

Growth of the Benefit System in UK

Keshab Bhattarai

University of Hull Business School

Article History

Received : 30 April 2021

Revised : 04 May 2021

Accepted : 11 May 2021

Published : 5 June 2021

Key words

Tax, benefit

JEL: J65

Abstract: The benefit system has expanded by ten times in the UK after the adoption the Beveridge social security system in 1940s. It has protected vulnerable people but also brought price distortions and adverse consequences in the economy. Efficiency issues relating to the this benefit system are analysed theoretically applying basic theories of the conditional general equilibrium model for benefit payments, natural rate of unemployment and state-space Markov process of transitions between employment and unemployment. Empirical analysis shows that the unemployment rate and the working age population are the major reasons for increase in the number of benefit claimants. This falls with higher weekly, monthly or annual pays and the duration of spells in the benefit. At macro level the growth rates of inflation indexed benefits are inversely related to that of output and the ratio of debt to GDP. Growth rates are lower with an increase in the level of benefits. These findings are based on cross section data of 201 British counties, monthly time series of vacancies redundancies and unemployment from 1992:1 to 1212:11 and panel data of 10640 wards form 2006 to 2014.

1. Introduction

Benefits are transfer payments from governments to economically vulnerable individuals from cradles to graves in their lives. These have grown over time in all advanced economies putting considerable pressure in public resources. As they are perceived to have distortionary impacts on work incentives, the sizes, shapes and formats of benefits have become subject of intense scrutiny and de- bate in recent years though it is commonly believed that these economies would be more regressive without the system of benefits. In this context, the first objective of this paper is to explain the major determinants on the growth of benefit claimants in the UK

economy using stylized facts and relevant models. The next objective is to assess its relation to economic growth. Final objective is to examine whether ongoing comprehensive reforms with the universal single taper rate can contribute in reducing the number of benefit claimants and to release extra resources for creation of jobs and growth. Assessment of these three questions are helpful in designing an efficient benefit system that not only enhances individual wellbeing but also contributes positively on economic growth. This is a very pertinent issue for investigation in the context of high wage and low benefit regime being implemented by the conservative government that came to power in May 2015. It is proposing to unify all forms of benefits and credit into one universal benefit or credit system from the fiscal year of 2017 to remove confusions due to multiplicity of benefit or credit system in operation so far.

Finding of this study shows that the number of benefit claimants relate directly to the rate of unemployment, the size of working age population and the retirees. This number rises significantly during a recession as it did between 2008 to 2011. Whilst the short run business cycle factors were less relevant for people who have been claiming benefits for more than two years or longer, higher average weekly pay lowers the number of benefit claimants in a county. Higher weekly pay indicates shortage of labour with lower unemployment rate and the number of benefit claimants.

Relative number of benefit claimants are smaller in counties with larger population as more densely populated counties should have larger markets and more jobs and hence fewer benefit claimants. These findings emerge from the analysis of data of the benefit claimants among 201 British counties, monthly time series on vacancies, redundancies and unemployment from 1992:1 to 1212:11 and the panel data on benefit claimants among 10640 wards form 2006 to 2014.

2. Stylized Facts on Benefit

Current system of benefits in the UK evolved from the Poor Laws (started in 1597 and amended in 1834) and unemployment insurance Scheme of 1911 (see Easton 1979, and Hohman 1934). The coverage and generosity of the system improved over time. Sir William Beveridge (1942) had thought of six groups of individuals in the society - employees, employers, housewives, others of working age, below working age and retired ones. He recommended six principles for a universal benefit system that affects everyone in the society. Individuals differ in ability to make contributions

and need for the benefits. The six principles aimed at achieving overall fairness of the system to everyone include the flat rate subsistence benefits, flat rate contribution, unification of administration, adequacy of benefits, comprehensiveness of it and no regards of social classification either in provision of cash benefits (transfers) or in raising contributions (taxes).

Amount of cash benefits adequate to fulfill basic needs of recipient individuals for a decent life has changed over last seven decades. Amount of benefit payments has increased ten times since 1942 (Figure 1) as the annual growth rates of real benefits have been systematically higher than that of GDP (Figure 2). The cash and in-kind benefits have become an integral part of advanced economies (Figure 3 and 4) for the UK and her European trade partners France and Germany. However, the benefit systems has stretched to their limits and become complex in practice.

Figure 1: Trend of Benefit Payments in the UK (Real in 2011 prices)

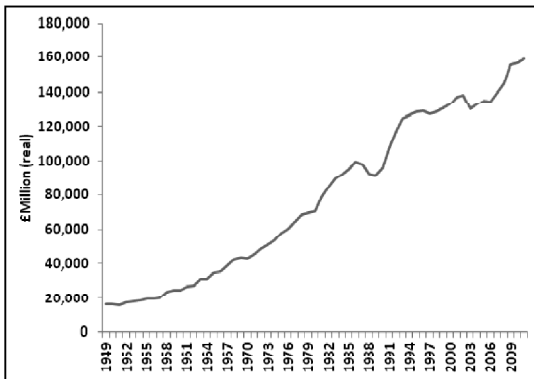


Figure 2: Growth rate of real benefit payment in the UK, 1949-2011

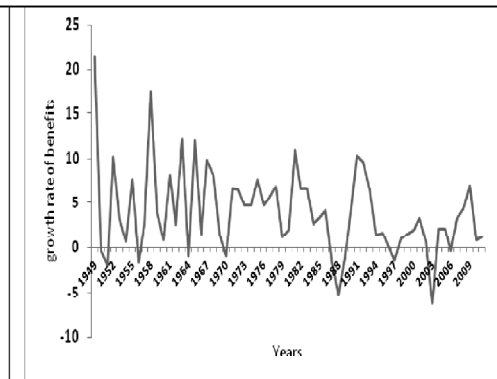


Figure 3: Ratio of Non-means tested benefit payments to GDP

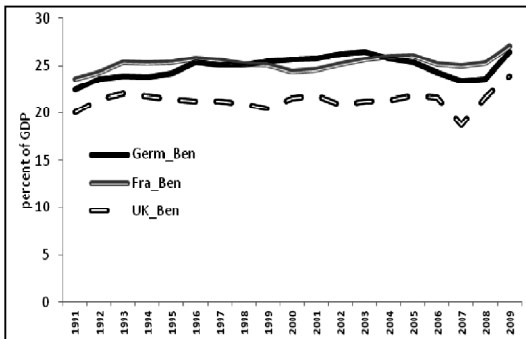
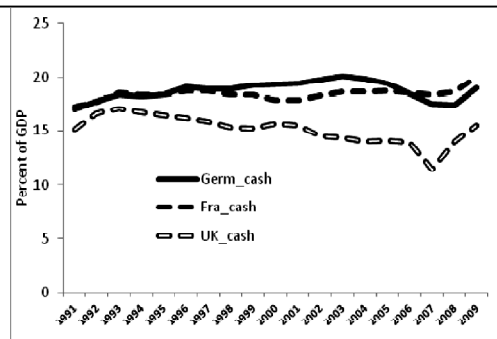
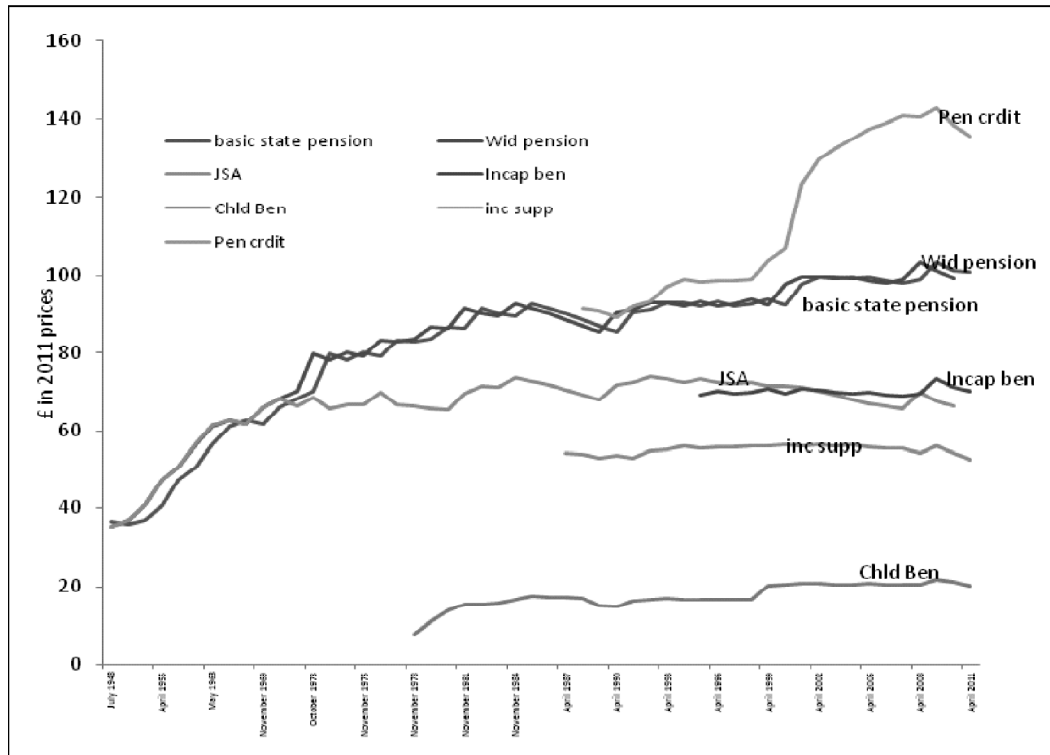


Figure 4: Ratio of payment of cash benefits to GDP



In principle the benefit entitlements are aimed to fit to individual circumstances (Figure 5)¹: the number children at home, lone parent or married couple status, hours of work being either less than or exceeding 30 hours per week, cost of child care or non-labour income of the household or the labour market experience. Growth rate of benefit is higher when economy slows down (Figure 6) and when the ratio of debt to GDP is lower (Figure 7). In general these payments are indexed to inflation (Figure 8) to maintain the real value of benefits. Size of total benefit payment increasing despite relatively stable size of population in the UK (Figure 9).

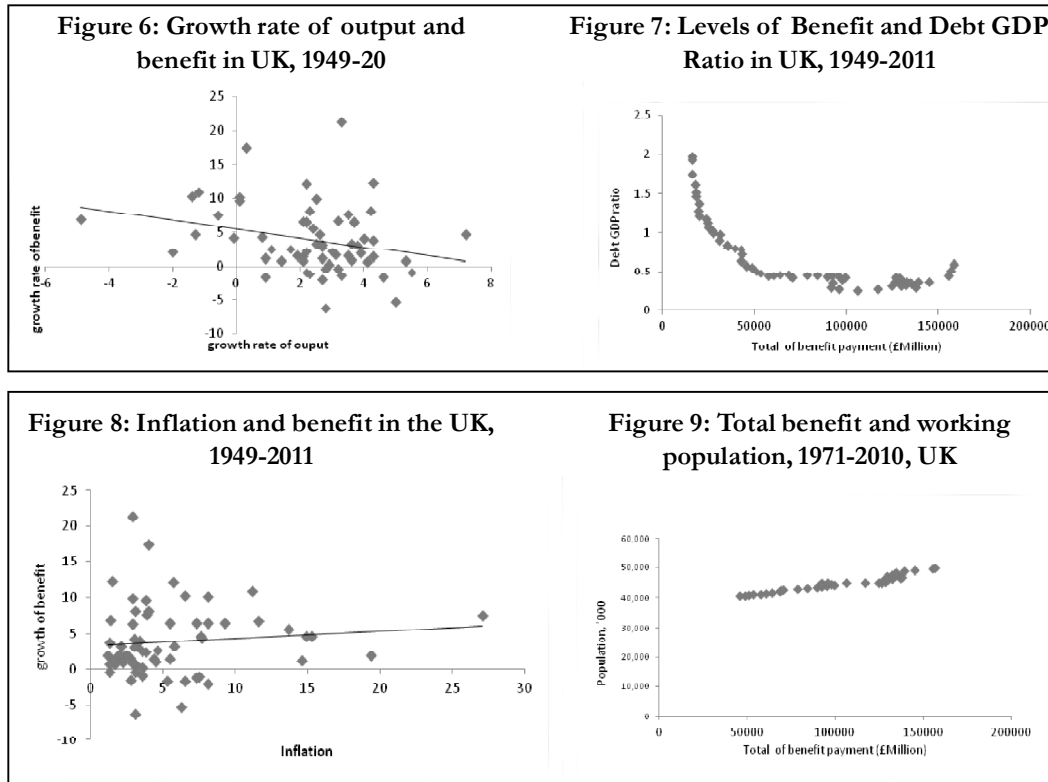
Figure 5: Weekly Amounts of Benefits in the UK, 2013



The benefit calculator of the Department of Work and Pension (DWP) for i th household are means tested as:

$$B_i = E_i - t_b(y_i - \bar{y}) \quad (1)$$

where B_i is the amount of annual benefit, E_i is the total entitlement² \bar{y} is threshold income. If income y_i is below the threshold \bar{y} the household gets more benefits and



if y_i is sufficiently above then household is not entitled to receive any benefit. Here t_b is the taper rate or tax back rate that applies when individuals start earning above the threshold income. For instance under the existing system people do not pay any tax in their first earning first £ 11600 after (see Autumn Statement 2015 from the HM-Treasury). Then threshold for the WFTC (working family tax credit) is set now at £ 3850 (earlier £ 6420); individuals with income level below this receive the full amount of benefits. After this taper rate (t_b) applies to the benefit; each additional pound is subject to taper rate of 48 pence from 2016 (earlier 41 pence). Similarly income threshold for the CTC (child tax credit) is being set at £12,125 (earlier £16,105). Table 1 provides a summary on the number of benefit claimants in the UK from 2006 to 2014 by wards which is the lowest political and economic unit in the country. The number of benefit claimants was 1.6 million 2012, about 94 percent above that in 2008. This was a year when 3.5 percent of the labour force was claiming the benefits as shown in the row of mean claimant rate in the middle of table 1. The average number of benefit claimant in each ward was 152 in 2012 and with maximum

of 2708 individuals. Numbers in Table 1 also indicate that the burden of benefit rises when economy is in recession or growing very slowly.

The universality of social insurance system over years has resulted in some stylized facts regarding the coverage or spread of benefits and their impacts on the livelihood of many people who either take or contribute towards it. While the social insurance system like this is a symbol of the level of civilization as every citizen of the country has minimum guaranteed income, the cost of maintaining the system should be reasonable and contribute towards higher level of employment and economic growth. Concerns are raised by the general public because of the sheer amount of benefit payments, that was around £ 220 billion for year 2015/16 and as many as 12 million households who receive it. Why does one in four working age adult need benefit? Why have more than 2.6 million people spent at least a half of their working time in some form of benefit in the last ten years (DWP 2000)? What are the emerging trends³?

Current government aims to reform the benefit system to make it appropriate for the economic realities of the 21st century. It is ensuring the index benefit payments to remain slightly above the inflation to maintain the real value of benefit (Figure 8,

Table 1: Average number of benefit claimants and claimant rates in the UK

| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Number of Wards | 10601 | 10597 | 10597 | 10646 | 10642 | 10647 | 10647 | 10640 | 10592 |
| Claimants ('000) | 981 | 918 | 835 | 1557 | 1568 | 1521 | 1617 | 1539 | 1142 |
| Job related claimant rates (16-64 age population) | | | | | | | | | |
| Mean | 2.12 | 1.96 | 1.78 | 3.45 | 3.43 | 3.30 | 3.50 | 3.34 | 2.49 |
| St. Deviation | 1.58 | 1.49 | 1.38 | 1.97 | 2.13 | 2.25 | 2.45 | 2.46 | 2.03 |
| Maximum | 12.1 | 12.7 | 12.1 | 16.1 | 15.8 | 16.0 | 20.3 | 20.2 | 19.7 |
| Number of job related benefit claimants in the UK | | | | | | | | | |
| Mean | 92.5 | 86.7 | 79.0 | 146.3 | 147.4 | 142.8 | 151.9 | 144.6 | 107.8 |
| St. Deviation | 128.7 | 122.8 | 112.1 | 169.3 | 177.6 | 179.0 | 192.6 | 187.7 | 147.6 |
| Maximum | 2070 | 2169 | 2060 | 2446 | 2380 | 2527 | 2708 | 2615 | 2226 |
| Growth rates of GDP | | | | | | | | | |
| Growth rates | 2.8 | 2.7 | -0.1 | -4.9 | 1.4 | 0.9 | 1.6 | 0.7 | 1.7 |

Source: <https://www.nomisweb.co.uk/Default.asp>

DWP (2010)). It is argued that system that existed till 2013 encouraged low wage workers to stay on benefits rather than moving into a job for work as the marginal benefits of a transition from unemployment to employment are very small as existing level of benefits raise the reservation wage rate reducing labour supply substantially of the benefit recipients. Blundell (2001) had succinctly summarized how the withdrawal of benefits and in kind supports to low income families result in implicit tax rate of almost 100%. A number of benefit models were considered to taper universal benefit rates by integrating the major elements of benefits that include income and child tax credits, housing and council tax benefits, job seeker or working tax credits. In the UK context Blundell *et al.* (2009), Brewer *et al.* (2009), Mortensen and Pissarides (1994), Layard and Nickell (1986), Blundell and Walker (1988), Meade (1978) and Mirrlees (1971) and most recently Mirrlees *et al.* (2010) have discussed issues and principles involved extensively. While Blanchard and Tirole (2008) show how the unemployment insurance are tightly linked to job protection, Pallage, Shruggs and Zimmermann (2009) illustrate that the European countries are three times more generous than the US system. In a move to the simplification of existing multi-tier benefit system the UK government is replacing it by the universal credit system with single unified taper rate to guarantee that work always pays and thus provide more incentives to work, by withdrawing benefits as income rise at a single reasonable rate from 2017. Government's objective is to assure that right money goes to the right people.

3. Theoretical Aspect

Three elements need to be clear from the theoretical analysis on benefit. First, why is it optimal for people to take benefits? Secondly how these relate to the equilibrium rate of unemployment? What is the role of benefit in explaining transitions between employment and unemployment?

An individual who is free to work or to remain in benefit compares levels of utilities in presence or absence of benefits taking prices, wages and level of benefits as given at the time of individual decision. Providing a social insurance the benefit systematizes the reservation wage rate and prices in the economy when general equilibrium impacts are taken into account. Thus the ultimate welfare gains to recipients is far less than what they or the government think at the first place. Bhattarai and Whalley (2009) argue that real value of benefit of £1 is just about 0.17 pence for reasonable values of elasticities of substitution between skilled and unskilled workers,

when costs associated with conditional benefits are incorporated into the general equilibrium system of the economy. This model essentially involves optimal choice of level of consumption (C_i) and leisure (L_i^e) taking the maximum of income from work and/or benefit in line of working family tax credit (WFTC) rules existing in the UK for household i . for high and low income household $i = L, H$. Taking the price (P), wage (w), benefits (B_i), transfers (R_i) and the labour income tax rate (t_i) as given in the market households maximise utility, $U(C_i, L_i^e)$ from consumption and leisure solving:

$$\max U(C_i, L_i^e) \quad (5)$$

subject to the budget constraint

$$PC_i = \max[\{w_i(1-t_i)(\bar{L}_i - L_i^e) + R_i\}, \{w_i(1-t_i)(\bar{L}_i - L_i^e) + B_i + R_i\}] \quad (6)$$

Individual takes benefit if the level of income under the benefit regime is higher than when not taking the benefit. In utility terms a typical household chooses to remain in the benefit regime if the utility from remaining in the benefit is higher than not receiving the benefit $U_B(p, w) > U_{NB}(p, w)$. These consumption side choices need to be consistent to the production side of the economy where output is produced by highly skilled labour (L_H) and unskilled labour (L_L), $C = F(L_H, L_L)$. When P is numeraire the market clearing conditions require that output equals consumption by two types of households $C = C_H + C_L$. Labour market clears across skill categories $\bar{L}_H = L_H^e + L_H$ and $\bar{L}_L = L_L^e + L_L$, leisure and labour supply sum to the endowment of labour (\bar{L}_i). The public sector balances require expenses on benefit and transfer payments equal to the revenues from income taxes and withdrawal of benefits (tax-backs) as recipients start working:

$$\sum_{i=H,L} B_i N_i + \sum_{i=H,L} R_i = \sum_{i=H,L} (1-N_i) t_1 w_i L_i + \sum_{i=H,L} N_i t_2 w_i L_i \quad (7)$$

Benefit system influences the natural rate of unemployment in the economy as it affects both supply and demand sides of the labour market. While by increasing the reservation wage rate benefits reduce the supply of labour, it also makes costlier to hire workers (Moffitt and Nicholson (1982)).

Natural rate of unemployment is determined by balancing the rate of creation and destruction of jobs. In Mortensen and Pissarides (1994) the natural rate of

unemployment rises when the amount of job destruction $\lambda(1-u)$ is higher than the amount of job creation $\theta q(\theta)u$. Here labor force is normalized to 1 and then $(1-u)$ represents those who are at work. The λ fraction of $(1-u)$ worker lose job, with the rate of idiosyncratic shock of job destruction $0 < \lambda < 1$. Let θ be the ratio of

vacancy to unemployment rate $\left(\theta = \frac{V}{U}\right)$ and $q(\theta)$ be the probability filling a vacancy.

Then $(1-q(\theta))$ is probability of not filling that vacancy. The difference between the job destruction and job creation results in the change in equilibrium unemployment rate (\dot{u}) for each instance as:

$$\dot{u} = \lambda(1-u) - \theta q(\theta)u \quad (8)$$

There is no change in unemployment rate ($\dot{u} = 0$) in the steady state. Equilibrium unemployment rate (Beveridge curve):

$$u = \frac{\lambda}{\lambda + \theta q(\theta)} \quad (9)$$

The actual value of λ , θ and $q(\theta)$ varies by the phase of the business cycle; as is clear from figures 10, 11, 12. During the recession in 2009 in the UK λ was 0.04, θ very low at 0.5, and $q(\theta)$ around 0.9; Thus the equilibrium unemployment rate

$$\text{becomes } u = \frac{0.04}{0.04 + 0.5 \times 0.9} = \frac{0.04}{0.49} = 8.2\%.$$

In a simple dynamic model of transition from employment (e_t) to unemployment (u_t), i.e $e_{t+1} = (1-\alpha)e_t + \beta u_t$ and then to the employment again $u_{t+1} = \alpha e_t + (1-\beta)u_t$, could be explained by a Markov process of the system as by Hoy *et al.* (2001) as:

$$\begin{pmatrix} e_{t+1} \\ u_{t+1} \end{pmatrix} = \begin{pmatrix} (1-\alpha) & \beta \\ \alpha & (1-\beta) \end{pmatrix} \begin{pmatrix} e_t \\ u_t \end{pmatrix}; \begin{pmatrix} 0 < \alpha < 1 \\ 0 < \beta < 1 \end{pmatrix} \quad (10)$$

Here $(1-\alpha)$ and $(1-\beta)$ are measures persistency of employment and unemployment rates. Using the undetermined coefficient method and using the initial conditions the complete time path of e_t and u_t are given by (see the derivations for this in the appendix):

Figure 10 : Probability of Job Finding Rate in the UK

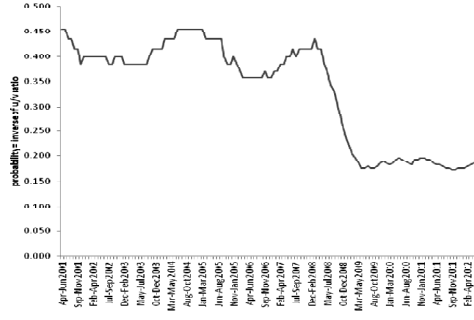


Figure 11: Redundancy Rates in the UK 1995 to 2012

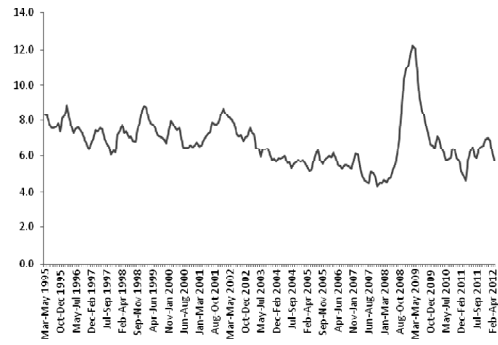


Figure 12 : Benefit per person and total benefit in the UK

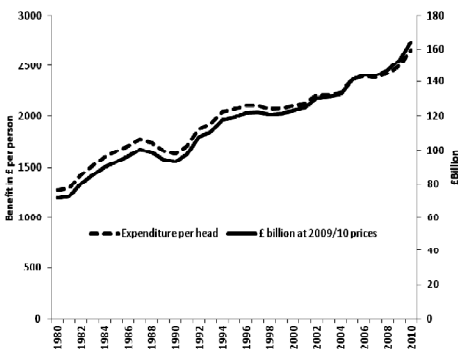
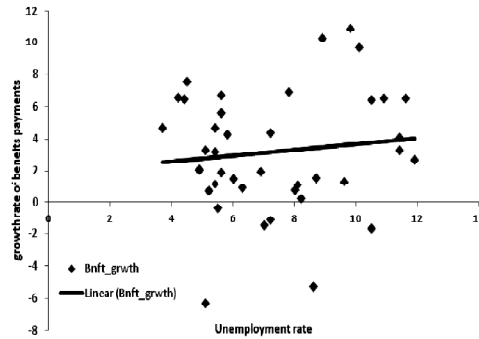


Figure 13: Unemployment and benefit growth in the UK, 1971-2011



$$e_t = \frac{\beta}{(\alpha + \beta)} + \frac{\alpha e_0 - \beta u_0}{(\alpha + \beta)} (1 - \alpha - \beta)^t + \xi_e \quad (11)$$

$$u_t = \frac{\alpha}{(\alpha + \beta)} + \frac{\alpha e_0 - \beta u_0}{(\alpha + \beta)} (1 - \alpha - \beta)^t + \xi_u \quad (12)$$

By influencing the behavioral parameters α and β of the transition equations benefit system influences course of unemployment and inflation. In theory it is possible to go back to 1942 and study all transition paths by calibrating the historical time series of e_t and u_t (Card, Chetty, and Weber 2007).

Redundancies (negative shocks to employment) and vacancies (shock to unemployment) causes fluctuations in the transitional paths of employment and unemployment as shown in the charts below. The evolution of employment and unemployment rates over time then is shown in Figure 14 and 15 respectively.

Table 2: Markov process for employment and unemployment

| Parameters | α | β | e_0 | u_0 | ξ_e | ξ_u |
|------------|----------|---------|-------|-------|------------|------------|
| Values | 0.05 | 0.2 | 56.9% | 9.6% | N (0, 0.5) | N (0, 0.5) |

Figure 14: Equilibrium employment rate

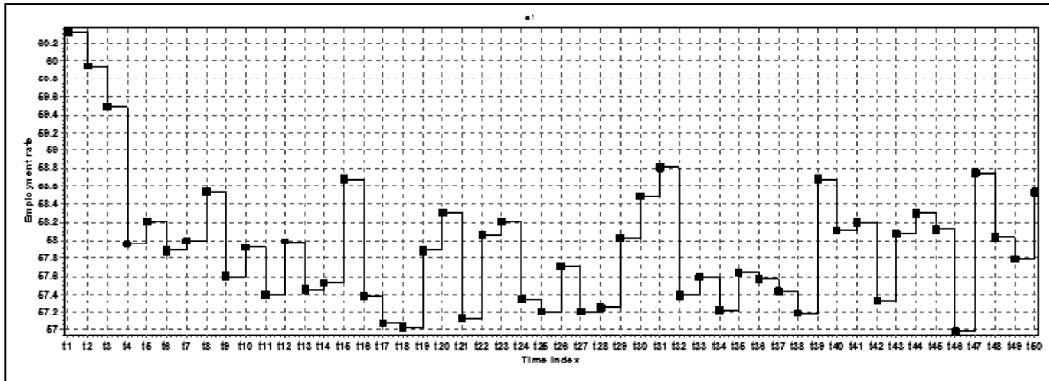
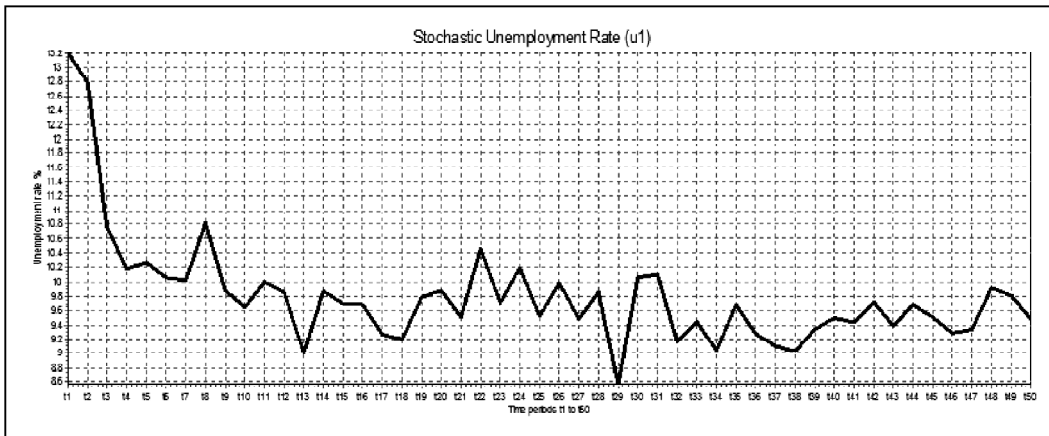


Figure 15: Equilibrium unemployment rate



Bhattarai and Dixon (2014) consider the state space model of the labour market as given by the transition probabilities $(\pi_{t,se}^b, \pi_{t,su}^b, \pi_{t,si}^b)$ between employment,

unemployment and inactive states in the labour market in a general equilibrium model with multiple sectors and households in the

$$\pi_{t,se}^b = \pi_{t-1,se}^b - \pi_{t-1,se}^b (su_t^b + si_t^b) + f_t^b \pi_{t-1,su}^b + ie_t^b \pi_{t-1,si}^b \quad (13)$$

Here su_t^b and si_t^b are separations from employment to unemployment and inactive state; f_t^b job finding rate by unemployed and ie_t^b is transition probability from inactive to employment state. Thus probability of being in the job is again the result of job creation factors, (f_t^b and ie_t^b) and the job destruction factors (su_t^b and si_t^b) and the transition probabilities ($\pi_{t,se}^b, \pi_{t,su}^b, \pi_{t,si}^b$) across three states.

Probability of being in unemployment state decreases with job finding rates by unemployed and in inactive states, ($f_t^b + f f_t^b$) by increases by job separation ($su_t^b \pi_{t-1,se}^b$) and transition from the inactive state to the labour market state ($ie_t^b \pi_{t-1,si}^b$) as:

$$\pi_{t,su}^b = \pi_{t-1,su}^b - \pi_{t-1,su}^b (f_t^b + f f_t^b) + s_t^b \pi_{t-1,se}^b + iu_t^b \pi_{t-1,si}^b \quad (14)$$

and probability of being in the inactive state decreases by movements from the inactive state to employment and unemployment states, ($\pi_{t-1,si}^b (ie_t^b + iu_t^b)$), transit to inactive state either from employment state ($si_t^b \pi_{t-1,se}^b$) or from the unemployment state ($f f_t^b \pi_{t-1,su}^b$)

$$\pi_{t,si}^b = \pi_{t-1,si}^b - \pi_{t-1,si}^b (ie_t^b + iu_t^b) + si_t^b \pi_{t-1,se}^b + f f_t^b \pi_{t-1,su}^b \quad (15)$$

Detailed numerical results and GAMS program is not reported due to space limitations but available upon request. Empirical early analysis of sectoral shifts and duration of unemployment in Mills, Pelloni and Zervoyianni (1995) for US economy is confirmed in more recent study by Panagiotidis and Pelloni (2014) as asymmetry in sectoral dispersion happens to me one of the major cause of unemployment. Changes in preferences and technology is the reason for this and Bhattarai and Dixon (2014) provide general equilibrium foundations to such analysis.

Above theoretical aspects are relevant for the discussion of benefit reforms being proposed recently in the UK as the real value of benefits are economically a lot less than thought by benefit recipients. Evaluation of income and substitution effects of price and wages with and without benefit creates non-convexity of the budget set and requires a more complicated procedure for the computation of equilibrium as heterogeneity of skills and labour supply behavior influenced by conditional choices also enter into the picture.

Remaining section of this paper focuses on the job seeker allowance (unemployment benefit in the UK) and aims to provide more recent empirical evidence on determinants of benefit claimants, work-hours and unemployment rate across 201 counties in Great Britain. To my knowledge the number of benefit claimants has not been assessed in this context and is a very pertinent issue at the moment given commitments of current government to reform the benefit system as a part of budget deficit reduction programme.

4. Basic Statistics on Pay, Unemployment and Benefit

Provision of benefits in UK is an integral part of the social security system that started from the Beveridge report in 1942 which states, “social insurance should aim at guaranteeing the minimum income needed for subsistence”. Summary statistics of the data constructed from the current population survey, 2009 (<https://www.nomisweb.co.uk/Default.asp>) presented in Table 1 reveals some important features of benefit and payment system across 201 British counties. Average population (working age population) per county was 297 thousands (193 thousands) with a range of 1.4 million (0.9 million). Similarly the number of benefit claimants on average was 7 thousands with a quite high range of 49 thousands. Among these claimants 64 percent were in benefit up to six months, 20 percent for about a year and 13 percent for two or more years. Since the year 2009 had experienced worst recession since 1930s and the average unemployment rate across counties was 8.4 percent with average number of employed individuals being 147 thousands per county. Average annual pay per county was £31,303 but varied between £20,303 and £83,969. Average pay per week was £577 and had a range of £740.

Table 3: Benefit Claimants and Related Variables in Great Britain 2009

| | Recession 2009 | | | | Recovery 2014 | | | |
|--------------------|----------------|----------|-------|---------|---------------|----------|-------|---------|
| | Mean | Std. Dev | Min | Max | Mean | Std. Dev | Min | Max |
| Pay per week, £ | 576.8 | 103.5 | 392.3 | 1132.2 | 519.3 | 72.7 | 374 | 826 |
| Pay per hour, £ | 14.80 | 2.9 | 9.8 | 29.6 | 13.2 | 2.1 | 9.4 | 21.5 |
| Pay per year, £ | 31302.8 | 7861.5 | 20303 | 83969 | 27297 | 4050 | 19933 | 45625 |
| Hours per week | 39.02 | 0.617 | 37.5 | 41.2 | 37.7 | 0.56 | 35 | 40 |
| Unemployed | 11764.2 | 9135.3 | 800 | 61400 | 6427 | 6680 | 700 | 73200 |
| Employed | 146673.1 | 122273.2 | 12800 | 697300 | 72826 | 73407 | 9600 | 671700 |
| Unemployment rate | 8.4 | 2.6 | 2.1 | 16.7 | 6.9 | 2.9 | 1.6 | 16.9 |
| Benefit Claimants | 7404.4 | 5804.4 | 360 | 48900 | 2856 | 3414 | 5 | 39070 |
| Claimants-6 months | 4772.9 | 3537.2 | 260 | 25060 | 1307 | 1775 | 0 | 21750 |
| Claimants-1 year | 1506.6 | 1255.0 | 60 | 11590 | 844 | 1190 | 0 | 14700 |
| Claimants-2 years | 962.8 | 857.4 | 40 | 8120 | | | | |
| Working age 16-64 | 193175.1 | 156612.4 | 16100 | 887600 | 18631 | 15011 | 3400 | 114700 |
| Total population | 297172.6 | 245597.6 | 26200 | 1411100 | 162845 | 111890 | 2300 | 1085400 |

Source: author's calculation from the Current Population Survey

The frequency distributions of number of benefit claimants, work-hours and unemployment rates and annual average pay are as shown in Figures 15,16,17 and 18 respectively.

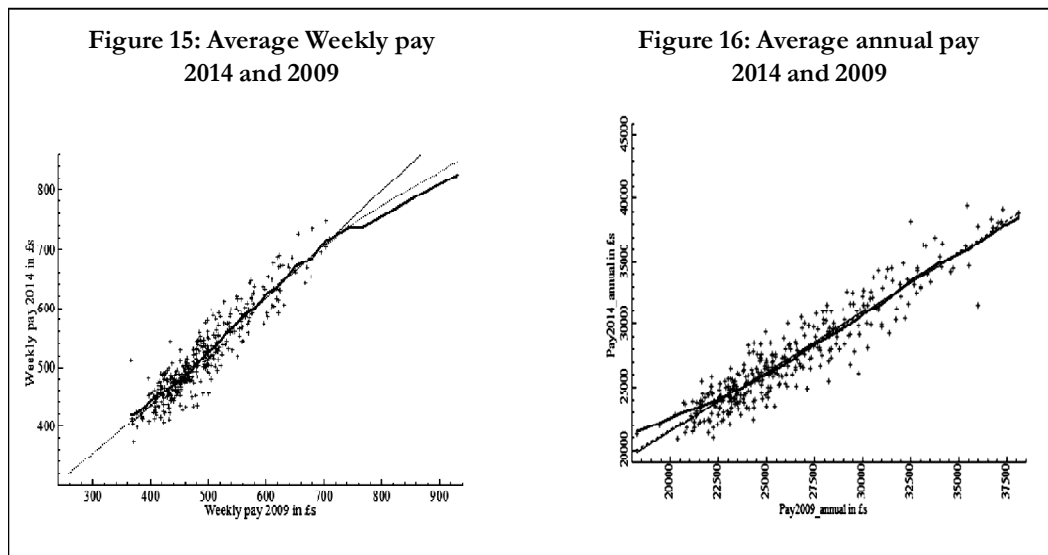


Figure 17: Average Weekly pay 2014 and 2009

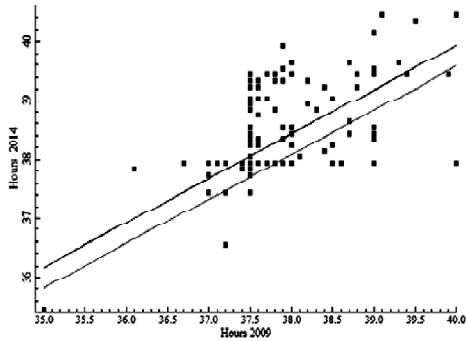


Figure 18: Average annual pay 2014 and 2009

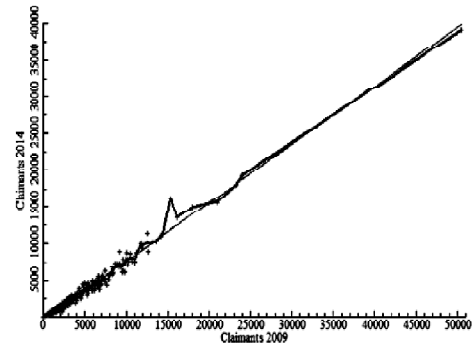


Figure 19: Vacancies and unemployed

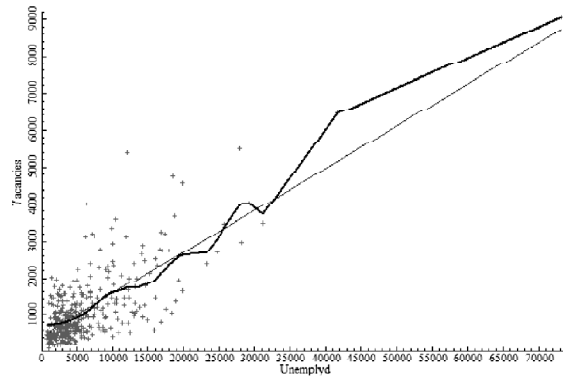


Figure 20: Claimants and unemployed



Figure 21: Unemployment rate density 2014

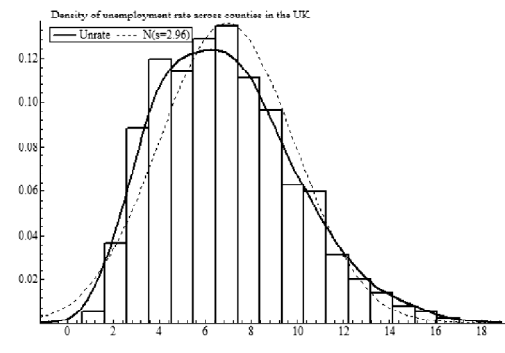
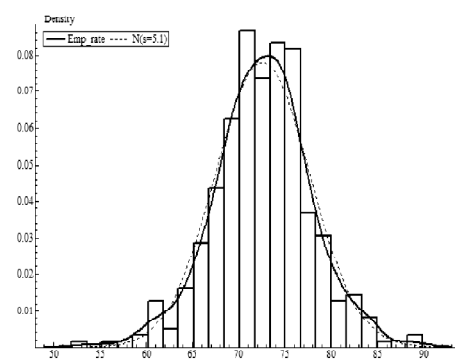


Figure 22: Employment rate density 2012



Density of unemployment rate and employment rates across counties in the UK

5. Determinants of Benefit Claimants

Multiple regression analysis is used here to process the empirical evidence on the determinants of benefit claimants among 201 UK counties in 2009. Let Y_i measure the number of benefit claimants in county i , $X_{1,i}$ the rate of unemployment in that county, $X_{2,i}$ be working age (16-64) population and $X_{3,i}$ total population, $X_{4,i}$ be pay per week in that county.

$$Y_i = \beta_0 + \beta_1 X_{1,i} + \beta_2 X_{2,i} + \beta_3 X_{3,i} + \beta_4 X_{4,i} + \varepsilon_i \quad i = 1 \dots N \quad (16)$$

UK government provides job-seeker and other unemployment related allowances to all eligible individuals. First determinant of the number of benefit claimant is the unemployment rate. One percentage point increase in unemployment is likely to raise more than 625 people in the benefit. The econometric evidence clearly supports that counties with higher rate of unemployment had larger number of benefit claimants. Second determinant of benefit claimants is pay per week. Claimant rate was lower for counties with higher weekly pay. Richer regions had more income and fewer claimants of benefits. Increase in weekly pay also raises the cost of remaining in unemployment. People are likely to take jobs than remaining unemployed and claiming the benefits. If pay rises by one pound it is likely to bring about nine people out of doles. Thirdly, number of working age population in the region has positive impact on the number of benefit claimants. Larger number of people in the workforce raises the number of people looking for jobs, this is likely to make getting job more difficult. More remain unemployed and claim the benefit. However for an advanced economy with good mobility of labour across counties this effect can be expected to be small as shown by coefficient of 0.12⁴.

6. Analysis of Empirical Findings

Four sets of regressions are estimated to establish the factors that determine benefit claims among British counties. First one is the general model without any distinction taken on the duration of payment received. Results in Table 1 show that unemployment rate and the working age population are major determinants of number of benefit recipients across these counties. While increase in unemployment rate by one percent is likely to raise the number of benefit claimants by 625, increase in population by 100 person is likely to add 12 claimants into the benefit system. Both these factors are statistically very significant as the null hypothesis is rejected by highly significant statistic. Overall fit of the model is quite good as indicated by R^2 ($R^2 = 0.86$) and F statistic (F

= 496.7). Further these estimates do not have autocorrelation problem as DW statistic of 13 is above the critical limit of the DW table.

Table 4: Determinants of Benefit Claimants in Great Britain

| | <i>Recession 2009</i> | | | <i>Recovery 2014</i> | | |
|-----------------------------------|-----------------------|----------------------|----------------|----------------------|----------------------|----------------|
| | <i>Coefficient</i> | <i>StandardError</i> | <i>t-value</i> | <i>Coefficient</i> | <i>StandardError</i> | <i>t-value</i> |
| Intercept | 496.7 | 1329.0 | 0.4 | -351.3 | 588.10 | -0.62 |
| Unemployment rate | 624.6 | 69.0 | 9.05 | 253.9 | 24.8 | 10.2 |
| Pay Per week | -8.7 | 1.8 | -4.9 | -5.0 | 0.95 | -5.27 |
| Population | -0.05 | 0.01 | -4.65 | 0.02 | 0.001 | 20.9 |
| Working age populaiton (16-64) | 0.12 | 0.02 | 6.45 | 0.005 | 0.002 | 3.09 |

$R^2 = 0.86$, $F = 496.7$ (0.00), $DW = 1.83$, $N = 201$. $R^2 = 0.87$, $F_{4,360} = 599.5$ (0.00)

Do these determinants of claimant counts vary in their influences on the claimants according to the duration of benefit taken by the individuals? Theoretically one can argue that benefit system protects against cyclical factors but not structural factors of the economy. UK economy shrank by more than 5 percent in 2009, the year of study. One could expect higher unemployment rate as well as larger benefit taken in that year. Those who have been taking benefits for more than one year or two years were taking benefits even when economy was prospering. Separate regressions of the number of benefit claimants for six months, one year and two years thus can indicate to the cyclical and long run factors behind the claimants. Results presented in Table 5 clearly prove this intuition. The influence of above determinants was far greater on and more pronounced on benefit claimants in six months than for ones who have been claiming benefits of one year or two years.

Table 5: Determinats of Six Month Benefit Claimants

| | <i>Recession 2009</i> | | | <i>Recovery 2014</i> | | |
|-----------------------------------|-----------------------|----------------------|----------------|----------------------|----------------------|----------------|
| | <i>Coefficient</i> | <i>StandardError</i> | <i>t-value</i> | <i>Coefficient</i> | <i>StandardError</i> | <i>t-value</i> |
| Intercept | 2511.4 | 322.5 | 7.79 | -418.5 | 341.5 | -1.23 |
| Unemployment rate | 0.337 | 0.161 | 21.0 | 139.7 | 15.2 | 9.19 |
| Pay Per week | -3.891 | 0.557 | -6.99 | -2.4 | 0.58 | -4.19 |
| Population | -0.011 | 0.004 | -2.85 | 0.011 | 0.0007 | 17.2 |
| Working age populaiton (16-64) | 0.20 | 0.007 | 3.01 | 0.002 | 0.001 | 2.27 |

$R^2 = 0.96$, $F = 1208$ (0.00), $DW = 1.81$, $N = 201$. $R^2 = 0.82$, $F_{4,360} = 409.3$ (0.00)

Those who have been claiming benefits more than one or two years may be doing it not just for cyclical reasons. Globalisation process has caused structural transformation of the economy with manufacturing jobs being transferred overseas. Service industries have not been able to create as many jobs as the number of job seekers that a growing work force would generate. Rates of job destruction recently have been higher than the rate of job creation. For individuals claiming more than a year benefit spell started long before 2009 recession. Higher rate of unemployment and larger size of working age population have further aggravated this problem.

People taking benefits for more than two years clearly have more serious problems - long term injuries or incapacities. Despite that on average higher pay per week deters these people to remain in the long term benefit so does the population of the county. Unemployment rate and working age population are still very dominant factors for number of long term claimants across British counties.

Table 6: Determinants of One Year Benefit Claimants

| | <i>Recession 2009</i> | | | <i>Recovery 2014</i> | | |
|--|-----------------------|-----------------------|--|----------------------|-----------------------|----------------|
| | <i>Coefficient</i> | <i>Standard Error</i> | <i>t-value</i> | <i>Coefficient</i> | <i>Standard Error</i> | <i>t-value</i> |
| Intercept | 572.4 | 176.6 | 3.24 | -312.7 | 241.3 | -1.30 |
| Unemployment rate | 0.183 | 0.009 | 20.7 | 97.7 | 107 | 9.10 |
| Pay Per week | -0.951 | 0.310 | -3.12 | -1.64 | 0.41 | -3.98 |
| Population | -0.003 | 0.002 | 1.34 | 0.007 | 0.0005 | 16.0 |
| Working age populaiton (16-64) | 0.001 | 0.004 | 0.260 | 0.002 | 0.0008 | 2.06 |
| $R^2 = 0.90, F = 474.8(0.00), DW = 1.87, N = 201.$ | | | $R^2 = 0.80, F_{4,360} = 360.5 (0.00)$ | | | |

Table 7: Determinants of Two Years Benefit Claimants

| | <i>Recession 2009</i> | | | <i>Recovery 2014</i> | | |
|---|-----------------------|-----------------------|--|----------------------|-----------------------|----------------|
| | <i>Coefficient</i> | <i>Standard Error</i> | <i>t-value</i> | <i>Coefficient</i> | <i>Standard Error</i> | <i>t-value</i> |
| Intercept | -141.1 | 266.1 | -0.53 | -266.6 | 140.4 | -1.61 |
| Unemployment rate | 119.8 | 13.81 | 8.67 | 57.6 | 6.27 | 9.21 |
| Pay Per week | -1.340 | 0.353 | -3.80 | -0.83 | 0.24 | -3.48 |
| Population | -0.008 | .002 | -3.53 | 0.004 | 0.0003 | 14.7 |
| Working age populaiton (16-64) | 0.017 | 0.004 | 4.69 | 0.0009 | 0.0004 | 2.07 |
| $R^2 = 0.73, F = 135.5(0.00), DW = 1.9, N = 201.$ | | | $R^2 = 0.78, F_{4,360} = 319.3 (0.00)$ | | | |

7. Conclusion

Sir William Beveridge (1942) had recommended six principles for six groups of individuals in the society on which the benefit system should operate. Over the last seven decades tax and transfer system has evolved and the benefit has become an integral part of the social security system in the UK. Benefit is the main source of income for working age people who are unemployed, disable, sick and in bereavement. Reviewing trends of benefit and its association to growth, unemployment, inflation and debt this study has identified factors that determine the number of benefit claimants among 201 British counties and monthly time series data from 1992:1 to 1212:11 and panel data of 10640 wards form 2006 to 2014. Higher the rate of unemployed in a county, larger the number of benefit claimants. As numbers of working age population rise, there is more labour supply relative to the demand for labour. Greater number of working age individuals end up claiming the benefits because of the higher reservation wage rate due to existence of the benefit system. Greater influence from explanatory variables, unemployment rate and working age population, on the number of claiming the benefits up to six months were mainly because of the recession of 2008/2009. Despite that the short run business cycles were less relevant for people who have been claiming benefits up to two years. In all cases higher the average weekly pay in a county lower was the number of benefit claimants. Higher weekly pay clearly indicates shortage of labour in that county, lower unemployment rate, and smaller number of benefit claimants. In general total population was found negatively related to number of benefit claimants as more densely populated counties should have larger markets and more jobs and hence fewer benefit claimants. These findings are important as these provide empirical support to current initiatives to reform the benefit system to make Britain a high wage low benefit economy. These are consistent to the policy focus on high growth, more investment and more job creation.

Notes

1. The Department of Work and Pensions (DWP) administers many kind of benefits. These include weekly payment for armed force allowance (£ 62.25-£41.65), bereavement entitlement (£ 84.25), care taker allowance (£ 46.95), disability allowance (£ 62.25), housing benefit (7.5% to 25%), incapacity benefit (£ 78.50), income support (single £ 57.45; couple £ 90.10), hospital rates (£ 46.75), industrial injuries (£ 127.10), job seekers' allowance (£ 34.60 to £ 45.58), maternity allowance (£ 108.85), pension credit (£ 114.05), state pension

(£ 84.25), severe disablement allowance (£ 47.45), widow benefit (£ 84.25) and monthly payments of winter fuel allowance (lump sum £ 200), national insurance (£ 84.01- £ 97.00). Six work related benefits such as the jobs seekers allowance (JSA),, income support, child tax credit, working tax credit and housing benefit are being merged into one and paid monthly directly to the bank account of the recipient households instead of weekly payments to individuals under the existing system. Online system are to be used for the initial claim and then to check the accuracy of those claims. Benefits are aligned to work to ensure that work always pays more than staying in the benefit.

2. The entitlement (E_i) constitutes of child tax credit and working family tax credit and t_b is the tax back rate, y_i is the annual household income that includes income of husband y_i^{hs} and wife y_i^{wf} and other incomes y_i^o such as the interest rate earning. The child tax credit (CTC) and the working family tax credit (WFTC) components of benefit entitlements for a family with dependent children can be calculated as:

$$E_i = E_{F,i} + E_{CH,i}N_{CH,i} - 0.7CC_i + E_{B,i} + (E_{\phi,i} \text{ or } E_{L\phi,i}) + E_{30k,i} \quad (2)$$

where E_i is the family entitlement, the entitlement per child the number of dependent children in the family, CC_i child care cost, $E_{B,i}$ entitlement for family, $E_{\phi,i}$ or $E_{L\phi,i}$ the entitlement for couples or lone parent and $E_{30k,i}$ the entitlement for working more than 30 hours. For instance for a family with y_i^{hs} equal to £ 15,000, y_i^{wf} equal to £10,000 and y_i^o net of £60 with three dependent children the DWP's benefit entitlement is calculated as:

$$\begin{aligned} E_i &= E_{F,i} + E_{CH,i}N_{CH,i} - 0.7CC_i + E_{B,i} + (E_{\phi,i} \text{ or } E_{L\phi,i}) + E_{30k,i} \\ &= 545 + 3 \times 1690 + 1620 + 1595 + 650 = \text{£}9490 \end{aligned} \quad (3)$$

Thus the annual amount of benefit is:

$$B_i = E_i - t_b(y_i - \bar{y}) = 9490 - 0.37(25060 - 5220) = \text{£}2149.20 \quad (4)$$

which amounts to £41.33 per week. Generally WFTC provides more benefits to a couple with many children and implicitly encourages at least one parent to remain at home to take care of children.

3. There are three ways to provide benefits: 1) direct cash payments for the vulnerable individuals in the form of social security insurance 2) in-kind public services such as health and education and 3) efficient private sector for higher rate of growth and job creation made possible by public private partnership for achieving higher standard of living in the country.

Cash benefit payment is a means to meet the public objective to achieve fairness and provide opportunities for all. Tax-transfer system is designed to create fair society in Britain. Job Centre plus and employment programmes had helped more than 3.2 million people leave the unemployment spell between 2005 and 2009. Similarly 18-24 year old claiming jobseeker's allowances for six months were guaranteed a job, work replacement

or work related training in that period. Schemes were in operation to eliminate the child poverty by 2020 by adopting comprehensive measures stated in Ending Child Poverty: Making it Happen. Free school meals are given to all children of low income families from September 2010. Basic state pension had increased by 2.5 percent and threshold of inheritance tax was kept at £325,000. Weekly minimum income guarantee schemes were in operation for working households. The number of benefit recipients who were affected by marginal deduction rates (MDR) in excess of 70 percent while entering to work had been halved since 1997. On the tax front government expected fair contribution from everyone to the taxes that fund public spending without bending the tax rules. Various measures such as new disclosure opportunity (NDO) are taken to minimise leakages of revenues in the form of offshore tax haven and tax evasion and avoiding hidden and fraudulent activities coordinating with EU and other trading partners. Provision of affordable housing, support to home owners and home buyers, support to pensioners and vulnerable families by supporting ISA savings are other parts of the cash benefits.

In kind benefits complement cash benefits and are provided by maintaining high quality front-line public services including the universality of free health care by the NHS, free education and the high level of security by good- policing. Hospital treatment within 18 months, referral to a cancer specialist within 2 weeks, A &E treatment within 4 hours were achievements of past investments in the NHS. Number of schools with less than 30 percent pupils achieving less than five good grades in GCSEs including English and mathematics that reduced from 1600 to 270 in the last 12 years followed from investment in education. Safer communities require additional police officers in the street.

Through various measures of macroeconomic stability and growth government has been supporting businesses and helped recovery of various industries by ensuring finances, promoting innovations and skill, enhancing enterprises and maintaining open and competitive markets and investing in low carbon infrastructures. Schemes like Skill for Growth, Digital Britain, Life Sciences Blue Print, Low Carbon Industrial Society, Building Britain's Future: New Industry, New Jobs support small, medium and large scale businesses and brings higher rate of growth into the economy. Prosper private sector creates more jobs and helps more individuals to transit from unemployment to employment and from life in doles to a decent life of work and higher income.

4. The OLS estimator $(\hat{\beta} = (X'X)^{-1} X'Y)$ here measures the influence of explanatory variable (X) on the number of benefit claimants across 201 counties of Great Britain. The Gauss Markov theorem establishes that this estimator is linear $(\hat{\beta} = aY; a = (X'X)^{-1} X')$, unbiased $(E(\hat{\beta}) = \beta)$ and most efficient among all estimators, $\text{cov}(b) > \text{cov}(\hat{\beta})$. Reliability of the OLS estimates depend on the variance of errors $(\hat{\sigma} = \frac{\sum e^2}{N - k})$ and the covariance

matrix for the coefficients, $(\hat{\beta}) = (X'X)^{-1}\hat{\sigma}^2$. Whether particular coefficient $\hat{\beta}_i$ is significant depends on $SE(\hat{\beta}_i)$ and associated t values $\left(t(\hat{\beta}_i) = \frac{\hat{\beta}_i - \beta_i}{SE(\hat{\beta}_i)}\right)$. How well data

fits to the model is indicated by $\left(R^2 = \frac{\sum \hat{y}_i^2}{\sum y_i^2}\right)$ and the level of significance of the overall

model is given by $F = \frac{RSS/(K-1)}{ESS/(N-k)}$ statistics. While white test $n.R^2 \sim \chi_{df}^2$ could detect

the existence of heteroskedasticity, the Durbin-Watson statistics $\left(DW = \frac{\sum_{t=1}^T (e_t - e_{t-1})^2}{\sum_{t=1}^T e_t^2}\right)$ detects any evidence for autocorrelation though this is less serious problem of cross section analysis reported in the next section.

References

- [1] Beveridge William (1942). *Social Insurance and Allied Services (Beveridge Report)*, Nov., HMSO, London.
- [2] Bhattarai K. (2012). Fiscal Policy, Growth and Income Distribution in UK, <http://www.aeanweb.org/aea/2012conference/program/preliminary.php>
- [3] Bhattarai K and H. Dixon (2014). Equilibrium Unemployment in a General Equilibrium Model with Taxes, *The Manchester School*, 82, pp. 90-128.
- [4] Bhattarai K and J. Whalley (2009). Redistribution Effects of Transfers, *Economica* 76:3:413-431 July.
- [5] Blanchard, O. J. J. Tirole (2008). The Joint Design of Unemployment Insurance and Employment Protection: A First Pass, *Journal of the European Economic Association*, 6,1 (Mar.), 45-77.
- [6] Blundell R. V. Fry and I. Walker (1988). Modelling the Take-Up of Means-Tested Benefits: the Case of Housing Benefits in the United Kingdom, *Economic Journal*, Conference Vol. pp. 58-74.
- [7] Blundell, R. (2001). Welfare reform for low income workers, *ford Economic apers*, 53(2):189-214.
- [8] Blundell R., M. Brewer, P. Haan, A. Shephard (2009) Optimal Income Taxation of Lone Mothers: An Empirical Comparison of the UK and Germany, *Economic Journal*, 119,(535), Feb., F101-F121.

- [9] Brewer M., M. Francesconi, P. Gregg and J. Grogger (2009) Feature: in-work benefit reform in a Cross-national perspective – introduction, *Economic Journal*, 119, Feb, F1-F14.
- [10] Card, D., R. Chetty, and A. Weber (2007). The Spike at Benefit Exhaustion: Leaving the Unemployment System or Starting a New Job?, *American Economic Review*, 97(2): 113-118.
- [11] DWP (2010). *21st Century Welfare*, Department of Work and Pension, www.dwp.uk21st-century-welfare.
- [12] Easton S. T. (1979). Aggregate Aspects of the Poor Law, Unemployment Insurance and Un-employment in Britain, 1855-1940, *Journal of Economic History*, 39, 1, March, 326-329.
- [13] Hohman Helen Fisher (1934). The Status of Unemployment Insurance in Great Britain, *Journal of Political Economy*, 42, 6, Dec., 721-752.
- [14] Hoy *et al.* (2001). *Mathematics for Economics*, MIT Press.
- [15] Layard R. and S. Nickell (1986). Unemployment in Britain, *Economica*, 53: S121-69.
- [16] Meade J. (1978). *Structure of Direct Taxation*, Institute of Fiscal Studies, London.
- [17] Mills T.C., G. Pelloni and A. Zervoyianni (1995). Unemployment Fluctuations in the United States: Further Tests of the Sectoral-Shifts Hypothesis, *Review of Economics and Statistics*, 77, 2, 294-304.
- [18] Mirrlees J., and S. Adam, T. Besley, R. Blundell, S. Bond, R. Chote, M. Gammie, P. Johnson, G. Myles, J. Poterba. (2010). *Dimensions of tax design: the Mirrlees review*, Oxford: Oxford University Press.
- [19] Moffitt R., W. Nicholson (1982). The Effect of Unemployment Insurance on Unemployment: The Case of Federal Supplemental Benefits, *Review of Economics and Statistics*, 64, 1 (Feb.), 1-11.
- [20] Mortensen D. T. and C. A. Pissarides (1994). Job Creation and Job Destruction in the Theory of Unemployment, *Review of Economic Studies*, 61: 3: 397-415.
- [21] Pallage S., L. Scruggs, C. Zimmermann (2009). Unemployment Insurance Generosity: A Transatlantic Comparison, *Annals of Economics and Statistics*, No. 95/96, Labor Market Outcomes: A Transatlantic Perspective pp. 15-23.
- [22] Panagiotidis T., G Pelloni (2014). Asymmetry and Lilien's Sectoral Shifts Hypothesis: A Quantile Regression Approach *Review of Economic Analysis* 6 : 68-86.
- [23] Pissarides, C. A. (2013). Unemployment in the Great Recession, *Economica*, 80: 385-403.
- [24] Pissarides, C. A. (2011). Equilibrium in the Labor Market with Search Frictions, *American Economic Review*, 101(4): 1092-1105.
- [25] Pissarides C. A. (2000). *Equilibrium Unemployment Theory*, MIT Press. Latest on benefit <https://www.nomisweb.co.uk/home/profiles.asp>

Appendix

Solution for the system of difference equations is given by the undetermined coefficient method

with the trace and determinant of the coefficient matrix $A = \begin{pmatrix} (1-\alpha) & \beta \\ \alpha & (1-\beta) \end{pmatrix}$; where $tr(A) = (2 - \alpha - \beta)$ and $|A| = (1 - \alpha - \beta)$. Then roots of the system is $r^2 - tr(A)r + |A| = 0$. $r^2 - (2 - \alpha - \beta)r + (1 - \alpha - \beta) = 0$.

$$r^2 - (2 - \alpha - \beta)r + (1 - \alpha - \beta) = 0 \quad (17)$$

$$r_1, r_2 = \frac{tr(A)}{2} \pm \frac{1}{2} \sqrt{tr(A)^2 - 4|A|}$$

$$r_1, r_2 = \frac{(2 - \alpha - \beta)}{2} \pm \frac{1}{2} \sqrt{(2 - \alpha - \beta)^2 - 4(1 - \alpha - \beta)}; r_1, r_2 = \frac{(2 - \alpha - \beta)}{2} \pm \frac{1}{2} \sqrt{(\alpha + \beta)^2}$$

$$r_1, r_2 = 1 - \frac{(\alpha + \beta)}{2} \pm \frac{1}{2}(\alpha + \beta); r_1 = 1; r_2 = (1 - \alpha - \beta).$$

The transitional dynamics of the system is:

$$e_t = C_1 r_1^t + C_2 r_2^t \quad (18)$$

$$u_t = \frac{r_1 - a_{11}}{a_{12}} C_1 r_1^t + \frac{r_2 - a_{11}}{a_{12}} C_2 r_2^t \quad (19)$$

Find values of C_1 and C_2 using initial conditions; $C_1 = \frac{\beta}{\alpha + \beta}$ and $C_2 = \frac{(\alpha e_0 - \beta u_0)}{\alpha + \beta}$. Then using all of these solutions, the complete time path is given by:

$$e_t = \frac{\beta}{(\alpha + \beta)} + \frac{\alpha e_0 - \beta u_0}{(\alpha + \beta)} (1 - \alpha - \beta)^t + \bar{e} \quad (20)$$

$$u_t = \frac{\alpha}{(\alpha + \beta)} - \frac{\alpha e_0 - \beta u_0}{(\alpha + \beta)} (1 - \alpha - \beta)^t + \bar{u} \quad (21)$$

Since $(1 - \alpha - \beta) < 1$ both e_t and u_t converge to steady states \bar{e} and \bar{u} as $t \rightarrow \infty$.

To cite this article:

Keshab Bhattarai (2021). Growth of the Benefit System in UK. *Journal of Development Economics and Finance*, Vol. 2, No. 1, pp. 153-176