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Increased Policy Space under Globalization

Rohit Azad and Anupam Das

Abstract

A severe blow to active Keynesian policy intervention occurred as a result of the New Classical resurgence in macroeconomics. With a vertical aggregate supply curve in the short and the long runs (New Classical) or at least in the long run (New Keynesians), it has been argued that the economy settles down at a unique non-accelerating inflation rate of unemployment (NAIRU) without any government intervention. Implicit in the NAIRU theory is that the prices can decrease just as they can increase. However, if the prices cannot decrease, the aggregate supply curve would be an inverse-L shaped curve, both in the short and the long runs. Furthermore, with globalization, the expectations-augmented Phillips curve becomes horizontal because of an absolute decline in the bargaining power of the working class in the advanced countries. This means that not only would the economy settle at less than ‘full employment’, but the only way it could be brought closer to that is through active policy intervention. In the present case, maneuverability of fiscal policy increases since the threat of accelerating inflation practically disappears.

JEL Classification

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Key Words

macroeconomics, heterodox economic models, non-accelerating inflation rate of unemployment, NAIRU, Phillips curve, wage bargaining

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1. Introduction

While the world economy is reeling under an economic crisis reminiscent of the Great Depression, the economic and political response has been quite short-sighted. Paradoxically, the arguments – whether of fiscal scare in the US or austerity measures in the European Union – are based on questionable theories of mainstream economics, which lie at the heart of the origin of the crisis.

In the mainstream framework, broadly two arguments are made against active intervention of the government through fiscal policy. First, there is a self-equilibrating mechanism under capitalism which settles the economy down at a unique rate of unemployment, referred to as the non-accelerating inflation rate of unemployment (NAIRU), entailing an absence of involuntary unemployment. In other words, it is not in the hands of the policy makers to target a particular unemployment rate. Second, even if the economy were stuck at a higher rate of unemployment in the short run, fiscal policy would be ineffective either because of crowding-out of household consumption or of private investment (Barro, 1974 and 1989; Blanchard, 1985).

The second argument has been questioned by a range of authors both theoretically and empirically. Arestis and Sawyer (2003) present an extensive literature survey on this issue. The focus of this paper is on the first argument, which assumes particular importance given the passive response of governments in dealing with the crisis, resulting in increasing misery of the working of the world people. In particular, we address the question of whether policy makers can target a low unemployment rate without worrying about inflationary pressures. This involves raising two points - Is there a unique NAIRU? If not, is there a lower bound to this range? Hypotheses made on these two points are tested on macroeconomic data obtained for the US economy.

There has been a great deal of empirical work, both within the mainstream and heterodox frameworks, to study the relationship between unemployment and inflation especially in the era of globalization. This has been particularly so because of an almost tame response of inflation in the advanced nations since the 1990s despite the prevalence of relatively low rates of unemployment. To give an example, between 1993 and 2000, the unemployment rate in the United States fell steadily from 7.5 to 4.0 per cent whereas the inflation rate also declined steadily, to a low point of 1.6 per cent by 1998. The experience in the early 2000s is also quite similar. Those swearing by the theory of NAIRU argued that it had shifted to a lower level (Staiger, Stock, and Watson, 2001; Gordon and Stock 1998; Gordon, 1997). There is, however, another explanation for this change of relationship between unemployment and inflation, which is the wage-aspiration effect.

Pollin (2005), however, argues that while offering insightful analyses and empirical findings, these approaches do not explicitly examine the issue of *how* the wage-bargaining environment might have changed over time, and, hence they, remain incomplete. In an attempt to find an answer to that, he extends the work of Lown and Rich (1997), who incorporated unit labor cost as an explanatory variable in the traditional triangle model of the NAIRU. Pollin (2005) finds that including unit labor costs as an explanatory variable significantly improves the ability of the triangle model to forecast inflation over the full 1990:2 to 2000:4 business cycle. He concludes that the combination of low unemployment and inflation, at least to some significant degree, was a reflection of the ‘traumatization’ of US workers due to the threat of job flight.

In more recent work, especially in the New Keynesian framework, Kuttner and Robinson (2010) find that there has been a flattening of the Phillips curve in the globalization period in the US. While Razin and Binyamini (2007) and Borio and Filardo (2007) cite globalization as the reason for it, Roberts (2006), among others, argues in favor of firmer anchoring of inflation expectations.

Our paper contributes to this debate on two specific points. First, we present a theoretical model in the heterodox tradition to explain why there has been a ‘flattening’ of the Phillips curve. In particular, we argue that the wage rates in the metropolis have become increasingly linked to that in the underdeveloped periphery as a result of globalization and the resulting threat of job flight. Given that the working class in the periphery is largely unorganized, their bargaining strength *vis-à-vis* the capitalists is abysmal, which keeps their wage levels low. Unlike the New Keynesian models, the arguments of flattening would remain equally valid for

the long run. This is of prime importance given the New Keynesian policy implications against state intervention in the long run. Second, we find in the empirical section that the nominal per unit labor cost in the US is indeed positively related to the nominal per unit labor cost in Mexico, which could be treated as a proxy for labor cost in the periphery, even as the rate of unemployment in the US distinctly loses its explanatory power in the post-globalization phase.

This paper is divided into six sections. Section 2 briefly introduces the existing approaches on NAIRU. Section 3 extends the heterodox argument by introducing the effects of globalization in a theoretical model. Section 4 presents the empirical methodology used for testing the hypotheses made in the theoretical model. In section 5, we present the results of the empirical exercise. The last section concludes the paper.

2. NAIRU in the Two Frameworks

Since the literature on NAIRU is extensive, we present a canonical model briefly followed by a presentation of the mainstream and heterodox schools. NAIRU results from the struggle over the share of workers and capitalists in total output.¹ In a world of price makers, their *ex ante* relative shares are decided by their bargaining positions *vis-à-vis* each other; i.e. based on monopoly power for firms and unemployment rate for workers. At low levels of unemployment, however, conflict becomes more intense as the bargaining strength of workers increases. If this cannot be accommodated by the overall production, it leads to accelerating inflation and *vice versa*.

The workers' weapon in this struggle is the *ex ante* money wages, which, as argued by Marx, in his theory of the reserve army of labor and later through Phillips curve, is dependent on the rate of unemployment ' U '. If the pool of the unemployed is small, then the labor unions have a higher bargaining power because of the lesser likelihood of defaults away from the wage negotiated between the union and the capitalists. The unions, on behalf of the workers, attempt to enforce an *ex ante* real wage share² (w^r). However, since they can negotiate only in terms of money wage rate, they base it on the expected price level of the next period. In such a situation where the *ex ante* money wage rate is being negotiated on a yearly basis, the rate of increase of wages in the long run would depend both on the rate of increase in prices and the rate of unemployment.

This can be written as,

$$\begin{aligned} w_t^r &= \alpha(U_t), \quad \alpha' < 0 \\ w_t &= p^e \cdot w_t^r = p^e \cdot \alpha(U_t) \end{aligned} \quad (1)$$

where, $w^r = ex\ ante$ real wage share;

w = money wage share negotiated

Correspondingly, capitalists stake their claim on the output through a mark-up ' μ ' that they set in the product market. In a world of price-makers, price is set as a mark-up over unit cost in the following manner.

$$p_t = (1 + \mu_t)(w_t + p_{t-1}^m z)$$

where, p^m = import prices

z = imported material used per unit of output.

For purposes of tractability, this equation can be converted in terms of inflation by dividing both sides of the equation by p_{t-1} ³.

$$\begin{aligned} p_t &= (1 + \mu_t)(p_t^e w_t^r + p_{t-1}^m z) \\ 1 + \pi_t &= (1 + \mu_t)(1 + \pi_t^e) w_t^r + (1 + \mu_t) \frac{p_{t-1}^m}{p_{t-1}} z \end{aligned} \quad (2)$$

This equation of inflation captures both demand-pull and cost-push inflation. While the first term, which depends on the rate of unemployment represents the demand component, the second term depends on the movement in import costs. Equations 1 and 2 together form a two-equation structural Phillips curve relationship.

If we substitute equation 1 into equation 2, we would get the following traditional expectations-augmented Phillips curve:

$$1 + \pi_t = (1 + \mu_t) \left(1 + \pi_t^e \right) \alpha(U_t) + (1 + \mu_t) \frac{p_{t-1}^m}{p_{t-1}} z$$

$$1 + \pi_t = \pi_t^e + \mu_t + \alpha(U_t) + M_{t-1} \quad (3)$$

where, $M = \frac{p_{t-1}^m}{1 + \pi_t^e} z$ (share of imports)

Let us use this canonical model to interpret the two frameworks.

2.1 Mainstream Tradition: A unique NAIRU

There are three assertions made by the mainstream school of thought. First, there is a unique rate of unemployment which can *exactly* accommodate the claims of workers and capitalists put together. Second, this is also the Natural Rate of Unemployment (NRU), a rate which is *de facto full employment* level for the economy (Friedman, 1968 and 1977). Third, and most importantly, the system is self-correcting, both in the short and the long runs, since movement in either direction is corrected due to revision in the ‘rational’ expectations of economic agents (Lucas, 1972 and 1996). It follows from this that the government can do precious little through its fiscal policy in terms of steering the economic activity.

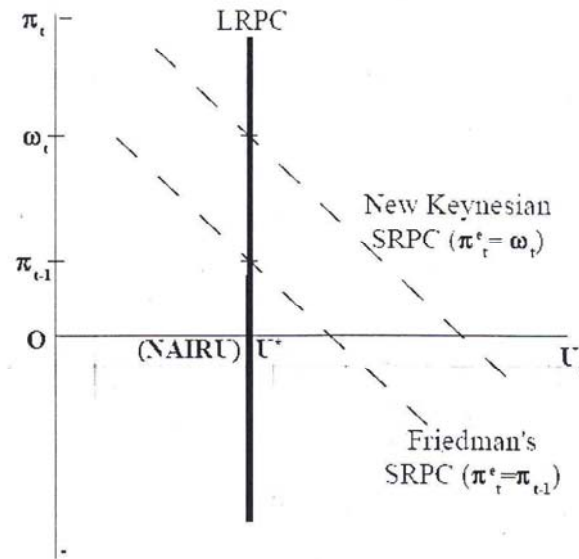
Unlike the original Phillips curve which could be understood in terms of equation 1 without the price expectation term (static expectations), Friedman argued that the workers would expect at least the previous period’s inflation to continue (adaptive expectations). This gives us Friedman’s short run Phillips curve (SRPC) as shown in Figure 1. From equation 2, *ceteris paribus*, we get the long-run Phillips curve (LRPC in Fig. 1) at a unique NAIRU, defined by the following:

$$1 + \pi_t = \pi_{t-1} + \mu_t + \alpha(U_t) + M_{t-1} \quad [SRPC]$$

$$\exists U = U^*, \text{ where } \pi_t = \pi_{t-1} \quad (4)$$

$$U^* = \alpha^{-1}(1 - \mu - M) \quad [LRPC]$$

Figure 1: NAIRU in the Mainstream Framework



Lucas (1972), however, went even further by arguing that adaptive expectations essentially mean that the economic agents (in our case workers) do not learn from their mistakes regarding predictions of inflation. On the contrary, the agents are rational, which means that their subjective expectation, with perfect information and in the absence of unanticipated shocks, equals its objective value. In that case, even in the short run, the economy is at the NAIRU (see LRPC in Figure 1). In other words, there is a vertical Phillips curve.

$$\pi_t = \pi_t + \alpha(U_t) - \alpha(U^*) \quad [SRPC = LRPC]$$

$$\ominus \pi_t^e = E(\pi_t | \Omega_{t-1}) = \pi_t, \quad U_t = U^* \quad (5)$$

While agreeing with Lucas in the long run, i.e. equation 5, New Keynesians question his argument for the short run because of the presence of price/wage rigidities arising out of imperfect competition (see the New Keynesian SRPC in Figure 1). In the short run, for example, in the presence of nominal wage rigidity w_t^* ,

$$\ominus \pi_t^e = w_t^*$$

$$\pi_t = w_t^* + \alpha(U_t) - \alpha(U^*) \quad [SRPC] \quad (6)$$

If $\pi_t \geq w_t^*$, $U_t \leq U^*$ and $\pi_t \leq w_t^*$, $U_t \geq U^*$

To be sure, these theories do include the possibility of a shift in the NAIRU *across* periods due to parametric changes, but it remains unique *within* the period. These parameters include the extent of monopoly power and other factors, apart from unemployment, which affect the *ex ante* wage claims of workers like unemployment benefits, etc. Therefore, it precludes the possibility of any government intervention to increase the economic activity through fiscal policy, thereby, negating one of the basic contributions of the Keynes-Kalecki tradition. While the economy settles down to a stable inflation on its own, any attempt by the government to decrease the unemployment rate beyond the NAIRU would create price instability in the system.

2.2 Heterodox Tradition: A range of NAIRUs

On the contrary, the heterodox school dismissed these propositions. First, in the presence of price rigidities, *both* in the short and the long runs, there is no reason why there would exist a *unique* NAIRU (Patnaik, 2009). Patnaik (2009) formulates a dynamic version of Joan Robinson's inflationary barrier, where prices in an economy start increasing in response to a rise in effective demand (Robinson, 1956: 48).

Second, the level of NAIRU at which the economy settles down is determined by the level of demand. This happens through running down the labor reserves, thereby, decreasing unemployment. Unlike the mainstream proposition,⁴ Robinson (1956) argued that the economy can settle at any level of activity ahead of the inflationary barrier. This equilibrium level of activity would be decided by the level of aggregate demand.

Third, given that there can be a range of NAIRUs, there is no self-correcting mechanism which takes the economy to its lowest possible NAIRU, since expectations in a fundamentally uncertain world cannot be 'rational'.

We present a canonical model which accommodates these possibilities and alter it to present a more realistic picture of income distribution in the era of globalization. It would be impossible to do an exhaustive representation of this strand of literature; so we choose to present one model which encapsulates the arguments.

Patnaik (2009) argues that even at high rates of unemployment, workers do not accept cuts in their *ex ante* money wage share as assumed in equation 1 above. Workers always succeed in obtaining a money wage share which is at least as much as in the previous period. But if their bargaining power enables them to secure a larger amount, they do so. It follows that the *ex ante* money wage share negotiated is the higher of the two: the previous period's money wage share and the negotiated money wage based on their bargaining strength.

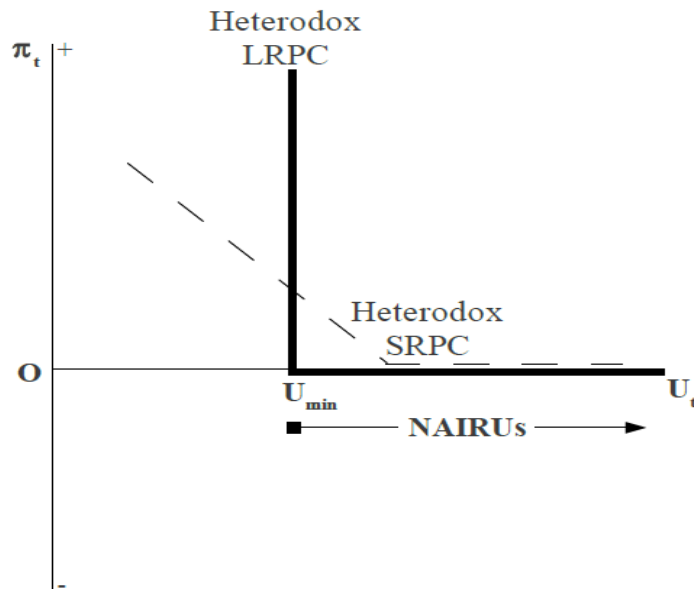
Reinterpreting the wage bargain equation (1) in this light,

$$w_t = \max[p^e \alpha(U_t), w_{t-1}] \quad (7)$$

This would give us the following two-equation system of heterodox model of the Phillips curve:

$$\begin{aligned} w_t &= \max[p^e \alpha(U_t), w_{t-1}] \\ 1 + \pi_t &= (1 + \mu_t)(1 + \pi_t^e)w_t^r + (1 + \mu_t)\frac{p_{t-1}^m}{p_{t-1}}z \end{aligned} \quad (8)$$

Figure 2: NAIRU in the Heterodox Framework



With adaptive expectations, this amounts to saying that while there would be accelerating inflation if the unemployment rate falls below a certain rate (U_{\min}), there would not be any deflation at any level of unemployment. To maintain comparison with Figure 1, instead of the two-step procedure, we plot the final relationship between inflation and unemployment in Figure 2. It can be seen that there is a kink in both the SRPC and LRPC, which results from the wage function mentioned above. Depending on the level of aggregate demand, the economy could settle even in the long run at any $U > U_{\min}$ without any price instability. Interpreted in this way, the expectations-augmented Phillips curve in the wage-unemployment plane, far from being vertical, is horizontal for unemployment rates higher than U_{\min} . At rates lower than this, it is of the normal shape. This contribution is quite important, since it refutes the uniqueness of NAIRU not just across periods, but within a period.

3. An Extension to the Heterodox Model

We propose an extension to this model to incorporate contemporary economic realities in a globalized world. In essence, we would like to argue that for the advanced countries, the Phillips curve in the wage-unemployment plane becomes horizontal irrespective of the rate of unemployment. In stronger terms, there is no inflationary barrier, i.e. the absence of U^* , or in weaker terms, the inflationary barrier shifts to a very low U^* . This is so because in today's world it is difficult to imagine the wage bargaining set-up in the advanced capitalist countries without taking into account the level of wages in the rest of the world, especially in countries where the economic activities have been outsourced. Therefore, the *ex ante* money wage share might be tethered to what prevails in the periphery. This can be captured by writing the following equation:

$$w_t = \min \left[\theta w_t^a, \max \{ p^e \alpha(U_t), w_{t-1} \} \right], \quad \theta > 1 \quad (9)$$

where, $w_t^a = \text{ex ante money wage share in the periphery}$

A few words about the form of the equation are in order here. The *ex ante* money wage share negotiated by workers in the core is higher than that of their counterparts in the periphery ($\theta > 1$). This is so because of historical and political reasons. Historically, the working class in the core has been organized and, hence,

negotiated significantly higher wages compared to the peripheral workers. Moreover, there is always a tendency for political instability if the working class geographically located within the core remains suppressed. While we are assuming $\theta > 1$, this value itself would depend on the extent of globalization and, therefore, on the credibility of the threat of the capitalists in the core.

Moreover, there is an added effect of globalization on the workers' bargaining strength. Capitalists, through coercion, attack the rate of unionization in the core. This is reflected in the drastic decline in the rate of unionization in the private sector in the US from close to 25 per cent in the mid-1970s to 7 per cent in the late-2000s. There are thus two different, yet interdependent, ways in which the *ex ante* money wage share in the core is kept under control – increasing globalization and dehumanization within the core.

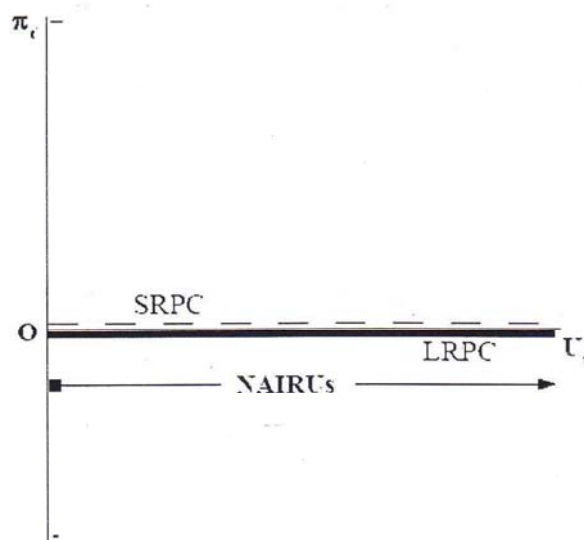
Equation 9 captures the effect of the downward pressure of peripheral workers' wages on the workers in the core in the era of globalization. The bargaining chip of the workers in the core is seriously hampered since they can no longer negotiate a wage higher than last period's wage even if their unemployment rate is extremely low, because there is always a *potential* threat of job flight to the peripheral countries. In such a situation, any increase in the monopoly power of the corporations in the core can be accommodated *within* the core without creating any price instability.

Though apparent in this formulation, it is not as if the workers in the periphery are responsible for the loss of the workers in the core. Rather it is the power of the capitalists in the periphery, which keeps the money wages down for the working people in the periphery. Moreover, as part of the neoliberal package, all possible efforts are made in the name of labor market flexibility to suppress the working class movements in these regions. This arrangement resolves the problem of price instability in the core economies. However, the question of price instability could come into the picture again if the workers in the periphery become more assertive and negotiate for a higher money wage share.

Together with the price equation, it gives us a 2-equation system of extended heterodox model of the Phillips curve (also see Figure 3):

$$w_t = \min \left[\theta w_t^\alpha, \max \{ p^e \alpha(U_t), w_{t-1} \} \right], \quad \theta > 1$$

$$1 + \pi_t = (1 + \mu_t) \left(1 + \pi_t^e \right) w_t^r + (1 + \mu_t) \frac{P_{t-1}^m}{P_{t-1}} z \quad (10)$$

Figure 3: NAIRU under Globalization in the Heterodox Framework

We test this system of equations in the empirical section that follows. The expected result is that the unemployment component in the wage equation should disappear as a result of increasing globalization and dehumanization within the core. Specifically, α becomes insignificant. In addition, we use the per unit labor cost of Mexico to approximately represent the peripheral wage share (w_t^a) and check its significance in the period of globalization.

In the next section, we present some empirical evidence to substantiate the claims made in the extended heterodox model of the Phillips curve.

4. Empirical Methodology

4.1 Behavioral Equations

We estimate the structural relationships that are mentioned in the theoretical section. Let us begin with the traditional Phillips curve. To estimate the Phillips curve, Gordon (1997) and Gordon and Stock (1998) used a triangle model of inflation, where the inflation rate was assumed to be influenced by the lagged inflation rate, excess demand pressure and other supply shock. Pollin (2002) attempted to estimate a modified version of Gordon's behavioral equation and used the growth rate of unemployment as a proxy of

excess demand pressure. Following Gordon (1997), Gordon and Stock (1998) and Pollin (2002), we first estimate equation 3, which takes the following form:

$$\pi_t = \beta_0 + \beta_1\pi_{t-1} + \beta_2U_t + \beta_3\pi_t^m \quad (11)$$

where, U_t is the growth rate of unemployment instead of the level, and π_t^m is the rate of growth of relative import prices.

Memory effect (inertia) of the inflation variable is captured by adding lagged inflation in the equation. In addition, the above equation is also estimated for the globalization and pre-globalization periods.

After estimating the traditional Phillips curve, we estimate its new form which divides this step into two equations. First, we estimate the behavioral equation 8 in the following form:

$$\pi_t = \beta_0 + \beta_1\pi_{t-1} + \beta_2w_t^r + \beta_3\pi_{t-1}^m \quad (12)$$

where, w_t^r is the growth rate of real wage share.

Second, we attempt to capture the effects of lagged inflation and growth rate of unemployment on the growth rate of money wage share corresponding to equation 8. The behavioral equation is presented below:

$$w_t = \beta_0 + \beta_1\pi_{t-1} + \beta_2U_t \quad (13)$$

Equations 12 and 13 are also estimated for the globalization and pre-globalization periods.

To identify the declining bargaining strength of the working class in the US as a result of globalization (equation 9), the next equation includes a variable, Mexico's money wage share, which could be seen as a proxy for the labor cost in the periphery. Hence, equation 13 is extended in the following manner:

$$w_t = \beta_0 + \beta_1\pi_{t-1} + \beta_2U_t + \beta_3w_t^a \quad (14)$$

Since the data on this variable is available from 1980, the above equation is estimated only for the period of globalization.

4.2 Data and Estimation Issues

Quarterly dataset for most of the variables ranges from 1960:Q1 to 2010:Q4 and has been obtained from the Bureau of Labor Statistics (henceforth BLS) and the Bureau of Economic Analysis (henceforth BEA). Due to unavailability of data, both real and money wage share data have been collected for the period of 1980:Q1 to 2010:Q4 from the OECD database.

Inflation is measured by the log difference of the core consumer price index (CPI), which is obtained from the BLS. Following Pollin (2002), we exclude changes in food and energy prices while calculating the core inflation rate. Data on unemployment rate is also obtained from the BLS. Growth in the unemployment rate is measured by the log difference of the quarterly rate of unemployment. To calculate the growth rate of relative import price, we first obtain import prices data from the BEA and then divide it by the core CPI. Growth in relative import prices is measured as log differences from the last quarter's value. Per unit nominal labor cost and per unit real labor cost variables are used for money wage share and real wage share respectively. Both these variables for the US are collected from the BLS. Data on these variables for Mexico are collected from the OECD database. Growth in per unit labor cost represents the log difference of the level variable. Finally, following the time period division adopted in Kuttner and Robinson (2010), the period 1960:Q1 to 1983:Q4 is identified as the pre-globalization period and 1984:Q1 to 2010:Q4 is the globalization period.

Inclusion of lagged dependent variables as explanatory variables makes the specified equations dynamic. Moreover, lagged inflation rate is endogenous as it may be affected by other macroeconomic variables (Abbas and Sgro, 2011). As a result, estimating these equations using OLS procedure would provide inconsistent estimates of the relevant coefficients (Greene, 2003: 221). Hence, an instrumental variable approach is called for. In this paper, we use the two-step feasible and efficient Generalized Method of Moments (GMM) technique. This technique is an information-efficient means of obtaining consistent coefficient estimates and outperforms the two-stage least squares technique. The Hansen (1982) test of the overidentifying restrictions is used to check for the validity and relevance of instruments.

5. Results

Empirical results are reported in Table 1 to Table 6. All estimated equations meet the Hansen criteria. Tests of overidentifying restrictions do not reject the hypothesis that the GMM instruments are valid and exogenous.

Table 1: Estimations of the Traditional Phillips Curve			
Dependent Variable: Inflation (π_t)			
	Coefficients		
Variables:	Full-Sample Period	Pre-Globalization	Globalization
Constant	0.004(0.000)	0.001(0.000)	0.004(0.001)
π_{t-1}	0.948*** (0.035)	0.970*** (0.038)	0.933*** (0.096)
U_t	-0.011*** (0.004)	-0.027*** (0.003)	-0.002(0.004)
π_t^m	-0.008(0.015)	0.015(0.022)	0.001(0.005)
Hansen Test	2.87(P Value: 0.24)	4.46(P Value: 0.11)	0.62(P Value: 0.73)
No. of Obs.	204	97	107
Notes: 1) *** indicates significance at the 1% level. 2) Standard errors are in the parenthesis. 3) Instrument variables: Inflation (Second Lagged), Growth in Unemployment (Lagged), Growth in Relative Import Prices (Lagged)			

Estimation results of three different versions (full sample, pre-globalization and globalization periods) of the traditional Phillips curve are presented in Table 1. As expected, the coefficients for the lagged inflation rate are significant at the 1% level in all the three versions. The size of these coefficients is 0.9, which proved extremely robust to changes in specifications. These results strongly support the hypothesis of the inertia characteristic of the inflation variable. Coefficients for growth in unemployment are negative and significant (at the 1% level) for the full-sample and pre-globalization periods with magnitudes of -0.01 and -0.02 respectively. However, this variable is found to be insignificant when the inflation equation is estimated for the period of globalization. Even a traditional Phillips curve estimation shows that growth in unemployment rate lost significance in explaining inflation during the globalization period. But can we say something more definitive and robust in this regard?

We now test a more robust heterodox model of Phillips curve in two steps. As mentioned in the last section, the first step is to estimate the inflation equation, while in the second step, we estimate the equation for the growth in per unit nominal labor cost. Equations 12 and 13 are first estimated for the full-sample period. Results from estimations of these two equations are presented in Tables 2 and 3.

Table 2: Estimation of the New Phillips Curve (Step 1)	
Dependent Variable: Inflation (π_t)	
Variables:	Full-Sample Period Coefficient
Constant	0.001*** (0.000)
π_{t-1}	0.883*** (0.024)
π_{t-1}^m	0.021*** (0.006)
ω_t^*	0.052*** (0.014)
Hansen Test of Overriding Restrictions	7.86 (P Value: 0.90)
Number of Observations	203
Notes: 1) *** indicates significance at the 1% level. 2) Standard errors are in the parenthesis. 3) Instrument variables: Inflation (Second Lagged), Growth in Relative Import Prices (Lagged), Growth in Per Unit Real Labour Cost (Lagged)	

Lagged inflation rate seems to have the strongest effect on the rate of inflation – this variable is positive and significant at the 1% level. Result suggests that approximately 88% of inflation can be explained by last quarter's inflation when the equation is estimated for the full-sample period. Hence, the memory effect of inflation is also prevalent in the modified Phillips curve. Growth in relative import price and growth in unemployment rate are both positive and significant at the 1% level. Magnitudes of these coefficients are 0.02 and 0.05 respectively.

Table 3: Estimation of the New Phillips Curve (Step 2)	
Dependent Variable: Growth in Per Unit Nominal Labour Cost (ω_t)	
Variables:	Full-Sample Period Coefficient
Constant	-0.001 (0.002)
π_{t-1}	1.913*** (0.165)
U_t	-0.013 (0.037)
Hansen Test of Overriding Restrictions	1.54 (P Value: 0.21)
Number of Observations	204
Notes: 1) *** indicates significance at the 1% level. 2) Standard errors are in the parenthesis. 3) Instrument variables: Inflation (Second Lagged), Growth in Unemployment (Lagged), Growth in Per Unit Nominal Labour Cost (Lagged)	

Results from the second step where the equation for nominal wage share is estimated are reported in Table 3. The Hansen overidentification test of all instruments suggests that the instruments are relevant and valid. Lagged inflation is significant at the 1% level, which is an evidence for adaptive expectations – i.e. workers

negotiate for a money wage keeping in mind the previous period's rate of inflation. On the other hand, growth in unemployment is not significant when the nominal wage share equation is estimated for the full-sample period. The question arises whether growth in unemployment was not an explanatory variable through the full-sample period, or was it because of the delinking between the two variables in the globalization period which overshadowed an otherwise significant relationship of the pre-globalization period. We test this in what follows.

In the next step, we estimate the new Phillips curve for both pre-globalization and globalization periods to identify if there is any differential effect of the relevant variables. Results are presented in Table 4 (for the inflation equation) and Table 5 (for the growth in per unit nominal variable cost equation).

Table 4: Estimation of the New Phillips Curve (Step 1)		
Dependent Variable: Inflation (π_t)		
	Coefficients	
Variables:	Pre-Globalization	Globalization
Constant	0.002*** (0.000)	0.002* (0.000)
π_{t-1}	0.743*** (0.028)	0.936*** (0.022)
π_{t-1}^m	0.049*** (0.012)	-0.011** (0.005)
ω_t^r	0.097*** (0.024)	0.020** (0.010)
Hansen Test	5.36 (P Value: 0.98)	5.36 (P Value: 0.98)
No. of Obs	96	107
Notes: 1) ***, ** and * indicate significance at the 1%, 5% and 10% level respectively. 2) Standard errors are in the parenthesis. 3) Instrument variables: Inflation (Second Lagged), Growth in Relative Import Prices (Lagged), Growth in Per Unit Real Labour Cost (Lagged)		

In the inflation equation (i.e., in step 1), lagged inflation and growth in per unit real labor cost are found to be positive and significant for both the pre-globalization and globalization periods. The size of the labor cost variable is approximately 0.10 (significant at the 1% level) for the pre-globalization period and 0.02 (significant at the 5% level) for the globalization period. This implies that growth in per unit real labor cost had a stronger effect on inflation prior to 1984. In other words, this corresponds to what has been called the flattening of the Phillips curve in the new Keynesian literature. Growth in relative import price is significant

in both periods, although the sign of the coefficient changes from positive in the pre-globalization period to negative in the globalization period.

Table 5: Estimation of the New Phillips Curve (Step 2)		
Dependent Variable: Growth in Per Unit Nominal Labour Cost (ω_t)		
	Coefficients	
Variables:	Pre-Globalization	Globalization
Constant	-0.000(0.001)	0.004(0.002)
π_{t-1}	1.971*** (0.069)	1.562*** (0.297)
U_t	-0.044*** (0.006)	0.003(0.012)
Hansen Test	0.34(P Value: 0.84)	3.33(P Value: 0.19)
No. of Obs	97	107
Notes: 1) *** indicates significance at the 1% level. 2) Standard errors are in the parenthesis. 3) Instrument variables: Inflation (Second Lagged), Growth in Unemployment (Lagged), Growth in Per Unit Nominal Labour Cost (Lagged)		

What is more interesting for our purposes, however, is the second step of this exercise. In the second equation, growth in the rate of unemployment is significant and negative in the pre-globalization period, but insignificant during the period of globalization. This seems to be one of the two most important results in favor of the theoretical model presented earlier. It means that while workers had a higher bargaining power in the pre-globalization period, globalization has resulted in a decline in their strength. This is why even an unemployment rate as low as 4 per cent in the 1990s and early 2000s did not make the economy hit the inflationary barrier. But as earlier, lagged inflation is always positive and significant, which reinforces the adaptive expectations hypothesis.

Having established the lack on any significant relationship between nominal labor cost and unemployment, we would like to test whether the nominal labor costs in the US have any linkages with those in the peripheral economies. Owing to lack of comprehensive data, we use Mexican nominal per unit labor cost as a proxy for the peripheral labor cost. The last table, i.e. Table 6, presents results of that estimation, which attempts to capture the effect of peripheral wage on workers in the core during the period of globalization.

Table 6: Estimation of the New Phillips Curve with Peripheral Wage Share (Step 2)

Dependent Variable: Growth in Per Unit Nominal Labour Cost (ω_t)	
Variables:	<u>Globalization</u> Coefficient
Constant	0.001(0.002)
π_{t-1}	1.325*** (0.343)
U_t	0.015(0.011)
ω_t^a	0.009*** (0.003)
Hansen Test of Overriding Restrictions	3.19(P Value: 0.36)
Number of Observations	107
Notes: 1) *** indicates significance at the 1% level. 2) Standard errors are in the parenthesis. 3) Instrument variables: Inflation (Second Lagged), Growth in Unemployment (Lagged), Growth in Per Unit Nominal Labour Cost (Lagged), Growth in Per Unit Nominal Labour Cost in Mexico (Lagged)	

The second important result is that the coefficient of our interest variable, i.e. growth in per unit nominal labor cost in Mexico is positive and significant at the 1% level. This means that nominal labor costs in the US are tethered to that in Mexico. As expected, lagged inflation is positive and significant at the 1% level, but the growth in the rate of unemployment is insignificant.

6. Conclusion

This paper contrasts the different theoretical frameworks on the relationship between price stability and unemployment in a capitalist economy. Unlike the mainstream models which argue that there is a vertical Phillips curve (in the inflation-unemployment plane) and the economy tends towards it, the heterodox models show, both for the short and the long runs, that it is an inverse-L shaped curve, i.e. horizontal up to a point, say U_{\min} , and vertical beyond that. Accordingly, the economy can settle down at any unemployment rate higher than U_{\min} depending on the level of demand. Our effort here has been to build upon the heterodox model to show that the Phillips curve does not remain even an inverse-L shaped one, but becomes horizontal in the period of globalization since there is an absolute decline in the bargaining strength of the working class in the metropolis due to the fear of job flight.

This means that the maneuverability of policy, both fiscal and monetary, increases in the globalization period as the government does not have to deal with the ‘heating’ in the economy. This assumes great

significance when the world economy and the US economy in particular are going through one of its worst phases. A high dose of fiscal policy (given the impotence of monetary policy, especially under conditions of severe crises) could help push the economy towards a higher level of activity without any worries about crowding-out.

Notes

- ¹ To be sure, the mainstream framework does not derive the theory of NAIRU in these terms. We have used the framework that Rowthorn (1977) developed and altered it to accommodate different arguments.
- ² We refer to wage share instead of wage rate because we have assumed that the workers negotiate for a money wage which takes into account the growth in productivity.
- ³ Steps of this conversion can be found in any basic macroeconomics textbooks like Blanchard (2007).
- ⁴ To be sure, at least empirically even if not theoretically, the mainstream economists themselves recognize that economies hardly ever face deflation even at higher levels of unemployment. That the Phillips curve relationship starts breaking down under low or zero inflation is now being debated even among mainstream economists. Blanchard (2007) observes that during the Great Depression, despite unemployment rates as high as 25%, the economies did not witness any deflation. In fact in certain years they even witnessed high inflation. This phenomenon, Blanchard notes, 'is one of the developments closely watched by macroeconomists today'.

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