

This paper introduces proportional wage and payroll taxation into the Blanchard and Giavazzi (BG, 2003, *Quarterly Journal of Economics*) model of the macroeconomic effects of product and labour market deregulation. Following BG, the authors assume strongly efficient bargaining in the labour market, monopolistic competition in the goods market, that the elasticity of substitution between products is an increasing function of the number of products, and that the reservation wage is a decreasing function of the aggregate unemployment rate; they solve for the macroeconomic equilibrium both in the short run (when the number of firms is exogenous) and in the long run (for an endogenous number of firms). They consider the comparative static effects of changing either the degree of product market regulation (by changing the parametric component of the demand elasticity), or the degree of labour market regulation (by changing the union bargaining power parameter in the Nash product), or the two tax rates on real wages and unemployment in both the short and long runs.

Two main results seem to emerge relatively to BG. First, labour market deregulation (a decrease in union bargaining power) leads both to higher real wages and lower unemployment in the long run (see Propositions 5 and 6 on p. 13; in BG long-run real wages are independent of union power), which improves the "intertemporal" trade-off workers face from a labour market reform (lower real wages in the short run, see equation 20 on p. 10, in exchange for lower unemployment rates and higher real wages in the long run, see equations 27 and 28 on p. 13, and p.17). Secondly, a fiscal reform that lowers payroll taxes while increasing wage taxes at the same time in order to keep a balanced budget (?) will have ambiguous effects on workers in the short run (as both real wages and the unemployment rate are likely to increase), but will benefit them in the long run (real wages increase while the unemployment rate falls), see Propositions 2 and 3 on pp. 10-11 and Proposition 7 on p.14. The authors also present some comparisons of the likely welfare and employment effects of the various reforms, with numerical examples based on OECD benchmark data.

#### General comment

Most people would agree that poor economic performance and/or high unemployment rates in several OECD countries depend to some extent on the combination between labour and product market distortions and excessively high labour taxation: the merit of this paper is to consider jointly the macroeconomic implications of market and labour tax reforms, and the interactions between product and labour market regulation and labour taxation in a simple static general equilibrium model à la BG: this simplification should allow the authors to identify clearly the basic macroeconomic comparative static mechanisms through which different reforms operate. However, the paper suffers from some serious weaknesses: in my opinion, the current version of the paper is slightly below publication standards. A major problem is expositional: the paper is not very well written, there are a few inconsistencies, and the comparison with the existing literature is unsatisfactory (see below). Moreover, the value added by the paper to the literature seems small: clearly, because the authors modify marginally the basic BG model, their results are quite close to BG's. However, provided that the authors revise it thoroughly, I think that the paper has potential for publication.

Below, I would like to share with the authors my comments and suggestions for improving the paper on specific points.

### Specific comments

#### General equilibrium nuisances.

- i) Firms earn excess profits in the short run: where do these profits go since they are not redistributed to workers/households, see equation 2 on p. 4? For example, the authors may choose to follow BG in assuming that entrepreneurs keep the profits and spend them on consumption goods (see BG p. 883). If entrepreneurs have the same preferences as the workers, this assumption implies that in equation (9) (the partial equilibrium demand function for each product market)  $Y$  includes both wage and profit income.
- ii) Which is the numéraire for this economy? From equations (1) and (6), there is no preference for diversity in this model: thus, a natural assumption is to set  $P \equiv 1$ .
- iii) p. 4, 1 line from bottom: The authors interpret  $w_r(u)$  either as the real value of the unemployment benefits or as the workers' reservation wage. However, in this latter case, this wage should not enter the worker-household's budget constraint, equation (2): the reservation wage is a constraint for the worker's labour participation decision.
- iv) The elasticity of substitution  $\delta$  must be strictly greater than unity: it cannot be equal to unity as claimed in various places (see e.g. the last paragraph of p. 9; or p. 12, 4 lines from bottom), otherwise firms set infinite prices.
- v) The fixed entry cost  $c$  is bounded: from equations (26) and (27) on p. 13 and given that  $\delta > 1$ , it turns out that  $(1-\beta)t_w < c < 1-\beta$ .

Section 2.2, pp. 5-6. In this section, the authors provide possible justifications for the assumption that the 'reservation wage' is a decreasing function of the aggregate unemployment rate; they also present a search theoretic explanation (starting on p. 5, 20 lines from bottom) with a few equations: this part does not play any particular role in the paper (but for a brief analysis on *Institutional reform*, see p. 17) and I would delete it. Alternatively, I would encourage the authors to develop a fully-fledged search theoretic model for addressing their issues.

p. 7, equation 7. The government budget constraint is incorrectly specified and is not easily interpreted (is it a per worker budget constraint?)

p. 7, 6 lines from bottom. The empirical evidence in favour of the (strongly) efficient bargaining solution is not very robust, and the quoted paper by Dobbelaere (2004) refers to Belgium only. BG use this assumption for avoiding that higher union power might lower employment in the short run: as a result, unions do not affect the size of the short-run rents to be shared upon with the firm (real wages play no allocative role).

p. 9, equation 17. The choice of parameterization for the (tax modified) price mark-up  $\mu$ , see equation 17, is unnecessarily complicated and, alas, confusing (see the subsequent remark). It would be better following BG

and setting, say,  $\varphi \equiv 1/(\delta-1)$ : this is the distortion due to imperfect competition; moreover, set, say,  $1+\tau \equiv (1+t_p)/(1-t_w)$ : this is the distortion due to labour taxation. The relevant short-run general equilibrium real reservation wage and real wage, now given by equations 19 and 20 on p. 10, would become:  $w_r(u) = 1/[(1+\varphi)(1+\tau)]$  and  $w/P = (1+\varphi\beta)/[(1+\varphi)(1+t_p)]$ , making it easier to derive comparative static effects.

p. 10 Proposition 1 is puzzling: the real wage (20) is clearly increasing in union bargaining power  $\beta$  for  $\delta > 1$  if one uses a less complicated notation than the authors'. Clearly, for  $\delta \rightarrow \infty$ , there are no product market rents to be shared upon, so  $\beta$  cannot affect the real wage. Propositions 2 and 3 are also straightforward: it would be useful to compare them to results derived in the related literature on the wage effects of labour taxation (see below).

pp. 11-13 Section 3.4. The first part of this section (from Proposition 4 to Corollary 3) is confusing. In order to understand the effects on the long-run equilibrium number of firms, unemployment rate, real wages, simply consider equations (26), (27) and (28), respectively. This analysis is straightforward and would avoid some of the inconsistencies of the current paper. For example, Proposition 4 on p. 12 claims that "the number of firms...rise if tax rates of either type are increased": but, from equation (26), it turns out that the number of firms is independent of the payroll tax; the proof of Corollary 3 on p. 12 states that "competition and the number of goods and firms all increase if the allowable level of entry cost increases": from the equation (26), it turns out that the opposite is true.

Section 3.5, pp. 13-14. Propositions 5-7 are the novel results of the paper: I would emphasise them by also providing more economic intuition (especially for Proposition 7); comparative static effects are easily signed by noting the restrictions on the entry cost  $c$  from the equations (26) and (27).

p. 14-15 Business tax reform: it is not clear whether the authors are using explicitly the government budget constraint to derive their results rather than merely claiming that a neutral budget tax reform requires that a reduction in payroll taxes must be matched by an appropriate wage tax increase.

Section 4, pp. 16-17: this section is basically a repetition of the results derived previously in section 3; merging the two sections would save space. In any case, the paragraph on p. 17, *Institutional reforms*, should be deleted: first, this part is independent of the rest of the paper (but for section 2.2); secondly, if the authors take BG seriously, any kind of labour market reform (including a reduction in firing costs and so on) can be parsimoniously summarised by changes in the union power parameter. (Actually, the authors take this view on p. 8, 18 lines from top).

Section 5 pp. 18-20. I am a rather puzzled by this section. The authors consider four policies: product market liberalisation (an increase in the elasticity of substitution); labour market deregulation (a reduction in union bargaining power), a reduction in wage taxes, and a reduction in payroll taxes, by comparing their effects on welfare and unemployment. However, there are a few open issues here. First, the authors use real wages as a welfare metric (see p. 18) rather than equation (7) on p. 6; second, it is unclear whether their welfare analysis

considers the short or long runs: on the one hand, welfare analysis in the short run cannot ignore the effects of policy on real profits (i.e. equation 7 as a welfare metric is a strong assumption in the short run); on the other hand, both real wages and unemployment in the long run are unaffected by the elasticity of substitution (see equations 27 and 28, on p. 13): this form of product market liberalisation has no long-run effects (see BG, p. 891, for intuition). Then, why the authors claim that ‘liberalising product markets is more effective than deregulating labour markets’ (see Corollary 5, on p. 19) as far as long-run unemployment is concerned? The thresholds derived in Corollary 4 and 5 seem very dubious to me and I am not sure whether the subsequent analysis of section 6 (pp. 20-21) makes sense. Moreover, why product market liberalisation does not take the form of a reduction in the fixed entry cost  $c$  here? In this case a comparison with labour deregulation or business tax reforms would make sense.

#### Related literature.

- i) I would like to see a clearer comparison especially with BG and with Spector (2004 EER); the authors need pointing out more clearly similarities and differences: for example, it would be useful to compare and contrast equations (26)-(28) on p. 13 with equations (9)-(11) in BG (see p. 890).
- ii) There are several papers analysing the effects on wage formation and employment outcomes of labour taxation in unionised labour markets, both in partial equilibrium (see for example Lockwood and Manning, 1993, *Journal of Public Economics*; Koskela and Schöb, 1999, *Economics Letters*), and in general equilibrium (see for example, Daveri and Tabellini, 2000, *Economic Policy*, who focus on the growth effects of changing proportional wage taxation) that may be useful to read and quote.
- iii) Finally, there are two very recent working papers (the authors may not be aware of them, since they have been published after the current paper was written) that are differently related to the current one. The first and more relevant paper is Fiori et al. (2007), ‘Employment outcomes and the interaction between product and labor market deregulation: Are they substitutes or complements?’, IZA DP 2770, which is very close to the current paper: these authors introduce proportional wage and payroll taxation into BG and test the model’s predictions on employment by using panel data for OECD countries, but they do not consider welfare analysis explicitly. The second paper is Heijdra and Ligthart (2007) ‘Labor tax reform, unemployment and search’, University of Groningen, mimeo, who study the labour tax reform of reducing payroll taxes and increasing progressive wage taxes in a fully-fledged search theoretic model with perfectly competitive goods markets.