



# Optimal redistributive taxation with both extensive and intensive responses <sup>☆</sup>

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## Abstract

We study optimal income taxation when labor supply reacts along the intensive and extensive margins. Individuals are heterogeneous across two unobserved dimensions: their skill and disutility of participation.

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We develop a new method to analytically derive conditions under which optimal marginal tax rates are non-negative everywhere. It is typically optimal to provide a distinct level of transfer to the non-employed and to workers with negligible earnings. Numerical simulations illustrate these properties for the US. We also apply our method to sign output distortions in other adverse selection frameworks with random participation, namely the monopoly nonlinear pricing and the regulatory monopoly problems.

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## 1. Introduction

When labor supply responses are concentrated along the *intensive* (in-work effort) margin only, the theory of optimal income taxation recommends that the marginal tax rates be positive.<sup>4</sup> However, the empirical literature (e.g., Heckman [16] or Meghir and Phillips [25]) suggests that a large fraction of labor supply responses occurs along the *extensive* margin (the participation decision). This paper proposes a new method to determine analytically the sign of optimal marginal tax rates in a model with both intensive and extensive margins.

For this purpose, we consider an economy where individuals are heterogeneously endowed with a type made of two unobserved characteristics: their skill level and disutility of participation. Because of the former heterogeneity, employed workers typically choose different earnings levels, while because of the latter heterogeneity, at any skill level, only a fraction of individuals choose to work. The government observes workers' gross earnings but neither their effort nor their type. The government can condition taxation on endogenous earnings only, and not on the exogenous characteristics whose heterogeneity in the population lies at the origin of the redistribution problem.

Our new method for signing optimal marginal tax rates consists in starting from the case where the government observes the skill of workers but neither the skill of the non-employed nor the disutility of participation of anyone. In this so-called “first-and-a-half-best” setting,<sup>5</sup> the optimal tax formula gives the participation tax schedule, i.e. the level of earnings taxes paid when one works plus the level of welfare benefit when jobless. The optimal participation tax profile is very similar to the one obtained with extensive margin only.<sup>6</sup> The optimal participation tax equals one minus the social welfare weight divided by the extensive behavioral response. If this ratio is increasing along the skill distribution, the optimal marginal tax rates are positive. Our contribution is to show that this implication, which is trivial in the first-and-a-half-best setting, is also valid in the second-best setting where the government does not observe individuals' types. Thanks to this new method, we derive a sufficient condition for optimal marginal tax rates to be positive everywhere, except at the two extremes of the skill distribution. We also retrieve the result of zero distortion at the bottom and at the top when the skill distribution is bounded and there is no bunching [33,39]. When the skill distribution is conversely unbounded [12] and the elasticity of participation is asymptotically constant, we obtain a positive asymptotic marginal tax rate.

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<sup>4</sup> See, e.g., Mirrlees [26], Sadka [33], Seade [40], Werning [41] or Hellwig [17] and the counterexamples of Choné and Laroque [8].

<sup>5</sup> This would be the second best in the pure extensive model and the first best in the pure intensive model.

<sup>6</sup> Diamond [11], Saez [35], Choné and Laroque [7,9].

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