Inflations, Hyperinflations, and Will We Have One?

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Inflation, an increase in “prices” in general, has been around as long as there has been money. But hyper inflation, arbitrarily defined as an inflation rate greater than 50% per month, can only exist with a central bank. This is because only a central bank can create unlimited quantities of money and get people to accept it.

For perspective, a 1% per month increase in the price level is a 12.68% annualized rate of inflation, not 12%. The difference is compounding. The one percent increase is applied to a larger base in the second month than it was in the first. A 50% increase per month is a 12,875% annualized rate of inflation, not 600%. Compounding matters!

The value of money, like everything else that is bought and sold, depends on supply and demand. In this case it is the supply of goods and services and the quantity of money available with which to buy them. Increase the supply of goods and services and their money prices will fall unless the quantity of money is increased as well. A fall in the money price of goods and services means that the value, or purchasing power, of money goes up. Each dollar buys more. If the guy with the printing press—the central bank—prints more money without an increase in the supply of goods and services to buy with it, its value will fall—the prices of the goods and services will increase—we will have inflation.

A logical person will ask: “why would a central bank print money more rapidly than the growth in the economy?” The simple answer through out the history of central banking is that they do it because governments have found that printing money is a very convenient way to finance their expenditures. The central bank just prints it and lends it to the government at a nice low interest rate. It is very simple. The resources needed by the government that it has not raised with other taxes are taken from the public by an inflation tax by reducing the value of the money held by the public and giving it to the government. Printing money obviously doesn’t put more food on the table.

The inflation tax, compared with others, however, fails the standards of good taxation. Its incidence is inequitable and it distorts relative prices and thus reduces real output (or its rate of growth). The inflation tax falls disproportionately on the poor who hold most of the cash. The wealthy hold very little cash keeping their wealth in stocks and real assets whose prices rise with inflation as the value of cash falls. As individual prices rise with inflation, some rise faster than others. Relative prices are distorted and thus economic
decisions are made on the basis of incorrect assessments of relative scarcity. The economy is made less efficient and thus economic growth is reduced.

Zimbabwe Hyperinflation

Zimbabwe, with the second highest inflation rate ever recorded, illustrates the devastating results of very high inflation rates for economic growth. While inflation in African countries has averaged 10% since 2000 through the end of 2008, in Zimbabwe it reached 500 billion percent per annum in November 2008. African countries have grown in real terms 4.8% per annum on average over the same period, while Zimbabwe’s real GDP declined 54%.

Zimbabwe, formerly known as Rhodesia, became independent of British rule in 1980, much later than most other African colonies. President Robert Mugabe has headed the government one way or another since then. Mugabe became a national hero leading the guerilla fighters in the Bush War (1964–1979) that overthrew the white-minority government ruling Rhodesia leading to its independence. He is/was revered throughout Africa.

Guided by the Lancaster House Agreement that provided for the transition from white to black rule of Zimbabwe, to which Mugabe was a signator, Zimbabwe prospered. Over the past ten years, however, Mugabe became impatient with the pace of his people empowerment programs (“reallocating” property from white Zimbabweans to black ones). His “Fast Track Land Reform”, which abandoned the land reform agreement among Zimbabwean stakeholders at Lancaster House, confiscated farm land from white corporate farmers and redistributed it to “poor’ blacks. In reality the redistribution largely enriched Mugabe’s political supporters. Every employee of the Reserve Bank, for example, was given land taken from its owners. This includes our central bank driver. Agricultural output plummeted. Mugabe’s “social” policies have bankrupted this beautiful and once prosperous country. The IMF reports “an estimated 14 percent fall in

1 Only the 1946 hyperinflation in Hungary was worse. Third and forth places go to Yugoslavia (1994) and Germany (1923) respectively.
2 Zimbabwe: “Staff Report for the 2009 Article IV Consultation,” IMF, April 20, 2009. In these conditions measures of economic magnitudes are extremely difficult. Steve Hanke measures the peak Zimbabwean inflation rate at 80 billion percent per annum, which is a daily rate of 98% implying that prices approximately double every day. The highest inflation rate ever recorded, according to Hanke, was in Hungary in July 1946 with an annual inflation rate of 1.30 x 10^{16}%, the equivalent of a daily rate of 195%, at which rate prices would double every 15.6 hours.
3 The early days of independence were marked by infighting between Maoist leaning Mugabe, whose support came largely from his Shona-speaking homeland in the north, and pro Soviet Joshua Nkomo, whose support came largely from the Ndebele-speaking south.
real GDP in 2008, on top of a 40 percent cumulative decline during the period of 2000–07.”

The greed and corruption of Zimbabwe’s ruling classes diverted the government’s resources to their personal use. The Reserve Bank was increasingly called upon to lend to various government projects (i.e. print money) to cover the difference. Inflation (annual percent change in the CPI) averaged around 20 percent in the 1990 and gradually rose to 239 percent in 2005, to over 1,000 percent in 2006, and to 10,000 percent in 2007. In 2008 it exploded and “is estimated to have peaked in September 2008 at about 500 billion percent. This incomprehensible rate of inflation means that in September prices were doubling every 11½ days. Are you surprised that a 100 percent increase in 11½ days if continued at that rate for one year will result in a 500 billion percent increase? This is the magic of compounding.

When the Zimbabwe Stock Exchange stopped trading the ZIM dollar in Nov 2008, the exchange rate of the ZIM dollar to the U.S. dollar was estimated by the UN to be 35 quadrillion (35 x 10^{15}). This is the rate generally used for 2008 year end financial statements. This is after 9 zeros had already been dropped from the currency last summer and three had been dropped earlier. The largest note issued before its collapse (and after the removal of the 12 zeros) was for 100 trillion ZIM dollars (100,000,000,000,000). The largest note I was able to get was for 20 trillion. The old notes are hard to find because Zimbabweans threw them away in disgust when the currency completely collapsed in November. As the currency collapsed, angry Zimbabweans came to the Reserve Bank to throw their notes at the building (this was the explanation given to me by a Reserve Bank employee for why the sidewalk in front of the Bank was still roped off).

It is difficult to comprehend such rates and the impact on Zimbabwean economic life was devastating. The economy spontaneously dollarized, which was formally recognized by the new “inclusive” government in February. At that time the new coalition government lifted its controls on imports and the price of goods and services, and legalized the use of foreign currencies. Thus for the time being inflation is over (prices—now in U.S. dollars—have actually declined since the first of the year.)

Under the conditions of last year economic calculation becomes impossible. Over a year before the collapse of the currency many firms had already established financial accounts in U.S. dollars for internal management purposes. In real terms the banking sector today is little more than a quarter of its size in 2004. Banks are well capitalized today because they invested all they could in real estate and the stock market rather than lending in

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5 Zimbabwe—Staff Report for the 2009 Article IV Consultation, International Monetary Fund, April 20, 2009.
6 In general elections held March 29, 2008 Mugabe’s party, the ZANU-PF, lost its majority in the Parliament, and informal returns indicated that Mugabe had lost the Presidency to Morgan Tsvangirai of the MDC, whose party in coalition with a relatively small party (MDC-M) now has a majority of Parliament. Mugabe refused to concede and won an uncontested run off in the midst of considerable violence as Tsvangirai refused to participate in the run off to protect his party members from violence. A coalition government was finally formed in February 2009 with Mugabe as President and Tsvangirai as Prime Minister and the Ministries divided up. The Finance Ministry went to Tsvangirai’s party.
order to protect the real value of their assets. As a result, however, they now have very little lendable resources.

For the last two years before dollarization the shelves in the shops were empty and there were long lines for gasoline. The Reserve Bank couldn’t print new currency notes fast enough to keep up with the demand as people spent ZIM dollars faster and faster before prices went up even more. This is what happens in hyperinflations. The velocity of circulation of money accelerates reflecting raising expectations for further inflation with the result that the real value of the money supply shrinks. The total amount of ZIM dollars currency in circulation at the end of 2008 was 22,400,000,000,000,000. Its value in U.S. dollars is 64 cents, yes 64 cents. The Zimbabwean people and economy have been brutally raped. The governor of the Reserve Bank drives a Lamborghini.

Because the Reserve Bank could not keep up with the demand for currency, it imposed a limit on the amount of cash depositors could take out of their bank accounts at one time. At one point this amount was not enough to pay for a full tank of gas, thus multiple trips to the bank were required. Zimbabwean’s can write checks on their bank accounts, but paying for gasoline with a check would entail a much higher price reflecting the inflation expected over the several days it would take the gas station to collect the money via check.

To help their customers pay for gasoline, wholesalers issued coupons denominated in litters of gasoline. These were purchased months before the holder intended to use them and locked in the real gasoline value of the later actual purchase of gasoline. Some firms bought large quantities and used these coupons to pay their employees. The coupons circulated as currency. The early sale of coupons for cash and its immediate use to pay for imported gasoline protected the wholesaler just as well as holding the inventory of gasoline for subsequent sale at a higher ZIM dollar price.

Restaurants put prices of menu items on a sheet at the back of the menu that could be replaced every day with new prices and some stated prices in “units” where the ZIM dollar value of a unit was updated ever day. These few examples barely scratch the surface of the difficulties and ingenuity of the Zimbabwe people in dealing with this huge inflation tax. This was but one of many brutal attacks on Zimbabweans by their government. I have not mentioned the murders and arrests of political opposition party members and many other forms of voter intimidation.

While the shops are full again and you can order almost everything on the menu, the practice of listing menu prices on a separate sheet perseveres still. With dollarization (the USD or the South African Rand), thus no more ZIM dollar, and stripping the powers of the Reserve Bank to the minimum needed to perform its remaining core functions of banking and payment system supervision (as we have proposed), hyperinflation is no longer possible.

This is made possible by ending government borrowing thus limiting its disbursements to cash on hands as tax revenues are received. However, for some time this means that
many obligations cannot be honored. Government employees cannot be paid their salaries (all receive month stipends of $100 for the time being). The Reserve Bank cannot repay all depositors, etc. The economy can only earn USD by exporting and many of its industries are operating at one third of their capacity because they do not have the money to pay for electricity and other imported inputs needed to operate. Private banks cannot lend to them because significant amounts of their money is deposited with the Reserve Bank, which cannot repay it at the moment. This policy is not sustainable without a recovery of the economy and the tax revenue that will accompany it and/or foreign assistance.

Reserve Bank Governor Gidion Gono still claims that the hyperinflation resulted from international economic sanctions on Zimbabwe. “President Robert Mugabe said Zimbabwe may revive the use of its own currency because the U.S. dollar introduced to tame hyperinflation was unavailable to a majority of people in the countryside…. ‘We cannot have a country like that. We are reviewing this so that we can go back to the use of our own national currency,…’”7 Bob’s friends must be getting hungary.

**Will the U.S. have hyperinflation?**

In reaction to the financial and credit crisis that seized American and international financial markets last September, the Federal Reserve has pumped enormous quantities of credit into the market in an effort to unblock clogged credit flows. The Fed creates this credit out of thin air, or as Fed Chairman Bernanke put it, it is printing money. Knowing that inflation is ultimately the result of the central bank (the Federal Reserve) printing too much money, many people are concerned that the Federal Reserve’s recent and current policies doom the U.S. and the dollar to serious inflation in the next few years. This section reviews the historical relationship between the growth in the money supply and prices (inflation) and the recent behavior of the money supply, and presents my assessment of the prospects for inflation over the next few years.

The simplest analytical framework for understanding inflation is the quantity theory of money. This framework may be presented in two different ways. As economists prefer to think of price determination in terms of supply and demand, our preferred formulation of the theory says that the value (purchasing power) of money (“the price level” P) results from its supply (M) relative to its demand and that (as the simplest assumption) its demand is proportional (k) to real output (real GDP=q) or M = kqP. An increase in the supply of money (M) will cause prices to raise (P) until the demand for money (kqP) matches the increase in its supply. Both theory and evidence says that the money supply has no long run effect on real output (q), thus ultimately the entire effect of money growth is on the price level (CPI).

Thus inflation (which is the rate of change or growth rate of the price level) reflects the growth rate of the money supply or ΔM = Δq + ΔP (where k is constant, q is

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7 Cris Chinaka, "Mugabe says Zimbabwe may revive its own currency" Reuters, June 26, 2009.
independently determined by growth in labor, capital and productivity, and $\Delta$ is the change from one period to the next in whatever it refers to). Hence inflation is determined by the economy’s real economic growth rate and the growth rate of the money supply: $\Delta P = \Delta M - \Delta q$.\(^8\) If the economy is growing at 3% per year and the money supply is growing at 5% per year, inflation will be approximately 2% per year. However, historical evidence reveals a lag of one to two years between changes in money growth rates and inflation. If money growth increases to say 10%, the impact on inflation would not materialize for another one to two years.

Instead of the demand for money formulation described above, the quantity theory of money is sometime presented in term of money’s velocity of circulation ($V$): $MV = Pq$. The two versions are equivalent ($V = 1/k$). The key point is that with a lag of a year or two increases in the rate of growth of the money supply cause a comparable increase in inflation.

These are long run relationships. In the short run other factors can dominate the behavior of inflation. In the long run a reduction in the economy’s growth rate ($\Delta q$) increases the inflation rate resulting from a given rate of growth of the money supply. However, in the short run if real income growth slows or even falls (with no change in its long run potential growth rate) it has the opposite effect on inflation. Economists refer to the difference between actual and potential real output as the output gap. When actual output falls below its potential, as occurs during recessions, inflation is reduced for a given rate of growth in the money supply (the demand for money—$k$—increases temporarily).

Our central bank--the system of Federal Reserve Banks--indirectly controls the money supply (currency held by the public and the public’s deposits with banks) and its rate of growth. There is a link between the money created by the Fed (called base money) and the broader money supply ($M$). The two are related by the so called the “money multiplier.” Usually the money supply grows at about the same rate as base money, i.e., because the multiplier is constant or only changes slowly.

With these ideas in mind the huge injection of liquidity by the Fed is worrying many people. The Fed has increased base money as a result of large loans to banks and other financial institutions and as the result of buying government securities and mortgage backed securities from the market. By two measures the increase has been huge. Total Federal Reserve Credit has more than doubled over the last year from 0.90 trillion dollars on April 11, 2008 to 2.15 trillion on April 15, this year. Almost all of that increase occurred since September. As a result, base money doubled over the same period, rising from 874 billion Sept 10, 2008 to 1,819 billion April 22 of this year.\(^9\)

\[^8\] This is a simplification of the following $\Delta P/P = \Delta M/M - \Delta k/k - \Delta q/q$, more correctly reflects the percentage rate of change of each variable.

\[^9\] By July 1 Federal Reserve Credit had retreated to 1.99 trillion and base money had retreated to 1.64 trillion.
The Federal Reserve argues that this will not cause inflation for two reasons. First, the large increase in the provision of Federal Reserve Credit and base money was undertaken because of a large increase in the demand for liquidity by banks and other financial institutions in response to the subprime mortgage crisis. Thus doubling base money has not increased the money supply by nearly as much. Using a popular, relatively broad definition of money (MZM), the money supply rose from 8.6 trillion on April 7 2008 to 9.4 trillion on April 6, 2009. Stated in terms of growth rates, which can be directly related to inflation rates, the growth in MZM over the past year (year on year) was 9.7%. This is already significantly reduced from the year on year increase of 14.5% on January 19th of this year and only modestly above the 8.7% average annual rate of growth over the decade ending December 2008 during which inflation averaged 3.0% (the demand for money, k, grew about 2% per year on average over this period).

Secondly, the Fed estimates that over the past year the public’s demand for money has increased temporarily as the public “moved to safety” in the holding of its assets (currency and insured bank deposits). An increase in money demand (k) or equivalently a decrease in its velocity of circulation (V) means that the supply of money can grow more rapidly to that extent without increasing inflation. In addition, the recession with its increasing “output gap” further reduces inflation (temporarily).

Finally, the Fed intends to withdraw the extra liquidity it has injected (and thus reduce base money) as the credit crunch eases and the economy begins to recover. It remains committed to its target for inflation of around 2%. Thus the answer to the question of whether Fed policy will produce inflation in a year or two depends primarily on whether it successfully withdraws the large amounts of liquidity injected over the past six months. I have confidence that it will be able to do so more or less (but not exactly) at the right time and pace.

The real risk of inflation, however, is political. The Federal budget has unfunded liabilities (the difference between the cost of the benefits promised and the revenue now legislated to pay for them) that simply cannot be paid for. The Federal budget deficit expected over the next three or four years as a result of the financial crisis, recession and foreign wars of several trillion dollars is nothing compared to the present value of the government’s unfunded obligations to pay out Social Security benefits of about 13 trillion dollars. The present value of unfunded liabilities of Medicare commitments’ is six times (yes six times) that. It is not possible to raise taxes enough to cover these commitments. Promised benefits will have to be cut. Invariably tax rates will be raised as well and the slowing of economic growth resulting from all this will make the burden of these deficits even harder to carry. In addition, the rest of the world will not continue to finance as much of our annual deficits (and thus to own as much of the outstanding debt) as they have in the past, i.e. the market will force our external trade deficits to contract.

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10 Because of lags in the effect of base money on broad money, MZM continued to increase through the most recent report (June 15) to 9.6 trillion.
11 The year on year annual inflation rate for May was minus 1%.
All of this adds up to higher, potentially significantly higher, interest rates in the years ahead (once we have recovered from the current recession) to enable the government to raise the money needed (sell its bonds) to finance its revenue shortfalls. Just how high interest rates will raise will depend on how much government spending can be cut and future entitlement promises reduced, how efficient and productive the economy will be and thus how high its growth rate will be, and how large a trade deficit the rest of the world lets us have.

“Economists have found that structural deficits raise long-run interest rates, complicating the Fed’s dual mandate to develop a monetary policy that promotes sustainable, noninflationary growth. The even more disturbing dark and dirty secret about deficits—especially when they careen out of control—is that they create political pressure on central bankers to adopt looser monetary policy down the road.”12 The short run effect of monetary growth is the opposition of its long run effect. Increasing the Fed’s creation of money initially pushes down interest rates as it buys more government securities or increases its lending to banks. However, as the higher money growth rate increases inflation, higher expected inflation gets built into new borrowing and lending interest rates pushing rates up eventually.

Current monetary policy does not need to result in higher inflation down the road. But the higher interest rates we are in for risk generating misguided political pressure on the Fed to try to keep them low. If the Federal Reserve gives in to that pressure, inflation will be higher and as soon as the economy comes to expect that higher inflation nominal interest rates will end up being even higher still. The year on year inflation rate reached 14.6% in March and April of 1980. It is extremely unlikely that we will experience such high rates over the next decade, though they could reach higher single digit rates if the government does not rain in its programmed excesses. Hyperinflation is not in the cards.

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