On the welfare effect of a wage subsidy on youth labor: Italy's CFL program

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Abstract

While a vast literature has analysed the wage and employment effects of active labor market programs (ALMPs), a welfare analysis of such programs is seldom implemented (Kluve and Schmidt, 2002). In an attempt to measure the welfare effect of a wage subsidy on youth labor, this paper performs a rudimentary cost-benefit analysis of Italy's training and employment enhancing program directed at young workers (*CFL, Contratti di Formazione e Lavoro*).

In particular, the analysis highlights the fact that the welfare effect of a targeted wage subsidy – in the form of a payroll tax rebate for firms employing youth labor – crucially depends on whether the labor market is affected by previous fiscal distortions generated either by the absence of linkage between payroll tax revenues and workers' benefit, or by the presence of a wage floor.

Based on reasonable estimates of youth labor demand and labor supply elasticities, it turns out that, in the absence of linkage between payroll tax revenues and benefits to young workers, the introduction of a 15% wage subsidy can be expected to generate a small employment gain (1 to 3 percentage points), and a net welfare gain – measured by the Marshallian approximation of employers' and workers' surplus – of less than €30 million (around 5% of the total cost of the welfare programme, amounting to almost €600 million), that could well be offset when the general equilibrium consequences of the selective wage subsidy are allowed for (substitution of non-eligible workers).

On the other hand, in the presence of a wage floor that equals the current wage of young *CFL* workers, and a *status quo* youth involuntary unemployment rate of 18%, it is estimated that the 15% wage subsidy can generate a youth employment rise of up to 15 percentage points, and a net welfare gain of over €300 million – almost 50% of the total cost of the welfare programme.

JEL classification: D61; J30.

Key words: payroll tax; wage subsidy; minimum wage; cost-benefit analysis.

1. Introduction

The reduction of payroll taxes (social security contributions) aimed at enhancing employment opportunities for low-wage earners has been on the agenda of many national governments for decades. In 1994, two authoritative European economists, J. Drèze and E. Malinvaud, advocated a general implementation of such measures, in parallel with the introduction of a carbon tax aimed at financing it.

In Western Europe generous rebates and/or holidays of social security contributions have been granted in various forms and areas since the Seventies. Many of such programs provided temporary wage subsidies for selected groups of new hires. Target groups have often included young workers, especially those who belong to disadvantaged groups and areas.

Much optimism was expressed in the past that well designed and targeted active labor market programs (ALMPs) could do much to help at-risk youths. Recently, however, optimistic views have become rare (Kluve and Schmidt, 2002). As the OECD Employment Outlook 1999 put it: "we know how difficult it is to develop effective labor market policies for this group. Evaluation of past policies have been fairly discouraging in the sense that few remedial or employment-insertion programs targeted at disadvantaged young people appear to have resulted in significant gains in employment or earnings after they have participated in the programs."

The extent of substitution between the target group and other workers with similar characteristics has been an important issue in Italy for several years (the so-called "young-in, old-out" effect).[1] Growing doubts have been expressed also on the long term impact of labour cost reductions aimed at protecting the least skilled in the labour force. High-skill workers may be crowded out by low-skill, high turnover workers: in the long run this may have serious implications on the waste of know-how and intellectual resources. Deadweight losses and displacement effects are relevant, especially in connection with the option, open mainly to small firms, of operating in the regular vs. the irregular (black/grey) economy. The re-emersion programs aimed at fighting the irregular economy were (and still are) mainly based on SSC and other tax exemptions. Thus, on the one hand, if the incentives are too small and few firms decide to emerge, the displacement effect against "regular" firms persists. On the other hand, if the incentives produce visible effects, there could still be a large deadweight loss, as some firms may decide to leave the irregular economy independently of the incentive itself. The displacement effect – it should be

[1] B. Contini and F. Rapiti (1994, 1999).

recalled – is the main source of concern of the European Commission in granting legitimacy to payroll tax rebates, on the grounds of potential unfair competition. As of today, targeted payroll tax rebates are legitimate (and may be financed via EU structural funds) only to the extent that new jobs are created by the same employer, in addition to existing ones.

The fundamental argument that we put forward in this paper is that, in order to investigate the impact of the introduction of an employer side wage subsidy on youth labor, it is crucial to recognize and quantify the degree of previous fiscal distortions and inefficiencies to which the relevant labor market is subject to.

Since the equilibrium that one observes in a labor market with a distortionary payroll tax is not a Pareto-optimum, for instance, the wage subsidy might be thought to bring the equilibrium closer to the optimum - not considering, though, either the distortions that would be created in other markets in financing the subsidy (Goulder and Williams, 2003), or the possible negative effects on other types of labor (Sorensen, 1997).

On the other hand, in the presence of a payroll tax with perfect tax/benefit linkage, in the sense that the payroll tax revenues are used to finance programs which only benefit workers, such as retirement benefits – Summers (1989), Gruber (1997) – the wage subsidy can be thought of as a distortionary measure that tends to lead to a welfare loss. Reasonably, of course, welfare could increase for society as a whole in the above situation if, for instance, the young workers that were previously unemployed and that get a job as a result of the wage subsidy were previously engaging in criminal or other external-diseconomy generating activities (Phelps, 1994), or were receiving welfare/unemployment benefits paid by society (Bell and Orr, 1994; Snower, 1994; Bell et al., 1999), and if the wage subsidy is actually able to create new jobs in the economy and not simply inducing firms to replace high cost workers with low cost workers (Warburton and Frketich, 1996).

Finally, in the presence of a wage floor that prevents the wage from adjusting in order to equate labor demand and supply, the introduction of a wage subsidy might lead to a welfare increase by easing the distortion provoked by the minimum wage (Nickell and Bell, 1997).

The rest of the paper is organised as follows. Section 2 describes the CFL wage subsidy program, while section 3 presents a simple model for studying firms' decisions on whether to employ subsidized youth work. Section 4 considers the effect of a wage subsidy in a labor market where a payroll tax generates a distortion (an excess burden), by creating a wedge between the wage received by employees and the labor cost borne by employers (Hamermesh, 1993). Section 5 studies the wage subsidy effect in the presence of a payroll

tax with perfect tax/benefit linkage, while section 6 analyses the impact of a wage subsidy in the presence of a wage floor. Finally, section 7 concludes.

2. The "Contratto di Formazione – Lavoro"

The Italian "Contratto di Formazione e Lavoro" (CFL, working and training contract) was introduced in 1985 to improve labour-market opportunities for young workers. Eligible people were, initially, workers younger than 30; over the years and across areas various age adjustments took place.

The programme provided employers willing to hire eligible workers with two key benefits:

- a 50% rebate on the labour cost via a reduction in social security contributions (SSC), amounting to 28% of gross pay;
- automatic termination of the contract after a maximum of two years (i.e., zero firing costs).

In principle, the programme should have featured an on-the-job training component. In fact, it seems that most times it was not implemented.

Over the years several reforms of the programme took place. In June 1988 the SSC rebate was reduced to 40%. Since January 1991, the rebate was further reduced in the Centre-North of Italy to 25%. Moreover, a more stringent rule was introduced, stating that a CFL-hire during year t would be allowed provided that at least 50 per cent of the CFL workers completing their employment spell with the same employer during years t-1 and t-2 be retained on a permanent basis.

To properly measure the CFL programme impact one has to take into account the interaction of the programme with other concurrent incentive schemes.

The main one provided firms operating in the South with a ten-year 100% holiday on SSC for each worker newly hired on a permanent basis, irrespective of age. As a result, firms operating in the South could choose between two options:

(a) hiring a young worker under the CFL program:

(b) hiring any worker under the special conditions accorded to the Mezzogiorno.

Not surprisingly, option (a) was seldom preferred, and very few CFL workers were hired in the South until December 1991, when the special scheme for the Mezzogiorno was cancelled.

In recent years the CFL scheme has been slowly phased out, as new policy instruments and more flexible working contracts have been introduced under the so-called "Pacchetto Treu" of 1996.

3. A simple model

In order to understand how are firms' incentives to hire young workers affected by the existence of a subsidy, consider the following super-simple model. A firm faces a vacancy in period 1, which may be filled by two alternative contracts:

(1) a permanent working contract with an experienced worker (PC);

(2) a subsidized temporary contract (training-and-work contract for youth, CFL).

The permanent contract (PC) carries with it a total labour cost per worker equal to $w(1 + t)$ – with t being the payroll tax rate and w the wage to the worker – and a firing cost equal to FC.

With the temporary one-year contract (CFL), labour cost equals: $w(1 + [1–s]t) < w(1 + t)$, with $0<s<1$ being the subsidy rate. However, the firm faces a training cost equal to Z.[2] At the end of year 1, the temporary contract CFL can either be interrupted at no cost, or renewed as a PC contract in period 2. If a contract is not renewed at the end of period 1, the firm will suffer a vacancy in period 2.

Nature has two states: a "good" state, G, occurring with probability g, and a "bad" state (B), occurring with probability (1-g). If the favourable state occurs, firms' revenues are positive, otherwise they are 0. In particular, firms' revenues when the state of nature is good depend on the quality of the worker. Workers' quality is "high" (H) with probability p – leading to revenues PH – and "low" (L) with probability (1 –p) – leading to revenues PL – with $[PH – w(1 + t)]>PV>[PL – w(1 + t)]$, where PV is firm's revenues with a vacancy. On the other hand, firms' revenues are zero if the state is bad, irrespective of workers' quality.

Worker's quality can be observed at the end of period 1. If the worker turns out to be "high quality" he is retained; otherwise he is fired. However, only if nature is "profitable" in period 1 will the firm continue operations in period 2. If year 1 is lousy, the firm will fire her worker (at cost FC if the contract is permanent, at no cost if the contract is temporary), no matter how good he/she is.

Since in period 2 the expected profit for the firm will be the same, irrespective of the decision made in period 1 as to the type of contract (because either it will face a vacancy, or it will employ workers with a permanent contract), it is easy to derive that the firm prefers to use the temporary youth contract CFL if:

[2] Z might also be interpreted as the loss of productivity associated with hiring a young (inexperienced) worker in place of an adult experienced one.

$$wst + (1 - gp)FC > Z \quad (1)$$

Equation (1) has a straightforward interpretation: the temporary youth contract CFL is preferred to the permanent contract PC if the fiscal opportunity cost of not using a temporary contract (value of the subsidy: wst) plus the expected firing cost (if either the state of nature is bad or the worker's quality is low) is higher than the training cost associated with the subsidized contract.

Equation (1) illustrates that a number of factors play a role in determining a firm's choice and that estimating the impact of the wage subsidy is not an easy task. In particular, it is clear that, even in the absence of the subsidy, the firm might still decide to employ a worker with a permanent contract.

In the following, we attempt to estimate the benefits and costs associated with the existence of the CFL wage subsidy, and argue that the benefit-cost balance is going to depend crucially on the pre-existing distortions in the youth labor market.

4. A wage subsidy in a tax distorted labor market

Assume that a selective wage subsidy s on youth employment is introduced in a market that suffers from previous fiscal distortions, in the sense that employers are subject to a payroll tax (t), and there is no linkage between payroll tax revenues and benefits received by workers. Say that the payroll tax equals 30% of the wage received by workers.

Within a frictionless labor market, depicted in figure 1, the labor demand function in the absence of the tax is D, the labor supply function is S, and the Pareto optimum equilibrium is at point O. As a consequence of the wage tax, the labor demand schedule shifts down to D_0, while the labor supply function S does not shift.[3]

The equilibrium with the payroll tax t=0.3 is at point H, with equilibrium wage IJ, employment IL_H, and labor cost IN (=1.30 × IJ). Given the market demand and supply of labor (D and S), the Marshallian approximations to employers' and workers' surplus (Hausman, 1981) are represented by areas MAN and JHG in figure 2, with NAHJ being the total payroll tax yield that funds general public spending, and AOH the deadweight loss caused by the payroll tax.

Now consider the introduction of an employer side wage subsidy. Assume that the subsidy is a payroll tax reduction for firms employing young workers, such that employers pay 15% (instead of 30%) on top of the wage. Since we are tackling here the case of no payroll

[3] But see section 5 below for perfect tax\benefit linkage.

tax/workers' benefit linkage, we can assume for the moment that, as a consequence of the wage subsidy, the government raises revenues equal to 15% of the wage in a non distortionary way, and we can disregard what those revenues are spent on.

Labor demand goes back up to D_1, with an equilibrium at point C. Net wage for workers goes up from IJ to IP. Labor cost goes down from IN (=1.30 × IJ) to IQ (=1.15 × IP).

It is straightforward to see that welfare increases by area ABCH in figure 1. The welfare gain can be attributed to the excess burden fall (from area AOH to area BOC) that is obtained through the drop in the distortionary tax, under the assumption that the government can raise in a non-distortionary way an amount of revenue equal to the foregone payroll tax yield.

Using reliable estimates of the labor demand elasticity (η_D) and labor supply elasticity (ε_S) of young eligible workers (Katz, 1996), and starting from the observed equilibrium in the youth labor market (employment=450,000; wage=€8,300; point C in figure 1), we want to compute a measure of the welfare impact of the labor market program consisting of a wage subsidy as a fraction s=0.15 of the wage.

As a first approximation, the Marshallian measures of employers' and workers' surplus are used to compute the welfare change (Slesnick, 1998). Table 1 shows the estimated counterfactuals – that is the level of employment and wage that would be observed in the absence of the wage subsidy (point H in figure 1) – under different hypotheses about the labor demand and supply schedules.

Table 2 shows the estimated effects – in terms of percentage increases – on employment and wages of young workers as a result of the 15% wage subsidy, as well as the estimated welfare change (area ABCH in figure 1). Two series of results are presented, based on different hypotheses on the functional form of the demand and supply schedules: linear and constant elasticity. The employment and wage effects of the 15% subsidy are roughly similar under the linearity and constant elasticity hypotheses, and correspond to the approximated effect based on equations (2) and (3) below (Hamermesh, 1993; Katz, 1996):

$$\frac{d\ln L}{ds} = \frac{\eta_D \varepsilon_S}{\eta_D + \varepsilon_S} \qquad (2)$$

$$\frac{d\ln w}{ds} = \frac{\eta_D}{\eta_D + \varepsilon_S} \qquad (3)$$

Since, with 450,000 eligible workers, the cost of the program amounts to €560 million per year (€1250 per worker), and given that the employment effect of the wage subsidy is

estimated to range from 1% to 3.5%, depending on the labor demand and supply elasticities, the welfare increase can be estimated to be as little as 8.5 to 27 million euros. Moreover, it should be taken into account that raising revenues to compensate the payroll tax reduction might well generate an excess burden and welfare losses in other markets that more than offset the above gain.

5. A wage subsidy in a perfect tax/benefit linkage labor market

Assume now that, as a consequence of the t=0.3 wage tax, both the labor demand and the labor supply schedules move, due to perfect tax/benefit linkage. While, as before, the labor demand schedule shifts down to D_0, the labor supply function S shifts down to S_0: since workers value the benefits that are "bought" with payroll taxes, they are willing to accept lower money wages (Gruber, 1997).

The equilibrium – depicted in figure 2 – with the payroll tax t=0.3 is at point K, with equilibrium wage IH, the same equilibrium employment as in the no tax case (IL_O), and the same labor cost as in the no tax case: IV (=1,30 × IH). No deadweight loss is caused by the payroll tax in this case, as it is entirely shifted onto the employees, and it works as a perfect benefit tax.

Now let us consider the introduction of the wage subsidy. Assume again that the subsidy is a payroll tax reduction for firms employing young workers, such that employers pay 15% (instead of 30%) on top of the wage, with the other 15% being borne by government.

Labor demand goes back up to D_1, with an equilibrium at point Z and employment at L_Z. Labor supply does not move because workers keep on receiving the entire benefit (PZ), which is partly paid for by employers (UZ) and partly by government (PU). Net wage to workers goes up from IH to IT. Labor cost goes down from IV (=1.30 × IH) to IR (=1,15 × IT). The total cost of the subsidy for the government (amounting to €560 million) is QPUR, while the cost of the payroll tax for firms (€560 million) is RUZT.

With respect to the no subsidy and full payroll tax equilibrium, firms' surplus has increased by the area VOUR. It is easy to see that workers' surplus has increased by the area QPOV. As the government bears the cost of the subsidy equal to the area QPUR, overall welfare as a consequence of the subsidy has fallen by the area of the triangle POU.

Tables 3 and 4 show that the wage subsidy has a small employment effect, and that the welfare loss represented by area POU ranges from €3 million to about €10 million, depending on the elasticities. To this loss, though, it should be added the likely excess burden that has been created in other markets in raising an amount of revenues equal to QPUR, as well as the potential welfare loss for substitution of non eligible workers.

6. A wage subsidy in a market with an implicit minimum wage

Finally, consider the presence of an implicit minimum wage in the youth labor market – that is the presence of a wage floor generated by minimum wage laws, unions or the benefit system – and assume, sticking to a purely neoclassical framework, that such wage floor prevents the labor market from clearing, causing involuntary unemployment.[4] As argued by Nickell and Bell (1997), this is a situation where a payroll tax cut on the unskilled might have a significant long-run employment effect.

To see how the impact of the wage subsidy in that case could be, figure 3 shows: a) the no tax labor market equilibrium (point O); b) the labor market equilibrium with a 30% payroll tax, perfect tax/benefit linkage, and no minimum wage (point O'); c) the labor market equilibrium with a 30% payroll tax, perfect tax/benefit linkage, and a minimum wage IW (point A).

In the latter instance, involuntary unemployment is AB and total surplus is given by area YAEF (=KMRQ): employers' surplus is KMH (≡YAW) and workers' surplus is WAEF=WARQ+QREF, where QREF (≡HMAW) is the benefit received by employees and financed by the payroll tax on firms.

Consider now a 15% wage subsidy. With reference to figure 3, labor demand shifts up to D_1, with equilibrium at G and unemployment equal to GB. Employment raises by AG, employers' surplus raises by HMPC, workers' surplus raises by AGJE, and the cost of the subsidy is HNPC (≡CPGW). Consequently, as MNP≡AGL by construction, welfare goes up for society as a whole by ALJE.

Tables 5 and 6 show a simulation of the Marshallian welfare impact of the subsidy in this case. Based on a 18% rate of youth unemployment in the presence of the subsidy (GB = 100,000 unemployed youths in figure 3), observed youth employment (L_G) of 450,000, and minimum wage (IW) of €8,300, it turns out that, relative to the no subsidy counterfactual, the payroll tax cut can generate an employment effect of up to 15 percentage points (L_A to L_G in figure 3).

In terms of employers' surplus, labor cost falls from €10,790 (=1.30 × €8,300=IH in figure 3) to €9,545 (=1.15 × €8,300=IC), leading to an increase in employers' surplus of over €500 million (area HMPC). As for workers, employment of previously unemployed youths at the €8,300 wage generates a surplus gain (area AGJE) of up to €375 million. Since the cost of

[4] However, see Card and Krueger (1994) for alternative theories and evidence on the impact of minimum wages.

the subsidy amounts to €560 million, the net welfare gain can be as large as 338 million euros.

Even though this analysis does not consider the potential excess burden generated through taxation to finance the subsidy, or the welfare loss from displaced workers in other markets, still the consideration of the inefficiency caused by a wage floor makes a very strong argument in favour of a wage subsidy targeted at low skill workers.

7. Concluding remarks

This paper argues that, in order to investigate the welfare effect of the introduction of an employer side wage subsidy on youth labor, it is crucial to recognize and quantify the degree of pre-existing fiscal distortions and inefficiencies to which the relevant labor market is subject to.

While the framework of the analysis is pretty naive and most of the results are preliminary and of a mainly qualitative nature, still some of the findings are rather suggestive. In particular, the paper shows that, in the case of perfect tax/benefit linkage case with a wage floor, a selective wage subsidy can substantially increase welfare, because, in the presence of a wage floor that determines an inefficient allocation of resources, the wage subsidy operates as to move the market outcome closer to the optimum.

Clearly, the above analysis represents just a first step in the direction of a complete welfare analysis of a selective wage subsidy. General equilibrium considerations (Sorensen, 1997; Goulder and Williams, 2003) suggest that it might be the case that the reduced labor cost of young workers after the subsidy depresses the demand for other types of labor (Snower, 1994), therefore decreasing welfare in other markets (non eligible workers), or reduces the incentive for the unskilled to acquire training (Nickell and Bell, 1997). Moreover, it should be taken into account that raising revenues to compensate the payroll tax reduction in the youth labour market might well generate an excess burden in other markets, that could partially or totally offset the welfare gain in the unskilled youth labor market.

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Figure 1
A wage subsidy in a tax distorted labor market

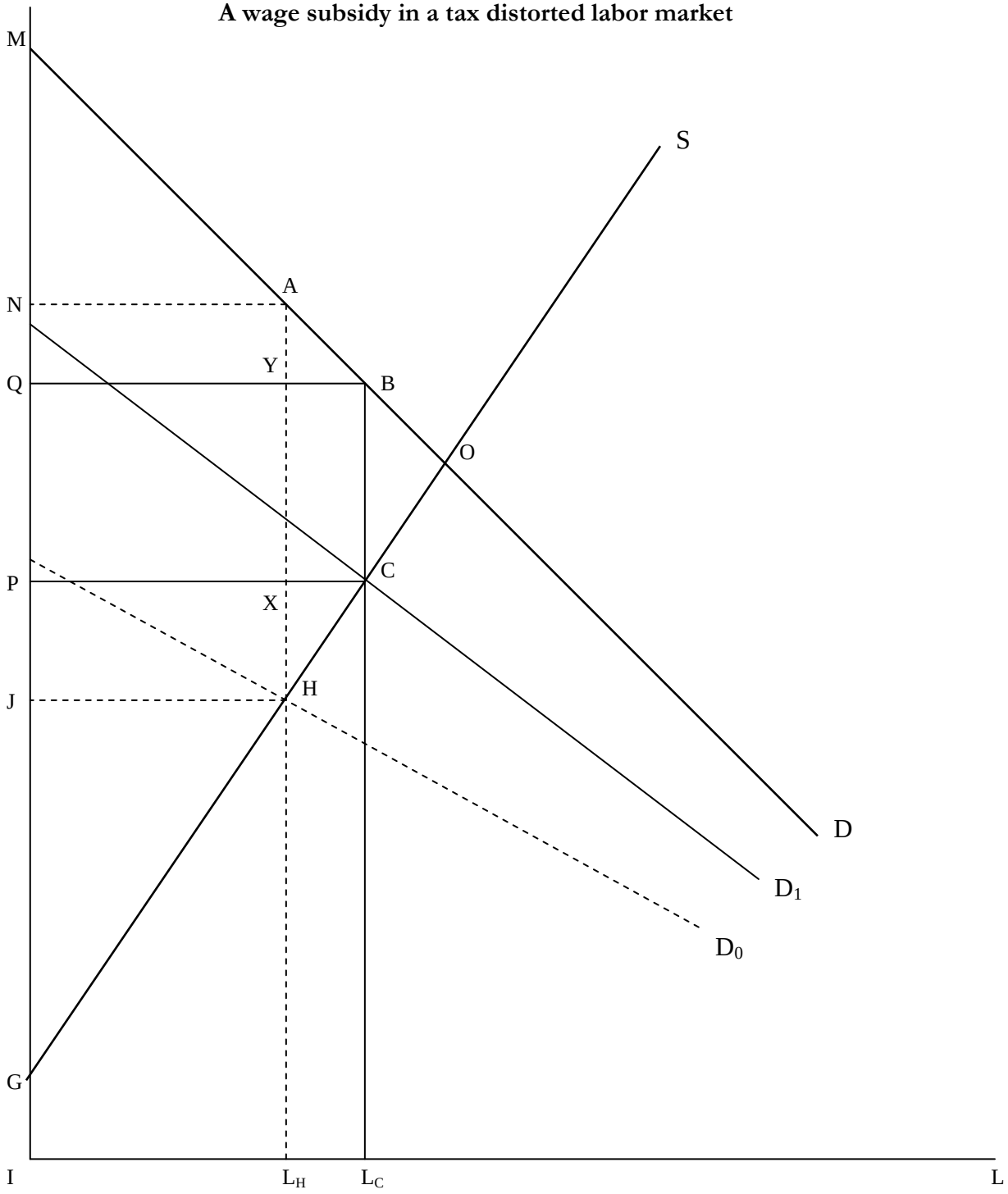

Figure 2
A wage subsidy in a perfect tax/benefit linkage labor market

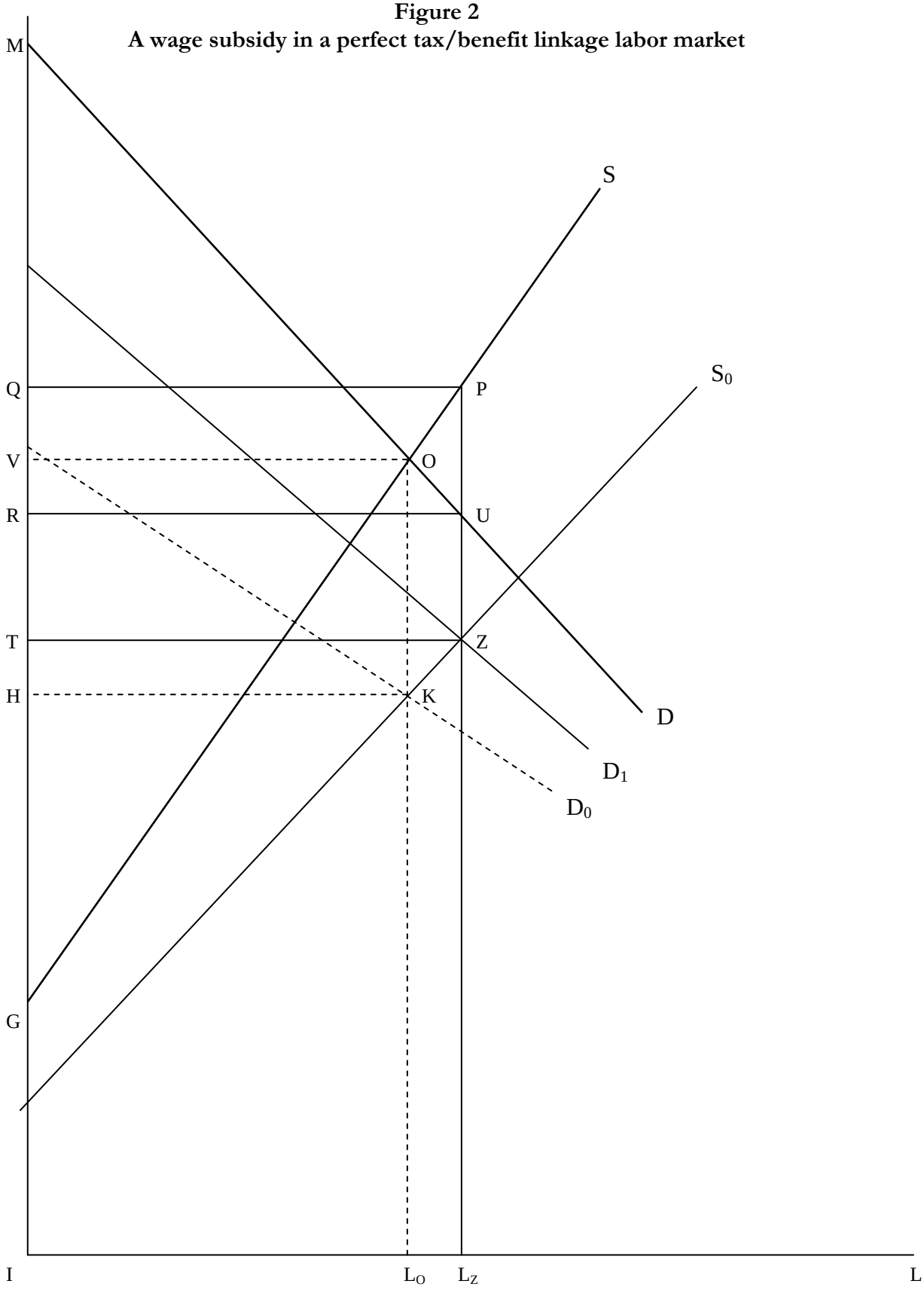

Figure 3
A wage subsidy in a perfect tax/benefit linkage labor market and an implicit minimum wage

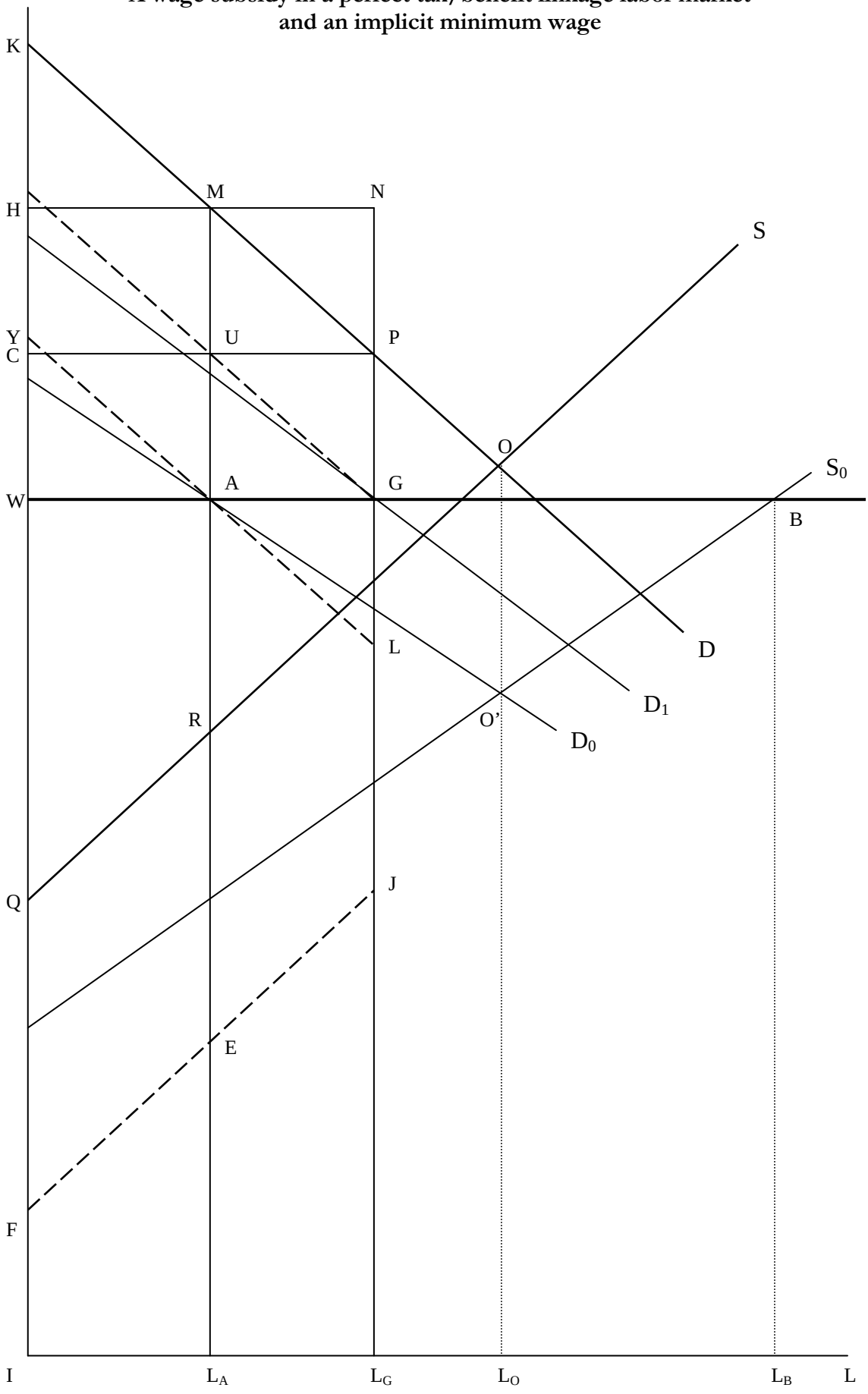

Table 1
Estimated counterfactual in a tax distorted labor market (figure 1)

Labor demand elasticity	Labor supply elasticity	Functional form	Employment (,000)	Wage (€)	Labor cost (€)
-0.1	0.4	linear	445.4	8,100	10,520
-0.5	0.4	linear	437.8	7,740	10,050
-1.0	0.4	linear	434.7	7,600	9,880
-0.1	0.4	constant elasticity	445.6	8,100	10,520
-0.5	0.4	constant elasticity	437.9	7,750	10,070
-1.0	0.4	constant elasticity	434.5	7,600	9,880

Notes
1) observed market equilibrium with 15% subsidy is at: employment = 450,000; annual wage = €8,300; labor cost = €9,545;
2) with linear demand and supply schedules, the elasticities are evaluated at the observed market equilibrium;
3) labor cost = wage × (1 + 0.3).

Table 2
Impact of 15% wage subsidy in a tax distorted labor market (figure 1)

Labor demand elasticity	Labor supply elasticity	Functional form	Employment % increase	Wage % increase	Welfare change (million €)
-0.1	0.4	linear	1.03	2.47	+8.5
-0.5	0.4	linear	2.79	7.24	+21.7
-1.0	0.4	linear	3.52	9.21	+27.0

Notes
1) observed market equilibrium with 15% subsidy is at: employment = 450,000; annual wage = €8,300.

Table 3
Estimated counterfactual in a perfect tax/benefit linkage labor market (figure 2)

Labor demand elasticity	Labor supply elasticity	Functional form	Employment (,000)	Wage (€)	Labor cost (€)
-0.1	0.4	linear	445.4	8,100	10,520
-0.5	0.4	linear	437.8	7,740	10,050
-1.0	0.4	linear	434.7	7,600	9,880

Notes
1) observed market equilibrium with 15% subsidy is at: employment = 450,000; annual wage = €8,300; labor cost = €9,545;
2) labor cost = wage × (1 + 0.3).

Table 4
Impact of 15% wage subsidy in a perfect tax/benefit linkage labor market (figure 2)

Labor demand elasticity	Labor supply elasticity	Functional form	Employment % increase	Wage % increase	Welfare change (million €)
-0.1	0.4	linear	1.03	2.47	-2.9
-0.5	0.4	linear	2.79	7.24	-7.6
-1.0	0.4	linear	3.52	9.21	-9.5

Notes
1) observed market equilibrium with 15% subsidy is at: employment = 450,000; annual wage = €8,300.

Table 5
Estimated counterfactual in a perfect tax/benefit linkage labor market and an implicit minimum wage (figure 3)

Labor demand elasticity	Labor supply elasticity	Functional form	Employment (,000)	Wage (€)	Labor cost (€)
-0.1	0.4	linear	444.1	8,300	10,790
-0.5	0.4	linear	420.6	8,300	10,790
-1.0	0.4	linear	391.4	8,300	10,790

Notes
1) observed market equilibrium with 15% subsidy is at: employment = 450,000; annual wage = €8,300 (minimum wage); labor cost = €9,545; involuntary unemployment = 100,000; unemployment rate = 18%.
2) labor cost = wage × (1 + 0.3).

Table 6
Impact of 15% wage subsidy in a perfect tax/benefit linkage labor market and an implicit minimum wage (figure 3)

Labor demand elasticity	Labor supply elasticity	Functional form	Employment % increase	Wage % increase	Welfare change (million €)
-0.1	0.4	linear	1.33	--	+26.3
-0.5	0.4	linear	6.99	--	+148.2
-1.0	0.4	linear	14.97	--	+337.8

Notes
1) observed market equilibrium with 15% subsidy is at: employment = 450,000; annual wage = €8,300 (minimum wage); involuntary unemployment = 100,000; unemployment rate = 18%.