Youth Employment and Wage Subsidy

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Abstract

The paper presents a theoretical analysis of macroeconomic effects of wage subsidy programmes for young workers. Subsidised employment is an important and effective tool of active labour market programmes to improve the chances to be hired for unemployed workers, especially for the young unskilled unemployed. One of the main reasons why young workers have difficulties in finding decent work opportunities is that their skills are not good enough to be employed. To upgrade labour skill, there are several ways, such as off-the-job training/education and on-the-job training. Wage subsidy programmes encourage the hiring of young unskilled workers and upgrade young workers' skills at the same time. The paper examines the macroeconomic effects of subsidised employment programmes targeted on young workers in a general equilibrium framework.

Keywords: youth unemployment, employment subsidy, active labour market programme, dual labour market
JEL classification: J31, J41, J64, J68

1 Introduction

The high level of persistent youth unemployment is a concern in Japan and many other industrialised countries. The youth unemployment rate in Japan is much higher than earlier generations' unemployment rates. However, high youth unemployment has not been considered as a serious problem in Japan. This is because youth unemployment is regarded as voluntary unemployment that is different from involuntary adult unemployment. Moreover, from the economic standpoint, voluntary unemployment is frictional unemployment (temporary unemployment) and this occurs when labour moves from the low-productivity sector to the high-productivity sector.

However, a persistent increase in the number of unemployed young workers will bring about serious problems for the Japanese economy/society in the future. An increase in youth

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unemployment will incur both a shortage of labour and a decline in labor productivity. As a result, international competitiveness inevitably will fall and economic growth will stop in the long-run. Moreover, a decrease in young employed workers will have negative impacts on the social welfare system and the risk of a collapse of the social welfare system will increase.

Youth labour market experiences in Japan/industrialised countries seem likely to have an important structural component that cannot be handled by demand policies only. Active labour market programmes (henceforth denoted ALMPs) are often seen as a measure that can help reduce equilibrium unemployment by making labour markets more flexible (OECD, 1994; European Commission, 2000). They can be considered to have three different roles: (1) a job brokerage role; (2) a training/education role; and (3) a job creation role (OECD, 1993; Calmfors, 1994). Through these roles, ALMPs may influence the labour market in many different respects: resource allocation, income distribution and business cycle stabilisation. Regarding young (un)employment, through these three roles, ALMPs help to decrease a mismatch of employers' needs and those of job seekers and prevent the youth unemployed from exiting the labour force (Wadensjö, 1987; Lindbeck, 1995; European Commission, 1996; OECD, 1998). An increase in youth unemployment mainly arises from a mismatch between job seekers and employers. All three roles of ALMPs may reduce mismatches between job seekers and employers. A job brokerage role raises efficiency of finding a job for the young unemployed. A training/education role increase the labour productivity for young workers and thus the probability of finding a job will increase because mismatches between job seekers and employers may be smaller. A job creation role directly helps to decrease youth unemployment by providing working opportunities for young workers. Moreover, once young workers are employed, they also obtain the chance for upgrading their skills by on-the-job training. Many young unemployed workers suffer from finding a job due to lack of working experience. Youth employment subsidy programmes encourage firms to hire young unskilled workers and provide young workers with the opportunity to upgrade their skills at the same time. In this paper, I focus on the job creation role of ALMPs. More precisely, I investigate the macroeconomic effects of wage subsidy programmes on youth (un)employment.

Gustman and Stenmeier (1988) studied the effect of training subsidies and wage subsidies on youth employment in a two-sector general equilibrium model. Labour was assumed to be heterogeneous in terms of ability. They concluded that both youth and aggregate employment may be increased by training subsidies for young workers. Wage subsidies for youth may have a positive impact on youth employment and an effect on aggregate employment is ambiguous.

Orszag and Snower (1999) used an overlapping generation model to study hiring subsidies for unemployed workers. They analysed the interaction between deadweight (hiring rate in the absence of hiring subsidies), and displacement (the effect of hiring subsidies on the separation rate), and hiring effectiveness (the effect of hiring subsidies on the hiring rate) in a dynamic framework. An optimal employment subsidy scheme was found to lead to a reduction in aggregate unemployment.

This paper uses a two-sector general equilibrium model. I rely on the idea that wages and

employment are determined by the intersection of an employment and a wage-setting schedule (Layard and Nickell, 1986; Johnson and Layard 1986; Layard et al., 1991). I study the macroeconomic effects of wage subsidies targeted on young workers. The next section of the paper sets the basic model. In Section 3 I demonstrate how an increase in wage subsidies affects macroeconomic variables, i.e., youth employment, adult employment, aggregate employment, and aggregate unemployment. Section 4 concludes.

2 The model

I consider an economy consisting of two competitive sectors: a high-productivity sector with adult labour (sector 1) and a low-productivity sector with young labour (sector 2). There are two types of workers: workers who have working experience and workers who have no working experience. A worker can find himself in one of the following four states: (1) an adult and employed worker in sector 1; (2) a young and employed worker in sector 2; (3) an adult and unemployed worker with working experience in sector 1; and (4) a young and unemployed worker without working experience in sector 2.

I shall assume that wage subsidies are provided when firms employ young workers. Wages and employment are determined by the intersection of an employment schedule and a wage-setting schedule. A Nash bargaining model of the same type as in Manning (1993) is used to define a wage-setting relationship in sector 1. The wage in sector 2 is given by a legislated minimum wage.

2.1 Labour market flows and stocks

The various stocks and flows of labour are summarised in Figure 1. I assume that the economy finds itself in a steady state and thus, that all stocks are constant. Moreover, I postulate a stationary total labour force, which is normalised to unity.

Individuals leave the labour market at a constant rate a, which is exactly the same rate as the rate of entry into the labour market. The new entrants, a, are new graduates from standard education and all new individuals enter the labour market as young unskilled job seekers who have no working experience.

The share of young unemployed workers is u_2. They find a job with the probability h_2. The steady condition for youth unemployment is

$$(a + h_2)\, u_2 = a. \tag{1}$$

The LHS is the outflow from youth unemployment and the RHS is the inflow into youth unemployment.

The steady state condition for youth employment (n_2) is

$$(a + q_2)\, n_2 = h_2 u_2, \tag{2}$$

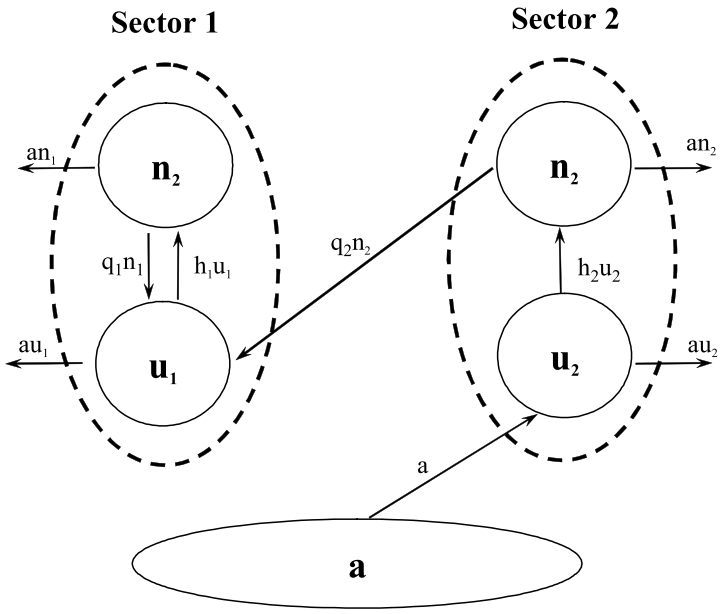

Figure 1: Stocke and flows of labour

where q_2 is the exogenously given quit rate from youth employment. The LHS is the outflow from youth unemployment and the RHS is the inflow into youth employment from the youth unemployment pool.

The steady state condition for adult unemployment (u_1) is

$$(a + h_1)u_1 = q_1 n_1 + q_2 n_2, \tag{3}$$

where q_1 is the exogenously given quit rate from adult employment and h_1 the endogenously determined probability of getting a job for adult unemployed workers. The LHS is the outflow from adult employment and the RHS the inflow into adult employment.

The condition for constant adult employment (n_1) is

$$(a + q_1)n_1 = h_1 u_1. \tag{4}$$

The LHS is the outflows from adult employment and the RHS the inflows into adult employment.

I let m_i denote the total labour force in sector i, i.e. $m_i = n_i + u_i$. From (1)-(4), the labour force in both sectors can be expressed:

$$m_1 = \frac{q_2 h_2}{(a + q_2)(a + h_2)}, \tag{5}$$

$$m_2 = \frac{a(a + q_2 + h_2)}{(a + q_2)(a + h_2)}. \tag{6}$$

As can be seen from (5) and (6), m_1 and m_2 are influenced by h_2, i.e. the endogenous determined probability to get a job for young unemployed workers. Differentiating (5) and (6) w.r.t. h_2 gives

$$\frac{dm_1}{dh_2} = \frac{aq_2}{(a+q_2)(a+h_2)^2} > 0, \tag{7}$$

$$\frac{dm_2}{dh_2} = -\frac{aq_2}{(a+h_2)(a+q_2)} < 0. \tag{8}$$

A rise in the probability to find a job for young unemployed workers (h_2) increases the total labour force in sector 1 and decreases the total labour force in sector 2. The reason is the following. A rise in h_2 leads to an increase in the number of youth employed workers and thus the labour outflow from youth employment to adult unemployment is increased. As a result, the total labour force in sector 1 increases and the total labour force in sector 2 decreases.

I denote the sectoral employment rates (employment in sector i as a fraction of the share of the labour force in that sector), n_i', as

$$n_i' = \frac{n_i}{m_i}. \tag{9}$$

From (4) and (9), the probability of getting a job in sector 1 can be written:

$$h_1 = (a+q)\frac{n_1}{u_1} = (a+q)\frac{n_1'}{1-n_1'}. \tag{10}$$

The probability of getting a job in sector 1 is positively related to the sectoral employment rate, i.e. $dh_1/dn_i' = (a+q)/(1-n_i')^2 > 0$.

2.2 Determination of wages and employment

The employment schedules are derived from the ordinary profit-maximising behaviour of firms. F identical firms in sector i produce a homogenous good through a decreasing-return-to-scale technology: $y_i^* = A_i (n_i^*)^{\alpha}$, where $0 < \alpha < 1$. y_i^* and n_i^* are the output and employment in each firm of sector i, respectively. A_i represents productivity in sector i, where $A_1 > A_2$. The relative price of the products is assumed to be given by the international market, and is normalised to unity. Each firm in sector 1 maximises its profit, $\pi_1^* = y_1^* - w_1^* n_1^*$, where w_i^* is the real wage in each firm in sector i. The first-order condition gives $w_1^* = \alpha A_1 (n_1^*)^{\alpha-1}$. Since $n_1^* = n_1/F$ and $w_1^* = w_1$ in a symmetrical equilibrium, the aggregate labour-demand schedule in sector 1 can be written:

$$w_1 = B_1 n_1^{\alpha-1}, \tag{11}$$

where $B_i = \alpha A_i F^{1-\alpha} > 0$.

I assume that the goverment pays the wage subsidy to firms when young workers are employed. Thus each firm in sector 2 maximises its profit, $\pi_2^* = y_2^* - (1-s)\, w_2^*\, n_2^*$, where s is the wage subsidy to each firm in sector 2. The first-order condition gives $w_2^* = (1-s)^{-1}\, \alpha A_2 (n_2^*)^{\alpha-1}$. Since $n_2^* = n_2/F$ and $w_2^* = w_2$ in a symmetrical equilibrium, the aggregate labour-demand schedule in sector 2 can be written:

$$w_2 = \left(\frac{1}{1-s}\right) B_2 n_2^{\alpha-1}, \tag{12}$$

Since $dw_i / dn_i < 0$ and $d^2w_i / dn_i^2 < 0$, the labour-demand curves in both sectors are downward-sloping and convex (see the LD_i-schedule in Figure 2). The labour-demand elasticity is constant and equal to $1/(1-\alpha)$.

I now turn to the wage-setting schedule in sector 1. I shall assume there to be firm-specific unions so that one union is associated with each firm in sector 1. Like in Manning (1991, 1993), each union attempts to maximise the union utility function (z^*):

$$z^*_{(t)} = n^*_{1(t)} \left[\Omega^*_{n_1(t)} - \Omega_{u_1(t)}\right],$$

where $\Omega^*_{n_1}$ is the discounted value of employment in each firm of sector 1, Ω_{u_1} is the discounted value of unemployment in sector 1, and t is a time subscript. Ω_{u_1} also represents the expected value of the alternative to workers losing their jobs, since all workers who lose their jobs enter the unemployment pool in the same sector. Thus the bracket in the RHS represents the rent from employment. The union maximises the total rent for employed workers.

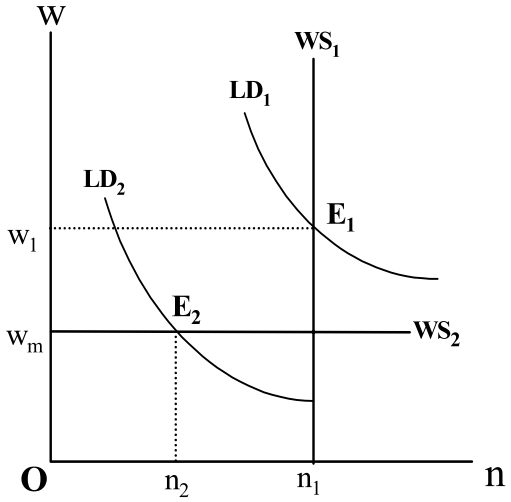

Figure 2: Labour market equilibrium

Workers are assumed to be risk neutral, so that an individual's instantaneous utility function, V, can be written as $V(I) = I$, where I is the after-tax income. I normalise the value of leaving the labour market to zero. Thus, the value of employment in each firm in sector 1 is

$$\Omega^*_{n_1(t)} = \frac{1}{1+r}\left[(1-\tau)\, w^*_{1(t)} + q_1 \Omega_{u_1(t+1)} + (1-a-q_1)\, \Omega^*_{n_1(t+1)}\right], \qquad (13)$$

where τ is a tax rate. The probability of an employed individual in sector 1 also being employed in this sector in the next period is $1-a-q_1$, which is assumed to be positive.

The value of being unemployed in sector 1 is

$$\Omega_{u_1(t)} = \frac{1}{1+r}\left[(1-\tau)\, b_{u_1(t)} + h_1 \Omega_{n_1(t+1)} + (1-a-h_1)\, \Omega_{u_1(t+1)}\right], \qquad (14)$$

where b_{u_i} is the unemployment benefit in sector i. The probability of a job seeker in sector 1

remaining a job seeker in this sector also in the next period is $1 - a - h_1$, and this probability is assumed to positive.

The wage, $w^*_{1(t)}$, is set so as to maximise a Nash bargain where the fall-back position of both the union and the firm is zero, i.e.

$$\max_{w^*_{1(t)}} \Psi = \left[z^*_{(t)}\right]^{\beta} \left[\pi^*_{1(t)}\right]^{1-\beta},$$

where β is the bargaining power of the union. Like Manning (1993), I assume wages to be determined for one period only. Hence, the current wage, $w^*_{1(t)}$, will not affect the values of future employment in the firm and future unemployment, i.e. $\Omega^*_{n_1(t+1)}$ and $\Omega^*_{u_1(t+1)}$. As I shall be analysing a steady state, I can drop all time subscripts. Since $w^*_{1(t)} = w_1$ in a symmetric equilibrium, the first-order condition gives

$$w_1 = \frac{(1+r)\,\mu}{(1+r)\,\mu - (a + r + q_1 + h_1)} b_{u_1},$$

where $\mu = \eta_N + [(1 - \beta) / \beta] \eta_\pi$. η_N and η_π are the elasticities of employment and profits, respectively, w.r.t. the wage in each firm, i.e. $\eta_N = 1 / (1 - \alpha)$ and $\eta_\pi = \alpha / (1 - \alpha)$. Hence, parameter μ can be treated as exogenous. I assume the replacement ratio to be constant and the same in both sectors, i.e., that $b_{u_i}/w_i = \rho$. Taking (10) into account, the wage-setting relationship in sector 1 can be expressed as

$$n_1 = \left[\frac{(1+r)\,(1-\rho)\,\mu - (a + q_1)}{(1+r)\,(1-\rho)\,\mu - r}\right] m_1. \tag{15}$$

Equation (15) implies that the wage-setting schedule in sector 1 is vertical for the given m_1 in the wage-employment plan (see the WS_1-schedule in Figure 2). Employment is a function of the total labour force in the sector. Moreover, together with (9), the sectoral employment rate in sector 1 (n_1') only depends on exogenously given parameters and it is constant. According to (10), the probability of getting a job in sector 1 (h_1) is also constant.

The wage in sector 2 (w_2) is assumed to be given at the same legislated minimum wage level for all future periods, i.e.

$$w_2 = w_m, \tag{16}$$

where w_m is the legislated minimum wage (see the horizontal WS_2-schedule in Figure 2).[1]

2.3 The present values of various states

The present values of being employed and unemployed in sector 1 are explicitly derived from (13) and (14) as

[1] It seems to be a stylised fact that employment varies less for skilled (adult) than for unskilled (young) workers (Blanchflower and Oswald, 1994). A simple way of capturing this stylised fact is to assume a vertical wage-setting schedule for skilled (adult) workers and a horizontal wage-setting schedule for the unskilled (youth).

$$\Omega_{n_1} = (1-\tau)\, w_1 \left[\frac{a+r+h_1+q_1\rho}{(a+r)\,(a+r+q_1+h_1)} \right], \tag{17}$$

$$\Omega_{u_1} = (1-\tau)\, w_1 \left[\frac{h_1+(a+r+q_1)\,\rho}{(a+r)\,(a+r+q_1+h_1)} \right]. \tag{18}$$

The present value of being employed in sector 2 ($\Omega_{n_2(t)}$) is expressed as

$$\Omega_{n_2(t)} = \frac{1}{1+r}\left[(1-\tau)\, w_m + q_2\Omega_{u_1(t+1)} + (1-a-q_2)\Omega_{n_2(t+1)}\right], \tag{19}$$

where $\Omega_{u_2(t)}$ is the discounted value of being unemployed in sector 2 at time t. Together with (18) and the assumption of a steady state, Ω_{n_2} can be expressed as

$$\Omega_{n_2} = (1-\tau) \left[\frac{w_m + q_2 \left(\frac{h_1+(a+r+q_1)\rho}{(a+r)(a+r+q_1+h_1)} \right) w_1}{a+r+q_2} \right]. \tag{20}$$

A young unemployed worker in sector 2 can find a job with probability h_2. The probability of an unemployed worker in sector 2 remaining a job seeker in the next period is $1-a-h_2$, which is assumed to be positive. The value of being unemployed in sector 2 at time t ($\Omega_{u_2(t)}$) can be written as

$$\Omega_{u_2(t)} = \frac{1}{1+r}\left[(1-\tau)\, b_{u_2(t)} + h_2\Omega_{n_2(t+1)} + (1-a-h_2)\,\Omega_{u_2(t+1)}\right], \tag{21}$$

where $b_{u_2}(t)$ is the unemployment benefit for unskilled labour at time t. I assume the replacement ratio in sector 2 to be constant and the same as in sector 1, i.e. $b_{u_2}(t) = \rho w_m$. The constant replacement ratio in sector 2 implies a constant unemployment benefit in that sector, since the wage in sector 2 is given by the minimum wage. It follows from (20), (21) and the assumption of a steady state that

$$\Omega_{u_2} = (1-\tau) \left[\frac{\left(\rho + \frac{h_2}{a+r+q_2}\right) w_m + h_2 q_2 \left(\frac{h_1+(a+r+q_1)\rho}{(a+r)(a+r+q_1+h_1)(a+r+q_2)} \right) w_1}{a+r+h_2} \right]. \tag{22}$$

2.4 The budget constraint

The tax rate is determined by the balanced budget requirement. It is assumed that taxes are levied on all workers in the economy and that no tax is levied on the profit of firms. Taxes are used to finance the unemployment benefit, the wage subsidy for youth employment. The tax rate can thus be written as

$$\tau = \frac{u_1 w_1 \rho + u_2 \rho w_m + s n_2 w_m}{n_1 w_1 + n_2 w_m + u_1 \rho w_1 + u_2 \rho w_m}. \tag{23}$$

The denominator in (23) is tax revenues and the numerator is the expenditure on unemployment and the wage subsity.

2.5 Equilibrium

There are 12 exogenous variables: the labour market policy variable, i.e. the wage subsidy, s; the replacement ratio, ρ; the productivity parameters, A_i; the other 'technical' parameters; a, q_1, q_2, r, α, β, γ; and the 'scale' variable, F.

There are 15 endogenous variables in the model: n_1, n_2, u_1, u_2, m_1, m_2, h_1, h_2, n_1', n_2', w_1, w_2, b_{u_1}, b_{u_2}, and τ, which are all simultaneously determined. The core variables, w_1, w_2, n_1 and n_2, are determined by (11), (12), (15) and (16). The other variables, i.e. n_1', n_2', u_1, u_2, m_1, m_2, h_1 and h_2, are given by (1), (2), (3), (4), (5), (6), and (9)[2]. The unemployment benefits, i.e. b_{u_1} and b_{u_2}, are given by the assumption of a constant replacement ratio. The proportional tax rate, τ, is provided by (23) and the tax rate, which does not interact with the other variables, can be recursively determined.

Figure 2 illustrates the general-equilibrium solution of the model. Wages are measured along the vertical axis and employment along the horizontal axis. The negatively sloped labour-demand curves in the two sectors are given by (11) and (12). The vertical wage-setting schedule in sector 1 for the given m_1 by (15). The horizontal wage-setting relation in sector 2 is given by (16). In this diagram, the equilibrium for sector 1 is E_1 and E_2 for sector 2. As can be seen from (11), (12), (15) and (16), the equilibrium in the labour market is independent of the tax rate, since the tax rate does not interact with macroeconomic variables and can be recursively determined.

3 Comparative statics

I shall examine the effects of a change in the wage subsidy (s), which is the labour market policy parameter decided by the government. Thus, I investigate the effects on macroeconomic variables, i.e., youth employment, adult employment, aggregate employment, and aggregate unemployment.

As can be seen from (11), (12), (15) and (16), a change in s directly affects employment in sector 2 through the labour-demand curve. The effect on youth employment is derived from (12) and (16) as

$$\frac{dn_2}{ds} = \frac{n_2}{1-\alpha} > 0. \tag{24}$$

A rise in the wage subsidy targeted on young workers increases youth employment. This is because the wage subsidy enables firms to employ young workers with lower wages and thus firms increase youth employment. This is illustrated in Figure 3. A rise in s shifts the demand curve in sector 2 (LD_2) rightwards. The equilibrium for sector 2 moves from E_2 to E_2^*. Employment in sector 2 increases from n_2 to n_2^* in Figure 3.

From (1), (2) and (24), the effect on youth unemployment can be written as

$$\frac{du_2}{ds} = -\left(\frac{a+q_2}{a}\right)\left(\frac{n_2}{1-\alpha}\right) < 0. \tag{25}$$

[2] Note that (9) represents two equations.

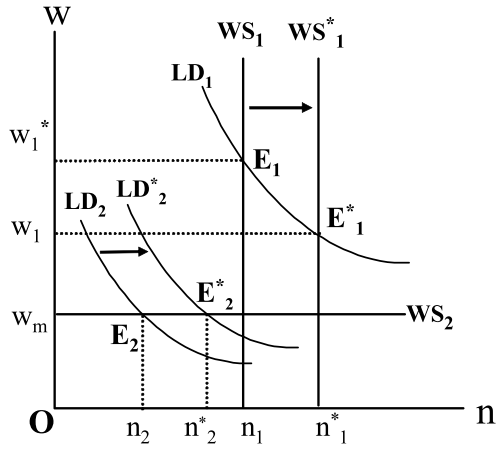

Figure 3: The effects of an increase in the wage subsidy

This shows that youth unemployment is decreased by a rise in *s*. This is because the number of newly employed workers is increased by a rise in *s* and thus the number of workers in the youth unemployment pool is decreased.

The effect on the probability of getting a job in sector 2 (h_2) is derived from (1) and (25) as

$$\frac{dh_2}{ds} = \left[\frac{(a+h_2)(a+q_2)}{(1-\alpha)a}\right]\left(\frac{n_2}{u_2}\right) > 0. \tag{26}$$

A rise in *s* encourages firms to employ more young workers and thus the probability to get a job for young workers is increased.

It follows from (5), (6) and (26) that the effects on the total labour force in both sectors are

$$\frac{dm_1}{ds} = \left[\frac{q_2}{(1-\alpha)(a+h_2)}\right]\left(\frac{n_2}{u_2}\right) > 0, \tag{27}$$

$$\frac{dm_2}{ds} = -\left(\frac{q_2}{1-\alpha}\right)\left(\frac{n_2}{u_2}\right) < 0. \tag{28}$$

Equations (27) and (28) show that a rise in the wage subsidy in sector 2 increases the labour force in sector 1 and decreases the labour force in sector 2. This is because a rise in the wage subsidy increases youth employment and this induces an increase in the labour flow from youth employment to the adult unemployment pool.

The effect on employment in sector 1 can be derived from (15) and (27) as

$$\frac{dn_1}{ds} = \left[\frac{(1+r)(1-\rho)\mu-(a+q_1)}{(1+r)(1-\rho)\mu-r}\right]\left[\frac{q_2}{(1-\alpha)(a+h_2)}\right]\left(\frac{n_2}{u_2}\right) > 0, \tag{29}$$

Adult employment is increased by a rise in the wage subsidy targeted on young workers. The explanation is the following. A rise in the wage subsidy encourages firms to employ young workers. This means that the labour flow from youth labour market into the adult labour market

is increased in my model. The adult labour market becomes more competitive and thus the wage in sector 1 tends to decrease and employment there tends to increase. This is illustrated in Figure 3. A rise in s shifts the wage-setting schedule in sector 1 (WS_1) rightwards. The equilibrium for sector 1 moves from E_1 to E_1^*. As a result, the wage in in sector 1 is decreased and employment increases. This result is different from earlier studies. Most earlier studies have pointed out that subsidised employment programmes may have displacement effects. Namely, it could be the case that the subsidies lead employers to substitute one category of workers for another. However, in my model, the wage subsidy targeted on young workers has no crowding-out effect on adult employment. On the contrary, the wage subsidy for young workers increases adult employment.

Since both youth employment and adult employment increase, aggregate employment ($n_1 + n_2$) is also increased by a rise in s. This can be seen from Figure 3.

I now turn to the effects on adult unemployment. Taking (27) into (29), differentiating $u_1 = m_1 - n_1$ w.r.t. s and rearranging terms gives

$$\frac{du_1}{ds} = (1 - n_1') \frac{q_2}{(1-\alpha)(a+h_2)} \left(\frac{n_2}{u_2}\right) > 0. \tag{30}$$

Unemployment in sector 1 increas since the sectoral employment rate in sector 1 is constant, which means that unemployment must change proportionally to the change in its employment.

Taking into account a stationary total labour force, i.e. $n_1 + n_1 + u_1 + u_2 = 1$, it follows from (24) and (29) that the effect on aggregate unemployment is

$$\frac{d(u_1 + u_2)}{ds} = -\left[\left(\frac{n_1' q_2}{a+h_2}\right)\left(\frac{1}{u_2}\right) + 1\right]\left(\frac{n_2}{1-\alpha}\right) < 0.$$

Aggregate unemployment is decreased by a rise in the wage subsidy for young workers.

4 Concluding remarks

This paper has analysed the general equilibrium effects of the wage subsidy programmes targeted on young workers. The youth wage subsidy encourages firms to employ young workers and thus youth employment tends to increase. A rise in the wage subsidy also increases adult employment. This is because an increase in youth employment leads to a rise in the labour flow into the adult labour market, which means that the labour market for adult workers with working experience becomes more competitive. As a result, the wage in the adult labour market tends to decrease and employment there tends to increase. This result is different from earlier studies, which have concluded that subsidised employment schemes may have displacement effects. Namely, the subsidies lead employers to substitute one category of workers for another. However, in my model, the wage subsidy targeted on young workers has no crowding-out effect on adult employment. On the contrary, the wage subsidy for young workers increases adult employment. Since both youth employment and adult employment increase, aggregate

employment is also increased by the wage subsidy programmes targeted on young workers. The analysis in this paper suggests that the subsidised employment programmes targeted on young workers are of great potential significance.

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