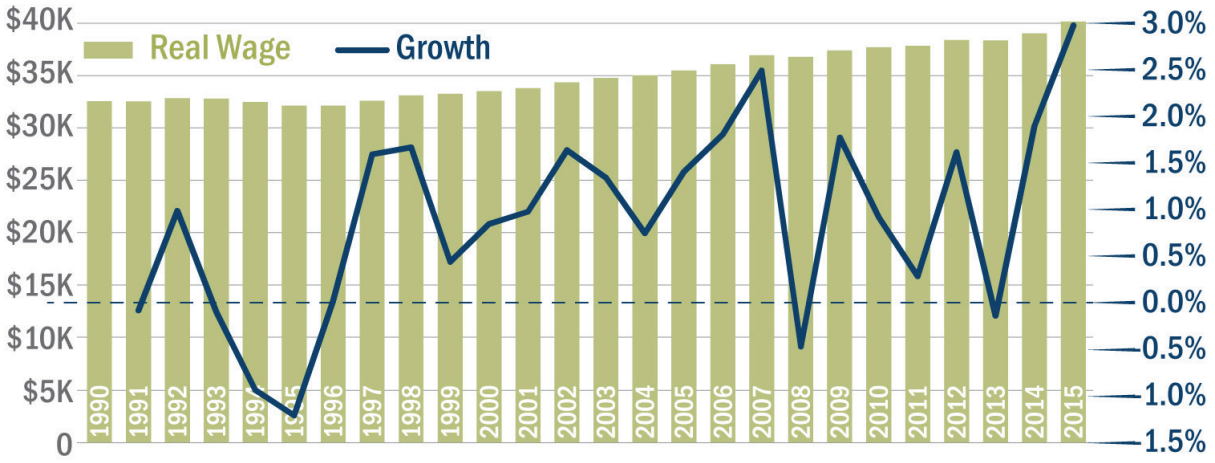
Inflation refers to a general increase in the average price level of all goods and services across the full economy. A key term in the definition is "average." If the price of gas spikes or falls, it doesn't necessarily mean there is inflation – the price of all other goods must also be considered. Many people think inflation costs them money and makes it hard to get ahead in life, but wages are also impacted by inflation. (In fact, wage increases also cause inflation!)

As an example, we have all heard how milk was dirt cheap back in our grandparent's day (along with the walk to school being uphill both ways). Using data from

FIGURE 1:

Fastest Real Wage Growth Recorded

MT's Real Wages (2015 dollars) and Real Wage Growth



Source: Quarterly Census of Employment and Wages (QCEW), U.S. Bureau of Labor Statistics, inflated using the CPI-U.

1955, milk cost $0.87 per gallon.[1] In 2016, a gallon of milk cost $3.20.[2] The $2.33 increase in the price of milk over the last 61 years makes it seem like milk is more expensive than it was in the past, and that inflation has caused it harder to get ahead in life. But prices are only half of the story – wage increases are also important. The median income for men in 1955 was $3,358, allowing the average man to purchase 3,859 gallons of milk with his annual income (if all of his income was spent on milk). If inflation were the only thing influencing the prices of milk and wages, the average man still would be able to also buy 3,859 gallons of milk with his income in 2017. In fact, incomes have increased faster than inflation, with the median incomes for males equal to $37,138 in 2015, allowing him to purchase 11,605 gallons of milk![3] Using both price and wage information leads to a more complete understanding of prices.

Figure 2 illustrates the increase in the consumer prices of certain goods and services since 1982, comparing them to the increase in median usual weekly earnings for U.S. workers. All prices and wages are indexed to 1982-84, allowing us to easily compare whether the price for the good has increased faster than (or more slowly than) the usual median weekly wage. For example, the price of milk has been increasing, but the line falls below the line

Inflation refers to a general increase in the average price level of all goods and services across the full economy.

for the increases in the median usual weekly earnings, indicating that wages have been increasing faster than milk prices. Other items that are becoming more affordable relative to wages include wireless telephone service, new and used motor vehicles, and food and beverages. All of these items have had price increases lower than the increases in the median usual weekly wage since 1982.

Particularly interesting is the level of price for personal computers; personal computers were quite expensive when the product was still relatively new, but improvements in technology has significantly reduced production prices, allowing those cost savings to be passed on to consumers through lower purchase prices. We now can afford more personal computers that we could in the past.

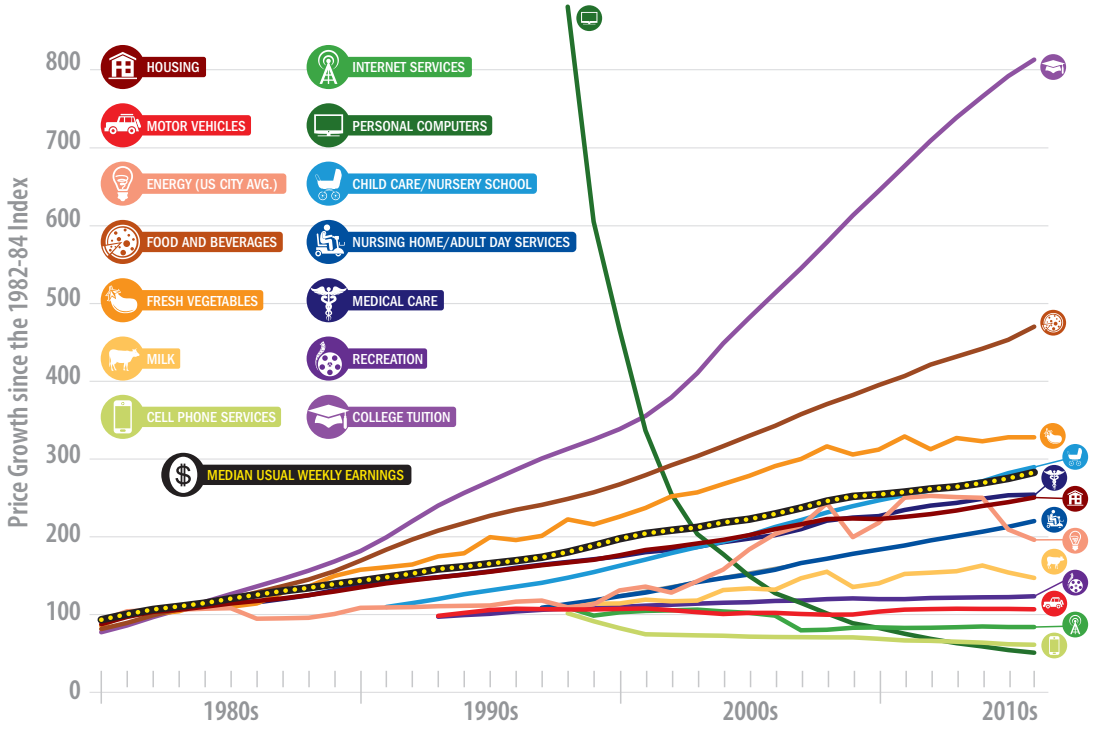
Figure 2 also illustrates how the prices paid for college tuition, medical care, and fresh vegetables have all increased faster than wages since 1982, underscoring

1 Reed, Stephen, 2014. "One hundred years of price change: the Consumer Price Index and the American inflation experience," Monthly Labor Review, April 2014, at https://www.bls.gov/opub/mlr/2014/article/one-hundred-years-of-price-change-the-consumer-price-index-and-the-american-inflation-experience.htm.

2 Bureau of Labor Statistics, 2016. CPI Average Price data.

3 U.S. Census Bureau, Current Population Survey, at https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-people.html.

FIGURE 2:
Prices of Certain Goods Compared to Wages since 1982 in the U.S.



Source: U.S. Bureau of Labor Statistics, CPI-U and Current Population Survey (CPS).

why there is considerable political debate over the affordability of these items. The prices for college tuition is eight times the level it was in 1982, compared to wages only being three times higher than the 1982 level. The cost of a college education has been a hot topic in both political and economic debates because of the reduced affordability, combined with the increased importance of higher education in our economy. Medical care costs also have increased faster than wages, which causes strain on the budgets of both workers and businesses.

Is inflation good or bad?

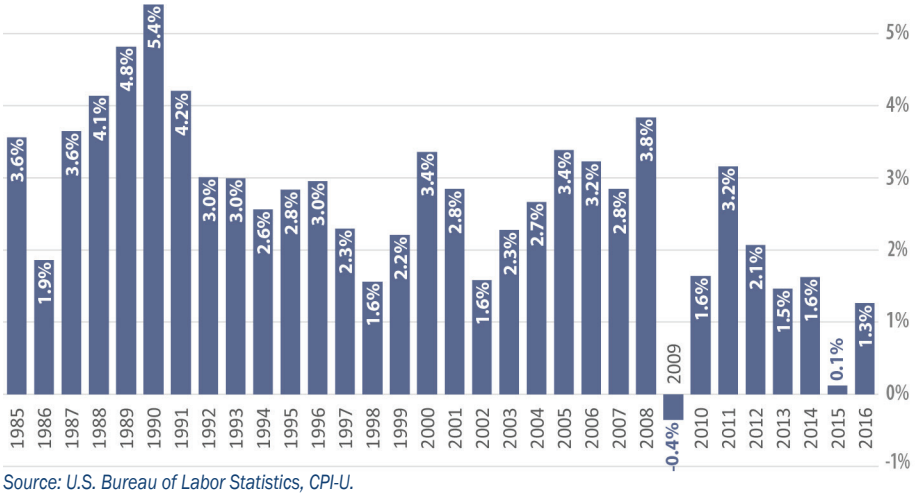
Figure 2 illustrated that the prices of some goods have increased much faster than wages, which causes hardship for workers and generates significant policy debate if the good is considered a necessity. Conversely, wages growing faster than prices benefits workers and increases their standard of living. However, it is also important to remember that not all price changes are due to inflation. Changes in the supply and demand for goods also result in price changes that are theoretically separate from the influences of inflation.

Inflation itself is neither good nor bad. Inflation is caused when the money supply in the economy grows faster than the economy's ability to produce goods and services. Yet, if the money supply does not grow fast enough, economic output can be constrained, leading to higher unemployment. Therefore, inflation is not necessarily bad. Inflation often goes hand-in-hand with economic growth, and is certainly preferable to the alternative of a recession. The tradeoff between inflation and unemployment explains why the Federal Reserve follows a balancing act of aiming for both full employment and price stability when considering increases or decreases to the supply of money. The current inflation rate of 2.4% is relatively low in historical terms, as shown in **Figure 3**.

Normal inflation is not bad, but it does have different impacts on different people. In general, wealthier people who own significant assets are harmed by higher-than-expected inflation because their assets lose value over time. Most wealthy individuals guard against inflation by investing their wealth into instruments that offer returns higher than the rate of inflation in order to maintain their relative wealth. On the other hand, higher-than-expected inflation benefits borrowers, including individuals who have mortgages, student loans, car loans, or other debt.

Borrowers pay interest on these debts at a rate set at the time of borrowing, with the rate including adjustments for the expected rate of inflation and a premium for the risk taken by the lender. If inflation is above the expected rate of inflation, the lender receives less for their profit in real terms, but the borrower ends up benefiting (in real terms). These differences in what type of person is affected by inflation often explains why some individuals argue for lower versus higher targeted rates of inflation.

FIGURE 3:
Annual Percent Change in the CPI-U
since 1984



Source: U.S. Bureau of Labor Statistics, CPI-U.

While normal levels of inflation are not bad, rapid inflation and deflation are bad. Rapid inflation creates costs to businesses because it makes it difficult to find the right price for their goods. Such costs are referred to by economists as menu costs or sticker costs because businesses incur costs from having to change their menus frequently. Hyperinflation is also thought to encourage consumers to spend (rather than save), which can negatively influence long-term growth. In a typical situation, interest rates adjust for inflation and work to keep the incentives for saving versus spending balanced. However, during a financial crisis, market forces may not result in an interest rate that appropriately adjusts for hyperinflation.

Deflation is an even bigger problem than rapid inflation. Deflation exacerbates recessionary pressure in the economy by causing consumers to delay purchases in anticipation of lower future prices, which can cause a failing economy to spiral downward more quickly. While interest rates can adjust to accommodate higher inflation levels, interest rates cannot go below zero (called the zero-bound problem), and therefore the economy cannot self-adjust for deflation.[4] Deflation leads to a worsening economy without any tools for the economy to self-correct, leading to what is called the "deflation trap." Because of the risks of deflation, many economists would rather see higher levels of inflation than take on the higher risks associated with deflation.

Price Indexes

Of course, not every worker spends the same amount of money on the same goods. In order to track inflation and the prices paid by consumers, the BLS conducts a survey of consumers to find out what they buy (the survey is called the Consumer Expenditure Survey). Then, the BLS tracks the prices of the goods included in the average "basket" of goods purchased by consumers, developing a price index. A price index is a way to measure increases in prices by tracking the overall price of the same "basket" of goods over time. For example, if the "basket" involves equal amounts of oranges and milk, and the price of both doubles, the price index will also double. But if the price of oranges drops, and the price of milk increases, the price index may end up not changing.

Rather than using the actual cost of the average basket of goods, price indexes set the price equal to 100% (or 100) in the base year to make the index easier to understand. For example, if the basket of goods actually costs $32,978 annually, the price index represents that number as 100 to make the math easier for users. Any price increase in the basket are represented as percentage increases, so that an increase of 3% from the base price is represented at 103. Users then do not have to do calculations to find the answer to 3% of $32,978.

4 *Negative interest rates have been used by the Bank of Japan, the European Central Bank, and several other authorities as unconventional monetary policy to address specific challenges in the wake of the 2007 financial crisis. However, the interest rates paid for consumer loans and set in the private market typically remain positive even with a negative Federal Funds rate, thus not breaking the theoretical zero-bound.*

The most well-known price index is the Consumer Price Index for Urban Consumers, or the CPI-U, which is produced by the BLS using the process described above. Although the CPI-U is the most well-known price index, there are many more. In fact, the BLS also produces the Consumer Price Index for Wage Earners, or the CPI-W. The CPI-W tracks the items most commonly purchased by workers and is used by the Social Security Administration to set cost-of-living increases for social security benefits. The BLS also produces the Producer Price Index, which tracks prices of things purchased by businesses. Other organizations also publish price indexes. The Bureau of Economic Analysis produces the Personal Consumption Expenditures index used by the Federal Reserve for decisions regarding the money supply. There are also very specific indexes, like ones that track prices paid by governments, prices of goods paid by retirees, and even prices paid for bananas. All of these price indexes use the same concept of tracking the prices of the same basket of goods over time.

Price Changes versus Cost-of-Living Changes

One of the biggest challenges in the accuracy of a price index is that the quality of goods changes over time, as does consumer preferences. For example, over time, consumers have switched from telephone land lines, to big "bag" cell phones, to smaller blackberries, to even smaller flip phones, to smart phones, and back to bigger smart phones. All of these products are technically telephone service, but the quality of the product has changed, as has consumer preferences.

If the intent of a price index was to measure inflation, then it would only track the cost of a landline over time, and not adjust for any price increases that come from increased quality of service and changing consumer preferences for mobile phones. Alternatively, an index intending to measure the average cost-of-living, or the cost necessary to live an average lifestyle, the metric should track the average amount paid for telephone services by consumers and include the switch from landline to smart phone in the analysis. Therefore, price indexes, which are designed to measure price changes, are not technically cost-of-living measures that include changes in the average cost of living, even though many people use the terms interchangeably.

- Tracks prices for an average "basket" of goods commonly bought by U.S. consumers
- Conducted by the U.S. Bureau of Labor Statistics
- Forms the basis of every major price index

BLS Bureau of Labor Statistics

CPI-U Consumer Price Index for Urban Consumers

- Tracks prices for items commonly bought by urban consumers.
- The most well-known, commonly-used index.

CPI-W Consumer Price Index for Wage Earners

- Tracks prices for items commonly bought by workers.
- Used by the Social Security Administration to set cost-of-living increases.

PPI Producer Price Index

- Tracks prices of items bought by businesses.

BEA Bureau of Economic Analysis

PCE Personal Consumption Expenditures Index

- Used by the Federal Reserve for decisions regarding the money supply.

A cost-of-living index is a conceptual measure that indicates the amount that consumers need to spend to reach a certain standard of living. A complete cost-of-living index would go beyond measuring the prices of goods and

services to also measuring changes in governmental or environmental factors that affect consumers' well-being. For example, crime rates, scenery, air quality, and other factors affect our standard of living, but are not included in most price indexes. That being said, many organizations still use a price index to approximate cost-of-living changes because it is the best measure available.

Most price indexes are somewhat of a mix between only measuring inflation and including changes in quality and type of goods. Price indexes attempt to address changing consumer preferences by updating the "basket" of goods regularly, allowing new products and services to be included in the updated basket. Further, economists also adjust for changing consumer preferences by using a different mathematical method to track the index called chain-weighting. Chain-weighted (also called chain-linked) price indexes use a different computational method that adjusts for changing consumer preferences, and therefore gives a more accurate picture of increases in inflation. However, even with these newer computational methods, adjusting for changes in product quality remains an ongoing challenge for economists and statisticians. It is difficult to quantify the gains in quality, especially when products get better and cheaper at the same time.

Wage escalation contracts and the best price index for Montana

Employers often contact the Montana Department of Labor & Industry asking for price indexes specific to Montana, typically wanting to update their employees' wages for changes in the price of groceries and other living expenses. For example, during the Bakken oil boom, many communities in Eastern Montana were experiencing rapidly rising grocery and retail costs due to rapidly rising wages in the area. Including automatic inflation adjustments for wages is called wage escalation, and is relatively common among Montana employers.

However, there is not a Montana-specific price index to adjust prices specific to our state, or data specific for smaller communities in the Bakken. Data is available from the Bureau of Economic Analysis that could be used by advanced users to track prices in Montana, but the data is delayed by nearly a year and requires significant manipulation to be used as a price index. Montana data is included in the price information tracked by the Bureau of Labor Statistics, but only from the urban areas, particularly Billings and Missoula. In fact, the most commonly used price index, the CPI-U, only includes urban consumers. The CPI-U accurately tracks prices for the 87 percent of the U.S. population that lives in an urban area, but there are no guarantees that it would accurately track prices in rural areas of Montana.

For lack of a better option, Montana employers typically use the CPI-U for wage escalation contracts, even though it may not represent all areas of Montana. It is possible to find price indexes that are more appropriate, such as using the CPI-U for smaller cities, or using the CPI-W (which tracks the prices for the paid by urban wage earners, excluding retirees, students, youth, and others who aren't earning wages). However, the CPI-U is the most commonly reported statistic, and using other measures can result in confusion for workers who are wondering why their wages did not change by the amount listed in the newspaper. It also reduces worker confusion when the inflation measure used for wage escalation is clearly communicated and remains consistent year after year. Finally, employers may wish to use the annual average for a price index, rather than using just one specific month (January to January, for example). Because gas prices tend to fluctuate significantly month to month, even after adjusting for seasonality, the CPI-U may spike in one particular month, then decline the next month. Using an annual average provides a more stable increase and reduces the likelihood of short-term volatility affecting wage outcomes

Conclusion

The goal of economic growth is to improve the lives of the population, including employers, workers, consumers, and firms. But it is not enough to just track the amount of wages paid or profits gained without taking prices and inflation into account. If inflation rises faster than incomes, the members of the economy could be worse off, even with income growth. While inflation is an often misunderstood concept and difficult to understand, it is an important concept for understanding the impacts of economic growth on the consumers, workers, and businesses that create the economy. The creation of price indexes, like the CPI-U and other measures, allows us to track prices and quantify changes in affordability of goods, leading to better understanding of policy problems like rising costs for medical care and tuition.