

AGGREGATE SUPPLY-DRIVEN DEFLATION AND ITS IMPLICATIONS FOR MACROECONOMIC STABILITY

David Beckworth

Deflation is generally considered to be inconsistent with macroeconomic stability. Any sustained decline in the price level is widely believed to be associated with weak to negative economic growth, a lower bound of zero on the policy interest rate, and an increase in financial disintermediation. However, a number of recent studies examining both historical, cross-country experience with deflation and more recent developments find that these concerns are not necessarily associated with deflation (Selgin 1997, 1999; Cleveland Federal Reserve 1998; Stern 2003; Bordo and Redish 2004; Bordo, Lane, and Redish 2004; Bordo and Filardo 2005; Bordo and Filardo 2004; Farrell 2004; King 2004; *The Economist* 2004, 2005; White 2006). They show that the deflationary experiences that shape the modern economic psyche, the Great Depression in the 1930s and Japan in the 1990s, are not truly representative of all deflation outcomes. These studies contend that a broader, historical perspective reveals a more nuanced view of deflation, one that requires taking seriously the possibility of both a *malign* deflation, a deflation originating from a collapse in aggregate demand, and a *benign* deflation, a deflation originating from an increase in aggregate supply.

Some of these studies further argue that not only is aggregate supply-driven deflation real, but it may be optimal. They contend that by avoiding all deflations instead of avoiding only the harmful form,

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David Beckworth is Assistant Professor of Economics at Texas State University.

monetary policy may in fact create economic imbalances that eventually will have to be corrected. Better to embrace aggregate supply-driven deflation today than to deal with the potentially painful correction of economic imbalances in the future (Selgin 1997, King 2004, *The Economist* 2005, White 2006).

Taking seriously the idea that deflation can be benign, however, is a tough sell in a world where inflation is considered standard and deflation is generally assumed to be harmful. Moreover, embracing this idea is embracing the unknown since aggregate supply-driven deflation has been absent from modern economies. As a result, most observers are simply unfamiliar with it. Aggregate supply-driven deflation, however, is an important issue going forward as the continued opening of China and India and the ongoing rapid technological gains should continue to buffet the world economy with positive aggregate supply shocks.

This article reviews the conventional view of deflation, which assumes that deflation is always harmful, and contrasts it with a more nuanced view of deflation, which makes a distinction between deflationary pressures originating from the aggregate demand and the aggregate supply sides of the economy. We then examine what this more nuanced view of deflation means for macroeconomic stability and how it sheds light on the recent turbulence in the global economy. Finally, the article concludes by considering the implications for policymakers going forward.

The Conventional View of Deflation

Deflation returned as a pressing issue as Japan struggled with its weak economy and falling price level and inflation in many of world's advanced economies declined significantly. Between 1995 and 2004, Japan's economy grew an anemic 1.15 percent per year while its price level declined by 0.04 percent per year. Advanced economies saw their inflation rates go from an annual average of 5.83 percent for 1980–94 to 1.97 percent for 1995–2004 (IMF 2008a).

Most of the renewed interest in deflation has been premised on a belief that deflation is harmful to economic activity (Stern 2003). This understanding of deflation is usually attributed to the Great Depression experience of the 1930s, when a severe economic collapse and a dramatic decline in prices led to a “near consensus [that] believed . . . deflation was deeply dangerous and to be avoided at all costs” (DeLong 1999: 231). The belief that deflation is economically

harmful is not only evident in the deflation literature, but is also borne out in practice: no central bank targets deflation while most central banks either implicitly or explicitly target some rate of inflation.¹

The conventional view of deflation is often justified by noting several important channels through which deflation can adversely affect an economy. First, given relatively rigid nominal input prices, particularly wages, an unexpected fall in the price level originating from a collapse in aggregate demand will increase real input prices and lower firms' profit margins. As a result, firms will cut back production and employment levels. The more rigid the nominal input prices, the larger will be the decline in output and employment (Akerlof, Dickens, and Perry 1996; Greenspan 2003).² Second, unanticipated deflation will pull down nominal interest rates and unexpectedly increase real interest rates, further constricting an already weak economy. Moreover, the deflation might drag the nominal federal funds rate down to its lower bound of zero and thereby eliminate the possibility of additional monetary stimulus through the policy rate (DeLong 1999, Svensson 2003).³ Third, the financial system will become beset with unplanned increases in real debt burdens and unplanned decreases in collateral values as the deflation-plagued economy deteriorates. Consequently, delinquencies and defaults will increase and the balance sheets of financial institutions will weaken causing financial intermediation to suffer (Bernanke 2002, IMF 2003, Fuhrrer and Tootell 2003). Collectively, these events may reinforce each other in a "deflationary spiral" where expectations of more deflation and additional economic weakness lead to a further fall in aggregate demand and a prolonged economic slump (Fuhrrer and Sniderman 2000). Thus, unanticipated deflation—the initial negative demand shock—and even anticipated deflation—the deflationary spiral—can have adverse economic effects. Accordingly, the conventional view is that deflation of any form should be feared and "avoided at all costs" (DeLong 1999: 231).

¹Furher and Tootell (2003: 4) note, "No developed country in the twentieth century has ever intentionally moved to a negative rate of inflation and decided to stay there. . . . Countries behave as if the costs of deflation outweigh any of its benefits."

²In early 2003, when concerns about deflation were heightened, former Federal Reserve chairman Alan Greenspan cited this channel as a concern. During his April 30 testimony to Congress, he argued: "With price inflation already at a low level, substantial further disinflation would be an unwelcome development, especially to the extent it put pressure on profit margins and impeded the revival of business spending" (Greenspan 2003).

³The lower bound on the nominal interest rate also prevents debtors from being able to write off a portion of their debt, which would occur if nominal interest rates could become negative (DeLong 1999).

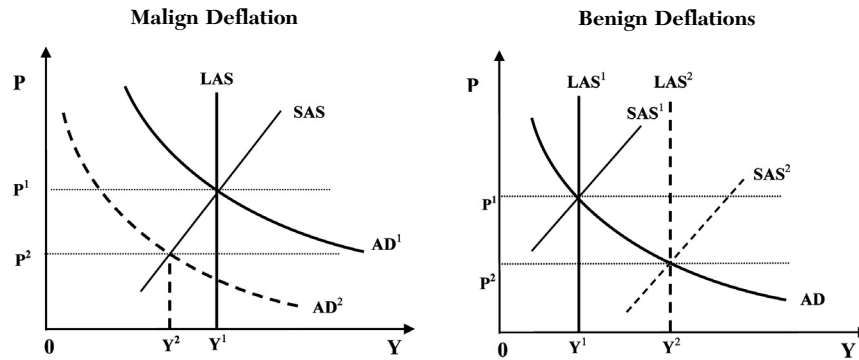
A More Nuanced View of Deflation

But should deflation always be feared? The aggregate demand-aggregate supply (AD-AS) model indicates deflation can occur for two reasons: a decrease in aggregate demand or an increase in aggregate supply. The first type of deflation is a consequence of a collapse in nominal spending that may, in the presence of nominal rigidities, drive actual output below its natural rate level. This malign form of deflation is consistent with the conventional view of deflation described above and is what most observers invoke when considering the issue of deflation. For example, Federal Reserve Chairman Ben Bernanke (2002) explains the “sources of deflation are not a mystery. Deflation is in almost all cases a side effect of a collapse in aggregate demand—a drop in spending so severe that producers must cut prices on an ongoing basis in order to find buyers.”

The second type of deflation, however, is the result of positive aggregate supply shocks that are not accommodated by an easing of monetary policy. Such aggregate supply shocks are the result of positive innovations to productivity or factor input growth that lower per unit costs of production and, in conjunction with competitive market forces, create downward pressure on output prices. Unlike a collapse in aggregate demand, positive aggregate supply shocks that are not monetarily accommodated generate a benign form of deflation where nominal spending is stable, because the decline in the price level is accompanied by an increase in the actual and “natural” level of output.

Figure 1 illustrates these two distinct forms of deflation using the standard textbook aggregate demand-aggregate supply (AD-AS) framework. Here, the malign form of deflation is seen as the result of a negative aggregate demand shock shifting aggregate demand from AD^1 to AD^2 and, owing to the nominal rigidities as indicated by the upward sloping short-run aggregate supply (SAS) curve, decreasing output temporarily to Y^2 from its natural rate level, Y^1 . Total nominal spending ($P \times Y$) collapses and the price level drops from P^1 down to P^2 . The benign form of deflation, on the other hand, occurs as the consequence of positive aggregate supply shocks shifting the long-run aggregate supply (LAS) curve—or the natural rate level—from LAS^1 to LAS^2 without monetary policy increasing aggregate demand to stabilize the price level. Unlike with malign deflation, ($P \times Y$) now remains stable even as the price level falls from P^1 to P^2 .

FIGURE 1
THE TWO FORMS OF DEFLATION



The benign form of deflation, however, can take on slightly different characteristics depending on whether the advances in aggregate supply originated from shocks to productivity or shocks to factor inputs. Consider first productivity-induced deflation. Profit margins are likely to remain stable since the decline in output prices caused by positive shocks to productivity are matched by a decline in per unit costs of production. Even with relatively rigid nominal input prices, such as sticky wages, productivity gains still lower per unit costs of production and allow for a stable per unit markup over marginal costs while output prices fall.⁴ Labor, meanwhile, benefits since positive productivity shocks mean a higher marginal product of labor and higher real wages. Nominal wages should remain stable, as real wage increases follow gains to the marginal product of labor by way of a falling price level. Consequently, stable nominal wages, increasing real wages, and stable profit margins are fully consistent with productivity-generated deflation (Selgin 1997: 65).

Standard growth models indicate an increase in productivity growth should also lead to an increase in real interest rates absent any changes in intertemporal preferences, the labor supply, and intervention by monetary authorities (Allsopp and Glyn 1999). In turn, the higher real interest rates should counter the downward

⁴If the output per worker is increasing, as is implied by a productivity gain, then the costs of a fixed nominal wage is spread out over more output (i.e., per unit costs decline) and poses no problem to the firm's viability.

pressure on nominal interest rates from the deflationary pressures and reduce the chance of hitting the lower nominal interest rate bound. As long as the deflation is being generated by productivity gains, there should be an offset from the real interest rate to prevent the nominal interest rate from hitting the zero bound.

Financial intermediation should not be adversely affected either, since the burden of any unexpected increase in the stock of real debt arising from deflation should be offset by a corresponding unexpected increase in real income, while collateral values should not decline but increase as the positive shocks to productivity raise expectations of current and future earnings. Deflation arising from advances in productivity growth, therefore, is not only benign but supportive of intensive economic growth (Selgin 1997: 41).

Benign deflation also arises from positive innovations to factor input growth. Since the capital stock is generally considered to be endogenous, any benign deflation arising from gains to the capital stock generally would be the result of shocks to productivity or the labor supply. Consequently, truly independent factor input-driven deflation is most likely to arise as the result of positive shocks to the labor supply. Under this form of benign deflation profit margins remain stable since per unit costs decline, but now the decline in per unit costs is the result of lower nominal wages not increased labor efficiency. The increase in the labor supply causes the marginal product of labor and real wages to fall and, given a falling price level, require a decline in nominal wages too.⁵

Absent any changes in productivity growth, intertemporal preferences, and monetary policy, standard growth models predict a positive shock to the labor supply should also cause the marginal product of capital to rise and increase real interest rates. Again, the higher real interest rates should counter the downward deflationary pressure on nominal interest rates and reduce the chance of hitting the lower nominal interest rate bound.

Financial intermediation should not be disrupted either since economic growth and earnings expectations will be robust if positive shocks to the labor supply are causing the actual and natural rate level of output to increase. This stimulus to output should keep

⁵If capital, however, is highly complementary to labor, then it is possible for an increase in the labor supply to cause an increase in the capital stock and avoid the decline in the marginal product of labor and the real wage.

collateral values from falling. However, the increased real debt burden arising from the deflation may prove challenging depending on whether the lower real wage labor is receiving is being offset by the higher return to capital in terms of debt payment ability.

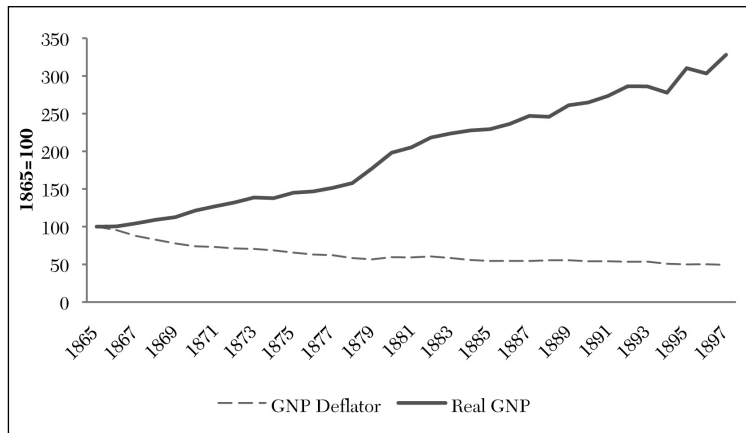
Overall, deflation arising from a positive shock to the labor supply is benign since it promotes economic growth, stable profit margins, and financial intermediation. This form of benign deflation, though, also may be associated with falling nominal wages and is limited to creating only extensive economic growth. How consequential these deficiencies are in a growing economy with falling prices is uncertain, but they do suggest that the best form of benign deflation arises from positive shocks to productivity growth rather than to factor input growth. Both forms of benign deflation, however, are associated with increases in the actual and the natural rate level of output and clearly dominate the malign deflation arising from a collapse in aggregate demand. Deflation, therefore, can be consistent with robust economic growth and should not always be feared.

Applying the More Nuanced View of Deflation

Recently, a number of studies investigating the historical record of deflation across many countries have adopted this more nuanced view of deflation. Bordo and Redish (2004) using a panel vector autoregression examine Canada and the United States in the late 19th century and find for this period both malign deflation originating from negative aggregate demand shocks and benign deflation arising from positive aggregate supply shocks. Using similar techniques, Bordo, Lane, and Redish (2004: 15) investigate the United States, the United Kingdom, and Germany during the late 19th century and find overall the deflation of this period was “primarily good.” Figure 2 displays the case of the United States, where for the period 1866 to 1897 real output grew almost 4 percent a year while the price level declined about 2 percent a year.⁶ Bordo, Lane, and Redish (2004: 15) conclude that deflation has received a “bad rap” and stress the importance of distinguishing between good and bad deflation.

⁶Beckworth (2007) shows that for the United States during this time, the aggregate supply-driven deflation occurred in the presence of meaningful nominal rigidities and was not simply a trivial case of deflation occurring in a highly flexible price environment.

FIGURE 2
ROBUST ECONOMIC GROWTH AND DEFLATION
IN THE UNITED STATES



SOURCES: Balke and Gordon (1989), Johnston and Williamson (2003).

Using a variety of empirical tests, Borio and Filardo (2004: 9) examine 14 countries across both 19th and 20th centuries and find “no reason to expect that deflations should necessarily be associated with economic weakness.” Rather, the economic “context in which they take place” is important. Consequently, they define three types of deflation: the good, the bad, and the ugly. The first type of deflation they associate with strong economic growth, the second with weak economic growth, and third with a deflationary spiral. They also find the zero bound on the nominal interest rate was rarely reached and never happened in the context of good deflation. Bordo and Filardo (2005), in a similar study, examine 30 countries over the last two centuries and also come up with the good, bad, and ugly types of deflation. They note that during the gold standard era, “deflation was generally of the good variety reflecting positive aggregate supply shocks” (p. 14). Finally, Atkeson and Kehoe (2004) using a large data set look at 17 countries over the last century and a half and find there is no strong empirical link—other than the 1929–34 period—between deflation and economic depression. They conclude, “The bar has been raised for those who claim that deflation and depression are closely linked” (p. 102). These studies all demon-

strate that historically benign deflation has been just as, or more, common than malign deflation. Moreover, since most of these studies show that the historical episodes of benign deflation were generated by positive aggregate supply shocks, a key implication is that declines in the price level can be both unanticipated and consistent with robust economic growth. These empirical findings, therefore, lend support to the more nuanced view of deflation laid out above.⁷

Aggregate Supply-Driven Deflation and Macroeconomic Stability

One implication of this more nuanced view is that since deflation is not always harmful, policymakers need not always assume the worst and automatically ease monetary policy at the first sign of deflationary pressures. Rather, they should determine the source of the deflation—whether it originated from shocks to aggregate supply or aggregate demand—and then act accordingly. However, distinguishing between the two forms of deflationary pressures may not be easy, especially if both forms of deflationary pressures are present. One easy solution for monetary policy then is to err on the side of inflation by targeting some positive rate of inflation. After all, how consequential could it be if policymakers in their attempt to avoid the malign form of deflation also eliminate the benign form of deflation? Some proponents of the more nuanced deflation view respond that given the non-neutrality of monetary policy in the short run such a response may be very consequential. They argue that not only is aggregate supply-driven deflation a real possibility, but by avoiding it and erring on the side of inflation policymakers may reduce macroeconomic stability (Selgin 1997, 1999; Cleveland Federal Reserve 1998; Bernard and Bisignano 2001; King 2004; Xie 2004; *The Economist* 2004, 2005; White 2006).

The idea that there is a relationship between aggregate supply-driven deflation and macroeconomic stability begins with the observation that shocks to productivity or factor input growth imply changes in per unit costs of production and, given competitive pressures, changes in the relationship between input and output prices. Allowing changes in the price level, an average of output prices, to

⁷Benign deflation, however, is not a new idea. Selgin (1995) shows it was widely understood and debated prior to the Keynesian revolution.

reflect these underlying changes in per unit production costs serves to stabilize profit margins and hence, production at sustainable levels. For example, assume there is an economy-wide positive productivity shock. Firms now have lower per unit production costs and will lower their sales price in an attempt to gain market share. Profit margins remain stable since the drop in sales price is matched by a drop in per unit costs. The aggregate price level, an average of all the sales prices, will also decline without harming firm viability.

If, however, monetary authorities attempt to keep the price level, and therefore firms' output prices, from falling in response to this positive productivity shock, upward adjustments in nominal input prices are required to maintain normal profit margins and sustainable production levels. Consequently, if input prices such as wages are at all sticky, such attempts will swell profit margins and lead to "profit inflation." Firms that fail to appreciate the temporary nature of the swollen profits will increase production, adding an unsustainable stimulus to the growth rate of output. This economic boom will continue until either output or input prices adjust and return profit margins to normal levels.⁵

There is also a nominal spending side to this story. It is based upon the understanding that in order to keep the price level from falling during periods of rapid productivity or factor input growth, monetary authorities must act to increase nominal spending. If this change in monetary policy were unexpected, or if there were significant nominal rigidities, the nominal spending increase that stabilizes the price level would also push actual output beyond its natural rate level. There would be both a sustainable component—the productivity or factor input gains—and a nonsustainable component—the monetary stimulus—to the subsequent increase in real output. Moreover, the unsustainable pickup in actual output would occur without any alarming increases in the price level, making the real economic gains appear macroeconomically sound. The increase in nominal spending

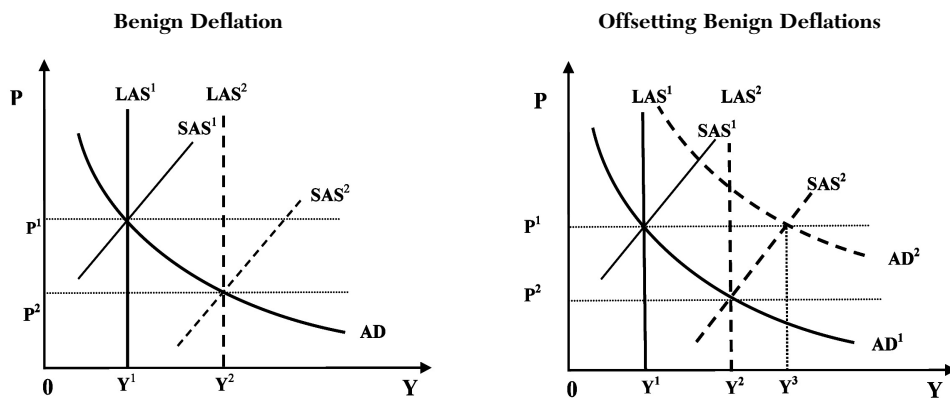
⁵A key assumption in this analysis is that firms have some market power and find it relatively easy to adjust their output prices downward. However, a willingness by firms to adjust output prices downward is assumed only in the case of positive supply shocks, not negative demand shocks, since only in the former case are per unit production costs falling, which allows firms to maintain relatively stable markups over marginal cost. Selgin (1997: 30) argues this view is consistent with the New Keynesian perspective that holds that firms are slow to adjust their output prices in response to demand shocks because of fixed money contracts, menu costs, and aggregate demand externalities.

could thus create a boom-bust cycle in real economic activity without any of the standard inflationary signs of overheating.

Figure 3 depicts these developments using the same AD-AS model of Figure 1. Here, monetary authorities offset the benign deflation depicted earlier by shifting the AD curve from AD^1 to AD^2 in order to stabilize the price level. This policy response not only stabilizes the price level but also increases nominal spending, $(P \times Y)$, and, given the upward sloping SAS curve, pushes real economic activity temporarily beyond its natural rate level, Y^2 , to Y^3 . Eventually, there will be a correction and the economy will return to Y^2 . Consequently, by focusing on price level stability, and ignoring the change in nominal spending, monetary authorities create destabilizing movements in economic activity.

The interest rate response to positive aggregate supply shocks also plays an important role in the relationship between the benign form of deflation and macroeconomic stability. Here, the Wicksellian view that the actual real rate of interest can deviate from the natural rate of interest in the short run is invoked to help explain the relationship. The natural rate of interest is the real interest rate justified by non-monetary fundamentals—specifically the productivity of capital, the labor supply, and intertemporal preferences—and is the real interest rate consistent with the natural rate level of output (Amato 2005).

FIGURE 3
IMPLICATIONS OF OFFSETTING BENIGN DEFLATION



Although the Wicksellian view holds that a stable price level best minimizes deviations of the real interest rate from the natural rate, the more nuanced view of deflation maintains that price level stability may actually *increase* the deviations of the real interest rate from the natural rate. As noted earlier, an increase in the growth rate of productivity or the labor supply should raise the natural rate of interest and create deflationary pressures. If, however, monetary authorities attempt to offset the deflationary pressures by lowering the policy interest rate, they may force the real interest rate below the natural rate and create an unsustainable credit boom. The resulting macroeconomic disequilibrium will be manifested in unwarranted capital accumulation, excessive leverage, speculative investments, and inordinate asset prices (Bernard and Bisignano 2001, King 2004, *The Economist* 2004, White 2006).

This understanding of the relationship between aggregate supply-driven deflation and macroeconomic stability suggests that, given its short-run real effects, monetary policy should not err on the side of inflation, but should allow the price level to fall in response to innovations in productivity or factor input growth. Such actions should stabilize nominal spending and keep the real interest rate in line with the natural rate. This understanding implies at a more general level that the price level should be allowed to move inversely with productivity and factor input shocks and that nominal spending, not the price level, should be stabilized around some target.

Understanding the Recent Global Macroeconomic Instability

According to the IMF (2008a), the world economy grew in real terms at an annual average rate of 4.02 percent between 2003 and 2007, the fastest clip for a five-year period over the last 30 years. This robust economic growth was the result of a series of positive aggregate supply shocks coming from the ongoing liberalization of the real economy in many countries, the entrance of China and India into the world economy, rapid technological gains, and the increasingly globalized financial system. According to the more nuanced view of deflation, these positive aggregate supply shocks to the global economy should have been reflected in a falling price level and higher real interest rates in the advanced economies beginning around

2003. Instead, monetary authorities in these economies, particularly the Federal Reserve, cut interest rates to check the global deflationary pressures. Some observers at the time questioned whether these actions, though well intended, would ultimately undermine global macroeconomic stability. They were concerned, for the reasons discussed above, that in their attempt to offset benign deflation monetary authorities were generating excessive borrowing, an unsustainable boom in asset prices, and an unsound stimulus to global aggregate demand. Moreover, they feared that the resulting economic imbalances that would have to be eventually corrected could lead to the very thing central banks were trying to avoid in the first place—malign deflation (*The Economist* 2004, 2005; King 2004; White 2006). For example, Xie (2004) argued,

The global economy has experienced a positive capacity shock through globalization. The need to find equilibrium should have caused a downward price level adjustment in the developed economies. Instead, monetary authorities, mainly the Fed, are using cheap money to fight this adjustment, causing a massive property bubble that creates superficial demand and stops prices from declining. However, as soon as the bubble bursts, the world will need a bigger downward adjustment because of the extra capacity formed during the bubble.

Most importantly, so much debt has been created that it may lead to debt deflation. Globalization would have caused benign deflation that benefits consumers and causes some industries to relocate to lower-cost locations. But fighting against this sort of deflation with bubbles and debts must lead to deflation. . . . When the global property bubble bursts, debt deflation could ensue.

A key part of these observers' story is that the Federal Reserve was creating a global liquidity glut given that it managed the main reserve currency of the world. For emerging market economies that were either formally or informally pegged to the dollar, the Federal Reserve's highly accommodative monetary policy at this time meant they had to acquire massive amounts of foreign reserves in order to maintain their peg and, ultimately, their external competitiveness. This currency intervention required either an increase in the domestic monetary base of the pegged currency regimes or, if sterilized, an

increase in the nonmonetary assets of their financial system that, in turn, could serve as the basis for the expansion of domestic credit.⁹ U.S. monetary policy, therefore, was being exported to these emerging markets. Advanced economies, to some degree, were also importing the loose U.S. monetary policy since they had to be mindful of their currencies becoming too expensive relative to the dollar and all the currencies pegged to the dollar. Taylor (2008) has shown, for example, that the European Central Bank at this time set its overnight policy rate in a less-than-optimal manner—it cut its policy rate more than suggested by the Taylor rule—in order to prevent cuts in the federal funds rate from adversely affecting the euro. The Federal Reserve, then, with support from other monetary authorities was creating a global liquidity glut in its attempt to offset the benign deflationary pressures of the time. According to this understanding, it was this global liquidity glut in conjunction with the positive aggregate supply shocks to the global economy that fueled many of economic imbalances that emerged during this time, including the global housing boom.

Evidence for this view can be seen in Figure 4. The first graph in the figure plots the year-on-year growth rate of quarterly world real GDP against a weighted average G-5 short-term real interest rate for years 1981–2006.¹⁰ This figure reveals that just as the global economy began to experience the rapid growth in the early-to-mid 2000s, the G-5 short-term real interest rate turned negative as monetary authorities in these countries eased monetary policy. This positive G-5 interest rate gap—the difference between the world real GDP growth rate and the G-5 short-term real interest rate—narrowed as the short-term real rate picked up in 2005, but it still fell notably short of the world real GDP growth rate by the end of 2006.

⁹These currency intervention efforts, which were needed to maintain the dollar pegs as U.S. monetary policy eased, kept the dollar pegging countries' currencies undervalued. As a result, imported consumption became more costly in these countries, lowering overall domestic consumption. The lower domestic consumption, in turn, meant higher domestic saving. The so-called saving glut, then, can be attributed, in part, to the policy choices made by monetary authorities in both the dollar-pegging countries and the United States.

¹⁰The quarterly world GDP series is constructed by taking the quarterly real GDP series for the OECD area and using it with the Denton method (1971) to interpolate the IMF's annual real world GDP series produced in the World Economic Outlook (IMF 2008a).

Figure 4 also shows two measures of global liquidity corroborate the easing seen by the positive G-5 interest rate gap. The first measure is a ratio comprised of the widely used “total global liquidity” metric, which is the sum of the U.S. monetary base and total international foreign reserves, to world real GDP.¹¹ The second measure is a ratio comprised of a G-5 narrow money measure, which is the sum of the G-5’s M1 money supply measures, to world real GDP.¹² Both measures show above trend growth beginning in the early-to-mid 2000s. Finally, Figure 4 shows the consequences of this global liquidity glut for real housing prices. The second graph in the second panel shows the real housing price indexes for the United States and the OECD area.¹³ Both series reveal a marked increase corresponding to the recent spike in global liquidity. The final two graphs show the relationship between the real housing price indexes and the G-5 interest rate gap is positive and systematic.¹⁴

These figures indicate that the recent global housing boom had its origins, in part, in the monetary policy-generated global liquidity glut. Since this housing boom has now turned into a housing bust that has created what the IMF (2008b: 4) is calling the “largest financial shock since the Great Depression” to hit global financial markets, those observers who expressed concern back in 2004 based on the more nuanced view of deflation now appear to be almost prophetic. Presumably, the global housing boom-bust cycle would have been far less pronounced, if at all, had monetary authorities taken more seriously the concerns raised by these economic “prophets.” It would have been far less painful if monetary authorities had confronted their fears of a falling price level and allowed benign deflation. Instead, they now have to deal with the economic consequences of the global liquidity glut.

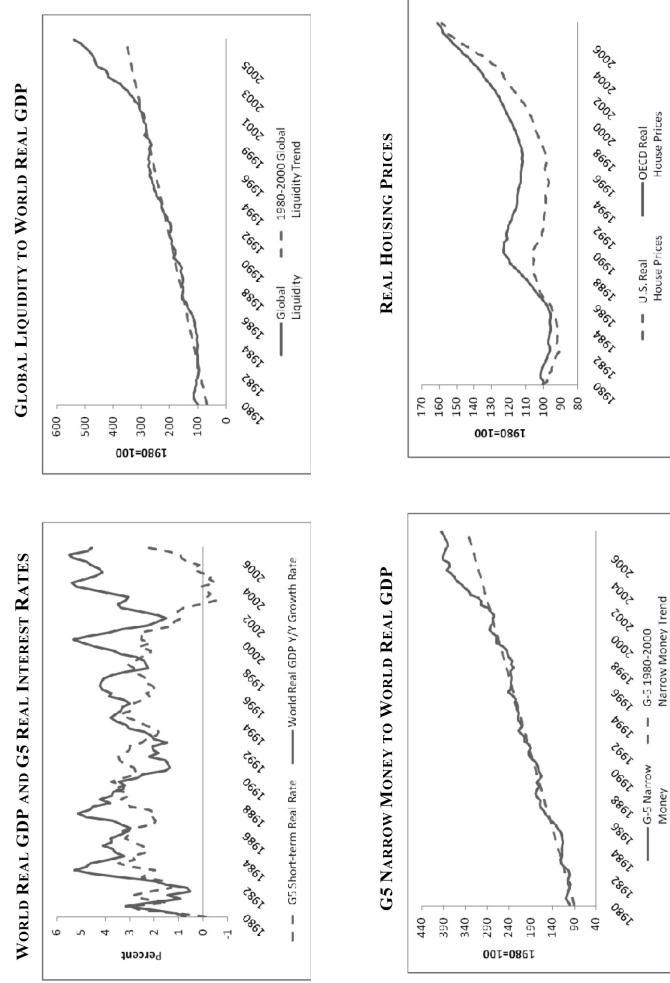
¹¹This metric provides a measure of global liquidity in that it is a measure of the all the currencies serving a reserve currency role (see Becker 2007).

¹²In the case of the United States, however, the money with zero maturity (MZM) measure is used since it provides a better measure of highly liquid, narrow money.

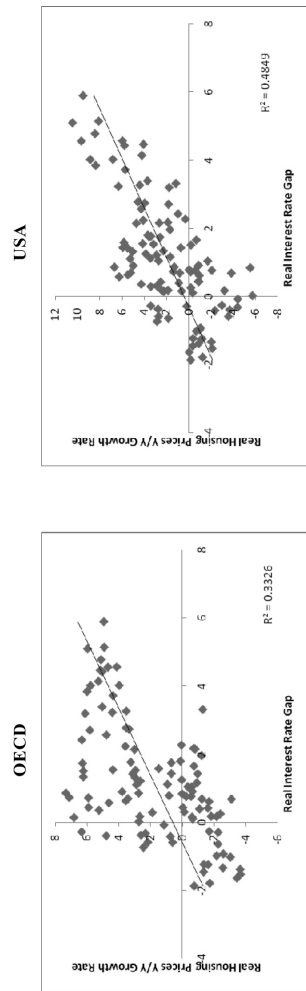
¹³Both series come from the OECD housing price database. Houses in the OECD real housing price index include the United States, Japan, Germany, France, Italy, United Kingdom, Canada, Australia, Denmark, Spain, Finland, Ireland, Korea, Netherlands, Norway, New Zealand, Sweden, and Chile.

¹⁴The relationships in the scatterplots are significant at the 1 percent level.

FIGURE 4
THE LIQUIDITY GLUT AND THE GLOBAL HOUSING BOOM



DEFLATION AND STABILITY



SOURCES: OECD Database, IMF WEO & IFS Databases, author's calculations.

Implications for Policymakers Going Forward

The IMF is forecasting global economic growth will slow down in 2008 and 2009. It also is forecasting, though, that by 2010 the world economy will return to the robust pace of growth it had between 2003 and 2007 (IMF 2008a). This forecast indicates the world economy will continue to beset with positive aggregate supply shocks. Should monetary policy accommodate these aggregate supply advances at that time, the more nuanced view of deflation suggests further global economic imbalances are in store. Consequently, going forward policymakers need to begin taking seriously aggregate supply-driven deflation.

Several issues, however, must be considered in operationalizing this benign form of deflation. First, monetary authorities must be able to distinguish between deflationary pressures arising from negative aggregate demand shocks and deflationary pressures arising from positive aggregate supply shocks, a nontrivial task if both sets of deflationary shocks are present. If that distinction can be made, then monetary authorities would accommodate malign deflationary pressures while allowing for benign deflationary pressures. A second issue for monetary authorities is the need to create a credible nominal anchor that would allow for benign deflationary pressures, but prevent the formation of malign deflationary expectations. A third issue facing monetary authorities is whether to allow all benign deflationary pressures to materialize or only productivity-driven deflationary pressures. Recall that a positive shock to the labor supply generates benign deflationary pressures, but it can also lead to a lower nominal and real wage. As noted earlier, it is not clear how consequential these deficiencies are in a growing economy, but to the extent monetary authorities wish to avoid them, monetary policy would need to find a way to allow for productivity-driven deflation while offsetting factor input-driven deflation.

With these issues in mind, Selgin (1997) proposed a nominal income-targeting rule that would allow for benign deflation arising from productivity gains. This “productivity norm” would have monetary authorities target a nominal income growth rate equal to the expected growth rate of real factor inputs. Such a nominal income target would allow the Fed to accommodate the real output effect of factor input growth, but not react to total factor productivity growth. The Fed, therefore, would allow the price level to inversely reflect both

shocks to and anticipated changes in total factor productivity. Selgin contends that such a monetary rule would avoid the potential drawbacks of factor input-generated deflation, but still minimize nominal spending shocks and the output gap. The productivity norm, like other nominal income stabilizing rules, would also provide a natural offset against aggregate demand shocks and any malign deflation.¹⁵

Adopting such a benign deflation-friendly monetary policy rule is important moving forward as the continued opening of China and India and the ongoing rapid technological gains are likely to create positive aggregate supply shocks for some time.¹⁶ Consequently, an overhaul of the conventional view of deflation is needed, one that would incorporate the insights of the nuanced view of deflation and open the door for a more thoughtful monetary policy. This article, building upon the other studies that have questioned the conventional view of deflation, is a step in that direction and hopefully will serve to elevate the debate among policymakers and other interested observers on the true nature of deflation.

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¹⁵Selgin also proposes a labor productivity norm that would have nominal income growing at the expected growth rate of labor inputs. This monetary policy rule would still stabilize the nominal wage but lead to a higher rate of deflation than the total factor productivity norm discussed above. Selgin suggests that, to the extent labor is more accurately measured than capital, the labor productivity norm would be more effective (1997: 65).

¹⁶Even in the absence of positive aggregate supply shocks, a nominal income rule—like the productivity norm—would still serve to stabilize macroeconomic activity.

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