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Economics -2020. What Happens When Everything Shuts Down Except the "Money Printing Presses"

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Abstract

This paper indicates how the massive fiscal deficits financed through creation of fiat money by central banks worldwide (undertaken in response to the 2020 coronavirus pandemic) may lead to either hyperinflation or stagflation. The current situation is explained to be comparable to that leading to the hyperinflation in Germany in 1923 except on a broad international scale. However, a future tightening of monetary policies to inhibit ever rising inflation rates could instead result in stagflation resembling the 1970s. Possible alternative solutions to the current economic situation are discussed.

Keywords: money supply, inflation, hyperinflation, pandemic, printing fiscal deficits

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Introduction

Theories of monetary economics have long indicated that excessive creation of money unmatched by an inadequate supply of production of goods and services will result in hyperinflation (Cagan, 1956). Such cause (massive money creation) and effect (hyperinflation) are often illustrated by the developments in Germany in the early 1920s when that country was unable pay its debts owed in gold to foreign countries for World War I reparations at the same time that the German government subsidized massive domestic strikes with cash payments for workers striking against the reparations and related foreign occupation that were disrupting economic production in the country (Liewellen and Thompson, 2019). Many economists then did not view the massive funding of the German fiscal deficits with money creation as inflationary (Laidler and Stadler, 1998). In recent times, a similar belief has taken hold, at least partially because the large amount of government deficit spending in the decade since the 2007-2009 crisis did not lead to rising inflation. A "modern monetary theory" (MMT) has even developed that indicates excessive money creation will not result in corresponding rises in the prices of real goods and services if there is slack in the labor force (Lewis, 2019).

This paper evaluates the potential impact of the large amount of monetary and fiscal stimulus that has been enacted worldwide to address the economic fallout resulting from the coronavirus pandemic in 2020. The phenomena that inhibited the inflationary impact of the large increases in the monetary

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base during the prior financial crisis of 2007-2009 are explained to be inapplicable to the economic situation in 2020 that is characterized by disruptions in the supply of real output and by government policies which promote rapid monetary growth. This situation is shown to potentially lead to hyperinflation, although stagflation could instead result if the monetary stimulus is moderated once inflation starts to heat up. These adverse scenarios might conceivably be avoided if aggregate demand could somehow be maintained through fiscal or other government policies at the same time that the massive monetary stimulus is contracted in an orderly manner. It is hypothesized that a Green New Deal financed by securities offering investors diversification into new infrastructure investments such as needed to clean up the air and water environment might create some of the needed productive demand if and when monetary tightening causes interest rates to rise.

I. A Brief Overview of Creating Money without Creating Inflation

Recent economic history has provided some examples of countries injecting large amounts of money into the economy without stoking inflation. For instance, Japan is often mentioned as a prime illustration of a country that has been both printing vast sums of money and running large fiscal deficits for decades while maintaining negligible inflation rates. However, that Asian country has long generated continuous trade surpluses that has enabled the nation's effective monetization of its very large government budget deficits to result in net capital outflows that increased Japanese investment in foreign countries. In particular, the money injections into the Japanese economy have largely been used to buy foreign assets (including U.S. government debt purchased by Japan's central bank), as opposed to creating excessive spendable money demand for domestic labor and output that would raise the prices of real goods and services in that particular country. As indicated by Murphy and Zhu (2008), individual countries with current account surpluses (deficits) in the international trade of goods and services finance (are financed by) nations with current account deficits (surpluses) through purchases (sales) of the deficit country capital or other assets like real estate[1].

Even more recent examples of low inflation rates despite double-digit increases in the monetary base are provided by the large central bank injections of money worldwide shortly after the onset of the financial crisis in 2007-2009 that did not stoke meaningful increases in the prices of real goods and services (Fawley and Neely, 2020). As explained by Murphy (2008b, 2010, 2011), the smaller yet enormous increase in commercial bank reserves during that earlier crisis was designed to rescue financial institutions from their excessively speculative investments into mortgage debts (which provided yield spreads above those existing on U.S. Treasury bonds that were insufficient to cover the default risk of those collateralized obligations). The massive money printing operations during the 2007-2009 crisis did succeed in rescuing the financial markets from collapse because the money was funneled to the banks and insurance companies and thereby bailed them

[1] Higher interest rates in the borrowing nations with current account deficits attract the capital inflows, but there is a limit on how long large trade deficits can be financed due to the finite amounts of domestic capital and other assets existing in a country (Murphy, 2003). Countries may be able to temporarily reduce their current account deficits by undertaking actions to devalue their currencies, but such depreciation of the domestic currency tends to lead to imported inflation that eventually returns the imbalanced trade situation (Murphy, 2008a).

out from the losses on their inadequately compensated investments in residential mortgages. The liquidity crisis created by the inability of those past imprudently granted credits to be serviced by the homeowner debtors was thereby alleviated.

Because the large central bank injections of money during the 2007-2009 financial crisis were effectively absorbed by banks to meet their liquidity/solvency needs, the rapid growth in the monetary base was partially offset by a reduced money multiplier that resulted in far lower increases in broader measures of the money supply like M2 (Cukierman, 2013). Increasing bank capital requirements (and initiation of interest being paid on bank reserves in the U.S.) during this period also contributed to lower growth in spendable money, as banks were constrained (and motivated) to lend less of their extra reserves generated from central bank security purchases (Congdon, 2017). As a result, the 2007-2009 experiment in large increases in the monetary base did not spur meaningful worldwide inflation over the subsequent decade. In particular, it was possible for the very limited increase in M2 (which sums the amount of cash, checking accounts, and small retail time deposits that can be readily spent) to be matched with the moderate increases in real economic production that were feasible, and the resulting real growth in Gross Domestic Product (GDP) across the world provided higher government tax revenues that inhibited rapid growth in fiscal deficits.

These recent successful experiences with large-scale money printing operations have resulted in greater acceptance of theories such as the MMT, which advances the notion that fiat money has exchange value because of its use in paying government taxes/levies and purports to enable full employment without inflation through monetary/fiscal policies that stimulate demand (Tymoigne and Wray, 2015). However, as explained by Palley (2015, 2020), the national income, savings, investment, and monetary identities of standard macroeconomic theories must still hold, and so inflation results when there is excessive monetization of fiscal deficits in the real world with frictions/imperfections in the labor market. Large increases in spendable money inevitably lead eventually to corresponding inflation rates when there is insufficient productive capacity to absorb it (Friedman, 1956).

The theoretical relationship between money and inflation has long been known. According to one view, the exchange value of any unit of money should equal its equivalent in terms of labor units/hours/costs needed to produce any commodity (Marx, 1867, 1885, 1894). Fiat money specified by a government to be legal tender is worth the value of labor that can be purchased with that government's expenditures for the provision of public goods and services financed with taxes which are levied and collected. When a government creates additional fiat money (typically through a central bank which can print the domestic currency in the form of coins and paper as well as electronically) to enable expenditures in excess of the tax revenues it receives (i.e., monetization of a budgetary deficit), it creates an oversupply of its currency relative to the labor value it can buy. The result is either an increase in the commodity production of labor (i.e., real economic growth) and/or a rise in the price of labor (i.e., inflation). When there are restrictions on increasing production (due to an economy operating at full capacity and/or disruptions in the supply of real goods and services for which there is monetary demand because of work and/or trade disruptions), inflation is the result of monetizing government fiscal deficits[2].

II. Economics-2020

When countries worldwide pursue expansionary monetary/fiscal policies in the face of constraints on the supply of goods and services (as is happening in 2020), the excess economic demand created by such international government stimulus must spill over into inflation in the prices of real goods and services according to standard macroeconomic identities. Just as in Germany in 1923 where declines in the prices of real goods and services occurred in that country in the beginning months of the nation's experiment with massive monetization of fiscal deficits in the face of disruptions in economic employment and output (Laidler and Stadler, 1998), an initial worldwide deflation resulting from the drops in demand stemming from the international lockdowns related to the coronavirus pandemic in 2020 merely creates a lower base from which inflation can expand exponentially. The newest experiment with massive money "printing" in 2020 in the face of large disruptions in the supply of goods and services thus seems quite similar to the developments which led to the hyperinflation in Germany in 1923 except on a global scale.

In the space of one month alone in the spring of 2020, the governments and central banks of the developed countries responded to the international economic crisis associated with the coronavirus pandemic by applying fiscal and monetary stimulus amounting to $14 trillion, which includes the creation of $6 trillion in new money (PTI, 2020) on top of the trillions of dollars of money injected into those economies over the prior decade (Canepi and Karanyi, 2020). An even more recent $484 billion in further coronavirus relief has been offered to small businesses and hospitals as well as to programs for disease testing in the U.S. (Hirsch and Dzhanova, 2020), and further monetary stimulus has been planned by the world's major central banks since the beginning of the pandemic (Goodman, 2020). Programs for unlimited central bank purchases of bonds have even been announced in the U.S. (Smialek, 2020) and Japan (Kahara, Kojimoto, Leussink, and Kaneko, 2020). Recent economic lockdowns due to an explosion in coronavirus cases at the onset of winter in late 2020 have motivated plans for further fiscal and monetary stimulus in the US. (Li and Spence, 2020) and elsewhere.

These actions are supported by the International Monetary Fund (IMF), the world's central bank, which also promotes further monetary stimulus for less developed countries (PTI, 2020). Some international liquidity was provided by the U.S. itself early in the pandemic through large amounts of U.S. Federal Reserve repurchase agreements which enabled foreign banks to borrow dollars (collateralized by U.S. government debt) to help fund their own obligations denominated in that currency which is widely used to finance international trade (Spratt and McCormick, 2020). Although that U.S. financing for other countries was largely repaid later in 2020, the large-scale growth in the money supply worldwide is continuing unabated. In addition,

[2] Although Germany in 1923 is often used as the most infamous illustration of the resulting increases in the nominal prices of goods and services, the ongoing hyperinflations in Venezuela and Zimbabwe represent more recent examples of massive money printing to finance fiscal deficits in the face of supply disruptions. In the case of those latter countries, international sanctions inhibited the productive capacity of the two nations and restricted the financing and supply of essential imports at the same time that their governments monetized continued fiscal deficit spending for needed goods and services, as indicated by The Herald (2019) and Weisbrot and Sachs (2019), respectively.

the dollar swap lines of credit remain open to foreign central banks (Federal Reserve, 2020b), thus effectively enabling U.S. financing of government worldwide providing their own fiscal/monetary stimulus.

Nevertheless, despite the massive printing of money internationally, there are some notable differences between the world in 2020 and Germany in 1923. For instance, the largest money printing operation in 2020 is being carried out by the U.S., which has almost all of its debts denominated in that country's domestic currency. The latter currency, the U.S. dollar, is widely held by foreign institutions and investors and represents the major international reserve currency held by other countries' central banks. The 2020 experiment with massive fiat money creation in the U.S. does not result in serious exchange rate losses for the foreigner investors in dollars because the value of their own money is being debased by their own money printing press operations in 2020. In that respect, the 2020 economic crisis has similarities to the massive money printing that occurred in the 2007-2009 financial crisis, as opposed to the German hyperinflation of 1923 that was restricted to one country with a rapidly depreciating currency.

However, in contrast with the liquidity crisis in the 2007-2009 interval, the 2020 coronavirus pandemic has led to upheavals in worldwide productive capacity, and the resulting drop in potential economic output may continue for potentially many years into the future (Kostohryz, 2020). In a situation where there is an inadequate supply of real goods currently or in the near future to meet the nominal demand resulting from the massive money creation, the laws of supply and demand indicate the nominal prices of real goods would have to rise, as past history has invariably indicated (Schwartzer, 2020). The reduced productivity that is likely to result from the preventive health measures relating to the 2020 pandemic that may persist for years (Sallo, 2020) might also contribute to cost-push inflation. The supply chain disruptions arising from the uncoordinated worldwide responses to the 2020 pandemic and growing movements for expanded domestic protectionism in international trade (that seem to be intensifying) amplify the rise in the real costs of producing real goods and services, thus further magnifying the inflationary impact of unlimited running of the money printing presses (Forsyth, 2020).

The lockdowns and social distancing policies implemented to inhibit the spread of the coronavirus pandemic in 2020 have also been disrupting demand, especially in industries which may be characterized by the greatest risk of disease contagion (such as travel, brick-and-mortar retail, and hospitality services) that may persist long-term (Wolf-Mann, 2020a). As a result, most of the money being printed is currently being held in fiat currency deposits and cash, as the flow of government credit is being largely funneled to investors through the purchase of the debts of businesses suffering real declines in their capacity to generate the operating profits to service those debts (Davison and Mohsin, 2020). With the 2020 pandemic resulting in higher operating costs to businesses at the same time that there may be reduced demand for some time to come due to pandemic fears and unprecedentedly high rises in unemployment inhibiting spending (Sen, 2020), it becomes increasingly difficult for many companies to cover their fixed overhead expenses. Large restructuring costs may continue to be incurred in the economy as demand for goods and services may switch long-term from some industries (including not only contagion-prone sectors but also some businesses not directly impacted by the pandemic like coal, oil, and gas that pose other risks) to alternatives that facilitate less risky consumption (such as relating to increased entertainment, work, and living at home as well as clean energy production)[3].

In this situation, it is likely that many companies will be unable to service all the excessive debts they had already accumulated over a decade of easy monetary policies in the decade since the 2007-2009 crisis, much less the newer obligations they are accumulating in the ongoing recession (Schwartzer, 2020). Any rise in the interest cost of debt (due to the rising default risk increasing credit premiums and/or higher inflation rates causing a rise in bond yields in general) can only amplify the problem. A massive wave of business bankruptcies seems quite possible, with a recent Bankruptcy Court precedent encouraging the liquidation of much of corporate America in an inflationary and/or recessionary environment that brings on rising yields being required on corporate debts (Murphy, 2019d)[4].

In addition, the pandemic is leading to grave strains in state and local government finances due to reduced economic activity lowering their tax revenues at the same time they are faced with the extremely high medical and social costs relating to the pandemic. Massive municipal bankruptcies are possible without further federal loans or aid to those political subdivisions, but such assistance is being held up by Republican leaders (Litvan, Wasson, and Dennis, 2020). In this environment, municipal fiscal spending may be constrained to the point of needing to cut basic governmental services (Murphy, 2018) that can lead to further health catastrophes and costs (Murphy, 2019c).

While the supply of real goods and services is being inhibited by the crisis in 2020, no policy actions have been undertaken to restrict the lending which magnifies the impact of the large monetary base injections into the world economy by central banks. In fact, with the European Central Bank (ECB) having loosened commercial bank capital

[3] There may also be other longer-term, cost-push stagflation pressures. Past data over the centuries indicate that pandemics tend to reduce the size of the labor force and therefore increase wages while reducing real demand for decades (Jordi, Singh, and Taylor, 2020). Although the coronavirus in 2020 has mostly affected the elderly who tend to be retired from productive work, there has also been a significant increase in the death rates among working-age people (Faust, Krumholz, and Walenski, 2020). In addition, many people have withdrawn from the labor force due to the pandemic, especially older laborers retiring early due to concerns about the health risks of continuing to work (Adamczyk, 2020) and women who have been diverted into family child care due to school closures (Buchwald, 2020). The upward pressure on labor costs that may result might be magnified by political pressures toward more labor friendly government policies such as relating to a rising minimum wage that partially represents a reaction to the growing inequities in income and wealth in the world as well as the rising share of national income going to profits. The decline in interest rates associated with the pandemic has also increased the costs associated with financing the growing pension obligations/needs associated with an aging population (Mitchell, 2020).

[4] That case ruling essentially allows creditors to "bribe" corporate management (with extra compensation and other benefits) to liquidate companies which are solvent on the basis of existing liquidity and balance sheet accounting (as well as with respect to the potential intrinsic value defined by the long-term operating/financial/economic outlook) in order to seize the companies' cash and other assets to be sold off in fire sales. For companies with bonds, loans, or other debts selling at prices significantly less than their par value, such liquidations can enable the creditors to profitably obtain a quick payoff greater than the going market price for the credits (Murphy, 2019d). With a possible large increase in interest rates arising from the potentially high inflation caused by the financing of massive government deficits with central bank money creation (or from increased default risk related to a recession/depression if and when the monetary stimulus is withdrawn), these types of bankruptcies managed for the benefit of creditors may become widespread.

requirements and otherwise encouraged bank lending early in the pandemic (Kowsmann, 2020) and with the US Federal Reserve doing likewise (Wade, 2020), actions have been taken to inhibit any contraction of the money multiplier due to disruptions in output demand/supply. As a result, double digit growth in the monetary base is leading to double-digit percentage rises in the amount of spendable money in existence across the world (Congdon, 2020).

Although many investors in this situation are hoarding cash as a precaution against the unknown future (McCormick and Torres, 2020), many others (seeking the possibility of higher returns than the existing negative real rates offered on most bank deposits and government bills) are putting their money into corporate bonds and stocks. These investment flows seem to be currently keeping the prices of those securities high and seemingly inflated compared to some measures of fundamental value.[5] However, many investors may become increasingly unsatisfied with the low expected future returns on risky security market investments (which have high prices relative to future predicted cash flows) as well as with fiat money deposits and Treasury debts with nominal interest rates at or below zero percent that supply negative real yields.[6] In this environment where the tens of trillions of dollars in government debt offer falling purchasing power over time, the extraordinary amount of liquidity in the market is likely to move more and more into purchases of real goods and services.[7] As the excessive money in the world eventually flows into consumption, the result may be the beginning of the inflation which normally comes with very expansionary monetary policy, as is indicated by the classical theory of monetarism.

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5 As the stock market was rebounding from the 2020 lows in March, one billionaire investor concluded “We’re only down 15% from the all-time high… the world is more than 15% screwed up” (Mohammed, 2020). While the market values of some securities may be backed by thin air (such as those of businesses in some travel, hospitality, entertainment, and retail businesses that may have little chance of their revenues ever covering their costs in the new future adversely affected economically by the pandemic fears that may persist to some extent even after the health crisis is contained), fairly high stock and bond prices in general may be justified by interest rates close to zero percent that result in very high present values of the long-term expected cash flows from the securities.

6 While longer-term T-bonds in the U.S. have positive yields, they are at historic lows that create the risk of large capital losses if and when interest rates rise to a more normal level that might reflect rising inflation and real interest rates. In addition, with the initiation of the government operations to rescue corporate America in March 2020 driving down corporate yield spreads (Smith and Davis, 2020), corporate bond investments face further risks of losses if default risk premiums above Treasury rates rise due to a recession/depression. The large drop in the prices of risky debt in March 2020 that was only from an elevated level where yield spreads above Treasury bonds were at historic lows (Kochkodin and Benhamou, 2020) and that could not be justified with credit fundamentals even before the pandemic hit (Murphy and Headley, 2020) illustrates the losses which corporate bonds can suffer.

7 To hedge/protect against the potential inflation that may occur with so much printing of money, an increasing amount of the current liquidity in the world may be invested into real assets such as precious metals which have a limited supply (Franke, 2020). The supply disruptions in the mining of precious metals relating to pandemic (Musings, 2020) could contribute to further rises in the prices of those real goods which have historically represented a store of value in uncertain/inflationary times. Other real assets which might attract some of this money might be housing. Currently, the inventory of homes for sale is very low while the pandemic has been constraining the building of new homes (Booth, 2020), and moratoriums on debt service payments (Fox, 2020) also inhibit an increased supply of existing houses resulting from lender foreclosure sales. At the same, the health crisis may cause many individuals to seek home ownership as a safer haven against the coronavirus disease or future pandemics/catastrophes (Murphy, 2020c). Some early evidence of home prices rising after the spread of the coronavirus had been stopped was provided in China in the spring of 2020 (Bloomberg News, 2020a).

III. The Implications of Classical Monetary Theory for the Worldwide Situation in 2020 and Beyond

The classical monetarist theory advanced by Friedman (1956) indicates that increases in the money supply must be reflected in the simple identity

$$PQ = MV, \tag{1}$$

where P represents the prices of goods and services, Q denotes the quantity of real goods and services, M is the money supply, and V represents the velocity of money. The money supply M is often measured as $M2$, which reflects the multiplicative effect of commercial bank lending that magnifies the sum of bank reserves and cash currency supplied by a central bank.

If V is constant, (1) indicates that rises in the money supply must be reflected in increases in nominal GDP. While the velocity of money can fluctuate somewhat over shorter time intervals, it historically has tended to be relatively stable long term (Friedman and Schwartz, 1963). The velocity of money has also been shown to continue to be fairly constant across many countries over the years into modern times, including through the financial crisis of 2007-2009 and the subsequent recovery when there was a large increase in commercial bank reserves but only moderate expansion of spendable money (and hence limited inflation and real economic growth) because of central bank policies that inhibited lending out bank reserves (Congdon, 2017). Equation (1) is also instructive for explaining the high inflation rates in numerous Latin American countries over the last half century that have experimented with large-scale money printing operations that resulted in $M2$ growth of over 50% and inflation rates of similar magnitude (Edwards, 2019).

In 2020, central banks across the world in 2020 have not only been increasing the monetary base but have also been encouraging greater lending through relaxation of capital/reserve requirements and other measures. As indicated by Congdon and Petley (2020), the result has been double-digit increases in broad measures of the money supply in 2020 across the world, with the rise in the U.S. being especially high at over 20% (and with Japan being the exception in having single digit money growth). The monetarist identity in (1) implies that the large increases in the supply of money should result in corresponding rises in inflation since international output has fallen in 2020 and will only fully recover in 2021 or later.

For the U.S. in particular, there has been a 25.1% increase in $M2$ over the last year (from $15.270 trillion to $19.099 trillion) as of November 2020 (Federal Reserve, 2020a), with a 1.7% rise in that measure of the money supply in November 2020 itself indicating the money supply continues to expand at a rapid rate of $19,099/18,780)12-1=22.4% on an annualized basis. With nominal (real) growth in U.S. GDP being -1.8% (-2.9%) over the prior year through the third quarter of 2020 (U.S. Bureau of Economic Analysis, 2020), and with a Goldman Sachs forecast of 5.3% real GDP growth in 2021 (Sozzi, Udland, and Hyman, 2020), (1) indicates that, even with a very surprising, complete stop in monetary growth in 2020 in conjunction with the velocity of money returning to pre-2020 levels, U.S. dollar prices of real goods and services should increase in 2021 by

$$(1.251)(1.000)(1)/(1\text{-}.018)(1.053)\text{-}1=29.4\%. \tag{2}$$

However, as the economy recovers from the coronavirus pandemic, which may subside with the successful development of apparently effective vaccines, and consumers start spending the large amount of money they had saved in 2020 due to the pandemic/recession fears (Sozzi, Udland, and Hyman, 2020), both V and M seem much more likely to grow rather than stay constant. In particular, the monetary base in the U.S. has increased by 53.6% over the last year (from \$3.315.6 trillion to \$5093.1 trillion) and at an annualized rate of 52.5% in the most recent month of November (Federal Reserve, 2020a). As the economy rebounds to real growth in 2021, the money multiplier may return to its pre-2020 level, thus potentially resulting in M2 growth in 2021 catching up with the monetary base increase of over 50% in the U.S. As a result, even if V doesn't fully revert to its historical norm for an expanding real economy in the U.S., U.S. inflation in 2021 could actually be far greater than the 29.4% rate estimated in (2)[8].

In addition, the monetary injections by central banks worldwide don't seem likely to dissipate any time soon. For instance, the Federal Reserve plans to continue its \$120 billion per month in security market purchases for many months (Matthews, 2020), and the ECB recently announced new policies that enable yet further expansion of commercial bank reserves in Europe by nearly \$2 trillion (SWFI, 2020), which represents about 15% of euro M2. Thus, with the monetary base likely to continue to expand at a very rapid rate in 2021, M2 growth could reach very high double-digit rates in 2021 if the money multiplier returns to its pre-2020 level. The fairly high real economic growth that is forecasted for 2021 (spurred by possible further fiscal stimulus and a subsiding pandemic relating to planned large-scale vaccinations against the coronavirus) seems to make such a matching of M2 and monetary base growth quite feasible. In this environment of economic expansion, the money multiplier may actually increase beyond the pre-2020 level if and when inflation starts to appear. As a result, according to (1), double-digit inflation seems to be possible worldwide, with hyperinflation levels possibly even being reached in the U.S. if and when money velocity increases to its historical norm[9].

[8] Indications of potentially much higher inflation in the future are already appearing in commodity prices, which rose by over 10% in November 2020 alone, and commodity shortages will likely appear in 2021 when aggregate economic "demand and output advance vigorously" (Congdon, 2020). There were some earlier inflationary pressures in the spring of 2020 that clearly relate to the impact of too much money chasing too few goods and exemplify the inflationary impact of supply disruptions. For instance, there was a rise of nearly 30% in beef and pork prices in the Spring of 2020 due to the coronavirus-related closures of meat-packing plants that was creating fears of shortages even as livestock producers were having to dispose of large numbers of their animals because of the lack of demand from the closed slaughter houses (Hertzer and Freitas, 2020). With shortages of some consumer goods already reappearing in November 2020 and possibly becoming more serious as coronavirus cases continue to rise (Marcus, 2020), there might be a reoccurrence of such short-term upward pressures on prices in the winter of 2020-2021. Some cost-push inflationary pressures relating to the pandemic, such as the inability of airlines to accommodate safe social distancing profitably at current prices, have already appeared that are pressuring the price of air travel upward as such travel is expected to be significantly reduced for years to come (Whitley, 2020). The latter upward pressure on prices might be widespread amongst hospitality and retail businesses as well as in the travel industry as long as there are inhibitions against social contact. However, the existence of a safe and effective vaccine, for which there is increasing evidence (Steenhuysen and Erman, 2020), might moderate such inflationary pressures resulting from such inhibitions persisting long-term.

[9] Except in extreme environments like strict control of a rural farm economy by a foreign occupying power, rising inflation rates typically result in a large decline in the demand for real money balances because of the purchasing power losses associated with holding a depreciating currency (Huff and Majima, 2013) Thus, although other factors such as income and interest rates also affect the real demand for money (Slavova, 2003), higher inflation tends to increase money velocity V, thus contributing to further rises in inflation rates according to (1)..

If and when more of the massive increase in the amount of money in existence (currently invested heavily into the securities markets and savings) begins to be spent on real goods and services, the inflation rate could start to rise quite quickly. If the large central bank reacted to rising consumer prices by discontinuing its monetary injections, a precipitous drop in stock and bond prices might result. Such a possible decline in security prices could cause a financial panic which would further magnify the fall in investor portfolio values.[10] Drops in investor wealth caused by collapsing financial markets might be likely to inhibit demand in the real economy from keeping up with the rising prices of goods and services. The resulting insufficient monetary demand for real output would make it even more difficult for businesses to be able to earn the operating profits they need to service their excessive debt loads without further raising prices.

Thus, once inflation rises significantly, central banks would have the choice between continuing to feed an upward inflationary spiral with ever-increasing monetary stimulus or witness collapsing financial markets and a large increase in unemployment. An inflationary recession/depression is quite feasible in these circumstances. The longer the money printing goes on, the higher the future inflation and the worse the recession or depression that may be induced by the need to withdraw the monetary stimulus. Of course, if the monetary spigots are never turned off, hyperinflation will result.[11]

IV. A Potential Stagflation Scenario

The monetary/economic situation in 2020 bears some similarities to the inflationary stagnation/recessions of the 1970s in the U.S. Just as in the decade leading up to 2020, there had been expansive monetary and fiscal policies in the 1960s (relating to the guns and butter programs of paying for both the Vietnam War and the social costs associated with the war on poverty) that could not be met with a higher supply of real goods

[10] It is interesting to note that individual investors did not panic during the precipitous drop in security prices in March 2020, as investment holdings of equities (and contributions to 401k retirement plans) generally held steady (Wolf-Mann, 2020b). However, there were massive sales of risky assets by institutional investors like hedge funds because of system-wide margin calls that were caused by the rapidly collapsing security market prices in late March (Ren, 2020). The latter liquidity problems were alleviated by the massive rescue operations which the U.S. federal government administered under the advice of the giant investment fund manager BlackRock (Massa, 2020).

[11] Currently, investors don't seem to be predicting very high inflation in the future. The market consensus forecast of long-term future inflation indicated by the difference between yields on fixed-rate U.S. Treasury bonds and Treasury Inflation Protected Securities (TIPS) fell below 1% in the spring of 2020 (Chen, 2020), and it only recently has risen to near the 2% inflation target of the U.S. central bank. It seems that investors are predicting a much more favorable resolution of the current crisis than are indicated by the risks explained in this paper. As explained by Anderson, Gascon, and Liu (2016), inflationary expectations do not rise even with large increases in the monetary base when central banks have "some credibility with respect to desiring a low, stable rate of inflation" and "can credibly commit to unwinding the expansion" of that money "when appropriate". However, it remains to be seen whether the double-digit growth in actual M2 measures of the money supply worldwide in the face of the international reduction in real output can be reversed to prevent a large increase in inflation when the high savings and precautionary money balances are spent and the velocity of money returns to normal levels. It is possible that the low inflation rates expected in the future implied by the difference between the T-bond and TIPS yields is caused by the Fed artificially keeping fixed-rate T-bond yields low while investors shy away from buying up the resulting negative real yields offered by TIPS that can soar into double digits if and when the Fed tightens to slow down the onset of double-digit inflation (as in the 1970s) that would result in hefty increases in real interest rates and thus large capital losses for buyers of TIPS.

and services when the economy was already operating at full employment. More fiscal and monetary stimulus throughout the 1970s designed to address recessions and rising unemployment rates eventually led to ever-increasing prices charged by businesses for real activity. Eventually, double-digit inflation resulted and was only halted by the restrictive monetary policies of the 1980s that led to the deepest economic recession in the U.S. since World War II, although the fiscal stimulus supplied by the massive tax cuts during the Reagan administration did allow an economic recovery once inflation was brought under control.

There are two differences between the 1970s and the 2020s, however. One contrast is related to the scale of the money printing in 2020 that is much larger as a percentage of GDP and that may therefore result in much higher inflation in the future. Even more restrictive monetary policy may therefore be required to keep it from turning into hyperinflation, and so a much deeper and more lasting recession/depression may eventually result. The other major phenomenon that distinguishes the 2020s is related to the special increases in real costs for businesses and declines in real demand for some goods and services relating to the 2020 pandemic. Rising real costs accompanied by reduced real demand inhibit the ability of businesses to provide goods and services at stable prices while generating the minimum operating profits needed to service their much higher debt loads that had already existed before the pandemic began in early 2020. A lasting inflationary recession/depression through part, if not all, of the 2020s, may very well be the result.

The current worldwide health and economic crisis is unprecedented over the past century, although it has some similarities to the influenza pandemic of 1918-1919. That influenza pandemic over 100 years ago happened at the same time as World War I was ending, and that war's end resulted in a large surplus of workers as soldiers returned to seek civilian employment, thereby putting a lid on labor cost increases. Despite the slack in the labor force, there was double-digit growth in M2 in the U.S. that led to a large rise in inflation rates which reached double-digit levels in both 1919 and 1920.

If there is sufficient tightening of monetary policy after 2020 to keep inflation from rising to hyperinflation levels, a major economic depression could occur that may lead to severe social and political upheavals which might be similar to those that occurred in the 1930s during that deflationary "Great Depression". However, unlike the depression of the 1930s (and unlike the 2007-2009 financial crisis), which was largely caused by inadequate economic demand (and a financial liquidity crisis) and therefore had a solution in fiscal stimulus (printing of money), the current crisis represents a complex health, social, political, economic, and financial dilemma (Reddy, 2020). In addition, the massive use of monetary and fiscal stimulus to rescue the financial markets and economy from a crash in 2020 may moderate the depth and duration of the decline in real wealth and output in the

2020s, thereby resulting in a less extreme political result than in the 1930s.[12] However, with the extraordinarily high amount of debt in the world (e.g., federal debt in the U.S. as a percentage of GDP in 2020 is at the highest point in the history of that country), and with the aging worldwide population requiring increased transfer payments to retirees while the size of the labor force is declining, there may be very limited capacity for fiscal stimulus to spur much more than anemic real economic growth (Landlord, 2020). The rapidly rising default rates that are likely to occur whenever the existing moratoriums on debt/rent payments (that were implemented at the onset of the pandemic in early 2020) are removed in Europe (Folpmers, 2020) and the U.S. (Newman, 2020) may motivate continued monetization of further government deficit spending to prevent a depression that will largely result in increasing inflation according to the monetarist identity in (1).

V. Possible Alternative Economic Policies and Outcomes

Although the international situation seems to indicate a grim future, there may be some solutions which can mitigate the ongoing global catastrophe. The huge spike in coronavirus cases, hospitalizations, and deaths worldwide in late 2020 is resulting in further economic lockdowns that may persist through the early winter months of 2021 (and that may spur yet further fiscal and monetary stimulus in the face of the lockdown-related disruptions in the supply of economic output). Nevertheless, there may be policies which can at least inhibit the worst outcomes, including with respect to the international health crisis.

For instance, China provides one example of how the health crisis can be contained by locking down areas with widespread cases of coronavirus, testing individuals for the disease, quarantining the infected throughout the rest of country, and implementing nationwide

[12] In the 1930s, nationalism, fascism, and war followed from the economic depression. While the political outcome of the 2020s may result in less scapegoating and vilification of other ethnic groups/nations/ideologies/religious, the vast amounts of wealth owned by the largest corporations and their richest owners make a political solution of divide and conquer very appealing to those with the money to influence election results and with the motive to do so to protect their riches (Murphy, 2020a). The persuasive power of big moneyed interests on government that occurs not only through direct lobbying and campaign financing of government leaders and other forms of legal bribery but also via skillful political marketing strategies (Murphy, 2019a) tends to funnel voters' attention into choosing between two different leaders who may advocate for different social policies but who both represent the economic/business interests of large corporations and the wealthy (Murphy, 2019b). In the U.S., a Democratic President (Joe Biden) combined with a divided Congress (with a Republican controlled Senate that depends on a runoff election in the state of Georgia in January 2021) potentially represents a very moderate form of division of political party power, but such a lack of unity might inhibit the tax increases necessary to pay for the large fiscal deficits arising out of the spiking pandemic (that include funding the added medical expenses, lost productivity due to sick leaves, unemployment benefits, and business losses). In that political/economic climate, the will of the Federal Reserve to enact monetary tightening when inflation starts to spike significantly above the current target of over 2% might be restricted, thus resulting in a continuation of monetizing fiscal deficits just as occurred in Germany in 1923 during that country's lockdown undertaken to protest French occupation and the related external costs imposed by reparations that arose out of World War I. The widespread pre-primed belief that there was fraud in the 2020 Presidential election (Rogers, 2020) illustrates how the political divisions might be magnified into extreme outcomes if and when hyperinflation and/or economic depression further inflames existing tensions. Serious risks of expanding international conflicts also exist, as China's emergence as a rapidly rising world power threatens U.S. dominance, thus representing a situation indicating a high probability of wars breaking out due to the "Thucydides Trap", which involves the conflicts that arise when a rising power threatens the power of a previously dominant state (Allison, 2015).

safety measures such as provision of face masks and social distancing (Beaubine, 2020). The result has been a rapid partial recovery of the domestic Chinese economy from its lows under the original lockdown earlier in 2020 (Aiden Research, 2020) without needing much fiscal or monetary stimulus to avoid an economic or financial collapse (Fujita, 2020).[13] While the Chinese political/economic system might allow policies that may not be applicable in other countries, similar successes in domestic elimination of the coronavirus have been observed in New Zealand, Fiji, Mongolia and Taiwan (as well as most of Australia) which utilized similar policies (Fernando, 2020). The U.S. with its fragmented and slower reactions to the pandemic has not had the same successes in stopping the disease and has suffered more draconian health, economic, and financial consequences despite massive monetary and fiscal stimulus (Cheung, 2020).[14]

Once the health situation has finally stabilized through adequate testing, quarantining, and continued safeguarding measures (like use of facemasks/faceshields and social distancing), as well as distribution of effective vaccines, it will become necessary to address the issues relating to the past large growth in the money supply that will be highly inflationary once the velocity of money recovers with the economy unless there is an actual contraction in the money supply. A moderation in the money supply growth may prompt a recession amidst the inflation unless extra real demand in the economy is created to offset the impact of tight money. In particular, a switch to a restrictive monetary policy would lead to rising real interest rates that will magnify the increases in nominal yields due to inflation, thus inhibiting investment and spending, as well as lower security prices and aggregate wealth that will further constrain demand.

[13] China's real GDP is estimated to actually have grown by over 2% in 2020 and is forecast to rise by 8% in 2021 (Bloomberg News, 2020c). That country's ability to navigate the health and economic crisis with relatively limited fiscal and monetary stimulus would seem to indicate that its currency, the yuan, as well as its security investments and other assets might eventually prove to be a safe haven against worldwide inflationary depression and the international social/political upheavals which may result from the 2020 pandemic. That country's imminent launch of a digital currency supplemented by that nation's development of a blockchain technology infrastructure to help integrate other nations in a “Digital Silk Road to provide interconnectivity to all of China’s trade partners around the globe” (Sung, 2020) may provide further impetus for many central banks and international investors to hold Chinese currency investments. Because China's digital currency will be integrated with the nation's payments and financial system as well as backed by the credit of the national Chinese government (Faridi, 2020), there may be added safety in such investments in comparison to private cryptocurrencies.

[14] Since the original posting of an earlier version of this paper on SSRN at the beginning of the pandemic in April 2020 (Murphy, 2020b), new evidence has arisen regarding the coronavirus mutating into an even longer incubation period that has required having to reimpose extreme lockdowns even in a country (China) which had previously appeared to have controlled the spread of the disease (Bloomberg News, 2020b). Newer mutations of the coronavirus that are becoming more prevalent seem to result in changes in the virus's properties which existing vaccines and antibodies target (World News, 2020) and which may therefore inhibit the effectiveness of current vaccines. In this context, it seems quite possible for the supply disruptions that prompt inflation in the face of massive money printing to persist for some time to come. As indicated by the humanitarian disaster unfolding in Brazil, ignoring the disease does not appear to represent a viable solution to the pandemic (Darlington, John, and Charner 2020). In addition, Sweden's experiment with a policy of merely encouraging residents to take voluntary precautions against the spread of the coronavirus has not been shown to be very successful, with that country already having had to adopt some mandatory restrictions on social behavior late in 2020 and considering more of them as Covid-19 cases, hospitalizations, and deaths in that country mount to many times that of neighboring countries (Erdbrink and Anderson, 2020).

One possible source of offsetting increases in real demand can come from government policies that encourage productive spending and investment. For instance, in the current situation of 2020, internationally coordinated government policies could be undertaken that promote increased infrastructure investments to address the risks associated with global warming that may represent an even larger future threat to the world economy than the coronavirus. Such programs could include taxes on carbon and methane emissions that encourage clean energy production and other economic activity which reduces the risks and costs of global warming. Besides taxation of all power plants which use dirty energy like coil, oil, and gas (unless the emissions from their use are recycled or eliminated through fuel cells or other new technologies under development),[15] large tax credits could be provided to those trading in gas guzzling vehicles for automobiles powered by electric batteries and hydrogen.

It might actually be optimal to enact a complete Green New Deal (Sarlin, 2019) which is a general program to supply national health care, affordable housing, and clean energy production (such as through solar, wind, and fuel cell plants as well as electric cars). This political policy would seem to enable addressing the medical problems of the pandemic at the same time that investment and employment is increased to advance those crucial needs for a healthy economy in the future. Higher income taxes levied on the corporations and wealthiest individuals could fund much of this productivity-enhancing real output as could fees levied on carbon/ methane emissions.[16]

In addition, at least some of the economic drag created by the excessive debt in the world (and by the large restructuring costs associated with switching production to meet changes in real demand) might be alleviated by using participation certificates like shared appreciation mortgages (SAMs) to refinance obligations that can't currently be serviced by debtors. The latter securities might be given a warm welcome by investors seeking diversification away from fixed-rate

[15] The drop in the price of oil to below zero in the spring of 2020 caused massive reductions in oil drilling operations (Blas, 2020), but the rise in energy prices since then has motivated a return to dirty energy production that will likely continue without a change in government policies.

[16] Taxing the wealthy has a smaller impact on spending and demand than government spending because the rich tend to save far more of their income and wealth. Of course, there can be adverse economic effects associated with raising taxes on businesses and wealthy individuals in terms of inhibiting productive investment, especially in nations where such higher taxation can motivate large movements of capital outside the country as well as inhibit capital inflows. However, the economic environment of late 2020 associated with the relatively oversized money printing of the U.S. is currently leading to declines in the value of the U.S. dollar against even the currencies of less developed countries which have provided their own large fiscal and monetary stimulus to address their own domestic recessions induced by the pandemic and related economic shutdowns. The fact that India is actually finding it necessary to sell large amounts of its rupee currency against the U.S. dollar in order to moderate capital inflows and further appreciation of the rupee in December 2020 (Sircar and Nag, 2020) supplies an illustration of the flexibility and motivation that other countries might have to raise taxes to try to inhibit further appreciation of their currencies that would make their businesses less competitive in international trade. Nevertheless, it should be noted that an alternative to raising tax rates might be policies which encourage productivity that prompt rising tax revenue through faster economic growth and incomes. One potential replacement for higher taxes would be a mandatory levy on the wealthiest that would be invested into productive investments designed to lower health care costs, enhance public health, and reduce the costs attributable to global warming, with a payoff on the levied investments in the form of future tax credits set as a function of some indices measuring the success of the investments through an independent third party.

instruments that offer extremely low yields (Murphy, 2020c). In addition, as opposed to using massive money printing activities to finance fiscal deficits, a large amount of the needed investments for conversion to a Green economy (and related infrastructure improvements such as relating to the provision of safe potable water) could be funded by bonds which make payments only to the extent that the investments spur future real economic activity and growth. Much of the unsystematic risk of the projects would thereby be transferred to wealthy investors who wouldn't require a higher average/expected value of return because of the resulting enhanced diversification which reduces their portfolio volatility (Murphy, 2019c).

Conclusion

The large injections of money into the world markets at the onset of the coronavirus pandemic create significant risks of inflation amidst the related disruptions in real economic output in 2020. To prevent a significant rise in inflation, the large increases in the money supply will have to be reversed. However, just a moderation of the ongoing monetary stimulus (that needs to be undertaken to keep the prices of goods and services from spiraling out of control into hyperinflation) is likely to result in large increases in interest rates and an inflationary recession/depression unless there is offsetting demand such as through expansionary fiscal policies financed by taxes on the dirty emissions and the wealthy. However, as indicated by Murphy (2020a), there are rather strong political pressures which may inhibit development of the political will to adopt such a solution in the U.S. and elsewhere. In contrast to the economically roaring 1920s that followed the 1918-1919 influenza pandemic and double-digit inflation, the 2020s may be characterized by a stagflation that resembles the 1970s.[17]

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[17] Hyperinflation remains possible, however. As indicated by Coomer and Gstraunthaler (2011), hyperinflation across the world has continued to occur in numerous countries at least partially because of the benefits it provides to some, including to speculators in the bubbling real estate and stock markets that result. In the case of the U.S. in 2020, the vast number of individual and other investors benefitting from the stock market and real estate boom in the U.S. in 2020 (that is being spurred by the large monetary injections provided by the Federal Reserve) would certainly gain financially from a continuation of the loose monetary policies that keep security prices high and rising (despite the risk of hyperinflation if the rapid money supply growth continues). Hyperinflation might also benefit the U.S. as a whole to the extent that it debases the real value of the trillions of U.S. dollars and U.S. Treasury debt with fixed interest rates that are held outside the U.S.

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