

The U.S. Economic Paradox after the 2008 Financial Crisis: Expansion of Money without Inflation

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Honors 3000

Fall 2017

A. Introduction

In modern economies, regardless if you are a borrower, lender, investor, or saver, we share the same goal: making life easier and better, backed by money. When it comes to money, all of us—its users—think about why money really matters. For the answer, as human beings, to satisfy some of all 5 levels of Maslow's Hierarchy needs and wants, having money is a logic solution. We learn from our parents that money does not grow on trees.

In the U.S.—the world's strongest economy, money is not issued by its government, and its production, for mainly funding federal deficit, actually follows an order. The money order process begins when the U.S. Treasury borrows from the public by selling its securities—IOW from the U.S. government—at auction to public. However, as the only financial institution that legally controls money supply in the U.S., the Federal Reserve, or the Fed—the central bank of the U.S.—interacts to the amounts of Treasury securities sold. How? The Fed purchases Treasury securities through giant financial firms—primary dealers—that associate with the Federal Reserve Bank of New York. The Fed conducts these transactions in the open market, known as open market operations, to hold Treasury securities. Indeed, the National Bureau of Economic Research announces that more than \$2.4 trillion worth U.S. Treasury securities are held by the Fed in November 2017.

According to the Bureau of Engraving and Printing (BEP), “the BEP prints billions of dollars – referred to as Federal Reserve notes – each year for delivery to the Federal Reserve System.” We can logically conclude that money supply order is from the Fed, not the government nor the Treasury. However, the Fed is an independent central bank. The Fed's establishment was an act of Congress and was signed by President Woodrow Wilson on December 23, 1913, called the Federal Reserve Act. And the act clarifies the Fed's authority and responsibility: to (1) establish the Federal Reserve System, (2) authorize the printing of Federal Reserve Bank Notes, and (3) manipulate the national monetary policy.

In their 2009 book “Financial system of the economy: principles of money and banking”, Burton and Brown define monetary policy as “the Fed's efforts to promote the overall health and stability of the economy” (13). In their report to Congress in August 2008, Labonte and Makinen confirms that the power

of U.S. monetary policy is remarkably stronger than U.S. fiscal policy, set by the national government, since globalization trends have significantly affected the American economy. While Engelhart (2014) states that government large expenses require extra monetization, that makes the Fed raise the rate of money supply each year. To determine the state of monetary policy, economists measure the growth of the money supply, federal fund rate, and the interest rate charged for loans made between lending institutions. The transformation of the money supply economically reflects the relationship between aggregate demand and money supply; it also impacts the federal fund rate, which influences households' confidence in their long-term, large costly assets such as houses and cars, as well as the investors' motivation in their current and new business developments.

The 2008 financial crisis was a hard test for the Fed to maintain its accountability. Firstly, what caused the financial crisis? According to his article on analyzing financial crisis, Taylor (2012) states that financial crises are typically caused by excesses, specifically monetary excesses, which create a boom and an unavoidable bust (1). The housing boom and bust—housing bubble—triggered the 2008 financial crisis in the U.S. In a summary of the primary cause of the housing bubble, Holt (2009) claims that the housing bubble was caused by (1) low mortgage interest rate, (2) low short-term interest rate, (3) relaxed standards for mortgage loans, and (4) irrational exuberance.

Consequently, the National Bureau of Economic Research announced that GDP decreased at annual rates of 5.4% in the 4th quarter of 2008 and 6.4% in the 1st quarter of 2009, leading the economy into a deep recession. The Fed responded to the turmoil by running a series of large-scale asset purchases (LSAPs), known as QE1 in March 2009 and QE2 in November 2010, which increased the Fed's balance sheet by more than two trillion dollars, according to Bernanke (2013). In other words, the Fed bought the amounts of U.S. Treasury securities worth \$2 trillion through transaction channels that the Fed associated with primary dealers and created \$2 trillion of money supply. From my explanation about the money order process above, now we are able to recognize that the Fed supplies \$2 trillion to market after the 2008 financial crisis. The increase in supply money is the expansionary monetary policy. Otherwise, the decrease in supply money is the contractionary monetary policy.

\$2 trillion is an unusually large money supply. The quantity theory of money (QTM) affirms that aggregate prices (P) and total money supply (M) are related according to the basic equation $P = VM/Q$, where Q is real output, and V is velocity of money. The central implication of the QTM is that a given change in the rate of money growth causes an equal change in the inflation rate. Milton Friedman claims that, "Inflation is always and everywhere a monetary phenomenon." In this '\$2 trillion of money supply' case, we expect high inflation rate to come. Contrary to the QTM and Friedman's famous statement, the U.S. post-crisis economy experienced low inflation rate at 2.7% in 2009, 1.7% in 2012, and 0.7% in 2015, according to FRED. This phenomenon is a very unusual event in the U.S. economy. It is very important to figure out what made this paradox happen because somehow it was able to counteract many key economic rules, which are used to measure the change in money supply and inflation.

The U.S. economy experienced inflation before the 2008 financial crisis. Simmons (2014) narrates that when the 1973 Arab oil embargo began in October, the decrease in oil supply immediately triggered an increased rate of inflation in America that hit the peak at 10.2% in September 1974, compared to 3.8% from the year before. We can learn that energy prices once caused inflation in the U.S. economy.

Although previous studies of the U.S. monetary policy and the Fed's role as the national central bank have increased our understanding of the post-crisis economic transformation, they have not fully answered the question addressed by the hypothesis I have, which is, the unusual relationship between money supply and inflation since 2008. In this proposal, I first provide an overview of the key concepts of money, the U.S. modern currency, and the U.S. money supply. Secondly, I illustrate 3 theories that I will use to test the relationship between money supply and inflation in my final research, and they are (1) the quantity theory of money, (2) aggregate demand-aggregate supply, or AD-AS model paired with the Phillips curve, and (3) exchange rate theory. Finally, I conclude my proposal with the hope that I will figure out why strong money supply was not accompanied by inflation and the limits of my research.

B. Overview

1. The Basics of Money

Ayn Rand once said, “Money is only a tool. It will take you wherever you wish, but it will not replace you as the driver.” To make the tool work efficiently you need to read its instruction first. So, what is money? Economists define money as anything that is regularly used in economic transactions and serves as a medium of exchange, a unit of account, and store of value. The International Monetary Fund (IMF) shares the same definition of money above on its site. In other words, money makes it convenient to trade, save, invest, and compare the value of goods or services. For an example, in the U.S modern economy, paper money and coins are money. In Saudi Arabi, gold is money. In prison, cigarettes might be money.

2. The Modern U.S. Currency

In America, the U.S. Constitution gave Congress exclusive power to define a national monetary unity. Section 16 of the Federal Reserve Act, passed by Congress, states: “[Federal Reserve] notes shall be obligations of the United States...They shall be redeemed in lawful money on demand at the Treasury Department of the United States, in the city of Washington, District of Columbia, or at any Federal Reserve bank.” Then, Section 31 U.S.C. 5103 entitled “legal tender,” states: “United States coins and currency [including Federal Reserve notes and circulating notes of Federal Reserve banks and national banks are legal tender for all debts, public charges, taxes and dues.” Indeed, every dollar bill we keep in pocket has the Fed seal with the words “This note is legal tender for all debts, public and private.”

What is legal tender? In his article on the U.S. currency system posted on the Federal Reserve Bank of St. Louis, Russell (1991) explains that legal tender is a government currency, which government requires or strongly encourage people to accept and use in payment of debts. He also concludes: “In the United States, both coins minted by the Treasury and Federal Reserve notes are legal tender” (41). So, we learn that the Fed notes—the official American currency—is legal tender, and it physically exists as the paper money and coins. Economists define that any money declared to be legal tender by a government as fiat money. Additionally, in his book on the Fed’s monetary policy, Hetzel (2008) comments that

approach of the 1929 Great Depression motivated the U.S. government dropping the gold standard for a fiat money standard (21). We confirm that the U.S. modern currency is fiat money.

3. Money Supply

Money supply is defined as a group of safe assets that businesses and households using to make payments or hold as short-term investments. To measure the money supply, we calculate monetary base, including M1 and M2. Monetary base is the total sum of currency in circulation and reserve balances—deposits held by banks and other depository institutions in their accounts at the Fed. The other depository institutions are the financial organizations that typically make funds through deposits from the public such as commercial banks, loans and savings firms, credit union, and savings banks. M1 includes all physical currency and transaction deposits, which are easily convertible into cash, at these depository institutions. M2 is M1 plus savings deposits, small-denomination time deposits issued less than \$100,000, and retail money market mutual fund shares.

C. Data

The LSAPs package that the Fed used to stimulate the U.S. economy after the 2008 financial was supplying massive money to the market; however, it did not cause inflation. I want to investigate whether there still exists a correlation between price stability and money supply in the U.S. economy after the 2008 financial crisis. In this paper, I mainly use 4 primary datasets to open the case. I use the Fed's monetary base—M1 and M2—, the national GDP data from the Federal Reserve Economic Data, the Consumer Price Index (CPI) and the unemployment rate from Bureau of Labor Statistics, from 2008 to 2015.

D. Methodology

To test the relationship between money supply and inflation, I first use the quantity theory of money (QTM). QTM affirms that aggregate prices (P) and total money supply (M) are related according the basic equation

$$MV = PQ$$

where Q is real output, and V is velocity of money. The central implication of the QTM is that a given change in the rate of money growth causes an equal change in the inflation rate. In other words, the increase in money supply causes the increase in price. Based on this theory, if I find that M increases, P should increase too.

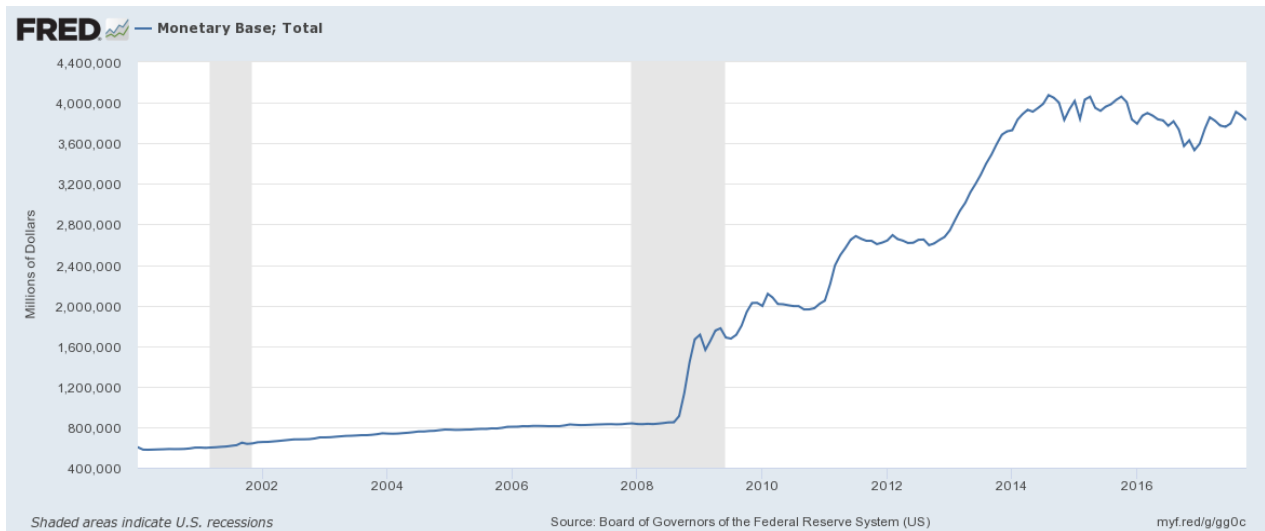
I calculator the rate of inflation from CPI reports from 2000 to present by employing the basic inflation formula:

$$\text{Rate of Inflation} = \frac{CPI_{x+1} - CPI_x}{CPI_x}$$

The chart below is my calculation on inflation rate from 2008 to 2015,

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVE.
2015	-0.09 %	-0.03 %	-0.07 %	-0.20 %	-0.04 %	0.12 %	0.17 %	0.20 %	-0.04 %	0.17 %	0.50 %	0.73 %	0.12 %
2014	1.58 %	1.13 %	1.51 %	1.95 %	2.13 %	2.07 %	1.99 %	1.70 %	1.66 %	1.66 %	1.32 %	0.76 %	1.62 %
2013	1.59 %	1.98 %	1.47 %	1.06 %	1.36 %	1.75 %	1.96 %	1.52 %	1.18 %	0.96 %	1.24 %	1.50 %	1.47 %
2012	2.93 %	2.87 %	2.65 %	2.30 %	1.70 %	1.66 %	1.41 %	1.69 %	1.99 %	2.16 %	1.76 %	1.74 %	2.07 %
2011	1.63 %	2.11 %	2.68 %	3.16 %	3.57 %	3.56 %	3.63 %	3.77 %	3.87 %	3.53 %	3.39 %	2.96 %	3.16 %

2010	2.63 %	2.14 %	2.31 %	2.24 %	2.02 %	1.05 %	1.24 %	1.15 %	1.14 %	1.17 %	1.14 %	1.50 %	1.64 %
2009	0.03 %	0.24 %	-0.38 %	-0.74 %	-1.28 %	-1.43 %	-2.10 %	-1.48 %	-1.29 %	-0.18 %	1.84 %	2.72 %	-0.34 %
2008	4.28 %	4.03 %	3.98 %	3.94 %	4.18 %	5.02 %	5.60 %	5.37 %	4.94 %	3.66 %	1.07 %	0.09 %	

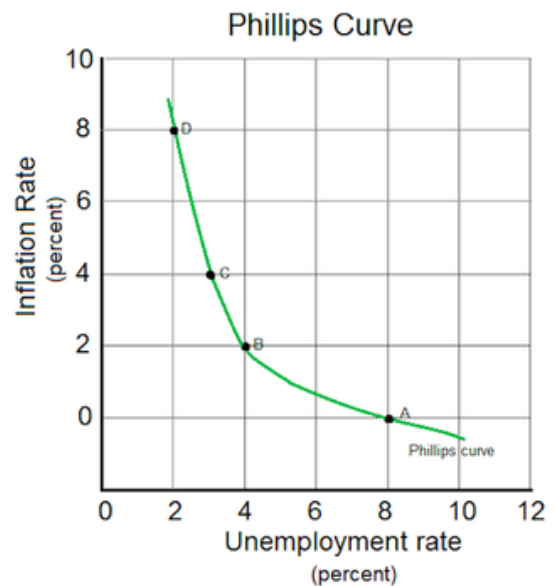
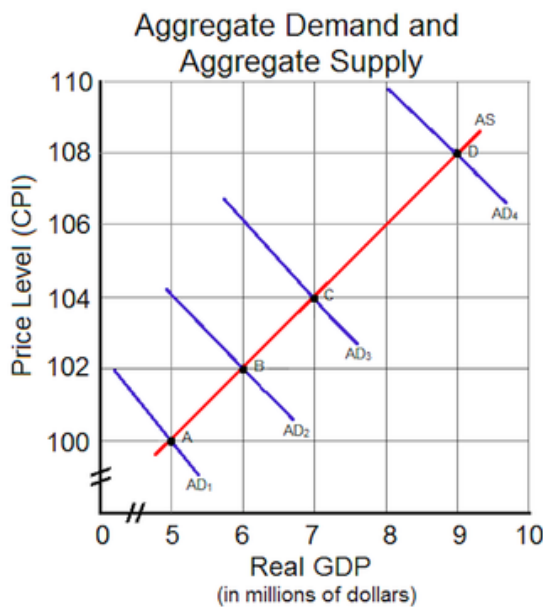


Source: Federal Reserve Economic Data

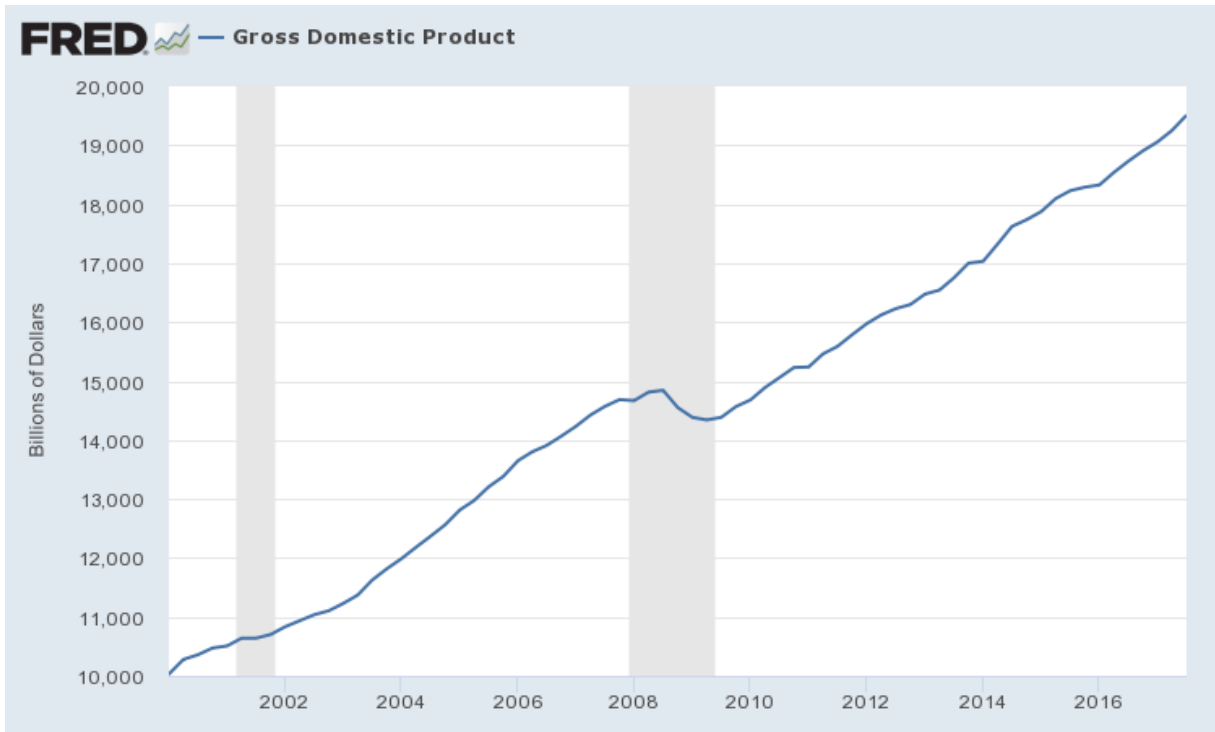
In the short period of time as 1 year, the money supply double increased from \$847,977 billion in January to \$1,671,463 billion in December during the year of 2008. In this case, the economy would expect the inflation to come next year, 2009, but inflation rate remarkably dropped from 4.28% in January, 2008 to 0.03% in January, 2009. Then, inflation kept lower and lower for almost the year of 2009 although the money supply grew more \$3.2 billion. In the long period of time as 5 years from 2008 to 2012, the increase in money supply significantly reached \$4,139,585 billion in January, 2015. However, the decrease in inflation bottomed at -0.09% in January, 2015.

Moreover, there is another macroeconomic key tool that measure the change in money supply and inflation: the AD-AS model. The AD-AS model is a classic macroeconomic standard that defines price level and quantity of output, which is GDP (PQ = nominal GDP). At a given time and price level, AD—aggregate demand—is the total demand for final goods and services in a country and AS—aggregate supply—is the total amount of goods and services. When AD curve and AS curve are put together, it presents the AD/AS equilibrium in the economy. At the point that AD and AS make the first intersection, it shows an equilibrium price level of P_1 and an equilibrium real GDP of Q_1 . Hence, any shift in AD and AS effects on the price level and the real GDP. Additionally, the increase in price level causes inflation; similarly, the decrease in price level causes deflation.

Furthermore, the Phillips curve shows the relationship between inflation rate and unemployment rate in an economy. The Phillips curve promotes that unemployment and inflation rate are inversely related, which means the rate of unemployment decreases, inflation increases. Significantly, the unemployment and inflation rate found in the Phillips curve correspond to the price level and the real GDP because AD and the Phillips curve share similar components. In other words, if AD grows, or shifts upward in the AD-AS model, the real GDP and price level shifts upward. Correlatively, the increase in AD drops the unemployment rate and increases inflation in the Phillips curve.

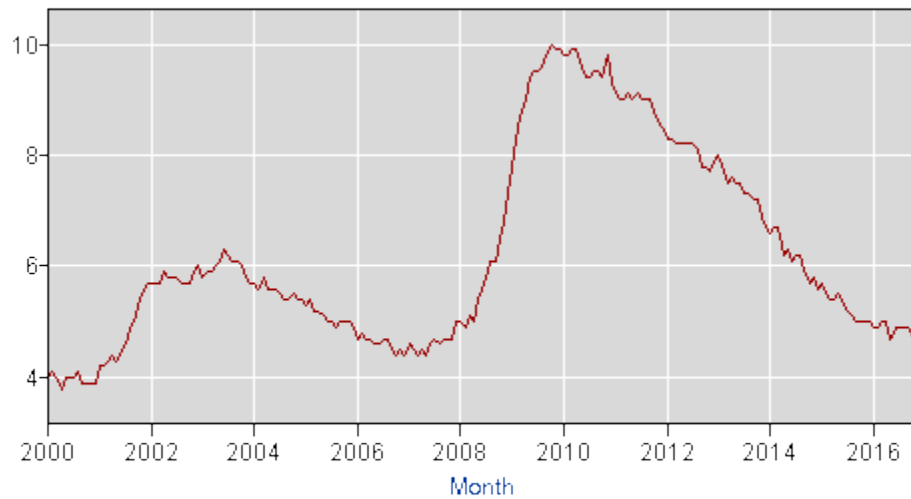


Source: <https://courses.lumenlearning.com>



Source: Federal Reserve Economic Data

Employment Rate Graph



Source: Bureau of Labor Statistics

Unemployment Rate Table

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000	4.0	4.1	4.0	3.8	4.0	4.0	4.0	4.1	3.9	3.9	3.9	3.9
2001	4.2	4.2	4.3	4.4	4.3	4.5	4.6	4.9	5.0	5.3	5.5	5.7
2002	5.7	5.7	5.7	5.9	5.8	5.8	5.8	5.7	5.7	5.7	5.9	6.0
2003	5.8	5.9	5.9	6.0	6.1	6.3	6.2	6.1	6.1	6.0	5.8	5.7
2004	5.7	5.6	5.8	5.6	5.6	5.6	5.5	5.4	5.4	5.5	5.4	5.4
2005	5.3	5.4	5.2	5.2	5.1	5.0	5.0	4.9	5.0	5.0	5.0	4.9
2006	4.7	4.8	4.7	4.7	4.6	4.6	4.7	4.7	4.5	4.4	4.5	4.4
2007	4.6	4.5	4.4	4.5	4.4	4.6	4.7	4.6	4.7	4.7	4.7	5.0
2008	5.0	4.9	5.1	5.0	5.4	5.6	5.8	6.1	6.1	6.5	6.8	7.3
2009	7.8	8.3	8.7	9.0	9.4	9.5	9.5	9.6	9.8	10.0	9.9	9.9
2010	9.8	9.8	9.9	9.9	9.6	9.4	9.4	9.5	9.5	9.4	9.8	9.3
2011	9.1	9.0	9.0	9.1	9.0	9.1	9.0	9.0	9.0	8.8	8.6	8.5
2012	8.3	8.3	8.2	8.2	8.2	8.2	8.2	8.1	7.8	7.8	7.7	7.9
2013	8.0	7.7	7.5	7.6	7.5	7.5	7.3	7.3	7.2	7.2	6.9	6.7
2014	6.6	6.7	6.7	6.2	6.3	6.1	6.2	6.2	5.9	5.7	5.8	5.6
2015	5.7	5.5	5.4	5.4	5.5	5.3	5.2	5.1	5.0	5.0	5.0	5.0

Source: Bureau of Labor Statistics

The GDP graph shows that its steady increase through years after 2008. It grew around 3% each year from 2009 to 2015. In the 1st quarter of 2009, it bottomed at \$14,384 billion, then, increased to \$14,681 billion in the same period of time in 2010. The GDP kept growing and peaked in the last quarter of 2015 at \$18,287. There was no point that the GDP decreased from 2009 to 2015. On the other hand, the data on unemployment rate reports that it grew during 2009 and 2010, but started to drop in 2011. In January 2010, the unemployment rate was 9.8%; however, it reduced 1.8% in January 2013 and 3.5% in January 2015. So, we learn that, since 2008, the GDP constantly increased and the unemployment rate decreased.

There is one factor of exchange rate theory that I want to use to investigate the relationship between money supply and inflation because its growth or loss heavily depends on the money supply in the U.S.. It is the demand-supply for U.S. dollar. The steady increase in the U.S. GDP since 2008 presents the growth in consumption of goods and service, including the consumption of imported goods. In his research about the imported goods trends, Moreno (2016) reports that the containerized imports rose strongly 5.4% from 2014 to 2015 to satisfy the rapid increase in the demand of cheap imported goods.

There are more foreign countries and firms sell products to the U.S. domestic market, and the currency for this trend of business must be U.S. dollar and it causes the tremendous demand of U.S. dollar globally. Additionally, the Fed states that 2/3 of the U.S. currency in circulation is held outside of its home market.

E. Conclusion

The Fed's historical efforts to saved the U.S. economy from collapse after the 2008 financial crisis supplies trillion dollars to the market. Since then, the Fed constantly adjusts expansionary monetary policy and creates the economic paradox that causes low inflation rate. In order to complete my research, I hope that I will figure out why the strong money supply was not accompanied inflation in the U.S. economy after the 2008 financial crisis by employing (1) the quantity theory of money, (2) aggregate demand-aggregate supply, or AD-AS model paired with the Phillips curve, and (3) exchange rate theory.

All studies have limitations, and mine has it own limitation: the lack of available or reliable data. As I mention above that I use 4 primary datasets, but I believe some data is missing in the monetary base. Due to its complexity and diversity, it is challenging to find the correct number on the deposits that banks and depository institutions held. To measure the money supply, my data should be clear on how much deposits commercial banks and depository institutions in their vaults. Also, it is difficult to figure out the sum of currency reserve in U.S. dollar from all foreign central banks because some data of these banks are not accessible. However, this obligation also brings me an opportunity to observe, study the structure and function of each bank and to compare it with the Fed. I will work hard and complete my research because I believe it is very beneficial for me and my future career.

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