

# Incentives in multi-task settings

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## **CHAPTER 6**

### **Summary and Conclusion**

#### **6.1 Introduction**

In this final chapter I summarize the dissertation. In addition to a discussion of the implications of the findings, I provide some directions for future research in the area of multi-task principal-agent models and incentive schemes.

#### **6.2 Summary**

Economic theory suggests that financial incentives are optimal for agents to induce effort in single-task settings. However, theory predicts that in multi-task settings where performance on different tasks are measured with different levels of precision, financial incentives can lead to an effort allocation between tasks that is not necessarily in line with the objectives of the principal. Risk-averse agents tend to prefer effort on a precisely measured task over effort on a task measured with noise. A solution put forward in the literature is to offer agents a fixed wage, so that effort can be allocated in line with organizational objectives - assuming that agents are willing to deliver effort at all and do not follow a random strategy. Empirical findings put forward that individuals are not only motivated by means of explicit financial incentives, as frequently argued by economic theory. Rather, individuals are also motivated by implicit financial incentives, like career concerns, and non-financial incentives, like reputation and social status. Total incentives of an

individual are thus a combination of explicit financial incentives and implicit financial and non-financial incentives.

The purpose of this dissertation is to give answers to the following two research questions:

- *How do explicit financial incentives influence effort allocation in multi-task agency settings?*
- *What role do other forms of incentives, such as social incentives and career concerns, play?*

The focus in this dissertation is thus on how financial incentives and other forms of motivation influence effort allocation of agents in a multi-task setting. I have examined the two research questions by means of two experimental studies with business students from Maastricht University.

#### *6.2.1 The role of financial and social incentives*

The objective of the study described in chapter 4 is to examine the influence of social incentives (group norms) and ethical concerns (individual norms) on effort allocation of agents who are exposed to distorting financial incentives in a multi-task setting. Participants work for an experimental firm on two independent tasks and are informed that an equal output on both tasks is optimal for the firm. Participants are randomly assigned to one of the following four treatments: (1) fixed wage/no social incentives, (2) fixed wage/social incentives, (3) financial incentives/no social incentives, and (4) financial incentives/social incentives. I find that subjects who receive financial incentives on one task significantly reduce their effort on the other task, which is consistent with agency theory. Contrary to agency theory, however, I find that subjects do not purely act in self-interest when exposed to congruent social incentives. In particular, results of this study show that the

distorted effort allocation caused by financial incentives is significantly reduced, both in statistical and economic terms, by social incentives and ethical concerns.

Results thus indicate that the effort allocation of subjects is not solely driven by financial incentives, but also by the desire for social approval and internalized values. This finding has important managerial implications given that managerial choices affect the social incentives within an organization. Results of this study are summarized in table 6.1.

**TABLE 6.1**

**The Role of Financial Incentives and Social Incentives in Multi-Task Settings**

	Hypothesis
Effort allocation lowest with FI <sup>a</sup> , higher with FI and SI <sup>b</sup> , and highest with fixed wages	1 - supported
Ethical concerns lower distorting effect of FI	2 - not supported
Ethical concerns positively interact with SI to decrease distorting effect of FI	3 - supported

<sup>a</sup> Financial incentives

<sup>b</sup> Social incentives

Findings of this study contribute to the literature in many ways. This study is one of the first to investigate the role of financial and social incentives in a multi-task agency setting. The important roles of social incentives as well as internalized values, such as ethical concerns, are underlined. Further, this study shows that there are settings where financial incentives are preferred over fixed wages despite being distorted and although performance of the agent on one task is not measured. Finally, results suggest that the agency problem is not only about inducing effort, but also about inducing the 'right' effort, because there is a tradeoff between effort allocation and the overall effort levels desired by the principal.

### 6.2.2 *The role of career concerns in multi-task settings*

The purpose of the study described in chapter 5 is to investigate three issues. In a multi-task agency setting with career concerns, I examine whether fixed wages are still optimal for the effort allocation of agents. Furthermore, this study investigates whether the negative relationship between noisy performance measures and incentive weights holds in presence of career concerns. A further objective of this study is to find out whether career concerns of agents and financial incentives are substitutes or complement each other.

To investigate the role of career concerns in multi-task settings, I run a 2x3 experiment. Participants work on two tasks per experimental period that are of equal complexity and character. However, effort on one task is measured precisely and effort on another task is measured with noise. Subjects are randomly assigned to one of the following six treatments: (1) fixed wage/no career concerns, (2) fixed wage/career concerns, (3) equally weighted financial incentives/no career concerns, (4) equally weighted financial incentives/career concerns, (5) unequally weighted financial incentives/no career concerns and (6) unequally weighted financial incentives/career concerns.

Findings of this study indicate that under incentives with equal weights on both tasks, effort is strongly allocated to the task that is measured precisely. However, participants are indifferent between tasks under a fixed wage, which is in line with theoretical predictions. Results further show that in presence of career concerns, participants prefer to allocate their effort to the precisely measured task also under fixed wages, because this signal is favored by the labor market. Agents with fixed wages *and* career concerns are thus not indifferent between tasks. Whereas in presence of career concerns, effort is mostly allocated to the precisely measured task both with fixed wages and with equally weighted financial incentives, increased explicit incentive weight on the task measured with noise helps to counterbalance this possibly harmful allocation. More specific, to avoid that agents with career concerns prefer effort on the precisely measured task, it can be necessary to increase the explicit incentive weight on the task measured with noise (unequally

weighted financial incentives), which is at odds with standard arguments in the literature. Results indicate that effort is almost evenly balanced between tasks when there are career concerns and a higher financial incentive weight on the task measured with noise, suggesting that career concerns and explicit incentive weights are not substitutes but complements.

This study contributes to the literature in several ways. It is one of the first empirical studies examining the role of career concerns in a multi-task setting. There is evidence that fixed wages are not necessarily optimal, because agents have an economic incentive to prefer effort on a precisely measured task when there are career concerns. Further, the relationship between risk and incentives can be positive. In presence of career concerns, financial incentives with a higher weight on a noisy task can help to mitigate effects of implicit incentives due to career concerns. Explicit financial incentives thus counterbalance these effects. Results indicate that financial incentive weights and career concerns complement each other. Table 6.2 summarizes the findings of this study.

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**TABLE 6.2**

**The Role of Career Concerns in Multi-Task Settings on Effort Allocation of Agents**

	<b>Hypothesis</b>
Career concerns → effort on precise task	1 - supported
No career concerns → fixed wage "optimal"	2 - supported
With career concerns → Unequally weighted financial incentives "optimal"	3 - supported

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### **6.3 Implications**

Findings of this dissertation have both theoretical and managerial implications. Whereas theory predicts that fixed wages may be optimal in multi-task settings for

effort allocation purposes, it seems that many multi-task jobs are not compensated with fixed wages. Especially managerial jobs in higher levels of an organization are characterized by multi-tasking, and are frequently compensated with performance-based financial incentives. Incentive compensation is, however, not only used to motivate employees to work, but is also used to attract the 'right' people for certain jobs. This holds especially for higher levels in an organization, where financial incentives are simply expected as standard compensation practice. The wide use of financial incentives and the apparent lack of alternatives for various reasons stress the importance of the findings and implications of this dissertation.

First, financial incentives have a strong impact on effort allocation. However, in addition to the effects of financial incentives, individuals are motivated also by other mechanisms, such as implicit financial incentives as well as group and individual norms (i.e., social incentives and ethical concerns). Non-financial motivations are thus important for individuals in their action choice and can have implications for organizational values and principles and can be an issue for recruiting and selection of individuals for certain jobs.

Second, it may not be beneficial for a principal to offer fixed wages, because fixed wages can lead to lower overall effort. Further, in presence of career concerns, effort under fixed wages is not necessarily in line with the objectives of the principal, because the agent's allocation is influenced by career concerns and signals to a labor market. It is necessary to understand motivational mechanisms for individual action choice in order to determine the appropriateness of fixed wages.

Third, whereas the literature suggests that explicit financial incentives and career concerns are substitutes, results of this dissertation put forward that the two are not substitutes, but even complement each other. For compensation practice it may be necessary to use explicit financial incentives in order to counter motivational effects due to career concerns. Given an almost omnipresence of career concerns, it is thus necessary to consider such concerns in the design of an incentive scheme.

Fourth, theory predicts that there is a negative relationship between risk and incentives. However, this dissertation shows a situation where the relationship is not negative but positive. To counterbalance the effects of career concerns it may be necessary to increase the incentive weights on tasks that are measured with high levels of noise, because these tasks are ignored by the labor market.

Contracts between a principal and an agent are a trade-off between the level of financial incentives and the risk imposed on an agent. Higher risk needs to be compensated with a risk premium, with the result that financial incentives are muted in very risky environments because compensation cost is too high. Prendergast (2002a) argues that this trade-off between risk and incentives is rather difficult to detect empirically, and mixed evidence on this trade-off may even suggest that the relationship is *not* negative. Bonus and incentive schemes are common for managers not only in very stable industries, but also in highly volatile and risky industries, such as the high-tech industry. More specific, Prendergast (2002A) gives four arguments why one would *not* see a negative relationship between risk and incentive weights. First, monitoring of managerial inputs is less effective in uncertain environments. The principal is more likely to offer an outcome-based incentive contract in very uncertain environments as he does not have a clear idea what exactly the agent should spend his time on. Second, sorting and truthful performance appraisals are less effective in uncertain environments. In particular, if reports of supervisors are less reliable, a firm may choose to increase financial incentives to induce effort of the agent, because performance appraisals become more noisy and incorrect. Third, sporadic investigations on the agent's performance are less effective in uncertain environments. Agents suffer less from investigations in risky environments because they can easier "get away" with bad performance in noisy environments than in stable environments. To motivate the agent, however, a firm may choose to increase financial incentives based on the performance of the agent. Fourth, agents have reputation and career concerns. These concerns, however, are less effective in noisy environments, where results of individual agents are difficult to assess by others. In such settings financial incentives are needed to induce effort of the agent to overcome shortcomings of evaluations of a labor



market (career concerns) or others. As mentioned by Prendergast (2002a), these reasons are not meant to claim that agency theory is "wrong" in the assumption of a negative relationship between risk and incentives. But the reasons above can be instances where the relationship between risk and incentives may be different.

#### **6.4 Limitations**

The studies of this dissertation are both experimental studies. The use of experiments in accounting research is increasing for various reasons. By means of laboratory experiments, one can investigate issues that are difficult to detect with field data. The main reason for choosing an experiment is to control everything except for the variables of interest. By keeping everything else constant one can infer a clear relationship that is not distracted by noise. Even further, experiments are the most suitable method to detect causal relationships (Shadish et al. 2002). Experimental research is subject to several specific limitations that I will discuss in detail in this section.

First, high internal validity often leads to rather abstract experiments. Lack of realism is one of the most frequently raised concerns with experiments. The question is how far results from experimental research can be generalized. How high is the external validity, i.e., do results generalize over different populations and different situations. Experiments cannot be a mirror of real-life. If they were, one could also use field data for research. The strength of experimental research is that one can investigate certain selected variables without noise. Usually, the variables of interest are embedded in the environment together with many other variables, so that it is impossible to draw conclusions on these variables alone. The fact that laboratory experiments are not very realistic is thus a limitation but is at the same time a strength and even a necessity.

Second, a limitation of the studies of this dissertation is the use of very simplified tasks. For the first study participants are asked to indicate their effort level. There is

thus no "real" effort of performing a certain task. In the second experiment, participants are asked to decode numbers based on a decoding key. The tasks are thus no typical managerial tasks, but serve the purpose to rule out any intrinsic motivation because of the tasks, to rule out certain skills and talents, and to keep necessary pre-knowledge as low as possible. Nevertheless, results of the studies here could be different with other types of tasks, for example problem-solving or memory tasks.

Third, the short duration of the experiments may pose another limitation. Due to the short duration, endogenous reputation building and other dynamic factors are excluded. However, such aspects could play an important role and lead to different results. The design of the experiments and the fact that they are laboratory experiments and no field experiments, do not allow longitudinal studies of the relevant variables.

A final remark concerns the use of student participants in experiments. There is a continuous debate on whether students behave differently than managers or other employees. Until now, there is no consensus on this issue. I cannot find a reasonable argument that students behave differently than employees of a firm. With respect to the incentives provided in the experiments, it may be a question on the level of financial incentives, but there is hardly any reason why students would behave in an opposite direction than employees in any of the two studies.

## **6.5 Future research**

Results of this dissertation open several interesting avenues for future research. First, the financial incentive schemes examined in the studies are piece-rate schemes. There are many other forms of financial incentives that can possibly lead to different results in multi-task settings. Bonus schemes or stock options, for example, can induce agents to behave less short-term oriented and myopic, but consider the long-term value of a firm.

Second, the study on the role of social incentives has indicated the strong effects of such incentives. Nevertheless, communication between subjects was not allowed and the group norm was exogenous. Communication between participants and extending the time frame of the experiment allows a group norm to develop or change over time. It could be interesting to find out how a norm endogenously develops over time, and how and why a group norm changes. Research in this direction can help to understand group behavior better, and can mitigate social incentive problems and incongruent behavior due to group dynamics.

Third, findings of the study on social incentives indicate that there is a tradeoff between effort allocation and overall effort level. Analytical research could tackle this tradeoff and analyze this tradeoff. Incorporating the dilemma of effort allocation and effort level in agency models could extend theory further and help to understand multi-task settings better.

Fourth, the study on career concerns allowed signaling of one type of ability. However, in a more complex situation employees with different abilities can signal these different abilities to the labor market. It is thus possible that employees compete not necessarily with the same (signaled) abilities but with different abilities and a labor market needs to trade-off an employee with different abilities. Given the simplicity of the task, agents could not signal different abilities to the labor market. This may change with increasingly complex tasks. It may be interesting to investigate whether and how results hold in a similar setting but with different abilities and more complex experimental tasks.

Finally, comparing the two studies of this dissertation, one can see an interesting finding with respect to total effort under fixed wages. Participants of the first study hardly delivered any effort with fixed wages, but participants of the second study delivered almost equal levels of total effort with fixed wages than their colleagues with financial incentives. This seems to contradict economic theory. Economic theory predicts that individuals do not deliver any effort at all when not given a performance-based compensation. The predictions of economic theory are to some

extent satisfied in the first study under fixed wages but not on the second one. I argue that given the fact that participants of the experiment could not leave and directly exchange effort for leisure, participants derived some utility from work. An interesting avenue for future research can be to investigate the influence of fixed wages on effort of individuals using different experimental methodologies. There are thus situations where fixed wages lead to effort, and there are situations where this is not the case. Future research could investigate the determinants that induce individuals to deliver effort under fixed wages.

## SUMMARY IN DUTCH

Dit proefschrift omschrijft twee experimenten over financiële en niet-financiële prikkels, die personen motiveren te werken. Beide experimenten belichten een principaal-agent situatie in een zogenaamde multi-task omgeving, waar de principaal van zijn agent verwacht zich ter gelijktijd op meerdere taken te richten.

Het eerste hoofdstuk bevat de inleiding van het proefschrift en beschrijft hoe de onderzochte vragen in de management accounting literatuur passen. Een van de meest belangrijke kwesties in management accounting is de vraag, hoe men het gedrag van individuen kan stimuleren/beïnvloeden in de richting van de doelstellingen van de organisatie. Een van de vele manieren om werknemers te motiveren is het geven van financiële prikkels op basis van hun prestaties. Op basis van een prestatiemaatstaf kunnen beloningen verstrekt worden. Een specifiek probleem binnen multi-task omgevingen is het verschil in meetbaarheid van de verschillende prestatiemaatstaven die gebruikt worden voor verschillende taken. Prestaties op een bepaalde taak kunnen wellicht beter gemeten worden dan prestaties op een andere taak. Deze verschillen kunnen tot een allocatie van werk leiden die overeenstemt met de voorkeur van de werknemer, maar niet met de doelen van de organisatie. De meetbaarheid en daarmee de kwaliteit van prestatiemaatstaven is dus van invloed op de allocatie van werk tussen de te verrichten taken. In een extreem voorbeeld zijn prestaties op een bepaalde taak perfect te meten, terwijl deze onmeetbaar zijn voor een andere taak. Vervolgens zal een werknemer zich wellicht alleen op die taak richten, die ook gemeten kan worden om zijn eigen evaluatie en beloning te verbeteren.

De vragen die in dit proefschrift centraal staan, zijn:

- 1) Welke invloed hebben expliciete beloningssystemen op de allocatie van werk in een multi-task omgeving?
- 2) Welke rol spelen andere vormen van motivatie, zoals sociale druk of lange termijn effecten?

In hoofdstuk 2 beschrijf ik de economische modellen, die voor dit proefschrift van belang zijn. Een expliciet en prestatieafhankelijk contract tussen een principaal en een agent is in een single-task omgeving optimaal om de agent te motiveren om zich in zijn werk te richten op de doelstellingen van de organisatie. Modellen van een multi-task omgeving laten echter zien, dat in een dergelijke situatie een expliciet en prestatieafhankelijk contract niet altijd optimaal is voor een organisatie. In een multi-task omgeving kan een expliciet contract leiden tot een verdeling van taken die niet in lijn is met de doelen van de organisatie.

Hoofdstuk 3 beschrijft de empirische literatuur op het gebied van principaal-agent theorie. De empirische literatuur bevestigt economische theorie en laat zien dat financiële prikkels van invloed zijn op het gedrag van individuen. Verder toon ik in hoofdstuk 3 aan, dat de empirische literatuur sommige aannames van economische theorie niet steunt. Individuen zijn blijkbaar niet alleen geïnteresseerd hun eigen beloning te maximeren, maar hechten ook belang aan reciprociteit, sociale reputatie en lange termijn effecten van hun werk. Dit zijn meestal impliciete prikkels.

De eerste studie van dit proefschrift beschrijf ik in hoofdstuk 4. In deze studie bestudeer ik de effecten van financiële en sociale prikkels op de verdeling van werk in een multi-task omgeving. In een 2x2 experiment met twee onafhankelijke taken, waarvan prestaties op een taak meetbaar en op een andere taak niet meetbaar zijn, vind ik dat individuen met financiële prikkels hun inspanning op de meetbare taak verhogen ten koste van hun inspanning op de andere, niet meetbare, taak. De resultaten tonen aan dat de voorkeur voor de taak die precies gemeten wordt, zowel in statistische als economische termen, beduidend wordt verminderd door sociale en

ethische druk. Met andere woorden, de verdeling van werk over de twee taken wordt niet alleen gedreven door financiële prikkels, maar ook door de wens voor sociale goedkeuring en persoonlijke waarden. Verder zijn deelnemers indifferent tussen de twee taken als er een vaste prestatieonafhankelijke beloning verstrekt wordt. De bevindingen hebben belangrijke implicaties voor zowel theorie als praktijk. Dit experiment toont aan dat sociale reputatie en ethische waarden een belangrijke rol spelen binnen management controle en dat financiële prikkels ongewenste effecten kunnen hebben met betrekking tot de verdeling van werk over taken. Verdere analyse van de resultaten laat zien dat er een afweging gemaakt moet worden tussen een optimale verdeling van werk en een optimaal inspanningsniveau. Hoewel een prestatieonafhankelijke beloning tot een gelijke verdeling van werk tussen taken leidt, is het inspanningsniveau van de agent beduidend lager.

Hoofdstuk 5 beschrijft de tweede studie van dit proefschrift. In een experimentele arbeidsmarkt, waarin principalen de prestaties van agenten op twee taken evalueren, onderzoek ik de rol van impliciete prikkels (middels reputatie-effecten ten opzichte van de arbeidsmarkt) en expliciete financiële prikkels van agenten. De prestaties worden precies gemeten op één taak en met ruis op een andere taak. Bij een prestatieafhankelijke beloning op beide taken richten agenten zich meer op de taak die precies gemeten wordt, en duidelijk minder op de taak die met ruis gemeten wordt. Deze verdeling blijft ook bestaan bij de aanwezigheid van een arbeidsmarkt, omdat agenten proberen vanuit carrièrebelang hun prestaties proberen te signaleren. Agenten prefereren de precieze maatstaf om een signaal aan de arbeidsmarkt te geven. Net als in de studie in hoofdstuk 4 zijn agenten bij een vaste beloning in afwezigheid van een arbeidsmarkt indifferent tussen beide taken. Echter, in aanwezigheid van een arbeidsmarkt die de prestaties van agenten evalueert, richten agenten zich meer op de precies gemeten taak. Dus, in aanwezigheid van carrièrebelang is een vast loon niet noodzakelijk optimaal voor de verdeling van werk tussen taken, die met verschillende kwaliteit gemeten worden. Agenten met expliciete financiële prikkels met een hoger gewicht op de taak die met ruis gemeten wordt, richten hun werk meer op deze taak. Agenten zijn bijna

indifferent tussen taken als er bovendien nog een carrièrebelang aanwezig is. Een hoger gewicht op de maatstaf met ruis kan dus voor de principaal voordelig zijn. Dit is niet in overeenstemming met standaardvoorspellingen. Expliciete financiële prikkels en impliciete prikkels gedreven door reputatie op een arbeidsmarkt zijn dus complementair in een multi-task omgeving, en in contrast met theoretische voorspellingen kan de relatie tussen risico en gewichten op expliciete prikkels positief zijn. Verder laten bevindingen van deze studie zien dat de werkgevers in de experimentele arbeidsmarkt hun aanstellingsbeslissing nemen op basis van beide prestatie maatstaven, maar groter belang hechten aan de precieze maatstaf. Dit komt overeen met theoretische voorspellingen.

In hoofdstuk 6 vat ik de resultaten van dit proefschrift samen en trek de volgende conclusies:

Ten eerste, hebben financiële prikkels een sterke invloed op de verdeling van werk in een multi-task omgeving. Desalniettemin worden individuen naast financiële prikkels ook gemotiveerd door andere mechanismen, zoals impliciete financiële prikkels in een arbeidsmarkt evenals sociale groep en individuele normen.

Ten tweede, hoeft het voor een principaal niet voordelig te zijn om vaste lonen aan te bieden, omdat de vaste lonen tot een lager algemeen inspanningsniveau kunnen leiden. Verder stemmen de inspanningen onder vaste lonen, in aanwezigheid van een carrièrebelang, niet noodzakelijk overeen met de doelstellingen van de principaal, omdat de werkverdeling van de agent door carrièrezorgen en signalen aan een arbeidsmarkt wordt beïnvloed.

Ten derde, terwijl expliciete financiële prikkels en carrièrezorgen volgens de literatuur substituten zijn, brengen de resultaten van dit proefschrift naar voren dat deze twee elkaar aanvullen.

Ten vierde voorspelt de theorie dat er een negatief verband bestaat tussen ruis in prestatie maatstaven en de gewichten op expliciete financiële prikkels. Dit



proefschrift toont een situatie aan waar deze verhouding niet negatief maar positief is.

Hoofdstuk 6 wordt afgesloten met een bespreking van de tekortkomingen van het experimenteel onderzoek en er worden aanbevelingen gedaan voor toekomstig onderzoek op het gebied van beloningssystemen in een multi-task omgeving.