MIND THE GAP: HYSTERESIS, INFLATION DYNAMICS AND THE SRAFFIAN SUPERMULTIPLIER[*]

Franklin Serrano[**]

[preliminary draft for discussion purposes, October 2006]

I The "New Consensus" Accelerationist View

I.1. Three fundamental assumptions

The "new neoclassical synthesis" (or "new consensus approach", see Blinder (1997), Romer (2000), Taylor (2000))[1] to macroeconomics which supposedly guides modern monetary policies (and in particular "inflation targeting", see Taylor, 1999), tells us that inflation can be explained starting from a Phillips curve of the general form:

(1) $p = ap_{-1} + b(u-1) + c$

where p is current inflation, p_{-1} lagged inflation, u is the actual degree of capacity utilization, expressed as the ratio of actual output Y and normal capacity Y^* , b measures the effect on inflation of the output gap $(u-1)$ and c accounts for supply shocks.[2]

The "new consensus" model[3] is based on three strong assumptions, namely:

[*] I wish to thank (but of course) not implicate Julia Braga, Fabio Freitas and Tony Aspromourgos for many useful discussions and/or comments to earlier drafts of this paper, Cristina Reis for research assistance and CNPQ-Brazil for continuing financial support.

[**] Professor Adjunct, Instituto de Economia, Universidade Federal do Rio de Janeiro, Brazil. (franklin@ie.ufrj.br)

[1] In this paper we are interested only in the aggregate inflation dynamics of the more pragmatic "new consensus" model and not at all concerned in the possible "New Keynesian" variants of this model explicitly incorporating neoclassical microfoundations such as those discussed in Clarida , Galí, & Gertler (1999).

[2] For the sake of simplicity we are ignoring the possible lag structures of the equation. In a more complex framework these coefficients should accordingly be interpreted as *the sum* of all current and lagged coefficients on that variable.

[3] As it is well known, the (closed economy version) of this model also includes a "IS curve" and an interest rate rule but these features will not be discussed in this paper, which is concerned only with the Phillips curve. Some criticism of these other features using a Sraffian supermultiplier framework can be found in Aspromourgos (2004b).

i) Supply shocks are random and zero on average over a longer period. Thus, *c* is zero, on average, over time.

ii) Potential or capacity output is determined by supply forces, independently from the path of actual short run levels of output, the latter usually seem as determined by aggregate demand.

iii) Another very important characteristic of this model is that the inertia coefficient on lagged inflation is equal to 1 which is sometimes justified by invoking adaptive expectations and/or some other forms of nominal price (and/or wage) stickiness.[4]

I.2. Demand shocks and the acceleration of inflation

These three assumptions tell us that the long run inflation dynamics should be described by an accelerationist Phillips curve:

(1a) $p=p_{-1} + b(u-1)$

In this view, the dynamics of inflation has a number of quite peculiar characteristics. Because of assumption iii) of full inertia, in this framework any temporary shock that lasts only for a single period (whether it is a demand or supply shock) has the effect of increasing permanently the rate of inflation.

On the other hand, any permanent shock will eventually lead to hyperinflation. For instance, if the government tries to keep output above the potential level permanently (through expansionary fiscal and/or monetary policies, as in the famous Friedman (1977) Nobel lecture story) this will create a permanent demand shock and the inflation rate will accelerate all the time.[5]

[4] The important point is that the inflation rate that appears in the Phillips curve must be "backward looking" since empirically new Keynesian models with expected "forward looking" inflation have performed very badly and are seen as not useful for realistic policy analysis (see Fuhrer (1997) and Eller & Gordon, R. (2003)).

[5] The same story was told later (with the same macro hypothesis) from a totally different "neo-marxian" point of view by Rowthorn (1977) and more recently from another eclectic (partially "kaleckian") point of viewby Carlin, & Soskice (1990). For a Sraffian critique of the latter see Stirati (2001).

[insert graph 1 here]

Given the assumption of full inertia (a=1) inflation will also accelerate if there is supply shock. Thus, after a change in the relative price of oil, the real exchange rate, or some other exogenous price, tax or public utility rate, c will become greater than zero and the rate of inflation will increase until the shock is over and c goes back to zero. Even then inflation will stabilize at a permanently higher level.

This result is not important in the long run only because supply shocks are conveniently assumed to be zero on average (assumption i). This strong assumption guarantees that "cost-push" inflation does not really matter in the long run since any bad supply shock will end up being evenly compensated by a good supply shock in the future. It is quite curious that such symmetry of compensating shocks is definitely *not* assumed for demand shocks.

Since positive and negative supply shocks compensate each other and full inertia is assumed the path of inflation, the long run will reflect the history of all previous demand shocks. That is why, in this view, the "core" or trend rate of inflation is ultimately "demand pull" inflation and should be dealt with the control of aggregate demand. In this case there is a permanent NAICU (Non Accelerating rate of Capacity Utilization) and inflation will accelerate whenever the economy expands beyond it.

I.3. Implications for "Inflation Targeting"

If there is a demand shock (demand and actual output exceed potential output) and policy makers want to bring inflation back to its former level (often the "inflation target") the model tells us that the authorities must generate a demand shock of the opposite sign causing a positive output gap to appear and help decelerate inflation back to its former level.

According to this model, in the case of negative supply shocks there are two alternatives. The first is that policy makers accommodate the shock and allow inflation to accelerate for a while, "knowing" that not only a positive *c* will die out on its own but also lead in the future to a negative *c* of the same magnitude. This is the reasoning behind people who want "inflation targets" to be set over long periods of calendar time and/or to be set for the "core" or persistent element of the rate of inflation (which, if you believe in this model, reflects only demand pressures and inertia).

Another option would be to not accommodate the presumably temporary bad supply shock and tighten monetary (and/or fiscal) policy in order to generate an anti inflationary demand shock at the same time. This alternative would also prevent the temporary acceleration of headline (or full) inflation which some people claim is good for "credibility" but it would certainly imply costs in terms of output volatility. More seriously, over any period of time short enough for the compensating benign supply shocks not to have happened yet, we would have, if authorities did not accommodate, permanent output (and employment) losses once the output gap over that period would be positive on average, instead of zero.

Most of the debates concerning inflation targeting have been around these policy choices. But the main lesson of the model, given its accelerationist character, is that any inflationary shock, whether on the supply or demand side, that becomes permanent will accelerate inflation without limit. This means that there is no permanent trade-off between inflation and output gap and that monetary authorities should be vigilant because hyperinflation is always there lurking just around the corner.[6]

[6] Taylor (1999). For an application of "emerging markets" case see Fraga, Goldfajn & Minella (2003).

II. Partial Inertia and the permanent trade off between output gap and inflation

Given that one does not observe hyperinflation in reality frequently (nor situation in which inflation rates go on falling and falling), we may wonder if the model above is a bit too drastic and not very realistic for the vast majority of inflationary experiences.

Luckily, one can easily get rid of them by simply dropping the strong assumption iii) of full inertia. Indeed, traditionally people thought that excess demand causes "demand-pull" inflation and not an acceleration of inflation. In the same fashion, most people thought that supply shocks (or distributive conflict) cause "cost-push" inflation and not an acceleration of inflation. It is true that in reality there is always some inertia for a number of reasons, including formal or informal contract indexation schemes but there is absolutely no reason to assume that for the economy as a whole there will be full indexation to past inflation.[7]

But if, realistically, we drop assumption iii and admit that indexation is partial ($a<1$ even if by just a little, say a=0,95) the results change substantially. In a model that keeps assumptions i) and ii) (average c=0, Y* independent of actual Y) we would revert to something like the old original Phillips curve where inflation would tend to:

(2) $p= b\,(u_{-1})/\,(1-a)$

and there would be a permanent trade-off between inflation and output gap. A permanently positive output gap will cause permanent inflation rather than a permanent acceleration of inflation.

Note also that with partial inertia the acceleration of inflation is explained not by the level but by the change in the size of the output gap:

[7] For evidence on partial inflation inertia or "persistence" in OECD countries and specially its marked decline after the mid nineties eighties see Martin & Rowthorn (2004) and Marques (2004). Ray Fair also finds results that imply partial inflation inertia for both the U.S. (Fair (2000, 2002, 2004)) and European countries (Fair (1999)). Partial inertia is also implied in the findings of the empirical "wage curve" (see Blanchflower and Oswald (2006)). For a Sraffian interpretation of this recent trend of reduced inertia referred to the case of the U.S. see Serrano (2004).

(3) $p - p_{-1} = b[\, u - u_{-1} \,] / (1-a)$

and a temporary contractionary (or expansionary) demand shock will have the effect of lowering (or raising) the level of the rate of inflation not for much longer than it lasts. With no excess aggregate demand the rate of inflation converges back to zero (assuming no supply shocks on average).

[insert graph 2 here]

With partial inertia (retaining the assumptions of exogenous potential output and self compensating supply shocks) we conclude that inflation is the result of excess demand and the acceleration of inflation is a function of the increase in excess demand, just like in the pre-Friedman "demand pull" tradition (on this see Setterfield (2004a)).

III. Hysteresis and the supermultiplier

III.1 Weak hysteresis in output and "Multiple Equilibria"

Let's now turn to discuss the possibility of dropping assumption ii) above, concerning the independence of potential output from actual output and effective demand. How could potential output be affected in the long run by aggregate demand?

One possibility contemplated in the literature is that this may happen because of multiple equilibria (Blanchard, O. e Summers, L. (1987), Ball (1996)). Indeed, if there is more than one possible equilibrium position, the long run behavior of the economy becomes path dependent. The long run equilibrium that the economy will ultimately settle to will depend on hers actual short run trajectory given that the system will evidently tend to the locally stable equilibrium position which is the "nearest" to its actual path.

However, there are many theoretical and empirical problems with this view. Here we shall not deal with the theoretical problems, that come mainly from the rather ad-hoc way in

which aggregate demand and short run levels of output and employment are seen affecting the fundamental determinants of potential output (usually the efficiency of techniques or some factor endowments). Indeed, it may be possible to make the same argument using more heterodox terms as done by Dutt & Ross (2004) and Kriesler & Lavoie (2004). But it is enough to our purposes here to note that the main empirical problem with the "multiple equilibria" story. According to this view, the long run trend of output or potential output is partially caused by the traditional forces on the "supply" side, which determine the various possible equilibrium positions, and partially by the evolution of aggregate demand, which roughly determines which of the possible equilibria the economy will "choose" to settle to.

In that case, this story would require that the trend of output exhibits only weak or partial hysteresis. However, considerable empirical evidence has been accumulating in favor of strong or full hysteresis on output ever since Nelson & Plosser (1982) (see references in footnote 1 above). This means that the long run trend of output is not only partially determined by whatever drives short run output (presumably aggregate demand) but rather that potential output is actually *fully* determined by the trend of whatever drives actual output.

As it is well known, this result of strong hysteresis in the output (GDP) series has been taken to provide evidence in favor of the "real business cycles" strand of new classical macroeconomics in which the common element driving trend and cycle are factor supplies and their productivity. New Keynesians correctly point out that the idea of a short run cycle is supply rather than demand driven (and that the economy is in a full neoclassical general equilibrium even in the short run) is way too implausible. However, they have great difficulty in dealing with the mounting evidence of strong hysteresis in output since this evidence is incompatible with their view that the cycle is driven by demand but the trend is driven by

altogether different (supply) forces. Therefore is only natural that they have for a long time been trying to question the quality of these empirical findings (Campbell & Mankiw (1987)).[8]

Nevertheless, in spite of the ongoing controversy, our general impression is that the more recent evidence and tests mostly confirm Nelson & Plosser (1982) original findings of strong hysteresis in output that we take as a stylized fact that theories have to explain.[9]

III.2. Strong hysteresis in output and the Sraffian supermultiplier

In the Sraffian or classical surplus approach that we follow here (Garegnani (forthcoming)), where distribution and in particular real wages are given by social customs and conflicts, capitalist economies are considered as not constrained by labor scarcity in the long run. This means that normal potential or capacity output is determined by size and efficiency of the stock of capital equipment. Additionally, the levels of both sectional and aggregate outputs in the long run are determined by the trend of effective demand, defined as the demand of those who can pay normal prices of production which are enough to, given technical conditions and a particular distributive configuration, induce firms to supply them regularly. Within this general approach some authors use the supermultiplier to formalize the process of demand led growth (Serrano (1995)).

The idea is that in the long run there is both a marginal propensity to consume and a marginal propensity to invest and the sum of both, the marginal propensity to spend is assumed, in a demand-led context, to be lower than one. Thus the reciprocal of the marginal propensity not to spend gives the size of the supermultiplier, and the autonomous

[8] See the recent attempt by Delong (2005) to argue that the growth of the U.S. economy has been around a given exogenous trend by extending the sample to the whole period from the 1880s to the 1980s. Delong argues that the great depression demand driven slump was just a cyclical matter around a given supply determined by an exogenous trend since it was entirely matched by a compensating Second World War demand driven boom leaving exogenous the trend rate. He mentions that he might have to resort to some "Old Keynesian" view where Keynesian demand management could have important trend effects for the post second war period.

[9] Braga (2006) shows that in the U.S., in postwar period, it is confirmed that the detrended U.S. GDP has unit roots, even considering a structural break and six different unit root tests.

expenditures do not create productive capacity for the private sector being what is "supermultiplied". In this view the trend growth of these "unproductive" autonomous expenditures is the key to sustained growth of effective demand, output and capacity output. Formally, taking *Z* as the amount of autonomous expenditures that do not create capacity, *w* as the marginal propensity to consume and *h* as the marginal propensity to invest we have that the level of output is given by :

(4) $Y = Z/ (1- w-h)$

In this view, gross investment is basically induced via a flexible accelerator or supermultiplier process by the need to gradually adjust the size and growth of productive capacity (with given planned margins of spare capacity to deal with fluctuations emphasized by Ciccone (1986)) to the gradual growth of the trend of effective demand over time.

Therefore, if the actual level of output happens to be initially different from the level of normal capacity output, the marginal propensity to invest *h* (gross investment share) will tend to change over time, gradually increasing when the output gap is positive and decreasing when the gap is negative.[10] This will make normal capacity output adjust to the trend of demand over time, the output gap will be tending to zero and the gross investment share will tend to that level (h*) which is required to sustain the growth of demand and capacity output at the rate *z* that the autonomous expenditures is growing[11]. Thus capacity output will tend to:

(5) $Y^*=Y=Z/(1-w-h^*)$

The supermultiplier shows that, once the growth rate of autonomous demand *z* is not too high and that the flexible accelerator adjustment of the investment share is not too intense, the growth of normal capacity output tends to follow the long run trend of the growth of

[10] There are many ways to formalize this adjustment process. Perhaps the simplest (and the easiest to estimate econometrically, see Braga(2006)) is just to make the investment share to adapt slowly to the past actual rate of growth of output. Thus if we call *v* the normal capital-output ratio, *d* the drop-out rate and *x* a small partial adjustment parameter we can write: $h = (1-x)h_{-1}+xv(g_{-1}+d)$

[11] To be precise, we have: $h^*= v.(z+d)$.

actual output and aggregate demand.[12] The trend and the cycle indeed have a common nature as the empirical literature shows but this common nature reflects that both are explained by demand (not supply) factors. Therefore, the Sraffian supermultiplier framework is entirely compatible with the evidence of full hysteresis in the output time series.[13]

The supermultiplier allows us to understand that, if there is this type of full hysteresis in output, positive or negative output gaps are mostly self correcting, even without policy intervention. This is because any more persistent under (or over) utilization of productive capacity will tend to stimulate a decrease (or increase) in the pace of productive (i.e., capacity generating) gross investment as firms are continuously trying to adjust the size of their productive capacities to the size of the trend of effective demand.

In this context of hysteresis, explained by effective demand and induced investment, even if we go back to the very strong assumption (iii) of full inertia, "demand-pull" inflation would only accelerate the rate of inflation temporarily. At least to the extent that capacity can adjust over time to demand, a single demand shock would be self correcting and it could not bring the economy to hyperinflation. After capacity adjustments to the permanently higher levels of demand, the positive output gap would close itself and inflation would stop increasing and stabilize at the new, permanently higher level. The same reasoning would hold in the case of a negative output gap that, if persistent, would lead to a lower pace of capital

[12] To be more precise, a sufficient condition for dynamic stability of the Sraffian supermultiplier is that it satisfies the Freitas condition (since it has been derived by my colleague Fabio Freitas from Rio Federal University in an unpublished note) which is: $vz+vd+vx+w <1$ .This condition means that the marginal propensity to spend must be structurally below one including induced consumption and both the trend and the adjustment induced investment. This means that the economy is demand-led for any growth rate of autonomous demand $z < [(1-w)/v –d – x]$.

[13] The Sraffian supermultiplier framework was developed independently with small differences by Bortis (1997), Serrano (1995) and DeJuan (2005). See also Cesaratto Stirati & Serrano (2003) and Aspromourgous (2004a, 2004b). It should be noted that while all the modern supermultiplier users are Sraffian not only Sraffa himself never used a supermultiplier and certainly not all Sraffians find the supermultiplier useful or even acceptable. For a "methodological" criticism of the supermultiplier (and also about any attempt to formalize aspects of long run effective demand for that matter) see Palumbo & Trezzini (2003).

accumulation in order to adjust the economy to the desired normal degree of capacity utilization.[14]

III.3 Hysteresis, full inertia and a temporary NAICU

In equation *1a* above, the normal or planned degree of capacity utilization has been normalized as being equal to one by our definition of *Y** as normal instead of maximum feasible capacity output. A degree of capacity utilization greater than one should accelerate inflation and hence in this context the value of the unique and exogenous NAICU (Corrado & Mattey (1997)), the Non Accelerating Inflation degree of Capacity Utilization, should be equal to one. However, with the supermultiplier process and the full hysteresis in output, even under full inflation inertia there isn't really a NAICU, because the acceleration of inflation caused by a degree of capacity utilization remaining persistently greater than one will not last too long as capacity output would gradually increase to close the output gap.[15]

[insert graph 3 here]

Therefore, if there is strong hysteresis in the level of output (and employment) we would not have demand-pull hyper-inflation. The acceleration of inflation would not tend to be permanent (unless the government was really crazy - crazier than Friedman's evil policy makers - and really kept via expansionary macro policies demand growth always one step ahead of capacity growth, which can be done only if the rate of growth of autonomous demand remains permanently very high and capacity can never catch up).

[14] The supermultiplier argument requires that the degree of capacity utilization is a stationary, "mean reversing" variable. For evidence in this favor see the American case in Braga (2006). See also Corrado & Mattey (1997).

[15] There are people that, in order to deal with full hysteresis on output, use the popular Kalman or HP filters (Hodrick & Prescott (1997)) to model the output gap. Perhaps they are more heterodox than they would like to, unless they are prepared to accept the implausible "real business cycle" story that hysteresis reflects common short and long run causes on the supply side, rather than the more reasonable effective demand explanation adopted here.

III.4. Hysteresis and Partial Inertia

Note, however, that even granted this connection between actual and potential output, we still get the result that a temporary, indeed self correcting, excess demand shock would permanently increase inflation. But this happens only because we dropped assumption ii) of no hysteresis on output but went back to assumption iii) of full inertia. If we take the much more reasonable assumption of partial inertia, when we combine it with full hysteresis on output we see that these excess demand situations (by their very nature temporary in this context) will not accelerate inflation permanently. With partial inertia demand pressures will tend to lead to higher inflation rates temporarily. Over time as capacity catches up with the higher levels of demand, demand inflation will stop. And with less than full inertia the memory of this episode will fade away over time.

In fact, as we have seen in section II (equation 2), with partial inertia the persistent level of inflation is a function of the size of the output gap. Considering the supermultiplier, even a permanent increase in the growth of autonomous demand causes positive temporal gap. This means that within the bounds of a demand led growth regime demand-pull inflation is inherently a transient phenomenon.

Indeed, in terms of equation 3 with the supermultiplier, a permanently higher rate of growth of demand will only cause inflation to accelerate while the output gap is increasing. As soon as the gap stops increasing, even if it is still positive, as capacity slowly catches up with (and then temporarily overtakes) the faster growth of demand, inflation will stop accelerating and will begin to fall as the output gap starts falling.

[insert graph4 here]

In other words, with full hysteresis in output levels and partial inertia on inflation, "demand-pull" inflation is just a temporary phenomenon and therefore does not determine "core" or persistent inflation.[16]

IV Incompatible Distributive Claims and "cost push" core inflation

IV.1 The Aspiration Gap

We began this paper complaining that the accelerationist model produced too much inflation but now we run the risk to have too litte, since core inflation would tend to zero over time in an economy with output hysteresis ($Y^* \rightarrow Y$) and partial inflation inertia ($a<1$). This is because we have not yet relaxed the strong assumption (i) of zero average supply shocks ($c=0$). Although the misleading name of "supply shocks" evokes temporary phenomena such as bad or good harvests, c in fact represents all autonomous cost-push pressure, the "aspiration gap", i.e., all the conflicting claims over the distribution of a particular level of output. A permanently positive c usually means that workers keep desiring and bargaining for an autonomous increase in their current money wages - the rate of growth of productivity. Note that it is immaterial at this point why they do this. Whether it is to recover some "fairer" level of real wages or of the wage share obtained somewhen in the past, that has been eroded by previous changes in other relative prices or distributive variables (oil prices, exchange rates, indirect taxes, public utility rates, profit mark-ups etc.), which is known as "real wage resistance", or if they are more actively pushing for a shift in distribution in their favor or even if they just expect higher inflation in the future and want to protect themselves from it.

[16] Note that assuming the values of the parameters to be in the demand-led regime (i.e., respecting the condition mentioned in note 12) before and after the changes examined. It is true that if parameters are such that the aggregate marginal propensity to spend (implausibly in our view) becomes chronically above one we would be in a capacity constrained demand-pull core inflation regime. Note however that if this were the case in reality there should be no evidence of strong hysteresis in output as capacity output should be independent from actual output (unless as mentioned in the text one is prepared to think along with the "real business cycles" literature where even the short run cycles are determined by supply rather than demand forces).

In any case, *c* will be positive whenever there are basic conflicting claims over distribution (an "aspiration gap" or "real wage resistance") of that particular level of output and this distributive inconsistency will reflect as a "cost push" increase in the normal supply prices, even if the output gap is zero (or positive, for that matter).[17]

The size of these conflicting claims can and does of course change a lot over time, but there is absolutely no reason to think the aspiration gap is a temporary and self correcting phenomenon, which is implied by assumption (i) above.

A permanently positive *c* means that there is some attempt to change distribution and relative prices. This is much more plausible under partial inertia. If we had full inertia, a permanent positive *c* would mean that there always is some group that is trying to make their nominal remunerations grow by more than the past rate of inflation. In the more realistic case in which there is only partial inertia this is not necessary. If $a<1$, a positive *c* only implies that some group wants positive nominal increases in their remuneration. And the opposite orthodox assumption of zero average supply shocks in the long run would (under partial inertia) imply that over time for every inflationary supply shock there would always be a sufficiently compensating autonomous reduction in nominal remuneration and prices. This symmetric downward wage and/or price nominal flexibility is rather unrealistic.

IV.2 An alternative benchmark model for core inflation

If we assume the existence of some persistent degree of real wage resistance (or distributive conflict) and partial inflation inertia we get that, as capacity adjusts to demand via induced investment, core inflation tends to:

$$(6) \qquad p = c/(1-a)$$

[17] The importance of changes in distributive "aspirations" for inflation has been admitted in the empirical literature about the U.S. economy by Ball & Moffit (2001) and even R. Gordon (Dew-Becker & Gordon (2005)) although these authors still insist that one day these "shocks" will be reversed. It can be found also without these restrictions in Pollin (2002) and Setterfield (2004b).

The equation shows that trend or core inflation is a "cost push" phenomenon that depends on the size of the aspiration gap and the degree of indexation (Serrano (1986)). In this view demand shocks usually have only temporary effects on the level of inflation.[18]

On the other hand, a permanent increase in the aspiration gap would lead to a permanently higher level of core inflation. Here it is important to note that different types of "supply shocks" may have very different impacts on inflation dynamics. For instance, imagine that there is an exogenous increase of the domestic price of imported oil and the bargaining power of workers is so low that they do not react to the initial increase in inflation (caused by this shock) by increasing their aspiration gap. This means that *c* will be positive only temporarily and also that the ensuing permanent fall in the wage share will generate a negative demand shock as the fall in the wage share reduces the marginal propensity to consume of the economy *w*. In this case the impact of the supply shock on inflation will be not only temporary but also weakened by the effect of the opposite and also temporary negative output gap on inflation caused by the permanent fall in the wage share. Of course the gap will close itself and gradually investment and capital accumulation slows down to adjust capacity to the lower levels of aggregate demand that come from the smaller size of the multiplier.

Things would be different if we assume the supply shock was a "wage explosion" caused say by increased trade union militancy. In this case the increase in the aspiration gap will permanently increase core inflation. At the same time the probable increase in the wage share that would ensue would increase the marginal propensity to consume *w* and generate a positive demand shock and output gap which would add to the rate of inflation. This positive gap will however be temporary and inflation will settle over time at its new high cost-push core level as the investment and capacity output growth catches up with the increased

[18] Arguing from a Kaleckian perspective Kriesler & Lavoie (2004) go further and argue that for a wide range of different degrees of capacity utilization demand has no effect whatsoever on inflation. Only very high rates of capacity utilization would increase prices and very low ones would decrease them.

effective demand generated by the new and permanently higher multiplier. It is interesting to note how this brief analysis of the reaction of the economy to a supply shock is different from that based on the new consensus model discussed in section I.2 above.

[insert graph 5 here]

IV.3 An alternative set of assumptions

Therefore in our heterodox (indeed Sraffian) standpoint of inflation we would replace assumptions i) ii) and iii) above by the following assumptions:

1. $c>0$, i.e. a distributive conflict exists;
2. potential output follows the trend of effective demand (Y^* adjusts to the trend of Y);
3. and $a<1$: usually there is only partial indexing to past inflation which increases the level of the inflation rate associated with any level of the basic distributive conflict.

Although assumptions 1-2-3 are completely incompatible with orthodox economic theory it is thoroughly supported by a large and growing number of econometric studies, often made by authors who tend to believe in orthodox economic theory.[19]

[19] For a critical survey of these studies see Braga (2006).

References

Aspromourgos T. (2004a): '"The Functionless Investor": Keynes's euthanasia of the rentier revisited', in Aspromourgos T., Lodewijks J. (eds.): *History and Political Economy: essays in honour of P.D. Groenewegen*, Routledge, London.

Aspromourgos, T (2004b) "Interest as an Artifact of Self-Validating Central Bank Beliefs**",** *The Third Australian Society of Heterodox Economists Conference*, University of New South Wales, 13 and 14 December 2004

Ball, L. (1996) "Disinflation and the NAIRU", *NBER Working Papers*, n. 5520.

Ball, L. e Mankiw, G. (2002) "The NAIRU in Theory and Practice", *NBER Working Papers*, n. 8940.

Ball, L. e Moffit, R. (2001) "Productivity growth and the Phillips curve", *NBER Working Papers*, n. 8421.

Blanchard, O. e Summers, L. (1987) "Hysteresis and the European Unemployment Problem January", *NBER Working Paper* No. W1950

Blanchflower, D. and Oswald, A. (2005), "The Wage Curve Reloaded", *NBER Working Paper*,No.11338,

Blinder, A (1997) "Is there a core of practical macroeconomics that we should all believe?" *American Economic Review*.

Bortis, H. (1997), "Institutions, Behaviour and Economic Theory - A Contribution to Classical-Keynesian Political Economy", Cambridge University Press.

Braga, J. (2006) "Raiz Unitária, Histerese e Inércia: o debate sobre as mudanças da NAIRU na economia americana durante a década de 1990", unpublished Ph.D. dissertation, Instituto de Economia, Universidade Federal do Rio de Janeiro, Brazil.

Campbell, J & Mankiw G (1987). "Are Output Fluctuations Transitory?" *Quarterly Journal of Economics*, 102: 857-880.

Carlin, W. e Soskice, D. (1990) "*Macroeconomics and the Wage Bargain",* Oxford University Press.

Cesaratto, S., Serrano F. e Stirati, A. (2003), "Technical Change, Effective Demand and Employment", *Review of Political Economy.*

Ciccone R. (1986) "Accumulation and capacity utilization: some critical considerations on Joan Robinson's theory of distribution', *Political Economy — Studies in the Surplus Approach*, 2, pp. 17–36.

Clarida, R., Galí, J. e Gertler, M. (1999) "The Science of Monetary Policy: A New Keynesian Perspective", *Journal of Economic Literature,* Vol. XXXVII, December, pp. 1661-1707.

Corrado, C. e Mattey, J. (1997) "Capacity Utilization" Journal of Economic Perspectives, Winter.

DeJuan, O. (2005) "Paths of accumulation and growth: Towards a Keynesian long period theory of output", *Review of Political Economy,* Volume 17, Number 2 / April 2005 Pages: 231 - 252

Delong B. (2005) "Existence of ´Unit Roots´", available *at* *www.j-bradford-delong.net/*

Dew-Becker I. & Gordon, R. (2005) "Where Did the Productivity Growth Go? Inflation Dynamics and the Distribution of Income", *NBER Working Papers,* 11842,

Dutt & Ros, Amitava and Jaime Ros (2003), 'Contractionary Effects of Stabilization and Long Run Growth', *University of Notre Dame*, unpublished manuscript.

Eller, J. e Gordon, R. (2003) "Nesting the New Keynesian Phillips Curve within the Mainstream Model of U. S. Inflation Dynamics" draft of a paper to be presented at *CEPR Conference: T he Phillips Curve Revisited*, Berlin Hilton, Berlin, Germany, June 5-6, 2003.

Fair, R. (1999) "Estimated inflation costs had European unemployment been reduced in the 1980's by macro policies" *Journal of Macroeconomics*, Winter.
Fair, R. (2000) "Testing the NAIRU model for the United States" *Review of Economics and Statistics*, February.
Fair, R. (2002) "On Modeling the Effects of Inflation Shocks", *Contributions to Macroeconomics*, Vol. 2, No. 1, Article 3.
Fair, R. (2004) "Estimating How the Macroeconomy Works", Harvard University Press.
Fischer, S. (1977) "Long-Term Contracts, Rational Expectations and the Optimal Money Supply Rule", 1977, JPE.
Fraga, A., Goldfajn I. & Minella, A. (2003) "Inflation Targeting in Emerging Market Economies", in Mark Gertler and Kenneth Rogoff (eds.), *NBER Macroeconomics Annual 2003*, MIT Press
Friedman, M (1977) "Inflation and Unemployment: Nobel lecture", 1977, *Journal of Political Economy*. Vol. 85, pp. 451-72.
Fuhrer, J. (1997), "The (Un)Importance of Forward-Looking Behavior in Price Specifications" *Journal of Money Credit, and Banking*, Vol. 29, No. 3 .
Garegnani, P. (forthcoming), "Prof. Foley and Classical policy analysis", *Review of Political Economy*
Gordon, R. (1989), "Hysteresis in History: Was there ever a Phillips Curve?", *The American Economic Review*, Vol. 79, n. 2.
Gordon, R. (1997) "The time-varying NAIRU and its implications for economic policy" *Journal of Economic Perspectives*, Winter.
Hodrick, R. e Prescott, E. (1997). "Postwar U.S. Business Cycles: An Empirical Investigation," *Journal of Money, Credit and Banking,* Ohio State University Press, vol. 29(1), pages 1-16, February.
King, Stock, J. e Watson, M. (1996) "Temporal instability of the unemployment-inflation relationship". *Economic Perspectives, Federal Reserve Bank of Chicago*.
Kriesler, P. & Lavoie, M**.** "The New View On Monetary Policy: The New Consensus And Its Post-Keynesian Critique"**,** Universisty of Ottawa**, mimeo**
Libanio, G. (2005) "Unit roots in macroeconomic time series: theory, implications, and evidence", *Revista Nova Economia*, vol. 15 n. 3 de Setembro/Dezembro.
Marques, C. (2004), "Persistence: facts or artefacts?" *Eurosystem inflation persistence network*; working paper series no. 371.
Martin, B. e Rowthorn, B. (2004), "Will stability last?" *UBS Research Paper*.
Nelson, C. e Plosser, C. (1982) "Trends and Random Walks in Macro-economic Time Series: some evidence and implications", *Journal of Monetary Economics*, 10, 1399162
Palumbo, A. & Trezzini, A. (2003) "Growth without normal capacity utilization", *European Journal of the History of Economic* Volume 10, Number 1 / Spring 2003 Pages: 109 – 135.
Pivetti, M. (forthcoming), "Distribution, Inflation and Policy Analysis", *Review of Political Economy*
Pollin, R. (2002), "Wage Bargaining and the US Phillips Curve: was Greenspan right about traumatized workers in the 90s?" mimeo, *Political Economy Research Institute*, University of Massachusetts Amherst.
Romer, D. (2000) "Keynesian and Macroeconomics without the LM curve", *NBER Working Paper*s, n. 7461, Jan.
Rowthorn, R. (1977), Conflict, Inflation and Money, *Cambridge Journal of Economics*, 1977, Volume 1, Issue 3**,** 215-39.
Serrano, F. (1986), "Inflação inercial e dexindexação neutra" em *Inflação inercial, teorias sobre inflação e o Plano Cruzado.* Editora Paz e Terra.

Serrano, F. (1995) “Long Period Effective Demand and the Sraffian Supermultiplier”, *Contributions to Political Economy*, 1995, vol. 14, pages 67-90.
Serrano, F. (2004), “Relações de poder e a política macroeconômica americana, de Bretton Woods ao Padrão Dólar Flexível”. In: FIORI, J. L. (Org.) *O poder americano*. Petrópolis, RJ: Vozes.
Serrano, F. (2001) “Equilíbrio Neoclássico de Mercado de Fatores: Uma Critica do Ponto de Vista Sraffiano”. *Ensaios FEE*, Porto Alegre, v. 22, n. 1.
Setterfield, M. (2004a) Central banking, stability and macroeconomic outcomes: a comparison of new consensus and post-Keynesian monetary macroeconomics, in M. Lavoie and M. Seccareccia (eds), *Central Banking in the Modern World: Alternative Perspectives*, Edward Elgar, Cheltenham, pp. 35-56.
Setterfield, M. (2004b) “Worker Insecurity and U.S. Macroeconomic Performance During the 1990s”, Trinity College, Department of Economics.
Staiger, D., Stock, J. e Watson, M. (1997). "The NAIRU, Unemployment, and Monetary Policy," *Journal of Economic Perspectives* 11 (Winter): 33-49.
Stirati, A. (2001) "Inflation, unemployment and hysteresis: an alternative view", *Review of Political Economy.*
Taylor, J. (1999) “Monetary Policy Rules”. in Taylor, J. (Ed.), Chicago: University of Chicago Press, 1999.
Taylor, J. (2000) "Teaching Modern Macroeconomics at the Principles Level", *The American Economic Review*, 90, 90-94.