Public Sector Mission and the Productivity Gap[*]

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Abstract

We develop an experimental paradigm to study the incentives-based productivity gap between the public and private sectors and the role of public sector mission. We distinguish the two sectors by their respective incentive power. Participants in the experiment engaged in a real-effort task and were paid according to their performance. In the "private sector", remuneration was more sensitive to individual performance than in the "public sector". We find that the high-powered incentives in the private sector induce more effort and attract higher-ability workers. We then incorporate an intrinsic reward in the public sector—in order to represent public sector mission—whereby a worker's output generates a donation to a selected charity. The results show that public sector mission induces a shift of workers from the private to the public sector, results in greater effort in the public sector and raises the average level of ability of public sector workers, thus reducing the productivity gap between the two sectors. Adding public sector mission has no effect on average productivity, work time or average ability in the private sector. These results highlight the importance and efficacy of imbuing workers in organizations that produce a public good with a sense of purpose. Intrinsic rewards in such organizations play a similar role to that of material rewards in the private sector by increasing worker motivation and attracting higher-skilled workers. This in turn may enhance competition for workers between the sectors.

Keywords: public sector, incentives, mission, productivity, laboratory experiment.
JEL classification: C91, j24, J45.

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1 Introduction

An efficient public sector is one of the cornerstones of a democratic society (King et al., 1998). Since it employs a large proportion of the workforce and accounts for a major share of GDP, it has a significant effect on the economy, including the private sector. In the OECD countries, for example, the public sector employed on average 21.3 percent of the workforce in 2014 and accounted for 44 percent of the countries' GDP (OECD, 2015). According to the World Bank website, "Effective governments improve people's standard of living by ensuring access to essential services—health, education, water and sanitation, electricity, transport—and the opportunity to live and work in peace and security" (Bank, 2017).

Feldstein (1996) argued that "The central public finance question facing any country is the appropriate size of the government. Although economics alone cannot provide an answer to that question, economists can help politicians and the public to analyze the question in the right way and can provide estimates of the key parameter values that they need to reach informed decisions. Unfortunately [economists] are not doing a very good job of that important task." In the current research, we contribute to the discussion by introducing a novel experimental paradigm. In this framework, we focus on the most salient difference between the public and private sectors, namely that private firms typically provide high-powered incentives to their workers, which involve remuneration that strongly depends on the performance of both the firm and the employee. In the public sector, in contrast, compensation is typically set by long-term collective agreements, and job security is high (Solomon, 1986; Mazar, 2011).

Most economists believe that the public sector is less productive and less efficient than the private sector, mainly due to the high-powered incentives offered to private sector workers (Shleifer, 1998; Sheshinski and López-Calva, 2003). However, there is no clear correlation between the size of the public sector (as measured by the proportion of workers in the public sector) and a country's prosperity (as measured by per capita GDP). Thus, while some high-income countries —such as the Nordic countries (Denmark, Norway and Sweden)—have large public sectors that account for 30 percent or more of total employment, others—such as Singapore, Japan and Taiwan—have a small public sector that accounts for 10 percent or less.[1] Empirical attempts to evaluate the contribution to overall productivity of processes such as privatization or nationalization have yielded mixed results (see Megginson and Netter (2001) for a survey of 22 countries). Similarly, empirical comparisons of performance between public and private firms have not reached any clearcut conclusions (e.g., Atkinson and Halvorsen, 1986). Even when privatization—which leads to a transition to high-powered incentives—increases productivity, it is difficult to identify the channel.[2]

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[1] A more sophisticated analysis would include additional variables, such as the occupation of the public sector employees, in order to determine which jobs in the public sector are responsible for higher efficiency. This might explain some of the differences between countries.

[2] This is of course a generalization. NGOs, for example, tend to employ low-powered incentives, while high-

High-powered incentives can increase worker productivity in two ways: by incentivizing effort and by attracting high-ability workers. While some studies find a direct incentivizing effect on the productivity of workers (Groves et al., 1994; Li, 1997), others conclude that high-powered incentives increase productivity by attracting new human capital (Barberis et al., 1996). The question of which channel is dominant in determining the productivity gap between the two sectors remains open. Lach and Schankerman (2008) found evidence for the co-existence of these two channels in the context of patent royalty rights in universities. Similarly, Lazear (2000) estimated that the observed increase in productivity following a transition to high-powered incentives can be equally attributed to the incentivization of effort and the attracting of human capital. This question has important policy implications: If high-powered incentives increase productivity only by attracting new human capital, then global processes, such as privatization or nationalization, will only affect the allocation of workers between the sectors but not total productivity of the market.

The experimental literature on the relative impact of the incentivizing and sorting effects on productivity is limited. Eriksson and Villeval (2008) showed that moving from a fixed wage to a variable-pay scheme increases the average effort level and attracts more talented workers. In a laboratory experiment carried out by Cadsby et al. (2007), per-performance compensation achieves significantly higher firm productivity than a fixed salary scheme by means of both the sorting and incentivizing effects. In other words, more productive employees selected into the per-performance pay scheme, and employees, regardless of their preferred compensation scheme, produced more when compensation was performance-based.

When examining the differences between the private and public sectors, it is important to consider the motivational characteristics of the workers in each sector. A large body of literature has investigated these differences and found that while public employees are more likely to place a higher value on the intrinsic reward of work—such as a feeling of accomplishment and a sense of mission—private sector workers are more likely to place a higher value on material rewards, such as high income and short work hours (Crewson, 1997; Wright, 2001). Besley and Ghatak (2003, 2005) argue that, as a public goods provider, the public sector is naturally mission-based and attracts mission-oriented workers. This, in turn, justifies and reinforces the tendency towards low-powered incentives in the public sector.[3] According to this view, satisfying the mission preferences of workers that provide a public good substitutes for high-powered incentives. In the context of a two-sector economy, public sector mission should therefore mitigate the incentivizing and sorting effects and should reduce the productivity gap.

The goal of the current research is therefore to provide a better understanding of the role

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powered incentives can be found in some parts of the public sector. Applying these conclusions to natural settings outside the lab should thus take into account the existing incentives and thus they may extend to beyond the public sector.

[3]Obviously mission also exists in the private sector since some of its workers produce public goods. Nonetheless, this characterization of the public sector relative to the private sector can be assumed to hold in general.

of the different incentive structures coexisting in a two-sector economy and will help address certain public policy issues, such as how to attract human capital and incentivize workers in the public sector and the role of public sector mission in public goods provision. This is in addition to contributing to the discussions of the desired size of the public sector and the decision between privatization and for-profit management on the one hand and government ownership and management on the other.

In this research, we use a controlled laboratory experiment to isolate and study the incentivizing and sorting effects on workers' productivity in a two-sector economy where the sectors differ in the power of incentives offered to workers. We differentiate the incentives in each sector by offering different remuneration schemes for an identical task. A controlled experiment has the advantage of being able to isolate specific processes and provide full control over the variables. The experiments focus on the effects of incentive power while controlling for variables such as work environment and task characteristics, which are endogenous in the field and may "muddy the waters". The experiments also allow for precise measurement of variables that are typically unobservable or difficult to measure. Specifically, individual performance can be directly observed in an experimental setting. Finally, the laboratory environment provides clear-cut identification of causal effects, which is often lacking in the field. Overall, experimental methods can make a significant contribution to understanding public vs. private sector issues.

The experimental results successfully replicate the productivity gap hypothesized to exist outside the lab. We find that the private sector attracts higher-ability workers and that its workers exert more effort. When a sense of mission is introduced into the public sector, the productivity gap between the sectors is reduced. Public sector mission mitigates both the incentivizing and sorting effects. In our settings, this meant that the public sector is able to attract higher-quality workers and work time increases in the public sector while remaining unchanged in the private sector.

The rest of the paper is organized as follows: In Section 2 we present a simple model to illustrate the incentivizing and sorting effects and the moderation effect of public sector mission. Section 3 presents the experimental design and procedure while Section 4 presents the results. Section 5 concludes with a discussion of the results and their implications.

2   Model

We start with the worker's effort decision. We assume that the contract specifies a total time on the job T, and remuneration equal to the worker's productivity times a sector factor s. The worker chooses how to allocate the time between actual work (t) and leisure activities ($T - t$), such as, for example, spending time on social networks. Time spent working increases productivity with decreasing returns, represented by the production function where θ is the

worker's ability. Time spent on leisure yields a personal benefit at a fixed rate of l. The worker's utility is thus given by:

$$U = b + 2s\theta\sqrt{t} + (T - t) \cdot l. \tag{1}$$

where b is the base wage. Solving for the optimal work time we obtain:

$$t^* = \left(\frac{s\theta}{l}\right)^2 \tag{2}$$

yielding an optimal utility of:

$$U^* = b + \frac{(s\theta)^2}{l} + T \cdot l \tag{3}$$

As expected, work time is higher for more productive workers, for higher per-production wages, and for lower utility from leisure.

2.1 Sorting

Assume two sectors, with remuneration schemes (b_1, s_1) and (b_2, s_2) and that $b_1 > b_2$ and $s_2 > s_1$. The "public" sector is characterized by a high base wage and low per-performance remuneration. The "private" sector is characterized by a low base wage and high per-performance remuneration. A worker with ability θ will prefer the private sector iff

$$\theta \geq \sqrt{\frac{(b1 - b2) \cdot l}{s_2^2 - s_1^2}}. \tag{4}$$

Thus, lower-ability workers will opt for working in the public sector and exerting low effort (high consumption of leisure). Higher-ability workers will opt for working in the private sector and exerting high effort (increased work time). An increase in either the base wage or the per-performance remuneration in the public sector shifts marginal workers from the private to the public sector.

2.2 Mission

We model public sector mission as additional utility gained from production in the public sector. Thus, replace s_1 with $s\prime_1 > s_1$. It is easy to see that this change has two implications: First, workers in the public sector increase their work time given in Equation (2). Second, the threshold θ given in Equation (4) increases, and marginal workers shift from the private to the public sector.

3 Experimental design and procedure

The experiment was conducted at the Experimental Economics Laboratory of the Department of Economics of Ben-Gurion University of the Negev using the z-Tree software package (Fischbacher, 2007). Participants were recruited from the laboratory database using ORSEE (Greiner, 2015). A total of 70 subjects participated in four sessions of 30 rounds each. Each session lasted for about 70 minutes, the average payoff was 70 NIS (approximately $20) and the average donation was 9 NIS (approximately $2.5).[4]

The experimental instructions were presented to the participants on-screen at the beginning of the experiment and before each stage (see Appendix A.1 for a translation into English). Participants could ask questions privately. The experiment started once all the participants had confirmed that they understood the instructions. The participants were asked to choose one of four possible charities to which a donation would be made on their behalf at the end of the experiment. The size of the donation was not specified except that it depended on variables to be explained at a later stage.

The experimental environment simulated an economy with two sectors distinguished by their respective incentive power, following Ravid et al. (2017). Participants performed a real effort task and were paid according to their performance. In the "private sector", remuneration is more sensitive to individual performance than in the "public sector".[5] In other words, the base wage is higher and the per-performance remuneration is lower in the "public sector" than in the "private sector". Production is based on the Slider Task (Gill and Prowse, 2011). In each round, participants are presented with 36 sliders and are allotted 90 seconds to move as many sliders as possible to the center position using only the mouse (see the appendix for the experimental instructions and screenshots). Total productivity in each round is defined as the number of sliders successfully positioned at the center position within the allotted time. Since effort in such experimental tasks has been found not to vary much with incentives (Araujo et al., 2016), we incorporate an effort investment decision by providing explicit payment for leisure. During each round of 90 seconds, the participants can switch between working mode and leisure mode by pressing a designated button. When in leisure mode, the sliders are deactivated and the participant accumulates payment at a fixed rate.[6]

The payoff for each round was determined by the sector type, the individual's productivity and his consumption of leisure. In the public sector, the base wage is higher than in the private sector, but the per-slider payment is lower. The payoff functions were as follows:

$$\text{Public sector: } \pi_i = 170 + 4 \cdot P_i + L_i,$$

$$\text{Private sector: } \pi_i = 50 + 10 \cdot P_i + L_i,$$

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[4]The donations were made by the experiment managers rather than being subtracted from the subject's payoff.

[5]We use the labels Private Sector and Public Sector rather than the more generic Sector 1 and Sector 2 in order to make the experiment more realistic.

[6]The leisure mode captures, for example, time spent on social media during work hours.

where $P_i \in \{0, 1, \ldots, 31, 32\}$ denotes the individual's productivity and $L_i \in \{0, 1, \ldots, 89, 90\}$ denotes leisure time in seconds. The sensitivity to changes in productivity is thus 2.5 times larger in the private sector than in the public sector (10 points vs. 4 points). Note that at a productivity of 20 sliders the salaries in both sectors are equal (assuming the same amount of leisure time).

In order to create a sense of mission in the public sector, participants in that sector were told that a donation would be made to the charity they selected at the beginning of the experiment for each unit of output while working in the public sector (cf. Charness et al., 2016; Koppel and Regner, 2014; Tonin and Vlassopoulos, 2014).

Each session consisted of four separate stages:

1. Practice Stage: Two unpaid rounds in which the participants familiarize themselves with the experimental task.

2. Exogenous Stage: Twelve rounds in which participants alternate between the public and private sector on odd and even rounds (counterbalanced between participants).

3. Endogenous Stage: Eight rounds in which participants choose the sector at the beginning of each round.

4. Mission Stage: Eight rounds; identical to the Endogenous Stage except that each unit of output produced in the public sector generates a fixed donation to the participant's selected charity.

The design allows us to isolate and separately estimate the incentivizing, sorting and mission effects. The incentivizing effect is measured by the difference in average work time between the private and public sectors in the Exogenous Stage; the sorting effect is measured by the difference in average ability of workers between the private and public sectors in the Endogenous Stage;[7] and finally, the mission effect can be calculated by comparing the productivity gap, average work time and average ability between the Endogenous Stage and the Mission Stage.

During the round, the participants have access to the following information: current sector, remaining time, leisure consumption, output, salary, and the salary of a hypothetical identical worker, i.e., one with the same performance and leisure time, in the other sector. In the Mission Stage, they also had access to their total donation. The final feedback provided at the end of the round summarized all of the data for that round for the aforementioned parameters (see Figure A.2 for an example of a feedback screen).

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[7]The worker's ability is defined as the mean productivity of the worker per minute in the Exogenous Stage in the private sector.

3.1 Hypotheses

The first three research hypotheses focus on the effect of differences in incentive power between the two sectors on worker productivity, such that the private sector is able to attract higher-ability workers and incentivize its workers to exert more effort (i.e., consume less leisure). Hypotheses 4–6 test whether public sector mission mitigates the effects of high-powered incentives.

Hypothesis 1. *High-powered incentives elicit higher productivity in the private sector.*

This hypothesis is tested by comparing the average productivity in the private and public sectors in the Endogenous Stage. The next two hypotheses separately test the two channels through which this effect operates - incentivizing and sorting:

Hypothesis 2. *High-powered incentives in the private sector elicit a higher level of effort.*

This hypothesis is tested by comparing effort levels—measured by the work time during the round—between the sectors in the Exogenous Stage.

Hypothesis 3. *High-powered incentives in the private sector attract higher-ability workers.*

We measure the basic ability of the individual worker as her mean productivity in the private sector during the Exogenous Stage. We thus test this hypothesis by comparing the difference in average ability between the two sectors in the Endogenous Stage.

Hypothesis 4. *Public sector mission reduces the productivity gap.*

This hypothesis states that public sector mission tends to compensate for the lack of high-powered incentives in the public sector and should reduce the productivity gap. The hypothesis is tested by comparing the productivity gap between the Mission Stage and the Endogenous Stage.

Hypothesis 5. *Public sector mission mitigates the incentivizing effect.*

This hypothesis states that workers choose to consume less leisure in the public sector when their work generates a public good. The effect of public sector mission on the incentivizing effect is tested by comparing the work time between the Mission Stage and the Endogenous Stage while controlling for a subject-specific fixed effect.

Hypothesis 6. *Public sector mission reduces the sorting effect.*

This hypothesis is tested by comparing the average ability gap between the Mission Stage and the Endogenous stage.

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4 Results

4.1 Incentivizing and sorting

Table 1 shows the percentage of rounds that workers chose to spend in each sector in each stage. Recall that in the Exogenous Stage, workers work in the two sectors for an equal number of rounds by design. In the Endogenous Stage, during which workers can freely sort into sectors, workers chose, on average, to spend more rounds in the public sector than in the private sector. This tendency was substantially reinforced in the Mission Stage, in which a public sector mission was introduced. Thus, it can be concluded that public sector mission attracts workers to the public sector. Note that in a labor market with a fixed number of jobs, public sector mission can be expected to result in greater competition for jobs in the public sector and consequently to increase the average ability of workers in the public sector to an even greater extent.

Table 1: Percentage of time spent in each sector

Sector	Exogenous stage	Endogenous stage	Mission stage
Public	50%	61%	83%
Private	50%	39%	17%
Total	100%	100%	100%

Table 2 presents the results for a set of linear regressions that estimate productivity, work time and average ability as a function of sector, stage and round. To facilitate the interpretation of the regressions, Figures 1–3 show the regression predictions by productivity, work time and ability for each sector in each stage.

Table 2: Regressions

	(1) Productivity	(2) Work Time	(3) Ability
Endogenous	-5.519***	-19.39***	-0.994***
	(0.872)	(3.940)	(0.298)
Mission	1.797	17.16***	-0.356**
	(1.348)	(5.897)	(0.175)
Private	6.847***	29.17***	0.00076
	(0.919)	(3.935)	(0.00099)
Endogenous x Private	9.537***	33.33***	2.643***
	(0.969)	(3.859)	(0.684)
Mission x Private	4.657***	7.695	2.550***
	(1.313)	(5.061)	(0.844)
Period	-0.0806*	-1.282***	-0.0044
	(0.048)	(0.206)	(0.0049)
Constant	11.86***	69.58***	18.05***
	(0.841)	(3.889)	(0.467)
Observations	560	560	560
Number of subjects	70	70	70

Robust standard errors in parentheses
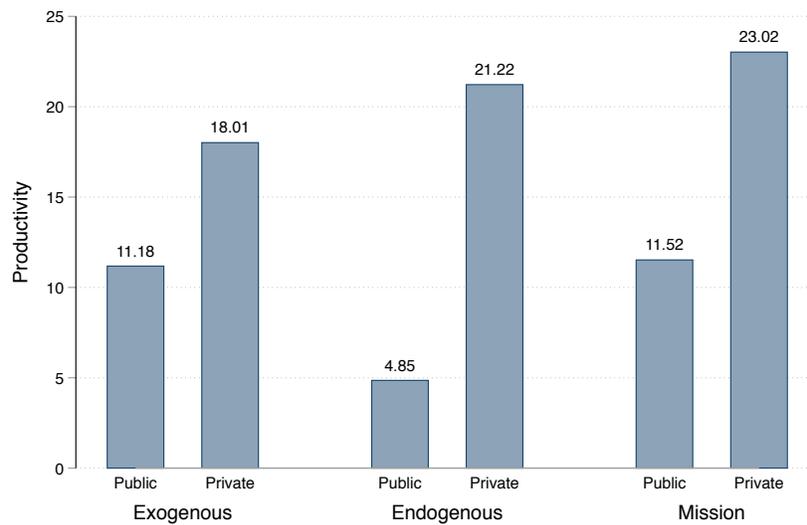
*** p<0.01, ** p<0.05, * p<0.1
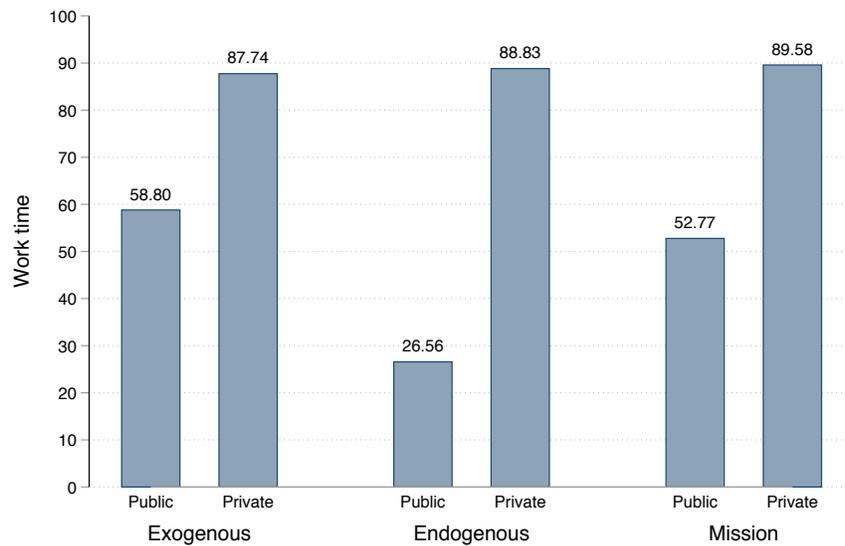
Figure 1: Average productivity

Figure 2: Average work time

We start with the analysis of the average productivity gap between the sectors in the Endogenous Stage. Figure 1 shows that in the Endogenous Stage average productivity (i.e., number of completed sliders) is more than 5 times higher in the private sector than in the public sector (21.5 versus 4.85). Thus, the experiment successfully reproduces the produc-
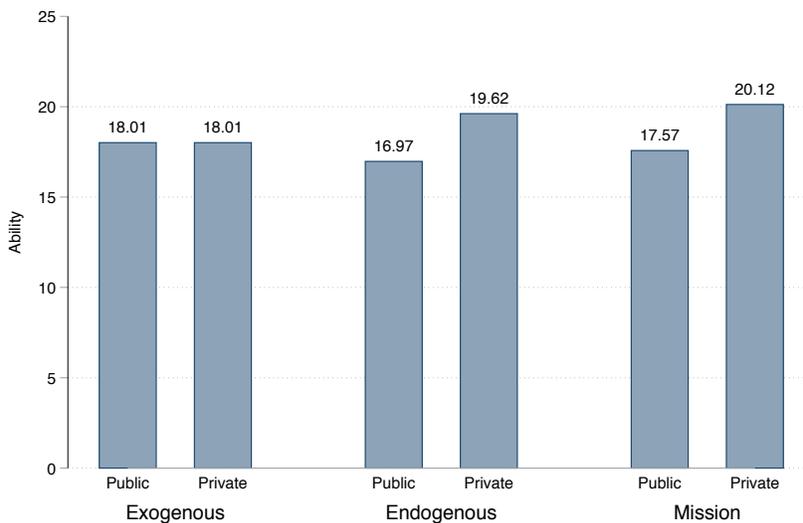
Figure 3: Average ability

tivity gap observed outside the lab and confirms Hypothesis 1. Recall that in this stage the productivity gap is due to both the incentivizing effect and the sorting effect .

Figure 2 shows that in the Exogenous Stage the work time in the private sector is 50 percent higher than in the private sector (87 seconds versus 58), with workers in the private sector allocating nearly all of their time to work. When those same workers move to the public sector, however, they spend as much as one third of their time in leisure mode. This decrease in the effort level can be attributed directly to the incentive power differences between the two sectors. Since in this stage workers are exogenously allocated among sectors, any difference in work time can be attributed to the incentivizing effect and therefore Hypothesis 2 is confirmed by the results.

Figure 3 shows that in the Endogenous Stage worker ability in the private sector was 15 percent higher than in the public sector (average ability decreased by 7 percent in the public sector and increased by 8 percent in the private sector). Since in this stage the participants could choose between the sectors, the results confirm Hypothesis 3 that higher-ability workers will tend to choose the private sector. This is in line with recent empirical studies Mazar (2018).

The results indicate that both effects—incentivizing and sorting—contribute to the productivity gap between the sectors. In order to estimate the relative contribution of each effect before the introduction of public sector mission, we shut down the sorting effect using subject fixed effects and estimate the resulting reduction in the productivity gap.[8] The results are

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[8]Alternatively, we could compare the productivity gap between the Exogenous and Endogenous stages. This

presented in Table 3. The coefficient in column 1 represents the productivity gap generated by both effects while the coefficient in column 2 is the productivity gap due only to the incentivizing effect. Therefore, the incentivizing effect accounts for 55 percent of the productivity gap (9.13/16.44) while the remaining 45 percent is due to the sorting effect. With respect to work time, the incentivizing effect explains 64 percent of the work time gap (40.26/62.69) while the remaining 36 percent is due to the sorting effect.

Table 3: Regressions with Fixed Effect

	Productivity				Work time			
	(1) Endogenous	(2) Endogenous	(3) Mission	(4) Mission	(5) Endogenous	(6) Endogenous	(7) Mission	(8) Mission
Private sector	16.44***	9.13***	11.50***	6.35***	62.69***	40.26***	36.82***	23.31***
	(1.117)	(1.616)	(1.193)	(1.725)	(4.438)	(6.202)	(4.571)	(6.232)
Period	-0.397***	-0.337***	0.0435	0.0488	-2.361***	-2.178***	-0.134	-0.120
	(0.093)	(0.082)	(0.128)	(0.129)	(0.417)	(0.383)	(0.512)	(0.511)
Constant	12.17***	13.94***	10.37***	11.11***	70.08***	75.50***	56.31***	58.26***
	(2.115)	(1.637)	(3.492)	(3.507)	(9.310)	(7.405)	(13.88)	(13.68)
Subject fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	560	560	560	560	560	560	560	560
Number of subjects	70	70	70	70	70	70	70	70

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

4.2 Public sector mission

We next consider how incorporating a sense of mission in the public sector in our laboratory settings affects the productivity gap. It is expected that the introduction of an intrinsic reward will compensate for the lack of high-powered incentives in the public sector and therefore should moderate the incentivizing and sorting effects and decrease the productivity gap. Figure 1 shows that the productivity gap is reduced by 33 percent in the Mission Stage relative to the Endogenous Stage, thus confirming Hypothesis 4. Note that while the increased productivity in the public sector was expected, there was also an increase—though not statistically significant—in the private sector. This is likely due to the fact that the workers attracted from the private to the public sector with the introduction of public sector mission tend be the less productive, thus raising the average productivity in the private sector.

Hypothesis 5, which states that public sector mission will mitigate the incentivizing effect, is tested by comparing the work time gap between the sectors in the Endogenous Stage and the Mission Stage, as illustrated in Figure 2. Similarly, a comparison of Columns (6) and (8) in Table 3 shows that public sector mission decreases the work time gap between

comparison, however, is confounded by learning effects that are apparent throughout the experiment, as we discuss below.

the sectors by 41 percent.[9] Note that the introduction of public sector mission also increased the average work time in the private sector, though again the increase was not statistically significant. As in the case of the previous productivity increase in the private sector, the introduction of public sector mission likely attracts the less productive workers from the private sector, thus raising the average effort level in that sector.

Hypothesis 6, which states that public sector mission will mitigate the sorting effect is confirmed in Figure 3, which show that average ability increased in both the Endogenous Stage and the Mission Stage but only in the public sector was it statistically significant. Overall, there is no significant change in the average ability gap. This is the same pattern observed in the cases of productivity and the incentivizing effect: the introduction of public sector mission attracts less talented workers from the private to the public sector due to their lower alternative cost. Because the transition of the workers is at the margin, this shift decreases average ability in the private sector while at the same time increasing it in the public sector. It is safe to assume that in situations outside the lab, in which firms can enter freely and low-ability workers do not get hired, we will likely see a decrease in average ability in the private sector.

The results in Table 3 make it possible to measure the relative contribution of each effect after the introduction of public sector mission. As noted previously, the coefficient in Column (3) represents both effects on the productivity gap while the coefficient in Column (4) represents only the incentivizing effect. Thus, the incentivizing effect accounted for 55 percent of the productivity gap (6.35/11.5) in the Endogenous Stage, while the sorting effect accounted for the remaining 45 percent. Similarly, the incentivizing effect estimated in Column (8) accounted for 64 percent of the work time gap (36.82/23.31) while the remaining 37 percent was due to the sorting effect. Combined with the previous results, it is possible to conclude that public sector mission moderates both the incentivizing and sorting effects to essentially the same extent.

While we find that much of the increased productivity in the private sector is due to reallocation of workers, which does not necessarily affect the aggregate productivity in the economy, the results imply that processes such as privatization and nationalization also affect effort decisions, and are thus predicted to increase the total labor productivity to some extent. However, the greater the sense of mission among workers in the public sector, the less impact these processes will have.

4.3 Learning effects

Table~2 reveals a decreasing time trend in work time and productivity, and insight can be gained by comparing this trend in the various stages in each sector. Figure 4 shows that work time in the private sector is stable at close to 90 seconds (the time allotted in each round)

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[9]The subject fixed effects control for the sorting effect.

across all stages. In the public sector, in contrast, work time steadily decreases during the Exogenous and Endogenous stages (from 80 to 20 seconds) and then rebounds in the Mission Stage (to almost 60 seconds). The decline in work time during the first two stages can be interpreted as resulting from a learning process, in which workers gradually adjust their level of effort according to the relative payoff function. Thus, the average work time in the public sector during the first two stages is higher than would be expected in natural work settings, which allow for a longer adjustment period. A similar pattern can be seen in productivity over time in Figure 5, whereby productivity increases over time in the private sector and decreases in the public sector. However, in the Mission Stage productivity in the public sector rebounds and remains stable throughout the stage. This again can be explained by the learning process of workers in both sectors.
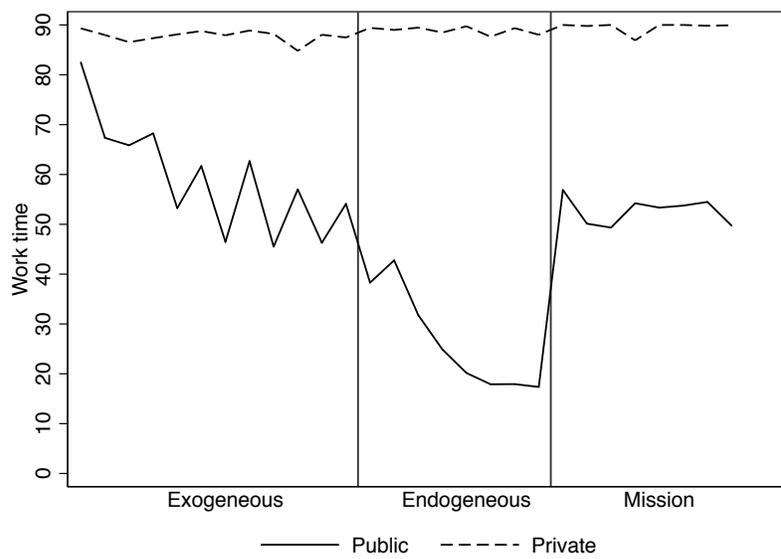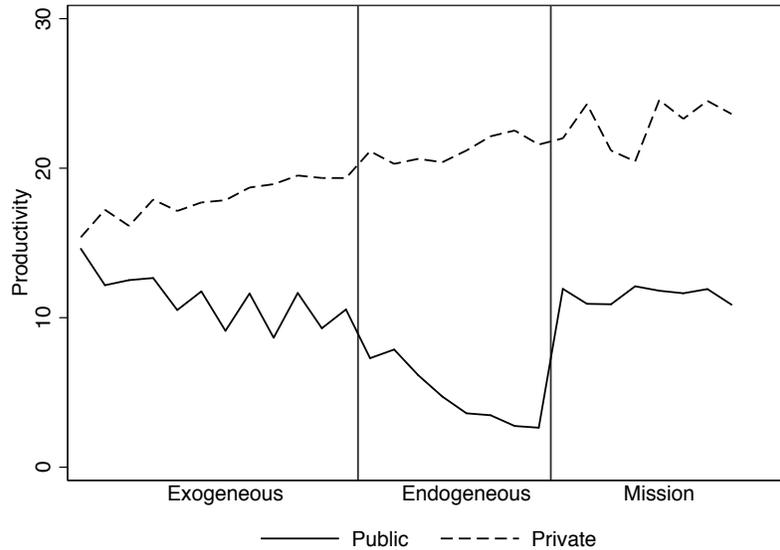

Figure 4: Work time across stages

Figure 5: Productivity across stages

To summarize the results, the introduction of public sector mission has a significant impact in a two-sector economy. It mitigates the sorting effect by attracting high-ability workers from the private sector to the public sector and mitigates the incentivizing effect by increasing work time in the public sector (while having no effect on the private sector). Thus, it acts by means of both effects to reduce the productivity gap.

5   Conclusion

We present a novel experimental paradigm to test the incentive mechanisms in the public and private sectors and to measure the impact of a sense of mission in the public sector. The laboratory setting successfully reproduces the productivity gap observed between actual private and public sectors, thus corroborating the results of field studies and making it possible to investigate the effect of additional variables. The results also confirm the impact of the two effects, i.e the incentivizing effect and the sorting effect, on the productivity gap and can be used to distinguish between them.

The findings also show that public sector mission mitigates both the incentivizing and sorting effect, thus reducing the productivity gap between the sectors. When public sector workers felt they were contributing to a higher purpose, they increased their effort and improved their productivity. Theses results underline the benefits of a sense of mission among workers providing a public good and reinforce the findings reported in the literature (Wright,

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2007). While the findings apply mainly to firms that produce a public good, recent studies suggest that it is also profitable for companies in the private sector if their employees feel that their work is meaningful (Gartenberg et al., 2016). Furthermore, studies consistently show that intrinsic rewards, such as a feeling of accomplishment, are crucial factors in job satisfaction (Steger et al., 2012) and are usually more important than extrinsic rewards (Mottaz, 1985; Judge et al., 2010). Gneezy et al. (2011) further argue that high extrinsic rewards over time may potentially crowd out intrinsic motivation. The experimental results obtained in this study reinforce the insight that the public sector will benefit if employees view their job as more meaningful (Carton, 2017), which leads to higher levels of motivation, effort and productivity and will attract higher-ability workers.

While the results of studies in the field are sometimes viewed as having greater validity than those of laboratory experiments, they necessarily treat some variables as fixed. The experimental framework presented here is thus novel in its ability to generate new questions with regard to variables that affect the productivity gap between the sectors. Future work might extend the paradigm to other variables—such as the free entry of firms or unemployment of low-ability workers—that affect the interplay between the incentive mechanisms in a two-sector economy.

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A Appendix

A.1 Experimental instructions

<Presented on-screen>

You are participating in an experiment under the auspices of the Department of Economics. Participation is voluntary, and you will receive a payoff according to the outcome of the experiment. During the experiment, you will accumulate points and on completion the points will be converted into money at a rate of 100 points = 1 NIS. The experiment consists of 30 rounds and is approximately 60 minutes long.

At the end of the experiment, you will receive payment according to the number of points you have accumulated and in addition a donation will be made to the charity you select. The exact amount depends on variables that will be explained later. The donation will be made online immediately after the experiment. All the participants will receive an email with a copy of the receipt.

Please choose one of the following organizations for your donation:

1. Elem: a non-profit organization helping youth in distress.

2. Educating for Excellence: a non-profit organization that aims to reduce social gaps by creating equal opportunity for children and youth in the periphery.

3. Anonymous: a non-profit organization for the humane treatment of animals and increasing awareness of their suffering.

4. Ofanim: A nonprofit organization that promotes educational activities for disadvantaged children and youth.

The first stage is for practice in order for you to get acquainted with the task. It will consist of 2 rounds of 1 minute each. A screen with 36 sliders will be presented. The position of the slider on the bar ranges from 0 to 100. The task is to move as many sliders as possible with the mouse exactly to the midpoint, i.e. to 50, within 90 seconds. The task remains the same in all the stages

During the round, participants will be able to switch between working on the task or leisure and vice versa by pressing on the leisure-work button that will appear on the left side of the screen. At the end of the round, a feedback screen will be displayed summarizing the number of sliders completed and leisure time in seconds.

The next stage will consist of 12 rounds of 1.5 minutes each. This stage simulates an economy with two sectors: a public sector and a private sector. Each participant will be assigned to a sector, which will alternate in each round.

The salary of each participant will be determined by two factors: the number of sliders completed and the sector. Note that in the private sector the base salary is lower but the

payment for each slider completed is higher. In other words, salaries in the private sector are more sensitive to output than in the public sector. The base wage is 50 in the private sector and 170 in the public sector. Ten points are earned for every slider completed in the private sector and 4 points in the public sector. Note that points are earned even for leisure: one point for each second in leisure mode.

After each round, a feedback screen will be displayed summarizing the results of that round. The results include: number of sliders completed, salary earned by the participant, and the salary that the participant would have earned for the same effort in the other sector.

The next stage will consist of 8 rounds. This stage is identical to the previous one except the participant can choose the sector to work in before each round.

The last stage will consist of 8 rounds and is identical to the previous one except that for each Slider completed in the public sector, 0.1 shekels will be donated to the organization selected at the beginning of the experiment. Note that a donation will be made only for output in the public sector.

Good luck!

A.2 Screens

Salary in other sector	Your salary	Seconds in rest mode	Your output	Seconds left in this round	Your sector
194	110	0	0	0	private

Figure A.1: An example of an effort task screen

Round summary

You worked in the public sector

Your base salary was 170

Your output in this round: 4

The payment for your output: 16

The payment for seconds in rest mode: 15

Your total salry in this round: 201

The salary in the other sector with the same output: 105

Continue

Figure A.2: An example of a feedback screen