Thorstein Veblen, Joan Robinson and George Stigler (probably) never met: Social Preferences, Monopsony, and Government Intervention*

Laszlo Goerke† and Michael Neugart‡

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Abstract

Wages and employment are lower in a monopsonistic labor market than in its competitive counterpart. Furthermore, a minimum wage or a subsidy may raise employment up to its first-best, competitive level. We analyze whether these important predictions still hold if workers have social preferences and compare their income to that of a reference group. First, we investigate how such social comparisons affect wages and employment in monopsony. Second, we show that the undistorted, competitive outcome may no longer constitute the benchmark for welfare comparisons in the presence of social comparisons. Third, we derive a condition which guarantees that the monopsony distortion is exactly balanced by the impact of social comparisons and the first-best results without government intervention. Finally, we show that depending on the relative strength of the two distortions either a minimum or a maximum wage, respectively wage cap, can ensure this condition. Alternatively, the government may employ subsidies or taxes.

Keywords: social preferences, government intervention, minimum wage, monopsony, taxation, wage regulation

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†Universität Trier, IAAEU (Institut für Arbeitsrecht und Arbeitsbeziehungen in der Europäischen Union), Campus II, D-54286 Trier, Germany, IZA, Bonn, CESifo, München, E-mail: goerke@iaaeu.de

‡Technische Universität Darmstadt, Department of Law and Economics, Hochschulstraße 1, D-64289 Darmstadt, Germany, E-mail: neugart@vwl.tu-darmstadt.de

1 Introduction

In standard textbook settings individual consumption and labor supply decisions are usually guided by own endowments only. There is, however, ample evidence that questions this assumption (see, e.g., Neumark and Postlewaite, 1998; Bowles and Park, 2005; Frank, 2008; Park, 2010). Individual decisions are often and substantially influenced by relative or positional considerations. Accordingly, an extensive literature has developed which analyzes the impact of preferences featuring social comparisons on competitive labor market outcomes. However, labor markets very often do not correspond to this setting and may more adequately be characterized as imperfectly competitive. Empirically, it has been shown that a firm's labor supply is not infinitely elastic, see, e.g., Nelson (1973) and Sullivan (1989) for pioneering work. These and also more recent findings[1] suggest that monopsonies are a pertinent feature of many labor markets. Therefore, it is astonishing that these highly pervasive facts, the prevalence of monopsonistic labor markets and of social comparisons, have only been looked at in separation, instead of constituting the empirical basis for a theoretical analysis of labor market outcomes and policy implications.

As is well known, in a monopsony there is insufficient employment in the absence of social comparisons, and wages are lower than on a competitive market, because the firm's marginal employment costs exceed the wage. In consequence, employment and welfare can be raised by a minimum wage (see, e.g., Manning, 2003). In contrast, social comparisons featuring jealousy result in excessive employment in a competitive labor market, while wages will be lower than in the absence of such preferences. The reason is that individuals have an incentive to expand labor supply in order to raise income and thereby improve their relative position. Since such relative concerns give rise to externalities, welfare can be increased if labor supply is curtailed. Accordingly, relative or positional considerations can justify progressive income taxation in competitive markets (see, e.g., Persson, 1995; Ireland, 2001; Corneo, 2002; Aronsson and Johansson-Stenman, 2014, 2015), or the use of wage ceilings.

Each topic on its own has a long tradition in economics. Thorstein Veblen already asserted that "Relative success, tested by an invidious pecuniary comparison with other men, becomes the conventional end of action." (Veblen, 1899, ch. 2: Pecuniary emulation, p. 24).[2] Monopsony and the effects of an upward sloping labor supply curve to the firm on wages and employment were analyzed by Joan Robinson in the 1930s (Robinson, 1933, ch. 18), and the

[1] Azar et al. (2018) employ online vacancy posting and infer that about half of all labor markets in the United States are judged as highly concentrated according to the definition of the Federal Trade Commission in its merger guidelines and may, thus, be regarded as exhibiting features of a monopsony. Moreover, the relevance of monopsonistic labor markets is likely to increase in the future, when the standard employment relation is increasingly being replaced by more flexible forms of contracts. For the extreme form of this flexibility, crowdworking, Dube et al. (2018) estimate labor supply elasticities for one of the largest on-demand platforms of around 0.1.

[2] Other very early contributions to the role of social preferences for individual choices include Smith (1776, Book V, Ch. II, Part 2), Pigou (1903, p. 60), Keynes (1936, ch. 2) and also Marx (1977).

(de-) merits of minimum wages were discussed as early as in the 1940s by George J. Stigler (Stigler, 1946). Nonetheless, the analyses of the various concepts have, to the best of our knowledge, not been combined. Given that Joan Robinson was born in 1903, while Thorstein Veblen died in 1929, and taking into account, for example, George J. Stigler's derogatory review of Robinson's Economic Philosophy (Stigler, 1963), it seems unlikely that our figureheads have ever discussed their ideas, let alone met to discuss their ideas.

In this paper, we take up their intellectual heritage and analyze what happens if the two distortions - monopsony and social comparisons - interact. Additionally, we consider what kind of government interventions might be called for.

Our analysis, first, shows that the impact of social comparisons on wages and employment is ambiguous in monopsony. The direction of the effects largely depends on how social comparisons affect the labor supply elasticity to the firm directly, and indirectly through the induced changes of wages and employment. Jealousy shifts the labor supply curve downwards in the wage-employment space. Moreover, it also affects the slope of the supply curve. In consequence, social comparisons do not necessarily shift the monopsonist's marginal cost curve downward in the wage-employment space, as well. Thus, predicting the wage and employment impact requires restrictions relating to the labor supply elasticity.

Second, a social planner confronted with the two distortions, a monopsony and social comparisons, will not always prefer an employment level that equals the one which occurs on a competitive market without social comparisons. Social comparisons alter preferences and cause externalities. The social planner internalizes these externalities when determining optimal employment. However, internalization is not generally equivalent to the absence of social preferences, as the latter affect the marginal utility from consumption. Accordingly, the first-best outcome in the presence of social comparisons will only equal the competitive one in their absence if workers' marginal utility satisfies rather special properties. Our analysis clarifies that an outcome in which the net effect of the two distortions, monopsony and social comparisons, is zero only constitutes the benchmark for a welfare-oriented policy for special utility functions.

Our third set of findings relates to policy measures which can be employed to achieve a first-best outcome. Assuming that the social planner uses wages in order to achieve her desired employment level, we find that she will impose a minimum wage if the labor supply elasticity is sufficiently small, relative to the intensity of social comparisons. Otherwise, it would be optimal to set a maximum wage or wage cap. A minimum wage, as is well established, would reduce marginal employment costs, thus expanding employment. A wage cap would prevent the monopsonist from raising the supply of labor it can utilize beyond the (welfare-maximizing) level. Analogously to the wage regulation we can also determine optimal tax rates or subsidies to restore efficiency in the presence of the two distortions. Whether the tax rate is positive or negative, i.e. a subsidy, again depends on the magnitude of the labor supply elasticity relative

to the strength of social comparisons.

While there is sweeping work on monopsonistic labor markets (Manning, 2003) and there is widespread interest in the effects of social preferences on market outcomes (see, among others, Persson, 1995; Ireland, 2001; Corneo, 2002; Liu and Turnovsky, 2005; Aronsson and Johansson-Stenman, 2008, 2014, 2015, 2018; Wendner and Goulder, 2008; Mujcic and Frijters, 2015), our contribution sits well with a less developed literature that looks into market outcomes when these two distortions meet. Desiraju and Sappington (2007) and von Siemens (2010; 2012) study the impact of social comparisons in a monopsony. Contrary to our contribution, they are interested in workers' sorting behavior into particular jobs, and firms' profits when workers have private information relating to their ability or social preferences. In previous work (Goerke and Neugart, 2017), we analyze social comparisons in oligopsony in which heterogeneous firms have limited market power and compete for the same pool of labor. We show for this framework, based on the set-up by Salop (1979), that a stronger prevalence of wage comparisons decreases wage inequality, shifts the functional income distribution in favor of workers, and increases welfare. In the Salop-type framework, social comparisons unambiguously raise the labor supply elasticity, such that a crucial element of the present analysis does not have an impact. Accordingly, we extend Goerke and Neugart (2017) by showing that the exact nature of the firms' market power affects outcomes. Moreover, we scrutinize various policy instruments with regard to their suitability to remedy the welfare losses resulting from the interaction of social comparisons and market power by employers. Finally, Sandmo (1994) studies a two-part wage schedule in monopsony. He shows that the monopsonist will equalize the effort-related wage component and a worker's marginal productivity and use the fixed income component to raise profits at the expense of wage income. These benefits of second-degree price discrimination extend to a setting in which individuals exhibit social comparisons. Consequently, in Sandmo (1994) there is no interaction between the two distortions we consider.

Market power may not only originate on the demand side of the labor market. Employees can also influence market outcomes. Goerke and Hillesheim (2013) show that labor demand and actual hours of work decline in a labor market with firm-specific trade unions, which represent individuals with preferences featuring social comparisons. The reason is that unions can internalize the impact of social comparisons that would otherwise have led to excessive work. Some years later, Chang et al. (2018) have developed the same basic idea independently. They also derive the potential for a welfare-enhancing role of trade unions in the presence of social comparisons, albeit in a different framework. Chang et al. (2018) derive a critical value for the union's bargaining power, such that the preference externality is fully internalized by the labor market distortion. Furthermore, Mauleon and Vannetelbosch (2003; 2010) and Mauleon et al. (2014) investigate how strike activity by a trade union, whose members have social preferences, changes with the structure of the market on which the firm sells its products.

Interactions of distortions of the social comparison type with some sort of market power are also studied outside of the labor market context. Woo (2011; 2016) shows that the prediction of over-consumption obtained for competitive settings may no longer arise in oligopoly or if there is monopolistic competition when status effects with respect to consumption goods are introduced. Similarly, Guo (2005) finds that the tax rate inducing first-best consumption may not be positive on account of a product market imperfection. These contributions demonstrate that social preferences interact with other market imperfections. Thereby they emphasize the relevance of the setting we consider.

In the next section, we describe our analytical apparatus. In Section 3, we show how social comparisons affect the market outcome if the labor market is characterized by a monopsony, focusing on the case of jealousy. Subsequent to this positive analysis, we characterize optimal employment in the presence of two distortions: monopsony and social comparisons. We also show how wage regulations, via either minimum or maximum remuneration levels (Section 4.2), and taxes and subsidies (Section 4.3) can be employed to enforce the optimal employment level. After a discussion of our results under the assumption that it is not jealousy but admiration that constitutes the externality in Section 5, we conclude in Section 6.

2 The Model

2.1 General set-up

We consider a world in which a monopsonist employs a large number of individuals. These workers derive utility from their own consumption and exhibit social preferences, since utility depends on a reference level of consumption, as well. From the perspective of an individual worker, reference consumption is exogenous. This kind of Nash-behavior implies that each individual creates an externality when deciding about labor supply and, hence, the impact of an individual's consumption on other individuals is neglected. Because these distortions already arise in a world with homogeneous individuals, we assume that all workers are identical also ex-post. In consequence, all workers are employed by the monopsonist and variations in employment take place at the intensive margin. This simplification does not substantially affect predictions and allows us to define welfare in a straightforward manner because we do not have to compare payoffs across individuals. In contrast to workers, the monopsonist takes into account that a wage change will alter not only consumption of each employee, but also the reference level. The monopsonist correctly anticipates the labor supply effects of altering the wage (Sandmo, 1994).

The monopsonist can sell its output at a fixed price normalized to unity, for example, on an internationally integrated market. Therefore, changes in income of the workers do not have an impact on product and labor demand. Workers are paid a wage, w, and supply an

amount of labor, L, resulting in labor income, wL, if supply is realized. In addition, profits of the monopsonist are redirected to the workers, adding to labor income. Accordingly, the distribution of income is without impact on consumption levels and we can concentrate on efficiency consequences of social comparisons in the normative part of our analysis. Workers are price-takers and, hence, cannot influence the wage, w. Moreover, they view the level of profit income, π, as given and, thus, as unaffected by labor supply decisions. This assumption and the differential ability of the monopsonist and an individual worker to affect the reference level of consumption reflect the idea that the firm has market power, while the number of employees is so large that each individual's actions have negligible effects on market outcomes.

2.2 Preferences

Utility, U, increases in the worker's own consumption level, c, at a strictly decreasing rate and declines in working time, L, at a weakly increasing rate, such that $U_c > 0 > U_L, U_{cc}$ and $U_{LL} \leq 0$ hold, where subscripts denote partial derivatives. Moreover, utility U depends on the reference level of consumption, c^r. The utility function is, therefore, defined by

$$U = U(c, c^r, L). \tag{1}$$

In previous empirical contributions, various kinds of reference groups have been looked at, such as neighbors, parents, people who are comparable with respect to age, education etc., individuals who have the same occupation, or colleagues (Luttmer, 2005; Senik, 2009; Goerke and Pannenberg, 2015; Clark et al., 2017). Given our setting, we focus on colleagues. Moreover, we primarily consider the case of jealousy, as defined by Dupor and Liu (2003), such that $U_{c^r} < 0$ holds. Accordingly, our model is set up in such a way that the employment-reducing impact of monopsony power could be counteracted by the employment-enhancing effect of social comparisons (see, e.g., Frank, 1984; Schor, 1991; Dupor and Liu, 2003). Most of our findings also apply if individuals exhibit admiration of colleagues ($U_{c^r} > 0$), as we show in Section 5.

For simplicity, the utility function is separable in consumption and labor supply ($U_{cL} = U_{c^rL} = 0$), see also, e. g., Persson (1995), Corneo (2002), or Goerke and Hillesheim (2013). The marginal rate of substitution between leisure and consumption, U_L/U_c will increase with the reference level of consumption, c^r, if $U_{cc^r} > 0$ applies, which we subsequently assume to be the case. This is often referred to as Keeping-up-with-the-Joneses (KUJ) preferences (see Dupor and Liu, 2003).[3] Furthermore, the direct positive impact of a general increase in consumption dominates the indirect one via reference consumption. This holds both for the utility level, U, (Dupor and Liu, 2003) and the marginal utility from consumption, U_c (Liu and Turnovsky, 2005), implying that $U_c + U_{c^r} > 0 > U_{cc} + U_{cc^r}$ for $dc = dc^r > 0$.

[3]Given the separability assumption ($U_{cL} = 0$), jealousy and KUJ-preferences are equivalent.

The utility impact of a change in the relevance of reference consumption is described by a parameter γ, $0 \leq \gamma$. If, for example, social preferences are of the additive type (Clark and Oswald, 1998), we could specify utility as $U(c-\gamma c^r, L)$. Accordingly, the signs of U_γ and U_{c^r}, as well of $U_{c\gamma}$ and U_{cc^r} coincide. The parameter γ then measures the intensity with which the monopsonist's employees compare their consumption to that of colleagues.

2.3 Labor Supply

To reduce notational burden, we set the number of workers equal to one. The representative worker chooses working hours or labor supply to maximize utility subject to the budget constraint, $c = wL + \pi$. Since each worker regards profits π as fixed, the first-order condition for a utility maximum is:

$$\frac{dU}{dL} = U_c(c, c^r)w + U_L(L) = 0. \tag{2}$$

Individual labor supply, L^*, is increasing in the own wage, w, if the substitution effect dominates the income effect, which we subsequently assume to be the case:

$$\frac{dL^*}{dw} = -\frac{\frac{d^2U}{dLdw}}{\frac{d^2U}{dL^2}} = -\frac{U_c + U_{cc}wL}{U_{cc}w^2 + U_{LL}} > 0. \tag{3}$$

We next consider the consequences of a higher wage paid by the monopsonist on labor supply, that is, of an encompassing wage increase. In order to determine this impact, we have to incorporate not only the effect on own consumption, $\partial c/\partial w = L$, but also the repercussion on the reference level, $\partial c^r/\partial w$, which will be positive if reference consumption is also partially financed by labor income. Moreover, the workers who constitute the reference group of the representative worker, will also adjust labor supply. Holding constant profits, the change in aggregate labor supply can be derived from:

$$U_c(c(wL), c^r(w, L), \gamma)w + U_L(L) = 0 \tag{4}$$

Totally differentiating the above expression for $c = wL + \pi$ yields the slope of the aggregate labor supply curve, denoted by $L(c, c^r, \gamma)$:

$$\frac{dL(c(wL), c^r(w, L), \gamma)}{dw} = -\frac{\frac{d(U_c(c,c^r,\gamma)w+U_L(L))}{dw}}{\frac{d(U_c(c,c^r,\gamma)w+U_L(L))}{dL}} = -\frac{U_c + w(U_{cc}L + U_{cc^r}\frac{\partial c^r}{\partial w})}{w(U_{cc}w + U_{cc^r}\frac{\partial c^r}{\partial L}) + U_{LL}}. \tag{5}$$

Given the assumptions that reference consumption c^r is also partially financed by labor

income and, hence, increasing in w, and that $U_{cc^r} > 0$, the numerator of (5) will surely be positive if the individual labor supply curve is upward-sloping ($dL^*/dw > 0$), as this implies $U_c + U_{cc}wL > 0$. As, furthermore, the denominator is negative for $\partial c^r/\partial L \leq w$ and $U_{cc} + U_{cc^r} < 0$, also the aggregate labor supply curve is upward sloping.

We can simplify expression (5) without affecting its qualitative features if we explicitly incorporate the assumption of homogeneous workers, which implies that reference consumption equals own consumption ($c = c^r$), and the feature that the monopsonist takes into account that workers obtain profit income. As there are no costs other than wages, and denoting the production function by $f(L)$, profits can be written as: $\pi = f(L) - wL$. It follows that consumption equals $c = c^r = wL + \pi = wL + f(L) - wL = f(L)$. In addition, we have $\partial c^r/\partial w = \partial c/\partial w = 0$ and $\partial c^r/\partial L = \partial c/\partial L = f'(L)$ so that the slope of the aggregate labor supply curve (5) becomes

$$L_w = -\frac{U_c}{w(U_{cc} + U_{cc^r})f'(L) + U_{LL}} > 0. \tag{6}$$

Hence, the aggregate labor supply curve only reflects the substitution effect of a wage increase but no income effect anymore. Moreover, an increase in the importance of reference consumption raises aggregate labor supply in the presence of KUJ preferences, as this implies that $U_{c\gamma} > 0$ holds.

$$L_\gamma = -\frac{U_{c\gamma}w}{w(U_{cc} + U_{cc^r})f'(L) + U_{LL}} > 0. \tag{7}$$

Equations (6) and (7) show aggregate labor supply as a function of the wage, w, and the measure, γ, of the intensity of social comparisons ($L = L(w, \gamma)$). Note, finally, that underemployment can be characterized by individuals working fewer hours, that is, achieving a lower value of L, than desired at a wage which would equal the marginal value product of labor, $f'(L)$.

2.4 Wage Choice

The production function $f(L)$, is characterized by standard properties, that is, $f(0) = 0$, $f'(0) \to \infty$, and $f' > 0$, $f'' < 0$ for $L > 0$. The monopsonist maximizes profits by setting the wage, taking into account that a wage change affects aggregate labor supply (as described in (6)). Hence, profits are given by:

$$\pi \;\; = \;\; f(L(w, \gamma)) - wL(w, \gamma). \tag{8}$$

The first-order condition for a profit-maximizing choice can, using the definition of the (aggregate) wage elasticity of labor supply, $\epsilon(w, L(w,\gamma),\gamma) = L_w w/L > 0$, be expressed as:

$$\pi_w = f'(L)L_w - L - wL_w = \frac{L(w,\gamma)\epsilon(w,L(w,\gamma),\gamma)}{w}\left[f'(L) - w\frac{1+\epsilon(w,L(w,\gamma),\gamma)}{\epsilon(w,L(w,\gamma),\gamma)}\right] = 0. \quad (9)$$

The monopsonist will set a wage equal to the marginal product of labor, corrected by a factor that depends on the labor supply elasticity. The second-order condition is:

$$\pi_{ww} = \frac{L(w,\gamma)\epsilon(w,L(w,\gamma),\gamma)}{w}\cdot$$

$$\left[f''(L)L_w - \frac{1+\epsilon(w,L(w,\gamma),\gamma)}{\epsilon(w,L(w,\gamma),\gamma)} + \frac{w}{(\epsilon(w,L(w,\gamma),\gamma))^2}\frac{d\epsilon(w,L(w,\gamma),\gamma)}{dw}\right] < 0. \quad (10)$$

The second-order derivative will surely be negative, given an upward-sloping aggregate labor supply curve, if the wage elasticity of labor supply weakly declines with the wage

$$\frac{d\epsilon(w,L(w,\gamma),\gamma)}{dw} = \frac{\partial\epsilon}{\partial w} + \frac{\partial\epsilon}{\partial L}L_w \leq 0. \quad (11)$$

Once the wage has been determined by (9), the employment level can be found by calculating labor supply, implicitly defined by (4).

3 Positive Analysis

In this section we investigate how wages and employment change with the intensity of social comparisons of the KUJ-type. First, we derive and illustrate the findings for the general utility function looked at thus far. Subsequently, we consider two often used specifications of preferences in order to resolve some of the ambiguities which remain for the general formulation.

3.1 A General Result

The wage and employment effects of a change in the strength of social preferences are summarized in the following proposition.

Proposition 1. *Suppose individual preferences are of the KUJ-type:*

(a) A sufficient condition for the wage to decrease with the intensity of social comparisons is that $\partial\epsilon/\partial\gamma \leq 0$ *and* $\partial\epsilon/\partial L \leq 0$.

(b) Sufficient conditions for labor supply and employment to increase with the intensity of social comparisons are that (1) the wage does not fall or (2) $\partial\epsilon/\partial\gamma \geq 0$ *and* $\partial\epsilon/\partial w \leq 0$.

Proof. The derivative of the first-order condition of the firm (9) with respect to the indicator, γ, of the strength of social comparisons is:

$$\pi_{w\gamma} = \frac{L(w,\gamma)\epsilon}{w}\left[f''(L)L_\gamma + \frac{w}{\epsilon^2}\left(\frac{\partial\epsilon}{\partial\gamma} + \frac{\partial\epsilon}{\partial L}L_\gamma\right)\right]. \tag{12}$$

Since labor supply rises with the intensity of social comparisons, see (7), the term in square brackets will surely be negative if the wage elasticity of labor supply rises neither with the strength of social comparisons nor with employment. This proves part (a).

As the firm's first-order condition determines the wage, the resulting employment level can be derived using the labor supply curve $L(w,\gamma)$. Its derivative with respect to γ, taking into account wage repercussions, is:

$$\frac{dL(w,\gamma)}{d\gamma} = L_\gamma + L_w\frac{dw}{d\gamma} = L_\gamma - L_w\frac{\pi_{w\gamma}}{\pi_{ww}}. \tag{13}$$

If the wage rises, the employment effect is clearly positive, c.f. (6). Substituting for the wage effect, we obtain:

$$\frac{dL(w,\gamma)}{d\gamma} = L_\gamma - L_w\frac{f''(L)L_\gamma + \frac{w}{\epsilon^2}\left(\frac{\partial\epsilon}{\partial\gamma} + \frac{\partial\epsilon}{\partial L}L_\gamma\right)}{f''(L)L_w - \frac{1+\epsilon}{\epsilon} + \frac{w}{\epsilon^2}\left(\frac{\partial\epsilon}{\partial w} + \frac{\partial\epsilon}{\partial L}L_w\right)} = \frac{-L_\gamma\frac{1+\epsilon}{\epsilon} + \frac{w}{\epsilon^2}\left(L_\gamma\frac{\partial\epsilon}{\partial w} - L_w\frac{\partial\epsilon}{\partial\gamma}\right)}{\pi_{ww}}. \tag{14}$$

Since the denominator is negative according to (10), the employment effect is unambiguously positive for $\frac{\partial\epsilon}{\partial w} \leq 0$ and $\frac{\partial\epsilon}{\partial\gamma} \geq 0$. This proves part (b). □

We can explain the proposition graphically and thereby also provide intuition. Figure 1 contains the textbook illustration of a monopsony. The thin lines ($\gamma = 0$) refer to the case without social comparisons. As is well known, the marginal cost curve for the monopsonist is situated above the labor supply curve it faces. The relative difference between the marginal product of labor and the wage of the worker is determined by the inverse of the labor supply elasticity to the firm, i.e., Pigou's measure of exploitation (Boal and Ransom, 1997, p. 88).

Incorporating social comparisons ($\gamma \neq 0$) has no impact on labor demand as it is independent of the employees' income. If workers exhibit jealousy, the intensity of which is measured by the parameter γ, the labor supply curve shifts downwards with γ in the wage-employment space. The bold line illustrates this effect in Figure 1. Moreover, the slope of the labor supply curve is likely to change (cf. eq. (6)). Accordingly, social comparisons affect the monopsonist's marginal costs $w(1+\frac{1}{\epsilon})$ through several channels. First, there is a direct effect on the wage because of the shift of the labor supply curve. Second, social comparisons will directly alter the labor supply elasticity if also the slope of the labor supply curve changes. Third, the labor supply elasticity may change due to the induced wage and employment changes. The overall impact of social comparisons on the labor supply elasticity and the monopsonist's marginal cost curve then determines the wage and employment consequences.

Equation (9) tells us under which conditions more intense social comparisons decrease the wage. Let us re-write the condition as $w = f'(L)\frac{\epsilon}{1+\epsilon}$ and note that the right-hand side is increasing in ϵ. Suppose for a moment that the wage would equal the marginal product, i.e. labor supply was infinitely elastic. As social comparisons shift the supply curve outwards, we move down the labor demand curve to get the new and now lower profit maximizing wage. In a monopsony the marginal cost to an employer equals the wage plus a (wage-dependent) mark-up which decreases with the labor supply elasticity. Thus, the monopsonist will only find it profitable to set a lower wage with social comparisons, than in their absence, if the change in the labor supply elasticity does not undo the decrease in wages. For this to hold, ϵ should not increase via a direct effect of γ or an indirect impact via a higher L (or lower w) by too much.

In Figure 1 we have assumed that the marginal cost curve shifts downwards. Since such a shift may occur because the labor supply elasticity rises, the sufficiency requirement in part (a) of Proposition (1) is not fulfilled. Thus, the wage may rise, as it actually is the case in Figure 1.

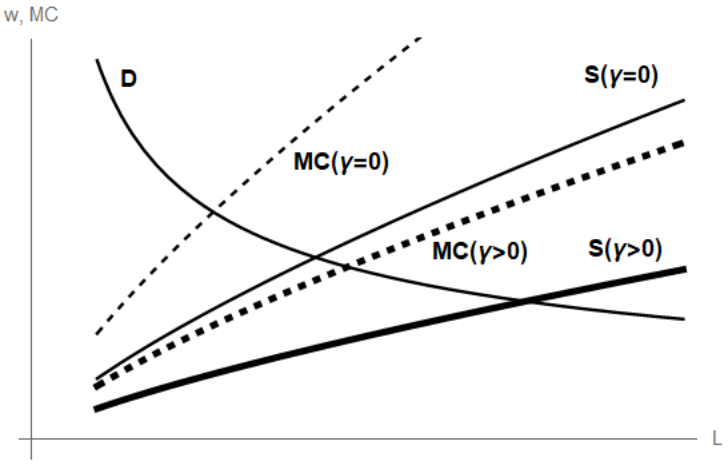
The ambiguous employment effect of social comparisons then follows from considering two countervailing forces: The shift in the labor supply curve and variations in the labor supply elasticity. The downward shift increases labor supply. For a given labor supply elasticity, marginal costs decline and employment rises. If the changes in marginal costs, incorporating the adjustment in the labor supply elasticity, are such that the monopsonist sets a higher wage than in the absence of social comparisons, labor supply and employment will rise because also a move to the right along the supply curve occurs. If, however, the wage declines, we can only be certain that employment rises if the marginal costs of employment do not increase. This will surely be the case if the labor supply elasticity does not fall. In Figure 1 this condition is met, as the vertical distance between the labor supply schedule and the marginal costs curve is less for the case of $\gamma > 0$ than for $\gamma = 0$.

3.2 Specific utility functions

Due to reasons of tractability and for being able to derive clear-cut predictions, the analysis of the effects of social preferences in various economic contexts mostly starts from the definition of a specific utility function (Grodner et al., 2011). Hence, there is no lack of candidates that we could look into. We will exemplify our more general result on the effects of social comparisons on employment and wages in monopsony with two specific utility functions, which have frequently been used. The first assumes that absolute consumption differences matter and has been employed by Ljungqvist and Uhlig (2000), inter alia. It is given by:

$$U(c, c^r, L) = \frac{1}{1-\beta}\left(\frac{c-\gamma c^r}{1-\gamma}\right)^{1-\beta} - AL, \tag{15}$$

Figure 1: Wages and employment in monopsony with social comparisons



Notes: S is labor supply and D labor demand. Thin lines refer to the case of a monopsony without social comparisons ($\gamma = 0$), bold lines to a monopsony with social comparisons ($\gamma > 0$). Dashed lines are the marginal cost (MC) curves to the monopsonist of hiring one more unit of labor.

where $A, \beta > 0$ and $0 < \gamma < 1$. As our second example, we will analyze a specification which focuses on relative consumption differences, using a specific form suggested by Gali (1994):

$$U(L) = \frac{1}{1-\beta}\left(\frac{c}{(c^r)^\gamma}\right)^{1-\beta} - AL, \tag{16}$$

for which we assume $\beta > 1$ in order to ensure KUJ preferences. In addition, $\gamma(1-\beta)+\beta > 0$ guarantees that the labor supply curve to the monopsonist is upward-sloping and the existence of equilibrium (Dupor and Liu, 2003). Both formulations assume separability between the disutility from supplying labor and the utility from consumption and also warrant the other assumption underlying our analysis, such as that $U_c > 0 > U_L, U_{c^r}, U_{cc}$ and $U_{LL} \leq 0$.Our choice of these two utility functions is also motivated by an ongoing discussion on whether social preferences should be modeled in relative or absolute terms (see, inter alia, Persson, 1995; Clark and Oswald, 1998; Choudhary and Levine, 2006; Pérez-Asenjo, 2011; Goerke and Hillesheim, 2013; Mujcic and Frijters, 2013). Thus, we have an example for each case. Moreover, we continue to assume symmetry ($c = c^r$) and specify a Cobb-Douglas production function, $f(L) = L^m$, $0 < m < 1$.

Example 1 - Absolute consumption differences Since individual workers regard reference consumption as given, the first-order condition for a maximum of utility as defined in (15) is:

$$\frac{dU}{dL} = \left(\frac{c-\gamma c^r}{1-\gamma}\right)^{-\beta}\frac{1}{1-\gamma}w - A = 0. \tag{17}$$

Given the assumptions stated above ($c = wL + \pi = L^m$), aggregate labor supply is defined by:

$$L^{-m\beta}\frac{1}{1-\gamma}w - A = 0. \tag{18}$$

With $dL/dw = L/(m\beta w) > 0$, the labor supply elasticity to the monopsonist becomes:

$$\epsilon = \frac{dL}{dw}\frac{w}{L} = \frac{1}{m\beta}. \tag{19}$$

We can also verify that the aggregate labor supply curve shifts downwards in the wage-employment space with more intense social comparisons ($L_\gamma > 0$). As $\epsilon_\gamma = \epsilon_L = \epsilon_w = 0$, it follows from Proposition (1) that employment increases in the prevalence of social comparisons, while wages decline. Therefore, social comparisons counteract the employment effects of a monopsony and aggravate the wage consequences.

Example 2 - Relative consumption differences Differentiation of (16) yields the first-order condition of the worker's utility maximization problem as

$$\frac{dU}{dL} = \frac{w}{c^\beta} - A\left(c^r\right)^{\gamma(1-\beta)} = 0. \tag{20}$$

Aggregate labor supply to the monopsonist (for $c = c^r = L^m$) follows from

$$z \equiv w - AL^{m(\gamma(1-\beta)+\beta)} = 0. \tag{21}$$

Inserting $dL/dw > 0$ into the labor supply elasticity to the firm gives

$$\epsilon = \frac{dL/L}{dw/w} = \frac{1}{m\left(\gamma(1-\beta)+\beta\right)}. \tag{22}$$

Proposition 1 starts from the assumption that labor supply shifts outwards with γ. This will be the case if $z_\gamma > 0$, that is $L > 1$. As $\beta > 1$ and $\gamma(1-\beta)+\beta > 0$, it holds that $\partial\epsilon/\partial\gamma > 0$ and employment unambiguously increases in the intensity of social comparisons.

The wage effect, however, does not straightforwardly follow. The wage is determined by the first-order condition

$$b \equiv mL^{m-1} - w\frac{1+\epsilon}{\epsilon} = 0. \tag{23}$$

Taking total differentials of z and b and applying Cramer's rule we get

$$\frac{dw}{d\gamma} = \frac{-z_\gamma b_L + b_\gamma z_L}{z_w b_L - b_w z_L}. \tag{24}$$

It holds that $z_w b_L - b_w z_L < 0$. The sign of the numerator is ambiguous. It, however, becomes negative if $m \to 1$, i.e. the production function becomes less concave and, consequently,

the labor demand curve flatter in the wage-employment space (see the Appendix for a more detailed exposition). Therefore, a given change in marginal costs results in a greater expansion of labor demand. In consequence, both the employment and the wage effect of more intensive social comparisons are positive. This shows that social comparisons counteract the negative employment effects of monopsonistic market power and that this may also be true with regard to wages.

The analysis of two specific utility functions clarifies that preferences which induce lower wages in a competitive setting need not necessarily have the same consequences in an imperfectly competitive market. Furthermore, Goerke and Neugart (2017) show for a Salop (1979)-type oligopsonistic labor market that wages rise with the intensity of social comparisons which are characterized by $U_{c^r} < 0$. Accordingly, the wage response to social comparisons also depends on the precise nature of the labor market imperfection.

4 Normative Analysis

In this section we move beyond the confines of a positive analysis in which we have compared two market outcomes. We inquire whether and under which conditions the two distortions - monopsony and preferences featuring social comparisons - balance out.In order answer this question, we assume that a social planner maximizes utility of the representative individual. Thus, given our assumptions of homogeneous workers and the redirection of the monopsonist's profits to them, the social planner's objective is given by $U = U(f(L), f(L), L)$.

4.1 Optimal versus undistorted market outcome

The setting we analyze is featuring two distortions: Market power by the employer and a consumption externality due to social comparisons. In order to answer the question under which conditions the two deviations from a first-best situation balance out, we need to determine an according benchmark. The subsequent Proposition states the condition which has to be fulfilled such that the outcome in a competitive market without any distortions represents this point of reference. Denoting the marginal utility from consumption in the absence (presence) of social comparisons by $U_c(\gamma = 0)$ ($U_c(\gamma \neq 0)$), we have:

Proposition 2. *A social planner confronted with two distortions, a monopsony and social comparisons, will only set an employment level that equals the one that results in a competitive market in the absence of social comparisons if* $\frac{U_c(\gamma=0)-U_c(\gamma\neq0)}{U_{c^r}} = 1$.

Proof. Maximizing $W = U(f(L), f(L), L)$ with respect to L, yields as first-order condition in the presence of social comparisons ($\gamma \neq 0$):

$$\frac{dW}{dL}_{\gamma\neq0} = (U_c(\gamma \neq 0) + U_{c^r})f'(L) + U_L(L) = 0. \tag{25}$$

Denote the resulting employment level by $L^{opt,\gamma\neq 0}$. The second-order condition holds, given the assumptions with regard to utility and the production function, $f''(L), U_{cc}, U_{c^r c^r} < 0$, $U_{LL} \leq 0$.

In the absence of any distortions, the outcome in a competitive market will be Pareto-efficient. If, in addition, there are no distributional effects of the market outcome on welfare, as it is the case in the present setting, the employment level resulting in a competitive market without distortions is equivalent to the social planner's choice, assuming $\gamma = 0$. Hence, we can determine the market outcome in the absence of distortions by maximizing welfare for $\gamma = 0$. The resulting employment level, $L^{opt,\gamma=0}$, is determined by:

$$\frac{dW}{dL}_{\gamma=0} = U_c(\gamma = 0)f'(L) + U_L(L) = 0 \tag{26}$$

Since $U_L(L)$ and $f'(L)$ are the same for a given employment level, the social planner's choice in the presence of social comparisons and the outcome in a competitive market in the absence of social comparisons will coincide ($L^{opt,\gamma\neq 0} = L^{opt,\gamma=0}$), if $U_c(\gamma \neq 0) + U_{c^r} = U_c(\gamma = 0)$. If $U_c(\gamma \neq 0) + U_{c^r} > U_c(\gamma = 0)$ holds, $L^{opt,\gamma\neq 0}$ will exceed $L^{opt,\gamma=0}$, as W is strictly concave in L. □

The intuition (for $\gamma > 0$) is as follows: The social marginal utility from consumption in the presence of social comparisons differs from the respective (individual and social) marginal utility in the absence of such effects for three reasons: First, employees are working more hours, raising consumption. This, ceteris paribus, decreases the marginal utility from consumption, given the strict concavity of U. Second, the marginal utility from own consumption is affected by the reference level of consumption and will be higher in the presence of social comparisons, as $U_{cc^r} > 0$. Third, the social planner takes into account that an expansion of labor supply not only alters consumption of the individual under consideration, but also the reference level. This, ceteris paribus, lowers the gain from working and consuming more. If the sum of all effects is positive and, therefore, the gain from additional consumption is greater in the presence of social comparisons than in an undistorted market without such comparison effects, optimal labor supply and employment will be higher.

Considering our particular utility functions, we may note that for the difference specification of utility (15) we have $U_c(\gamma \neq 0) = (c^{-\beta})/(1-\gamma)$ and $U_{c^r} = -\gamma(c^{-\beta})/(1-\gamma)$ for $c = c^r = f(L)$. These derivatives imply that $U_c(\gamma = 0) - U_c(\gamma \neq 0) = U_{c^r}$ holds. For the formulation of preferences (16) proposed by Gali (1994), we have $U_c(\gamma \neq 0) = c^{-\beta+\gamma(\beta-1)}$ and $U_{c^r} = -\gamma c^{-\beta+\gamma(\beta-1)}$. Accordingly, the ratio defined in Proposition (2) is given by:

$$\frac{U_c(\gamma = 0) - U_c(\gamma \neq 0)}{U_{c^r}} = \frac{c^{\gamma(\beta-1)} - 1}{\gamma c^{\gamma(\beta-1)}}. \tag{27}$$

This ratio will only be unity for particular values of output and consumption, but will not

generally attain this value.

The two starting points of our investigations are the predictions that, first, employment in monopsony declines below the first-best, competitive level while, second, KUJ preferences induce excessive employment. The resulting question is, under which conditions the two effects neutralize each other. Proposition (2) clarifies that even if the two effects just balance out and the outcome results which would prevail in a competitive setting without social comparisons, this employment level will only be first-best for particular utility functions. The reason is that the social planner, on the one hand, incorporates that individual preferences feature social comparisons. On the other hand, she takes the externality of such preferences into account. The two effects balance out for certain specifications of utility, namely those for which the marginal utility from own and reference consumption is proportional to own consumption.A straightforward policy implication is that an employment level of a competitive, undistorted market cannot, in general, guide policymaking. A policymaker who tries to accomplish an employment level of the competitive market may only for rather special preferences maximize welfare as we defined it.

4.2 Wage regulation

In the previous section, we inquire which level of employment would be chosen if the social planner could determine employment directly. This employment level may be higher or lower than the level chosen by the monopsonist. Typically, analyses of monopsonies have considered settings in which a social planner or government does not have the ability to determine employment directly, but can establish the price of labor, while the firm continues to choose the number of employees in a profit-maximizing manner (Boal and Ransom, 1997; Manning, 2003). In accordance with this approach, we now assume that the social planner can only fix the wage. In line with our argument from above this may be a minimum wage or a wage cap. Our main insight is given by:

Proposition 3. *Let the ratio* $-\frac{U_c r}{U_c(\gamma \neq 0)}$ *be denoted by* γ*. A social planner who can affect welfare by fixing the wage, will set it at higher level than the monopsonist if*

$$1 - \gamma > \frac{\epsilon}{1+\epsilon}. \tag{28}$$

Proof. We know that the employment level resulting in monopsony, denoted by L^{Mon}, is implicitly defined by eq. (9). Moreover, labor supply is given eq. (6). Combining both equations, yields:

$$f'(L^{Mon})\frac{\varepsilon}{1+\varepsilon} = -\frac{U_L(L^{Mon})}{U_c(\gamma \neq 0)}. \tag{29}$$

Evaluating the social planner's choice as defined in (25) at $L = L^{Mon}$ yields:

$$\frac{dW}{dL}_{\gamma\neq 0, L=L^{Mon}} = (U_c(\gamma \neq 0) + U_{c^r}) f'(L^{Mon}) + U_L(L^{Mon})$$

$$= -\frac{U_L(L^{Mon})}{U_c(\gamma \neq 0)} \left[U_c(\gamma \neq 0) + U_{c^r}\right] \frac{1+\varepsilon}{\varepsilon} + U_L(L^{Mon})$$

$$= U_L(L^{Mon}) \left[-\frac{1+\varepsilon}{\varepsilon} \left(1 + \frac{U_{c^r}}{U_c(\gamma \neq 0)}\right) + 1\right]. \tag{30}$$

Assume that $\frac{U_{c^r}}{U_c(\gamma\neq 0)} = -\gamma$. The social planner's objective will, hence, be maximized by the market outcome if $1-\gamma = \epsilon/(1+\epsilon)$ and the social planner will want to increase (reduce) employment above (below) L^{Mon} if $(1-\gamma)(1+\epsilon)/\epsilon > (<)\, 1$ holds, given $U_L < 0$. Employment can be increased by (marginally) raising the wage above the level chosen by the monopsonist. Therefore, if $(1-\gamma)(1+\epsilon)/\epsilon > 1$ holds, the social planner will raise the wage. If, however, the reverse inequality applies, the social planner will restrict labor supply by setting a wage below the level chosen by the monopsonist. □

The intuition is as follows: Employment in monopsony in the absence of other distortions is too low because marginal costs exceed the wage by the factor $(1+\epsilon)/\epsilon$. The labor supply effect of not taking into account social comparisons if preferences exhibit jealousy ($\gamma > 0$) is due to the increase in the marginal rate of substitution from $U_L/U_c(\gamma = 0)$ to $U_L/(U_c(\gamma \neq 0) + U_{c^r})$. Assume $\frac{U_{c^r}}{U_c(\gamma\neq 0)} = -\gamma$, which is fulfilled for specifications (15) and (16), and also for more general descriptions of preferences $U = U(c - \gamma c^r, L)$ and $U = U(c/\left(c^r\right)^\gamma, L)$.[4] In consequence, the marginal rate of substitution equals $U_L/(U_c(\gamma \neq 0)(1-\gamma))$. The two distortions will exactly neutralize each other if the labor demand impact of higher costs, $(1+\epsilon)/\epsilon$, equals the labor supply effect of ignoring social comparisons, measured by $1/(1-\gamma)$. If the cost impact is higher, i.e. if $(1+\epsilon)/\epsilon > 1/(1-\gamma)$, the social planner will want to expand employment. In a monopsony this is feasible by raising the wage because a (small) general wage increase will actually lower the marginal cost of employment.

In a "standard" monopsony a minimum wage slightly above the level set by the monopsonist will always raise employment and welfare, as defined above. Our result shows that this will not generally be the case if workers exhibit social preferences. More precisely, a wage increase will only enhance employment and raise welfare if the extent of monopsony power outweighs the strength of social comparisons. Moreover, Proposition 3 establishes an easily observable condition which helps to ascertain whether a minimum wage or a wage cap are welfare-enhancing.

Empirically, there is evidence that the parameter γ is somewhat less than 0.5. Wendner

[4] Note that the parameter γ, $\gamma \equiv -\frac{U_{c^r}}{U_c(\gamma\neq 0)}$, measuring the strength of social comparisons, is equivalent to the (negative of the) degree of positionality as used by Aronsson and Johansson-Stenman in a series of papers (see, e.g., Aronsson and Johansson-Stenman, 2008, 2010), given their specification of utility as, $u = u(c, L, c - c^r)$.

and Goulder (2008) summarize findings from survey-based studies and conclude that γ is likely to be greater than 0.2 but less than 0.4. This is consistent with findings based on panel data by Alvarez-Cuadrado et al. (2016) who estimate a value of γ around 0.3. Estimates of the wage elasticity of labor supply vary widely across labor markets and countries (Manning, 2011). Estimates as low as 0.1 (cf. Dube et al., 2018) seem to be an exception, while values of ε of unity or more in monoposonistic settings appear to be more common. Assuming, therefore, $\gamma = 0.33$ and $\epsilon = 1$ suggests that the monopoly distortion dominates, such that a minimum wage will enhance welfare. However, if the intensity of social comparisons is somewhat higher and exceeds $\gamma = 0.5$ or, alternatively, the labor supply elasticity is greater than $\epsilon = 2$, the policy implications are reversed and a wage cap will benefit society. This ambiguity clarifies that the combined analysis of social comparisons and monopsony not only satisfies academic curiosity, but is also of utmost policy relevance.

4.3 Taxes and subsidies

While a restriction on the level of wages set by the monopsonist is one feasible instrument to affect employment and to increase welfare, there is ample evidence that minimum wages are not always paid. Moreover, both the monopsonist and individual employees have incentives not to adhere to wage regulations.[5] Hence, the social planner may want to employ other means to enhance the society's payoff. This could be taxes or subsidies. Taxes which internalize the externalities due to social comparisons have been analyzed comprehensively, generally assuming competitive labor markets (see, inter alia, Duesenberry, 1949; Boskin and Sheshinski, 1978; Persson, 1995; Ireland, 1998; Corneo, 2002; Gómez, 2008; Dodds, 2012; Aronsson and Johansson-Stenman 2010; 2013; 2018; Eckerstorfer, 2014 and Wendner, 2014). Moreover, there are some contributions which establish the efficiency impact of wage or employment subsidies (taxes) in monopsonistic labor markets. Manning (2004) ascertains the effects of a progressive tax system in a general equilibrium search and matching framework. Cahuc and Laroque (2014) analyze taxation in a monopsonistic labor market that hosts heterogeneous workers, and Strobl and Walsh (2007) allow firms to choose wages and hours of work when examining the effects of subsidies. However, the impact of both distortions - monopsony and social comparisons - on optimal tax policy has not been considered.

If social comparisons characterize workers in a monopsonistic labor market, it is not obvious a priori, whether a tax or subsidy enhances welfare and can help the social planner to achieve the optimal employment outcome. Monopsonistic market power requires the latter, social comparisons which enhance labor supply necessitate the former. In order to consider this issue, we assume that the firm pays a payroll tax, t, $t > 0$, or receives an according subsidy, $t < 0$. Profits can, hence, be expressed as:

[5] See the evidence surveyed in Danziger (2010) who then builds a model to show that imperfectly enforced minimum wages in a competitive labor market will induce small firms to become monopsonists.

$$\pi \quad = \quad f(L(w,\gamma)) - (1+t)wL(w,\gamma). \tag{31}$$

Since the considerations of individuals are unaffected by a change in the monopsonist's cost, the features of the labor supply curve are the same as outlined in Section 2.2. Any tax receipts shall be returned to the firm or individuals in a lump-sum manner. Similarly, in case of t being a subsidy, a profit tax or another non-distortionary means of raising revenue is assumed to balance the government's budget. Consequently, the only impact of the tax is the change in the firm's wage choice.

Maximization of profits as defined in (31), possibly amended to incorporate profit taxation or lump-sum payments, yields as first-order condition

$$f'(L^{Mon,t}) - w(1+t)\frac{1+\epsilon}{\epsilon} = 0, \tag{32}$$

where $L^{Mon,t}$ denotes the employment level (implicitly) chosen by the monopsonist in the presence of a payroll tax or subsidy. Combining (32) with the outcome of the individual optimization (cf. eq. (2)), we obtain:

$$f'(L^{Mon,t}) = -(1+t)\frac{1+\epsilon}{\epsilon}\frac{U_L(L^{Mon,t})}{U_c(\gamma \neq 0)}. \tag{33}$$

The socially optimal outcome is defined by eq. (25). Evaluating this derivative at the market outcome, $L^{Mon,t}$, and using our notation of $\frac{U_{c^r}}{U_c(\gamma \neq 0)} = -\gamma$, we obtain:

$$\begin{aligned} \frac{dW}{dL}_{\gamma \neq 0, L=L^{Mon,t}} &= -(U_c(\gamma \neq 0) + U_{c^r})(1+t)\frac{1+\epsilon}{\epsilon}\frac{U_L(L^{Mon,t})}{U_c(\gamma \neq 0)} + U_L(L^{Mon,t}) \qquad (34) \\ &= U_L(L^{Mon,t})\left[1 - (1-\gamma)(1+t)\frac{1+\epsilon}{\epsilon}\right]. \end{aligned}$$

The expression in square brackets will be zero, such that welfare is maximized if

$$t^{opt} = \frac{1}{1-\gamma}\left[\frac{\epsilon}{1+\epsilon} - (1-\gamma)\right]. \tag{35}$$

The optimal tax or subsidy rate will be zero if the two distortions just balance out and the wage set by the monopsonist induces the optimal employment level. If $1-\gamma < \epsilon/(1+\epsilon)$, the impact of social comparisons dominates the consequences of market power and t^{opt} will be positive. In a world in which the labor market is competitive ($\epsilon \to \infty$), the optimal tax equals $t^{opt}(\epsilon \to \infty) = \gamma/(1-\gamma) = -U_{c^r}/(U_c(\gamma \neq 0) + U_{c^r}) > 0$. If the effects of social comparisons are relatively weak, and $1-\gamma < \epsilon/(1+\epsilon)$, the monopsonist will be subsidized. In the limiting

case of preferences exhibiting no social comparisons, $t^{opt}(\gamma = 0) = -1/(1+\epsilon) < 0$.

Alternatively, the tax could be imposed on workers, such that their budget constraint, in the absence of any transfer or lump-sum tax, reads $wL(1-\tau) + \pi - c = 0$. In this case, the labor supply elasticity also depends on the tax ($\tau > 0$) or subsidy ($\tau < 0$) rate, implying that $\epsilon = \epsilon(w, \gamma, \tau)$. Proceeding in the same manner as in the derivation of t^{opt}, the optimal income tax or subsidy rate is (implicitly) defined by:

$$\tau^{opt} = \frac{1+\epsilon(\tau^{opt})}{\epsilon(\tau^{opt})}\left[\frac{\epsilon(\tau^{opt})}{1+\epsilon(\tau^{opt})} - (1-\gamma)\right]. \tag{36}$$

Once again, the optimal tax rate, τ^{opt}, will be positive (negative) if $1-\gamma < (>)\epsilon/(1+\epsilon)$. In the absence of labor market imperfections, the optimal tax rate equals $\tau^{opt}(\epsilon \to \infty) = \gamma = -U_{c^r}/U_c(\gamma \neq 0) > 0$.[6]

We can summarize the considerations of this subsection in:

Proposition 4. *Let the ratio* $-\frac{U_{c^r}}{U_c(\gamma \neq 0)}$ *be denoted by* γ. *A social planner who can affect welfare by taxing or subsidizing either labor costs or wage income, will set the tax/subsidy rate on labor costs in accordance with* (35) *and the tax/subsidy rate on wage income in line with* (36)*, in order to maximize welfare.*

Proof. Follows from the above. □

Accordingly, in our simple setting either a minimum wage or a subsidy can raise employment if it is below the optimal level. Alternatively, a tax or a wage cap are both equally suitable as policy instruments if social comparisons of the KUJ-type dominate the monopsony distortion and employment needs to be reduced, in order to enhance welfare.

5 Admiration

Our analysis has thus far focused on jealous individuals. Such type of preferences induce workers to supply labor excessively. Hence, jealousy may counteract the decline in employment due to monopsony power. Nonetheless, it is worthwhile to also consider the case of admiration. Such preferences imply that utility is an increasing function of reference consumption, $U_{c^r} > 0$ (Dupor and Liu, 2003). In our setting, this is equivalent to individuals exhibiting Running-away-from-the-Joneses (RAJ) preferences. Formally, admiration implies that $\gamma < 0$ holds in our specifications of utility such that $U_{cc^r}, U_{c\gamma} < 0$. From eq. (7), $L_\gamma < 0$ results. Analogously to Proposition 1 we can now state that more intense social comparisons, that is, a rise in

[6] See, e.g., Persson (1995), Ljungqvist and Uhlig (2000), Dupor and Liu (2003), Aronsson and Johansson-Stenman (2010; 2013; 2018). From the results obtained by Liu and Turnovsky (2005) and Alvarez-Cuadrado (2007) we can derive comparable expressions if taking into account that they incorporate more than one tax rate.

the value of γ, will raise the wage if the labor supply elasticity, ϵ, does not decline with γ, $(\partial\epsilon/\partial\gamma \geq 0)$, and does not increase with employment $(\partial\epsilon/\partial L \leq 0)$. These requirements ensure that the monopsonist's marginal cost curve will shift downwards in the wage-employment space. Furthermore, more pronounced social comparisons will reduce employment in the presence of admiration if either the wage does not rise or $\partial\epsilon/\partial w \leq 0$ and $\partial\epsilon/\partial\gamma \leq 0$ hold.

Inspection of Proposition 2 reveals that its content is independent of the sign of γ and, thus, of the nature of social comparisons. Therefore, it applies to the case of admiration, as well. This is because the proposition formulates a condition in which the undistorted market equilibrium in the absence of social comparisons constitutes the benchmark for economic policy. The suitability of this benchmark depends on the nature of preferences, in that it derives a condition under which internalizing the distortion due to altering other individuals' payoffs $(U_{c^r} \neq 0)$ is just balanced by the alteration in the marginal utility in consumption due to social comparisons $(U_c(\gamma = 0) - U_c(\gamma \neq 0))$. Put differently, the important aspect is whether preferences are (specified) such that the effect of undertaking social comparisons is equivalent to the impact of internalizing the consumption externality. In this case, the competitive outcome in a world without distortions constitutes the first-best. It is, however, irrelevant for the characterization of the benchmark, if individuals consume too much or too little, i.e. if the consumption externality is due to jealousy or admiration and, thus, either positive or negative.

In contrast, Propositions 3 and 4 yield clear-cut predictions in the case of admiration. If $\gamma < 0$ holds, $(1 - \gamma)(1 + \varepsilon)/\varepsilon > 1$ results, and the social planner will set a wage above the level preferred by the monopsonist, respectively subsidize labor. In this case, the government will always want to raise employment because both the monopsony and the social comparison effect lower employment to below the first-best. Thus, admiration strengthens the case for a minimum wage and wage or labor cost subsidies, the rates of which increase with the strength of social comparisons.

6 Conclusions

There is ample evidence for the existence of non-competitive labor markets on the one hand, and social comparisons on the other hand. Thus far, the consequences of the simultaneous occurrence of the two distortions on wages, employment, and potential government interventions have hardly been explored.

Our analysis reveals the conditions for the wage and employment effects of social comparisons in monopsony. As the marginal wage costs of a monopsonist depend on the labor supply elasticity it faces, the effects can be determined if we know the direct impact of social comparisons on the labor supply elasticity, and the indirect consequences via changes in equilibrium wage and employment levels. We derive fairly general conditions on the labor supply

elasticity to the firm that allow us to sign the total impact, i.e. the sum of the direct and indirect effects, of more intense social comparisons on wages and employment. We provide examples for these more general conditions by deriving the relevant variations for two specific utility functions. As we let workers compare their consumption in absolute terms using a utility function suggested by Ljungqvist and Uhlig (2000), we find that employment increases in the prevalence of social comparisons, while wages decline. Using a utility function as in Gali (1994) we derive for a case of relative comparisons that the employment and the wage effect of more intensive social comparisons will both be positive if the production function is not too concave. We also address the welfare effects that the two potentially countervailing distortions have. Interestingly, a social planner will not necessarily suggest an employment level equal to the one in a competitive market without social comparisons. She will only do so for rather special properties on the marginal utility of a worker's own and reference consumption being fulfilled.

Our findings bear novel policy implications. A social planner who tries to achieve the optimal employment level by setting wages accordingly would not always employ a minimum wage. If the labor supply elasticity to the firm is sufficiently large, for a given prevalence of social comparisons, she would rather cap wages. Such a wage restriction will prevent the monopsonist from choosing employment in excess of the optimal level. This will be the case if the distortion due to social comparisons is strong enough. Analogously, we find conditions for an optimal use of either subsidies, or alternatively, taxes in a monopsony with social comparisons. Given the evidence that the labor supply elasticity to a monopsonist varies with the business cycle (Hirsch et al., 2018), this implies that optimal policy may alternate between minimum and maximum wages, or positive and negative tax rates, respectively. Such challenges to determining optimal wage or tax levels would be augmented if also the intensity of social comparisons varied with the economic situation.

In sum, it occurs to us that interesting consequences arise from social preferences (Thorstein Veblen) in imperfectly competitive labor markets (Joan Robinson) with respect to wages and employment, and that these call for quite notable modifications on how to think about the role of minimum wages (George J. Stigler) and other tools of government interventions, such as taxes and subsidies.

Appendix

Wage effect for Example 2:

Aggregate labor supply to the monopsonist (for $c = c^r = L^m$) follows from eq. (21). Differentiating, we obtain

$$z_w = 1 \tag{37}$$

$$z_L = -m\left(\gamma(1-\beta)+\beta\right)AL^{m(\gamma(1-\beta)+\beta)-1} < 0 \tag{38}$$

$$z_\gamma = -AL^{m(\gamma(1-\beta)+\beta)}ln(L)m(1-\beta) > 0 \tag{39}$$

if $L > 1$.

From the optimality condition for the firm (23) we get

$$b_w = -\frac{1+\epsilon}{\epsilon} < 0 \tag{40}$$

$$b_L = m(m-1)L^{m-2} < 0 \tag{41}$$

and

$$b_\gamma = w\frac{\epsilon_\gamma}{\epsilon^2} > 0. \tag{42}$$

We want to determine the sign of (24). After inserting terms we get for the determinant

$$z_w b_L - b_w z_L =$$

$$= m(m-1)L^{m-2} - \left(\frac{1+\epsilon}{\epsilon}\right)\left(m\left(\gamma(1-\beta)+\beta\right)AL^{m(\gamma(1-\beta)+\beta)-1}\right) < 0. \tag{43}$$

Furthermore, the numerator can be written as

$$-z_\gamma b_L + b_\gamma z_L =$$

$$= \left(AL^{m(\gamma(1-\beta)+\beta)}ln(L)m(1-\beta)\right)m(m-1)L^{m-2} - w\frac{\epsilon_\gamma}{\epsilon^2}\left(m\left(\gamma(1-\beta)+\beta\right)AL^{m(\gamma(1-\beta)+\beta)-1}\right). \tag{44}$$

Substitution of elasticities and making use of $z = 0$ yields after simplifying terms

$$-z_\gamma b_L + b_\gamma z_L =$$

$$= m(1-\beta)\left(\left(AL^{m(\gamma(1-\beta)+\beta)+m-2}ln(L)\right)m(m-1) + \left(m\left(\gamma(1-\beta)+\beta\right)A^2L^{2m(\gamma(1-\beta)+\beta)-1}\right)\right). \tag{45}$$

For this expression to become negative (so that $\frac{dw}{d\gamma} > 0$) we need to have

$$mAL^{m(\gamma(1-\beta)+\beta)+m-2}\left(ln(L)(m-1) + \left(\gamma(1-\beta)+\beta\right)AL^{m(\gamma(1-\beta)+\beta)-m+1}\right) > 0 \tag{46}$$

which will be fulfilled if the first term in brackets drops out, i.e. for $m \to 1$.

References

Alvarez-Cuadrado, F. (2007): "Envy, leisure, and restrictions on working hours," *Canadian Journal of Economics/Revue canadienne d'économique*, 40, 1286–1310.

Alvarez-Cuadrado, F., J. M. Casado, and J. M. Labeaga (2016): "Envy and habits: panel data estimates of interdependent preferences," *Oxford Bulletin of Economics and Statistics*, 78, 443–469.

Aronsson, T. and O. Johansson-Stenman (2008): "When the Joneses' consumption hurts: Optimal public good provision and nonlinear income taxation," *Journal of Public Economics*, 92, 986–997.

——— (2010): "Positional concerns in an OLG model: Optimal labor and capital income taxation," *International Economic Review*, 51, 1071–1095.

——— (2013): "Conspicuous leisure: Optimal income taxation when both relative consumption and relative leisure matter," *The Scandinavian Journal of Economics*, 115, 155–175.

——— (2014): "Positional preferences in time and space: Optimal income taxation with dynamic social comparisons," *Journal of Economic Behavior and Organization*, 101, 1–23.

——— (2015): "Keeping up with the Joneses, the Smiths and the Tanakas: On international tax coordination and social comparisons," *Journal of Public Economics*, 131, 71–86.

——— (2018): "Paternalism against Veblen: Optimal taxation and non-respected preferences for social comparisons," *American Economic Journal: Economic Policy*, 10, 39–76.

Azar, J. A., I. Marinescu, M. I. Steinbaum, and B. Taska (2018): "Concentration in US labor markets: Evidence from online vacancy data," National Bureau of Economic Research Working Paper 24395.

Boal, W. M. and M. R. Ransom (1997): "Monopsony in the labor market," *Journal of Economic Literature*, 35, 86–112.

Boskin, M. J. and E. Sheshinski (1978): "Optimal redistributive taxation when individual welfare depends upon relative income," *The Quarterly Journal of Economics*, 589–601.

Bowles, S. and Y. Park (2005): "Emulation, inequality, and work hours: Was Thorsten Veblen right?" *The Economic Journal*, 115, F379–F412.

Cahuc, P. and G. Laroque (2014): "Optimal taxation and monopsonistic labor market: does monopsony justify the minimum wage?" *Journal of Public Economic Theory*, 16, 259–273.

Chang, J.-j., C.-y. Liu, and W.-n. Wang (2018): "Conspicuous consumption and trade unionism," *Journal of Macroeconomics*, 57, 350–366.

Choudhary, M. A. and P. Levine (2006): "Idle worship," *Economics Letters*, 90, 77–83.

Clark, A. E. and A. J. Oswald (1998): "Comparison-concave utility and following behaviour in social and economic settings," *Journal of Public Economics*, 70, 133–155.

Clark, A. E., C. Senik, and K. Yamada (2017): "When experienced and decision utility concur: The case of income comparisons," *Journal of Behavioral and Experimental Economics*, 70, 1–9.

Corneo, G. (2002): "The efficient side of progressive income taxation," *European Economic Review*, 46, 1359–1368.

Danziger, L. (2010): "Endogenous monopsony and the perverse effect of the minimum wage in small firms," *Labour Economics*, 17, 224–229.

Desiraju, R. and D. E. M. Sappington (2007): "Equity and adverse selection," *Journal of Economics & Management Strategy*, 16, 285–318.

Dodds, S. (2012): "Redistributive taxation with heterogeneous relative consumption concerns," *Canadian Journal of Economics/Revue canadienne d'économique*, 45, 220–246.

Dube, A., J. Jacobs, S. Naidu, and S. Suri (2018): "Monopsony in online labor markets," National Bureau of Economic Research Working Paper 24416.

Duesenberry, J. S. (1949): *Income, saving, and the theory of consumer behavior*, Harvard University Press.

Dupor, B. and W.-F. Liu (2003): "Jealousy and equilibrium overconsumption," *The American Economic Review*, 93, 423–428.

Eckerstorfer, P. (2014): "Relative consumption concerns and the optimal tax mix," *Journal of Public Economic Theory*, 16, 936–958.

Frank, R. H. (1984): "Are workers paid their marginal products?" *The American Economic Review*, 74, 549–571.

——— (2008): "Should public policy respond to positional externalities?" *Journal of Public Economics*, 92, 1777–1786.

Gali, J. (1994): "Keeping up with the Joneses: Consumption externalities, portfolio choice, and asset prices," *Journal of Money, Credit and Banking*, 26, 1–8.

Goerke, L. and I. Hillesheim (2013): "Relative consumption, working time, and trade unions," *Labour Economics*, 24, 170–179.

Goerke, L. and M. Neugart (2017): "Social comparisons in oligopsony," *Journal of Economic Behavior and Organization*, 141, 196–209.

Goerke, L. and M. Pannenberg (2015): "Direct evidence for income comparisons and subjective well-being across reference groups," *Economics Letters*, 137, 95–101.

Gómez, M. A. (2008): "Consumption and leisure externalities, economic growth and equilibrium efficiency," *Scottish Journal of Political Economy*, 55, 227–249.

Grodner, A., T. J. Kniesner, and J. A. Bishop (2011): "Social interactions in the labor market," *Foundations and Trends® in Microeconomics*, 6, 265–366.

Guo, J.-T. (2005): "Tax policy under keeping up with the Joneses and imperfect competition," *Annals of Economics and Finance*, 6, 25–36.

Hirsch, B., E. J. Jahn, and C. Schnabel (2018): "Do employers have more monopsony power in slack labor markets?" *Industrial and Labor Relations Review*, 71, 676–704.

Ireland, N. J. (1998): "Status-seeking, income taxation and efficiency," *Journal of Public Economics*, 70, 99–113.

——— (2001): "Optimal income tax in the presence of status effects," *Journal of Public Economics*, 81, 193–212.

Keynes, J. M. (1936): *The general theory of interest, employment and money*, London: Macmillan.

Liu, W.-F. and S. J. Turnovsky (2005): "Consumption externalities, production externalities, and long-run macroeconomic efficiency," *Journal of Public Economics*, 89, 1097–1129.

Ljungqvist, L. and H. Uhlig (2000): "Tax policy and aggregate demand management under catching up with the Joneses," *The American Economic Review*, 90, 356–366.

Luttmer, E. F. (2005): "Neighbors as negatives: Relative earnings and well-being," *The Quarterly Journal of Economics*, 120, 963–1002.

Manning, A. (2003): *Monopsony in motion: Imperfect competition in labor markets*, Princeton University Press.

——— (2004): "Monopsony and the efficiency of labour market interventions," *Labour Economics*, 11, 145–163.

——— (2011): "Imperfect competition in the labor market," in *Handbook of Labor Economics*, ed. by D. Card and O. Ashenfelter, Elsevier, vol. 4b, 973–1041.

Marx, K. (1977): "Wage Labour and Capital (1849)," in *Collected Works*, ed. by K. Marx and F. Engels, Moscow: Progress Publishers.

Mauleon, A. and V. Vannetelbosch (2010): "Market integration and strike activity," *Journal of International Economics*, 81, 154–161.

Mauleon, A., V. Vannetelbosch, and C. Vergari (2014): "Unions' relative concerns and strikes in wage bargaining," *Bulletin of Economic Research*, 66, 374–383.

Mauleon, A. and V. J. Vannetelbosch (2003): "Market competition and strike activity," *International Journal of Industrial Organization*, 21, 737–758.

Mujcic, R. and P. Frijters (2013): "Economic choices and status: measuring preferences for income rank," *Oxford Economic Papers*, 65, 47–73.

——— (2015): "Conspicuous consumption, conspicuous health, and optimal taxation," *Journal of Economic Behavior and Organization*, 111, 59–70.

Nelson, P. (1973): "The elasticity of labor supply to the individual firm," *Econometrica*, 853–866.

Neumark, D. and A. Postlewaite (1998): "Relative income concerns and the rise in married women's employment," *Journal of Public Economics*, 70, 157–183.

Park, Y. (2010): "The second paycheck to keep up with the Joneses: Relative income concerns and labor market decisions of married women," *Eastern Economic Journal*, 36, 255–276.

Pérez-Asenjo, E. (2011): "If happiness is relative, against whom do we compare ourselves? Implications for labour supply," *Journal of Population Economics*, 24, 1411–1442.

Persson, M. (1995): "Why are taxes so high in egalitarian societies?" *The Scandinavian Journal of Economics*, 569–580.

Pigou, A. C. (1903): "Some remarks on utility," *The Economic Journal*, 13, 58–68.

Robinson, J. (1933): *The economics of imperfect competition*, London: Macmillan, reprint 1950.

Salop, S. C. (1979): "Monopolistic competition with outside goods," *The Bell Journal of Economics*, 10, 141–156.

Sandmo, A. (1994): "Monopsonistic wage discrimination, incentives and efficiency," *Labour Economics*, 1, 151–170.

Schor, J. B. (1991): *The overworked American: The unexpected decline of leisure*, New York: Basic Books.

Senik, C. (2009): "Direct evidence on income comparisons and their welfare effects," *Journal of Economic Behavior and Organization*, 72, 408–424.

Smith, A. (1776): *An Inquiry Into The Nature And Causes Of The Wealth of Nations*, Basil.

Stigler, G. J. (1946): "The economics of minimum wage legislation," *The American Economic Review*, 36, 358–365.

——— (1963): "Reviewed Work(s): Economic Philosophy by Joan Robinson," *Journal of Political Economy*, 71, 192–193.

Strobl, E. and F. Walsh (2007): "Dealing with monopsony power: Employment subsidies vs. minimum wages," *Economics Letters*, 94, 83–89.

Sullivan, D. (1989): "Monopsony power in the market for nurses," *Journal of Law and Economics*, 32, S135–S178.

Veblen, T. (1899): *The theory of the leisure class*, A Penn State Electronic Classics Series Publication, published in 2003.

von Siemens, F. A. (2010): "Heterogeneous social preferences, screening, and employment contracts," *Oxford Economic Papers*, 63, 499–522.

——— (2012): "Social preferences, sorting, and competition," *The Scandinavian Journal of Economics*, 114, 780–807.

Wendner, R. (2014): "Ramsey, Pigou, heterogeneous agents, and nonatmospheric consumption externalities," *Journal of Public Economic Theory*, 16, 491–521.

Wendner, R. and L. H. Goulder (2008): "Status effects, public goods provision, and excess burden," *Journal of Public Economics*, 92, 1968–1985.

Woo, W. C. (2011): "Status and welfare under monopolistic competition," *Social Choice and Welfare*, 36, 227–239.

——— (2016): "Status goods and market powers," *German Economic Review*, 17, 26–35.