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John Komlos

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Poschingerstr. 5, 81679 Munich, Germany

Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de

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Abstract

The *official* unemployment rate has become an inadequate measure of labor market conditions. This poses a major challenge for basic research as well as for the formulation of adequate economic policy. We propose a new definition of the unemployment rate by weighing part-time workers with 62.5%, the proportion of the time they work relative to full-time workers. We provide new monthly estimates of the unemployment rate for the period 1994-2019 and find that their average during this 25-year period was 10.1% or 4.4 percentage points above the average of the *official* rate of 5.7%. The gap between the two rates fluctuated between 3.6 and 5.6 percentage points and rose in wake of the recession of 2008 reaching a peak in 2014 only to decrease slowly thereafter back to its pre-recession level of 4 percentage points. The Phillips curve is investigated with the new unemployment rate as well as with U3 and U6 in seven specifications for the period 2008-2019 confirming the very shallow slope found in other studies. However, in one of the specifications the slope is much steeper, mysteriously reminiscent of the coefficients estimated for the 1970s providing a conundrum for further study.

JEL-Codes: J400, J490, 690.

Keywords: unemployment, labor market slack, discouraged workers, involuntary part-time workers, Phillips curve.

John Komlos
University of Munich / Germany
John.Komlos@gmail.com

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Introduction: Who is Unemployed?

The official unemployment rate estimated by the Bureau of Labor Statistics (BLS) has not been conforming recently to economic theory in several respects. For example, the absence of significant inflation even though the official unemployment rate (also referred to as U3) has been well below the natural rate of unemployment for two whole years is a conundrum, challenging theoretical expectations of what should happen near or below the natural rate of unemployment (Friedman, 1968; Phelps, 1967). Similarly, the empirical estimates of the Phillips curve (the negative relationship between the unemployment rate relative to the natural rate and the inflation rate), a key monetary policy tool of central bankers, have been controversial.¹ Many scholars question the validity of a robust relationship while others argue that “reports of the death of the Phillips curve may be greatly exaggerated” or that “the Phillips curve is alive and well” (Hooper, Mishkin, and Sufi, 2019; Fuhrer, 1995). Left unacknowledged, at least in the recent literature, however, is the critical fact that the extremely complex and sophisticated empirical models—the backbone of macroeconomics—have been analyzed with errors-in-variables, insofar as the unemployment rate has been mismeasured and the natural rate probably equally so.² This paper argues that the definition of the unemployment rate needs a reset.

In the U.S., the unemployment rate began to receive its modern conceptualization in the 1930s, although the BLS did not start publishing monthly statistics until 1948. Note that economists write volumes about the unemployment rate, but they have not defined it theoretically, although it would be straightforward to do so as any adult who is without a job but would like to work. Nonetheless, “economists left the question of how to define and measure unemployment to the statisticians and bureaucrats” (Card, 2011). Hence, it became the task of the BLS to define such a bellwether variable arbitrarily as “the inability to find a job when you are actively seeking one” instead of wanting one³ (Karabell, p. 43). This seems like a benign distinction but it is not, as will be argued below. To be sure, the BLS did have some rationalization for the restrictive nature of the definition. They thought that “...asking people without work if they were able and/or wanted to work was fraught with value judgments, as the questions were largely hypothetical” (Dunn, et al., 2018).⁴

Instead, researchers settled on a more objective way to ascertain one’s employment status—by simply finding out what job-market-related activities people were *doing* during a prescribed period. Under this *activity concept*, a person who was not working but was actively seeking a job would be classified as unemployed. Classification based on activity is inherently

more objective because actions are overt and demonstrable, rather than merely indicating that one wants a job” (Dunn, et al., 2018).

This justification is disingenuous, because wanting to work is hardly “fraught with value judgements,” and is not any more “hypothetical” than “seeking” work is. It is the reflection of the unemployed persons’ current state of mind and “values” are hardly salient in this regard. Besides, the unemployed who want to work but are not looking actively have no objective reason to deceive the interviewer any more than those persons who declare that they are actively seeking work. Both statements are based on the interviewer’s reliance on the respondents accurately describing their current situation. Moreover, the interviewers were not “finding out what job-market-activities people were doing.” Instead, they were relying on the information the interviewee was providing. Given that the unemployed have no objective incentive to twist the facts, there is no *prima facie* reason to question the reliability of one set of information any more than the other set. They are both based on testimonials rather than evidence based. Hence, there is no warrant to think that “seeking” is any more accurate than “wanting” particularly since the people might have become discouraged from “seeking” through an accumulation of experienced frustration in the job market. It does not seem appropriate to exclude discouraged workers from the labor force just because the labor market put so much psychological pressure on them that they became so stressed that they gave up looking; they realized that “seeking” was in vain (Green 1997).⁵

In any case, the interviewees do not have to “enter the job market” as asserted above, because they are already part of it through their aspirations even if they are passive about. The uncertainty associated with what kind of job the respondent would accept “like the nature of the job, hours, location, and pay” pertains just as well to those who state that they are actively seeking a job. It remains unknown under what circumstances they would accept a job offer and whether their expectations are reasonable. Perhaps their salary expectations are too optimistic, or they would not be so keen on accepting a pay cut, a part-time job, or a socially undesirable job. That kind of ambiguity does not disqualify the self-proclaimed active seekers from being considered unemployed; why should the same ambiguity disqualify a discouraged member of the labor force?

The assertions that discouraged workers “arguably could vacillate from day to day” or that they could give “biased answers to such questions toward socially acceptable responses”

also fail to convince, because they are hypothetical and not evidence based. After all, one study of this issue found that the transition probabilities into work of “the most active” members of the “out-of-the-labor-force job seekers” “are actually indistinguishable from the unemployed” (Brandolini et al., 2006). In any case, the above arguments apply equally to those who respond that they are active searchers. Their disposition could also vacillate from day-to-day, and their answers on “what job-market-related activities people were *doing*” could also be swayed by social concerns. Moreover, the likelihood that the active searchers were being sincere is not at all greater than those of the discouraged workers, particularly since they are not asked to provide proof that they actually did search actively for a job. In both cases the classification depends solely on the information provided by the respondents without any evidence. Consequently, the distinction between these two types of unemployed can hardly be considered objective. On the contrary, the distinction is arbitrary, highly ideological, not evidence based, and with profound political implications, especially since limiting the job search to the previous four weeks has not been properly justified. (A suggestion was made to extend the cut-off period to two months (President’s Committee, 1962, p. 52). Furthermore, the differences between the officially unemployed and the discouraged workers have not been sufficiently investigated empirically in the U.S.

One should also consider that at mid-century when the current definition was being adopted, the number of discouraged workers was negligible because of the more dynamic nature of the labor market. It was more difficult to become discouraged when work opportunities were plentiful for the less skilled and the prospect of finding work was reasonably certain. A contemporary study found that “those not in the labor force are chiefly women whose primary activity is housework, boys and girls in school, and the aged” (President’s Committee, 1962, p. 55). However, in the labor market of the 21st century, in the midst of the IT revolution, deindustrialization, and skill mismatch with outsourcing, offshoring, informal work arrangements, unfulfilling and precarious jobs, it is much easier to become discouraged especially as the share of the gig economy without benefits proliferates⁶ (Friedman, 2014; Graeber, 2018; Heller, 2018; Blanchflower, 2019). In other words, the psychological impact of looking for work was considerably less severe 70 years ago implying that the rise of discouraged workers and involuntary part-time workers tended to impinge on the accuracy of the *official* unemployment rate over time.⁷

Janet Yellen, Chair of the Federal Reserve at the time, implied as much when she said that “greater worker discouragement is most directly the result of a weak labor market... ongoing shifts in the structure of the labor market and the possibility that the severe recession caused persistent changes in the labor market's functioning... [which] made it more difficult to judge the remaining degree of slack” (Yellen, 2014).⁸ She continued to worry about “slack” in the labor market and that, “elevated levels... [of] disability applications and educational enrollments... may partly reflect perceptions of poor job prospects” (Yellen, 2014; Beatty and Fothergill, 2002).⁹

In addition, the above argument claiming to be objective about defining unemployment is also inconsistent in the sense that working full-time or part-time is unquestionably objective, yet the current definition conflates the two types of workers although they are quite distinct. Discussing the elevated number of involuntary part-time workers, Yellen recognized that the “unemployment rate may understate the amount of remaining slack in the labor market” (Yellen, 2014). Similarly, Boston Fed President Eric Rosengren spoke of the slack in the labor market as indicated by “the high numbers of U.S. workers who want full-time work but are currently working part time” (Rosengren, 2014).

This vexing problem of involuntary part-time workers has been recognized also in the European context: “the description of employment levels that is provided by head count measures is partial... [It] imposes a very specific, and hence debatable, value judgement in the social evaluation: one that treats any job as equal independently of worked time” (Brandolini and Viviano, 2016). In sum, it is inconsistent to obscure the important distinction between full-time and part-time workers.¹⁰ The implication is that the *official* unemployment rate provides a distorted view of the labor market (Blanchflower, 2019).

This essay provides additional evidence that the current simple “headcount index” of the *official* unemployment rate has become unreliable and unacceptably misleading and thereby provides an ambiguous and easily misunderstood condition of the labor market (Brandolini and Viviano 2018).¹¹ In contrast, we propose a theoretically founded conceptualization of unemployment and find that the real unemployment rate is more than twice the official rate.

Mismeasuring the Labor Market

It has been recognized for some time that “the unemployment statistic is no longer an adequate indicator of the economic condition of the labor market, or of the social condition of the labor force, and therefore does not represent the best possible... information for public policy...” (Clogg, 1979, p. 2). “It cannot describe the... dynamic... in the labor force with clarity demanded by modern social science. It should be replaced... by a more complete framework for measurement” (Clogg, 1979, p. xi) That its definition now requires a reset has become increasingly urgent and obvious:

“...it is time for a new set of statistics. It’s time for measures that do a better job of capturing the realities of modern American life.... The trouble is that a handful of statistics dominate the public conversation about the economy despite the fact that they provide a misleading portrait of people’s lives. Even worse, the statistics have become more misleading over time.... The unemployment rate has also become less meaningful than it once was. In recent decades, the number of idle working-age adults has surged. They are not working, not looking for work, not going to school and not taking care of children. Many of them would like to work, but they can’t find a decent-paying job and have given up looking. They are not counted in the official unemployment rate. All the while, the federal government and much of the news media continue to act as if the same economic measures that made sense decades ago still make sense today” (Leonhardt 2019).

Jeffrey Sachs also questions the official data. He suggests that there is a problem with: “illusory economic statistics that hide as much as they reveal” (Sachs, 2019). And the *official* unemployment rate hides a lot because “boundaries between different labor market states are blurred” (Brandolini and Viviano, 2018). Stiglitz et al., conclude similarly:

“there often seems to be a marked distance between standard measures of important socio economic variables like economic growth, inflation, unemployment, etc. and widespread perceptions.... [This] has undermined confidence in official statistics... with a clear impact on the way in which public discourse about the conditions of the economy and necessary policies takes place.... The way in which statistical figures are reported or used may provide a distorted view of the trends of economic phenomena” (Stiglitz et al., 2010, pp. 7, 8).

Economists at the Federal Reserve and other central banks know that the *official* unemployment rate is an inaccurate indicator of labor market slack (Cajner et al., 2014; Brandolini and

Viviano, 2016; Rosengren, 2014; Valletta, Bengali, and van der List, 2018; Valletta and van der List, 2015; Valletta, 2018, Yellen 2014).

That the Western definition of unemployment was inadequate for developing societies was emphasized long ago (Myrdal 1968). To recognize and admit that the *official* unemployment rate is equally inadequate for a developed society such as the U.S. is well overdue. This is especially true in the 21st century, insofar as the nature of the labor market has changed markedly and has become more like the dual labor markets of the developing world (Temin 2017).

To appreciate how conflating part-time with full-time workers can obscure the trends in the labor market note that during the recent financial crisis the economy shed 8.3 million jobs officially, but these numbers concealed the fact that the number of full-time jobs lost was actually 2.7 million greater: 11.0 million (FRED, LNS12600000 CLF16OV, LNU02000000, UNRATE). However, the numbers of part-time workers spiked by some 2.7 million and that compensated to some extent for the loss of full-time jobs, making the *official* unemployment numbers appear less ominous than they actually were (FRED, series NS12600000).¹²

Similarly, involuntary part-time workers, those who were working part-time not out of choice but out of necessity, doubled during the crisis from 4.5 million to 9.0 million, implying that the impact of the recession on the labor market was deeper than the 11 million unemployed implied (FRED, series LNS12032194). By disregarding those who were involuntarily partly unemployed, the official statistics puts a heavy Panglossian sheen on the labor market, especially in recessions, and thereby disguises the real nature of conditions in the labor market inducing Fed economists to be apologetic about the misleading nature of the official unemployment statistics (Buffie, 2016).

That the Federal Reserve Bank of Kansas City introduced another indicator of labor-market conditions based on 24 variables is more evidence that a more nuanced approach to understanding the conditions prevailing in this important market is needed (Kansas City, no date; FRED, series FRBKCLMCIM). Similarly, the Federal Reserve Bank of Richmond calculated a “non-employment” index which “arguably provides a more accurate reading of labor market conditions than the standard unemployment rate”¹³ (FRED, series NEIM156SFRBRIC; Richmond, no date; Hornstein, Kudlyak, and Lange, 2015). In other words, the Fed is well acquainted with the shortcomings of the *official* unemployment rate.

As mentioned above, the requirement to be “seeking” work rather than “wanting” work is arbitrary and lacks any theoretical, linguistic, or philosophical justification (Card, 2011), inasmuch as actively searching for work is hardly the essence of being without work. These are two different characteristics of the person in question. Note that even gathering information by “simply reading want ads is not considered active job search” by the BLS and is not a sufficient condition of meeting the requirement of actively seeking work (Bradbury 2008). This is anachronistic in an age in which internet search is a favorite method for looking for work. In 2011 a third of those who were not considered to be in the labor force or unemployed used the internet to search for work (Faberman and Kudlyak, 2016). Hence, objectively, those actively searching the internet should not be excluded from the unemployment rate (Eubanks, 2018).

There is no obvious reason why the state of being unemployed should depend on the ability to change that state. After all, being jobless is an objective fact and not contingent on any peripheral condition; wanting to work is a verbal expression of a disposition no more subjective than a statement pertaining to looking for work. By way of analogy, note that I might have a common cold and want the services of a doctor in order to remedy my ills without the ability to pay for it. Hence, my state of being sick is not contingent on my ability to do something about it. It is an objective attribute of my current state of being. Likewise, my being thirsty is not contingent on my looking for a drink even if I would like to have one; after all, I might not have the money remedy my situation, and I might be living in Flint, Michigan with a contaminated water supply. I might be in the middle of the desert. So, I remain thirsty even if I do not seek to remedy it. It is hardly legitimate to conflate the two issues.

Similarly, with unemployment: there might be many reasons why unemployed persons are not looking for work even though they want to work. They might be so discouraged by prior rejections that it seems to them to be a waste of time and money to actively go and look for a job. They might have felt so stressed by having experienced racial, gender, or age discrimination that their level of depression became debilitating. Searching for work under such circumstances might just lead to further frustration, anxiety, and depression (Tcherneva, 2017, 2019). Perhaps they do not have gas money or bus fare to go to an interview or perhaps their car needs to be repaired. That does not make them any less unemployed than someone who does have gas money to search for work. Moreover, in the locality in which they live there might not have any jobs available for which they might qualify, and they lack the money required to relocate in

search of a job.¹⁴ The point worth emphasizing is that they are still unemployed, and still want a job, even if they had not had a job interview recently; circumstances might have prevented them from actively searching although they are still looking at advertisements on the internet and in newspapers. Whether they are going door to door is immaterial to their state of being unemployed. It seems rather improper to disqualify someone from being counted as unemployed because the adverse nature of the labor market impacted their state of mind. It is like saying that someone does not like to swim just because she does not jump into a shark-infested waters. It is the nature of the ocean that keeps her from swimming, just like it is the nature of the labor market that keeps the discouraged unemployed from working.

Hence, the state of being unemployed is not contingent on changing that state. Indeed, the profound psychological impact of an adverse labor market might well mean that the person affected is hindered from seeking work actively by the very nature of the labor market. This is clearly the consequence of the social and psychological impact of unemployment: “the effects of unemployment eventually emerged: a diminution of expectation and activity, a disrupted sense of time, and a steady decline into apathy through a variety of stages and attitudes” (Jahoda et al., 2002). Hence, the scale of the thermometer measuring the state of the labor market should not be endogenous to the conditions prevailing in that market. The scale should be independent of the state of that market. It is like measuring temperature with Celsius in some cases and Fahrenheit in others. Put another way, shifts in the demand for labor should not appear to be shifting the supply of labor. So, the litmus test of being classified as unemployed should not be based on whether the person in question is actively looking for work but whether they are willing and ready to work. Unemployment should mean simply that the person desires to work but is not working.

Consequently, “the US official unemployment rate is potentially subject to measurement error” (Feng and Hu, 2013). This is crucial, because the restrictive nature of the BLS definition implies that the *official* unemployment rate is a lower-bound estimate which can serve political purposes and confuse both the public as well as researchers (Feldstein, 2017; Leonhardt, 2018; Stiglitz, Sen, and Fitoussi, 2010). Inappropriate economic policies follow from inadequate data and this is particularly important in such a crucial economic variable as the unemployment rate (Häring and Douglas, 2012 Green, 1995). For instance, at the January 2016 meeting of the American Economic Association in San Francisco, Martin Feldstein declared pompously that

“The U.S. economy is in good shape... We are essentially at full employment with the overall unemployment rate at 5%” (Feldstein 2016a,b,c). The headlines generated by his pronouncement could well have led Hillary Clinton to be more sanguine about her prospects than she should have been. Note, furthermore, that the implication of the important equivocating word “essential” in his statement, which was no doubt overlooked in the media as well as by the public.¹⁵

In addition, the mismeasurement leaves analysts to wonder why there is so much discontent in a society at full employment that includes an ominous rise in suicides and other forms of deaths of despair (Case and Deaton, 2017; Sachs, 2019). Of course, this also impacts basic research, insofar as econometric estimates in “the presence of measurement errors causes biased and inconsistent parameter estimates and leads to erroneous conclusions” in a myriad of ways (Hong 2008). This is particularly important for the unemployment rate, the centerpiece of thousands of research projects and policy concerns (Card, 2011).

The Real Unemployment Rate

We estimate the actual unemployment rate between 1994 and 2019 according to the above delineated considerations. Objectively, we believe that part-time workers should not be conflated with full-time workers.¹⁶ (The BLS conflates part-time with full-time workers and does a simple head count by considering part-time workers just as employed as full-time workers.) So, the first task is to estimate the hours worked by part-time and full-time workers: we find that in this period the former worked about 63.4% as long as the latter but in March 2019, the month to which Table 1 pertains, they worked only 62.5% as many hours.¹⁷ Hence, only 62.5% the number of part-time workers is added to the labor force (Table 1, row 2). The reason is that in March 2019 part-time workers worked about 26.6 hours per week, while full time workers worked 42.5 hours (BLS, hours of work, no date). So, a part-time worker is considered the equivalent to .625 full-time member of the labor force.

Note, in addition, that there are two kinds of part-time workers: those who are content working part time, and those who would like to work full time but have not found full-time employment.¹⁸ The former are not considered further, since they are not counted as unemployed. They are considered 62.5% members of the labor force; so they are fully employed although their contribution to employment is 0.625¹⁹ (Table 1, row 2). However, the involuntary part-time workers are considered full members of the labor force even if they

are not working full time. Thus, the involuntary part-time workers are considered 37.5% unemployed (Table 1, rows 4 and 7) and 62.5% employed (Table 1, row 2). So, 62.5% of their number is included to the labor force in row 2, and 37.5% is included in the labor force in rows 4 and 7 as unemployed.²⁰

Table 1 about here

Second, there is no theoretical reason to exclude those who work for the military (as there was when soldiers were drafted) since they work for the government and receive a salary just like many other government workers, and they do work full time. Hence, we include their number as well in the labor force (Table 1, row 3). To this we add the number of really unemployed, the calculation of which is discussed below (Table 1, rows 4 and 9). This yields a total effective labor force of 167.2 million.²¹ This is 4.2 million above the official estimate, because of counting the military as part of the labor force but also because the BLS does not count those who want a job but have not looked recently as part of the labor force (Table 1, row 8) (FRED, series CLF16OV).

The actual number of unemployed consists of those officially unemployed (3.8%), plus 37.5% of those who are working part time involuntarily since they would like to work full time (1.0%) (Table 1, rows 6 and 7). In contrast, the BLS considers them fully employed in the official unemployment rate (U3) and fully unemployed in the U6 rate. So our preference is in between these two extremes. To that number we add the numbers of those who want to work but have not looked for work within the previous month (Table 4, row 8). This is valid for the above enumerated reasons and yields as the estimated number of unemployed in March 2019 of 13.1 million and an unemployment rate of 7.8%; this is 4.0% above the *official* unemployment rate (3.8%) and 0.5% higher than the U6 rate.²² This implies that the *official* unemployment rate is just 48.5% of the actual rate.²³

We apply this method for the period 1994-2019 for which the above data are available and find that the average actual unemployment rate in the 25-year period was 10.1%, 4.4 percentage points above the *official* rate of 5.7%. The gap between the two rates fluctuated between 3.6 and 5.6 percentage points and rose in wake of the recession of 2008 and decreased slowly after 2014 back to its pre-recession level of 4 percentage points (Figure 1, U3 Gap). In contrast, the real unemployment rate was merely 1.28 percentage points above the “non-employment” rate calculated by the Richmond Fed (FRED, series NEIM156SFRBRIC). The

range of the gap was between -0.2 and 3.7 percentage points. Moreover, the U6 Gap fluctuated between -2.8 and +0.8 percentage points with an average value of -0.3 percentage points. The reason why the U6 rate was greater than our estimate is that the U6 rate considers the involuntary part-time workers as fully unemployed whereas they are only 37.5% unemployed in the above calculation and their number swelled considerably during the recession and its immediate aftermath (Figure 1). Thus, in a recession the U3 rate understates while the U6 overstates the true nature of the labor market conditions.

Figure 1 about here

Next, the unemployment gaps are calculated as a percentage of the U3 rate and the U6 rate. The former gap fluctuates between 43.5% and 109.0% of the U3 rate with an average value of 80% while the latter gap fluctuates between -17.0% and +11.3% of the U6 rate with an average value of -0.7% (Figure 2). As a percent of the official rates the gaps decline in a recession and its aftermath when part-time workers swell in number.

Figure 2 about here

The Philips-Curve Controversy

We consider the extent to which the inflation rate (CPI) is related to the various unemployment rates (FRED, series CPIAUCSL).²⁴ A major weakness of the empirical Phillips-curve literature is that it is based almost exclusively on the *official* rate of unemployment without even considering the possibility that U6 might be also a useful variable to consider in this context.²⁵ However, there is now a study that recognizes that “the Phillips curve in the UK has now to be rewritten into wage underemployment space” implying that alternative measures of unemployment are needed to understand the macroeconomic relationship between prices (or wages) and unemployment or labor market slack in general (Bell and Blanchflower, 2018b; Santomero and Seater, 1978).

We contribute to this research program by considering the Phillips-curve relationship with various unemployment rates using a simple OLS regression model in levels with the CPI inflation rate as the dependent variable and the gap between the natural rate of unemployment (both long-term and short-term) and U3, U6, and the real unemployment rate as six independent variables²⁶ (FRED, series NROUST and NROU) (Table 2, rows 1-6). Finally, we also consider the difference between the newly estimated real unemployment rate and U3 as the independent variable (Table 2, row 7).

We find that during the period 1994-2007 there was no significant relationship between the CPI and any of the unemployment gap measures. However, in the following period (2008-2019) a negative and statistically significant relationship emerged for all the unemployment gaps (Figure 3 and Table 2). The real unemployment rate does not perform better than U3 or U6 in the short-term NAIRU specification but it does have a steeper coefficient estimate and is more significant in the long-term NAIRU specification. All the estimated slopes are significant but shallow with the largest estimate (in absolute value) of -0.16. This is of similar magnitude to other estimates for the period which report a slope coefficient of about -0.2 from the period after the 1990²⁷ (Blanchard, Cerutti and Summers, 2015; Blanchard 2016). Ball and Mazumder (2011) report a slope coefficient of -0.14 for the period 1985-2010.

However, the slope coefficient estimated using the variable created by subtracting U3 from the new real unemployment rate is much steeper than the other slopes (-0.68), being four to eight times as large (in absolute value) as the other slope estimates; it is also the most significant of the estimates presented here (significance level = 1,3%) (Table 2, row 7). The strength of this somewhat puzzling relationship might have to do with people interpreting the U3 rate as the NAIRU instead of the rate reported by the Federal Reserve or at least that the market does not have much confidence in the official natural rate.²⁸ Another possibility that might be considered is that the extensive involuntary part-time work following the Great Recession could have led to an unusual amount of skill depreciation that, in turn, led to hysteresis effects that transformed the labor market in such a way that NAIRU as well as U3 have different implications than they did a generation ago. Obviously, this important somewhat puzzling relationship needs to be investigated further in order to improve our understanding of the Phillips-curve in today's economy. Suffice it to say at this point, that the estimate of -0.68 (2008-1019) for the seventh slope coefficient bears an uncanny similarity to the -0.7 slope estimate of the Phillips curve for the 1970s (Blanchard, Cerutti and Summers, 2015; Blanchard, 2016).²⁹ An earlier study also found that taking hidden unemployment into account improved the wage equations (Simler and Tella, 1968).

Figure 3 and Table 2 about here

Conclusion

Accurate economic data are a prerequisite for formulating valid theories on the basis of empirical research; this applies particularly to a headline variable, such as the unemployment rate upon which so many important relationships such as the Phillips curve are based (Thies, 2017). The consensus is that the Phillips curve has not disappeared, but it has flattened in the 21st century and probably since the 1980s or 1990s (McLeay and Tenreyro, 2019; Hooper, Mishkin, and Sufi, 2019, Blanchard 2016). The slope estimates cited in the literature are in the range of -0.14 to -0.20. Six of the seven specifications of our estimates for the period 2008-2019 are within this range although generally somewhat smaller, even if statistically significant (Table 2, rows 1-6). However, the seventh specification yields a much steeper slope of the Phillips curve, one that is reminiscent of the estimates for an earlier epoch (Figure 3, Table 2, row 7).

Insofar as the results of economic research play a significant role in implementing effective economic, monetary, and social policy, it is incumbent upon the economics profession to update its conceptualization of what it means to be unemployed and estimate the conditions of the labor market realistically instead of relying on outdated formulations: “it is difficult indeed to conceive of another socioeconomic statistic that has been more influential in public policy debate, more critical in the shaping of modern political cleavage, or more central to social scientific theory about the socioeconomic order” (Clogg, 1979, p. 2). This implies that economists should proceed as objectively and as rigorously as possible to estimate the unemployment rate in such a way that it mirrors accurately the fundamental relationship between the supply and demand for labor.³⁰ Stratification of the unemployment rate by ethnicity, age, and gender awaits further research (Dernburg and Strand, 1966).

The above evidence points to the extent to which the *official* unemployment rate has become untenably misleading impression of the labor market. Generally, the real unemployment rate is about twice the official rate. For instance, the Fed started to raise interest rates at the end of 2015 when the real unemployment rate was still 9.6% and the number of part-time workers for economic reasons was still 1.6 million above their pre-recession level. They did so precisely at the moment when the *official* unemployment rate (U3) reached 5%, the “magic” number which Feldstein labeled “full employment” (FED series LNS12032194, INTDSRUSM193N, UNRATE). This is just one example of how the *official* unemployment rate influences monetary policy even though Janet Yellen and many others had repeatedly voiced skepticism about the

relevance of the U3 measure (Cajner et al., 2014; Brandolini and Viviano, 2016; Rosengren, 2014; Valletta, Bengali, and van der List, 2018; Valletta and van der List, 2015; Valletta, 2018; Yellen 2014).³¹

Thus, it is fair to say that the imprecise nature of the *official* unemployment rate is not a secret as “underemployment replaces unemployment as the main measure of labor market slack in the post-recession years” (Bell and Blanchflower, 2018a; Leonhardt, 2018; Thies, 2017; Feng and Hu, 2013). Also, both Yellen and Rosengren of the Fed stressed repeatedly the “significant ‘slack’ in labor markets” as a way of signaling that the *official* unemployment rate was providing an insufficient gauge of labor market conditions “in the aftermath of the Great Recession, which... may have been associated with... unprecedented structural changes in the labor market—changes that have yet to be fully understood” (Yellen, 2014; Rosengren 2014). This is also the reason why the European Commission set a goal “that 75% of the population aged 20-64 years ‘should be employed’ by 2020” instead of considering the unemployment rate (Brandolini and Viviano, 2016).

This ambiguity about labor market conditions poses a major challenge for policy makers as well as for basic research, thereby impeding our understanding of economic, social, and political processes. The cavalier treatment of such a bellwether indicator as the unemployment rate is a major oversight because:

“subjective measures of people’s well-being... point to the high costs of unemployment for people’s quality of life. People who become unemployed report lower life-evaluations, even after controlling for their lower income, and with little adaptation over time; unemployed people also report a higher prevalence of various negative effects (sadness, stress and pain) and lower levels of positive ones (joy). These subjective measures suggest that the costs of unemployment exceed the income-loss suffered by those who lose their jobs, reflecting the existence of non-pecuniary effects among the unemployed and of fears and anxieties generated by unemployment in the rest of society” (Stiglitz et al., 2010, 44).³²

The new definition of unemployment should be adjusted to reflect the changing nature of the economy, of worker’s psychological condition as well as the labor market itself. With the rise of digitalization, the gig economy, and the skill mismatch the *official* unemployment rate no longer provides an adequate measure of the state of the labor market (Abraham et al., 2019; Blanchflower, 2019). Skirting the issue by using ambiguous terminology such as nonemployment or underemployment just muddies the waters. Obviously, unemployment is not the only problem plaguing the current U.S. labor market preventing mass flourishing (Spence,

2019); nonetheless, accurate measurement of the rate of unemployment would be a step in the right direction.³³

One might also argue that even if the *official* rate is inaccurate it can be at least a guide to trends in the labor market. However, that may be misleading as well if the change in the *official* rate is offset by trends in the “marginally” attached workers or part-time workers. After all, neither the U3-Gap nor the U6-Gap is constant (Figure 1). Hence, even the direction of the trend is an unreliable guide to labor market conditions especially in the midst of a new normal characterized by digitization, automation, artificial intelligence, and changes in the sectoral composition of the labor force.

According to most mainstream economists, the U.S. economy has been at full employment for about four years (Feldstein 2015, 2016a,b).³⁴ The fact that the *official* unemployment rate has been mysteriously lower than the natural rate of unemployment for more than two years since April 2017, reaching a full -1% in April 2019, without causing any acceleration in the inflation rate, should be quite a conundrum for theorists (FRED, series UNRATE and NROUST). That is not supposed to happen (Friedman 1968; Phelps, 1967). The most likely inference is that the unemployment rate is measured inaccurately, as argued above or that the estimate of the natural rate is incorrect. Likewise, one can also wonder why wages are not increasing faster in a supposedly “tight” labor market (Bracha and Burke, 2018). A plausible inference is that the labor market is far from tight and far from being at full employment: the *official* unemployment rate, at 3.8%, is actually 4.0 percentage-points below the rate calculated in Table 1. That is not a benign margin of error. It far off the mark, being about half of the actual rate of 7.8%. Feng and Hu also estimated a discrepancy but a smaller one of 2.1 percentage points instead of the 4.0 percentage points estimated here (Feng and Hu, 2013). In addition, our estimate of the real unemployment rate was 0.5 percentage points above the U6 rate in March 2019.

One might also speculate why there is so much discontent in the society if the “economy is in good shape” as Feldstein and many of his colleagues insist (Feldstein, 2016a,b). Why is there so much anxiety at full employment? Yet, signs of malaise, anxiety, and discontent abound from mail bombs, mass shootings (at schools, concerts, churches and synagogues) to the enormous rise in the “deaths of despair” including opioid overdoses, suicides, and alcoholism

(Case and Deaton, 2017). These social developments generate an entirely different impression of a society in turmoil than Feldstein's assessment (Tcherneva, 2017).

This “shocking increase in [self-inflicted] midlife mortality” among white Americans (both male and female) affected especially the less skilled, those without a college education. This has never happened before in a developed country in peacetime in the absence of a major epidemic such as HIV (Case and Deaton 2017). It would be difficult to imagine such a demographic calamity in a flourishing labor market which was truly at full employment. However, one can account for this apparent anomaly by acknowledging that the *official* unemployment figures are downwardly biased. Those who are not actively looking for work and are therefore not counted as unemployed are so discouraged about their job prospects that they are committing suicide or becoming addicted to opioids instead. However, they are not being counted as unemployed.

Thus, Feldstein overlooked the elephant in the room, namely that in January 2016, U6, the more accurate measure of the unemployment rate, was 9.8%, far from his imaginary full employment rate. Obviously, the labor market had and still has “far more slack than is typically associated with an unemployment rate of 5.0 percent. It is therefore unlikely that the economy is at or near full employment” (Buffie, 2015). Moreover, shortly after Feldstein spoke, a Harris Poll found that 43% of the jobless “have completely given up looking for work” and most have not had an interview in the previous couple of years (Funk, 2016). This is a natural psychological response to adversity. There is only so much perseverance one can muster up in face of a stream of setbacks. This is particularly so among minorities who face additional challenges of discrimination.

Both Rosengren and Yellen conceded that the U3 *official* unemployment rate is an “imprecise measure of full employment” (Rosengren 2015, Yellen 2014). In contrast, the new unemployment rate estimated above, based on a more inclusive conceptualization of real unemployment, dovetails much better than the *official* one in six aspects of the labor market because: 1) it supports the the Phillips curve with possibly a steep and statistically significant slope coefficient reminiscent of the 1970s; 2) it reflects much better the malaise in the population as mirrored in subjective surveys and in the trends in deaths of despair, 3) it does not conflict with the conceptualization of NAIRU, i.e., why there is no inflation although U3 has been below the natural rate for more than two years; 4) is also consistent with the absence of pressure on

wages,³⁵ 5) correlates better with the decline in trust for neo-liberal principles and institutions, and 6) is much more suitable for the current constitution of the labor market in which low-skilled, low-educated workers have much more difficulty finding work than they did when the *official* unemployment rate was first defined.³⁶ As a consequence, especially for this segment of the labor force, it is much easier to become psychologically discouraged and abstain from looking for work than it was at mid-century. Hence, maintaining the current official definition is no longer defensible. It is time to estimate the unemployment rate more accurately.

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Tables

	Labor Force	Millions	Percent
1	Civilian labor force full time	136.0	
2	Part-time voluntary (0.625*26.9 million)	16.8	
3	Military	1.3	
4	Really Unemployed	13.1	
5	Total <i>effective</i> labor force	167.2	
	Unemployed		
6	Official unemployed	6.2	3.8%
7	Part-time involuntary (0.375* 4.5 million)	1.7	1.0%
8	Want job, did not look	5.2	3.1%
9	Total <i>really</i> unemployed	13.1	7.8%
10	Hidden Unemployment	7.5	4.0%

Note: All data except the military data are from the Federal Reserve Bank of St. Louis. The various series are: Line 1) the labor force [LNS11000000] minus the part-time workers [LNS12600000], 2) part-time workers [LNS12600000] worked only 62.5% as many hours as full-time workers in 2018, 4) from line 9, 5) sum of rows 1-4, 6) UNEMPLOY, 7) LNS12032194, 8) NILFWJN 9) sum of 7, 8, and 9; The Military data on line 3 is from: U.S. Department of Defense. "Number of Military and DoD Appropriated Fund (APF) Civilian Personnel Permanently Assigned," 31 December 2017, and (Coleman, 2015). See also: Bureau of Labor Statistics, Table A-1. Employment status of the civilian population by sex and age; Table A-8. Employed persons by class of worker and part-time status; Table A-15. Alternative measures of labor underutilization; series LNS15026639.

NILFWJN; note that the BLS does not distinguish between those unemployed who would like to work full time and those who are looking for part-time employment. Part-time workers work about 37.5 as much as full-time workers. They are divided into two groups: those who are content with working part time (row 2), and those who would like to work full time but have not found full-time employment (row 3). So, 62.5% of the number of part-time workers who are content to work part time is added to the labor force on row 2. However, the involuntary part-time workers are considered a full member of the labor force. Only 62.5% of their number is added to the labor force in row 2, inasmuch as the other 37.5% is considered unemployed and therefore is included in the labor force in rows 4, 7 and 9.

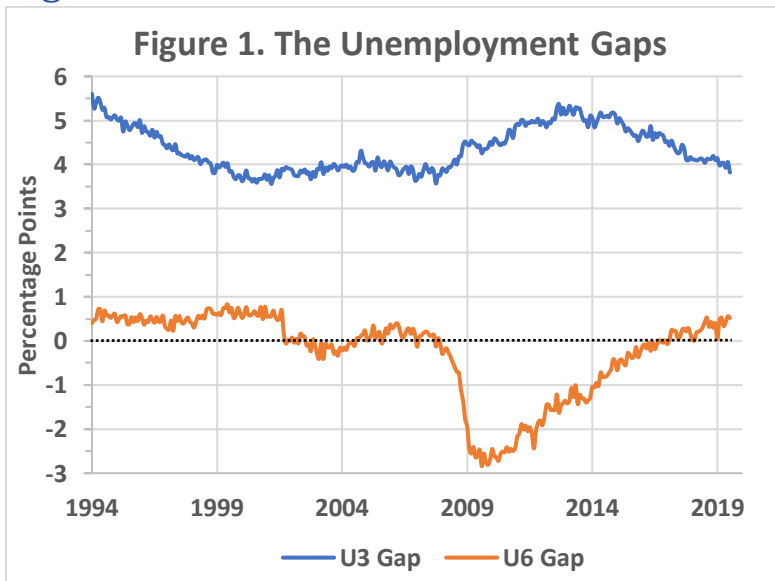
Table 2. The Reemergence of the Phillips Curve, U.S., 2008-2019, monthly data

	Independent Variables	Slope Coef.	sig. level
Short-Term Nairu Gap			
1	U3	-0.157	0.021
2	U6	-0.096	0.014
3	Real UN	-0.085	0.086
Long-Term Nairu Gap			
4	U3	-0.110	0.066
5	U6	-0.078	0.030
6	Real UN	-0.146	0.015
U3 Gap			
7	Real UN	-0.682	0.013

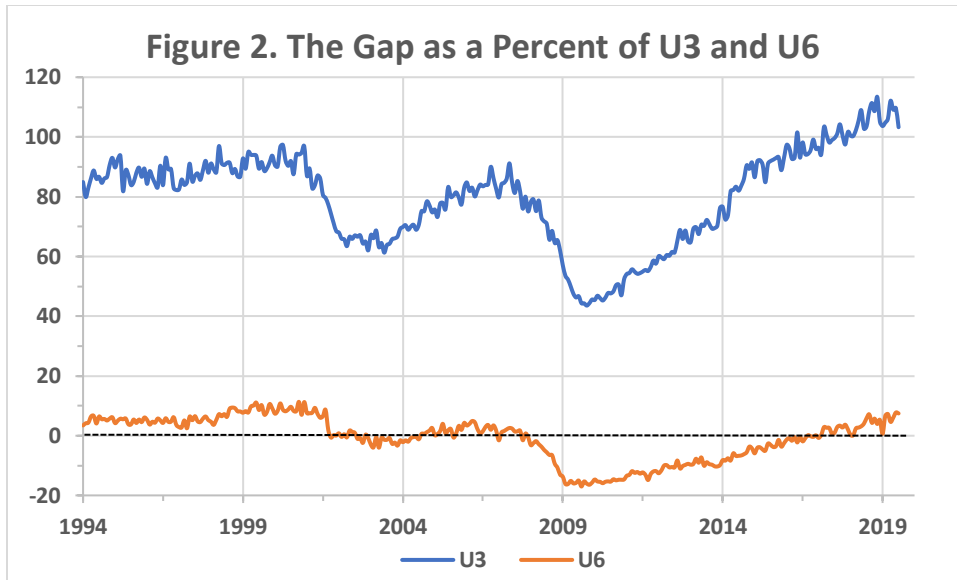
Note: the slope coefficients are from a regression in which the CPI is the dependent variable. The constant is not reported.

The Natural Rate of Unemployment Long Term and short term are from (FRED, series NROU and NROUST). The real unemployment rate is the one reported above in this paper.

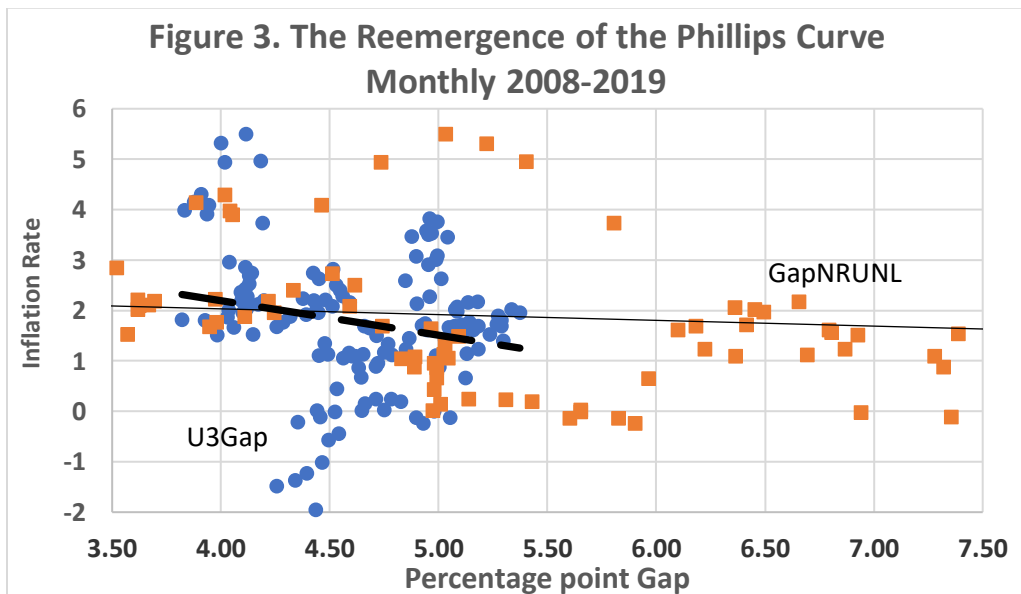
Figures



Note: The U3 Gap = our estimate of real unemployment minus U3; the U6 Gap = our estimate of real unemployment minus U6.



Note: The U3 percentage gap equals the U3 Gap divided by the U3 rate and the U6 percentage gap equals the U6 Gap divided by the U6 rate.



Note: $U3Gap = \text{real unemployment} - U3$; $GapNRUNL = \text{real unemployment} - \text{natural rate of unemployment (long-term)}$.

Endnotes

¹ For a discussion of the relevant issues see (Ball and Mazumder (2011)).

² An older literature did pay attention to hidden unemployment (Simler and Tella, 1968; Taylor 1970).

³ The International Labor Organization uses the same definition as the BLS.

⁴ The justification continued: “They failed to stipulate a range of factors people would consider before deciding whether to enter the job market, like the nature of the job, hours, location, and pay, among others. Also, whether a person not currently working wanted or was able to take a job—even if liberally interpreted as indicative of current labor market attachment—arguably could vacillate from day to day with changing perceptions about the state of the job market or changes in one’s current living situation. There was also concern about how cultural norms and current economic conditions might bias answers to such questions toward socially acceptable responses, especially during a period of widespread unemployment. In the end, measuring unemployment by inquiring about ability and/or wanting/willingness to work was deemed much too subjective.” (Dunn, et al., 2018).

⁵ Discouraged workers have not actively sought work within the last month but have worked or sought work during the previous year and the reason they are not looking for work currently is that they do not believe that they would be successful in finding a job. Marginally attached workers do want to work and have worked or looked for work within the last year but have not looked for work within the last month for any reason. Thus, they include discouraged workers plus those who have not looked for work for other reasons besides thinking that they would not find work. Persons who want to work but have not looked for work because their car broke down and do not have money to repair it would fall into this category (BLS, Glossary).

⁶ “...secular changes in the industrial composition of employment could lead to a permanently elevated share of involuntary part-time work” (Cajner et al., 2014).

⁷ Charles L. Allen writes that the rise of the two-income family might have contributed to the changing dynamic of the labor market. “In a two-income family with equally educated parents, an unemployed parent will look for a job comparable to what the other parent has. Furthermore, before the second parent takes a job, the opportunity cost of childcare must be considered, as well the opportunity for a greater parental role in the development of children. With these considerations, families may have become more tolerant of supporting discouraged workers. As a result, policy makers may have found increasing the number discouraged workers and involuntary part-time workers the path of least resistance in breaking the back of inflation. And

the official unemployment makes it look like a great success when the problem has only been swept under the rug, not an uncommon outcome in government policy.”

⁸ The employment rate of those aged 25-54 is sometimes cited as a gauge of labor market conditions. This metric has decreased by 2% since the year 2000. Given that there are about 100 million people in this age group, this implies that there are about 2 million fewer adults in the prime of their life who are working than in 2000 (FRED, series LREM25TTUSM156S and LFAC25TTUSA647S). The metric is worse among men whose employment rate has decreased from 95% in 1967 to 86% in 2018, a decline of 9%. This means that about 4.5 million fewer men are working in this age group than would have worked had their employment rate remained the same as in 1967 (FRED, series LREM25MAUSA156S).

⁹ She was not the only one to notice: “The shift toward service industries with uneven work schedules and the rising importance of the gig economy appear to be long-term trends that are unlikely to reverse in the near future. As such, in the absence of public policies aimed directly at altering work schedules, it looks like higher rates of involuntary part-time work are here to stay” (Valletta, Bengali, and van der List, 2018; Valletta and van der List, 2015; Valletta, 2018).

¹⁰ The nomenclature associated with this issue tended more to obfuscate than to illuminate the main problem. Terms used include “discouraged workers”, “hidden unemployment,” “jobless”, “labor utilization or underutilization”, “marginal workers”, “marginally attached workers,” “nonemployed”, “partial and disguised unemployment”, “sub-employed”, and “underemployed” (Armstrong, 1999; Green and Hasluck, 1998; Green, 1997; Clogg and Sullivan 1983; Ducoff and Hagood, 1957; Hauser, 1949).

¹¹ Some unresolved problems remain. For instance, there are people who choose to attend college or graduate school because of they are unable to find work. These are not considered as part of the labor force or as unemployed. The gig economy also harbors some unemployment. The “Zero-hour contract” used in the UK also might well include some unemployed. An additional problem is the related question of employment at or below a living wage.

¹² The number of part-time workers is still 2.2 million above its pre-crisis level.

¹³ In our opinion, the Hornstein-Kudlyak-Lange index is a substantial improvement on both U3 and U6 but it is conceived so as to provide an indication of how likely are the unemployed to become employed. The weights are apportioned according to “the likelihood that a non-

employed person will transition back into the job market” (Hornstein, Kudlyak, and Lange, 2015). In contrast, our conceptualization uses weights that are geared more toward estimating the actual state of the labor market from the point of view of measuring the stock of people who are not contributing to production regardless of how likely it is that they will transition out of unemployment. In our opinion the demand for labor influences the psychological condition of the unemployed which, in turn, influences the supply of labor making the scale of the index (and the transition weights) endogenous to the state of the labor market.

¹⁴ There may be other reasons as well such as not wanting to part with family or friends or unable to sell their house if they live in a depressed area.

¹⁵ On another occasion he used a different qualifier: “In an important sense, the US economy is now at full employment” (Feldstein 2015).

¹⁶ A similar argument has been made for the unemployment rate in the world with a labor force of 3.3 billion and with an official unemployment rate of 5.6%. However, this fails to count 400 million involuntary part-time workers. Counting them as half unemployed would add 200 million to the unemployed, increasing the unemployment rate by 6% to 11.6% (Clifton, 2018).

¹⁷ The minimum was 61.4% and the maximum was 65.9%. BLS, “Labor Force Statistics from the Current Population Survey, Table 19. “Persons at work in agriculture and nonagricultural industries by hours of work,” accessed August 24, 2019. Here we follow the calculations that were done for the European Union (Brandolini and Viviano, 2016).

¹⁸ Data on involuntary part-time workers is published by the BLS on the basis of the current population survey. Involuntary part-time workers are also referred to as part-time for “economic reasons”; <https://data.bls.gov/timeseries/LNS12032194> accessed July 24, 2019.

¹⁹ To be sure this is an approximation, since it is possible that some of them might want to more work more hours even if they do not want to work full time (Bell and Blanchflower, 2018a).

²⁰ Cajner et al. also suggest that involuntary part-time workers “should be appropriately weighted when compared to other standard measures of underemployment” (Cajner et al., 2014).

²¹ However, how many of the estimated 7.6 million undocumented immigrants in the labor force are included in this number is unclear (Krogstad, Passel and Cohn, 2019). The BLS points out that “it is likely that... [the] surveys include at least some undocumented immigrants” (BLS, no date). However, the surveys do not include questions that would enable the BLS to count the

unauthorized workers and it is likely that the unauthorized workers would attempt to evade the surveys. Hence, it is possible that the labor force is larger than the 167.2 million estimated here.

²² The U6 rate includes involuntary part-time workers as well as the so-called “marginally attached” workers (Current Population Survey).

²³ Even this leaves out of consideration the 2.3 million people who are incarcerated and presumably would want to work but did not find adequate employment in the legal labor market. Their numbers would raise the true unemployment rate to 8.9%. The incarcerated population is from <https://www.bjs.gov/content/pub/press/cpus16pr.cfm>.

²⁴ We use monthly values of the CPI and calculate the inflation year on year, that is to say the inflation rate in month “t” compared to month “t-12” compared to the unemployment rate in month “t”.

²⁵ See for instance (Russel and Banerjee, 2008; Gordon 2010).

²⁶ Blanchard finds that “the Phillips curve relation is now close to a level-level relation, with the level of the inflation rate relative to stable long-term expected inflation depending on the level of the unemployment rate” (Blanchard, 2016).

²⁷ Those regressions were run on quarterly data whereas the OLS regressions reported here were used monthly data.

²⁸ $U3Gap = \text{real unemployment rate} - U3$.

²⁹ Another study also reports a value of -0.69 for the slope of the Phillips curve for 1973-84 (Ball and Mazumder, 2011).

³⁰ “The employment rate is a fundamental policy objective. Yet, it is necessary to bring to the fore the definite normative views that are implicit in its definition” (Brandolini and Viviano, 2016).

³¹ “Rosengren noted that although the typical, widely-reported measure of unemployment (known as “U-3”) is lower now than at the outset of the earlier tightening cycles of 1994 and 2004, the broader definition of unemployment (“U-6”, which includes those who are working part time for economic reasons and those only marginally attached to the workforce), is not particularly low compared to the start of the prior two tightening cycles. ‘If one believes the broader measure of unemployment better captures slack in the economy, then labor markets would not be viewed as unusually tight for commencing the tightening cycle,” he said. “This

potential additional slack would also be a reason for policymakers to follow a more modest interest rate path at the beginning of a tightening cycle'" (Rosengren, 2015).

³² However, there are improvements in GDP growth estimates underway (Piketty et al., 2018).

³³ To be sure, getting the unemployment rate right should not be our only concern. Incomes and the reliability of incomes, of course, also matter to welfare, as does the nature of the employment and whether it is the foundation of a fulfilling life.

³⁴ His pronouncement is hardly unusual. Former chairman of the Federal Reserve, Ben Bernanke made similar statements prior to the financial crisis: in regard to a possible recession, he said in 2005 that, "I don't think it's going to drive the economy too far from its full employment path, though" (Fox, 2009, @1:16 min). The implication is that the economy was at full employment in 2005.

³⁵ "Underemployment replaces unemployment as the main influence on wages in the years since the Great Recession" (Bell and Blanchflower, 2018a).

³⁶ "Changes in real labor markets and policy agendas challenge these traditional conventions" (Brandolini and Viviano, 2018)