

Did the Collapse of Bretton Woods Cause the Great Inflation?

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1. Introduction

There is no shortage of explanations of the Great Inflation of the 1970s. One interpretation is that policy makers mistakenly adopted a nonmonetary view of inflation as being driven by idiosyncratic (“cost push”) factors, leading them to disregard monetary policy as a tool for containing price-level increases.¹ In effect, they saw inflation as unresponsive to aggregate demand and therefore to monetary policy actions.² A second interpretation is that policy makers mistakenly concluded that they could attain a permanently higher level of output by accepting a higher rate of inflation.³ And a third interpretation cites price-level disturbances, in the form of the oil shock of 1973-4, in combination with a monetary policy rule that caused policy makers to accommodate the resulting inflation.⁴

One common feature of the competing explanations is that they make no reference to the Bretton Woods System that provided the international framework for monetary policy in the 1950s and 1960s and whose collapse coincided with the Great Inflation of the 1970s. Sargent, in his influential work on the inflationary consequences of policy makers’ belief in an exploitable output-inflation tradeoff, makes no reference to the Bretton Woods System. Nelson, in his work on the implications of policy makers’ nonmonetary view of the inflation process, does not mention Bretton Woods. Romer and Romer, in providing a detailed exegesis of Federal Reserve policy in the 1960s and 1970s, do not refer to Bretton Woods. Clarida, Gali and Gertler, in searching for shocks that might have created actual or expected inflation, do not invoke the collapse of Bretton Woods.⁵

Yet there are grounds for thinking that the Bretton Woods Agreement played a role in restraining inflation. Countries other than the United States were obliged to peg their currencies to the dollar – that is, to establish par values – and to leave those par values unchanged except in exceptional circumstances.⁶ Given nonnegligible levels of international capital mobility, this left only limited room for running an independent national monetary policy and determining their own inflation rates.⁷ The only way of

¹ See Nelson (2005).

² See Romer and Romer (2002).

³ As emphasized by Sargent (1999). Some compounded this error by overestimating the output gap. This is the argument of Orphanides (2003, 2004). Others assumed the existence of an exploitable output-inflation relationship but perceived a steepening of the tradeoff, encouraging them to accept higher inflation in order to maintain unemployment at low levels. See Taylor (1997) and Primiceri (2005).

⁴ See Clarida, Gali and Gertler (2000).

⁵ [Michael: you could usefully go through these articles to confirm that my sweeping statements of “no mention” are literally correct.]

⁶ The technical term for these exceptional circumstances was “fundamental disequilibrium,” a term left undefined in the Articles of Agreement of the IMF but designed to connote that par value changes should be the exception and not the rule.

⁷ This was the key insight of the monetary approach to the balance of payments developed in the late 1960s and early 1970s, coincident with the events that are the subject of our paper.

running more inflationary policies was by devaluing the currency. But officials in countries like the UK and Italy that might have preferred more inflationary policies had to worry that these would erode international competitiveness and clash with their Bretton Woods obligations. They were aware that, if they devalued, there would be political repercussions.⁸ There is no question that they took the Bretton Woods constraints into account when considering policy options.

The situation of the United States was more complex (and hence we concentrate on it in this paper). The U.S. pegged the dollar not to foreign currencies but to gold. It issued the reserve currency that other countries used to augment their international reserves as their economies grew. If one takes the demand for reserves by other countries as perfectly elastic, then the U.S. was not constrained from running an independent monetary policy by its Bretton Woods obligations. In practice, however, the demand for dollar reserves by foreign central banks and governments was not perfectly elastic. The more money the U.S. created and the more ended up in foreign hands, the greater was the danger that other countries would present some of these for conversion into gold and the greater therefore was the risk U.S. gold stocks would be exhausted, forcing the \$35 gold price to be abandoned.

U.S. officials were aware of their obligations under Bretton Woods; they referred to them in public and private. They attached at least some value to maintenance of the system. They understood that policies creating inflation, undermining international competitiveness, and resulting in the further accumulation of U.S. dollar liabilities abroad might prove incompatible with the external constraint and ultimately force dollar devaluation. They understood that dollar devaluation might bring the system of par values and pegged exchange rates crashing down.⁹ Using a combination of qualitative and quantitative evidence, we will show that U.S. monetary policy makers took the external constraint quite seriously in the first half of the 1960s. Secondary accounts (Meltzer 2006) and our reading of the minutes of the Federal Open Market Committee both suggest that the dollar peg to gold was viewed as an important objective of monetary policy through 1964. On a number of occasions policy rates were raised for international reasons, and discussions at many FOMC meetings indicated that Chairman Martin and many governors attached priority to the external constraint. President Kennedy supported the priority that the Fed attached to the gold parity and low inflation, as had Eisenhower and his advisors before him.

But the situation changed once Johnson succeeded Kennedy and especially starting in 1965. Johnson and his advisers emphasized the employment objective of

⁸ Cooper (1971) summarized the contemporary evidence that devaluation tended to have adverse consequences for governments and, in particular, for the political careers of finance ministers. We return to this below.

⁹ Essentially, the argument is that the world rate of inflation was at least loosely tied down by the rate of growth of monetary gold stocks under Bretton Woods. The U.S. could not run more inflationary policies, or it would lose gold faster, precipitate a crisis of confidence, and be forced to devalue. Other central banks and governments, for their part, found themselves compelled to run the same inflation rate as the United States (with adjustment for, inter alia, Balassa-Samuelsong effects). In essence, the Bretton Woods System restrained inflationary tendencies and anchored expectations (more on this below) in the same manner as a gold standard, acknowledging of course that the link between gold stocks on the one hand and exchange rates, money supplies and inflation rates was looser under Bretton Woods than under a gold standard – for a variety of reasons we discuss below.

monetary policy and pressured the Fed to pursue it. The independence of the Fed was significantly weakened in the second half of the 1960s, undermining its commitment to defend the gold parity and low inflation. International considerations played little role in FOMC discussions and voting patterns, in contrast to before 1965 with the exception of major crises that threatened the dollar.. Although there was continued concern over the U.S. external position, responsibility for dealing with it was shifted from the Fed to the Treasury, which used up a variety of expedients to bottle up balance-of-payments pressures.

Quantitative evidence similarly supports this interpretation. Studies of sterilization and offset coefficients suggest a nonnegligible effect of domestic monetary impulses on reserve flows (and vice versa), challenging the presumption of monetary independence.¹⁰ The literature similarly demonstrates that inflation showed greater persistence after the collapse of Bretton Woods, a fact which plausibly shaped inflation forecasts and expectations (Baxter and Stockman 1989 and Alogoskoufis and Smith 1991). Recent work (e.g. Cecchetti, Hooper, Kasman, Schoenholtz and Watson 2007) suggests a break in the inflation process in the United States of precisely the sort our interpretation suggests, in 1965 or shortly thereafter.

In arguing that lifting the exchange rate anchor altered expectations and in turn forced policy makers to respond in ways that validated inflationary expectations, we are applying the expectations-trap model popularized by Clarida, Gali and Gertler (2000) and Christiano and Gust (2000). However, neither of these treatments mentions the exchange rate or links the exchange rate regime to the expectations trap. Armenter and Bodenstein (2005) suggest that an expectations trap is less likely under a pegged than a flexible exchange rate, but they do not refer to Bretton Woods.

Section 2 starts by laying out the background to this controversy. Section 3 then describes our conceptual framework. It provides a more complete description of the expectations-trap model. In contrast to previous treatments, we highlight the role of the exchange rate and, in particular, the constraints of Bretton Woods.

Section 4 next sets out some basic facts about inflation in the Bretton Woods period and in the 1970s. This shows that there was a change in the inflation process around the time of this collapse: not only did inflation accelerate but it grew more persistent, and these changes were more pronounced in the countries that were most plausibly constrained under the earlier regime.¹¹ We suggest that these changes in the inflation process were direct results of policy by estimating Taylor rules for the central banks in question, analyzing deviations from that benchmark, and searching for changes in the weights attached to the output gap and to deviations of inflation from target.

Section 5 then presents evidence, including citations from central bank minutes and financial publications as well as historical accounts suggesting that officials took the Bretton Woods constraints seriously when formulating policy and that the public was aware of this official preoccupation, plausibly influencing expectations. In Section 6 we

¹⁰ While much of this literature is concerned to test whether the offset was complete (domestic and foreign assets were highly substitutable and capital mobility was perfect), complete offset is not necessary for our argument; all we need is some evidence of offset.

¹¹ [We can look at measures of inflation persistence constructed by your RA. We can also report Cecchetti-Stock-Watson-style time series analysis on a longer sample seeking to identify the timing of the break in inflation process.]

also review the statistical studies of offset and sterilization coefficients, as well as studies of interest-rate linkages, which similarly suggest that the exchange rate constraint had a significant influence on the conduct of monetary policy.

Section 7 then develops our argument that the collapse of Bretton Woods cannot be understood simply as a consequence of the failure of monetary policy makers to respect its constraints and to indulge in significantly more inflationary policies already in the 1960s. Specifically, we discuss an alternative explanation for the collapse of the system, namely that Bretton Woods was internally flawed and intrinsically unstable, as argued by Robert Triffin (1960).

Section 8 concludes by summarizing the implications of this perspective for our understanding of the Great Inflation.

2. Background to the Controversy

There are reasonable grounds for questioning the importance of the Bretton Woods in restraining inflationary tendencies in the 1960s and of its collapse in loosing them in the 1970s. One argument, already alluded to above, is that policy was never significantly constrained by the Bretton Woods obligations. Both surplus and deficit countries found at least limited protection from balance-of-payments pressures in capital controls. Controls placed a wedge between domestic and foreign interest rates. They facilitated the conduct of an independent monetary policy by helping to reconcile it with maintenance of the exchange rate peg. In addition, countries other than the United States hesitated to exercise their privilege of converting their dollars into U.S. deficits into gold because they valued the system and recognized that the dollar was its linchpin. They formed the Gold Pool to address their collective action problem, bulletproofing the dollar against speculation.¹² Insofar as Bretton Woods did little to constrain policy, it cannot explain the absence of inflation while it operated or the acceleration of inflation when it collapsed.

And even if the constraints of Bretton Woods bound, the collapse of the system, it could be argued, was a consequence rather than a cause of the Great Inflation. International obligations constrained the conduct of monetary policy but happily so in the 1960s. Policy makers were prepared to subordinate domestic policy to the imperatives of pegging the exchange rate. But preferences, perceptions and shocks changed starting in the second half of 1960s. In the U.S. there was the Great Society, the Vietnam War, and the first OPEC oil-price increase, three shocks to the conduct of policy. These shocks shifted the balance of costs and benefits of forsaking monetary autonomy in order to preserve exchange-rate stability. They undermined the willingness of officials to subordinate policy to their Bretton Woods obligations. The result was inflationary monetary policies, first in countries like Britain, forcing them to devalue, and ultimately in the United States, precipitating the collapse of the par value system.

In this view, Bretton Woods played no role in restraining inflation in the 1960s. Officials would have followed policies of low inflation even in its absence. Similarly, the collapse of Bretton Woods played no role in the acceleration of inflation in the 1970s. Given the shocks hitting the economy and changes in their own preferences, officials would have preferred higher inflation whether Bretton Woods was present or not. By this interpretation, the exchange rate system was just another casualty of the Great Inflation.

¹² One of us has analyzed the gold pool in Eichengreen (2006).

By contrast, we argue in this paper that the Bretton Woods System mattered for restraining inflation in the 1960s and that its collapse contributed to the Great Inflation of the 1970s. Central to this argument is the premise that Bretton Woods significantly constrained policy. The case is clear for countries other than the United States, which were small, open economies, were reluctant to devalue, and which were not issuers of an international reserve and vehicle currency.¹³

But for the argument to hold water, it must also apply to America. We will argue that if the U.S. had increased its money supply faster, resulting in a higher rate of inflation, international competitiveness would have been eroded, and larger balance-of-payments deficits would have resulted. As foreign central banks sterilized the surpluses that were the mirror image of those same policies, they would have accumulated reserves – but not without limit. As the foreign monetary obligations of the United States rose relative to U.S. gold stocks, individual foreign central banks had an incentive to convert their dollar reserves into gold before there was a run on those gold stocks, the gold window was closed, and the dollar price of gold was allowed to rise. They had an incentive to chisel on their Gold Pool agreement in order not to be left holding the bag. To the extent that the U.S. policy makers valued maintenance of the \$35 gold price that was the linchpin of the Bretton Woods System, their temptation to run more inflationary policies was similarly restrained. And the public knew it.

From these building blocks flow the following implications. The anchor provided by Bretton Woods avoided a situation where a sharp increase in inflationary expectations posed policy makers with the dilemma of whether to validate those expectations or precipitate a costly recession. Awareness that policy makers were prepared to sacrifice other objectives and even to endure a significant recession in order to protect their investment in the Bretton Woods System prevented expectations from drifting off and obviated the need to subject the economy to recessionary policies in the first place. Eventually, however, a confluence of factors forced countries to abandon their Bretton Woods pegs. At this point expectations were no longer anchored by the belief that monetary policy makers would do what was necessary to defend the currency. And when expectations of inflation accelerated, monetary policy makers felt compelled to validate them.

We make no claim that our interpretation of the Great Inflation, emphasizing the role of Bretton Woods, has the same implications for all countries. The expectations-trap model suggests that removing the anchor provided by Bretton Woods will expose the economy to the danger of an expectations-induced shift from a low to a high inflation equilibrium only if policy makers are inclined to validate inflationary expectations – that is, only if they attach a high cost to increases in the output gap relative to increases in inflation. And, for such countries, Bretton Woods will effectively anchor expectations only if policy makers attach a significant cost to altering the exchange rate peg. In fact, there is good reason for thinking that these conditions varied across countries. In countries like Germany, where agents still had vivid memories of high inflation, central

¹³ The evidence suggests policy makers valued their Bretton Woods pegs and were prepared to make sacrifices to maintain them. This, in conjunction with the fact that capital controls were less than watertight, meant that both surplus and deficit countries had limited control over their national monetary policies and domestic inflation rates. In addition, market participants were aware of the value that policy makers attached to their pegs, an awareness that helped to anchor expectations.

banks were less inclined to validate an increase in inflationary expectations, even if this meant an increase in the output gap. Since they did not operate in the zone where expectations could be self-fulfilling and multiple equilibria could arise, removing the Bretton Woods anchor mattered relatively little. Similarly, one can argue that U.S. policy makers attached less value to the maintenance of their exchange rate peg and more to the maintenance of full employment, especially after 1965. As a relatively large, relatively closed economy, the U.S. suffered less from any disruption of trade associated with increased exchange rate volatility. And from 1965, President Johnson and his advisers increasingly emphasized the objective of full employment, downplaying risks to price stability. Bretton Woods thus functioned less effectively as an anchor for the United States than for other countries, rendering the U.S. more vulnerable to the expectations trap starting around 1965.

Nor do we argue that the Bretton Woods constraints in the 1960s and their removal in the 1970s are a complete explanation for the Great Inflation. Flawed models, political pressures, and macroeconomic shocks also played a contributory role. Moreover, the testable implications of these other factors are often similar to the testable implications of our Bretton Woods story. This makes it hard to determine the weight that should be attached to Bretton Woods in the anatomy of the Great Inflation. But the converse is equally true. Other interpretations of the Great Inflation that make no mention of Bretton Woods are open to the criticism that they are giving primacy to a particular factor where, in fact, much of the blame belongs elsewhere. They are similarly open to the objection that the same evidence is subject to alternative interpretations.

3. Conceptual Framework

This section describes in more detail the expectations-trap model that we use to link the Bretton Woods System to the Great Inflation. We have in mind the broad class of models emphasizing the possibility of self-fulfilling increases in inflationary expectations (Christiano and Gust 2000, Clarida, Gali and Gertler 2000, Armenter and Bodenstein 2005). Although these models differ in their particulars, it is the general idea of self-fulfilling inflationary expectations rather than the specific channel through which those expectations are realized that is important for our purposes.

Consider an economy initially characterized by a given rate of growth, a given inflation rate, and a given monetary policy. There then occurs an increase in the public's expectations of inflation.¹⁴ The private sector adjusts its behavior in response. Workers, expecting higher inflation, demand higher wage settlements. The result is increased costs of production and a lower level of output for firms not able to fully pass on those costs. Investors, seeking to avoid the erosion of real rates of return, sell bonds, causing nominal interest rates to rise. Similarly, we may think of private agents anticipating a fall in real interest rates cutting back on their saving. The result is a higher cost of loanable funds, making life more difficult for firms that must borrow to purchase the inputs needed to engage in production.

This creates a dilemma for the authorities. Validating the increase in inflationary expectations with an increase in the money supply will drive real wages back down, limiting the labor-cost shock and its recessionary effects. This more inflationary

¹⁴ At this stage it is not necessary for us to specify what causes this rise in inflation expectations – although, as we saw above, there is no shortage of candidates in the late 1960s and early 1970s.

monetary policy will drive real interest rates back down, limiting the financial-accelerator shock that further increases production costs and creates recessionary tendencies. Avoiding recession is a positive for the central bank, but the increase in inflation is a negative (assuming a conventional central bank objective function that is declining in both inflation and the shortfall of actual output relative to potential). How exactly the central bank responds will depend on the weights it attaches to inflation and the output gap and on the structure of the economy (in particular, on the response of output to increases in the price level and money supply). But if the weight attached to the output gap in the central bank's objective function is large and output is relatively responsive to increases in the price level, then a central bank finding itself in this position will opt to validate the public's expectations of increased inflation.

This, then, is an instance of multiple equilibria. If there is no increase in the public's expectations of inflation, the economy continues along the initial path of stable economic growth, low inflation and low money growth. But if inflation expectations rise, the central bank switches to a more inflationary policy. This is not the result of any misunderstanding of the inflation process. Officials are not misinformed about the slope of the Phillips Curve. They do not have an inaccurate estimate of the magnitude of the output gap. There is no change in the central bank's objective function or in the intensity of political pressure and influence. The central bank opts for more inflationary policies when the public's inflationary expectations rise because it is optimal to do so.

Consider now an extension of the central bank's objective function where it also incurs a cost from having to alter the exchange rate and an extension of the model of the economy in which a rise in inflation makes it more difficult to avoid devaluing.¹⁵ Where it was optimal previously for the central bank to validate an increase in inflationary expectations, the same shock may now cause it to resist inflating and accept recession instead. Knowing that the central bank will not be inclined to inflate, the public will be less inclined to raise its own expectations of inflation. Realizing that inflation will not be forthcoming, workers will not raise their wage demands, and investors will not drive up nominal interest rates. The exchange rate peg has the effect of anchoring expectations and, in the context of an expectations-trap model, anchoring inflation.

The two elements required for the exchange rate to make a difference are that officials incur a cost from devaluation and that inflation makes it more difficult to avoid devaluation. The classic evidence on costs is that of Cooper (1971), that finance ministers lost their jobs with high probability as a result of devaluation. Cooper's evidence is for developing countries, necessarily so since actual devaluations among the G10 were few and far between.¹⁶ But the limited experience of devaluation among the industrial countries during the Bretton Woods years – that of Britain in 1967, for example – is consistent with his view.¹⁷

Aside from the political costs, there was also the fact or at least the belief that changing a fixed Bretton Woods peg had economic costs. The peg created a perception of stability and predictability, fostering investor confidence. In the absence of deep and liquid hedging markets, it supported the growth of foreign trade. In the contemporary

¹⁵ A model incorporating these assumptions is analyzed by Cuikerman, Spiegel and Leiderman (2004).

¹⁶ Were this not the case, it would be hard for us to argue that Bretton Woods made a difference for the advanced-industrial countries with which we are concerned in this paper.

¹⁷ Thus, Callahan was replaced by Jenkins as Chancellor of the Exchequer in 1968.

perception, the high growth of the 1950s and 1960s depended on the maintenance of high investment and rapid export growth. And a stable exchange rate in turn was seen as an important precondition for their maintenance.¹⁸

The other assumption, that inflation in conjunction with a pegged nominal exchange rate creates problems of competitiveness that, if uncorrected, require devaluation, is supported by a large body of evidence from the Bretton Woods period and its aftermath. To be sure, early contributions to this literature like Orcutt (1950), written before most of the evidence was in, offered modest estimates of the impact of real exchange rate changes on the balance of payments. Subsequent studies benefiting from more data and using more sophisticated methods suggested larger effects of overvaluation on the balance of payments and thereby on the sustainability of pegged exchange rates.¹⁹ For economists who believe that relative prices matter, this should not be a controversial assumption.

We should acknowledge that this is not the only context in which scholars have posited the existence of multiple equilibria involving nominal aggregates. Just as there are multiple-equilibrium models of inflation, there are multiple-equilibrium models of exchange-rate determination. The conditions under which an increase in inflationary expectations can be self-validating and under which an increase in devaluation expectations can be self-validating are analytically quite similar. In so-called “second-generation” models of exchange-rate determination (Obstfeld 1994), officials derive utility from maintenance of the prevailing exchange rate peg but disutility from unemployment and slow growth. In the absence of a shock to exchange rate expectations, a given rate of growth, a given level of interest rates and a given exchange rate will prevail indefinitely. But imagine that, for whatever reason, there is an increase in the public’s expectations of exchange rate depreciation. Investors sell the currency in anticipation of devaluation. The authorities must then raise interest rates to defend the peg.²⁰ But higher interest rates also raise unemployment and lower growth. If the authorities attach a high value to maintenance of the exchange rate peg, the benefits of the interest rate defense will dominate its costs. The increase in expectations of devaluation/depreciation will not lead them to abandon the peg and to validate those expectations. In contrast, if the output gap and unemployment have a sufficiently large weight in their objective function, officials may choose not to raise interest rates, instead allowing the currency to depreciate. Under this configuration of parameter values, there again may exist multiple equilibria.

This is, in fact, just the mirror image of the story we told above. There, the possibility was that the authorities would not validate the increase in expectations of inflation/depreciation because they attached a high value to price and currency stability relative to other objectives and because pursuing those other objectives, in the face of that change in expectations, would have unfavorable implications for the variables to which they attached high value. Here, the possibility is that the authorities will validate the

¹⁸ Readers wanting more evidence of these linkages, as perceived by contemporaries, can find it in Eichengreen (2007).

¹⁹ See for example Houthakker and McGee (1969) and, for a more recent treatment using a larger sample of Bretton Woods data, Edwards and Santaella (1993).

²⁰ Think of this as making it more attractive for investors to hold domestic-currency-denominated assets that they would otherwise be inclined to sell.

increase in expectations of inflation/depreciation because they attach a high value to other objectives (full employment and stable growth) relative to price and currency stability and they can pursue them at an acceptable cost. There is no incompatibility between multiple equilibrium (or expectations-trap) models of inflation on the one hand and multiple equilibrium (or “second generation”) models of involuntary devaluation on the other. Which prevails depends on parameter values.

For some authors it is critical to identify the mechanism linking inflationary expectations to recessionary tendencies. For those inspired by the literature on cost-push inflation, the increase in wages in the 1960s and oil prices in the 1970s caused the Fed to succumb to the temptation to inflate (Clarida, Gali and Gertler 2000). For others, the key factor was increase in interest rates and the reduction in the availability of loanable funds (Christiano and Gust 2000). They argue that increases in interest rates not only aggravated recessionary tendencies but undermined political support for policies of price stability for distributional reasons, insofar as higher interest rates redistributed income from labor to capital. In their view, the increase in interest rates forced the abandonment of wage and price controls, which in turn unleashed the increase in wages and prices.

For our purposes, this is a subsidiary debate. Both mechanisms give us what we need, namely the possibility of multiple inflation equilibria and a role for the exchange rate in selecting between them.

4. The Great Inflation in Statistical Perspective

In this section we provide some stylized facts about inflation under Bretton Woods and in its aftermath. As in Bordo (1993) and Eichengreen (1993), we present summary statistics for the G10 countries for the average rate of inflation, its standard deviation, and first- and higher-order autocorrelation coefficients.²¹ We consider a number of different measures of wage and price inflation. We contrast 1959-1970 and 1973-79, the first period being when the Bretton Woods System came into full operation (most of the countries we consider having restored current account convertibility at the beginning of 1959) and the second being the period of high inflation following the collapse of Bretton Woods.

Figure 1 shows for the United States three measures of inflation and inflation persistence; the CPI, GDP deflator and money wages. We show the raw data in panel 1.1 and the serial correlation of inflation based on an AR(1) regression using a ten year rolling window in panel 1.2. To correct for bias associated with measures of persistence using OLS (Andrews 1993) we calculated the median unbiased estimator for each series in panel 1.3.

Overall, the data are consistent with the notion that inflation was more stable and inflation expectations were better anchored under Bretton Woods. Inflation rates were lower, less volatile and less persistent than prior to the collapse of the pegged-rate system. As can be seen from the rolling regression results and the median unbiased estimates, inflation persistence declined markedly in the early 1960s and then increased

²¹ The focus on the G10 may be controversial. But most discussions of the Great Inflation focus on the advanced-industrial countries. And the G10 is an appropriate grouping for present purposes in that it was made up of countries whose policies were important to the operation of the Bretton Woods System (it was the grouping that established and operated the Gold Pool designed to help maintain the Bretton Woods System).

dramatically after 1965. As we discuss in section 5 below, this corresponds with the decrease in importance attached to low inflation and the balance of payments between the Kennedy and Johnson administrations.

Table 1 shows summary statistics for the CPI using quarterly data for the G10 countries plus Switzerland over the period 1959 to 1979. The pattern of increased inflation and inflation persistence after the breakdown of Bretton Woods is replicated in every country that had been constrained by the maintenance of pegged rates in the earlier period. However Germany and Switzerland stand out as countries where inflation was relatively low before 1971 and increased only slightly in the 1970s. This suggests that it was not simply other events affecting economies differently in the 1960s and 1970s but the exchange rate constraint that the data are picking up. Also seen in the Table is the fact that U. S. inflation was lower than most of its trading partners in both Bretton Woods and post Bretton Woods periods.

We also provide a statistical characterization of trend inflation over a longer period, in manner of Cecchetti, Hooper, Kasman, Schoenholtz and Watson (2007), hereinafter CHKSW. It is plausible that private-sector agents were capable of learning about these changes in trend behavior; this exercise thus allows us to make some inferences about expectations formation. Here the results support the notion that there was an increase in trend inflation around the time of the collapse of Bretton Woods.²²
[Add here]

It is also plausible that these changes had to do with the stance of policy rather than simply exogenous shocks hitting our economies. To establish this we consider Taylor rules for the G10 countries for the period spanning the Bretton Woods convertible regime and the Great Inflation (1959-1979), assuming constant coefficients. If central bank policy was responsible for the acceleration of inflation, then this will show up as deviation of actual policy rates from those predictable by the Taylor rule. This exercise again follows Cecchetti, Hooper, Kasman, Schoenholtz and Watson, who also construct deviations of interest rates from the Taylor rule. But where CHKSW do this only for four countries from 1970 (1965 for the United States), we look at the period starting in 1959 and the entire G10. [what we find]

5. Qualitative Evidence

If the commitment to the maintenance of par values under Bretton Woods was taken seriously by policy makers – that is, if they perceived a cost from changing the exchange rate and were prepared, under certain circumstances at least, to adjust policy to ensure its maintenance – then this should be evident in the discussions, both public and private, of the policy makers in question. In this section we provide qualitative evidence for the United States that U.S. monetary policy makers took the external constraint quite seriously in the first half of the 1960s. Based on secondary accounts such as Meltzer (2006) and Hetzel (2008) and our own reading of the minutes of the Federal Open Market Committee, we argue that maintaining the dollar peg to gold was viewed as an important goal of monetary policy up through 1965 with increasingly less weight for the following six years before the U.S. suspended gold convertibility in August 1971.

²² Although for a number of countries the increase in inflationary expectations appears to have preceded the collapse of the exchange rate system, which complicates our story.

The Eisenhower administration in many respects was very classical, believing in fiscal rectitude (balanced budgets, price stability and maintenance of the Bretton Woods peg to gold at \$35.00 per ounce. Chairman William McChesney Martin of the Federal Reserve also was a firm believer in maintaining price stability and adherence to the gold peg. Until the beginning of 1959, when the Western European countries attained current account convertibility, there was little pressure on the U.S.'s huge gold reserves. The recession of 1959-60 largely engineered by tight monetary policy in reaction to an incipient build up in inflation, led to both price deflation and a gold inflow in the classical manner (Meltzer 2006 chapter 2).

John F. Kennedy, elected in the fall of 1960 with a mandate to get “ America moving again” and a commitment to restore and maintain full employment, also like Eisenhower firmly believed in maintaining the gold parity and price stability. Pressure on U.S. gold reserves and a growing balance of payments deficit (reflecting U. S. private and public foreign investment in excess of the current account surplus), became important issues in the early 60s but less so in comparison to what was to follow after 1965. Part of the more benign environment in the Kennedy years was the fact that U. S. inflation was less than in the European countries so that the real exchange rate depreciated producing an improvement in the current account(See Table 1 and Meltzer 2006 chapter 3).

In those years , the U. S. Treasury under Secretary Dillon and Under Secretary Robert Roosa acted as the senior partner in international monetary affairs. The Treasury undertook vigorous efforts to stem the dollar outflow beginning with Exchange Market Intervention and the development of a swap network in March 1961(the Fed joined in a year later), creation of the IMF's General Agreements to Borrow which created a line of credit large enough to potentially finance U.S. current account shortfalls, establishment of the London Gold Pool (a concerted effort by the key Western European countries and the US to maintain the dollar peg), and the issuance of Roosa bonds (foreign currency denominated U.S. Treasury securities). However none of these efforts and the many to follow dealt with the basic problem of dollar overvaluation and the Triffin Dilemma (see section 7 below).

Although the Federal Reserve 's main policy focus in the early 60s was on the domestic economy and the maintenance of full employment in adherence to the Employment Act of 1946, it paid considerable attention to the balance of payments and the level of U.S. gold reserves. Many of the FOMC meetings from 1961 through 1964 were characterized by an ongoing and vigorous debate between those who advocated tight policy to defend the dollar(usually including Chairman Martin) and advocates of looser conditions to stimulate the real economy and reduce unemployment. On many occasions a stalemate between the two groups led to no change in policy. On several occasions , the FOMC voted to raise rates to protect the balance of payments. These included December 18, 1961, May 1963 and July 1963. The latter two increases were part of Operation Twist in cooperation with the Treasury, under which the Fed would raise short-term interest rates to stem capital inflows and the Treasury would lower long-term rates to stimulate domestic investment.

The Johnson administration in 1964 continued the policies of its predecessors , but increasingly less priority was placed on international monetary affairs. The growing balance of payments deficit and monetary gold loss were to be dealt with by a panoply of

capital controls beginning with the Interest Equalization Tax in 1965, also the elimination of the gold reserve against member bank reserves in 1965 and against notes in 1968.

During the Kennedy administration Keynesian ideas, especially belief in a permanent Phillips curve tradeoff between inflation and unemployment came to dominate the Council of Economic Advisors. This development continued under Johnson. Keynesian views in those years also began to predominate in the Federal Reserve system. This weakened the position of the international hawks on the FOMC increasingly as the decade wore on. As Meltzer and others describe, belief in a permanent Phillips Curve tradeoff between unemployment and inflation, mounting fiscal deficits to finance Johnson's Great Society and the Vietnam War, "even keel" operations by the Fed to facilitate Treasury debt issues and cooperation between the Fed and the Treasury (which greatly undermined the independence of the Fed), all contributed to the build up and persistence of inflation beginning in 1965. Chairman Martin's attempts to stem the inflationary pressure and improve the balance of payments with a 50 basis point hike in the discount rate on December 3 1965 led to a withering verbal attack on him by LBJ at his Texas ranch. Meltzer and others argue that this event significantly weakened Martin's resolve in the following years. Indeed the Fed henceforth only responded to crises which threatened the dollar.

In this less benign environment 5 Federal Reserve banks raised their discount rates in aid of sterling in November 1964. In the final sterling crisis in 1967 the discount rate was raised to defend the dollar by 50 basis points in August and then again after the pound was devalued in November. When the Gold Pool collapsed in March 1968 leading to direct pressure on the dollar, the Fed raised the discount rate by 50 basis points. The New York Fed wanted to increase it by 150 basis points to defend the dollar "at all costs", but the Board was opposed to "all costs", worrying about domestic employment, and the hike was reduced. Then in April the discount rate was again raised by 50 basis points to defend the dollar. In December the discount rate was raised by 25 basis points by 9 Reserve banks in reaction to fears of a sterling float.

The Nixon administration, taking office in January 1969 inherited the run up in inflation of the previous administration but, because of its aversion to unemployment, rather than urging a tightening monetary policy, attempted to deal with the problem with wage price guidelines and later wage price controls. By this time many were discussing abandoning the dollar peg and turning to floating exchange rates as a solution to the chronic balance of payments deficit and loss of gold reserves. Arthur Burns became Chairman of the Federal Reserve in February 1970. He viewed the international sphere as primarily the administration's problem. After the devaluation of the pound and the collapse of the Gold Pool, pressure continued to build up on U.S. gold reserves reaching a climax in the spring of 1971. In May 1971 the New York Fed requested a 50 basis point rise in the discount rate to defend the dollar but the Board concerned with rising unemployment blocked it. In June, the Board, to defend the dollar, raised the discount rate by 25 basis points. This hike was followed by a 50 basis point rise in the Federal funds rate in July. Finally, on August 15, facing the prospect of massive Western European conversion of outstanding dollar balances into gold, President Nixon closed the gold window effectively ending the Bretton Woods system.

6. Quantitative Evidence

Quantitative studies of money supplies and balance-of-payments flows under Bretton Woods similarly suggest that the exchange rate mattered for the conduct of policy. First, studies of offset and sterilization coefficients suggest that the scope for independent national monetary policy was limited by this regime of pegged exchange rates and significant international capital mobility. By implication, policy initiatives increasing the domestic monetary base partly spilled out in the form of balance-of-payments deficits rather than simply increasing the money supply and inflation. Insofar as international capital mobility was imperfect, there was still some scope for influencing the domestic money supply and, thereby, inflation. But even if capital outflows offset only part of increases in the money supply, they might still reduce international reserves and increase foreign claims on the economy, raising questions about the stability of the exchange rate. Similarly, insofar as expansionary monetary initiatives had some effect on inflation, they also eroded domestic competitiveness, again raising questions about the peg.

There is disagreement in the empirical literature over whether monetary independence was eliminated or only limited by this combination of pegged exchange rates and significant capital mobility. One of the first studies in this genre, by Kouri (1975), estimated the offset to monetary policy initiatives due to international capital flows for Germany, a country which notoriously desired a lower inflation rate for much of the Bretton Woods periods but difficulty in attaining this. Kouri finds that Germany's anti-inflationary monetary policy initiatives were significantly offset by capital inflows. The estimated offset coefficient was less than one, indicating some residual scope for an independent monetary policy, plausibly for circumstances where there were limited capital controls and less than perfect substitutability between domestic and foreign assets. Still, maintaining interest rates at higher levels than abroad resulted in very large capital inflows and uncomfortably large increases in international reserves. For other countries seeking to keep interest rates at lower levels than abroad, the implication was that there would be very large capital outflows and reserve losses, of a magnitude incompatible with the peg.

Subsequent studies by Herring and Marston (1977) and Obstfeld (1980) argued that these OLS estimates of the offset coefficient were upward biased, on the grounds that capital flows and central bank policy were simultaneously determined. They sought to estimate simultaneous-equations models of capital flows and sterilization. Typically, estimates of the offset coefficient were smaller in studies using this structural approach. But the implication remained the same: according to these authors, somewhat more than half (50 to 65 per cent) of any increase in the monetary base was offset by capital flows. Again, the implication was uncomfortably large reserve fluctuations for countries attempting to pursue an independent monetary policy.

Subsequently, Pasula (1994) estimated a reserve-flow equation using two-stage least squares on data for West Germany, the Netherlands, Canada and Italy. He obtained larger offset coefficients and concluded that central banks in these countries had essentially no monetary independence under Bretton Woods. He pointed to a number of specification problems in previous structural models that might have led them to obtain artificially small estimates of the offset coefficient. Other critics of the structural approach sought to finesse these problems of specification, like Nobay and Michael (1993), by adopting a cointegration framework and obtain "superconsistent" estimates of

the relevant parameters. Their results similarly tended to move the literature back in the direction of large impacts of foreign conditions on domestic interest rates and even more limited monetary autonomy.

Another reduced-form approach asks how much leeway central banks have for adjusting domestic interest rates, distinguishing countries with pegged and floating rates and countries with and without capital controls. The authoritative work here is by Shambaugh (2004), who relates changes in domestic interest rates to changes in interest rates in the reference country, along with a measure of the presence of capital account restrictions and other variables, for economies pegging their exchange rates. But Shambaugh's analysis extends back only to 1973. For purposes of the present analysis, we therefore extend his exercise back to 1959. [Details here. What we find.]

Given that central banks had at least some leeway for determining the level of interest rates, given the prevalence of capital controls, we return to the Taylor rule, this time estimating rather than imposing coefficients on deviations of inflation from target and the output gap. Our hypothesis is that central banks attached higher weights to increases in inflation relative to target in the Bretton Woods period, since limiting deviations of inflation was necessary to avoid the erosion of competitiveness and a threat to the exchange rate peg, relative to the weight attached to the output gap. [what we find].

7. The Collapse of Bretton Woods

In our view, then, the Bretton Woods System provided an anchor for expectations that prevented the economy from shifting to a high-inflation equilibrium, while its collapse exposed the economy to a high-inflation expectations trap. But what explains the collapse of Bretton Woods? Two potential answers – that policy makers came under growing pressure to pursue objectives like full employment and rapid growth that were at odds with maintenance of the prevailing exchange rate pegs, and that there was a shift in their own preferences toward pursuit of those other objectives – have uncomfortable implications for our story. These answers suggest that policy makers may not have been effectively restrained from pursuing inflationary policies by Bretton Woods, since they were prepared to see the pegged-rate system collapse when it proved incompatible with other objectives. A large literature, highlights from which are enumerated in the footnotes to the opening paragraph of this paper, argues the importance of such political pressures and preference changes.

Our interpretation will be more compelling, therefore, if it is possible to argue that Bretton Woods collapsed for reasons unrelated to the preferred domestic monetary policy stances of the participating countries. In this case our key factor, namely the presence or absence of Bretton Woods, is not simply another endogenous variable. In particular it is not endogenous with respect to preferences and political pressures that shaped the policies of the key central banks.²³

In fact, there is an argument that the collapse of the Bretton Woods System was exogenous to these other factors. This argument was first mooted by Robert Triffin already in the 1940s when the design of the new postwar system was clear but long before it came into full operation.²⁴ Triffin observed that there was an intrinsic flaw in the structure of the system that would lead eventually to its collapse quite independently

²³ At least it is not *solely* driven by the determinants of those policies. We return to this qualification below.

²⁴ See for example Triffin (1947).

of the policies and preferences of national central banks. Under Bretton Woods there were only two significant sources of international reserves, gold and the dollar. Other currencies lacked the convertibility and the deep and liquid markets required to make them viable for reserve holding in the 1950s and 1960s. And new flow supplies of monetary gold were relatively inelastic.²⁵ Thus, as the world economy grew and countries demanded additional reserves commensurate with their now larger economies and higher levels of international trade, they necessarily accumulated additional dollars. The design flaw emphasized by Triffin was that there was an unavoidable tendency, given the structure of the system, for U.S. foreign monetary liabilities to rise relative to U.S. gold stocks, undermining confidence in the U.S. commitment to convert the dollars held by foreign central banks into gold at \$35 an ounce. Eventually, there would be a run on U.S. gold reserves, and the system would come crashing down. Triffin himself proposed the creation of a synthetic reserve asset to supplement dollars, what eventually came into existence as Special Drawing Rights, but progress in this direction was too little and too late to head off the collapse of Bretton Woods.

Triffin's point was that the tendency for the reserve-currency country, the United States, to run balance of payments deficits and for other countries to accumulate uncomfortably large dollar reserves was an unavoidable consequence of growth of the world economy, the associated growth in the demand for reserves, and the inelasticity of alternative sources of reserves. These factors, which eventually undermined the stability of the system, were independent of the monetary policy decisions (and, for that matter, the other macroeconomic policy decisions) of U.S. officials.²⁶

Imagine that U.S. policy makers had been even more concerned than they actually were about the country's balance-of-payments deficit. In this counterfactual they would have raised interest rates to damp down domestic demand, including import demand, and narrowed the U.S. deficit. But other countries, with fewer reserves, would have seen their foreign trade grow more slowly. Insofar as they sought to accumulate reserve more quickly, they too would have raised interest rates in order to strengthen their own balances of payments. The result would have been to push the U.S. balance of payments back into deficit. The only difference would have been somewhat slower growth of the world economy and hence a somewhat smaller increase in the demand for reserves. The U.S. deficit being smaller, the collapse of the Bretton Woods System would have come later. But the same flaw in the design of the system would have still led, eventually, to the same kind of collapse.

Triffin's thesis dissolves only if one assumes that U.S. and foreign policy makers were prepared to defend the stability of their parities and the Bretton Woods System itself at any cost. Had they been willing to accept deflation and slow growth sufficient to avoid any growth in the demand for nominal international reserves, there would have been no need for the ratio of U.S. official foreign dollar liabilities to U.S. gold stocks to rise. There would have been no threat from this source to the stability of Bretton Woods.²⁷ In

²⁵ Moreover, efforts to encourage gold mining were seen as problematic insofar as they would benefit two problematic regimes, those of the Soviet Union and South Africa. In fact, there was some increase in global stocks of monetary gold in the period under discussion here. But the key point is that new gold supplies were relatively inelastic. For simplicity, in the discussion that follows we abstract from new gold supplies.

²⁶ Subject to one qualification, described below.

²⁷ This is the one qualification to the Triffin thesis flagged in the preceding footnote.

reality, of course, there were limits on how much deflation and depression policy makers were prepared to accept after World War II. We can think of this as a lower bound on the inflation rate that U.S. policy makers were prepared to accept (say, zero) and a corresponding lower bound for policy makers in other countries (which would have been higher owing to the Balassa-Samuelson effect). Under such assumptions, the Bretton Woods System would have collapsed eventually even in the absence of any increase in political pressures or preferences for inflation in the countries concerned. This then would have allowed the expectations trap to come into play.

Just as, more plausibly than not, the Great Inflation had more than one cause, the collapse of the Bretton Woods System plausibly had more than one cause. Here we emphasize the imminent collapse of the Bretton Woods System, for structural reasons, as a factor in the Great Inflation. In reality, the Great Inflation could have also been fueled by the policy response to flawed models, political pressures, and macroeconomic shocks. There is no incompatibility between these interpretations, as we emphasized in our introduction. Analogously, the collapse of Bretton Woods could have been precipitated by a combination of factors – both by the intrinsic sources of instability emphasized by Triffin and a shift toward more inflationary policies reflecting flawed models, political pressures, macroeconomic shocks and other factors. Again, there is no incompatibility between these interpretations. The difficulty of assigning weights to these complementary interpretations is a problem for us, but it is equally a problem for those who would not emphasize the exchange rate system and its associated constraints.

8. Conclusion

[to be added]

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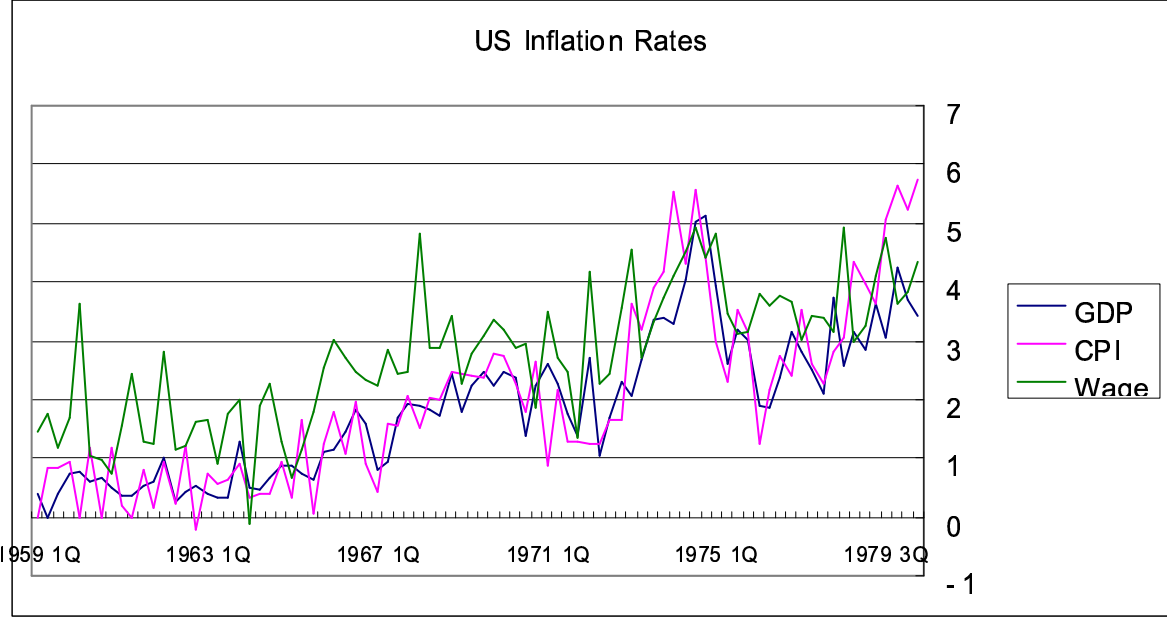
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Figure 1. CPI Inflation and Inflation Persistence : G10, Quarterly data 1959 I to 1979 III

1.1. US Inflation Rates : 1959 I to 1979 III



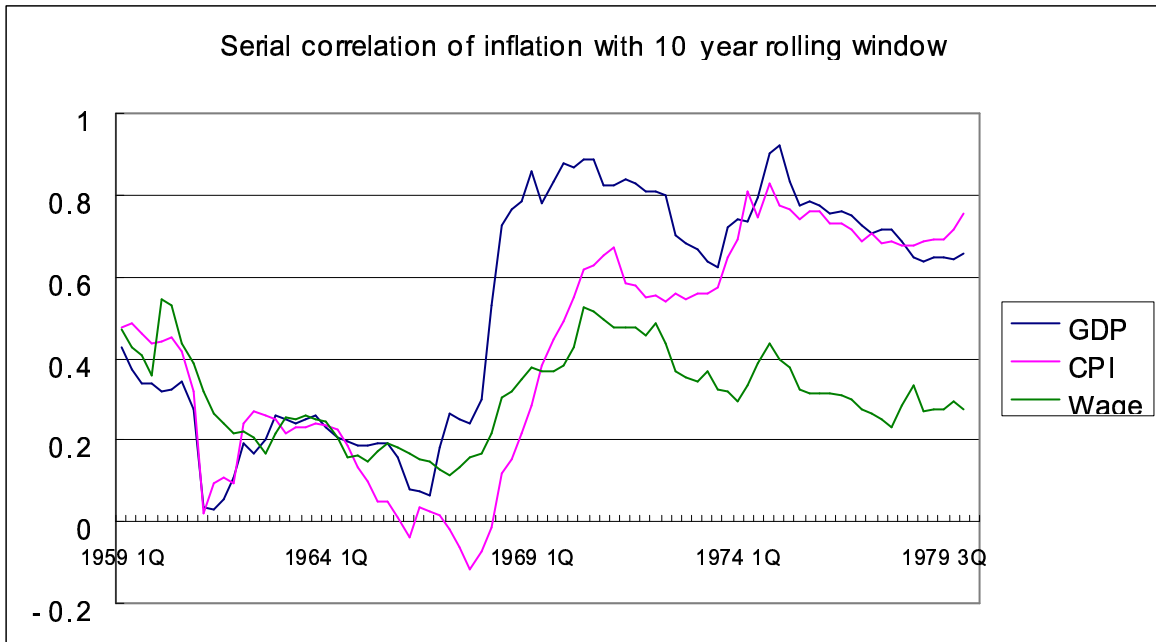
Data sources

GDP deflator : Bureau of Economic Analysis, Department of Commerce

CPI : Bureau of Labor Statistics, Department of Labor

Wage = Nonfarm compensation per hour : Bureau of Labor Statistics, Department of Labor.

1.2 US Serial Correlation of Inflation : 1959 I to 1979 III



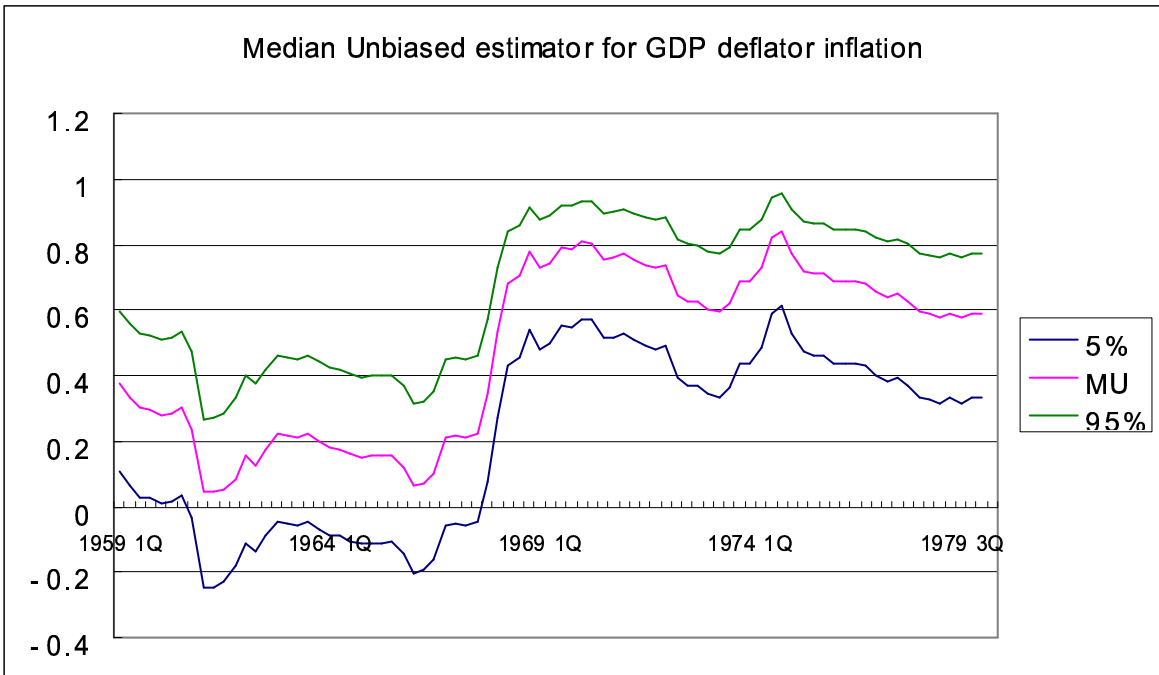
1.3 US Median Unbiased Estimator for each series

Model

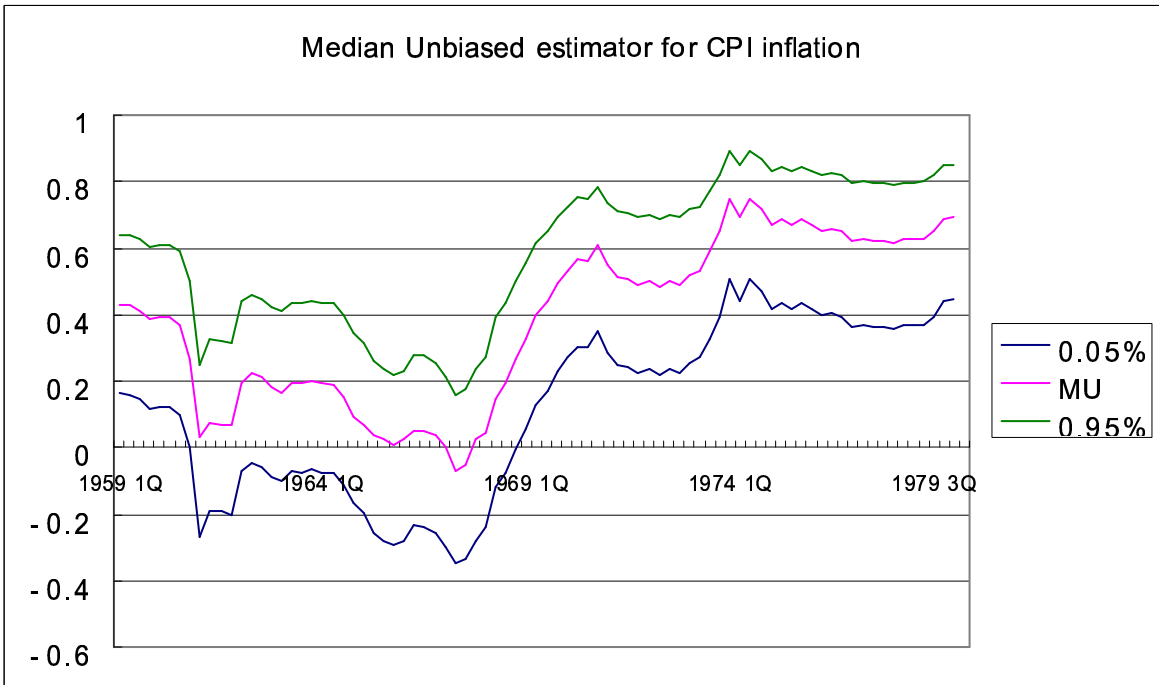
$$P_t = \bar{\mu} + \alpha P_{t-1} + U_t, \text{ for } t = 1, \dots, T \quad \text{where } \bar{\mu} = \mu(1 - \alpha) \text{ and } \alpha \in (-1, 1]$$

where P_t is the inflation rate of each series from Andrews(1993)

1.3.1 GDP deflator



1.3.2 CPI



1.3.3. Wage

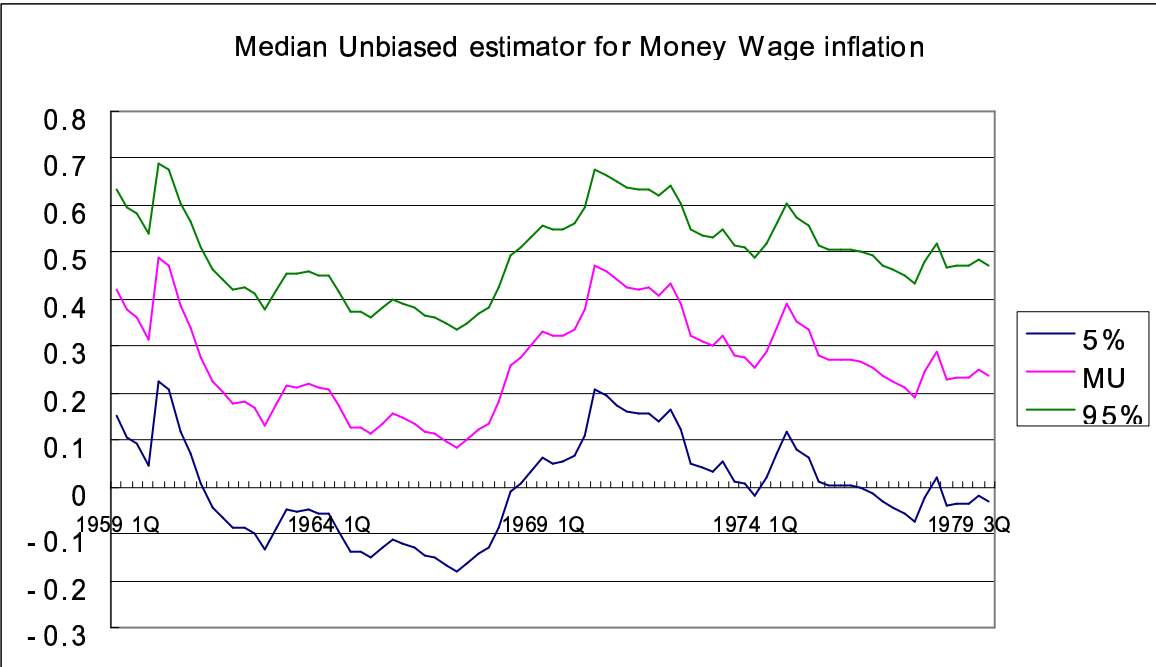


Table 1. CPI Inflation and Inflation Persistence : G10, Quarterly data 1959 I to 1979 III

| CPI | US | Canada | Japan | UK | France | Germany | Italy | Netherland | Sweden | Switzerland | Belgium |
|--------------------------|--------|--------|--------|---------|--------|---------|---------|------------|--------|-------------|---------|
| 1959 I ~ 1970 IV | | | | | | | | | | | |
| Mean | 1.1495 | 2.3974 | 5.1937 | 3.6441 | 4.1271 | 2.4350 | 3.4113 | 3.9684 | 3.8717 | 2.9641 | 2.6693 |
| Stan. Dev. | 0.8629 | 2.2242 | 3.5610 | 2.5399 | 3.0165 | 2.2905 | 2.7095 | 4.0278 | 3.0917 | 2.2281 | 2.1454 |
| Autocorrelation | 0.2300 | 0.2359 | 0.2148 | 0.2373 | 0.2701 | 0.0663 | 0.4404 | 0.0322 | 0.2107 | 0.3957 | 0.1918 |
| Mean Unbiased | 0.2147 | 0.2031 | 0.1857 | 0.2109 | 0.2324 | 0.1320 | 0.3544 | 0.0359 | 0.1766 | 0.3486 | 0.1607 |
| 1959 I ~ 1964 IV | | | | | | | | | | | |
| Mean | 0.5484 | 1.3199 | 4.8912 | 2.5666 | 4.0749 | 2.2888 | 3.9877 | 2.9838 | 3.1814 | 2.2779 | 1.9245 |
| Stan. Dev. | 0.4351 | 1.9984 | 3.8323 | 2.5178 | 3.5511 | 2.4145 | 3.2263 | 4.6222 | 2.8942 | 2.3356 | 2.3909 |
| Autocorrelation | 0.2721 | 0.3271 | 0.3610 | 0.4017 | 0.3509 | 0.1393 | 0.3713 | 0.0729 | 0.3117 | 0.3865 | 0.2309 |
| Mean Unbiased | 0.2298 | 0.2869 | 0.3196 | 0.3549 | 0.3065 | 0.2634 | 0.3257 | 0.0650 | 0.2693 | 0.3400 | 0.1950 |
| 1965 I ~ 1970 IV | | | | | | | | | | | |
| Mean | 1.7119 | 3.4748 | 5.4962 | 4.7216 | 4.1792 | 2.5812 | 2.8349 | 4.9530 | 4.5620 | 3.6503 | 3.4141 |
| Stan. Dev. | 0.7531 | 1.9218 | 3.3218 | 2.1026 | 2.4451 | 2.2014 | 1.9748 | 3.1246 | 3.1877 | 1.9254 | 1.5911 |
| Autocorrelation | 0.1880 | 0.1448 | 0.0686 | 0.0730 | 0.1893 | -0.0068 | 0.5095 | -0.0086 | 0.1097 | 0.4049 | 0.1528 |
| Mean Unbiased | 0.1995 | 0.1193 | 0.0517 | 0.0668 | 0.1583 | 0.0005 | 0.3832 | 0.0068 | 0.0839 | 0.3573 | 0.1265 |
| 1973 I ~ 1979 III | | | | | | | | | | | |
| Mean | 3.6791 | 8.8034 | 9.7052 | 14.1343 | 9.9823 | 4.7495 | 14.8903 | 6.9544 | 9.1661 | 4.3583 | 7.8028 |
| Stan. Dev. | 1.2032 | 2.1104 | 6.9905 | 6.6954 | 2.6915 | 2.5655 | 4.9319 | 2.6304 | 3.7780 | 4.3721 | 3.7474 |
| Autocorrelation | 0.7173 | 0.5427 | 0.5085 | 0.7605 | 0.6660 | 0.3832 | 0.8344 | 0.4144 | 0.0683 | 0.5168 | 0.7923 |
| Mean Unbiased | 0.6603 | 0.4874 | 0.4550 | 0.6927 | 0.6026 | 0.2207 | 0.7626 | 0.3663 | 0.0602 | 0.4627 | 0.7176 |

SOURCE

USA : Bureau of Labor Statistics, Department of Labor

Other countries : Global Financial Data

(All of data are seasonally adjusted with X-12 ARIMA unless original data is adjusted)