



**Texto para Discussão 003 | 2019**

***Discussion Paper 003 | 2019***

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# The (conflict augmented) Phillips curve is ‘alive and well’<sup>1</sup>

February, 2019

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## Abstract

The aim of this paper is twofold: first, to analyze critically the mainstream empirical and theoretical attempts to keep the accelerationist Phillips curve alive; and second, to propose an alternative way of thinking about the relation between (wage and price) inflation and unemployment rate. The mainstream view, which is based on the idea of scarcity of labour and full incorporation of expectations in wages, will be criticized. And it will be shown that all the recent empirical puzzles can be better understood if we drop these neoclassical hypotheses about the functioning of the labour market and replace them by a conflict augmented Phillips curve in which inflation is a result of conflicting claims over income distribution, which are mediated by institutional arrangements and political power relations and there is no labour scarcity.

**Keywords:** Phillips curve, distributive conflict, natural rate of unemployment, Hysteresis

**JEL codes:** B51, E31, E13.

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<sup>1</sup> The authors would like to thank Franklin Serrano and Luciano Barros for their very valuable comments. Ricardo Summa is fellow at the CNPq and would like to thank to the financial support for this research.

# 1 Introduction

The relation between inflation and unemployment, in a very broad sense, is a cornerstone in many macroeconomic models. In modern mainstream macroeconomics, the Phillips curve is understood as a systematic relation between **changes** in the rate of inflation and demand shocks. This mainstream view depends on two crucial hypotheses: (i) that wage inflation is a result of a situation of scarcity in the labour market (deviations from the natural rate of unemployment), and (ii) that expected inflation is fully incorporated into nominal wage increases. This approach implies the ‘accelerationist curse’ (Blanchard 2016a, 2018) since inflation will accelerate (or decelerate) continuously if demand shocks are permanent.

However, in the last few decades this relation has been challenged both theoretically and empirically, and it is still controversial. Since the 80s, there are some puzzles with the accelerationist and the unique natural rate (or NAIRU) hypotheses when the empirical data is observed (Stirati 2001). Those puzzles were dealt with in mainstream macroeconomics by introducing some imperfections, rigidities, and shocks while maintaining the neoclassical framework with its two crucial hypotheses as a benchmark for the labour market functioning. Gordon (2013), an enthusiast of the accelerationist model and of this kind of procedure, believed that the accelerationist Phillips curve was still alive and well (for the US economy). Nowadays, however, Blanchard (2018), Krugman (2018), Solow (2018) and even Gordon (2018), without discarding the neoclassical theoretical framework, seems to believe that this accelerationist relation has somehow been ‘asleep’, at least in the short or medium run, after the 2008 crisis in the US economy.

But there is an alternative heterodox view that discards these two crucial hypotheses of wage inflation based on labour scarcity and full incorporation of expectations on nominal wages. Following the tradition of the classical surplus approach combined with the view that growth is usually demand-led, the long run growth of the labour force follows the growth of employment opportunities such that there is always some structural unemployment. Wages do not reflect a situation of labour scarcity and the influence of

unemployment (and various forms of underemployment) on wages must be seen as mediated by social, political and institutional aspects (such as accepted social norms of ‘subsistence’). Since labour is not scarce, the degree of incorporation of inflation expectations into wage increases will also depend on the overall bargaining power of workers. As a result, wage inflation is seen as cost-push phenomenon and depends on the degree of the distributive conflict and accelerating inflation is just one possible outcome in this framework (in very conflictive situations, for example), but stable inflation with different unemployment levels can be compatible within this approach.

Thus, the aim of this paper is twofold: first, to analyze critically the empirical and theoretical attempts by the mainstream to keep the accelerationist Phillips curve alive; and second, to propose an alternative way of thinking about the relation between (wage and price) inflation and unemployment rate from a conflict augmented Phillips curve perspective. We will argue that all the recent empirical puzzles can be better understood if we drop the two crucial neoclassical hypotheses and follow the alternative conflict inflation approach.

The structure of the paper is the following. Section 2, will briefly analyze the evolution of the mainstream Phillips curve. The third section will show some attempts by mainstream macroeconomists to fit the accelerationist model within the empirically verified stable inflation since the eighties. In the fourth section, we will show how our alternative approach can deal with the same empirical evidence and brings us closer to the original ‘old’ empirical Phillips relation between the *level* of inflation and the rate of unemployment. Final remarks will be made in section 5.

## 2 The mainstream view of the Phillips curve

The evolution of the Phillips curve from a mainstream perspective starts with the seminal work of Phillips in 1958, which was viewed as just empirical evidence of the relation between (wage) inflation and unemployment, without a theory (Tobin 1972). The hypothesis of nominal wages as a measure of scarcity in the labour market was first proposed by Lipsey (1960), who interpreted the Phillips relation within a neoclassical framework, in which the wage inflation or deflation is seen as a consequence of a disequilibrium position between labour demand and supply<sup>2</sup>, being the situation of **full employment** as the only one compatible with zero wage inflation. Samuelson and Solow (1960) transformed this relation in a simple menu of choices between **price inflation** and the level of unemployment which could be exploited by policymakers<sup>3,4</sup>. This simple version of the Phillips curve was popularized and incorporated into the neoclassical synthesis framework (Palumbo 2015b), (Stirati and Meloni 2018). In Equations 1 and 2, wage and price inflation are denoted by  $w$  and  $\pi$ , respectively, and unemployment rate by  $U$ . Also, It can be easily seen that  $U = \frac{\theta}{\beta}$  will be the unemployment related with zero inflation.

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<sup>2</sup> In a recent debate, Solow also believed that Phillips paper is important to its empirical conclusions but should be understood as a disequilibrium in the neoclassical labour market framework:

Let me go back to Phillips for a moment. Phillips's 1958 paper is purely empirical. All the theory in it is contained in the first two sentences of the paper, and what they say this: we are all used to the idea that excess demand in a market will cause the price to rise, and excess supply in a market will cause the price to fall. So why shouldn't the same idea apply to the labour market? That's all the theory there is. Evidently, in Phillips's mind, the arrow of causality clearly runs from the unemployment rate to the rate of inflation. He is thinking of the unemployment rate as a measure of the supply-demand balance in the labour market, an indicator of disequilibrium, and it would push the rate of wage inflation in the same way that you would expect excess supply or demand for peanut butter to push the price of peanut butter. (I don't remember any explicit discussion about why the rate of inflation rather than the price level.) (Solow, Taylor and Mankiw 2009).

<sup>3</sup> The passage from wage inflation to price inflation can be made by abstracting from changes in labour productivity and in profit margins.

<sup>4</sup> Samuelson and Solow (1960, p. 193) however were aware that this systematic relation was valid in the short run but the action of policymakers could shift the Phillips curve.

$$(1) \pi = \theta - \beta U, \pi = w$$

$$(2) \pi = \theta - \beta U$$

This version of the Phillips curve was criticized by Friedman (1968) one decade after Phillips' seminal work. He correctly pointed out that within the neoclassical framework, if the wage inflation is a result of disequilibrium in the labour market, the correct variable which governs labour demand and supply decisions is not the nominal but the **real wage**. In this way, expected real wages must be taken into account (Equation 3) (Palley 2012, 2018). From this hypothesis, Friedman deduces that all the expected inflation is incorporated into nominal wage increases, such that parameter  $\alpha$  is equal to one. Inflation expectations thus appear in the reduced form of the Phillips curve (Equation 4), implying that all the expected inflation is passed on to the current inflation rate. Moreover, labour scarcity in the will happen at  $U^*$ , which was called by Friedman the **natural rate of unemployment**, and when positive (negative) demand shocks occur the unemployment rate deviates from the natural rate of unemployment at the cost of a higher (lower) than expected rate of inflation.

$$(3) w - \alpha\pi^e = \beta(U - U^*), \alpha = 1 \text{ and } \pi = w$$

$$(4) \pi = \pi^e - \beta(U - U^*)$$

Friedman also assumed backward-looking expectations, formed in an adaptive way. Using the simplest form of the adaptive expectations where only the most recent past inflation is used to form expectations, that is,  $\pi^e = \pi_{-1}$ , we get:

$$(5) \pi = \pi_{-1} - \beta(U - U^*)$$

Equation 5 shows the accelerationist Phillips curve, where *changes* in the rate of inflation are related to demand shocks. According to this view, one single temporary demand shock changes permanently the level of inflation, and a permanent shock leads to accelerating (or decelerating) inflation. The only possible situation where inflation is stable occurs if the economy lies in the natural rate of unemployment, that is when the labour market is in neoclassical equilibrium.

Nowadays, a Phillips curve very similar to Friedman's accelerationist curve is called the triangle model (Gordon 1977, 1997), (Taylor 2000), (Ball 2009)<sup>5,6</sup>, and incorporates lags, supply shocks (which however for theoretical reasons must have zero mean in the long run) and possible imperfections in the neoclassical labour market, with the natural rate of unemployment being substituted by the more general concept of non-accelerating inflation rate of unemployment - NAIRU (Carlin and Soskice 2014).

$$(6) \pi = \sum \alpha_i \pi_{t-i} + \sum \beta_i (U_{t-i} - U^*) + \varepsilon, \sum \alpha_i = 1$$

Gordon believes that ‘the expected inflation term is a set of long lags on past inflation, reflecting the view that the influence of past inflation reflects generalized backward-looking inertia, not just the formation of expectations (Gordon 2009, p. 23)’.<sup>7</sup> In this case,

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<sup>5</sup> The reduced form of the forward-looking version of the Phillips curve is similar to equation 2 when expectations are forward-looking: (5')  $\pi = \pi_{t+1}^e - \beta(U - U^*) + \varepsilon$ . According to equation 5', anticipated demand shocks will deviate inflation from its expected value. This will happen because if equation (5') is solved recursively, inflation will be equal to the sum of expected unemployment gaps in the future. This result is problematic because, contrary to empirical evidence, the inflation series generated by this model tends to fall in booms and increase in recessions, since those gaps are perfectly anticipated (see Carlin and Soskice 2014). See also Gordon (2009, 2013) for more criticisms about the poor empirical performance of the new Keynesian Phillips curve. The standard microfoundation for this version of the Phillips curve is the Calvo Model. This is a staggered price model in which for some reason only a random fraction of firms is able to adjust its price in each period. The firms who are able to adjust price will do that based on their present rational expectations about future prices and the deviations of the current markup from its optimum level, caused by the output gap.

<sup>6</sup> In general, this new Keynesian version of the Phillips curve takes into account a mark-up gap (the difference between current and optimal markup) as a source of demand pressures. The optimum level of the markup is basically defined by a constant demand elasticity faced by each firm operating on imperfectly competitive markets (Goodfriend 2004). But the optimal markup is associated with a unique level of employment (and unemployment). In this way, here we present the New Keynesian Phillips curve with the unemployment gap as a proxy of the output gap in order to compare it with the tradition of the Phillips curves. But it is important to notice that the labour market in this kind of model is always in equilibrium since when aggregate demand fluctuations occur, they shift ‘labour demand schedule’ while workers are always in their labour supply schedule (Stirati 2015).

<sup>7</sup>According to Gordon:

Important sources of inertia include the set of explicit and implicit contracts that dampen short-term changes in prices and wages and the input-output supply chain that creates thousands of links of unknown magnitude and duration between changes in crude and intermediate goods prices and

the full incorporation of past inflation on inflation will be imposed by  $\sum \alpha_i = 1$ . In fact, equation 5 above is a special case of the triangle model, with a single lag and no supply shocks.

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the prices of final goods. All of these channels interact to create the 'inertia' effect, the first leg of the triangle (Gordon 2009, p. 23).

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### **3 Mainstream amendments in the accelerationist Phillips curve**

The accumulated empirical evidence since the 1980s shows some puzzles related to the accelerationist and the unique natural rate (or NAIRU) hypotheses. Mainstream macroeconomists, however, for theoretical reasons do not want to discard the accelerationist Phillips curve framework to explain inflation dynamics, and they have used a number of amended versions of this model to explain away those puzzles. The procedures of amendment are - while maintaining the two crucial hypotheses of full employment as a phenomenon of scarcity and the full incorporation of expectations on nominal wage increases - to introduce some supply shocks (like productivity shocks) or to mitigate demand shocks by introducing hysteresis effects in the NAIRU and/or other procedures to reduce the size and duration of the unemployment gaps in order to make an empirically observed (quite stable) inflation compatible with a potentially (quite unstable) accelerationist model. Another way to fit in the stable data in a potentially unstable equation is to impose that inflation expectation can be exogenous and/or constant. Let's look at the empirical puzzles and analyze critically some of the procedures which attempted to keep the accelerationist Phillips curve alive.

#### **3.1 Some empirical puzzles related to the accelerationist Phillips curve**

Some puzzles found in empirical literature are listed in the sequence. First, unemployment in Europe in the 1980s increased sharply and remained at higher levels than before during the whole decade, without generating decelerating inflation. According to Blanchard and Summers,

[b]ut to the extent that aggregate demand shocks do not affect the equilibrium or natural rate of unemployment, one would expect sustained high unemployment to be associated with rapid declines in the rate of inflation (...)  
There is substantial evidence however that this relation has broken down and

that there has been a much smaller decline in inflation than would have been predicted by past relationships (Blanchard and Summers 1986b, p. 8)<sup>8</sup>.

Second, the US economy during the nineties experienced a process of very low unemployment but low and stable inflation. Although US unemployment had broken the supposed accelerationist inflation barrier (the NAIRU of 6%) inflation did not accelerate in the period, but on the contrary, inflation actually decreased and remained stable in the same period (Galbraith 1997).

Third, the ‘missing deflation’ in the US after the 2008 crisis, that is, a low but stable (and not decelerating) inflation associated with a high and long-lasting unemployment gap. Ball and Mazumder (2011) showed that, if we use the Triangle Model estimated using the data from 1960 to 2007 to forecast core inflation in the US in 2008-2011, it should have had a deflation in 2011 of almost 5% in contrast to observed inflation that oscillated between about 1,5% and 3% in 2010-2011. Even The Economist (2017) has wondered if the (accelerationist) Phillips curve may be broken down and points out its empirical flaws while Krugman (2018) is quite critical and recognizes the failure of orthodox theory to explain inflation dynamics after the great recession.

### **3.2 The Time-Varying NAIRU and weak Hysteresis**

One way to deal with such puzzles is to mitigate the inflation effects of demand shocks by introducing hysteresis effects in the natural rate of unemployment (or in the NAIRU), that is, by allowing it to change endogenously over time - the Time-Varying NAIRU (TV-NAIRU) (Gordon 1996), (Ball and Mankiw 2002).<sup>9</sup> For Gordon (1989), hysteresis occurs

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<sup>8</sup> See also Stirati (2001).

<sup>9</sup> There are different interpretations by mainstream economists for the causes of the presence of hysteresis (see Ball and Mankiw 2002). The most common one says that a temporary rise in unemployment can decrease the ‘human capital’ by workers that went out of labour market. There is a decrease in the marginal product of labour leading to a permanent rise in the unemployment rate. This interpretation is based on the new-Keynesian model of structural unemployment with real wage rigidity (see Mankiw 1995). In this model, potential output is given by the stock of capital, whose growth depends on potential savings, so it is

(in the simplest case) when the natural rate of unemployment (or NAIRU) ( $U^*$ ) is a function of the lagged current unemployment rate ( $U_{t-1}$ ). In this way, changes in the current unemployment rate will also affect the natural rate and thus reduce the size and duration of the unemployment gaps. Equation (6) shows the idea of hysteresis for Gordon (1989):

$$(7) U^* = \eta U_{t-1} + (1 - \eta) Z$$

Where  $Z$  is, in his interpretation, determined by microeconomic supply side variables. The case of  $\eta=0$  is equivalent of a constant NAIRU rate ( $Z$ ). On the other hand, full hysteresis happens when  $\eta=1$  (equation 8).

$$(8) U^* = U_{t-1}$$

If we substitute full hysteresis in the accelerationist Phillips curve (equation 5), this implies in the inexistence of a NAIRU and it will result in a relationship between changes in inflation and changes in unemployment rate (equation 9). In this way, for example, a situation of high (or low) but stable unemployment rate is perfectly compatible with stable inflation rate:

$$(9) \pi = \pi_{-1} - \beta(U - U_{t-1})$$

Partial hysteresis occurs when  $0 < \eta < 1$ , case in which the NAIRU exists but is not constant in the short run (Ball and Mankiw 2002). In this case, the long run NAIRU ( $Z/(1-\eta)$ ) is a slow attractor. This difference between strong (or full) and weak (or partial) hysteresis can be analogously be viewed, in statistical terms, as the difference between a process with a stochastic trend (such as a random walk) and a stationary process.

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not determined by the same factors of current output, that is demand driven. In this interpretation, the level of employment, in the long run, is determined by supply-side forces, as the capital stock, human capital, productivity of labour and the level of rigid real wages.

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Empirical evidence generally did not support the strong hysteresis hypothesis for the unemployment rate.<sup>10,11</sup> In Staiger, Stock and Watson (1996), for instance, the hypothesis of full hysteresis is rejected for the US unemployment and unit root test are not consensual about non-rejecting the hypothesis of a unit root. But weak or partial hysteresis in the unemployment rate is largely evidenced for European economies in the eighties (see Ball 1996) and widely accepted in the literature about the nineties for the US economy, when the NAIRU started to be estimated as time-varying (e.g., Gordon 1997).

But in practice the empirical estimated time-varying NAIRU<sup>12</sup> in the end is a type of a moving average of the current unemployment rate (Palumbo 2013, 2015a). As pointed out by Palumbo (2015b, p. 18) ‘It absorbs, by construction, all changes of level in the series of the actual unemployment rate, leaving to the behavior of inflation only the explanation of cyclical variations.’ The time-varying NAIRU estimated in this way is influenced by the current unemployment rate, so the idea that NAIRU is determined only by supply-side factors is undermined. It’s important to notice that the practical result is that, at least in the short run, the effects of demand shocks on inflation acceleration are dampened since the unemployment gap tends to endogenously close by these movements in the TV NAIRU, which are also influenced by aggregate demand. The reduced size and duration of the unemployment gaps generates less inflation and can be, by construction, an explanation for the puzzles.

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<sup>10</sup> Empirically hysteresis is measured by different ways. One way to test is estimating the coefficient of the rate of unemployment on the accelerationist Phillips curve (see Staiger, Stock e Watson (1996), for instance). If the coefficient associated by unemployment rate in Phillips aceleracionist curve were zero there would be no NAIRU, or in other words, there would be full (or strong) hysteresis. Another common way to measure hysteresis is by investigating the presence of a unit root in unemployment rate time series. In statistical terms, the concept of a long-term output that is not influenced by short-term shocks can be view as stationarity around a linear time trend. Stationarity in a time series implies a mean reversion behavior. Among Nelson and Ploser (1982) data set unemployment rate was the only one to have a unit root. Hongyi Li (1995) also find evidence of stationarity in the unemployment rate. For a discussion about more recent evidence on hysteresis, see Blanchard (2018).

<sup>11</sup> If the coefficient associated with unemployment rate in Phillips accelerationist curve were zero there would be no NAIRU, or in other words, there would be full (or strong) hysteresis.

<sup>12</sup> Estimated weather as a stochastic filter like Hodrick Prescott, as in Ball e Mankiw (2002) or a frequency filter as in Staiger, Stock e Watson (1996).

### 3.3 Worker's aspirations and productivity shocks

Another strategy is to introduce some supply shocks - mainly productivity shocks - to turn compatible a quite stable inflation with an accelerationist model.

Ball and Moffit (2001) presented a simple model to justify theoretically why real wages may not follow the labour productivity in the short run<sup>13</sup>. According to them, the increase in productivity observed in the US economy in the nineties was explained both by the information technology (the 'New Economy') and by the advantages of low-cost imports and was not followed by an increase in the real wages aspired by workers. Wage aspiration is the real wage that workers find fair. The model supposes that wage aspiration influences nominal wages and is a function of past real wages. The hypothesis is that workers are used to a certain level of purchasing power and slowly adjust real wage aspiration upwards to their productivity gains. As a consequence, if productivity accelerates this gain will not be incorporated into the current wage for a while. But the model also imposes long run distributive neutrality (a constant wage share) and thus after some time workers realize productivity has grown and fully incorporate it in their real wages.

So, unlike the models of distributive conflict inflation, in which the distribution of income can change permanently and aspirations have permanent effects on the rate of inflation, the model of Ball and Moffit has the restriction that, in the long term, the rate of growth of the real wage is equal to the rate of growth of labour productivity (and so the wage aspiration becomes constant over time). Thus, after a productivity shock, the NAIRU decreases but tends to return to the initial level, by the time workers perceive the increase in productivity occurred. In addition, the value of the NAIRU is calculated also under the hypothesis of the steady state constant wage share. In this way, the movements of the

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<sup>13</sup>The model has its inspiration in the heterodox conflict inflation tradition, started by the influential work of Rowthorn (1977).

difference between wage growth and productivity are treated as supply shocks, with temporary effects on inflation.<sup>14</sup>

Empirically, Dew-Becker and Gordon (2005) and Koenig (2001) also incorporated the fact that real wages have, in the most recent period, have grown on average less than productivity and that this has lowered the trend of inflation. However, as also these authors believe that these changes in distribution are temporary - and impose it on the data – these shocks, in the long run will, eventually be compensated with changes in the opposite signal.

### **3.4 The Phillips curve has flattened**

In relation to demand shocks, some authors found that the Phillips curve has flattened in the last decades in US (Mishkin 2007), (Ball and Mazumder 2011) and Advanced countries (Blanchard 2016a). Ball and Mazumder (2011) show that the unemployment coefficient -  $\beta$  in equation 5 - varied in the sample, being small in 1960, increasing in the early 1970s until 1980, then decreasing sharply and becoming quite stable with this low value in 1985-2010 for the U.S. economy. More recently, Murphy notices that ‘the evidence for the U.S. suggests that the slopes of the price and wage Phillips Curves– the short-run inflation-unemployment trade-offs – are low and have got a little flatter’ (Murphy 2018, p. 1).

In consequence, a demand pressure measured by the difference between unemployment rate and NAIRU since 1985 generates, according to these estimates, a much smaller effect on inflation. In the theoretical framework discussed in section 2, this means that the responses from disequilibrium position in labour market to wage and price changes are

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<sup>14</sup>The authors test the influence of the difference between the growth of the current productivity and the past growth of the actual wage in the accelerationist Phillips curve. The result is a decrease and almost disappearance of inflation overestimation, especially in the second half of 1990. In this way, according to this interpretation, what happened in 1990 was that wage growth rate did not follow the rate of productivity growth. Productivity began to accelerate when the wage aspiration was very low, still tied to the decrease in the rate of productivity growth initiated in 1970.

weak. There are a lot of attempts to explain this fact and according to Blanchard (2016a, p. 32) ‘the most convincing [explanation] is that as the level of inflation has decreased, wages and prices are changed less often, leading to a smaller response of inflation to labour market conditions.’ But if we know since Friedman that in the neoclassical labour market real variables like real wages were the relevant ones to the determination of labour market equilibrium, it is difficult to understand how a nominal (and thus neutral) variable (the level of inflation) can play such a role and affect the response of real wages to the unemployment gap.

### **3.5 Gordon: keeping the accelerationist curve alive**

In response to the idea of missing deflation posed by Ball and Mazumder (2011), who show the accelerationist Phillips curve estimated using the data from 1960 to 2007 to forecast US core inflation in 2008-2011 should generate a deflation of almost 5% in contrast to observed positive and stable inflation (which oscillated between about 1,5% and 3% in 2010-2011), Gordon (2013) makes an attempt to keep the accelerationist curve alive by introducing, besides the TV-NAIRU and productivity shocks, a new concept of what is the relevant unemployment rate to inflation.

Besides the long empirical tradition in estimating Phillips curves using aggregate unemployment rate, Gordon (2013) replaces the data of total unemployment rate by the short-term unemployment rate, which varied much less in the period. Gordon justifies theoretically this change by positing that ‘long-run unemployment is a structural problem, and that the portion of the unemployed with durations of six months or more may not be considered viable applicants by employers and thus may put little downward pressure on wage rates and prices’ (Gordon 2013, p. 22). This point is reinforced by Krueger, Cramer and Cho (2014) who also believe that long-term unemployed are on the margins of the labour market.

In the neoclassical labour market framework, this change means that the relevant disequilibrium comes now from the short-term and not by aggregate unemployed. This denotes that long-term unemployed should not be taken into account on the labour supply

function, implying in introducing more imperfections in the neoclassical labour market. But this change seems rather arbitrary since the Phillips curve in its long empirical tradition has always been expressed in terms of aggregate unemployment rate and wage or price inflation and makes it look like this was changed by mere convenience. In fact, Ball and Mazunder explain this empirical procedure to fit the accelerationist Phillips curve to the data: ‘labour-market slack since 2008 is less severe if it is measured by short-term rather than total unemployment, so the Phillips curve predicts a smaller fall in inflation in this case.’ (Ball and Mazunder 2014 p. 7-8).

Regarding supply shocks, Gordon (2013) introduces also a ‘productivity trend acceleration variable’ in the accelerationist triangle Phillips curve. This variable is constructed by a Hodrick-Prescott filter ‘of the productivity growth trend minus that trend eight quarters earlier’ (Gordon 2013, p. 19). As the HP filter generates by construction a symmetrical series, these shocks will have zero mean in the long run. It is worth noticing that these shocks are not randomly distributed around zero but follows long waves of positive and negative values. And as a consequence, from 2000 until 2013 (which is the end of the sample), there is a permanent negative shock arising from this productivity index, which means that this shock, in fact, is avoiding a decreasing inflation since 2000 in Gordon (2013). The permanent negative productivity shock seems to be very important to generate a low and positive stable inflation and avoid a deflation in the triangle Phillip curve estimated by Gordon (2013), since the same accelerationist model (even with short-term unemployment and TV-NAIRU) estimated without this productivity shock shows a forecasted out-of-sample increasing deflation in Ball and Mazumder (2014).

So, the strategy of Gordon (2013) to keep the accelerationist curve alive includes the dampening of demand shocks by including an unemployment gap defined by a short-term unemployment rate and a TV-NAIRU and the introduction of a permanent negative productivity shock to explain the missing deflation of the 2000s.



### 3.6 Nominal wage rigidity

Another attempt to explain the missing inflation is the hypothesis of downward nominal wage rigidity, that is, positive unemployment gaps do not generate decelerating inflation because nominal wages do not actually fall (Daly and Hobijn 2014). Empirically, this kind of explanation is complicated since in the US economy after the 2008 crisis there was a stable and low but positive inflation, which cannot be generated by constant nominal wages and some positive productivity growth. Thus, a sticky nominal wage as a consequence of a positive unemployment gap combined with (even low) productivity growth should lead to a stable rate of deflation and not a positive level of inflation. Moreover, as noticed by Hall (2013), wage inflation was also positive in the US since the crisis (when it should be zero). And finally, as noticed by Krugman (2018), the nominal wage rigidity hypothesis is an ex-post ad hoc explanation and not a modification of the theory that would allow policymakers to foresee the phenomenon.

### 3.7 Anchored expectations and nominal wage rigidity

The idea of anchored expectations, that is, that ‘expectations may have become so well anchored that inflation may be well characterized by random deviations around a constant’ (Fuhrer 2010, p. 469) dates back from Williams (2006), Mishkin (2007) and Fuhrer (2010). Despite this, it is with the missing deflation of the post-crisis period that this notion has become widespread.

Blanchard (2016a) proposes a Phillips curve with anchored inflation expectations in an attempt to fit the accelerationist model to stable data. We can translate Blanchard ideas using our notation. Inflation expectations are fully passed through inflation and demand shocks are generated by deviations of unemployment rate from the natural rate (equation 5), but now (equation 10) expectations are in part exogenous and constant (equal, for instance, to the target announced by the Central Bank  $\pi^T$ ) and in part dependent on

lagged inflation. The extreme case of  $\varphi = 1$  means that the inflation is well anchored and we thus get equation 11<sup>15</sup>:

$$(10) \pi^e = (1 - \varphi)\pi_{-1} + \varphi\pi^T,$$

$$(11) \pi = \pi^T - \beta(U - U^*), \varphi = 1$$

The conclusions reached by this equation 11, if taken seriously, points out to a considerable change in the reduced form of the Phillips curve with strong consequences to the accelerationist principle. So, it is important to take into account that it represents a considerable change in the trade-off proposed by the pragmatic new consensus model with the triangle Phillips curve.

According to Blanchard, the ‘accelerationist curse’ may have come to an end. In the same line, Ball and Mazumder (2014) argue:

with a constant expected inflation, the Phillips curve becomes a relationship between unemployment and the level of inflation, not the change in inflation. This idea goes in the right direction for explaining the missing deflation. According to the accelerationist Phillips curve, a recession causes inflation to fall lower and lower as long as unemployment exceeds the natural rate. With anchored expectations, a period of high unemployment implies a low level of inflation but not an ever-falling level. (Ball and Mazumder 2018, p. 5).

But Blanchard warns that central bank must be aware of the dangers of exploring this trade-off since ‘prolonged deviations of inflation from target may de-anchor expectations’ (Blanchard 2016a, p. 33). In this way, this proposal can make the model compatible with stable data but is flexible enough to convert the model back to the accelerationist one by supposing that expectations can quickly change and became endogenous again if the

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<sup>15</sup> Blanchard (2016a) estimates some sort of Equations 10 and 11 for 20 advanced countries and found very low values for  $(1-\varphi)$  and  $\beta$ . See also Blanchard, Cerutti and Summers (2015) and Ball (2014).

government tries to explore the output-inflation trade-off. In this version, the accelerationist Phillips curve is alive even though it is asleep and ‘central banks should keep the natural rate hypothesis as their baseline, but keep an open mind and put some weight on the alternatives (Blanchard 2018, p. 100)’.

Recently, Gordon (2018) seems somehow to agree with Blanchard regarding anchored expectations, in such a way that he even forgot to quote his optimistic paper from 2013 that argued that the accelerationist model was alive and well. According to Gordon (2018), ‘since 2000 its [the accelerationist-triangle Phillips] curve parameters appear to have shifted, with a diminished response to supply shocks, a flatter short-run PC, and a **diminished response to lagged inflation that has been interpreted as the anchoring of inflationary expectations**’ (p. 435). Using our scheme, Gordon is saying that  $0 < \varphi < 1$ , which, replaced in equation (10) above gives us <sup>16</sup>:

$$(12) \pi = \pi^T - \frac{\beta}{\varphi} (U - U^*)$$

Finally, Solow (2018) also tends to agree with the solution proposed by Blanchard and is also quite skeptical about using this scheme in the long run: ‘[n]o such anchor is likely to survive a large and prolonged deviation of inflation from current experience. Neither is it fly-by-night. The medium run is where we live’ Solow (2018, p. 423).

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<sup>16</sup> It is important to notice that contrary to the empirical evidence, as  $0 < \varphi < 1$ , this would increase  $\left[\frac{\beta}{\varphi}\right]$  and thus a steeper (and not flatter) Phillips Curve for the same parameter  $\beta$ .

## 4 The conflict augmented Phillips curve

We showed in the last section how mainstream macroeconomists incorporate, for each empirical puzzle, different ad hoc theoretical explanations and a number of empirical proxies and procedures in an attempt to keep the accelerationist Phillips curve alive without discarding its core hypotheses: that inflation is a consequence of disequilibrium in neoclassical labour market and is neutral to distribution (at least in the long run) and that expectations are fully incorporated into wages and passed through inflation. In the present section, it will be discussed how the relation between unemployment and inflation can be tackled in a heterodox approach which rejects these two crucial neoclassical hypotheses.

### 4.1 Theoretical foundation

The route towards one alternative to understanding the relationship between unemployment and inflation must begin by rejecting completely the neoclassical view of the labour market functioning as an explanation to wage determination, and as a consequence, the idea of the price of labour as a measure of relative scarcity of this factor of production (represented by the natural unemployment rate). This theory is completely incompatible with demand led growth with structural and persistent unemployment, since this situation would lead to real wages falling to zero (Garegnani 1990).

The alternative classical surplus approach has a long tradition of providing an alternative explanation to the labour market functioning and wage determination. In this view, structural unemployment is a normal phenomenon in capitalist economies and the level and evolution of nominal and real wages must be determined otherwise, such as political, institutional and cultural factors (Stirati 1994) that affect workers bargaining power in influencing their wages.

According to this approach, the relationship between wage inflation and the trend of the unemployment rate is not necessarily stable through time, since this relationship is mediated by political, institutional and cultural aspects such as minimum wage policy,

the power of trade unions, labour protection legislation, etc. that influence workers' bargaining power (Kalecki 1971), (Rowthorn 1977), (Stirati 1994, 2001). Persistently lower trend rates of unemployment strengthen the bargaining power of the labour force, especially under favorable political and institutional circumstances (Kalecki 1971), (Rowthorn 1977). And this can occur even if the economy is still quite far away from a situation of labour scarcity. For other political or institutional reasons wage inflation may not appear at all even if the level of employment is growing fast.<sup>17</sup>

In fact, Abba Lerner (1951) distinguishes two situations: the 'High Full Employment' and the 'Low Full Employment'. The former refers to the neoclassical view of full employment with labour scarcity, in the sense that by stimulating aggregate demand it is impossible to expand employment level but will cause wage inflation, while the latter position can arise if workers' bargaining power is strong and can create a price-wage spiral even if the current output level is below its potential and it is possible to expand the level of production and employment through aggregate expenditures. In this low full employment view, wage inflation is understood as a consequence of 'workers "excessive" demands' (or claims) relative to productivity growth, instead of the usual neoclassical view of an 'excess demand for labour'.

Palumbo (2015b) believes that Phillips' seminal work can be understood under this classical-institutionalist framework. Contrary to the mainstream common sense, it is not just an empirical exercise but is grounded in some theory, although not a neoclassical one. It is important to remember that about the relationship between labour market conditions and wage behavior, Phillips (1958) believed that both the level and the change in the unemployment rate were important to explain wage growth<sup>18</sup>. According to him, lower levels of unemployment lead to greater competition among employees, which leads to an

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<sup>17</sup> Pollin (1998) believes that the size of the 'reserve army of labour' which is structural unemployment is important to put downward pressure on wage through the bargaining power effect. In fact, this is exactly the opposite of Gordon's (2013) view about the importance of long-term unemployment on inflation.

<sup>18</sup> Other possibility is to think that not only the level and change in unemployment could influence wage inflation, but also the time for which the unemployment rate remains at high or low levels. Thus, in periods where the unemployment rate is kept in low (high) levels for a long period, an increase (decrease) in the bargaining power of workers can arise through the 'discipline effect' (Kalecki 1943).

increase in money wages. On the other hand, decreases in the unemployment rate (the rate of change of the unemployment rate) enhance the workers' bargaining power and put them in a stronger position to demand wage increases (Phillips 1958, p. 283)<sup>19</sup>. In this way, according to Palumbo, for Phillips

the unemployment-money wage change relationship is, in reality, an approximate relationship, only valid broadly and over long periods, which in the different sub-periods may change position and shape, appear less clearly or disappear altogether, according to the intensity of these and other influences (Palumbo 2015b, p. 9).

## **4.2 Expectation formation versus incorporation**

In the mainstream discussion about the Phillips curve, there is a wide discussion on how to model inflation expectations: are they rational and forward-looking, adaptive or exogenous due to the credibility about central bank achieving the inflation target? But as we saw, the hypothesis that inflation expectations are completely incorporated into nominal wages is not questioned by mainstream economists, although it is very important to generate the accelerationist result.

Rowthorn (1977) calls attention that, in fact, the important question is not the ability of workers in forecasting future inflation, or how expectations are formed in general, but the extent of the actual power of the workers to incorporate expected inflation in their negotiated wage contracts. This will depend on workers' bargaining position and nothing guarantees that expected inflation can be always fully incorporated. Setterfield and Leblond (2003) and Palley (2012) go beyond and show that if inflation expectations are incorporated only partially, the Phillips curve presents the old shape and thus a long-run trade-off between unemployment rate and the level of inflation. The same point is made

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<sup>19</sup> On this point, see also Pollin (2003).

again in Palley (2018), who relates the parameter of incorporation of expectations into wages to the degree of capital-labour conflict.

Translating this idea in our scheme presented in section 2 (equation 3 and 4), it can easily be seen that if  $\alpha < 1$ , wage inflation is equal to price inflation,  $\pi = w$ , and expectations are fulfilled,  $\pi^e = \pi$ , trend inflation will be:

$$(13) w = \alpha(\pi^e - \beta(U - U^*))$$

$$(14) \pi = \left[ \frac{-\alpha\beta}{1-\alpha} \right] (U - U^*)$$

Which has the same shape of the old Phillips curve, that is, a long-run negative relation between inflation and the level of unemployment. From section 4.1, there is no natural rate of unemployment or a situation of scarcity as there is always some involuntary unemployment, so we can drop the demand shock variable as being related with the deviations from unemployment to the full employment rate. To formalize this using our scheme, it will be included in equations 13 a distributive conflict term ‘c’.

$$(15) w = \alpha(\pi^e + c)$$

And we can also define the conflict term  $c = c_0 - \psi U$  as dependent both on the parameter ‘ $\psi$ ’ reflecting institutional, social and political aspects and on the level of unemployment rate since these variables affect workers' degree of bargaining power. The trend of inflation in this conflict augmented Phillips curve will be:

$$(16) \pi = \left[ \frac{\alpha}{1-\alpha} \right] c_0 - \left[ \frac{\alpha}{1-\alpha} \right] \psi U$$

Here it is important to notice that both  $\alpha$ ,  $c_0$  and  $\psi$  depends on the degree of bargaining power of workers in setting their wages and so must vary through time according to institutional, social and political issues.

### 4.3 Unemployment and employment gap

In section 3.1.3 we argued that weak hysteresis is incorporated in the time-varying natural rate hypothesis in the empirical literature and so unemployment is a long memory process, but stationary. Unemployment rate by definition depends on the employment and the size of the labour force. Following Serrano (1995) we consider that the potential output is only given by capital since the workforce is supposed to be abundant in relation to the capital. So, long-term employment will depend solely on capital accumulation and (negatively on) labour productivity growth, since aggregate demand will determine output in the short run and its trend will induce investment and the expansion of productive capacity in the long run through the flexible accelerator mechanism.<sup>20, 21</sup> Consequently, the long-term employment trend is influenced by the trajectory of current employment, in a similar way as potential output is influenced by the current output.<sup>22</sup>

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<sup>20</sup> The presence of a stochastic trend in the U.S. product is largely evidenced by unit-root tests - even those with structural breaks, e.g. Lee and Strazicich (2003). The lack of strong hysteresis in the unemployment rate in some empirical research can be justified precisely by the influence of the dynamics of the workforce. But even if the unemployment rate is stationary, the level of employment can have a stochastic trend, as is the case of the output. In the same way as Gordon (1989) differentiates weak and strong (or full) hysteresis in the unemployment rate (equation 9), we consider that strong hysteresis in the employment occurs when there is a stochastic trend, in a process like a random walk with drift, and weak hysteresis occurs when the series is stationary but has a long memory. We suppose that employment has a stochastic trend and thus strong hysteresis. Employment was among one of the macroeconomic series that Nelson and Plosser (1982) consider having a unit root. Hongyi Li (1995) also find evidence of stationarity in the unemployment rate and a stochastic trend in the employment rate.

<sup>21</sup> DeLong and Summers (2012) model hysteresis effect (measured by parameter  $\eta$ ) as a way current output change  $\Delta Y_n$  influences future output  $\Delta Y_f$ . The authors mention investment shortfalls as a source of hysteresis or 'capital-stock' hysteresis, besides hysteresis effects on labour market. Investigating the US case, in the aftermath of the 2008 recession, authors describe a channel similar from an accelerator investment function, estimating that a 1% shortfall in demand for industrial goods for one year would produce something around 0.24% to 0.31%-point reduction in potential GDP. In spite of this empirical result, authors maintain the theoretical background that potential output is entirely determined by supply side, the channel through demand impact potential output is on the decay of skills of workers without employment. The same point is made by Ball (2014) for OECD countries.

<sup>22</sup> So, a strong hysteresis on output is the reason for a strong hysteresis on employment. Even considering demographics movements in the labour force, some authors show that the labour market in the US is still weak despite the low unemployment rate (Buffie et al. 2016) and that 'there is likely still a demand-driven shortfall in this indicator (Bivens 2016, p. 273)'. According to:



The unemployment rate depends on employment but also on the labour force dynamics, such as participation rate of certain social groups (such as young people, women and the elderly), the size of the informal sector, international and internal migratory movements, disguised unemployment, demographic changes, and workers adapting to the hours supplied to the actual employment opportunities. To some extent, there is an endogenous component in the movement of the labour force that adapts to avoid a systematic fall or rise without limits of the unemployment rate. In the long term, the unemployment rate is kept within bounds due to these endogenous changes of the size of the workforce seeking employment, adapting to the evolution of actual employment opportunities, as argued by Garegnani (1990). Also, labour productivity is both procyclical, due to Okun's Law (Jeon and Vernengo 2008), and partially follows endogenously the trend growth of demand according to some sort of Kaldor-Verdoorn effect (Deleidi, Meloni and Stirati 2018).

In this way, the demand-led explanation to the empirical fact of strong hysteresis in the levels of output and employment (Braga 2006), together with the idea that labour force and productivity growth are also in part endogenous, help us to explain the presence of weak hysteresis of the unemployment rate. And finally, as the endogenous adjustment of the labour force is understandably quite slow, lagged and incomplete, this allows us to understand why the level of the unemployment rate can remain in high or low (not predetermined or natural) levels for long periods of time.

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Today, the unemployment rate is back below five percent, and job growth is even stronger than it was in 2007. However, the economy is far from fully recovered (...) various measures presented in this paper; by every single metric, the economy appears unrecovered. Buffie et al. (2016, p. 20)

According to Fay and Ketcheson (2016):

there is considerable uncertainty about whether the decline in participation unrelated to aging is driven by structural or cyclical phenomena and representative of slack. Nevertheless, a review of the historical experience suggests that a sizable number of persons outside the labour force could be "activated" and drawn back into the market under much 'hotter' labour market conditions.

A similar point is made by Mason (2017).

#### 4.4 Bargaining Power and Traumatized workers since the 1980s

The empirical puzzles facing the accelerationist Phillips curve (discussed in section 3.1 above) can be easily interpreted by our conflict augmented Phillips curve. Notice that, in the end, all the supposed puzzles are about the same key issue: a large and long-lasting rate of unemployment which does not lead to accelerating or decelerating deflation. In the conflict augmented Phillips curve there is no such thing as a natural rate of unemployment and expected inflation is not necessarily fully incorporated into nominal wages, as this relation depends on the bargaining power of workers, which depend on labour market conditions and institutions as well as other social, political and social aspects. As a result, the accelerationist relation between inflation and unemployment is much more an exception (occurring only when conflicting claims are very intense and/or there are other permanent strong cost-push pressures) than the rule. Thus, a relatively of stable inflation can be compatible with a set of different and persistent unemployment rates.

In this view, all the lower and more stable process of inflation in U.S. and Europe since the 1980s can be explained by the same broad factor: the decrease in the intensity of the distributive conflict as a result of greatly reduced bargaining power of workers. The origin of the lower bargaining power of American and Western European workers can be traced back to the 1980s. This decade inaugurates a period of institutional changes in the labour market that led to: 1) the reduction of the unionization of workers; 2) the fall of the real value of the federal minimum wage; 3) the end of income policies; 4) the increase of immigration; 5) the rapid increase in non-traditional, part-time or temporary jobs — partly associated with increasing sector participation and services at the expense of the industry — 6) the increase of flexible forms of remuneration, rather than a formal salary and 7) a process of increasing lack of stability at work (Braue 2002), (Glyn 2006). Additionally, there has been a process of industrial deregulation (downsizing) and transfer of labour-intensive production units using less qualified work to developing countries ('delocalization' and 'relocalization'), especially to China<sup>23</sup>. All these changes have

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<sup>23</sup> Pollin (2003) emphasizes the role of 'globalization' in the 1990s in diminishing the bargaining power of the workers. The possibility of 'relocalization' of companies toward countries with low wage costs makes

diminished the bargaining power of workers and their ability to obtain large wage increases.

In the academic literature, a number of heterodox economists, such as Pollin (2003), Serrano (2004), Setterfield (2005) and Braga (2006) for the US economy and Stirati and Meloni (2018) for OECD countries, have pointed to the strong evidence in favor of the reduction of bargaining power of workers as a key determinant of the trend towards lower (wage and price) inflation in advanced countries. But this relation between workers' bargaining power, institutions and wage and price inflation is recognized also by important policymakers and policy-oriented mainstream macroeconomists. Paul Volcker<sup>24</sup> and Alan Greenspan agree that the defeating of unions power in the US at the beginning of 1980s was very important to control trend inflation<sup>25</sup>. The lower degree of worker bargaining power was recognized as important to prevent (wage and price) inflation pressures with low unemployment rates in the 1990s by Janet Yellen and Allan Greenspan, the latter having classified workers as 'traumatized'<sup>26</sup>. Finally, even Phelps

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it credible the threat of firms to fire their workers if they want, for example, to unionize. The reserve industrial army increases in potential conditions when unemployed or poorly paid workers from other countries are inserted (mainly if they can produce sophisticated industrial goods, as it is the case of China). See also Serrano (2004).

<sup>24</sup> According to Volcker, in the 1980's in U.S.:

the most important single action of the administration in helping the anti-inflation fight was defeating the air traffic controllers' strike. He thought that this action had rather a profound, and from his standpoint, constructive effect on the climate of labour-management relations, even though it had not been a wage issue at the time (Glyn 2006).

<sup>25</sup>

Ms. Minehan: ...I am wondering whether the principal effect of strikes is not so much their near-term impact on economic activity or inflation but rather their longer-term impact on people's perceptions of the relative power of labour unions versus management despite the decline of membership in labour unions in this country. ...So, I am wondering whether, even if a strike does not have an immediate inflationary impact, its potential to affect even nonunion relationships between labour and management may be significantly going forward. Chairman Greenspan: That would depend on how the strike came out, whether, for example, it was a significant management victory... There have been significant strikes in the past where evident union defeats had a very damping effect on labour unions. For example, the flight controllers' strike, which was quashed, did more to suppress union power than almost anything else in the 20th century (FOMC 1996).

<sup>26</sup>

(2017), one of the fathers of the accelerationist curve, seems to have adopted the traumatized workers' argument to explain why inflation is not accelerating as a result of low unemployment in US economy after 2017<sup>27</sup>. And a similar explanation can be found in Larry Summers (2017)<sup>28</sup>.

The lower degree of bargaining power of the workers would be represented in equation 16 as lower values of the parameters  $\alpha$ ,  $c_0$  and  $\psi$ , which help to explain why Phillips curve became flatter, a lower degree of inertia and the end of the accelerationist curve since the 1980s. Also, the classical surplus approach along with the demand-led interpretation of the adjustment of the unemployment rate can account for the direction of the observed changes in this variable.

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To be sure, an acceleration in nominal labour compensation, especially its wage component, became evident over the past year. But the rate of pay increase still was markedly less than historical relationships with labour market conditions would have predicted. Atypical restraint on compensation increases has been evident for a few years now and appears to be mainly the consequence of greater worker insecurity. In 1991, at the bottom of the recession, a survey of workers at large firms by International Survey Research Corporation indicated that 25 percent feared being laid off. In 1996, despite the sharply lower unemployment rate and the tighter labour market, the same survey organization found that 46 percent were fearful of a job layoff (Greenspan 1997).

27

For me, a compelling hypothesis is that workers, shaken by the financial crisis and the deep recession that resulted, have grown afraid to demand promotions or to search for better-paying employers raises – despite the ease of finding working in the recently tight labour market (Phelps 2017).

28

But I suspect the most important factor explaining what is happening is that the bargaining power of employers has increased and that of workers has decreased. (...) On this Labour Day we would do well to remember that unions have long played a crucial role in the American economy in evening out the bargaining power between employers and employees. They win higher wages, better working conditions and more protection from unjust employer treatment for their members. More broadly they provide crucial support in the political process for broad measures such as Social Security and Medicare, which benefit members and non-members alike. Both were at their inception passionately opposed by major corporations. The shrinking of the union movement to the point where today only 6.4 per cent of private sector workers — a decline of nearly two-thirds since the late 1970s — are in unions is one important contributor to the decline in the relative position of labour in general and those who work with their hands in particular (Summers 2017).

## 5 Final remarks

The paper has analyzed critically the mainstream empirical and theoretical attempts to keep the accelerationist Phillips curve alive. It was showed how a set of ad hoc hypotheses have been included to explain these empirical puzzles without discarding its core framework: that inflation is a consequence of disequilibrium in neoclassical labour market and is neutral in relation to distribution (at least in the long run); and that inflation expectations are fully passed through to wages and inflation.

We proposed an alternative way of thinking about the relation between (wage and price) inflation and unemployment rate by discarding these two crucial assumptions and interpreting inflation as a consequence of conflicting claims over income distribution which are mediated by institutional arrangements and political power relations, where labour is seen (apart from very specific historical conditions such as major wars) as being fundamentally non-scarce. We believe that this conflict augmented Phillips curve, which does not necessarily (by the way, quite the contrary, not very often) generates an accelerationist behavior of inflation, is alive and well.

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