

CESifo CONFERENCES 2019

11th Norwegian-German Seminar on Public Economics

Munich, 6 – 7 December 2019

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4 SEPTEMBER 2018

ABSTRACT

Wage subsidies can be provided directly to the worker, or indirectly by subsidizing the employer; with reduced cost of labor, employers offer higher wages. The standard literature stipulates that this statutory incidence bears no implications for the economic incidence. We propose and test a mechanism by which indirect subsidies lead to higher social welfare. Studies show that workers reciprocate higher wages with higher effort. Indirect subsidies are shifted to the workers as higher wages, leading workers to reciprocate with higher effort and productivity. A controlled laboratory experiment supports our behavioral hypotheses and confirms the behavioral and welfare implications.

Keywords: wage subsidies, welfare, gift exchange, tax incidence, laboratory experiment.

JEL classification: C92, H21, H22, H53, J33

^{*}We thank Gary Charness, Raj Chetty, Dirk Krueger, David Laibson, Omer Moav, Andreas Pechl, Arno Riedl, Yona Rubinstein, Rupert Sausgruber, Jean-Robert Tyran, seminar participants at Bar-Ilan University, the Interdisciplinary Center Herzliya, Technical University of Munich, University of Vienna, Bank of Israel, and conference participants at the Economic Science Association International Meeting, Jerusalem, CESifo Behavioral Economics Area conference, the Incentives and Behavior change conference, Tel-Aviv, CESifo Employment and Social Protection Area conference, and the European Economic Association meeting in Cologne for useful comments and discussion. This research was supported by the ISRAEL SCIENCE FOUNDATION (grant No. 552/14).

1 INTRODUCTION

Wage subsidy programs constitute a major component of welfare systems in most OECD countries. These programs serve the purpose of poverty alleviation and redistribution. The federal Earned Income Tax Credit (EITC) program in the US provides a salient example. This program was first introduced in 1975, reflecting wide concerns about the efficacy of the negative income tax (NIT) system as a means to reduce poverty due to its inherent disincentive effects on labor market activity. Unlike the NIT system, which guarantees a minimum standard of living to everyone, the EITC is a refundable tax credit that is targeted at the working poor. In 2010, 25 million families benefited from the tax credit at the total cost to the federal government of \$61 billion (Tax Policy Center, 2013). The EITC program has gained much popularity in the public as it focuses on the ‘deserving poor’ class, namely individuals who participate in the labor market and exhibit efforts to make a living rather than taking the advantage of a generous welfare system (or, worse, engaging in misreporting in order to prove eligibility). Eissa and Hoynes (2011) provide a review of the voluminous empirical literature examining the labor-supply responses and the re-distributive implications of the EITC program.

The EITC program is essentially a wage subsidy given directly to the workers via the federal income tax system. Alternatively, wage subsidies to the working poor can be implemented by indirectly subsidizing their actual (or would be) employers. By doing so, the government can reduce the cost of labor faced by the employers and induce them to offer higher wage rates. Indirect subsidies typically take the form of a reduction in the employers’ portion of the payroll tax. These tax incentives are often targeted towards workers facing a high risk of unemployment such as low-earners, the young and the elderly.¹ The extent to which such indirect subsidy will shift to workers (the subsidy economic incidence) depends on the market structure, and in particular on the labor demand and labor supply elasticities. The standard literature stipulates the irrelevance of statutory incidence: the identity of the entity that is statutorily entitled for the subsidy bears no implications for the economic incidence, that is, who will actually gain from the subsidy. In contrast, we develop a theoretical argument

¹For a review of related policy reforms in OECD countries, see Saez, Schoefer, and Seim (2017) and the references therein.

introducing a novel channel by which indirect subsidies (IDS) may lead to an efficiency gain compared to direct subsidies (DS). We report on a laboratory experiment validating our behavioral assumption and confirming our conclusions in simple labor relationship.

Our theoretical analysis is rooted in the notions of fair wages and gift exchange. Akerlof (1982) analyzed employer-worker relations as a gift-exchange in which the employer gives a gift in the form of a fair wage (wages above the competitive equilibrium level) and the workers reciprocate with the gift of exerting higher effort than the minimum contractible levels (see also Akerlof and Yellen, 1988; Akerlof and Yellen, 1990). The insight driving our results is the following. Indirect subsidies are shifted to the worker as part of the wages paid by the employer. Thus, by reducing the cost of labor, indirect subsidies allow the employer to offer a fair wage, incentivizing the worker to increase voluntary effort and thereby overall productivity. Direct subsidies, on the other hand, are paid directly to the worker and do not enter the gift exchange relationship between the worker and the employer.

The welfare dominance of the indirect-subsidy regime over direct subsidization is premised on the labor market incompleteness. The inability to remunerate based on the observable (or ex-post verifiable) effort levels introduces a positive externality, not accounted for by the profit-maximizing employer, which implies that the wage rate and effort level set in the laissez-faire equilibrium are inefficiently low. Assuming, in line with our experimental evidence, that workers respond to the direct compensation received from the employer (excluding any direct subsidies provided by the government), rather than to the total compensation, implies that a direct subsidy scheme operates like a lump-sum transfer. As such, it induces a pure income effect, thereby affecting neither the choice of the worker nor that of the employer. In contrast, the indirect subsidy regime induces a substitution effect, as the employer shifts part of the subsidy to the worker, offering a higher wage rate that, in turn, yields a higher effort level. This serves to mitigate the distortion in the labor market and enhance welfare.

We ran a controlled laboratory experiment to test the assumptions underlying the theoretical analysis. We build on the bilateral gift exchange game first studied by Fehr et al. (1998), and introduce direct- and indirect-subsidy regimes. The results support the assumption that workers respond to the gross wages set by the employer. Furthermore, the experimental results are consistent with the

model predictions. We find that only part of the indirect subsidy is shifted from the employer to the worker, leading to lower net wages under indirect subsidies. Despite the lower net wages, workers choose higher effort levels under IDS (though the difference is not significant). When adjusting for the subsidy level, effort levels are substantially and significantly higher under IDS. Given the behavioral regularities observed in the experiment, our theoretical model predicts that switching from direct to indirect subsidies results in higher social welfare *at the same government expenditure*, that is, after adjusting for the partial shifting of subsidies.

The remainder of the paper is organized as follows. Section 2 reviews the related literature. Section 3 presents the theoretical analysis, followed by the normative analysis in Section 4. Sections 5 and 6 describe the experimental design and results, respectively, and Section 7 concludes.

2 RELATED LITERATURE

This paper brings together two strands of the literature. On one hand, we contribute to the literature testing statutory tax incidence equivalence. Our approach differs from the existing literature in that we do not test violations of theoretically predicted tax incidence irrelevance, but propose and test a new theory that predicts that behavioral and economic outcomes *are* sensitive to the tax liability side. On the other hand, we build on the experimental study of labor relations as gift exchange. To the best of our knowledge, the only other paper that tested tax side equivalence in a gift exchange environment is Riedl and Tyran (2005), discussed below.

Empirical studies have shown that statutory tax incidence equivalence predicted by theory does not necessarily hold in the laboratory or in the field. Examples include inclusive vs. exclusive taxes (Chetty, Looney, and Kroft, 2009; Feldman and Ruffle, 2015) and income vs. sales taxes (Blumkin, Ruffle, and Gannun, 2012; Riedl and Van Winden, 2012). Closer to the current research, several studies looked at the effect of the tax liability side on economic outcomes. Kerschbamer and Kirchsteiger (2000) looked at simple ultimatum bargaining, where a lump sum tax is levied either on the proposer or on the responder after reaching an agreement. The results show that the tax liability side influenced the economic outcome, with the tax tending to ‘stick where it lands’. Nonetheless,

other studies have found that the the tax liability side had no effect in competitive markets (Borck et al., 2002; Ruffle, 2005; Sausgruber and Tyran, 2005). However, even when the tax liability does not affect the economic outcomes, it may affect individual perceptions (Blumkin and Menirav, 2009), as reflected in support for taxation and subjective well being (Sausgruber and Tyran, 2005; Weber and Schram, 2017)

The experimental interest in labor relations as a gift exchange started with Fehr, Kirchsteiger, and Riedl (1993), who studied a market with excess labor supply and gift exchange. Their results established that employers offer wages that are significantly above the equilibrium prediction under the assumption of pure money maximizers; that workers exert effort beyond the minimum effort dictated by selfish preferences; and that higher wages lead to higher effort. In a follow up study, Fehr et al. (1998) tested whether the high wage offers observed in the market are driven by an attempt to attract workers or by the gift exchange effect. They found that behavior in a bilateral gift exchange game, in which an employer and a worker are exogenously matched, is similar to that observed in the gift exchange market of Fehr, Kirchsteiger, and Riedl (1993). A complete contracts market, in which workers who accept a wage offer are committed to exerting full effort, however, resulted in low wage offers and unemployment, showing that firm competition in itself can not explain the high wages observed in the gift exchange market.

Sundry studies followed up on these pioneering efforts, establishing the existence and robustness of reciprocal labor relations (e.g., Bellemare and Shearer, 2009; Brandts and Charness, 2004; Charness, 2004; Gneezy and List, 2006; Kube, Marechal, and Puppe, 2012; Kube, Maréchal, and Puppe, 2013; Maximiano, Sloof, and Sonnemans, 2007).² Closely related to our paper is the experiment by Riedl and Tyran (2005), who studied a gift exchange market with excess supply and a linear production function. Following Kerschbamer and Kirchsteiger (2000), Riedl and Tyran (2005) conjectured that the tax liability side affects the perceptions of social norms. If fairness perceptions dictate that the market side levied with the tax is also the one ought to pay the tax, then the tax liability side would affect the workers' reference point against which they judge the firm's generosity. Consequently, workers would respond differently to the same wages

²The field evidence for the existence of gift exchange in the workplace is mixed (Esteves-Sorenson, 2017). We return to this point in the conclusion.

under different tax regimes, and liability side equivalence breaks down. In their experiment, each employer-worker pair had to pay a specific (lump-sum) tax of 20 units. In different phases of the experiment the tax was levied on either the employer or the worker. Although effort and wages were strongly correlated, the effort levels were not significantly affected by the tax incidence.

Despite the similarities between the two studies, they differ in their motivation and hypotheses. Riedl and Tyran (2005) conjectured that the statutory incidence, by setting the reference point, affects the *workers'* perceptions and behavior. The employers' optimization is only affected indirectly, in that it takes this change in workers' behavior into consideration. In contrast, we suggest that employer-side subsidies (or taxes) affect the cost of labor, therefore altering the *employers'* optimal strategy, with the workers' strategy (conditional on the wages) remaining unchanged. The different theoretical analyses lead to different predictions. Riedl and Tyran's (2005) analysis predicts that tax liability side matters (even) for lump-sum tax, which was accordingly tested in their experiment. Our analysis predicts that statutory incidence irrelevance breaks down under proportional subsidies (or taxes), but holds in the environment studied by Riedl and Tyran (2005). As such, our theoretical contribution is able to explain the experimental results of both studies.

3 THEORETICAL MODEL

Consider a labor market with an equal number of firms and workers (each normalized to a unit measure with no loss in generality).³ Each firm can employ at most one worker and its output, denoted by x , is given by the following production function:

$$x = f(e),$$

where $f' > 0$, $f'' \leq 0$ and e denotes the level of (non-contractible) effort exerted by the hired worker.

The preferences of a typical worker are represented by the following utility

³The partial equilibrium framework with a fixed number of firms and workers will be the relevant setting for our experimental part. When the number of workers exceeds the number of firms, the analysis for the partial equilibrium case would remain unchanged. The case in which the number of firms exceeds the number of workers will be equivalent to the general equilibrium setting with free entry of firms, analyzed in section 3.1.

function:

$$u(w, e) = w - h(e) + \alpha v(w - \hat{w}, e), \quad (1)$$

where w denotes the total compensation paid by the firm to the worker, $h(e)$ denotes the cost of effort and $v(w - \hat{w}, e)$ represents the worker's psychological utility obtained from gift exchange, and $\hat{w} \geq 0$ denotes the worker's reference point, reflecting a benchmark level of 'fair remuneration'.

We assume that the cost of effort is strictly increasing and strictly convex; namely, $h'(e) > 0$ and $h''(e) > 0$, and further satisfy $h'(0) = 0$. We further assume that there exists some threshold level of compensation, $\hat{w} \geq 0$, such that $v(w - \hat{w}, e) = 0$ for all $w \leq \hat{w}$; and $\frac{\partial v}{\partial w} > 0$, $\frac{\partial v}{\partial e} > 0$, $\frac{\partial^2 v}{\partial w \partial e} > 0$, $\frac{\partial^2 v}{\partial e^2} \leq 0$ for all $w > \hat{w}$. Finally, we assume that $\alpha \geq 0$.⁴

Several remarks are in order. For tractability we invoke a quasi-linear functional form (which rules out income effects). The latter is common in the optimal tax literature (see, e.g., Diamond, 1998; Salanie, 2003). The first two terms in (1) are standard and represent the payoff to the worker from receiving the wage w , and exerting an effort e . The third term captures the double reciprocity pattern stressed by the literature on gift-exchange. Provided that the level of compensation crosses a certain threshold setting a benchmark level of 'fair-remuneration', \hat{w} , workers derive a strictly positive utility from exerting a positive effort level, which increases with respect to both the level of compensation and the effort level exerted.⁵ Wage and effort are complementary, so that the psychological utility that the worker derives from exerting an incremental effort is increasing in the level of remuneration received from the employer. The parameter $\alpha \geq 0$ measures the intensity of the gift exchange component, so that the standard model without social (other-regarding) preferences becomes a special case of our model with $\alpha = 0$ (cf. Rabin, 2013). The assumption that the total compensation does not depend on the level of effort chosen by the worker (as in Akerlof, 1982) reflects a realistic pattern of labor market incompleteness: efforts are often non-verifiable by third parties, even when observed by the employer; hence, remuneration can not be based on the observed level of efforts as this

⁴Alternatively, we can assume that the workers receive disutility from 'unfair' wages. Because the analysis is comparative, this would not affect the conclusions.

⁵This approach is roughly equivalent to the models of reciprocal labor relations included in Dufwenberg and Kirchsteiger (2004), Falk and Fischbacher (2006), and Rabin (1993). Our model is context-specific, but allows for a general functional form.

form of contract can not be legally enforced.⁶ In the absence of social preference (setting $\alpha = 0$), the effort level chosen by the worker would be zero, so as to minimize the cost of effort, for any level of compensation. Assuming that $\alpha > 0$ implies that the worker would optimally choose a strictly positive level of effort despite the incomplete contract. Furthermore, as will be shown below, by virtue of the complementarity property, the optimal effort level would be increasing in the level of remuneration.

In the following, we normalize the reference point of ‘fair remuneration’ \hat{w} to be equal to zero. As our focus is on comparing subsidy regimes, we remain agnostic as to the determinants of what constitutes a fair remuneration. For example, Akerlof and Yellen (1990) suggested that the reference point is a weighted average of the equilibrium wage under the standard neoclassical assumptions and the average wage within a reference group. Endogenizing the reference point in such a way does not alter our qualitative conclusions with respect to the subsidy regimes. Of course, the results are sensitive to whether the reference level of remuneration—which essentially determines the magnitude of the gift offered by employers to their employees—adapts to the subsidy regime chosen by the government. We return to this issue when we come to analyze the equilibrium under the varying regimes.

The typical firm’s payoff function is given by:

$$\pi(w, e) = f(e) - w. \quad (2)$$

We turn next to characterize the benchmark equilibrium in the labor market in the absence of government intervention.

3.1 *Benchmark equilibrium*

Unless noted otherwise, we analyze in the following the case of $\alpha > 0$, hence setting focus on the case where workers exhibit gift-exchange reciprocal preferences. The protocol of the labor-market game is as follows. First, the employer

⁶Our choice of a particular setting with one-time interaction between the employer and the worker and non-observable or ex-post verifiable efforts is aimed to capture in sharpest relief the moral hazard problem and the role of gift exchange in mitigating it. Clearly, allowing for labor contracts to partially depend on verifiable efforts or for repeated interactions would serve as incentivizing devices and would presumably weaken the role of gift exchange in eliciting efforts. It is important to notice, however, that our qualitative predictions would not change as long as some incompleteness remains to hold.

posts a wage offer w . Next, the worker observes the wage offer and chooses an effort level e . The firm then receives the gains from production $f(e)$ and remunerates the worker.

We solve the two-stage game by backward induction. Starting from the second stage, given a wage w , the worker maximizes the utility in (1) by determining the effort level e . In the first stage, given the optimal response function of the worker, $e(w)$, the firm is maximizing the profit in (2) by determining the wage w . Formulation of the worker's first-order condition yields:

$$-h'(e) + \alpha \frac{\partial v(w, e)}{\partial e} = 0. \quad (3)$$

Let $e(w)$ denote the optimal effort level chosen by the worker as a function of the wage w , given by the implicit solution to (3). Notice that by virtue of the properties of the utility function in (1) it follows that the second-order condition is satisfied. It further follows that $e(0) = 0$ and $e(w) > 0$ for $w > 0$. Moreover, total differentiation of the first-order condition in (3) with respect to w yields upon re-arrangement (arguments are omitted to abbreviate notation):

$$\frac{\partial e}{\partial w} = \frac{\alpha \frac{\partial^2 v}{\partial e \partial w}}{(h'' - \alpha \frac{\partial^2 v}{\partial e^2})} > 0,$$

where the inequality sign follows as $\alpha > 0$ (strict inequality is assumed, otherwise e is zero for any w), $h'' > 0$, $\frac{\partial^2 v}{\partial w \partial e} > 0$ and $\frac{\partial^2 v}{\partial e^2} \leq 0$.

We thus conclude that despite the incomplete contract and due to the gift exchange psychological effect, the optimal effort level chosen by the worker is bounded away from zero for any positive wage offered by the firm and is increasing with respect to the wage offer.

Substituting the optimal effort level $e(w)$ into the production function $f(e)$, letting $g(w) \equiv f[e(w)]$, the firm's payoff function can be re-written as:

$$\pi(w) = g(w) - w.$$

As $f' > 0$ and $\frac{\partial e}{\partial w} > 0$, it follows that $g' > 0$. We further assume that $g'' < 0$ and $\lim_{w \rightarrow 0} g'(w) = \infty$.⁷

⁷Clearly, the concavity and INADA properties of g impose restrictions on the forms of the production function given in (1) and the utility function given in (2). It is straightforward to

Formulating the firm's first order condition with respect to w yields:

$$g'(w) = 1 \quad (4)$$

The optimal wage offer set by the firm is given by the implicit solution to (4). By virtue of the strict concavity of g , the second-order condition is satisfied. Furthermore, by virtue of the INADA property of g , the optimal wage offer set by the firm is strictly positive.

We thus conclude that, despite the incomplete contract and due to the gift exchange psychological effect, the optimal wage set by the firm is bounded away from zero. The firm does so as it anticipates that the worker will reciprocate to a strictly positive wage offer by exerting a strictly positive effort level

Finally, it is straightforward to verify that in the absence of the gift exchange effect, namely when $\alpha = 0$, $e(w) = 0$ for any wage w and hence the optimal wage rate set by the firm would be zero. Thus, due to the incomplete contract, both the remuneration offered by the firm and the effort level chosen by the worker will be set to zero.

3.2 Policy regimes

The government is seeking to raise the wellbeing of a typical worker by offering a wage subsidy. We examine two alternative regimes. The first regime is a wage subsidy that is directly paid to the worker (DS) and resembles the earned income tax credit (EITC) program in the US. The second regime is an indirect wage subsidy, which is paid to the firm/employer (IDS). In the absence of the psychological component of the utility function ($\alpha = 0$), the two regimes are equivalent (namely, the statutory incidence of the subsidy plays no role). When $\alpha > 0$, however, equivalence between the DS and the IDS regimes no longer necessarily holds. The exact effect of the policy requires an additional assumption to be posed on the psychological component of the utility; namely, defining properly what the worker is responding to. As we show below, if the worker responds

verify that these properties of g are satisfied by a large class of commonly used functional forms. For instance, letting $f(e) = e$, $h(e) = \frac{e^2}{2}$ and $v(w, e) = 2w\sqrt{e}$, for $w > 0$, implies that $g(w) = e(w) = (\alpha w)^{\frac{2}{3}}$. It is straightforward to verify that the function g is strictly concave and satisfies the INADA condition. More generally, $g'' \geq 0$ implies that employers can maximise profits by offering infinite wages and obtaining infinite effort from the workers, which is economically nonsensical.

to the direct compensation received from the employer, IDS leads to higher effort levels and a higher level of aggregate welfare (to be properly defined in the following). Alternatively, the workers may respond to their total compensation—including direct subsidies—or to the employer’s sacrifice, which excludes indirect subsidies. As will be shown below, invoking either one of these alternative assumptions would render the two policy regimes (DS and IDS) equivalent in terms of elicited effort levels and aggregate welfare.

An alternative way to conceptualize these competing assumptions is to view the reference point \hat{w} , which we normalized to zero under no intervention, as endogenous to the policy regime. Our leading assumption—that workers respond to the direct compensation received from the employer—is equivalent to the view that the reference point adapts to the amount of subsidies directly paid by the government. The alternative assumption that the workers responds to the total compensation received would hold if the reference point remains fixed at zero. Finally, the assumption that workers respond to the employer’s sacrifice is equivalent to setting the reference point at the total amount of government subsidies (direct and indirect), leaving the employer’s net costs as the gift perceived by the worker.

We start our analysis with the assumption that the psychological utility depends on the direct compensation, and consider the alternative assumptions formally in the next section. We turn first to the DS regime. Reformulating (1) yields that the worker’s utility under DS is given by:

$$u(w, e)^{DS} = bw - h(e) + \alpha v(w, e). \quad (5)$$

where $b > 1$ denotes the rate of direct subsidy provided by the government to the worker and w denotes the wage rate set by the employer.

Note that the psychological component in the utility, $v(w, e)$, depends on the direct compensation received from the employer w rather than on the total compensation bw , which includes the direct subsidy granted by the government.⁸ The employer’s payoff remains as in (2). As the subsidy b does not enter the worker’s first-order condition (determining the optimal effort level e given the wage rate w)—which remains as in (3)—it is straightforward to verify that the

⁸The reference level in this case is given by the direct subsidy paid by the government $(b-1)w$, hence the psychological component in the utility function is given by $v[bw - (b-1)w, e] = v(w, e)$.

equilibrium analysis remains as in the benchmark case with no subsidy in place, yielding the same wage rate and effort level. Thus, the direct subsidy regime induces a pure income effect and changes neither the optimal choice of the worker nor that of the firm.

We turn next to the IDS regime. The employer's payoff becomes:

$$\pi(w, e)^{IDS} = f(e) - \frac{w}{b}, \quad (6)$$

where $b > 1$ denotes the rate of indirect subsidy provided by the government to the employer and w denotes the wage rate set by the firm. The subsidy rate b is equivalent to that defined for DS in the sense that, under tax incidence equivalence, these two formulations yield the same economic outcomes. As in the absence of direct subsidies, w reflects both the direct and the total compensation from the point of view of the worker, the worker's utility remains as in (1), setting the reference level \hat{w} at zero as in the no-intervention case, as there are no direct subsidies provided by the government. Thus, the worker's optimal response function $e(w)$ remains as in the benchmark equilibrium. Substituting the optimal effort level $e(w)$ into the production function $f(e)$, letting $g \equiv f[e(w)]$, the firm's payoff function can be re-written as:

$$\pi(w)^{IDS} = g(w) - \frac{w}{b}.$$

Formulating the employer's first order condition with respect to w yields:

$$g'(w) = \frac{1}{b}. \quad (7)$$

The strict concavity of g implies that the optimal wage offer set by the firm, given by the implicit solution to (7), is strictly higher than the optimal wage offer under the benchmark regime given by the implicit solution to (4). As the optimal response function of the worker is increasing in w , it follows that the effort level exerted by the worker under the IDS regime strictly exceeds the effort level exerted under the benchmark (and the DS) regime.

To sum up, compared with the DS regime, the IDS regime induces an incentivizing effect, yielding a higher level of remuneration and in response a higher level of effort exerted by the worker, so that the equivalence between the two policy regimes fails to hold.

A commonly stipulated goal of providing wage subsidies is to raise the utility level of the worker. Two related remarks are in order. First, note that this policy goal is indeed realized by implementing the IDS regime. This follows, as the worker's utility function under both the benchmark and the IDS regimes is identical [given by (1)], whereas the IDS regime yields a higher level of remuneration than under the benchmark regime. Further notice that the extent to which the indirect subsidy would be shifted to the worker generally depends on the properties of g . The direct compensation offered to the worker under the IDS regime w is strictly increasing in the rate of subsidy b [this follows from (7) by virtue of the strict concavity of g]; namely, the firm shifts (at least part of) the subsidy to its employee to elicit a higher effort level. Notwithstanding, the cost of labor w/b may either increase or decrease with respect to the rate of subsidy b , implying, respectively, over- or under-shifting of the subsidy to the worker.⁹

3.2.1 Alternative assumptions

In the previous subsection we have demonstrated that statutory incidence equivalence fails to hold if the worker responds to the compensation directly received from the employer. In the current subsection we turn to re-examine the equivalence between the direct and the indirect subsidy schemes, posing two alternative assumptions regarding what the worker is responding to.

Consider first the case in which the worker responds to the total compensation received, including any government subsidy directly transferred to the worker, which is the standard presumption in neo-classical frameworks. In this case, under the DS regime, the worker's utility is formulated as:¹⁰

$$u(w, e)^{DS} = bw - h(e) + \alpha v(bw, e).$$

and the firm's payoff function remains as in (2). The worker's utility and the firm's payoff under the IDS regime remain as in (1) and (6), respectively. In this case, the subsidy (b) enters the psychological component in the worker's utility under both the direct- and the indirect subsidy regimes, leading to a higher (iden-

⁹When the function g is sufficiently concave (formally, when $-\frac{g''(w)w}{g'(w)} > 1$), it is straightforward to show that the cost of labor w/b decreases with respect to b , implying under-shifting of the subsidy to the worker.

¹⁰The reference remuneration level remains as in the no-intervention regime and is given by zero by virtue of our normalization.

tical) effort level than under the benchmark (*laissez-faire*) regime. The complete derivation is included in the appendix.

The experiments conducted by Kube, Marechal, and Puppe (2012) show that the efficacy of increased wages in inducing higher effort levels depends on the extent to which the employer invests effort into the compensation presentation. These results suggest that workers might be concerned with actual costs incurred by their employer in providing the wages rather than with the direct compensation (or total compensation as we just postulated). We consider next, therefore, the case in which the worker responds to the cost of labor (the employer's sacrifice), excluding any government subsidy indirectly transferred to the firm from the direct compensation received from the employer.

The worker's utility and the firm's payoff under the DS regime remain as in (5) and (2), respectively. Under the IDS regime, the worker's utility becomes:¹¹

$$u(w, e)^{IDS} = w - h(e) + \alpha v\left(\frac{w}{b}, e\right), \quad (8)$$

while the firm's payoff remains as in (6). In equilibrium, under both the DS and the IDS regimes, the cost of labor borne by the employer, and consequently the elicited effort level, would be identical. The complete derivation is included in the appendix. In contrast to the case where workers respond to the total compensation received from the employer, the subsidy (b) does not enter the psychological component in the worker's utility in both the direct- and the indirect subsidy regimes. Therefore, the equilibrium effort levels are the same as under the benchmark (*laissez-faire*) regime.

Before turning to the normative analysis, some final remarks are in order. First, the three alternative assumptions are not mutually exclusive. That is, it is possible, e.g., that workers respond to some combination of the gross wages and the employers' costs. We can accommodate such a situation by replacing w in (1), not with $\frac{w}{b}$, as in (8), but with some function $m(w, b)$; $\frac{w}{b} < m(w, b) < w$, $\frac{\partial m}{\partial w} > 0$, $\frac{\partial m}{\partial b} < 0$. It is easy to confirm that, as long as workers respond positively to gross wages received over and above the employer's sacrifice, our main analysis holds qualitatively, and equilibrium effort levels are higher under IDS than under DS.

¹¹The reference remuneration level in this case is given by the amount of indirect subsidy the firm receives from the government given by $(b - 1)w/b$.

Second, note that in the latter case examined, in which the worker responds to the cost of labor, the equivalence between the DS and the IDS regimes crucially hinges on the worker being aware of the employer's payoff structure. Under realistic situations, workers do not receive direct information about the employer's subsidy, and may not be able to deduce this information due to ignorance of the law or cognitive limitations (see, e.g., Duflo et al., 2006). On the other hand, it is not clear that employers will increase the wages offered in this situation.

Finally, it is interesting to compare our theoretical model's prediction with an earlier experimental study by Riedl and Tyran (2005). In this study, Riedl and Tyran tested the tax liability side equivalence (the irrelevance of statutory incidence) in a labor market context exhibiting gift exchange type relations. Assuming that taxes were specific (exogenously set at a fixed amount), they showed that the equivalence between a regime in which a tax is levied on workers and one in which an identical tax is imposed on employers holds in the presence of gift-exchange considerations. Our formal analysis reveals that the statutory incidence does matter when the tax is proportional to the wage set by the firm. In contrast, with a specific tax in place, consistent with the results of Riedl and Tyran (2005), both tax regimes induce a pure income effect which does not affect the first-order conditions and, hence, the optimal choices of the agents.

4 NORMATIVE ANALYSIS

In the current section we turn to compare the DS and IDS regimes from a welfare perspective. We invoke the standard welfare measure used in partial equilibrium settings by letting the welfare be measured by the aggregate social surplus given by the sum of: (i) firms' profits, and (ii) workers' utility. Assuming that the gift exchange component depends only on the compensation the worker receives directly from the employer, we will compare the DS and the IDS regimes under the calibrating assumption that the total government expenditure is identical across the two policy regimes. Our first proposition states the welfare dominance of the IDS regime.

Proposition 1. *The IDS regime attains a higher level of aggregate social surplus than the DS regime, for the same level of government expenditure.*

See the appendix for the proof.

To understand the rationale for the welfare dominance of the IDS regime it would be instructive to compare the *laissez-faire* equilibrium with the Pareto efficient allocation. Let e^* and w^* denote, respectively, the effort level chosen by the worker and the wage offer set by the firm in the *laissez-faire* equilibrium, given by the implicit solution to the first-order conditions in (3) and (4). Further denote by π^* the profits earned by the firm in the *laissez-faire* equilibrium, given by:

$$\pi^* = f(e^*) - w^*. \quad (9)$$

An allocation is *Pareto* efficient if it maximizes the utility of the worker subject to a constraint that the firm's payoff is weakly exceeding a certain threshold. To render the comparison with the *laissez-faire* allocation more transparent, suppose that this threshold is set at π^* , the level of profits earned by the firm in the *laissez-faire* equilibrium. A *Pareto* efficient allocation is, hence, given by the solution to the following maximization program:

$$\begin{aligned} & \max_{e,w} [w - h(e) + \alpha v(w, e)] \\ & s.t. \\ & f(e) - w \geq \pi^*. \end{aligned}$$

It is straightforward to verify that in the optimal solution for the maximization program the constraint is binding. Substituting for w from the (binding) constraint into the objective yields the following reformulated (unconstrained) maximization program:

$$\max_e ([f(e) - \pi^*] - h(e) + \alpha v[f(e) - \pi^*, e]). \quad (10)$$

Formulating the first-order-condition with respect to e (assuming that the second-order condition is satisfied) yields:

$$f'(e) - h'(e) + \alpha \frac{\partial v}{\partial e} + \alpha \frac{\partial v}{\partial w} f'(e) = 0. \quad (11)$$

Let e^{**} denote the worker's effort level in a *Pareto* efficient allocation, given by the implicit solution to (11). Further let w^{**} denote the firm's wage offer in a

Pareto efficient allocation, given by:

$$w^{**} = f(e^{**}) - \pi^*. \quad (12)$$

Comparing the first-order conditions in (3) and (11) reveals that $e^{**} > e^*$ and $w^{**} > w^*$. Namely, the wage and effort levels in the *laissez-faire* equilibrium are lower than the corresponding levels associated with the *Pareto* efficient allocation.

To see this, differentiate the objective in (10) with respect to e and evaluate the derivative at the *laissez-faire* effort level, e^* , to obtain:

$$f'(e^*) - h'(e^*) + \alpha \frac{\partial v[f(e^*) - \pi^*, e^*]}{\partial e} + \alpha \frac{\partial v[f(e^*) - \pi^*, e^*]}{\partial w} f'(e^*) > 0,$$

where the inequality sign follows by virtue of the first-order condition in (3) [recalling that $w^* = f(e^*) - \pi^*$], and as $\alpha > 0$, $\frac{\partial v}{\partial w} > 0$ and $f' > 0$, by assumption. By virtue of the second-order condition for the maximization program in (10), which is assumed to hold, it follows that $e^{**} > e^*$. Conditions (9) and (12) and the fact that $f' > 0$ hence imply that $w^{**} > w^*$.

The inefficiency of the *laissez-faire* allocation derives from an externality. The firm is setting the wage rate to maximize its profits [the first order condition is given in (4)] but fails to account for the positive externality an increase in the wage offer would exert on the worker. The latter comes from two sources: (i) the remuneration to the worker; and, (ii) the contribution to the psychological gift-exchange component.

The market failure associated with the *laissez-faire* equilibrium is the driving force underlying the welfare dominance of the IDS regime. As, by presumption, the worker responds to the direct compensation received from the employer (rather than to the total compensation), the DS regime operates in an equivalent manner to a lump-sum transfer by inducing a pure income effect, thereby, changing neither the optimal choice of the worker nor that of the firm. In contrast, the IDS regime induces an incentivizing (substitution) effect, yielding a higher level of remuneration and in response a higher level of effort exerted by the worker. This serves to mitigate the distortion in the labor market and enhance welfare.

Before concluding this section, a final comment is in place. It is important to notice that the welfare-enhancing role of the indirect wage subsidy scheme is

sensitive to the welfare measure being invoked. If, for instance, we launder-out the gift-exchange component from the welfare calculus, the government would seek to maximize the ‘real’ surplus given by the output minus the cost of effort. In such a case, if the intensity of the gift-exchange component, measured by the parameter $\alpha > 0$, is sufficiently large, the effort associated with the *laissez-faire* allocation will exceed the *Pareto* efficient level, implying, therefore, that any level of subsidization will be welfare detrimental.¹²

4.1 General equilibrium

Thus far, we have considered a partial equilibrium setting, assuming a fixed number of firms. Allowing for free entry of firms will induce an (upward) adjustment in the wage rate that will be set at a level that renders firms’ profits to zero.

Formally, in equilibrium the following condition would hold:

$$g(w) - w = 0, \quad (13)$$

where the definition of g remains as in the partial equilibrium analysis. We let \tilde{w} denote equilibrium wage rate in the presence of free entry given by the implicit solution to (13).

By virtue of the properties of g , $g(w^*) - w^* > g(0) - 0 = 0$; where w^* denotes the optimal wage offer set by the firm in the partial equilibrium case, given by the implicit solution to (4). Hence, by the strict concavity of g , it follows that $\tilde{w} > w^*$. Note that \tilde{w} is indeed the optimal wage offer set by a firm in the presence of free entry; namely, no firm has an incentive to deviate from offering \tilde{w} . A deviation to a lower wage rate will allow the firm to earn positive profits but induce the worker to reject the offer and seek an alternative employer who offers him a higher wage rate (and earning non-negative profits, nonetheless). A deviation to a higher wage rate will result in negative profits. To see this notice that as $\tilde{w} > w^*$, by virtue of (4), (13) and the strict concavity of g , it follows that $g(w) - w < 0$ for all $w > \tilde{w}$.

Our second proposition states that the welfare dominance of the IDS regime,

¹²For instance, letting $f(e) = e$, $h(e) = \frac{e^2}{2}$ and $v(w, e) = 2w\sqrt{e}$, the government is seeking to maximize the ‘real’ surplus given by the term $e - \frac{e^2}{2}$. The surplus-maximizing effort level is hence given by $e = 1$. In the benchmark regime (with no government intervention in place) the effort level would be given by $e = (\frac{2\alpha}{3})^2$. For $\alpha > 1.5$, any level of subsidization is clearly welfare detrimental!

established for the partial equilibrium setting (see proposition 1), extends to the general equilibrium case.

Proposition 2. *Allowing for free entry of firms, the IDS regime remains welfare-dominant to the DS regime, by attaining a higher level of aggregate social surplus for the same level of government expenditure.*

See the appendix for the proof.

5 EXPERIMENTAL DESIGN AND PROCEDURE

The basic experimental game is adapted from the bilateral gift exchange game introduced by Fehr et al. (1998). The game involves an employer and a worker. The employer first chooses a wage $w \geq 30$.¹³ The worker observes the wage and chooses an effort level $e \in (0, 10)$.¹⁴ The payoff of the employer in the No subsidy (NS) treatment is given by

$$\pi_{\text{employer}} = 120 - w + 10e.$$

The payoff of the worker is given by

$$\pi_{\text{worker}} = w - c(e),$$

where the cost of effort $c(e)$ is presented in Table 1.

In the Direct subsidy (DS) treatment, the worker's payoff is revised in line with the theoretical analysis to be

$$\pi_{\text{worker}} = bw - c(e).$$

¹³The lower-bound imposed on the level of remuneration may be interpreted as a binding minimum wage rule. This lower bound remains fixed throughout the experiment, and we are therefore unable to test the implications of a minimum wage on the workers' reference level and the magnitude of the 'gift' received from their employers. We nonetheless conjecture that a raise in the minimum would (at least partially) increase the reference level of remuneration. Examining the implications of the minimum wage on the gift-exchange relationship and a comparison with wage subsidies as a means to elicit effort levels and enhance workers' utility are beyond the scope of the current paper and remain for future work.

¹⁴We elicited stated rather than real effort to allow for better control and consistency with the theoretical analysis. Stated effort decisions were found to correspond to real effort exertion (Brüggen and Strobel, 2007).

TABLE 1
COST OF EFFORT.

Effort level e	1	2	3	4	5	6	7	8	9	10
Cost of effort $c(e)$	0	1	2	4	6	8	10	13	16	20

In the Indirect subsidy (IDS) treatment, the employer’s payoff is revised to be

$$\pi_{\text{employer}} = 120 - \frac{w}{b} + 10e,$$

with the subsidy factor set at $b = 1.5$ and all other aspects of the experiment remaining fixed.

The roles of employer and worker remained fixed throughout the session, with employers and workers randomly matched in pairs at the beginning of each period within matching groups of eight. Participants knew that there will be two parts to the experiment, each consisting of ten periods, and that they will be randomly rematched with a new partner for each period. We conducted two types of sessions, summarized in Table 2. In the *Switch subsidy* treatments, participants first played in either DS or IDS for ten periods, and then switched to the other regime for an additional ten periods. In the *Introduce subsidy* sessions, participants first played for ten periods without subsidies, after which one of the regimes—DS or IDS—was introduced for the next ten periods.

The experiment was programmed in z-Tree (Fischbacher, 2007) and conducted in the Negev Experimental Economics Laboratory at Ben-Gurion University of the Negev. Two hundred and forty eight participants, recruited through ORSEE (Greiner, 2015), participated in 14 sessions. The sessions lasted for 90 minutes, and the average total payoff was 73.29 NIS (approximately 19 USD).

5.1 Hypotheses

Our first two hypotheses relate to the behavioral assumptions of the theoretical analysis. First, we test the hypothesis that workers reciprocate gross wages.

Hypothesis 1. *Workers’ effort across treatments is higher for higher gross wages, controlling for net wages and employers’ costs.*

Next, we test the hypothesis that employers shift indirect subsidies to work-

TABLE 2
SESSIONS AND TREATMENTS.

Periods 1–10	Periods 11–20	N groups
<i>Switch subsidy</i>		
DS	IDS	10
IDS	DS	9
<i>Introduce subsidy</i>		
NS	DS	6
NS	IDS	6

ers.

Hypothesis 2. *Gross wages in IDS are higher than in NS.*

The main objective of the experiment is to test the behavioral components of the model, as reflected in hypotheses 1 and 2. Nonetheless, we also aim to test the implication of Proposition 1, namely the welfare dominance of the IDS regime. In this, we face two constraints. First, the psychological utility is not directly observable, hence we examine the efficiency (defined to be the aggregate observable payoffs), which, in our setup, are fully determined by the worker's effort. Second, we could not guarantee *ex-ante* that the calibrating assumption (identical government expenditure under both the IDS and DS regimes) holds, as required to test the proposition. Recall that, to test the subsidy side equivalence, we set the direct and indirect subsidy factors to yield economic equivalence under that null hypothesis, which we reject. Further, that whether indirect subsidies are partly, overly, or exactly shifted to the workers crucially depends on the unobservable psychological utility. Consequently, the government expenditure is unlikely to be equated in DS and IDS. We therefore state our third hypothesis in terms of efficiency (and effort, which uniquely determines efficiency) per government expenditure. Given that Hypotheses 1 and 2 are confirmed to validate the model, the efficiency comparison lends support to the welfare enhancing switch from DS to IDS. Note that the observed efficiency does not include the gift-exchange component of the worker's utility. Thus, an observed increase in efficiency (and in the gross wages and effort that enter the gift-exchange component in a complementary way) provides a lower bound to the increase in welfare.

Hypothesis 3. *Aggregate payoffs, as determined by the workers' effort, per subsidy is higher in IDS than in NS and DS.*

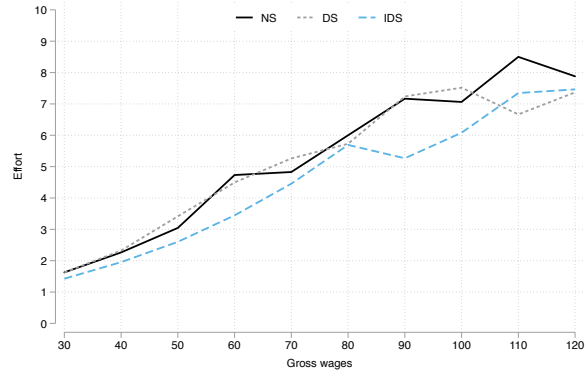
6 EXPERIMENTAL RESULTS

Table 3 presents the means of variables of interest.¹⁵ Efficiency is defined as the sum of the employer and worker's 'real' surplus (inclusive of effort costs), minus the government expenditures. The mean gross wages are in line with Hypothesis 2, with higher gross wages in IDS compared to NS and DS. Subsidy shift is only partial, however, as the increase in net wages when indirect subsidies are introduced is only 56% of the increase resulting from direct subsidies. Although net wages are lower in IDS than in DS, workers' mean effort increases from 3.7 in DS to 4.1 in IDS, suggesting that workers respond to gross wages, as stipulated in Hypothesis 1.¹⁶ This is further supported by the effort response graphs depicted in Figure 1. Panel (b) reveals that, in DS, workers choose lower effort levels for the same net wages—as gross wages are actually lower—whereas Panel (c) shows that, in IDS, effort levels are higher for the same employer's costs—as gross wages are actually higher. The response to gross wages in Panel (a) is similar across treatments, indicating that workers indeed respond to gross wages, although there is a small downward shift in IDS, suggesting that there may be some sensitivity to employer's actual costs.

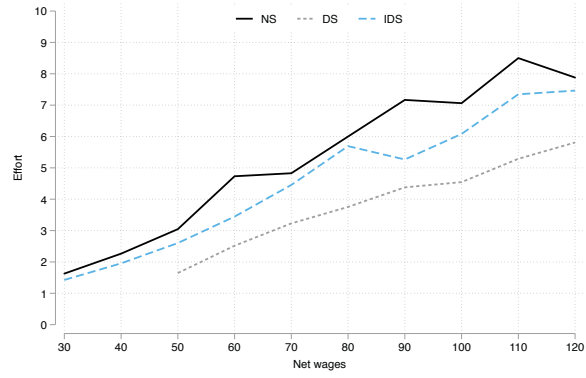
Table 4 presents OLS regressions of worker's effort on gross and net wages and employers' costs, with robust standard errors clustered on matching groups. The results confirm the conclusions drawn based on Figure 1. Gross wages emerge as the best predictor for the worker's effort, both when all three variables are

¹⁵We report the significance of differences from the IDS treatment based on OLS regressions with robust standard errors clustered on matching groups, where the predicted margin is equal to the actual mean in the data. The results remain qualitatively unchanged in panel regressions with bootstrap standard errors. See the appendix for details.

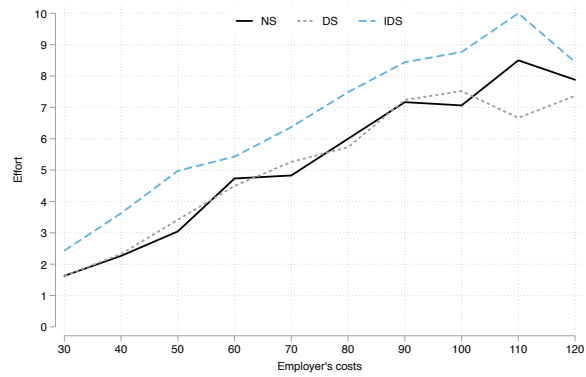
¹⁶The *Introduce subsidy* sessions may be the most interesting. Over the first ten periods, the workers can be assumed to develop a certain pattern of response to their wages. On average, workers receive wages of 52.27, and choose a mean effort level of 3.51. From period 11 onwards, they experience a regime change. When the switch is to the DS regime, the mean gross wages (and employer's costs) decrease from 52.27 to 46.00, while the mean net wages increase to 69.00. The mean effort is 2.98, lower than in the benchmark regime. When workers experience a switch to the IDS regime, in comparison, the mean wages increase to 66.08 while the employer's costs decrease to 44.05. Should workers increase their effort—as their remuneration goes up—or decrease their effort—as the employer is investing less in their remuneration? The mean effort, in fact, increases to 3.75.



(A) BY GROSS WAGES.



(B) BY NET WAGES.



(C) BY EMPLOYER'S COSTS.

FIGURE 1
WORKER EFFORT.

TABLE 3
EXPERIMENTAL RESULTS.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Gross wages	Net wages	Employer's costs	Subsidy costs	Effort per subsidy	Efficiency per subsidy	Employer's payoff	Worker's payoff
NS	52.27*** (3.01)	52.27*** (3.01)	52.27 (3.01)				102.79*** (2.07)	48.02*** (2.50)
DS	56.01*** (3.36)	84.02*** (5.04)	56.01*** (3.36)	28.01*** (1.68)	0.13*** (0.01)	6.53*** (0.20)	100.96*** (2.47)	79.29*** (4.61)
IDS	70.08 (4.20)	70.08 (4.20)	46.72 (2.80)	23.36 (1.40)	0.17 (0.01)	8.36 (0.35)	114.43 (1.29)	64.39 (3.64)
<i>N</i>	2480	2480	2480	2000	2000	2000	2480	2480

Notes: Means based on OLS regressions. Robust standard errors clustered on matching groups in parentheses. *** denotes values in NS and DS that are significantly different to IDS, $p < 0.005$.

included in Column (1) and when comparing the fit of the separate models in Columns (2)–(4). Although the employer's costs have some marginal predictive validity, it is eliminated when pitted directly against the gross wages by removing the net wages from the model in Column (5), or in the corresponding tobit regressions (reported in the appendix).¹⁷ Thus, the regression analysis provides empirical validity to Hypothesis 1.

Result 1. *Workers respond to the gross wages chosen by the employer.*

Consistent with the theoretical predictions, direct subsidies increase the worker's payoff without affecting the employers' or workers' decisions ($p = 0.370$ for gross wages, $p = 0.670$ for worker's effort). Indirect subsidies, in contrast, lead to significantly higher gross wages, indicating that employers shift the subsidy to workers. The net wages are, however, significantly lower in IDS compared to DS (cf. Table 3), indicating a partial shift. The results support Hypothesis 2.

Result 2. *Employers (partially) shift indirect subsidies to workers.*

Note that, due to the partial shift, workers' payoff is significantly lower in IDS than in DS (cf. Table 3, Column (8)), so that workers might actually be worse off under indirect subsidies if the subsidy factor is not properly adjusted. On average, employers increase the workers' wages by 25% in the IDS compared to the DS

¹⁷Recall that to obtain the dominance of the IDS regime, it is enough to assume that the workers respond to some combination of the gross wages and employer's costs.

TABLE 4
REGRESSIONS ON WORKERS' RESPONSE FUNCTION.

	(1)	(2)	(3)	(4)	(5)
Gross wages	0.050*** (0.009)	0.049*** (0.011)			0.045*** (0.007)
Employer's costs	0.035*** (0.012)		0.052*** (0.016)		0.005 (0.020)
Net wages	-0.025 (0.015)			0.034*** (0.011)	
Constant	0.792 (0.685)	0.863 (0.697)	1.160 (0.825)	1.350 (0.809)	0.851 (0.759)
AIC	10326	10357	10556	10641	10357
Ind. fixed effects	Yes	Yes	Yes	Yes	Yes
N	2480	2480	2480	2480	2480

Notes: Robust standard errors clustered on matching groups in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

treatment whereas the direct subsidy increased wages by 50% by design. Back of the envelope calculations show that the subsidy factor should increase by 20% in order to compensate for this partial shifting. That is, compared to $b = 1.5$ in DS, a factor of $b = 1.8$ in IDS would eliminate the reduction in net wages while maintaining the same government expenses.¹⁸

Finally, Columns (5) and (6) of Table 3 confirm Hypothesis 3.

Result 3. *Indirect subsidies lead to higher effort and efficiency per subsidy than direct subsidies.*

7 CONCLUSION

Wage subsidies (in the form of EITC program in the US) constitute a prevalent policy tool to promote redistributive goals and alleviate poverty amongst the working poor. In a standard neoclassical framework the statutory incidence of

¹⁸Further assumptions are required to allow a more precise calibration. Clearly, careful empirical tests in the field are needed to quantitatively guide policy, which depends on situation-specific characteristics. The example here is presented to illustrate the possibility and direction of the necessary adjustment.

such wage subsidies is typically policy irrelevant and bears no normative implications. In this paper we provide a theoretical analysis of the potential perceptual advantage of providing indirect subsidies to the employers relative to subsidizing workers directly. Employing a behavioral theoretical setting, we demonstrate that by shifting from direct to indirect subsidies the government can enhance the well being of workers, while maintaining the level of expenditure unchanged. Our experimental results support the behavioral assumptions underlying the theoretical analysis, and provide direct evidence for the welfare enhancing potential of indirect subsidies.

Our results contribute to the broad question of the exact nature of the gifts in a gift-exchange type relationship. In the field experiment conducted by Kube, Marechal, and Puppe (2012), workers responded to nonmonetary gifts but not to monetary gifts, although they largely preferred the monetary gifts when able to choose between the two. The authors conclude that workers focus on the effort and time invested by the employer rather than on the resulting benefit to themselves. With monetary bonuses, the two sides of the transfer—the sacrifice made by the employer and the gain of the worker—are typically equivalent. The nonmonetary aspect of the gifts disentangles the two as the effort made by the employer (for example, in choosing an appropriate gift) is larger than the material gain of the worker. Our framework disentangles the two using only monetary transfers, with the third player—the government or subsidy provider—absorbing (a negative) part of the transfer. Within our framework, a focus on the employer’s sacrifice implies that the workers respond to the employer’s costs. While we do find some evidence for this effect, we find that workers primarily respond to the gross wages.¹⁹ This result is consistent with an interpretation that the workers respond to the employer’s *discretionary choice* with respect to the no-subsidy benchmark. Gilchrist, Luca, and Malhotra (2016) found that workers respond to a monetary bonus *only if* it is provided voluntarily after the worker has accepted the contract. Similarly, employers voluntarily choose to invest in nonmonetary gifts in Kube, Marechal, and Puppe (2012), or—in our experiment—to shift the subsidy to the worker rather than pocketing the money and keeping the wages at their non-subsidy levels. This interpretation is consistent with Akerlof’s (1982)

¹⁹In a real-effort experiment, Fochmann et al. (2013) manipulated the gross wages and tax rate simultaneously, such that the net wages remained constant. Their results showed that workers’ effort responded to the gross wages. In this context, however, higher gross wages also imply higher employer costs.

concept of fair wages as wages that the employer voluntarily offers above market-clearing wages.

Whereas the gift-exchange phenomenon is highly robust and replicable in laboratory conditions, the field evidence is mixed, with some studies finding that higher wages per se do not lead to consistently high worker effort (Esteves-Sorenson, 2017; Gneezy and List, 2006; Hennig-Schmidt, Sadrieh, and Rockenbach, 2010; Kube, Marechal, and Puppe, 2012; Kube, Maréchal, and Puppe, 2013), while others find significant worker response (Bellemare and Shearer, 2009; Cohn, Fehr, and Goette, 2014; Gilchrist, Luca, and Malhotra, 2016). Employer gifts appear to increase productivity if they display employer consideration (Kube, Marechal, and Puppe, 2012, discussed above), the worker has information about the employer's gains (Hennig-Schmidt, Sadrieh, and Rockenbach, 2010), or when the low remuneration (without the gift) is below the worker's expectations of a fair wage (Cohn, Fehr, and Goette, 2014; Kube, Maréchal, and Puppe, 2013). This last moderator is especially relevant in the current context, as our analysis is directed at the working poor. While the implementation of employer gifts is clearly non-trivial, we argue that indirect subsidies provide the employer with the means to improve the worker's satisfaction with the employer and consequently increase productivity.

Our theoretical analysis suggests that when remuneration cannot be based on observed (or ex-post verified) effort levels; and hence the incentivizing structure relies on a gift-exchange (double reciprocity) mechanism, workers respond to the amount of compensation received directly from the employer, rather than to the total compensation (including government direct subsidies). Thus, a standard assumption in neo-classical frameworks of perfect substitutability between a dollar of remuneration received from the employer and a dollar of compensation obtained (in the form of a direct subsidy) from the government, fails to hold. Workers seem to care not only about the 'bottom line' (total amount received) but also about the 'channel' (whether the direct source of remuneration is the employer or the government). This novel feature supported by our experimental evidence bears important implications for the design of labor contracts and welfare policy.

REFERENCES

- Akerlof, George A. (1982). Labor contracts as partial gift exchange. *The Quarterly Journal of Economics* 97(4), pp. 543–569.
- Akerlof, George A and Janet L Yellen (1988). Fairness and unemployment. *American Economic Review* 78(2), pp. 44–49.
- Akerlof, George A. and Janet L. Yellen (1990). The fair wage-effort hypothesis and unemployment. *The Quarterly Journal of Economics* 105(2), pp. 255–283.
- Bellemare, Charles and Bruce Shearer (2009). Gift giving and worker productivity: Evidence from a firm-level experiment. *Games and Economic Behavior* 67(1), pp. 233–244.
- Blumkin, Tomer and Ehud Menirav (2009). Framing the rabbit to snare the votes. *Social Choice and Welfare* 32(4), pp. 603–634.
- Blumkin, Tomer, Bradley J Ruffle, and Yosef Ganun (2012). Are income and consumption taxes ever really equivalent? Evidence from a real-effort experiment with real goods. *European Economic Review* 56(6), pp. 1200–1219.
- Borck, Rainald et al. (2002). Tax liability-side equivalence in experimental posted-offer markets. *Southern Economic Journal*, pp. 672–682.
- Brandts, Jordi and Gary Charness (2004). Do Labour Market Conditions Affect Gift Exchange? Some Experimental Evidence*. *The Economic Journal* 114(497), pp. 684–708.
- Brüggen, Alexander and Martin Strobel (2007). Real effort versus chosen effort in experiments. *Economics Letters* 96(2), pp. 232–236.
- Charness, Gary (2004). Attribution and reciprocity in an experimental labor market. *Journal of Labor Economics* 22(3), pp. 665–688.
- Chetty, Raj, Adam Looney, and Kory Kroft (2009). Salience and Taxation: Theory and Evidence. *American Economic Review* 99(4), pp. 1145–1177.
- Cohn, Alain, Ernst Fehr, and Lorenz Goette (2014). Fair wages and effort provision: Combining evidence from a choice experiment and a field experiment. *Management Science* 61(8), pp. 1777–1794.
- Diamond, Peter A (1998). Optimal income taxation: an example with a U-shaped pattern of optimal marginal tax rates. *American Economic Review*, pp. 83–95.
- Duflo, Esther et al. (2006). Saving incentives for low-and middle-income families: Evidence from a field experiment with H&R Block. *The Quarterly Journal of Economics* 121(4), pp. 1311–1346.

- Dufwenberg, Martin and Georg Kirchsteiger (2004). A theory of sequential reciprocity. *Games and Economic Behavior* 47(2), pp. 268–298.
- Eissa, Nada and Hilary Hoynes (2011). Redistribution and Tax Expenditures: The Earned Income Tax Credit. *National Tax Journal* 64(2 Part 2), pp. 689–730.
- Esteves-Sorenson, Constanca (2017). Gift exchange in the workplace: Addressing the conflicting evidence with a careful test. *Management Science*.
- Falk, Armin and Urs Fischbacher (2006). A theory of reciprocity. *Games and Economic Behavior* 54(2), pp. 293–315.
- Fehr, Ernst, Georg Kirchsteiger, and Arno Riedl (1993). Does fairness prevent market clearing? An experimental investigation. *The Quarterly Journal of Economics* 108(2), pp. 437–459.
- Fehr, Ernst et al. (1998). When social norms overpower competition: Gift exchange in experimental labor markets. *Journal of Labor Economics* 16(2), p. 324.
- Feldman, Naomi E and Bradley J Ruffle (2015). The impact of including, adding, and subtracting a tax on demand. *American Economic Journal: Economic Policy* 7(1), pp. 95–118.
- Fischbacher, Urs (2007). z-Tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics* 10(2), pp. 171–178.
- Fochmann, Martin et al. (2013). Net Wage Illusion in a Real-Effort Experiment. *The Scandinavian Journal of Economics* 115(2), pp. 476–484.
- Gilchrist, Duncan S, Michael Luca, and Deepak Malhotra (2016). When $3 + 1 > 4$: Gift structure and reciprocity in the field. *Management Science* 62(9), pp. 2639–2650.
- Gneezy, Uri and John A List (2006). Putting behavioral economics to work: Testing for gift exchange in labor markets using field experiments. *Econometrica* 74(5), pp. 1365–1384.
- Greiner, Ben (2015). Subject pool recruitment procedures: organizing experiments with ORSEE. *Journal of the Economic Science Association* 1(1), pp. 114–125.
- Hennig-Schmidt, Heike, Abdolkarim Sadrieh, and Bettina Rockenbach (2010). In search of workers' real effort reciprocity: A field and a laboratory experiment. *Journal of the European Economic Association* 8(4), pp. 817–837.

- Kerschbamer, Rudolf and Georg Kirchsteiger (2000). Theoretically robust but empirically invalid? An Experimental Investigation into tax equivalence. *Economic Theory* 16(3), pp. 719–734.
- Kube, Sebastian, Michel Andre Marechal, and Clemens Puppe (2012). The Currency of Reciprocity: Gift Exchange in the Workplace. *American Economic Review* 102(4), pp. 1644–62.
- Kube, Sebastian, Michel André Maréchal, and Clemens Puppe (2013). Do wage cuts damage work morale? Evidence from a natural field experiment. *Journal of the European Economic Association* 11(4), pp. 853–870.
- Maximiano, Sandra, Randolph Sloof, and Joep Sonnemans (2007). Gift Exchange in a Multi-Worker Firm. *Economic Journal* 117(522), pp. 1025–1050.
- Rabin, Matthew (1993). Incorporating fairness into game theory and economics. *American Economic Review* 83(5), pp. 1281–1302.
- (2013). An Approach to Incorporating Psychology into Economics. *American Economic Review: Papers and Proceedings* 103(3), pp. 617–22. URL: <http://www.aeaweb.org/articles.php?doi=10.1257/aer.103.3.617>.
- Riedl, Arno and Jean-Robert Tyran (2005). Tax liability side equivalence in gift-exchange labor markets. *Journal of Public Economics* 89(11), pp. 2369–2382.
- Riedl, Arno and Frans Van Winden (2012). Input versus output taxation in an experimental international economy. *European Economic Review* 56(2), pp. 216–232.
- Ruffle, Bradley J (2005). Tax and subsidy incidence equivalence theories: Experimental evidence from competitive markets. *Journal of Public Economics* 89(8), pp. 1519–1542.
- Saez, Emmanuel, Benjamin Schoefer, and David Seim (2017). *Payroll Taxes, Firm Behavior, and Rent Sharing: Evidence from a Young Workers' Tax Cut in Sweden*. Working Paper 23976. National Bureau of Economic Research.
- Salanie, Bernard (2003). *The economics of taxation*. MIT press.
- Sausgruber, Rupert and Jean-Robert Tyran (2005). Testing the Mill hypothesis of fiscal illusion. *Public Choice* 122(1-2), pp. 39–68.
- Tax Policy Center (2013). *Tax Facts on Historical EITC*. http://www.taxpolicycenter.org/taxfacts/Content/PDF/eitc_recipients.pdf. Washington, DC.
- Weber, Matthias and Arthur Schram (2017). The Non-equivalence of Labour Market Taxes: A Real-effort Experiment. *The Economic Journal* 127(604), pp. 2187–2215.

APPENDIX A: PROOFS AND DERIVATIONS

A.1 *Alternative assumptions*

In the following, we characterize the equilibrium under the alternative assumptions of section 3.2.1. Consider first the case in which the worker responds to the total compensation received, including any government subsidy directly transferred to the worker, which is the standard presumption in neo-classical frameworks. In this case, under the DS regime, the worker's utility is formulated as:

$$u(w, e)^{DS} = bw - h(e) + \alpha v(bw, e). \quad (\text{A1})$$

and the firm's payoff function remains as in (2) and given by:

$$\pi(w, e)^{DS} = f(e) - w, \quad (\text{A2})$$

where w denotes the wage rate set by the firm and total compensation hence given by bw .

Turning next to the IDS regime, the worker's utility and the firm's payoff are, correspondingly, given by:

$$u(w, e)^{IDS} = w - h(e) + \alpha v(w, e), \quad (\text{A3})$$

and

$$\pi(w, e)^{IDS} = f(e) - \frac{w}{b}, \quad (\text{A4})$$

where w denotes the wage rate set by the firm and $\frac{w}{b}$ denotes, therefore, the cost of labor. Reformulating the equations given in (A3) and (A4) by setting $z \equiv \frac{w}{b}$ yields:

$$u(z, e)^{IDS} = zb - h(e) + \alpha v(zb, e), \quad (\text{A5})$$

and

$$\pi(z, e)^{IDS} = f(e) - z, \quad (\text{A6})$$

where z denotes the cost of labor borne by the firm (the employer's direct sacrifice). Comparing the equations given in (A1) and (A2) associated with the DS regime with the corresponding reformulated equations given in (A5) and (A6)

associated with the IDS regime, it is straightforward to verify that the two alternative policy regimes are equivalent. [formally, substituting z for w in equations (A1) and (A2) yields equations (A5) and (A6)]. Thus, in equilibrium (the derivations are similar to those in the main analysis and are hence omitted), under both the DS and the IDS regimes, the total compensation received by the worker and, consequently, the elicited effort level, would be identical.

Next, consider the case in which the worker responds to the cost of labor (the employer's sacrifice), excluding any government subsidy indirectly transferred to the firm. Reformulating the worker's utility and the firm's payoff under the DS regime yields, respectively:

$$u(w, e)^{DS} = bw - h(e) + \alpha v(w, e), \quad (\text{A7})$$

and

$$\pi(w, e)^{DS} = f(e) - w, \quad (\text{A8})$$

where w denotes the wage rate set by the firm, which reflects the cost of labor in the absence of indirect subsidies.

Turning next to the IDS regime yields the following corresponding equations:

$$u(w, e)^{IDS} = w - h(e) + \alpha v\left(\frac{w}{b}, e\right), \quad (\text{A9})$$

and

$$\pi(w, e)^{IDS} = f(e) - \frac{w}{b}, \quad (\text{A10})$$

where w denotes the wage rate set by the firm and $\frac{w}{b}$ denotes the cost of labor.

Reformulating the equations given in (A9) and (A10) by setting $z \equiv \frac{w}{b}$ yields:

$$u(z, e)^{IDS} = zb - h(e) + \alpha v(z, e), \quad (\text{A11})$$

and

$$\pi(z, e)^{IDS} = f(e) - z, \quad (\text{A12})$$

where z denotes the cost of labor borne by the firm. Comparing the equations given in (A7) and (A8) associated with the DS regime with the corresponding reformulated equations given in (A11) and (A12) associated with the IDS regime, it is straightforward to verify that the two alternative policy regimes are equivalent.

lent [formally, substituting z for w in equations (A7) and (A8) yields equations (A11) and (A12)]. Thus, in equilibrium (the derivations are similar to those in the main analysis and are hence omitted), under both the DS and the IDS regimes, the cost of labor borne by the employer and, consequently, the elicited effort level would be identical.

A.2 Proofs

Proposition 1. *The IDS regime attains a higher level of aggregate social surplus than the DS regime, for the same level of government expenditure.*

Proof. Denote by $b^{DS} > 1$ and $b^{IDS} > 1$ the subsidy rates associated with the DS and IDS regimes, respectively. Further denote by w^{DS} and w^{IDS} the corresponding wage rates optimally set by the firm in equilibrium under the DS and IDS regimes, which are formally given by the implicit solution to:

$$g'(w^{DS}) = 1, \quad (\text{A13})$$

$$g'(w^{IDS}) = \frac{1}{b^{IDS}}, \quad (\text{A14})$$

where $g(w) \equiv f[e(w)]$ and $e(w)$ denotes the worker's optimal response function (specifying the effort level as a function of the compensation directly received from the firm). Finally, let E^{DS} and E^{IDS} denote the total government expenditure levels associated with the DS and the IDS regimes, respectively, formally given by:

$$E^{DS} = (b^{DS} - 1)w^{DS},$$

and

$$E^{IDS} = \frac{(b^{IDS} - 1)}{b^{IDS}}w^{IDS}.$$

By virtue of our definition of the welfare measure, given by the sum of firms' profits and workers' utility, the welfare measures associated with the DS and IDS regimes are correspondingly given by:

$$W^{DS} = [g(w^{DS}) - w^{DS}] + [b^{DS}w^{DS} - h[e(w^{DS})] + \alpha v[w^{DS}, e(w^{DS})]], \quad (\text{A15})$$

and

$$W^{IDS} = [g(w^{IDS}) - \frac{w^{IDS}}{b^{IDS}}] + [w^{IDS} - h[e(w^{IDS})] + \alpha v[w^{IDS}, e(w^{IDS})]]. \quad (\text{A16})$$

Subtracting (A15) from (A16) and employing the fact that, by virtue of our calibrating assumption, total government expenditure is identical across regimes; namely, $E^{DS} = E^{IDS}$, it follows that:

$$W^{IDS} - W^{DS} = K(w^{IDS}) - K(w^{DS}),$$

where $K(w) \equiv g(w) - h[e(w)] + \alpha v[w, e(w)]$.

Conditions (A13) and (A14) imply, by virtue of the strict concavity of g and the fact that $b^{IDS} > 1$, that $w^{IDS} > w^{DS}$. Thus, to complete our proof it suffices to show that K is strictly increasing in w . Differentiating K with respect to w , employing the worker's envelope condition, yields:

$$K'(w) = g'(w) + \alpha \frac{\partial v}{\partial w} > 0,$$

where the positive sign follows as $\alpha > 0$ and $\frac{\partial v}{\partial w} > 0$, by assumption, and $g' > 0$, by our earlier derivations. This concludes the proof. \square

Proposition 2. *Allowing for free entry of firms, the IDS regime remains welfare-dominant to the DS regime, by attaining a higher level of aggregate social surplus for the same level of government expenditure.*

Proof. Denote by $b^{DS} > 1$ and $b^{IDS} > 1$ the subsidy rates associated with the DS and IDS regimes, respectively. Further denote by w^{DS} and w^{IDS} the corresponding wage rates optimally set by the firm in equilibrium, under the DS and IDS regimes, which are formally given by the implicit solution to the zero-profit conditions:

$$g(w^{DS}) - w^{DS} = 0, \quad (\text{A17})$$

$$g(w^{IDS}) - \frac{w^{IDS}}{b^{IDS}} = 0, \quad (\text{A18})$$

where $g(w) \equiv f[e(w)]$ and $e(w)$ denotes the worker's optimal response function (specifying the effort level as a function of the compensation directly received from the firm).

Finally, let E^{DS} and E^{IDS} denote the total government expenditure levels associated with the DS and the IDS regimes, respectively, formally given by:

$$E^{DS} = (b^{DS} - 1)w^{DS},$$

and

$$E^{IDS} = \frac{(b^{IDS} - 1)}{b^{IDS}}w^{IDS}.$$

By virtue of our definition of the welfare measure, given by the sum of firms' profits and workers' utility, the welfare measures associated with the DS and IDS regimes are correspondingly given by:

$$W^{DS} = [g(w^{DS}) - w^{DS}] + [b^{DS}w^{DS} - h[e(w^{DS})] + \alpha v[w^{DS}, e(w^{DS})]], \quad (\text{A19})$$

and

$$W^{IDS} = [g(w^{IDS}) - \frac{w^{IDS}}{b^{IDS}}] + [w^{IDS} - h[e(w^{IDS})] + \alpha v[w^{IDS}, e(w^{IDS})]]. \quad (\text{A20})$$

Subtracting (A19) from (A20) and employing the fact that, by virtue of our calibrating assumption, total government expenditure is identical across regimes; namely, $E^{DS} = E^{IDS}$, it follows that:

$$W^{IDS} - W^{DS} = K(w^{IDS}) - K(w^{DS}),$$

where $K(w) \equiv g(w) - h[e(w)] + \alpha v[w, e(w)]$.

Recall that we have shown (see the proof of proposition 1) that K is strictly increasing in w . Thus, to complete our proof it suffices to show that $w^{IDS} > w^{DS}$. Letting $M(w, b) \equiv g(w) - \frac{w}{b} = 0$, where $b \geq 1$ denotes the indirect subsidy rate provided to the firm, conditions (A17) and (A18) can be reformulated as:

$$M(w^{DS}, 1) = 0, \quad (\text{A21})$$

$$M(w^{IDS}, b^{IDS}) = 0. \quad (\text{A22})$$

Fully differentiating $M(w, b)$ with respect to b yields upon re-arrangement:

$$\frac{\partial w}{\partial b} = \frac{-\frac{w}{b^2}}{[g'(w) - \frac{1}{b}]} > 0, \quad (\text{A23})$$

where the inequality sign follows as $g'(w) < \frac{1}{b}$, by virtue of the fact that the equilibrium wage rate in the presence of free entry strictly exceeds the partial equilibrium wage rate [given by the implicit solution to $g'(w) - \frac{1}{b} = 0$] and the strict concavity of g .

By virtue of condition (A23) and the fact that $b^{IDS} > 1$, conditions (A21) and (A22) imply that $w^{IDS} > w^{DS}$. This concludes the proof. \square

APPENDIX B: ROBUSTNESS CHECKS

TABLE B.1
REGRESSIONS WITH INDIVIDUAL FIXED EFFECTS.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Gross wages	Net wages	Employer's costs	Subsidy costs	Effort per subsidy	Efficiency per subsidy	Employer's payoff	Worker's payoff
NS	57.92*** (3.27)	59.94*** (2.88)	57.38*** (2.43)				102.06*** (1.83)	54.80*** (1.94)
DS	55.21*** (3.24)	83.07*** (4.16)	55.43*** (2.62)	28.59*** (1.84)	0.13*** (0.01)	6.44** (0.18)	101.07*** (2.12)	78.44*** (2.72)
IDS	68.17 (3.01)	67.35 (3.42)	44.85 (1.77)	22.78 (1.05)	0.17 (0.01)	8.44 (0.33)	114.67 (0.92)	62.00 (1.82)
<i>N</i>	2480	2480	2480	2000	2000	2000	2480	2480

Notes: Bootstrap standard errors in parentheses. Stars denotes values in NS and DS that are significantly different to IDS, ** $p < 0.01$, *** $p < 0.005$.

TABLE B.2
REGRESSIONS WITH INDIVIDUAL RANDOM EFFECTS.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Gross wages	Net wages	Employer's costs	Subsidy costs	Effort per subsidy	Efficiency per subsidy	Employer's payoff	Worker's payoff
NS	57.54*** (2.64)	59.36*** (2.92)	57.01*** (2.40)				102.28*** (1.45)	52.90*** (1.95)
DS	55.27*** (3.86)	83.16*** (4.63)	55.48*** (2.98)	27.95*** (1.26)	0.13*** (0.01)	6.51*** (0.18)	101.03*** (2.22)	78.73*** (3.41)
IDS	68.29 (3.45)	67.54 (3.10)	44.98 (2.26)	22.29 (1.06)	0.17 (0.01)	8.50 (0.30)	114.60 (1.12)	62.62 (1.67)
<i>N</i>	2480	2480	2480	2000	2000	2000	2480	2480

Notes: Bootstrap standard errors in parentheses. *** denotes values in NS and DS that are significantly different to IDS, $p < 0.005$.

TABLE B.3
TOBIT REGRESSIONS ON WORKERS' RESPONSE FUNCTION.

	(1)	(2)	(3)	(4)	(5)
Gross wages	0.058*** (0.010)	0.052*** (0.011)			0.052*** (0.007)
Employer's costs	0.021 (0.016)		0.056*** (0.017)		-0.001 (0.022)
Net wages	-0.019 (0.016)			0.037*** (0.011)	
Constant	0.627 (0.670)	0.689 (0.672)	0.962 (0.829)	1.184 (0.783)	0.692 (0.729)
AIC	11505	11518	11721	11775	11520
BIC	11534	11536	11738	11792	11544
Ind. fixed effects	Yes	Yes	Yes	Yes	Yes
N	2480	2480	2480	2480	2480

Notes: Bootstrap standard errors clustered on matching groups in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

APPENDIX C: EXPERIMENTAL INSTRUCTIONS

General instructions

<Placed on table>

Hello, and thank you for agreeing to participate in the experiment.

Please turn off all mobile phones.

Important: Do not talk to the other participants.

The experiment consists of several rounds, during which you will be able to accumulate points according to the decisions you will take.

These points will be converted to money at a rate of **15 points = 1 NIS**.

The final payment in the experiment will be determined according to the **average** of the points in the round that you will accumulate, in addition to a base of **25 NIS**.

At the end of the experiment please wait for the experimenter to call you for payment.

We will distribute the instructions for the experiment and read them out loud. If you have any questions, please wait until we have finished reading the instructions and then raise your hand. The experimenter will approach you to answer your question privately.

Please do not ask questions aloud.

Instructions for the experiment

<Presented as a pdf document and available throughout the experiment>

The experiment

The experiment is divided into two phases. Each phase consists of ten rounds. At the beginning of the experiment you will be allocated into two groups – employers and workers. This allocation is random, and will remain fixed throughout the experiment.

In each round, you will be randomly **rematched in pairs**, where each pair consists of **one worker and one employer**.

The employer will choose a wage (the minimum is 30), to pay to the worker.

Next, the worker will choose the number of units that he will produce for the employer.

The worker incurs the cost of producing the units, as will be explained below.

The payoff of each employer in the round is:

$$\text{Payoff} = 120 - \text{Wage paid to the worker} + 10 \times \text{The number of units produced.}$$

The payoff of each worker is:

$$\text{Payoff} = \text{Wage received from the employer} - \text{Cost of production}$$

The worker can produce between 1 and 10 units, where the cost of production is given in the following table:

Number of units	1	2	3	4	5	6	7	8	9	10
Cost of production	0	1	2	4	6	8	10	13	16	20

Instructions for the first/second phase < ONLY IN DS >

Additionally, in the first/second phase of the experiment, the following addition applies *<in second phase of switch subsidy sessions: (instead of the first phase addition) >*

For the wage that the employer will choose to pay the worker, we will give the worker a supplement of 50%.

For example: if the employer will choose to pay a wage of 30 points, we will give the worker a supplement of 15 points, so that the worker will receive 45 points in total.

If the employer will chose to pay a wage of 80 points, we will give the worker a supplement of 40 points, so that the worker will receive 120 points in total.

Instructions for the first/second phase < ONLY IN IDS >

Additionally, in the first/second phase of the experiment, the following addition applies *<in second phase of switch subsidy sessions: (instead of the first phase addition) >*

For the wage that the employer will choose to pay the worker, we will give him a rebate of 33.3%.

For example: if the employer will choose to pay a wage of 30 points, we will give him a rebate of 10 points, so that the employer will pay 20 points in total.

If the employer will chose to pay a wage of 120 points, we will give him a rebate of 40 points, so that the employer will pay 80 points in total.