

Wonderful and Woeful Work:
Incentives, Selection, Turnover, and Workers'
Motivation

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Wonderful and Woeful Work:
Incentives, selection, turnover, and workers' motivation

Geweldig en ellendig werk:
Prikkels, selectie, personeelsverloop en de motivatie van werknemers

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Preface

This thesis is the result of my first steps into the realm of research in Economics. Although it is said that doing a PhD is a solitary and sometimes frustrating experience, for me the past four years have been pleasant and smooth. In various ways, many people have helped to make this period a success, and I would like to thank several of them.

First and foremost, I want to thank Robert. Robert, you spotted my ability for doing research even before I knew what doing research exactly implies. Furthermore, you offered me this PhD-position and collaborated with me in writing three of the papers contained in this thesis. Yet, I am most grateful to you for your guidance, enthusiasm, and encouragement. The fun you have in doing research is inspiring, and I have learned much, both from your comments on my work and from your attitude towards research. I must admit, though, that my most vivid memories of you tend to involve disco's or bars in various conference sites.

Being part of a group of people who are willing to read, discuss, and comment upon each others' work is invaluable. Over the years, our 'public economics' group provided the basis for informal seminars, discussions, conference visits, and social activities. Otto, Bauke, Herman, Ioulia, Klaas, Phongthorn ('Ton'), Klaas, Hein, and Silvia, I have enjoyed and benefitted from our interactions. Of course, Silvia deserves special mention. We started our PhD together, shared an office for four years, and were quickly accused of being inseparable. Silvia, I have highly appreciated discussing research with you. More importantly, I have greatly enjoyed the distraction you offered through our conversations on a wide variety of topics, your cheerfully pessimistic attitude, and your Dutch down-to-earth view of the world flavoured with Spanish temperament. Again, I sincerely apologise for my occasional tendency to

use you as my secretary.

The nice environment at the 16th floor and later at the 9th floor of the H-building has certainly contributed to making my PhD an enjoyable period. For this, I thank the TI-staff and my fellow PhD-students. The lunches, lunchseminars, and soccer matches were always a pleasant break from work (unfortunately, the results of our TI-team point to a negative relation between the abilities on which PhD-students are being selected and soccer talent). I would like to thank Enrico Pennings, Maarten Janssen, and Jan Boone for evaluating my thesis and for their willingness to take part in the doctoral committee. I would also like to thank Mirjam van Praag, Andrew Clark, and Han Bleichrodt for accepting their role in my PhD-defense as members of the doctoral committee. Two chapters of this thesis are based on data collected by the Dutch Ministry of the Interior and Kingdom Relations (Ministerie van Binnenlandse Zaken). I would like to thank the Ministry, in particular André Dickmann, for allowing me to use this data and for occasional feedback. Several times, Richard Paap provided valuable advice on issues of estimation.

Proper moments to express gratitude towards one's parents are scarce, so let me seize this opportunity. I have had the privilege to grow up in two families, which offered me quite distinct visions on life, but shared their unconditional support. I am very happy to have four caring parents and, of course, my big brother Igor and my not-so-little-anymore sister Myla. Besides offering the standard benefits of a big brother (like beating me with tennis until I, eventually, was able to cope with losing), Igor was also my first teacher and I still feel that those lectures when playing 'schooltje' a long time back helped me to develop a taste for learning. Igor, I know you are proud, despite my failure to make it to 'Westlandia 1'. I am also grateful to Frans and Bep for providing yet another place where I feel comfortably at home. For me, the biggest event in the past four years has been leaving the parental homes and moving with Monica to our apartment in Capelle aan den IJssel; a move that has been more smooth than I could have hoped. Monica, I am really happy that, despite the times that I am mentally absent and the relative insecure life that a career in research offers, you keep supporting me in my decision to pursue a career in Economics.

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Chapter 1

Introduction

"Pleasure in the job puts perfection in the work." Aristotle

For most people, work is the primary source of income. Moreover, working is one of the main activities in peoples' lives. Given the importance of work for both individuals and for the economy as a whole, it is natural that economists study human behaviour at the workplace. Economic models of behaviour at work traditionally depict workers as opportunistic and lazy beings, who shirk at every occasion. The promise of money is the only motive for going to work and for providing effort. Only strictly necessary duties are being performed, and for every minute of overtime workers demand financial compensation.

Few people will recognise themselves in this image. Surely, money plays a role, but work is more than just a source of income. Many people take pride in their job, care about the outcome of their efforts, or simply enjoy (some of) their tasks. Work can lead to a better self-image and higher self-esteem, and provides a social network of colleagues and clients. Indeed, survey respondents generally express that money is not the sole reason for working. For instance, in a survey of the US labour force half of the respondents agreed with the statement *"what I do at work is more important than the money I earn"*, and more than 70 percent claimed that they would continue working even if they would be financially comfortable for the rest of their lives (Quinn and Staines, 1979).¹ Minkler (2004) reports that 95% of US

¹Glenn and Weaver (1982) even find that 25 percent of Americans enjoy time at work more than time off work.

employees said that they would provide high effort even when it would be almost impossible for their boss to check up on them. One of the main explanations given by the respondents was “*I enjoy my work*”. Surveys among managers in Sweden and the US indicate that managers are aware that workers can be motivated by non-pecuniary means (Agell and Lundborg, 1999, Bewley, 1998). Rather than financial incentives, managers commend the inspiring effects of e.g. interesting tasks and recognition of achievements. Echoing Aristotle, a Swedish manager stated that “*people work hard as long as they have fun*”.

These observations suggest that standard economic models have a too narrow view of work. Instead, psychologists and sociologists acknowledge that work has a broad impact on peoples’ lives. For instance, Maslow’s well-known hierarchy of needs theory asserts that after physiological and safety needs are met, individuals strive for social acceptance, esteem, and self-development (Maslow, 1970). Work provides individuals with the means to fulfil these needs. Furthermore, psychologists argue that many activities arise from within individuals, without the presence of an external stimulus. ‘Intrinsic motivation’ is considered to be a major determinant of behaviour (DeCharms, 1968). Workers differ substantially in their intrinsic motivation to put in effort at work (Caplan, 2003, Furnham, 1990, 1992). This implies that employees who intrinsically value working will put in more effort than predicted by standard economic models. Moreover, if workers differ in their intrinsic motivation to work at a specific firm, then the performance of the firm depends on its ability to recruit well-motivated workers.

In this thesis, workers’ valuation of non-monetary job aspects plays a central role. Without abandoning the rigour of economic analysis, we allow workers to care about the whole content of their job rather than about money alone. The thesis revolves around two issues. First, we look at the implications of heterogeneity in workers’ intrinsic valuation of (specific) jobs for the optimal provision of incentives and for the recruitment and selection of employees, under various market structures. Second, we empirically analyse how workers’ assessment of various (monetary and non-monetary) aspects of their job affects both whether and where they would like to obtain another job. These extensions of standard economic analysis provide new

insight into firms' incentive and selection practices and into patterns of job search and job mobility.

The remainder of this Introduction discusses the key elements of the analysis, and provides an overview of the chapters of this thesis.

1.1 Key elements

1.1.1 Intrinsic motivation at work

There are many reasons why people may enjoy exerting effort at work. Working hard can give a sense of achievement and accomplishment. Helping out colleagues and customers can be satisfying, and contributing to a worthy goal or mission of the organisation can be inspiring. Whatever the reason, the result is that people who intrinsically enjoy working will exert (some) effort, even in the absence of external incentives.

In general, any job can evoke intrinsic motivation. Commonly used examples of jobs that have intrinsic qualities are jobs in health care and education, where employees directly affect the life and future prospects of patients and pupils. Still, since preferences are not identical across people, the kind of jobs someone intrinsically values differs from person to person. People who are afraid of heights will not enjoy working as a window-cleaner, and gardener is not the ideal profession for someone with hayfever. For some students, doing a PhD in Economics is the ideal job, whereas others see it as a mere stepping-stone to more favourable positions, and yet others are simply horrified by the suggestion. Hence, the level of intrinsic motivation generally depends on the match between a worker and a job.

The benefits of an intrinsically motivated workforce for firms are obvious. As shown by Besley and Ghatak (2005), Francois (2000), and Glazer (2004) as well as in Chapter 2 of this thesis, intrinsically motivated workers are more productive and demand less financial compensation for exerting effort. However, if workers differ in intrinsic motivation to work at a certain firm, then the firm first needs to recruit the best-motivated workers in order to enjoy these benefits. As a job applicant's intrinsic motivation is not easily observable for firms, the level of motivation is

private knowledge of the applicant. Moreover, in contrast to IQ and other abilities, intrinsic motivation is hard to measure. Surely, firms may get an indication of applicants' motivation during the selection process. Huang and Cappelli (2006) show that organisations that actively screen applicants for work ethic tend to hire more productive personnel. Still, screening methods are never perfectly accurate, and job candidates may successfully fake or hide their intrinsic motivation. This implies that firms have an incentive to make sure that less motivated workers refrain from applying in the first place, so as to increase the probability that the new hiree is highly motivated.

1.1.2 Monetary incentives and selection

Ask an economist how the performance of employees can be improved, and the likely answer is to use financial sticks and carrots. Piece-rates, bonuses, and other pay-for-performance schemes are supposed to induce employees to increase their productivity. Similarly, the (implicit) threat of being fired after substandard performance keeps employees from shirking. Tapping into employees' desire for higher earnings, these monetary incentive schemes ensure that exerting effort is in the interest of the employees. Moreover, performance pay is particularly attractive to productive employees, implying that it may facilitate the recruitment of skilled personnel.

There is a growing body of empirical evidence showing that financial incentives affect employees' behaviour. Lazear (2000) finds a sharp increase in productivity after the introduction of piece-rate payment at a company installing windshields in cars, which can be partially attributed to above average productivity of new hirees. Bandeira et al. (2006) show that tying the salary of managers to the performance of their subordinates also results in higher worker productivity. Several other studies are discussed by Prendergast (1999).

Some anecdotal evidence on ill-designed incentive schemes also suggests that workers react to financial incentives, albeit not always in the way the firm aims to. Examples include workers who increase the quantity produced at the expense of quality after the introduction of a piece-rate scheme, teachers who 'teach to the test' or even hand out answers before the test when their rewards depend on students'

test scores, and typists who started tapping the same key over and over again during lunchbreaks after their salary was linked to the number of keystrokes; see e.g. Kerr (1975) and Holmström and Milgrom (1991). In short, financial incentives indeed affect behaviour and, when properly designed, can increase productivity substantially.

1.1.3 Job satisfaction and turnover

A worker starts searching for another job when she feels that she might be able to find a better job. A job change occurs when a new job opportunity indeed yields higher expected utility. Clearly, any job aspect, both financial and non-financial, can be a reason for searching or changing jobs. Using survey data, Akerlof et al. (1988) show that more US employees change jobs for non-financial than for financial reasons. A significant part of the workers who has non-financial motives takes a wage cut. Still, almost all job movers report to be better off after the job change.

From a macro-perspective, labour mobility is necessary to accommodate growth differences between firms, industries, and nations. For an individual firm, however, turnover brings about recruitment cost and may reduce the incentive to invest in firm-specific skills. Insight into workers' reasons to search for another job or to quit may help to reduce the cost arising from turnover. Similarly, insight into employees' reasons to leave their industry may help to reduce industry-wide personnel shortages, e.g. those expected in some parts of the public sector in the near future (OECD, 2001).

In the voluminous economics literature on the causes and consequences of job mobility, much attention is paid to wages and other relatively easily measurable job domains. The effects of intangible job domains such as job duties, relations with colleagues and management, and autonomy are studied less often, due to the lack of objective measures. As an alternative for objective measures, organisational psychologists often use workers' own assessment, by asking them about their attitude towards their job and about their satisfaction with various job domains. Traditionally, economists have been suspicious of the subjective nature of this kind of information, but recently a growing number of papers use subjective data (for a discussion see Ferrer-i-Carbonell and Frijters, 2004). Various studies have convincingly

shown that subjective data can help to explain job mobility. Freeman (1978) shows that workers who are satisfied with their job are significantly less likely to quit in the subsequent period than dissatisfied workers; see also Akerlof et al. (1988). Clark (2001) shows that the probability of a quit not only increases with overall job dissatisfaction, but also with dissatisfaction with several job domains, both financial and non-financial.

Whatever the reason for a worker's desire to change jobs, the search for a new job is unlikely to be a random process. Rather, the worker will look for job opportunities at places where she expects to find a job that offers better conditions on the job aspects she wants to improve upon. For instance, a civil servant who is fed up with his Minister will not be looking for a position in another unit within the department. Similarly, a PhD-student who realises that she dislikes doing research has little to gain from moving to another university. Neal (1999) distinguishes between job mobility and career mobility, where the latter is defined as a change in both industry and occupation. Examining patterns of individual job mobility, he finds evidence that workers first choose a suitable career and subsequently a suitable job within their career. This suggests that there is a relation between workers' reasons for searching for another job and the direction of their search efforts.

1.2 Overview of the thesis

This thesis discusses the implications of workers' valuation of non-monetary aspects of jobs for their behaviour at work. The thesis comprises six articles, which broadly deal with two subjects. In Chapters 2 to 5, we examine how heterogeneity in workers' intrinsic motivation affects optimal monetary incentive schemes and the selection of workers. Chapters 6 and 7 use survey data to link employees' satisfaction with various aspects of their (former) job to their job search and mobility behaviour.

Chapter 2 starts by examining the value of an intrinsically motivated worker to a firm. In line with Besley and Ghatak (2005), Francois (2000), and Glazer (2004), we show that intrinsically motivated workers are more productive and are willing to provide a given level of effort in exchange for a lower wage than non-motivated

workers. Hence, recruiting intrinsically motivated workers can yield both higher productivity and lower wage cost. However, since motivated workers obviously rather have a high wage, they have an incentive to hide their motivation from the firm. In Chapter 2, we study how the firm can use the wage scheme to recruit well-motivated workers when workers differ in their intrinsic motivation to work at the firm. We also examine how the observability of applicants' motivation affects the optimal monetary incentive scheme.

In Chapter 3, we study the effects of liberalising a sector dominated by a public agency when workers differ in their intrinsic motivation to work in the sector. In the last decades, we have witnessed a worldwide wave of liberalisation and privatisation, often prompted by the (perceived) inefficiency of public organisations. The empirical literature finds that liberalisation and privatisation lead to higher productivity and wages, lower employment, and stronger monetary incentives (Kikeri and Nellis, 2002, Megginson and Netter, 2001). Relatedly, Burgess and Metcalfe (1999) find that public organisations provide weaker incentives than comparable private firms, and argue that this is a sign of inefficiency. In contrast, we argue in Chapter 3 that weak incentives in public organisations may be cost-efficient. While firms in a competitive market have to compete for the best-motivated workers, a monopsonistic public agency is able to extract part of the motivational rents through clever design of the wage scheme. We compare the levels of productivity, employment, wages, and incentives chosen by a public monopsonist to the levels arising in a perfectly competitive market, and look at total wage cost under both market structures. Chapter 3 also examines which workers benefit and which workers lose from liberalisation.

Chapter 4 studies the selection of workers by a public agency when workers not only differ in their intrinsic motivation to work for the agency, but also differ in general productivity. Thus, some workers are less productive than others, regardless of where they work. This is particularly interesting in the light of the stereotype views of civil servants. Besides the popular image of the dedicated physician, teacher, and police officer, a common depiction of civil servants is that of the lazy, incompetent bureaucrat. We study which workers are optimally attracted by the public agency, and derive the optimal level of monetary incentives provided by the public agency to

the various worker types. We also examine how the objectives of the public agency affects the optimal incentive schemes and the selection of workers.

In Chapter 5, we zoom in on health care. In many countries, physicians have to take an oath to act in their patients' interest before entering the profession, and it is likely that some physicians indeed have a genuine concern for patients' wellbeing.² In Chapter 5, some physicians intrinsically care about patient welfare and patients differ in income. This allows us to examine how the system of health care provision affects the allocation of patients to physicians. In particular, we examine which patients benefit from allowing for private provision of health care parallel to public provision, by deriving which patients opt for treatment in the private sector and which physicians choose to work in the private sector. We also analyse the effect of subsidising private provision and the effect of allowing physicians to operate in the public and the private sector simultaneously.

Chapters 6 and 7 study the relation between workers' perception of their own job and their behaviour regarding job search and mobility. In Chapter 6, we investigate how workers' assessment of their job affects both whether and where they search for another job, using data from a survey among employees in the Dutch public sector. Following Freeman (1978) and Clark (2001), we examine the relation between (domain) job satisfaction and job search intensity. Interestingly, the job seekers in the survey had to indicate the importance of 19 different job domains in their decision to start searching for another job. We use this information to analyse the relation between workers' self-proclaimed reasons to search and their decision to search within their current organisation, within the industry, or outside the industry. We argue that our findings provide a unique view on workers' perception of the relative heterogeneity of the conditions on various job domains across jobs within organisations and industries.

Chapter 7 uses data from a similar survey among employees who entered or left an organisation in the Dutch public sector in 2001. As in the survey used in Chapter 6, respondents had to indicate the importance of 19 job domains in their decision to

²See e.g. the account of the events after hurricane Katrina hit New Orleans as described by several health professionals in the *New England Journal of Medicine*, Volume 353(15). More examples are provided in Chapter 5.

leave their former job. In Chapter 7, this information is used to examine the relation between workers' reasons to quit and their decision to take up another job within the same industry, in another part of the public sector, or in the private sector. Chapter 7 also analyses the impact of workers' reasons to quit on their wage growth.

Chapter 8 concludes by providing a summary of the main findings of the thesis and discussing some directions for further research.

Chapter 2

Signaling and Screening of Workers' Motivation*

Joint with Robert Dur

2.1 Introduction

Economic models of worker behaviour typically assume that people dislike working; hence, in order to induce workers to exert effort, employers must provide external incentives. Employers have different means to increase workers' effort. For instance, the introduction of pay-for-performance devices will induce employees to work harder. Equivalently, closer monitoring of workers' effort, accompanied by sanctions (e.g. dismissal) in case of shirking, will also result in higher effort.

Empirical research suggests that the standard neoclassical view of worker behaviour is often too narrow. Agell and Lundborg (1999) report results of a survey among managers in Swedish manufacturing and conclude (p. 25) that "*much recent theorizing about effort and incentives is potentially misplaced [because] most managers appear to ascribe a more important motivational role to psychological and sociological factors than to economic sticks and carrots*". Interviews with US managers by Bewley (1998) yield corresponding results. Rather than monetary incentives,

*A slightly adapted version of this chapter is forthcoming in the *Journal of Economic Behavior & Organization*.

managers emphasise that work should be interesting and stimulating, that workers should feel involved in decision-making, and that workers' achievements should be noticed and appreciated.¹ One Swedish manager responded that *"people work hard as long as they have fun"*.

Surveys among employees also indicate that monetary rewards are of much less importance for job satisfaction and workers' effort than postulated in economic analysis. For instance, in a 1977 survey of the US labour force, half of the respondents agreed with the statement that *"what I do at work is more important to me than the money I earn"*, and more than 90 percent stated that they put in more effort into their job than required (Quinn and Staines, 1979). Even though we should be cautious (or even suspicious) about stated preferences, the results of these surveys suggest that a large part of the labour force is motivated at work by more than just monetary rewards (Baron, 1988).

The observation that workers may provide effort for non-pecuniary reasons has two important implications. First, monetary incentive schemes designed to motivate a 'standard neoclassical worker' may be suboptimal. Second, when people differ in their motivation, the performance of a firm may become dependent on its capability to select the 'most motivated' candidate among job applicants.

This chapter relaxes the standard assumption in the economic literature that people dislike working to study these issues. We develop a model in which workers to a certain extent like to exert effort at the workplace. Hence, people like their job, not only because they get paid, but also because they enjoy working. Whereas this type of motivation has for long been virtually absent in mainstream economics, psychologists have argued that people undertake many activities without expecting an extrinsic reward. 'Intrinsic motivation' is considered to be of major importance for human behaviour (see e.g. DeCharms, 1968, Deci, 1971, and Furnham, 1990).

Recently, a few papers in economics have studied wages and incentive schemes when workers are intrinsically motivated (Benabou and Tirole, 2003, Besley and

¹Bartram et al. (1995) asked 498 small businesses in the UK which qualities of young workers they regard as important. The employers ranked 'interest in the work' third, just below 'honesty and integrity' and 'conscientiousness', and just above 'general personality' and 'motivation and drive', all with average ratings above 3.4 on a 4-point scale. General ability, educational qualifications, and work experience were considered less important.

Ghatak, 2005, Francois, 2000, and Glazer, 2004). The main distinguishing feature of this chapter is that we allow workers' motivation to be private knowledge. As a result, the firm can not select the best-motivated worker among the job applicants. Hence, an adverse selection problem arises. We show that it may be in the interest of the firm to offer a low wage to discourage relatively low motivated workers from applying. This comes at the cost of a higher probability of leaving the vacancy unfilled. The optimal wage scheme entails a trade-off between the probability of filling the vacancy, the rents left to the worker, and the expected motivation of the selected worker.

People may be intrinsically motivated to work for different reasons. One might simply like to undertake certain activities. The activities which are intrinsically valued, and hence the evaluation of intrinsic qualities of different jobs, may vary across people. A motivated veterinary surgeon is not likely to be motivated to work as a butcher. Intrinsic motivation is not solely determined by persons, jobs, or firms, but by combinations of certain people and certain jobs or firms.

Intrinsic motivation may also be related to 'self-esteem', broadly defined as how people think about themselves. Thus, people may be intrinsically motivated to work (or to refrain from shirking) because it makes them think better about themselves. Self-esteem may be enhanced by working or refraining from shirking in general, but it may also be related to particular kind of jobs. For instance, workers in hospitals may feel that they contribute to a goal which is considered to be 'good'. Dixit (2002) notes that organisations that serve an idealistic or ethical purpose may be particularly attractive for people who share these goals. Obviously, which goals are considered to be 'good' may differ among individuals.

Regardless of the precise reason for the enjoyment of or satisfaction from work, the baseline is that people can derive utility from working. The presence of intrinsically motivated workers has important implications for firms. Motivated people probably work harder, which increases output, and because people derive utility from the job, they may be willing to work for a lower wage. People will take job satisfaction into account when deciding on whether to accept or reject a wage offer. A higher wage at another job may not compensate for the loss of intrinsic qualities

of the job.

We develop a model in which workers are heterogeneous in their intrinsic motivation to work at a particular firm. Working at the firm has some unique trait that is valued differently by different workers, giving the firm monopsony power.² We study two issues. First, we examine the implications of workers' intrinsic motivation for optimal monetary incentive schemes. We extend a standard incentive wage model and show that, in line with Dixit (2002), motivated workers work harder and, for a given level of effort, are willing to work for a lower wage. The higher the firm's bargaining power, the more it can extract the motivational rents from the worker. When the firm has sufficient bargaining power, a more motivated worker brings about higher output and, under a mild condition, lower wage cost. We also show that when the firm has a decreasing returns to effort production technology, then better motivated workers imply weaker monetary incentives.

Second, we examine how the firm can attract and select highly motivated workers to fill a vacancy. We assume that each worker has positive probability of observing the vacancy. The workers who observe the vacancy decide whether or not to apply, taking application cost into account. We consider three cases that differ in the assumption made about the observability of applicants' motivation. We start with the assumption that the firm can observe the motivation of applicants. Next, we consider the case where the firm cannot observe the motivation of the applicants. Lastly, we allow the applicants to signal their motivation to the firm credibly.

We will show that in all of these cases, it is optimal for the firm to commit to a minimum wage offer either because commitment resolves the Diamond paradox (Diamond, 1971) or because it avoids a lemons problem (Akerlof, 1970). When motivation of applicants is observable to the firm, the firm hires the worker with the best motivation among those who applied. The profit-maximising level of the minimum wage is determined by the trade-off between wage cost and the probability

²Manning (2003, p. 4) argues that heterogeneity in workers' preferences is one of the three most plausible sources of frictions in the labour market, giving firms monopsonistic power. Monopsony power arises naturally when intrinsic motivation is firm-specific. Dixit argues that 'company spirit' in private firms and the idealistic purpose served by a public agency may motivate agents. When intrinsic motivation is related to an occupation rather than to working at a particular firm, monopsony power arises only if there are no other firms (in the neighbourhood) offering similar jobs.

of filling the vacancy. When motivation is unobservable, there is an additional selection effect. A higher minimum wage decreases the expected quality of job applicants since it induces less motivated workers to apply for the job, decreasing the probability that a highly motivated worker is selected. However, if applicants can signal their motivation to the firm, a commitment to a minimum wage gives them an incentive to reveal their motivation, eliminating the selection effect.

The different assumptions about the observability of applicants' motivation may reflect different screening technologies employed by firms, ranging from application forms and job interviews to work trials and the use of assessment centres (see Keenan, 1995, and Bartram et al., 1995). The use of tests in the screening process has increased substantially over the last decades (Jenkins, 2001). The 'personality and workstyle questionnaire' has become one of the most widely used test types (Ryan et al., 1999). While these findings may suggest that firms have ample opportunities to determine applicants' motivation, the performance of applicants in such tests may be subject to their choice of effort and behaviour, implying that applicants may have a choice whether or not to reveal their motivation to the firm.

The chapter is organised as follows. Section 2.2 discusses the related literature. Section 2.3 examines the implications of workers' intrinsic motivation for optimal monetary incentive schemes. In Section 2.4 we study how the firm can attract and select highly motivated workers to fill a vacancy, assuming that the firm can only offer a fixed wage. Section 2.5 generalises the results of Section 2.4 to the case of optimal monetary incentive schemes, as studied in Section 2.3. Section 2.6 concludes.

2.2 Related literature

Intrinsic motivation has, until recently, been largely ignored in economic analysis, with the exception of the work by Bruno Frey (see among others Frey, 1993, 1997a, and 1997b). We differ from his work in our focus on sorting and selection issues. Moreover, we abstract from the possibility that external incentives crowd out a worker's intrinsic motivation. Therefore, in our model, it is always in the firm's interest to provide monetary incentives, even when a worker is highly motivated.

However, high wages reduce the average intrinsic motivation among the pool of job candidates and may thus reduce labour productivity unless the firm can fully observe applicants' intrinsic motivation.

The idea that, all else equal, workers are willing to work for a lower wage at jobs with intrinsic qualities traces back to Adam Smith's *Wealth of Nations*. The theory of equalising differences (Brown, 1980, Rosen, 1986) states that all (dis)amenities of a job are reflected in its wage. Several studies suggest that the opportunity to contribute to the goals of a non-profit organisation is valued by workers and may explain the wage differential between non-profit and for-profit organisations (see e.g. Hansmann, 1980, Preston, 1989, Frank, 1996, and Rose-Ackerman, 1996). Recent empirical evidence is provided by Leete (2001) and Frey et al. (2001). This chapter contributes to this literature by examining the effect of intrinsic motivation on optimal pay-for-performance schemes and on recruitment and selection of job applicants.

Most of our analysis focuses on the case where workers' motivation is unobservable to the firm. Hence, our model is a principal-agent model where the agent (the worker) has private information about his type. Benabou and Tirole (2003), by contrast, focus on the case where the principal has private information about the attractiveness of the job to workers. The choice of the wage scheme by the principal may then signal his private knowledge to the worker. As a result, extrinsic rewards may either crowd in or crowd out intrinsic motivation. Several recent papers study incentive provision to intrinsically motivated workers, among others Besley and Ghatak (2005), Francois (2000), and Glazer (2004). In these papers, as in this chapter, firms have all the bargaining power. In contrast to this chapter, these papers assume that the firm can observe workers' intrinsic motivation.³

Our analysis builds on signaling and screening models of the labour market. A seminal paper in this field is Spence (1973), and Riley (2001) provides a recent survey of the literature. Most studies focus on screening of workers' abilities. The setup of our model is closely related to the ability-models. As in our model, firms must

³The kind of intrinsic motivation that we focus on in this paper differs from an intrinsic motivation to behave reciprocally, as studied by Akerlof (1982) and Falk et al. (1999), or intrinsic feelings of altruism towards one's colleagues or boss, which is studied by Rotemberg (1994).

commit to pay high wages to induce workers to signal their type. An important difference between the ability-models and our model is that motivation not only affects worker's productivity, but also his willingness to work. Moreover, our model departs from the standard screening model by assuming that the firm faces several job applicants among which it chooses, as in Janssen (2002). The standard model considers the case of one worker and two firms, see Cho and Kreps (1987).

Our work is also related to the job search literature, in particular to directed search models (see e.g. Burdett et al., 2001, and Shi, 2002). Montgomery (1991) argues that firms that face a high cost of leaving a vacancy unfilled offer higher wages. The reason is that workers send an application with higher probability to firms that offer higher wages. Hence, firms increase their probability of filling the vacancy by posting a higher wage, as in our model. Another common element is that workers base their application decision on the probability of getting the job, which depends on the expected total number of applicants for this job.

Closest to this chapter is Handy and Katz (1998). They study a model in which potential employees differ in both ability and motivation. While the firm can test for an applicant's ability, it cannot distinguish motivated from unmotivated workers. Handy and Katz show that to promote self-selection among potential employees, the firm has an incentive to commit itself to pay a low wage. By committing to pay a low wage, the firm is certain that a job applicant is a motivated worker. Our analysis differs from theirs in various respects. First, we assume that the firm cannot draw on an infinitely large pool of applicants consisting of all types of workers. In our model, the firm cannot be certain that the worker who is most motivated for the job has observed the vacancy and, hence, is in the pool of job applicants. Therefore, a commitment to pay the lowest possible wage (the wage that is acceptable only to the most motivated worker in the economy) is in general not optimal for the firm, for it precludes hiring a worker who is somewhat less motivated when the most motivated worker in the economy is not available. Hence, the firm optimally sets a minimum wage that attracts workers with different (albeit high) levels of motivation to apply for the job. Second, Handy and Katz do not consider the decision of potential employees to apply for a job. We show that their results depend on the assumption

that application costs are zero. Positive application costs, however small, imply that a maximum wage is of no avail, whereas a minimum wage helps to attract and select highly motivated workers. Application costs are likely to be positive, given the time and effort involved in writing an application, having job interviews, and possibly performing tests, attending an assessment centre, or even undertaking a work trial. Lastly, our analysis allows for signaling by workers and offering performance pay by firms.

2.3 Optimal monetary incentive schemes for motivated workers

This section explores the implications of workers' intrinsic motivation for the optimal design of monetary incentive schemes. The literature (see e.g. Lazear, 1995) usually assumes a worker's utility function of the form:

$$U[w(e), e]$$

where utility is concave in income ($U_1 > 0, U_{11} < 0$), income depends on effort according to the wage scheme $w(e)$, and the cost of exerting effort is convex ($U_2 < 0, U_{22} < 0$). We introduce intrinsic motivation by adding a third argument to the utility function:⁴

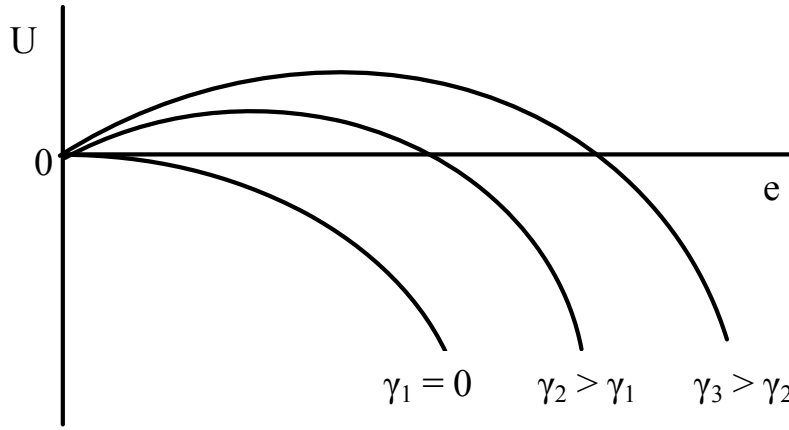
$$U[w(e), e, \gamma_i e] \tag{2.1}$$

where $\gamma_i \in [0, \bar{\gamma}]$. γ_i measures the degree to which worker i is intrinsically motivated, which varies between different kind of jobs. The positive utility derived from effort is assumed to be concave in e ($U_3 > 0, U_{33} < 0$).⁵ Hence, apart from an indirect effect of effort on income through the wage scheme, utility first increases in effort and then, starting from some level depending on the value of γ_i , starts decreasing;

⁴Without significant loss of generality, we introduce intrinsic motivation as a third argument in the utility function, and not as a modification of the second argument, for ease of exposition.

⁵Constant or even increasing marginal positive utility from effort does not affect the results as long as optimal effort is finite (i.e., we abstract from 'workaholics'). We also assume $U_3 > -e\gamma U_{33}$, a condition that will be discussed below.

Figure 2.1: The effect of intrinsic motivation on the direct utility of effort



see Figure 2.1. Depending on the level of e , total utility derived from exerting effort may be positive or negative. For convenience, we assume that all cross-derivatives are zero: $U_{ij} = 0$ for all $i \neq j$.

The firm's profit depends on the effort of the worker:

$$\pi = q(e) - w(e). \quad (2.2)$$

Profit is the difference between the value of the output generated by the effort of the worker, $q(e)$, and the wage cost. The production function has decreasing returns to worker's effort, $q'(e) > 0$ and $q''(e) < 0$.

In this section, we assume that the firm observes the worker's motivation γ and has all the bargaining power. The firm sets wage cost as low as possible, but the wage must meet the worker's participation constraint:

$$U[w(e), e, \gamma_i e] \geq U^{out} \equiv U(b, 0, 0) \quad (2.3)$$

where U^{out} is the outside option of the worker. We assume that the worker's alternative to employment at this firm is living on an unemployment benefit b . More

generally, the outside option of the worker would take into account expected job opportunities at other firms. If other firms would offer jobs with the same kind of intrinsic qualities, a worker's outside option would depend on his motivation. This would weaken our argument that motivated workers are willing to work for a lower wage. In the next chapter, we analyse the effects of competition in the labour market for intrinsically motivated workers and show that competition leads to higher wages, stronger incentives, and higher productivity. Here, we abstract from outside job opportunities. We thus focus on situations where the firm has (sufficient) monopsonistic power, either because workers' intrinsic motivation is firm-specific or because there are no other firms (in the neighbourhood) offering jobs with the same intrinsic qualities.

The worker's optimal amount of effort is found by maximising the utility function (2.1) to e :

$$\max U \rightarrow w'(e)U_1(\cdot) + U_2(\cdot) + \gamma_i U_3(\cdot) = 0 \quad (2.4)$$

In the optimum, the worker's (financial and motivational) marginal benefits of effort equal the marginal cost of effort.

The firm maximises profits. Since the firm has all the bargaining power, it sets the worker's total compensation such that it leaves no rents to the worker. Though the firm does not directly control the worker's effort e , it can design a monetary incentive scheme that induces the worker to exert the optimal level of effort:⁶

$$\max \pi \text{ s.t. } U(\cdot) \geq U^{out} \rightarrow q'(e) - w'(e) = 0 \quad (2.5)$$

In the optimum, the marginal product equals marginal wage cost.

First-order conditions (2.4) and (2.5) imply that if the firm sets the wage scheme optimally, the worker's marginal utility of effort, apart from the effect of extra effort on his income, is negative. Hence, people stating that they enjoy every aspect of their work ("my work is my hobby") are simply exerting too little effort (or, in other words, their wage scheme is suboptimal). Note also that (2.4) and (2.5) imply that

⁶When neither effort nor production is verifiable, the firm cannot induce workers to provide optimal effort. We deal with this case at the end of this section.

if the worker is less motivated, then monetary incentives are stronger (i.e., the lower γ_i is, the larger $w'(e)$ is). Important for this result is our assumption that $q''(e) < 0$. With constant returns to effort [$q''(e) = 0$], the optimal reward per unit of effort $w'(e)$ equals the marginal product of effort $q'(e)$, which is constant when $q''(e) = 0$.

The firm sets total compensation to the worker such that it leaves no rents to the worker. In the optimum, the firm creates a compensation scheme that induces the worker to choose the level of effort defined by (2.4) and (2.5) at the lowest cost to the firm, implying that the worker ends up with a total utility of $U = U^{out}$, defined by (2.3).

Intrinsic motivation has two important effects. First, the higher γ , the higher the maximum wage the firm is willing to offer. Stated differently, given the level of the wage, it is more profitable to the firm to hire a worker who is more motivated. The maximum wage the firm is willing to offer is the wage that would leave the firm with zero profit:

$$w(e) = q(e) \quad (2.6)$$

Since marginal productivity $q'(e)$ is positive, we have to show that e increases in γ . Applying the implicit function theorem to (2.4) results in:

$$\frac{de}{d\gamma} = \frac{U_3(\cdot) + e\gamma U_{33}(\cdot)}{-\partial^2 U(\cdot)/\partial e^2} \quad (2.7)$$

where $\partial^2 U(\cdot)/\partial e^2 < 0$ is the second-order condition to the worker's optimisation problem (2.4). Effort increases in a worker's motivation if $U_3 > -e\gamma U_{33}$. We assume that this condition holds: it is unlikely that a more motivated worker works less hard because he already enjoys working so much. More effort implies more output. Hence, the maximum wage the firm is willing to offer increases in the worker's motivation.

Second, given the level of effort, intrinsic motivation affects the wage the firm needs to offer to meet the worker's participation constraint. We show that for constant $e = \hat{e}$, the minimum wage for which the worker is willing to work decreases in γ . Applying the implicit function theorem to (2.3) results in:

$$\frac{dw(\hat{e})}{d\gamma} = -\frac{\hat{e}U_3(\cdot)}{U_1(\cdot)} < 0 \quad (2.8)$$

The expression in (2.8) is always negative: given the level of effort, a worker who is more motivated for the job needs to be compensated less.

In general, the effect of motivation on total wage compensation is ambiguous. A more motivated worker needs to be compensated less for each unit of effort. However, he exerts more effort than less motivated workers, implying that the total wage may be increasing in motivation. In appendix 2.A.1 we prove that $\frac{dw(e)}{d\gamma} < 0$ if the following condition holds:

$$eU_3(\cdot) > -[U_2(\cdot) + \gamma_i U_3(\cdot)] \frac{de}{d\gamma} \quad (2.9)$$

The right-hand side of this inequality denotes the net increase in disutility due to the higher level of effort. The left-hand side is the increase in motivational utility derived from all effort the worker exerts because of the higher motivation. If, in the new optimum, the increased pleasure of working is higher than the burden of the additional effort, highly motivated workers need less financial compensation than less motivated workers.

Higher motivation thus has two effects: the firm is willing to offer a higher wage while, given the level of effort, the worker is willing to accept a lower wage. Motivation therefore increases the joint surplus of the worker and the firm. When the firm has all the bargaining power, it can extract all rents from the motivation of the worker by adjusting the compensation scheme. This implies that, if condition (2.9) is satisfied, more motivated workers will be offered lower wages, even though they are more productive.⁷ Hence, without a commitment of the firm not to extract all motivational rents, job applicants may be reluctant to reveal their motivation to the firm, or worse even, the firm may not be able to attract any applicant at all. Section 2.4 addresses this problem.

Both effects of intrinsic motivation are also present in the case of a fixed wage. When the firm is unable or unwilling to use incentive wages,⁸ the optimal level of

⁷Allowing for a more equal distribution of bargaining power between the firm and the workers need not affect this result. As long as the firm has sufficient bargaining power, the wage of the worker decreases in motivation, provided that condition (2.9) holds, see Appendix 2.A.2.

⁸One reason why firms may refrain from providing monetary incentives to motivated workers is high monitoring cost; see Weiss (1990, pp. 73-76). In case of multiple tasks, monetary incentives may crowd out facets of tasks that are hard to observe by facets of tasks that are more easily

effort of the worker is given by (2.4) with $w'(e)$ equal to zero. The effect of intrinsic motivation on effort is still given by (2.7). Effort and thus output increase in the worker's motivation. This is also clear from Figure 2.1: a worker's optimal effort with a fixed wage is given by the top of the curve, which moves to the right when γ becomes higher. Hence, the maximum fixed wage the firm is willing to offer increases in the worker's motivation. Moreover, the minimum fixed wage a worker is willing to accept decreases in motivation. By using first-order condition (2.4), we can rewrite condition (2.9) to:

$$eU_3(\cdot) > w'(e)U_1(\cdot)\frac{de}{d\gamma} \quad (2.10)$$

In case of a fixed wage, $w'(e) = 0$, condition (2.10) always holds. Therefore, if motivation is higher, then the direct utility from effort is higher, and so the minimum wage that satisfies the participation constraint of the worker is lower.

2.4 Attracting and selecting motivated workers

This section examines how a firm can attract and select highly motivated workers to fill a vacancy. We consider three cases: one where the firm can observe the motivation of the applicants, one where it cannot, and one where workers decide whether or not to signal their motivation. To focus on the distributional conflict between the firm and the worker, we abstract from monetary incentives and assume that the firm offers a base salary only. Allowing for monetary incentives does not affect the results qualitatively, which we show in Section 2.5, but it distracts attention from our main results.

2.4.1 Setup of the model

A firm has one vacancy and posts a 'help-wanted' ad. As in the previous section, the firm has all the bargaining power. However, we assume that the firm can credibly commit to pay at least a certain wage by posting a base salary w_{\min} in the ad. Workers differ in their intrinsic motivation $\gamma \in [0, \bar{\gamma}]$ to work at this firm while their

observed (Holmström and Milgrom, 1991). Alternatively, monetary incentives may crowd out intrinsic motivation, see Frey (1997a) and Benabou and Tirole (2003).

outside options are identical, U^{out} . There is a discrete number of worker types in the economy, with n_{γ_i} workers of type γ_i . Denote by N_{γ_i} the total number of workers with motivation equal to or higher than γ_i :

$$N_{\gamma_i} = \sum_{\gamma \geq \gamma_i} n_{\gamma} \quad (2.11)$$

Each worker has probability μ of observing the ad, $0 < \mu < 1$. One reason for $\mu < 1$ could be that not all workers read the newspaper every day. As a result, the firm is uncertain about the composition of the group of potential applicants. If a worker decides to apply, she incurs application cost C .⁹

Following the results from the previous section, worker i 's indirect utility function can be written as $U(\gamma_i, w)$, with properties $U_{\gamma}(\cdot) > 0$ and $U_w(\cdot) > 0$, and profits of the firm as $\pi(\gamma_i, w)$, with properties $\pi_{\gamma}(\cdot) > 0$ and $\pi_w(\cdot) < 0$. Since condition (2.9) is always satisfied in case of a fixed wage, the minimum wage offer a worker is willing to accept decreases in motivation. That is, if $\gamma > \gamma'$, then $U(\gamma, w) = U(\gamma', w')$ implies that $w < w'$.

2.4.2 Observable motivation

Suppose the firm can observe the level of intrinsic motivation of each applicant during the selection process. The sequence of events is as follows:

1. The firm posts a 'help-wanted' ad, in which it can credibly commit to a minimum wage.
2. The workers who observe the ad decide whether or not to apply. If a worker applies, she incurs cost C .
3. The firm observes the types of all applicants, selects one applicant, and makes her a wage offer w .
4. The applicant accepts or rejects. Rejection results in zero profits.¹⁰

⁹Instead of $\mu < 1$, we could also assume that C is a random variable that differs among workers. Important for the results is that the firm faces some uncertainty about the composition of the group of applicants.

¹⁰A more general set-up of the game would allow the firm to make a wage offer to another applicant (or a better wage offer to the same worker) after a rejection. While this could reduce the probability to end up with an unfilled vacancy, it may increase the rents that have to be left to the

We first consider the case where the firm has not committed to a minimum wage at stage 1. We solve the model by backward induction. The optimal strategy of each worker at stage 4 is simple: accept if and only if $U(\gamma_i, w) \geq U^{out}$. Application costs are sunk at this stage. As profits increase in the worker's motivation, the firm optimally selects the most motivated worker among the applicants. The optimal wage offer is such that $U(\gamma, w) = U^{out}$. This strategy of the firm at stage 3 makes that no worker applies at stage 2. Each worker anticipates that the firm extracts all rents of her motivation, leaving the worker with the sunk application cost.¹¹ This result is known as the Diamond paradox (Diamond, 1971; see also Mortensen and Pissarides, 1999).¹²

To give workers an incentive to apply, the firm must make a credible commitment not to extract all rents from their motivation. It can do so by putting a minimum wage w_{\min} in the ad at stage 1.¹³ If the minimum wage is sufficiently high, some worker types have positive expected benefits from applying. Since $\pi_\gamma(\cdot) > 0$, the firm still selects the most motivated worker from the pool of applicants at stage 3. If the lowest wage that this worker would accept is below the minimum wage, the minimum wage is binding. Otherwise, the firm offers the wage that makes the worker indifferent between accepting and rejecting. However, as above, these workers optimally do not apply. Hence, the firm always offers w_{\min} .

At stage 2, worker i applies if the expected benefits from applying are positive. Obviously, if a certain worker type has positive expected benefits from applying, all workers with higher motivation also have positive expected benefits from applying. A worker of type γ_i applies if and only if

$$f(\gamma_i)[U(\gamma_i, w_{\min}) - U^{out}] - C \geq 0 \quad (2.12)$$

hired worker. Workers may wait for a next (higher) wage offer at the risk that an other applicant accepts one of the firm's next offers. Allowing for multiple wage offers will also affect the decision to apply. We leave this for future research.

¹¹The assumption that the firm makes a take-it-or-leave-it wage offer implies that even if there is a single most motivated worker, $n_{\bar{\gamma}} = 1$, this worker cannot capture any rents.

¹²If $C = 0$, all workers who observe the ad apply. The firm selects the most motivated worker and offers the wage that exactly meets her participation constraint as described in Section 2.3.

¹³We assume that posting a range of wage offers conditional on a worker's motivation is not credible due to the unverifiability of the level of motivation. Thus, posting a single wage is the best the firm can do.

where $f(\gamma_i)$ is the expected probability for a worker of type γ_i of being selected by the firm and $U(\gamma_i, w_{\min})$ is the utility that the worker obtains if she accepts offer w_{\min} . $f(\gamma_i)$ is determined by the distribution of worker types:

$$f(\gamma_i) = (1 - \mu)^{N_{\gamma_i} - n_{\gamma_i}} \sum_{x=0}^{n_{\gamma_i} - 1} \left[\frac{1}{1+x} \binom{n_{\gamma_i} - 1}{x} \mu^x (1 - \mu)^{n_{\gamma_i} - 1 - x} \right] \quad (2.13)$$

where N_{γ_i} is given by (2.11). The first term is the probability that all workers with $\gamma > \gamma_i$ do not observe the ad. If any of these workers apply, then worker i will not be selected by the firm. The second term gives the probability that worker i is selected from all applicants of the same type. This probability is the function $\frac{1}{1+x}$, where x is the number of applicants with motivation γ_i besides worker i , which follows a binomial distribution.

The firm sets the minimum wage such that expression (2.12) holds with equality for the least motivated worker type that it wants to apply. Denote this worker type by γ_{\min} . As argued above, if $w_{\min} < w'_{\min}$, then $\gamma_{\min} > \gamma'_{\min}$. Expected profits are given by:

$$E[\pi(\gamma, w_{\min})] = \sum_{\gamma \geq \gamma_{\min}} F(\gamma) \pi(\gamma, w_{\min}) \quad (2.14)$$

where:

$$F(\gamma) = (1 - \mu)^{N_{\gamma} - n_{\gamma}} [1 - (1 - \mu)^{n_{\gamma}}] \quad (2.15)$$

is the probability that γ is the highest level of motivation among the applicants and $\pi(\gamma, w_{\min})$ is the accompanying level of profit. Suppose the firm increases the minimum wage from w_{\min} to w'_{\min} such that γ_{\min} decreases by one worker type to γ'_{\min} . This leads to the following change in expected profits:

$$\begin{aligned} \Delta E[\pi] &= E[\pi(\gamma, w'_{\min})] - E[\pi(\gamma, w_{\min})] \\ &= \sum_{\gamma \geq \gamma'_{\min}} F(\gamma) \pi(\gamma, w'_{\min}) - \sum_{\gamma \geq \gamma_{\min}} F(\gamma) \pi(\gamma, w_{\min}) \end{aligned}$$

which can be written as:

$$\Delta E[\pi] = F(\gamma'_{\min})\pi(\gamma'_{\min}, w'_{\min}) + \sum_{\gamma \geq \gamma_{\min}} F(\gamma)[\pi(\gamma, w'_{\min}) - \pi(\gamma, w_{\min})] \quad (2.16)$$

Increasing the minimum wage leads to a higher probability of filling the vacancy as an additional worker type, γ'_{\min} , has an incentive to apply after observing the ad. This is reflected by the first term. However, if some worker with motivation higher than γ'_{\min} observes the vacancy, the increase in the minimum wage only leads to additional cost, as this worker would have applied at the lower minimum wage as well. This is described by the second term.

The firm sets the minimum wage such that $0 \leq \gamma_{\min} \leq \bar{\gamma}$. A local optimum of $E[\pi(\gamma, w_{\min})]$ can be found by stepwise increasing the minimum wage until the sign of $\Delta E[\pi]$ turns negative. Whether there is only one local (and thus global) optimum is unsure given the general specification of the distribution of worker types and of the profit function $\pi(\gamma, w_{\min})$. More specifically, if, for a value of w_{\min} above the local optimum, a small increase in w_{\min} results in a large increase in the probability of filling the vacancy, then $E[\pi(\gamma, w_{\min})]$ may not be concave in w_{\min} , and hence, there may be more than one local optimum. Restricting the distribution of worker types such that $n_{\gamma} = n$ for all γ and $\pi(\gamma, w'_{\min}) - \pi(\gamma, w_{\min})$ is constant in w_{\min} (that is, the increase in w_{\min} necessary to attract one additional worker type is equal for all worker types), both terms of (2.16) decrease with w_{\min} . This implies that $E[\pi(\gamma, w_{\min})]$ is concave in w_{\min} and, hence, there exists only one local and global optimum. Corner solutions cannot be excluded: it is possible that the optimal γ_{\min} is either 0 or $\bar{\gamma}$.

2.4.3 Unobservable motivation

When the firm cannot observe the types of the applicants, it randomly selects one applicant and makes her a wage offer. As in the previous subsection, we assume that when the wage offer is rejected, the firm ends up with zero profits.

Consider first the case where the firm has not committed to a minimum wage. The beliefs of the firm about the distribution of applicants' types are crucial in

determining the optimal wage offer. Suppose that the firm believes that there exists some γ_l such that only workers with $\gamma_i \geq \gamma_l$ apply after observing the vacancy. Let w_l be the wage such that $U(\gamma_l, w_l) = U^{out}$. Given the firm's beliefs, its optimal wage offer w is such that $w_{\bar{\gamma}} \leq w \leq w_l$. Hence, workers of type γ_l optimally decide not to apply as the wage offer does not compensate them for the application cost. This, in turn, reduces the firm's optimal wage, which removes the incentives of workers with slightly higher motivation to apply. As this holds for any γ_l (including $\bar{\gamma}$), the market collapses, as in Akerlof's lemon market. In Akerlof's model, the existence of bad types drives the good types out of the market. Interestingly, in our model, it is the withdrawal of the bad types from the market that drives out the good types.

Again, the firm needs to commit to a minimum wage in order to attract applicants. In Appendix 2.A.3, we derive the optimal minimum wage when workers' motivation is unobservable. Compared to the case where motivation is observable, there is an additional selection effect of raising the wage. As before, a higher minimum wage induces workers who are less motivated to apply. Hence, the average level of intrinsic motivation of applicants goes down. If the firm can fully observe applicants' motivation, this reduction in average motivation of applicants does not entail a cost since the firm simply chooses the best motivated worker among the applicants. However, if applicants' motivation is unobservable, the firm picks an applicant randomly, and hence, higher wages reduce the expected level of motivation of the worker that is hired. The selection effect imposes an additional cost of increasing the minimum wage compared to the case where motivation is observable, so the optimal minimum wage is lower.¹⁴

2.4.4 Motivation can be signaled

Suppose that the firm cannot observe the motivation of the applicants, but applicants can credibly signal their type to the firm.¹⁵ Obviously, when the firm does

¹⁴If $C = 0$, the firm need not commit to a minimum wage to attract applicants. However, the selection effect indicates that the firm might want to commit to a maximum wage in order to reduce the number of relatively less motivated workers in the pool of applicants, as in Handy and Katz (1998). Note also that a maximum wage is of no use when $C > 0$.

¹⁵If signals are not credible, motivation remains unobservable, as all applicants would signal that they have motivation $\bar{\gamma}$.

not commit to a minimum wage, none of the workers apply, as in the previous subsections. Each applicant anticipates that when she signals her type, the firm fully extracts all the rents of motivation, leaving the applicant with the sunk application cost. Because no applicant reveals her type to the firm, motivation remains unobservable. As we have seen in the previous subsection, this results in a complete breakdown of the market.

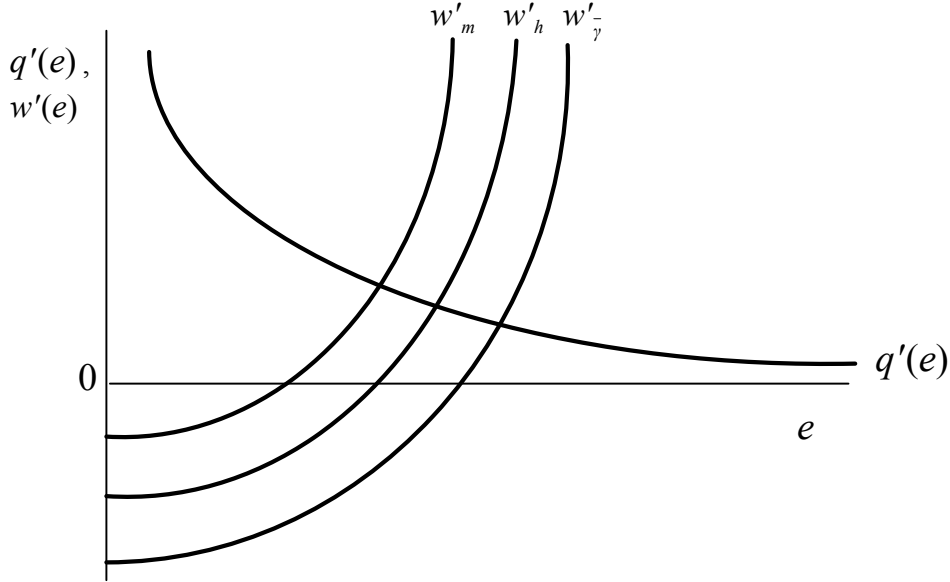
When the firm posts a minimum wage w_{\min} , each applicant signals her motivation to the firm. The intuition is that signaling increases a worker's probability of getting the job. Consider an applicant with motivation $\bar{\gamma}$, and suppose that all other applicants do not signal their motivation. If she signals, she is certain to get the job. If she does not signal, she only gets the job if she is randomly selected. Hence, she signals her type as signaling increases her probability of being selected by the firm. This also holds when other workers signal. Next, consider workers of the highest but one type of motivation, γ_h . Signaling is of no avail when a worker of type $\bar{\gamma}$ is in the pool of applicants. However, if none of the workers of type $\bar{\gamma}$ apply, signaling is beneficial, as the firm prefers to select a worker of type γ_h if there are no workers of type $\bar{\gamma}$ available. Since workers have no information about the other applicants and signaling is costless, it is always in the interest of workers of type γ_h to signal their type. Analogously, all applicants have an incentive to signal their type so as to increase the probability of getting the job.

It follows that a worker only gets the job if she is the most motivated applicant, as in Subsection 2.4.1 where the firm could observe the motivation of the applicants. Hence, workers have the same incentives to apply as in Subsection 2.4.1, and the firm optimally sets the minimum wage at the same level.

2.5 Signaling and screening with optimal monetary incentive schemes

This section shows that the results derived in Section 2.4 under the assumption of a fixed wage generalise to the case where the firm provides monetary incentives to the worker, as in Section 2.3.

Figure 2.2: Intrinsic motivation and the optimal monetary incentive scheme



Suppose the firm wants only workers with motivation $\bar{\gamma}$ to apply. Analogous to the previous section, the firm needs to commit to a minimum wage scheme in order to attract applicants, regardless of whether or not the firm can observe the motivation of the applicants. The firm has to commit to a minimum wage scheme that satisfies the following constraint:

$$p(\bar{\gamma}) \{U[w(e), e, \bar{\gamma}e] - U^{out}\} - C \geq 0$$

where $p(\bar{\gamma})$ is the probability of getting the job for a worker of type $\bar{\gamma}$, given by (2.13) in case of observable motivation and by (2.A8) in case of unobservable motivation, respectively. Optimal effort is again described by first-order conditions (2.4) and (2.5), with $\gamma_i = \bar{\gamma}$. Clearly, there exist many wage schemes that satisfy these conditions. One of these is depicted in Figure 2.2.

Figure 2.2 depicts the marginal product of effort $[q'(e)]$ and the marginal disutility from effort for three different types of workers. The latter curves are obtained by

rewriting the first-order condition for optimal effort of the worker (2.4) to

$$w'_i(e) = -\frac{U_2(\cdot) + \gamma_i U_3(\cdot)}{U_1(\cdot)} \quad (2.17)$$

where $i \in \{m, h, \bar{\gamma}\}$, $\gamma_m < \gamma_h < \bar{\gamma}$. Equation (2.17) describes for each level of effort the minimum reward the firm must provide to induce a worker of type γ_i to provide an additional unit of effort. Notice that when the firm creates an incentive scheme that follows (2.17) exactly, the worker is just compensated for his (net) disutility from effort. In order to give workers an incentive to apply, the firm has to make sure that a worker with motivation $\gamma_{\min} = \bar{\gamma}$ ends up (in expected terms) with utility U^{out} . Hence, the firm must offer a base salary $B_{\gamma_{\min}}$ such that:

$$U(B_{\gamma_{\min}}, 0, 0) = U^{out} + \frac{C}{p(\gamma_{\min})} \quad (2.18)$$

An optimal minimum wage scheme that induces only workers with motivation $\bar{\gamma}$ to apply thus consists of a base salary $B_{\gamma_{\min}}$, given by (2.18) with $\gamma_{\min} = \bar{\gamma}$, and a monetary incentive scheme that follows (2.17) up to the point where $w'_{\bar{\gamma}}(e) = q'(e)$. Denote the accompanying level of effort by $e_{\bar{\gamma}}$. The firm's offer is:

$$B_{\bar{\gamma}} + \int_0^{e_{\bar{\gamma}}} w'_{\bar{\gamma}}(e) de$$

This minimum wage offer is just sufficient to induce workers with motivation $\bar{\gamma}$ to apply. All other worker types have negative expected benefits from applying and, hence, decide not to apply.

Now suppose the firm prefers to give the highest two types an incentive to apply, types $\bar{\gamma}$ and γ_h . As in the previous section, this implies that the firm has to leave a rent to workers of type $\bar{\gamma}$. The firm optimally trades off the rents it has to leave in case the selected applicant appears to be a worker of type $\bar{\gamma}$ and the effort exerted by a worker of type γ_h . The profit maximising wage scheme that is acceptable to

both types of workers is described by:

$$\max_{e_h} P(\gamma_h) [q(e_h) - B_{\gamma_h} - w_h(e_h)] + P(\bar{\gamma}) \left[q(e_{\bar{\gamma}}) - B_{\gamma_h} - w_h(e_h) - \int_{e_h}^{e_{\bar{\gamma}}} w'_{\bar{\gamma}}(e) de \right] \quad (2.19)$$

where e_h is the level of effort a worker of type γ_h is induced to exert by this profit maximising scheme, and $P(\gamma_h)$ and $P(\bar{\gamma})$ are the probabilities that a worker of type γ_h and a worker of type $\bar{\gamma}$ are hired, given by (2.15) when motivation is observable and by (2.A10) when motivation is unobservable, respectively. Base salary B_{γ_h} is implicitly given by (2.18) with $\gamma_{\min} = \gamma_h$, and $w_h(\cdot)$ and $w'_{\bar{\gamma}}(\cdot)$ are described by (2.17) with $\gamma_i = \gamma_h, \bar{\gamma}$, respectively. The first term in brackets is the firm's profit in case a worker of type γ_h is hired, which happens with probability $P(\gamma_h)$. In expected terms, the firm does not leave a rent to these workers. The first derivative with respect to e_h of this term equals zero when e_h equals the optimal effort level of workers of type γ_h under full information, described in Section 2.3. The second term in brackets is the firm's profit in case a worker of type $\bar{\gamma}$ is hired, which happens with probability $P(\bar{\gamma})$. To meet this worker's individual rationality constraint, the firm must provide monetary incentives as if the worker is of type γ_h up to effort level e_h . Hence, the firm leaves a rent to workers of type $\bar{\gamma}$. Starting from effort level e_h , the firm just compensates workers of type $\bar{\gamma}$ for each additional unit of effort. The first derivative with respect to e_h of the second term is always negative since $w'_h(e) > w'_{\bar{\gamma}}(e)$ for any e . Clearly, it is in the firm's interest to set e_h lower than the optimal effort level under full information, as derived in Section 2.3. The profit maximising wage scheme induces a worker of type γ_h to exert suboptimally low effort to reduce the rents that the firm has to leave in case the offer is made to a worker of type $\bar{\gamma}$.¹⁶ Workers of type $\bar{\gamma}$ are induced to exert an efficient level of effort, as in Section 2.3. The firm must, however, leave a rent to these workers. The optimal wage scheme that gives types $\bar{\gamma}$ and γ_h an incentive to apply is described by:

$$B_{\gamma_h} + \int_0^{e_h} w'_h(e) de + \int_{e_h}^{e_{\bar{\gamma}}} w'_{\bar{\gamma}}(e) de \quad (2.20)$$

¹⁶For a similar result in a more general context, see chapter 7 in Fudenberg and Tirole (1992).

Along the same lines, we can derive the optimal wage scheme when the firm wants to induce more worker types to apply. The lower γ_{\min} , the higher the base salary and the higher the incentive wage up to $e_{\gamma_{\min}}$ to give workers with motivation $\gamma \geq \gamma_{\min}$ an incentive to apply. The wage scheme is such that each worker type (except $\bar{\gamma}$) exerts a suboptimal level of effort to decrease the rents the firm has to leave to higher types. As in Section 2.4, the optimal wage scheme entails a trade-off between the probability of filling the vacancy, the rents left to workers, and, if motivation is unobservable, the expected quality of the selected worker. It is straightforward to show that the firm needs to commit to a sufficiently high base salary to attract applicants and to give them an incentive to signal their motivation.

2.6 Concluding remarks

In this chapter, we have studied a firm's optimal recruitment, selection, and pay-for-performance practices when workers differ in their intrinsic motivation to work at the firm. We have shown that when intrinsic motivation cannot be observed by the firm, posting a higher wage may increase the probability of filling a vacancy, but at the same time decrease the expected motivation of the hired worker. Screening technologies such as personality and workstyle tests, work trials, and the use of assessment centres may help a firm to select the best motivated worker among the applicants, but these may only help if the firm commits to pay at least a certain wage. Otherwise, workers may have an incentive to conceal their motivation or, even worse, to abstain from applying.

Our model predicts that when workers' motivation is more easy to assess, workers' productivity and wages will be higher. Productivity is higher since the firm is better able to select the best-motivated applicant. Wages will also be higher as there is less need to discourage low-motivated workers from applying by offering a low wage. When workers' employment history contains some information on workers' motivation, older workers' motivation may be more easy to assess than younger workers' motivation. Adverse selection problems arising from heterogeneity in workers' motivation may therefore increase the wage premium on labour market experience. A

testable implication of our model therefore is that in sectors where workers' intrinsic motivation is important, wage-experience profiles are steeper.

Heterogeneity in workers' motivation may also affect the effects of intensifying competition in an industry. In the next chapter, we extend our model to examine the consequences of creating a fully competitive market in a sector previously dominated by a monopsonistic firm. We show that firms in a competitive market provide stronger monetary incentives to workers, pay higher wages, and employ fewer workers than a monopsonistic firm. These findings square well with the empirical evidence on the effects of privatisation and liberalisation.

We have adopted a very simple concept of workers' intrinsic motivation, namely that workers to a certain extent enjoy exerting effort at work. We have assumed that this enjoyment of effort is independent of the firm's pay policies. Adopting a more sophisticated concept of intrinsic motivation may reveal interesting effects additional to the ones we discussed above. For instance, a higher wage may change the public perception of how noble a task or job is, which in turn may reduce workers' motivation to do the job. Seabright (2002) and Janssen and Mendys-Kamphorst (2004) have recently developed models along these lines. Moreover, offering pay-for-performance may undermine workers' intrinsic motivation as they feel that their intrinsic motivation is not acknowledged by the firm (see Frey, 1997a and Frey and Jegen, 2001).

2.A Appendices

2.A.1 Appendix 1

In this appendix we derive the condition under which the total wage compensation decreases in motivation. For this purpose, it is convenient to write the wage scheme as:

$$w(e) = q(e) + B \quad (2.A1)$$

Hence, in line with first-order condition (2.5), workers get their full marginal product, while the base salary B is such that the participation constraint of the worker is just satisfied:

$$U(w(e), e, \gamma e) = U(q(e) + B, e, \gamma e) = U^{out} \quad (2.A2)$$

By combining the optimal wage scheme (2.A1) and the first-order conditions for effort (2.4) and profit (2.5), it follows that the optimal level of effort is implicitly given by:

$$q'(e)U_1(\cdot) + U_2(\cdot) + \gamma U_3(\cdot) = 0 \quad (2.A3)$$

In Section 2.3, we derived the effect of a marginal change in γ on the optimal level of effort:

$$\frac{de}{d\gamma} = \frac{U_3(\cdot) + e\gamma U_{33}(\cdot)}{-\partial F/\partial e} > 0 \quad (2.A4)$$

where $\partial F/\partial e < 0$ is the second-order condition to the worker's optimisation problem (2.A3). We are interested in the sign of $\frac{dw(e)}{d\gamma}$. By using (2.A1), we can rewrite this to:

$$\frac{dw(e)}{d\gamma} = \frac{dq(e)}{d\gamma} + \frac{dB}{d\gamma} \quad (2.A5)$$

The first term on the right-hand side of this equation is simply:

$$\frac{dq(e)}{d\gamma} = q'(e)\frac{de}{d\gamma}$$

where $\frac{de}{d\gamma}$ is given by (2.A4). The second term on the right-hand side of (2.A5) can be found by using the participation constraint (2.A2) and applying the implicit

function theorem:

$$\frac{dB}{d\gamma} = -\frac{eU_3}{U_1} + \frac{[q'(e)U_1(\cdot) + U_2(\cdot) + \gamma U_3(\cdot)]}{U_1(\cdot)} \frac{de}{d\gamma} = -\frac{eU_3}{U_1}$$

where the term in square brackets is zero by first-order condition (2.A3) (the envelop theorem). Hence, we can rewrite (2.A5) as:

$$\frac{dw(e)}{d\gamma} = q'(e) \frac{de}{d\gamma} - \frac{eU_3(\cdot)}{U_1(\cdot)} = \frac{-[U_2(\cdot) + \gamma U_3(\cdot)] \frac{de}{d\gamma} - eU_3(\cdot)}{U_1(\cdot)}$$

where the second equality follows from (2.A3). Total wage compensation thus decreases in motivation if the following condition holds:

$$eU_3(\cdot) > -[U_2(\cdot) + \gamma U_3(\cdot)] \frac{de}{d\gamma} \quad (2.A6)$$

which is identical to condition (2.9) in the main text.

2.A.2 Appendix 2

Suppose the wage results from a bargain between the firm and the worker, of which the outcome is described by the generalised Nash bargaining function. The worker's bargaining power is denoted by χ , the firm has bargaining power $1 - \chi$ ($0 \leq \chi \leq 1$). Note that apart from the total compensation to the worker, the incentive scheme derived in Section 2.3 is optimal for both the firm and the worker. Denote the minimum wage for which the worker is willing to work by $w_{\min}(\gamma)$. The maximum wage the firm is willing to offer is denoted by $w_{\max}(\gamma)$. The wage that results from the bargaining is the minimum wage plus a proportion χ of the total rents (the difference between the maximum and the minimum wage):

$$w = w_{\min}(\gamma) + \chi[w_{\max}(\gamma) - w_{\min}(\gamma)]$$

To examine the effect of γ on w , we differentiate this function with respect to γ :

$$\frac{dw}{d\gamma} = \chi w'_{\max}(\gamma) + (1 - \chi)w'_{\min}(\gamma)$$

In Section 2.3 we have shown that $w'_{\max}(\gamma) > 0$ and $w'_{\min}(\gamma) < 0$, provided that condition (2.9) holds. The wage decreases in motivation if:

$$\frac{\chi}{\chi - 1} < \frac{w'_{\min}(\gamma)}{w'_{\max}(\gamma)}$$

Hence, as long as χ is sufficiently low, the wage decreases in the motivation of the worker.

2.A.3 Appendix 3

Suppose the firm puts minimum wage w_{\min} in its ad.¹⁷ When motivation is unobservable a worker of type γ_i applies if and only if:

$$g(\gamma_i)[U(\gamma_i, w_{\min}) - U^{out}] - C \geq 0 \quad (2.A7)$$

where $g(\gamma_i)$ is the expected probability for a worker with motivation γ_i of being randomly selected by the firm after applying. This probability is $\frac{1}{1+v}$, where v is the number of applicants besides worker i . v is a random variable that follows a binomial distribution. It is easily verified that:

$$g(\gamma_i) = \sum_{v=0}^{N_{\gamma_{\min}}-1} \left[\frac{1}{1+v} \binom{N_{\gamma_{\min}}-1}{v} \mu^v (1-\mu)^{N_{\gamma_{\min}}-1-v} \right] \quad (2.A8)$$

The firm sets the minimum wage such that expression (2.A7) holds with equality for the least motivated worker type, γ_{\min} , that it wants to apply. Expected profits of the firm are given by:

$$E[\pi(\gamma, w_{\min})] = \sum_{\gamma \geq \gamma_{\min}} G(\gamma) \pi(\gamma, w_{\min}) \quad (2.A9)$$

where $G(\gamma)$ is the probability that the firm selects an applicant with motivation γ .

¹⁷Clearly, this will also be the firm's actual offer. Offering a wage that is higher than the wage announced in the ad could only be optimal if the firm believed that the least motivated applicants would reject offer w_{\min} . However, these workers anticipate that they will not be compensated for the application cost and, hence, optimally decide not to apply. As in the absence of a commitment, the firm's beliefs are unsustainable.

This probability is $\frac{S}{S+Z}$, where S is the number of applicants of type γ and Z the number of applicants with a different type of motivation. Both S and Z follow a binomial distribution, and their joint distribution is given by:

$$\begin{aligned} P(S = s, Z = z) &= P(S = s)P(Z = z) \\ &= \binom{n_\gamma}{s} \mu^s (1 - \mu)^{n_\gamma - s} \binom{N_{\gamma_{\min}} - n_\gamma}{z} \mu^z (1 - \mu)^{N_{\gamma_{\min}} - n_\gamma - z} \end{aligned}$$

where the first equality follows from the observation that the two random variables S and Z are independently distributed. Hence, $G(\gamma)$ is described by:

$$G(\gamma) = \sum_{s=1}^{n_\gamma} \sum_{z=0}^{N_{\gamma_{\min}} - n_\gamma} \frac{s}{s+z} \binom{n_\gamma}{s} \mu^s (1 - \mu)^{n_\gamma - s} \binom{N_{\gamma_{\min}} - n_\gamma}{z} \mu^z (1 - \mu)^{N_{\gamma_{\min}} - n_\gamma - z} \quad (2.A10)$$

The summation over s starts at $s = 1$, because $G(\gamma) = 0$ if none of the workers with motivation γ observes the ad. Note that $\sum_{\gamma \geq \gamma_{\min}} G(\gamma) < 1$, as there may be no applicant at all, which happens with probability $(1 - \mu)^{N_{\gamma_{\min}}}$.

Suppose the firm increases the minimum wage from w_{\min} to w'_{\min} , such that γ_{\min} decreases by one worker type to γ'_{\min} . This reduces the probability of selecting an applicant with motivation γ to:

$$G'(\gamma) = \sum_{s=1}^{n_\gamma} \sum_{z=0}^{N_{\gamma'_{\min}} - n_\gamma} \frac{s}{s+z} \binom{n_\gamma}{s} \mu^s (1 - \mu)^{n_\gamma - s} \binom{N_{\gamma'_{\min}} - n_\gamma}{z} \mu^z (1 - \mu)^{N_{\gamma'_{\min}} - n_\gamma - z} \quad (2.A11)$$

Since $N_{\gamma'_{\min}} > N_{\gamma_{\min}}$ by definition, $G'(\gamma) < G(\gamma)$ for all $\gamma \in [\gamma_{\min}, \bar{\gamma}]$. Intuitively, the probability that a worker of a certain type is selected decreases if the number of worker types that apply increases. This is the selection effect. As before, the increase in the minimum wage decreases the probability that nobody applies, as $\sum_{\gamma \geq \gamma'_{\min}} G'(\gamma) > \sum_{\gamma \geq \gamma_{\min}} G(\gamma)$.

The increase in the minimum wage from w_{\min} to w'_{\min} leads to the following

change in expected profits:

$$\begin{aligned}\Delta E[\pi] &= E[\pi(\gamma, w'_{\min})] - E[\pi(\gamma, w_{\min})] \\ &= \sum_{\gamma \geq \gamma'_{\min}} G'(\gamma)\pi(\gamma, w'_{\min}) - \sum_{\gamma \geq \gamma_{\min}} G(\gamma)\pi(\gamma, w_{\min})\end{aligned}$$

which can be rewritten as:

$$\Delta E[\pi] = G'(\gamma'_{\min})\pi(\gamma'_{\min}, w'_{\min}) + \sum_{\gamma \geq \gamma_{\min}} [G'(\gamma)\pi(\gamma, w'_{\min}) - G(\gamma)\pi(\gamma, w_{\min})] \quad (2.A12)$$

The first term gives the probability of selecting a worker with motivation γ'_{\min} and the accompanying profits. The second term indicates that by increasing w_{\min} to w'_{\min} , each worker type $\gamma \geq \gamma_{\min}$ has a lower probability of being selected, and given a selected worker type, the profit of the firm is lower as a result of the wage increase. This expression is negative since $G'(\gamma) < G(\gamma)$ for all $\gamma \in [\gamma_{\min}, \bar{\gamma}]$ and $\pi(\gamma, w'_{\min}) < \pi(\gamma, w_{\min})$. As in Subsection 2.4.2, the optimal minimum wage is found by stepwise increasing the minimum wage until the sign of $\Delta E[\pi]$ turns negative. See the last paragraph of Subsection 2.4.2.

Chapter 3

From Public Monopsony to Competitive Market: More Efficiency but Higher Prices

Joint with Robert Dur

3.1 Introduction

The last decades have seen much debate about privatisation of public firms and liberalisation of markets. During the seventies and eighties, people became more and more sceptical about the performance of public companies. The lack of profit motive and the absence of competition would give public firms insufficient incentive to produce efficiently, resulting in too low productivity, too high employment, and, hence, excessively high cost. This debate has led to an ongoing wave of privatisation of public companies, usually accompanied by introducing or strengthening competition among firms in the market. The empirical literature by and large supports the notion that privatisation and liberalisation may increase efficiency. Megginson and Netter (2001) provide an extensive survey of the empirical literature and conclude that privatisation leads to an increase in productivity. Employment usually falls, unless the firm is able to increase its sales substantially. Another recent survey, by

Kikeri and Nellis (2002), reaches similar conclusions.¹

This chapter develops a model to examine the consequences of creating a fully competitive market in a sector previously dominated by a cost-minimising public firm. Our model implies that firms in a competitive environment provide stronger monetary incentives for workers to exert effort than the public firm. Hence, productivity increases and the sector's employment decreases after liberalising the sector. Even though liberalisation thus improves allocative efficiency of the economy, prices of the sector's output rise. The reason is that liberalising the sector not only intensifies competition between firms in the product market, but also in the labour market.

An important element of our model is that workers in the economy have private information about their intrinsic motivation to work in the sector. Thus, we assume that working in this sector has some particular trait which is valued differently by different workers. Better motivated workers work harder and are willing to work for a lower wage. Besides intrinsic motivation, workers' effort depends on the monetary incentives provided by the firm. We show that the public firm can save on wage cost per unit of output by providing weak monetary incentives for workers. This way, the public firm extracts part of the rents from motivated workers. When the sector is liberalised, competition among firms for the best-motivated employees leads to an increase in the incentive wage up to the point where each worker is paid his full marginal product. Wage cost per unit of output and, hence, prices increase after liberalisation.

The model's implications concerning productivity and employment are well in line with the empirical findings mentioned above. Moreover, and consistent with our model, the empirical literature often attributes the increase in productivity to an increase in monetary incentives for workers (e.g., Megginson, Nash, and Van Randenborgh, 1994). Kikeri and Nellis (2002) discuss several studies which find an increase in performance-based incentives for workers in privatised firms. Martin and

¹To what extent the mere change of ownership (privatisation) or the strengthening of competition (liberalisation) is responsible for efficiency gains is still unclear. As privatisation and liberalisation often take place simultaneously, it is hard to disentangle the effects empirically (Kikeri and Nellis, 2002).

Parker (1997) report similar evidence for several British firms. In line with these studies, Burgess and Metcalfe (1999, 2000) find, using British data, that firms in the private sector make far more use of incentive wages than in the public sector, and that incentive schemes are more common in competitive establishments than in non-competitive establishments, both for managers and non-managers. Moreover, they conclude that it is difficult to rationalise the relatively weak incentives in the public sector as being optimal on the basis of differences in the scope for performance measurement or multitasking. We argue that weak incentives in public firms may stem from exploitation of monopsonistic power, a power that firms in a competitive environment lack.

Our result on the level of wages seems to square less well with common belief. Indeed, it is often claimed that workers bear the burden of privatisation and liberalisation through job losses and lower wages. The empirical literature, however, suggests otherwise as regards wages. Kikeri and Nellis (2002) observe that *“in many instances, and contrary to popular perception, those who retain their jobs in privatised firms receive higher wages, sometimes substantially so”* (p. 18). For the UK, effects on wages appear to be mixed (Haskel and Szymanski, 1993, Martin and Parker, 1997). The most comprehensive study is by La Porta and López-de-Silanes (1999) for Mexico, where a massive process of privatisation and liberalisation has taken place. They report large increases in real wages of the privatised firms while overall real wages throughout Mexico stagnated.² In addition, they asked firms why they increased worker’s pay. Interestingly, *“matching the conditions offered by similar firms”* was listed as an important reason for the increase in wages after privatisation. La Porta and López-de-Silanes (1999) also examine the effect of privatisation on prices. Prices tend to increase, albeit modestly. There is surprisingly little other evidence on how privatisation and liberalisation affect prices (cf. Megginson and Netter, 2001).

Our study relates to a number of recent papers which stress the importance of

²The increase in wages is not confined to executive compensation: real wages of blue-collar workers rose even more than those of white-collar workers. Moreover, only a small part of the increase in wages can be attributed to composition effects. See Section V in La Porta and López-de-Silanes (1999).

workers' intrinsic motivation for optimal incentive schemes and effort, particularly in public service occupations (see, among others, Francois, 2000, Dixit, 2002, Benabou and Tirole, 2003, Prendergast, 2004, Besley and Ghatak, 2005, Glazer, 2004). As in these papers, we assume that workers' effort choices are partly driven by non-pecuniary benefits. More specifically, we assume that some of the economy's workers enjoy exerting effort or intrinsically value their contribution to output, if working in a particular occupation.³ There is lots of evidence for such motivations. Marsden and French (1998) find that intrinsic rewards are important for many public sector workers in the UK across a wide range of types of occupational activity. For instance, they report that many headteachers "*derive a lot of satisfaction from the nature of their activity*" (p. 111) and that the staff of trust hospitals "*appear highly motivated in their work, find it intrinsically interesting and worthwhile*" (p. 100). Other studies include Antonazzo et al. (2003) on nursing workers, Edmonds et al. (2002) on teachers, and Frank and Lewis (2004) on employees in these and several other areas of the public sector. These studies also indicate that there exists substantial variation in occupational preferences among workers (see also Daymont and Andrisani, 1984, and Harper and Haq, 2001).

Commonly used examples of sectors where workers' intrinsic motivation plays an important role are health care and education (Besley and Ghatak, 2003). Our model's predictions are well in line with recent experiences in these sectors. For instance, in Sweden, wages in the health-care sector have risen at three times the earlier rate, and have become more closely tied to individual performance, since private companies began competing with public units (Hjertqvist, 2001). Likewise, Hoxby (1994), Merrifield (1999), and Vedder and Hall (2000) show that competition from private schools increases teacher salaries at public schools in the US. Hoxby (2002) finds that school competition creates a more high-powered incentive environment within the teaching profession and concludes that under increased competition "*less skilled or motivated incumbent teachers might find themselves earning*

³This assumption corresponds to Dixit (2002), Benabou and Tirole (2003), Besley and Ghatak (2005), and Glazer (2004). In contrast, Francois (2000) and Prendergast (2004) assume that workers have an altruistic motivation, that is, workers care about the provision of public services, but do not derive utility from their personal involvement in production.

smaller salary increases than some of their peers" (p. 883).⁴ Empirical studies also show that competition among schools raises school productivity substantially (Hoxby, 1994 and 2000) and enhances the work effort of teachers (Rapp, 2000).

The chapter is organised as follows. Section 3.2 discusses related literature. Next, Section 3.3 presents the basic features of our model. In Section 3.4, we derive the sector's employment, the wage scheme, and the output price in the competitive equilibrium. Next, we show in Section 3.5 that a public monopsony produces output at a lower price by setting weaker work incentives and expanding employment compared to the competitive equilibrium. We also discuss the distributional consequences of moving from public monopsony to competitive market in Section 3.5. Section 3.6 generalises the model to a continuum of worker types. We show that our results hold as long as workers in the neighbourhood of the marginal worker do not differ too much in motivation. Section 3.7 concludes.

3.2 Related literature

Our setup and results deviate from other theoretical work on privatisation and liberalisation. There is a large literature on public versus private ownership given the degree of competition. One strand focuses on incomplete contracting problems; see in particular Laffont and Tirole (1991) and Hart, Schleifer, and Vishny (1997). We abstract from these kind of problems: firm's output and worker's effort are fully contractible in our model. This implies that ownership as such does not matter: public ownership of the firm and public regulation of a private firm yield identical outcomes. For convenience, we use the label 'public firm' in the monopsony case and 'private firms' in the competitive case, but it should be stressed that the monopsony analysis applies to a regulated private firm as well.

Another group of studies emphasizes that the objectives of the management may change after privatisation. Whereas private firms care only about profit, public firms are supposed to be concerned also about wages, employment, and (sometimes)

⁴In line with our model, her interpretation of the evidence is based on heterogeneity in intrinsic motivation to perform job-specific tasks, e.g. working with school-aged children. Unlike our model, she assumes that competition affects a school's production function.

consumer surplus. In Boycko, Schleifer, and Vishny (1996), these concerns stem from politicians' desire to preserve jobs and keep wages high in public firms. Privatisation raises the cost to politicians of influencing the firms' decisions and, hence, results in lower wages and lower employment. Corneo and Rob (2003) argue that public firms set weaker work incentives than private firms, because a public firm incorporates workers' utility of socializing at the workplace into its own objective function. Haskel and Szymanski (1993) model privatisation as a shift to more commercial objectives. Privatisation affects production, employment, and wages negatively as a private firm places less weight on consumer surplus and workers' welfare than a public firm. In contrast to these papers, we abstract from differences in managerial objectives between public and private firms. In our model, both private firms and the public firm maximise profits. In the competitive equilibrium, private firms' profits are driven to zero because of free entry and exit of firms. Under the public monopsony, profits are zero because the government extracts all of the public firm's rents by designing an appropriate contract. As for the government's objectives, we assume that politicians represent the interest of consumers of the good produced in the sector. Therefore, the government induces the manager of the public firm to minimise cost. We also consider the case where the government is a social planner.

The paper by Haskel and Szymanski (1993) is the only theoretical study that examines the consequences of both privatisation and liberalisation. It shows that liberalisation decreases the output price and increases the sector's employment, because firms can exploit product market power to a lesser extent. In the presence of trade unions, liberalisation reduces wages, as trade unions find themselves with less surplus to bargain over. Note that these results are exactly opposite to ours. Whereas Haskel and Szymanski analyse the consequences of a decrease in power of the firm in the product market, we focus on the effects of a decrease in firm's power in the labour market. In practise, liberalisation will affect employment and wages through both channels. The empirical evidence discussed in the Introduction, particularly the evidence on wages, suggests that the effects arising from a decrease in monopsony power may dominate, at least in some important cases.

Lastly, this chapter closely relates to the literature on monopsonistic power of

employers. It has long been recognised that employer's power in wage determination may drive wages below marginal productivity. Bhaskar, Manning, and To (2002) and Manning (2003) review a number of intriguing implications of monopsonistic power of employers, among others for interfirm wage dispersion, for employer's incentive to pay for general training, and for the effect of minimum wages on employment. We contribute to this literature by examining the implications of monopsonistic power for the optimal design of pay-for-performance schemes. In our model, monopsonistic power arises because workers differ in the extent to which they intrinsically value working in a particular sector. We could as well assume that workers differ in an ability which is particularly valuable in one sector of the economy. Recently, Booth and Zoega (2002) have developed a model along these lines and argue that increased labour market competition may explain why wage inequality has risen in some countries.⁵

3.3 The model

The model revolves around production in a particular sector of the economy. Production takes place either in one public organisation or in private firms which compete with each other. For convenience, we assume a very simple production technology and very simple product demand characteristics. All firms in the sector, including the public firm in case of public production, have the same technology and labour is the only production factor. Output depends linearly on workers' effort e . The marginal product of effort is denoted by κ . Introducing (dis)economies of scale in production does not affect the results as long as it does not preclude competition. Demand for the sector's product is assumed to be perfectly price inelastic and denoted by Q^d . Assuming, instead, a downward-sloping demand curve does not affect the results qualitatively.⁶

Workers in the economy differ in their intrinsic motivation to work in the sector,

⁵In Booth and Zoega's model, workers' effort is exogenous. For our results to hold in a model where workers differ in ability instead of motivation, effort must be endogenous and complementary to ability.

⁶Price elastic demand enlarges the real effects of liberalisation in the sector and reduces the price effects.

otherwise they are identical. Outside the sector, workers obtain utility U^o . If worker i is employed in the sector, his utility is described by:

$$U_i = w(e_i) + \gamma_i e_i - \frac{1}{2} \theta e_i^2 \quad (3.1)$$

where w is the wage, which depends on worker's effort e_i , γ_i measures the degree to which worker i is intrinsically motivated to work in this sector, and θ measures the cost of effort (the value of foregone leisure, tiredness). A worker with $\gamma = 0$ is a 'standard neoclassical worker' who dislikes effort and only works to make a living, see e.g. Lazear (1995). The higher is γ , the more a worker values exerting effort at work and, therefore, the higher his effort given the power of the incentive scheme. Equation (3.1) captures in a simple way the ideas that workers differ in the extent to which they are motivated to work in the sector and that motivation matters for workers' effort. The sector-specificity of motivation is important for the results as it gives the public firm monopsonistic power. In contrast, differences between workers' general work motivation would not give the public firm monopsonistic power as general motivation is valuable in many different jobs in the economy.

While workers' motivation is private information, firms observe workers' effort. For simplicity, we assume a linear wage scheme:⁷

$$w(e) = \alpha e + \beta \quad (3.2)$$

Substituting (3.2) into (3.1) and maximising with respect to e gives worker i 's optimal level of effort, if employed in the sector:

$$e_i^* = \frac{\alpha + \gamma_i}{\theta} \quad (3.3)$$

Clearly, optimal effort increases in the incentive wage and in intrinsic motivation, and decreases in the cost of exerting effort.

⁷In Appendix 3.A.1, we allow firms to offer non-linear separating contracts.

Worker i is willing to work in the sector if:

$$U_i \geq U^o \quad (3.4)$$

For simplicity, we initially assume that there are only two types of workers in the economy, high-motivation workers (h) with $\gamma = \gamma_h > 0$ and low-motivation workers (l) with γ_l normalised to 0. In Section 3.6, we generalise the model to allow for any distribution of motivation over the work force. Substituting (3.1), (3.2), and (3.3) into (3.4), it easily follows that for any combination of α and β , the participation constraint of low-motivation workers is more binding than that of high-motivation workers:

$$\frac{1}{2} \frac{(\alpha + \gamma_i)^2}{\theta} + \beta \geq U^o \quad (3.5)$$

Thus, for any given level of incentive wage α , high-motivation workers can be attracted at a lower base salary β than low-motivation workers. Together with the result that high-motivation workers exert more effort, this implies that when product demand is low, the public firm optimally attracts only high-motivation workers by setting α and β such that the participation constraint for high-motivation workers binds. We assume that product demand Q^d is sufficiently high (or that the number of high-motivation workers in the economy is sufficiently low) such that the sector also employs some low-motivation workers. Obviously, in the more general case of a continuum of worker types, no restriction on demand is required, see Section 3.6. Denoting the number of high-motivation workers in the economy by H and the number of low-motivation workers employed in the sector by L , total employment in the sector is given by:

$$Q^d = \kappa (e_h^* H + e_l^* L) \Leftrightarrow H + L = \frac{1}{\alpha} \left(\frac{\theta Q^d}{\kappa} - \gamma_h H \right) \quad (3.6)$$

3.4 Competitive market

In the competitive equilibrium, firms compete in both the product market and the labour market. Free entry and exit of firms guarantees zero profit. Given the linear

production technology, profit on every single job is zero in equilibrium:

$$\pi_i = p\kappa e_i^* - (\alpha e_i^* + \beta) = 0 \text{ for } i = l, h \quad (3.7)$$

where p is the equilibrium price of the sector's output, which is an endogenous variable. Using (3.3) with $i = l$ and $i = h$ respectively, it follows that:

$$\begin{aligned} \alpha &= p\kappa \\ \beta &= 0 \end{aligned}$$

Hence, we obtain the familiar result that under perfect competition each worker earns his full marginal product and does not receive a fixed wage.

The participation constraint of the low-motivation workers must bind in equilibrium. If this is not the case, low-motivation workers who are employed outside the sector underbid the insiders. Hence, condition (3.5) must hold with equality for $i = l$. Substituting $\alpha = p\kappa$ and $\beta = 0$ into (3.5), we obtain the equilibrium price in the competitive equilibrium:

$$p = \frac{\sqrt{2\theta U^o}}{\kappa}$$

The price of the sector's output increases in workers' cost of effort and in workers' outside opportunity, and decreases in the productivity of effort. Note that in the competitive equilibrium, firms' cost and the price of the sector's output depend neither on the degree to which high-motivation workers are motivated (γ_h) nor on the number of high-motivation workers in the economy (H). The reason is that high-motivation workers receive all of the rents of their motivation.

Lastly, employment is found by substituting the equilibrium value of α into (3.6):

$$H + L = \frac{1}{\sqrt{2\theta U^o}} \left(\frac{\theta Q^d}{\kappa} - \gamma_h H \right)$$

Employment increases in demand for the sector's product and worker's cost of effort, and decreases in productivity of effort and the workers' outside option. While motivation of the labour force does not affect the price, it does affect the level of

employment: the higher the number of high-motivation workers and the better their motivation, the lower is total employment.

Table 3.1 summarises the results for the competitive equilibrium.

Table 3.1: The competitive equilibrium

α	$\sqrt{2\theta U^o}$
β	0
p	$\frac{\sqrt{2\theta U^o}}{\kappa}$
$H + L$	$\frac{1}{\sqrt{2\theta U^o}} \left(\frac{\theta Q^d}{\kappa} - \gamma_h H \right)$

3.5 Public monopsony

Let us now consider the case of a public firm (or regulated private firm) which is the sole supplier of output Q^d . Entry of firms is blocked by government regulation. The government induces the public firm to minimise cost.⁸ The public firm's optimisation problem is:

$$\min_{\alpha, \beta, L} \alpha (e_h^* H + e_l^* L) + \beta (H + L) \quad (3.8)$$

subject to the production constraint (3.6) and the low-motivation worker's participation constraint (3.5), and where e_i^* is given by (3.3). The solution is summarised in Table 3.2. For ease of comparison with Table 3.1, we define μ as the share of motivation-induced effort in total effort in the sector:

$$0 < \mu = \frac{\kappa \gamma_h H}{\theta Q^d} < 1$$

⁸In the absence of agency problems, the government can offer a contract to the manager of the public firm to deliver Q^d at the minimum price p , which is derived below. Profit maximisation by the public firm then results in cost minimisation, as in (3.8).

Table 3.2: Public monopsony

$$\begin{array}{ll}
\alpha & \sqrt{\frac{1-\mu}{1+\mu}} \sqrt{2\theta U^o} \\
\beta & \left(\frac{2\mu}{1+\mu}\right) U^o \\
p & \sqrt{1-\mu^2} \frac{\sqrt{2\theta U^o}}{\kappa} \\
H+L & \sqrt{\frac{1+\mu}{1-\mu}} \frac{1}{\sqrt{2\theta U^o}} \left(\frac{\theta Q^d}{\kappa} - \gamma_h H\right)
\end{array}$$

The public firm sets weaker incentives for workers, pays a fixed wage, and employs more workers than private firms do in a competitive market. Yet, the public firm supplies output at a lower price than results in a competitive market. The intuition is straightforward. As the public firm reduces the incentive wage α , it has to increase the fixed wage β so as to keep the low-motivation workers' participation constraint satisfied. Low-motivation workers need to be compensated for a reduction in α to a relatively small extent because they exert little effort. High-motivation workers, who exert more effort, therefore lose income. They face a reduction in their performance-related pay which is only partly compensated for by the increase in the fixed wage. Thus, by providing weak monetary incentives, the firm extracts part of the motivational rents of high-motivation workers. The cost of reducing the incentive wage is that workers reduce their effort, which necessitates an increase in employment so as to keep production at Q^d . Starting from the competitive equilibrium, a marginal increase in employment entails no additional cost because the fixed wage is zero. However, as α decreases, the increase in employment becomes more and more costly as the fixed wage β goes up along with the reduction in α . In the optimum, the cost of employing an additional worker exactly equals the marginal benefit of extracting rents from the high-motivation workers. Comparing Table 3.1 and Table 3.2, it is easy to see that the extent to which the wage scheme, employment, and output price differ between competitive market and public monopsony depends only

on μ , the share of motivation-induced effort in total effort.

Note that the opportunity to extract motivational rents stems from the monopsonistic power of the public firm. The positive fixed wage implies that total pay per unit of effort is higher for low-motivation workers than for high-motivation workers. Thus, the public firm makes a loss on the input of low-motivation workers, while it makes a profit on the input of high-motivation workers. In a competitive environment, a competing firm would offer a slightly lower fixed wage and a higher incentive wage so as to attract the profitable high-motivation workers. In equilibrium, competitive firms pay the full marginal product and no fixed wage, as we have derived in the previous section.⁹

The implications of the model square well with the empirical observations mentioned in the Introduction. Incentive wages and productivity are higher in a competitive environment, while total employment is lower than under a public monopsony. The wage of all retained workers increases after liberalisation. The wage of the low-motivation workers is higher because stronger incentives induce them to work harder. High-motivation workers' pay increases even more, as their motivational rents are no longer expropriated by the public firm. Hence, the relative wage of low-motivation workers decreases after liberalisation.¹⁰ This is in line with empirical evidence that wages are more compressed in the public sector than in the private sector (Gregory and Borland, 1999, Borjas, 2003, Grout and Stevens, 2003).

The welfare consequences of liberalisation are straightforward in the two-type case. Total production in the economy increases as a result of liberalisation because more workers become available for other sectors of the economy. Social welfare also increases, see Appendix 3.A.2. Low-motivation workers throughout the economy nevertheless lose, as their job-related utility remains at U^o while they have to pay a higher price for the sector's output.¹¹ High-motivation workers gain all of the

⁹None of the results changes if high-motivation workers also derive some constant intrinsic benefits from working in the sector (e.g. stemming from pride to work in the sector). As both high-motivation and low-motivation workers are needed in the sector, the participation constraint of high-motivation workers is never binding, implying that neither the public firm nor the private firms can extract any of these constant benefits from the high-motivation workers.

¹⁰The relative wage under the public monopsony is: $w_l/w_h = \sqrt{2\theta U^o}/(\sqrt{2\theta U^o} + \gamma_h\sqrt{1-\mu^2})$, while in a competitive market: $w_l/w_h = \sqrt{2\theta U^o}/(\sqrt{2\theta U^o} + \gamma_h)$.

¹¹The low-motivation workers who remain employed in the sector earn a higher income but the

surplus from liberalising the sector. As high-motivation workers in a particular sector are a small group, the distributional consequences of liberalisation may well hinder its political viability. Insofar as politicians want to please the public at large, our analysis can thus be viewed as a positive theory of distortionary regulation.¹²

3.6 A continuum of worker types

This section relaxes the assumption that there are only two types of workers in the economy. We assume that intrinsic motivation of workers is distributed according to the cumulative distribution function $F(\gamma)$, where $F(0) = 0$ and $F(\bar{\gamma}) = 1$. The upper boundary $\bar{\gamma}$ is introduced to rule out the case that one worker produces all output. The sector's employment as a share of the economy's labour force equals $F(\bar{\gamma}) - F(\underline{\gamma})$, where $\underline{\gamma}$ denotes the motivation of the least motivated employee in the sector.

3.6.1 Competitive market

In the competitive equilibrium, the zero-profit condition (3.7) holds for all $\gamma \in [\underline{\gamma}, \bar{\gamma}]$. Hence, as in the two-type model, competition between firms implies that all workers earn their full marginal product: $\alpha = p\kappa$, $\beta = 0$. The price of output is such that the participation constraint of the sector's least motivated employee is just satisfied:

$$\frac{(p\kappa + \underline{\gamma})^2}{2\theta} = U^0 \quad (3.9)$$

The production constraint reads:

$$Q^d = \kappa \int_{\underline{\gamma}}^{\bar{\gamma}} f(\gamma) e^* d\gamma = \kappa \int_{\underline{\gamma}}^{\bar{\gamma}} f(\gamma) \frac{p\kappa + \gamma}{\theta} d\gamma \quad (3.10)$$

utility gain from higher income is annulled by the utility loss of exerting more effort.

¹²In this respect, this chapter relates to the optimal taxation literature where the government redistributes income from high-ability workers to low-ability workers at the cost of distortions in work incentives (Mirrlees, 1971). In this chapter, the government abstains from liberalisation and distorts work incentives in the public firm so as to extract rents from highly motivated workers. As in the optimal taxation literature, we assume that the government can not identify workers' types.

Constraints (3.9) and (3.10) together implicitly define the equilibrium values of the price p and employment $F(\bar{\gamma}) - F(\underline{\gamma})$. The comparative static results are qualitatively the same as in the two-type case and are, therefore, not discussed here.

3.6.2 Public monopsony

Total cost of the public firm is:

$$C = \int_{\underline{\gamma}}^{\bar{\gamma}} f(\gamma)(\alpha e^* + \beta) d\gamma$$

Substituting optimal effort (3.3) to eliminate e^* , and the least-motivated worker's participation constraint (3.5, with $\gamma = \underline{\gamma}$) to eliminate β , yields after some rewriting:

$$C = \alpha \frac{Q^d}{\kappa} + \left[U^o - \frac{(\alpha + \underline{\gamma})^2}{2\theta} \right] [F(\bar{\gamma}) - F(\underline{\gamma})] \quad (3.11)$$

where we have simplified the first term on the right-hand side by using the production constraint:

$$Q^d = \kappa \int_{\underline{\gamma}}^{\bar{\gamma}} f(\gamma) e^* d\gamma \quad (3.12)$$

The public firm's optimisation problem is to minimise (3.11) with respect to α and $\underline{\gamma}$, subject to (3.12). Combining the first-order conditions results in:

$$\begin{aligned} & -\frac{\alpha + \underline{\gamma}}{\theta} [F(\bar{\gamma}) - F(\underline{\gamma})] + \int_{\underline{\gamma}}^{\bar{\gamma}} \frac{\alpha + \gamma}{\theta} f(\gamma) d\gamma \quad (3.13) \\ & -\frac{[F(\bar{\gamma}) - F(\underline{\gamma})]}{(\alpha + \underline{\gamma})f(\underline{\gamma})} \left\{ \left[U^o - \frac{(\alpha + \underline{\gamma})^2}{2\theta} \right] f(\underline{\gamma}) + \frac{\alpha + \underline{\gamma}}{\theta} [F(\bar{\gamma}) - F(\underline{\gamma})] \right\} = 0 \end{aligned}$$

We can not derive explicit solutions for the optimal values of α and $\underline{\gamma}$. However, we can characterise the properties of the optimal wage scheme by using the results for the competitive equilibrium described in the previous subsection. Condition (3.13) describes four effects of a change in the incentive wage α on total cost. The first term is the increase in the fixed wage necessary to keep the least-motivated worker's participation constraint satisfied. This increase in β , by $\frac{\alpha + \underline{\gamma}}{\theta}$, must be paid to all workers, $[F(\bar{\gamma}) - F(\underline{\gamma})]$. The second term describes cost savings as a result of a

decrease in α : all units of effort are rewarded less when the incentive wage decreases. Because the average effort level is higher than the effort level of the least-motivated worker, the first two terms are positive in sum. This is the cost-saving effect of giving weaker incentives for workers.

The terms on the second line of (3.13) describe the marginal cost of reducing the incentive wage. The term outside the brackets is the increase in employment necessary to keep production at Q^d . The first term inside the brackets describes the increase in cost of enhancing employment as the new hires need to be paid the fixed wage. Starting from the competitive equilibrium outcome in which the fixed wage is zero, this term is zero. The second term inside the brackets is the increase in the fixed wage necessary to attract outsiders to work in the sector. The increase in the fixed wage must be paid to all workers. This effect was absent in the previous section. In the two-type model, the firm could hire additional employees from the pool of equally motivated workers of type l . In the model with a continuum of worker types, increasing employment necessitates to increase the wage because outsiders are less motivated than insiders.

This additional cost implies that we can not be certain about whether the incentive wage under the public monopsony is higher or lower than in the competitive market. The same holds for the level of employment and the fixed wage. Much depends on the specific distribution of motivation over workers. When individuals in the neighbourhood of the competitive sector's marginal worker differ a lot in intrinsic motivation, the public firm may optimally give stronger monetary incentives for workers than in a competitive market. The fixed wage then becomes negative, and employment becomes lower. If, instead, workers close to the marginal worker differ little in their intrinsic motivation, the increase in the wage cost to attract new employees is small and dominated by the cost-saving effect described by the first line of condition (3.13). Then, as in the two-type model, the public firm gives weaker incentives, and hence liberalisation leads to lower employment and higher wages for all retained workers. Obviously, if (3.13) implies that deviating from the competitive market's optimal incentive wage is optimal, the public firm is more cost-efficient than firms in a competitive market.

The welfare effects of liberalisation are more dispersed than in the two-type model. The reason is that with a continuum of workers, all those employed in the sector obtain a rent except for the marginal worker, who is just indifferent between working inside and outside the sector. When liberalisation entails stronger work incentives and less employment, the workers who are laid off lose this rent. Also, some of those who remain employed in the sector (the ones with relatively low motivation) lose as the increase in disutility from effort more than offsets the increase in total wage. The other workers in the sector - those who are relatively highly motivated - gain. Workers outside the sector lose as a consequence of the price increase, as in the two-type model.

3.7 Conclusion

This chapter has developed a model which can explain the empirical observations that firms in a competitive market provide stronger monetary incentives to workers, reach higher productivity, employ less workers, and pay higher wages than a public monopsony. We have argued that weak incentives for workers in public firms may stem from exploitation of monopsonistic power, a power that firms in a competitive environment lack. Our model implies that strengthening competition between firms may raise wage cost and, thus, output prices. Hence, liberalisation of a sector may particularly favour the workers who remain employed in the sector at the expense of the public at large. Political support for liberalisation may therefore be limited, even though liberalisation improves allocational efficiency of the economy.

We have compared two extreme cases, a competitive market without any market failures and a publicly owned or regulated monopolist without any government failures. Clearly, allowing for market failures and government failures could alter the results. For instance, if the government could not perfectly regulate the public firm, e.g. due to information asymmetries, then the public firm may limit production (and hence employment) so as to raise the price of output. Creating a competitive market may then lead to lower prices and higher employment as the public firm can no longer exploit its monopoly power. In practice, it seems likely that liberalisation

of a sector reduces both the monopoly power and the monopsony power of the public firm, implying that the effect of liberalisation on prices and employment is ambiguous. Allowing for monopoly power of the public firm does not affect our conclusions on incentive pay and wages, as it is also in the interest of a public monopolist to exploit its monopsony power so as to reduce wage costs. This may explain why the empirical evidence on the effect of liberalisation on wages and incentive pay is more conclusive than the evidence on prices and employment.

3.A Appendices

3.A.1 Separating contracts

This appendix relaxes the assumption that firms offer a single wage scheme. Obviously, in the case of a competitive market, none of the results change: the participation constraint of the low-motivation workers binds, and the high-motivation workers receive all of the rents of their motivation as each worker is paid his full marginal product in equilibrium. In the case of a public monopsony, the results are in the same spirit as we will show now.

For convenience, assume that each contract specifies a fixed wage and an effort level: (β_l, e_l) and (β_h, e_h) . We could as well assume that contracts consist of a fixed and an effort-related component, as above, but this unnecessarily complicates the analysis. The first contract must satisfy the low-motivation workers' participation constraint:

$$\beta_l \geq U^o + \frac{1}{2}\theta e_l^2$$

The second contract must satisfy the high-motivation workers' revelation constraint:

$$\beta_l + \gamma_h e_l - \frac{1}{2}\theta e_l^2 \leq \beta_h + \gamma_h e_h - \frac{1}{2}\theta e_h^2$$

Using these two constraints and the production constraint [$Q^d = \kappa(L e_l + H e_h)$], we can write the cost of production as:

$$\begin{aligned} C &= \beta_l L + \beta_h H \iff \\ C &= \left(U^o + \frac{1}{2}\theta e_l^2 \right) \left(\frac{Q^d - \kappa H e_h}{\kappa e_l} \right) + \left(U^o - \gamma_h (e_h - e_l) + \frac{1}{2}\theta e_h^2 \right) H \end{aligned}$$

Minimising C with respect to e_l and e_h results in the following two first-order conditions:

$$\left(\frac{1}{2}\theta - \frac{U^o}{e_l^2} \right) \frac{Q^d - \kappa H e_h}{\kappa} + \gamma_h H = 0 \quad (3.A1)$$

$$-\frac{U^o + \frac{1}{2}\theta e_l^2}{e_l} + (-\gamma_h + \theta e_h) = 0 \quad (3.A2)$$

We can not derive explicit solutions for the optimal values of e_l and e_h . We can, however, compare them with the effort levels in the competitive equilibrium. Recall that the effort of low-motivation workers in the competitive equilibrium equals $\frac{\sqrt{2\theta U^o}}{\theta}$. Substituting this into first-order condition (3.14), the first term becomes zero. Hence, as the second term is positive, the public firm sets e_l below the competitive level so as to increase the rents that can be extracted from the high-motivation workers, just as in the case of a single wage scheme. Using this result, it follows from first-order condition (3.14) that e_h is larger than the effort level of high-motivation workers in the competitive equilibrium. The intuition is straightforward. As the reduction in e_l entails an increase in the cost of output that is produced by the marginal worker, it is profitable to let the high-motivation workers work harder. Total employment is higher and average productivity is lower in a public monopsony compared to the competitive equilibrium if:

$$(\theta Q - \kappa\gamma_h H) \left[\left(\theta Q - \kappa\gamma_h H - \kappa H \sqrt{2\theta U} \right)^2 - \kappa^2 \gamma_h H^2 \sqrt{2\theta U} \right] + \kappa^3 \gamma_h H^3 \theta U > 0 \quad (3.A3)$$

This follows from rewriting and combining first-order conditions (3.14) and (3.14) and using the results for the competitive case. A sufficient condition is that the term in square brackets is positive, which can be rewritten as:

$$\alpha_c L_c^2 > \gamma_h H^2$$

where α_c and L_c are the incentive wage and the number of low-motivation workers in the competitive equilibrium, respectively; see Table 3.1. Hence, when the public firm can offer separating contracts, employment may be lower than in the competitive equilibrium if the number of high-motivation workers and their motivation are high relative to the contribution of low-motivation workers to production. Note, however, that if $\gamma_h H$ becomes sufficiently high, only high-motivation workers will be employed in the sector, both in the competitive equilibrium and in the case of a public monopsony. Then, competition and monopsony yield identical outcomes. A numerical analysis suggests that if both low-motivation and high-motivation workers are hired, condition (3.A3) is almost always satisfied and, hence, employment

is lower in the competitive equilibrium. Finally, prices are always lower in the case of a public monopsony. If this would not be the case, the public monopsony would offer the same contracts as those that result in the competitive equilibrium.

3.A.2 Maximising social welfare

Suppose the public firm maximises the sum of utilities of all workers in the economy. Since utility is linear in income, we can write the social welfare function as:

$$\Psi = (K - L)U^o + LU_l + HU_h - C \quad (3.A4)$$

where K is the total number of low-motivation workers in the economy, C is the cost of production of the sector's output, and we have imposed that Q^d is sufficiently large such that it is optimal for the public firm to hire also low-motivation workers, as in the main text. Our assumption of price-inelastic demand implies that the utility from the sector's output is a constant, so we can safely ignore it. Substituting total cost C , described in (3.8), and the workers' utility function (2.1) with $i = l$ and $i = h$, respectively, into (3.A4) gives after some rewriting:

$$\Psi = (K - L)U^o - L \left(\frac{1}{2}\theta e_l^{*2} \right) + H \left(\gamma_h e_h^* - \frac{1}{2}\theta e_h^{*2} \right) \quad (3.A5)$$

Note that the fixed wage β paid by the public firm does not affect social welfare, but must satisfy the low-motivation workers' participation constraint (3.5). Substituting optimal effort (3.3) into (3.A5) and maximising with respect to α and L , subject to the production constraint (3.6), yields after some rewriting that optimal $\alpha = \sqrt{2\theta U^o}$, the same as in the competitive equilibrium. Consequently, the level of employment is also the same and the fixed wage $\beta = 0$.

Chapter 4

Incentives and Workers' Motivation in the Public Sector

Joint with Robert Dur

"Citizens and taxpayers have their own global view of bureaucracy. To them, bureaucrats are lethargic, incompetent hacks who spend their days spinning out reels of red tape and reams of paperwork, all the while going to great lengths to avoid doing the job they were hired to do."

James Q. Wilson (1989), p. x.

4.1 Introduction

Bureaucrats have a bad reputation. Jokes about bureaucrats' laziness and stories on bureaucratic errors abound. The lack of monetary incentives at public organisations is supposed to attract workers who are most averse to exerting effort. This pessimistic view is also prominent in the economics literature. For several decades, the literature has identified bureaucrats as pursuing their narrow self-interest, usually being at odds with the interest of society (see Tullock, 1965, Downs, 1967, Niskanen, 1971, and Buchanan, 1978).

However, when citizens are asked about recent personal experience with civil servants, many tend to be satisfied with their performance (Katz et al., 1975, Goodsell,

1985). Surveys of workers and managers in the public sector also suggest that quite a few civil servants do not fit the stereotype. Instead, even when external incentives are weak or nonexistent, quite some civil servants appear to be highly motivated to provide a service to the community.¹ Such 'public service motivation' of civil servants is also a central theme of a number of recent economic studies of public agencies (Francois, 2000, Dixit, 2002, Prendergast, 2004, Glazer, 2004, and Besley and Ghatak, 2005).

How to reconcile these seemingly opposing points of view? This chapter develops a model with three types of workers: regular, motivated, and lazy workers. Compared to regular workers, lazy workers have higher cost of effort in both the private and the public sector. Motivated workers, to some extent, enjoy exerting effort in a public sector job, but are otherwise identical to regular workers. This public service motivation gives monopsony power to the government. We show that it is in the interest of a cost-minimising government to recruit, in addition to motivated workers, lazy workers rather than regular workers.

Whereas we model the private sector as a competitive market in which workers are paid their full marginal product, the public sector is assumed to be a single organisation whose objective is to produce a certain amount of public goods at minimum cost. This organisation, which we refer to as the public agency, attracts workers by offering one or more contracts specifying the wage and, if verifiable, required effort. The public agency can not observe the workers' type and, hence, can not make the contracts contingent on worker type. Workers choose the contract that yields them the highest utility, provided that the private sector is not a better option.

We consider two cases: verifiable and unverifiable effort. When effort is unverifiable, the public agency prefers to hire either motivated or lazy workers. We show that it may occur that the public agency prefers to attract only motivated workers, but that it can not avoid hiring lazy workers as well. However, if desired public

¹See chapter 2 in Le Grand (2003) for a review of the empirical literature on workers' motivation in the public sector. Other recent studies include Antonazzo et al. (2003) on nursing workers, Edmonds et al. (2002) on teachers, and Frank and Lewis (2004) on employees in these and several other areas of the public sector.

production is sufficiently large, the public agency wants to attract both motivated and lazy workers, implying that the problem of nonexcludability of lazy workers is less severe.

When effort is verifiable and desired production in the public sector is sufficiently small, the public agency hires only motivated workers, and extracts all motivational rents from these workers. This full rent extraction may not be possible if a second worker type is needed. Any rents motivated workers obtain when they would choose the other type's contract can not be extracted by the public agency. Since a contract satisfying a lazy worker's participation constraint has lower wage and lower required effort than a regular worker's contract, a lazy worker's contract is less appealing to the motivated workers. Therefore, the public agency can extract more motivational rents, and hence attracts motivated workers at lower cost, if it attracts lazy workers rather than regular workers.

The public agency distorts both contracts in order to extract even more motivational rents. It offers lower-powered incentives to lazy workers than do private firms. This way, the lazy worker's contract becomes even less appealing to the motivated workers. However, to keep production at the desired level, the public agency has to hire additional lazy workers, which is costly. These costs can be reduced by giving motivated workers higher-powered incentives, above the level private firms would offer.

These contract distortions are cost-efficient, but reduce social welfare. If we impose that the public agency maximises social welfare rather than minimises cost, it does not distort the contracts of the workers. The public agency still prefers to attract motivated workers, but if a second worker type is needed, it is indifferent between lazy and regular workers. Compared to a cost-minimising public agency, social welfare is higher. However, total cost of public goods production and, hence, taxes are also higher when the public agency maximises social welfare. Only motivated workers benefit, whereas the utility of lazy and regular workers decreases as a result of higher taxes. When motivated workers are a minority in society, politicians are likely to strive for cost-minimisation rather than for social welfare maximisation, so as to please the public at large.

While there exists quite some empirical evidence showing that a significant part of the civil work force has a public service motivation (see the references in footnote 1), there exists little evidence confirming the stereotype view that civil servants are lazy. It is important to note that our model does not necessarily imply that workers in the public sector are on average more lazy than workers in the private sector; nor does it imply that lazy workers are always more numerous in the public sector than in the private sector.² Therefore, rather than comparing sectoral averages of workers' characteristics, Table 4.1 presents data on workers who have moved from one sector to the other. Following Johnson (1978)'s model of 'job shopping' and Jovanovic (1979)'s model of turnover, we expect a worker to move in case of a mismatch between the worker's tastes or abilities and his job's attributes or requirements. In the context of our model, we thus predict regular workers to move from the public sector to the private sector, whereas lazy and motivated workers move in opposite direction. Our model implies that for lazy workers, the attractive feature of working in the public sector is that the workload is relatively low, either because effort is unverifiable, or because weak incentives are provided. In 2002, the Dutch Ministry of the Interior and Kingdom Relations undertook a survey of workers who had recently entered or left the public sector. In Table 4.1, we list the percentage of workers moving between the private and the public sector who mentioned workload as one of the three most important reasons to leave their job. Workers who moved from the private sector to the public sector mention workload more often than workers who moved in the opposite direction. The difference is most pronounced for central government and local governments. Education is the main exception. This may be due to the increasing shortage of teachers in The Netherlands during this period (Meesters, 2003), or it may indicate that our model does not apply to all jobs in the public sector.

Another reason for why people may differ in their disutility from work effort is that they face different external constraints. For instance, the care for children or

²For instance, when there are many lazy workers in the economy, and the public sector is not too large, the majority of lazy workers will work in the private sector. Depending on the number of motivated workers, workers in the public sector can be more lazy or less lazy on average than are workers in the private sector.

Table 4.1: Percentage of workers moving from the private sector to the public sector and vice versa who mention workload (column 1) and combining work and family life (column 2) as one of the three most important reasons to leave their job (The Netherlands, 2002).

Sector	Workload		Combining work and family life		Number of respondents	
	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
Central	15.8	1.5	19.0	8.3	329	134
Local	16.3	7.4	20.5	4.5	681	267
Police	9.1	2.0	10.2	8.7	444	95
Research ¹	12.7	9.3	17.1	4.3	128	31
Hospitals ²	11.0	12.9	11.9	14.2	40	46
Defence	3.2	4.6	9.5	34.5	159	107
Education	14.5	35.0	23.4	13.3	432	145

Data source: BZK, Mobiliteitsonderzoek 2002.

¹ Research consists of universities and research institutes.

² Only university hospitals were surveyed.

for a sick family member may draw on someone's energy and concentration at work and may raise the opportunity cost of time at work. The second column of Table 4.1 presents the percentage of workers moving between the private and the public sector who mention combining work and family life as one of the three most important reasons to leave their job. Clearly, people who moved from a private sector job to a public sector job mention combining work and family life relatively often compared to people who moved from the public to the private sector, with defence being an obvious exception.³

The chapter is organised as follows. The next section discusses how the chapter relates to the literature. Section 4.3 describes the model. Section 4.4 analyses the case where effort in the public sector is unverifiable. In Section 4.5, effort is verifiable in both sectors of the economy. Section 4.6 compares our results with the case where

³When we restrict our sample to people who worked full-time at both jobs, the results for workload provide even stronger support for our prediction, and the results for combining work and family life are only slightly weaker.

the public agency maximises social welfare rather than minimises costs. Section 4.7 concludes.

4.2 Related literature

Our paper is related to the Roy model of occupational choice (Roy, 1951). Roy studies workers' self-selection into occupations and the resulting income distribution in a model where workers are heterogeneous in occupation-specific productivity. Jovanovic (1982)'s extension of the Roy model allows a worker's productivity in one sector of the economy to be private knowledge of the worker. As a result of this information asymmetry, the market equilibrium has too many people working in the sector where productivity can not be observed relative to the second-best social optimum. The crowding-out argument we develop in Section 4.4 is close in spirit to this result. Besides our focus on the public sector and workers' motivation, our analysis differs from both Roy (1951) and Jovanovic (1982) in that worker's effort is endogenous, which leads to interesting issues of contract design in Section 4.5. Moreover, while the earlier studies assume competitive labor markets, we assume that the public sector has monopsony power over some workers (those with a public service motivation), which gives rise to rent extraction.

Our model is related to the literature on screening of workers' ability following the seminal papers by Spence (1973) and Rothschild and Stiglitz (1976) (for an overview, see Riley, 2001). In a standard adverse selection model (see e.g. Laffont and Martimort, 2002), a firm induces the 'low' type to exert a suboptimally low level of effort, so as to extract more of the rents from the 'high' type. The contract of the 'high' type is efficient. In contrast, in our model the contracts of both types are distorted. Whereas in the standard model a firm designs contracts for a fixed number of workers, our model describes the behaviour of a firm which has to meet a production requirement.⁴

Heterogeneity in laziness may stem from differences in people's physical fitness or ability, as in the standard adverse selection model, but may also stem from hetero-

⁴It is easy to extend our model to allow for price-elastic demand for the public good. Then, as in the case of a production requirement, both contracts are distorted.

geneity in general work ethic or morale. Differences in work ethic have been associated with, for instance, personality traits (Furnham, 1992) and cultural factors (Hofstede, 1991). Caplan (2003) surveys the modern personality psychology literature and concludes that: “*Some people are much more eager to shirk than others by showing up late, spending their effort on non-work projects, taking their time, stealing office supplies and so on. Preferences for these sorts of behavior throughout the population markedly differ, holding constraints constant*” (p. 398).

A new strand in the economics literature emphasises that workers in public organisations (or, more generally, in non-profit organisations) may be intrinsically motivated to work. For instance, Dixit (2002) argues that organisations that have an idealistic or ethical purpose may be attractive to workers who share these goals. Besley and Ghatak (2005) show that, when workers are protected by limited liability, a good match between an organisation’s and a worker’s mission may reduce monetary incentives. Francois (2000) and Glazer (2004) develop models where workers intrinsically value the output of the public organisation, see also Preston (1989). In Benabou and Tirole (2003) workers may enjoy exerting effort at work or intrinsically value their contribution to output (‘warm-glow’). The main difference between these papers and our study is that we relax the assumption that types of agents are fully observed by the principal.

Most related to our work is a recent paper by Prendergast (2004). He assumes that workers differ in altruism for clients. The government prefers to attract different worker types for different agencies. For agencies where the preferences of the government and clients are aligned, as in health care, the government prefers the most altruistic bureaucrats. However, when the preferences of the government and clients are not aligned, as with (suspected) criminals, bureaucrats should be biased against their clients. Prendergast shows that, when agents’ types are unobservable, agencies are likely to attract both the most preferred and the least preferred workers. The latter enter the agency because they benefit most from diverting from the government’s most preferred policy.

Our work also relates to Lazear (1986). He argues that firms can use their wage policy so as to attract certain types of workers, just like the public agency

in our model does. Strong monetary incentives induce highly productive workers to apply at a firm, whereas less productive workers prefer a high base salary and weak incentives (see also Lazear, 1995, and Prendergast, 1999, for surveys). Moen and Rosen (2005) have recently built on this and argue that, when there is a multi-tasking problem, competition between firms for highly productive workers may result in incentives that are too high-powered from a social welfare perspective. Burgess and Metcalfe (1999) show empirically that private companies make far more use of incentive wages than public organisations. Moreover, they argue that there are insufficient grounds to justify the low incentivisation of the public sector. Our model implies that lazy workers get indeed weaker monetary incentives at the public agency compared to the private sector, and suggests that this may be cost-efficient. On the other hand, motivated workers get stronger incentives.

A few papers consider heterogeneity in ability among government workers in the context of downsizing the government (Jeon and Laffont, 1999, and Rama, 1999). Jeon and Laffont (1999) show that the optimal voluntary downsizing mechanism consists of a menu of public wages, severance pay, and probabilities of dismissal. The government's choice of which workers to retain closely resembles our results in Section 4.6, where we impose that the government maximises social welfare. When workers differ in a sector-specific trait, the government prefers the workers that have a comparative advantage in the public sector, whereas when workers differ in a general trait, the government is indifferent. This chapter differs in three important aspects. First, we consider a model in which workers are heterogeneous both in general and in sector-specific productivity, whereas Jeon and Laffont study heterogeneity in general and in sector-specific productivity separately. We show that heterogeneity in sector-specific motivation implies that a cost-minimising government is not indifferent between workers who differ in general work ethic. Second, in their model, effort is fixed, implying that they do not consider optimal incentive schemes. Third, most of our analysis focuses on a cost-minimising government rather than a social welfare maximising government.

4.3 The model

There are two sectors in the economy, a private and a public sector. The private sector is a fully competitive market where workers receive their full marginal product. The public sector is run by a single entity, which can be thought of as the government. This single organisation will be referred to as the public agency. Both sectors have the same linear production function:

$$q(e) = e \tag{4.1}$$

where q is production and e is effort. Each unit of production of the private sector can be sold on the world market for the exogenous price p . The public agency produces public goods, which are therefore not priced. The desired amount of public production is given by Q .⁵ First, we assume that the public agency minimises cost of production. Next, we compare the results with a social welfare-maximising public agency. We abstract from principal-agent problems between voters, politicians, and managers of the public agency, which implies that the objective of the public agency is in line with the interest of (a majority of) the voters.

Three types of workers exist in the economy: regular workers r , motivated workers m , and lazy workers l . Lazy workers incur greater disutility from working than the other types. Motivated workers derive intrinsic utility from exerting effort in the public sector, but are otherwise identical to regular workers.⁶ Workers know their own type, but neither private firms nor the public agency can observe a worker's type. Let N_i denote the number of workers of type i in the economy and let n_i denote the number of workers of type i employed in the public sector, where $i \in \{r, m, l\}$.

The utility of a worker of type i from working in the private sector is given by:

$$U_i = w - \theta_i C(e) \tag{4.2}$$

⁵Price-elastic demand for public goods would not alter any of the results qualitatively. By varying the level of Q , our analysis yields the supply function for public goods. Together, demand and supply then determine the optimal level of Q .

⁶Allowing for worker types with private sector motivation does not change the results, as these workers would seek employment in the public sector only when wages in the public sector are very high.

where w is the wage, $C(e)$ describes the cost of effort, with properties $C(0) = 0$, $C'(\cdot) > 0$, and $C''(\cdot) > 0$, and θ_i measures the degree of laziness. We assume that $0 < \theta_r = \theta_m < \theta_l$.

The utility of a worker of type i from working in the public sector is given by:⁷

$$U_i = w + \gamma_i V(e) - \theta_i C(e) \quad (4.3)$$

where $V(e)$ is a concave function with properties $V(0) = 0$, $V'(\cdot) > 0$ and $V''(\cdot) < 0$, and γ_i measures the public service motivation of a worker. We assume that $\gamma_m > \gamma_r = \gamma_l = 0$. Hence, only motivated workers derive utility from exerting effort in the public sector. Motivated workers have an action-oriented motivation, as in Benabou and Tirole (2003). Since $q = e$, results are the same if we assume that motivated workers intrinsically value their contribution to output ('warm-glow'), as in Besley and Ghatak (2005) and Glazer (2004).⁸ As motivated workers derive motivational utility only at the public agency, the agency has monopsony power over these workers.⁹

Competition in the private sector ensures that workers in the private sector receive their full marginal product. Hence, total wage of a worker of type i employed in the private sector is given by pe_i . It follows from (4.1) and (4.2) that the optimal level of effort e_i^* of a worker of type i in the private sector is implicitly given by:

$$C'(e_i^*) = \frac{p}{\theta_i} \quad (4.4)$$

⁷We assume that workers are employed either in the private or in the public sector. Allowing for part-time jobs in the private sector increases the distortions in the optimal contracts when worker types are unobservable. We also abstract from subcontracting, thereby ruling out that a motivated worker takes over the contracts of two or more lazy workers at the public firm.

⁸In contrast, Francois (2000) and Prendergast (2004) assume that workers have an altruistic motivation, that is, workers care about the provision of public services, but do not derive utility from their personal involvement in production.

⁹Allowing for a fourth type of worker, who derives motivational utility from working in the public sector, but is lazy as well ($\gamma = \gamma_m$, $\theta = \theta_l$) does not affect the results, unless there are much more lazy motivated workers than regular motivated workers and γ_m is very low compared to $\theta_l - \theta_r$.

The resulting level of utility is:

$$U_i^* = pe_i^* - \theta_i C(e_i^*) \quad (4.5)$$

Note that U_i^* is decreasing in θ_i .

For future reference, we derive the level of effort motivated workers would exert in the private sector *if* they would have intrinsic motivation to work in the private sector. This level of effort, denoted by e_m^x , is implicitly given by:

$$C'(e_m^x) = \frac{p + \gamma_m V'(e_m^x)}{\theta_m} \quad (4.6)$$

In the public sector, we distinguish two cases, verifiable effort and unverifiable effort. If effort is verifiable, the public agency offers one or more contracts in which both the level of effort and the wage are specified. In the second case, effort (and output) is unverifiable above a certain level of e , \bar{e} .¹⁰ We assume that \bar{e} is sufficiently small such that it is a binding restriction for lazy and regular workers. This requires that $\bar{e} < e_l^*$. Then, the public agency can only offer a contract in which a wage level is specified, along with the threat not to pay the wage if effort is below \bar{e} .

Wages in the public sector are financed through a lump-sum (non-distortionary) tax, uniformly levied on all workers in the economy. This implies that we can ignore taxation when deriving the optimal occupational and effort choice of the workers.

4.4 Unverifiable effort in the public sector

We first consider the case where in the public sector effort levels above \bar{e} are unverifiable. Hence, the best the public agency can do is to offer a contract consisting of a wage which is only paid if the worker exerts at least effort level \bar{e} . Clearly, lazy and regular workers never exert more effort than \bar{e} . Motivated workers may decide to exert more effort, which occurs when the level of effort \tilde{e}_m implicitly defined by

¹⁰ \bar{e} reflects that workers who do not show up at work or remain idle behind their desk all day can be detected and are fired. When $\bar{e} = 0$, no extrinsic incentives can be provided, implying that public goods production has to rely completely on intrinsic motivation.

first-order condition

$$C'(e_m) = \frac{\gamma_m V'(\tilde{e}_m)}{\theta_m}$$

is greater than \bar{e} . The minimum wage w_i at which the public agency can attract a worker of type i is given by the participation constraint:

$$w_i = U_i^* + \theta_i C(e_i) - \gamma_i V(e_i) \quad (4.7)$$

where $e_i = \bar{e}$ for lazy and regular workers and $e_i = \tilde{e}_m$ for motivated workers. Using (4.5), we find that for non-motivated workers:

$$\frac{\partial w_i}{\partial \theta_i} = [p - \theta_i C'(e_i^*)] \frac{\partial e_i^*}{\partial \theta_i} - C(e_i^*) + C(\bar{e}) = -C(e_i^*) + C(\bar{e}) < 0$$

where the first term drops out using first-order condition (4.4). The inequality follows from the restriction $\bar{e} < e_i^*$. Hence, the public agency prefers lazy workers to regular workers because they demand a lower wage. The intuition is that lazy workers value the relatively low level of effort in the public sector more than regular workers. The same holds for motivated workers, but for a different reason: they require a lower wage than regular workers, as they derive motivational utility from working in the public sector. Hence, the public agency also prefers motivated workers to regular workers, because wage cost are lower and, if $\tilde{e}_m > \bar{e}$, their effort is higher.

Whether the public agency prefers motivated workers to lazy workers is ambiguous. Motivated workers may exert more effort and need less monetary compensation for their effort, but have higher opportunity cost of working in the public sector than lazy workers. If $\tilde{e}_m \leq \bar{e}$, then the public agency prefers motivated workers to lazy workers when $w_m < w_l$, where w_m and w_l follow from participation constraint (4.7). If $\tilde{e}_m > \bar{e}$, then motivated workers are preferred when $w_m/\tilde{e}_m < w_l/\bar{e}$. However, in the latter case it is possible that the agency prefers to attract only motivated workers, but that at the wage it has to offer to attract them, lazy workers apply as well. In other words, lazy workers may crowd out motivated workers in the public sector. This occurs when $w_l/\bar{e} > w_m/\tilde{e}_m$ and $w_l < w_m$.¹¹ Then, setting w_m rather

¹¹If the public firm could distinguish between worker types, this crowding out of motivated workers would not occur, as contracts could be made contingent on type.

than w_l is optimal if:

$$w_l/\bar{e} > w_m \frac{N_l + N_m}{N_l\bar{e} + N_m\tilde{e}_m} \quad (4.8)$$

where we assume that, when setting w_m , the public agency randomly attracts workers from the groups of motivated and lazy workers, and that the agency sets employment such that expected output is Q . Hence, for a larger range of parameter values, it is optimal to attract lazy workers only. With concave utility from public goods, the condition becomes even more stringent as total public output becomes uncertain when the agency sets w_m .

Crowding out of motivated workers may also happen when Q is sufficiently large, such that the public agency would like to attract all of the motivated workers in the economy and a limited number of lazy workers. Then, as the public agency can not distinguish between lazy and motivated workers, some of the motivated workers may not obtain a public sector job.¹²

4.5 Verifiable effort

When effort is verifiable, the public agency optimally offers one or more contracts specifying a wage and a required level of effort. Consider first the case where Q is sufficiently small, such that the agency needs only one worker type. Given the type of worker, the optimal contract then minimises

$$Z = \sum_i w_i n_i \quad (4.9)$$

with respect to e_i , subject to the participation constraint (4.7) and the production constraint $Q = e_i n_i$. This gives first-order condition:

$$[\theta_i C'(e_i) - \gamma_i V'(e_i)] - \left[\frac{U_i^* + \theta_i C(e_i) - \gamma_i V(e_i)}{e_i} \right] = 0 \quad (4.10)$$

¹²In Appendix 4.A.1 we prove that for each case considered in the main text, there exists a level of Q for which it is optimal for the public firm to attract two worker types instead of one. When effort is unverifiable, the supply function of public goods displays a discontinuous jump at this level of Q . When effort is verifiable, the supply function is continuous but displays a kink at this level of Q .

In the optimum, the marginal cost of effort by the employed workers (the first term) is equal to the marginal cost of effort by hiring an additional worker (the second term). Using (4.4) and (4.5), it is easy to verify that condition (4.10) is satisfied for lazy workers and for regular workers if $e_i = e_i^*$. Hence, if the public agency chooses to hire lazy or regular workers, it induces them to exert as much effort as they do in the private sector. By (4.7), this implies that the public agency has to pay them the same wage as they earn in the private sector, pe_i^* . When we substitute $e_m = e_m^*$ into equation (4.10) for $i = m$, we find, by using (4.4) and (4.5), that condition (4.10) is not satisfied, since:

$$-e_m^* \gamma_m V'(e_m^*) + \gamma_m V(e_m^*) > 0$$

where the inequality follows from the concavity of $V(e)$. Hence, motivated workers are induced to exert *less* effort than in the private sector, even though their intrinsic motivation makes them willing to exert more effort at the same wage than in the private sector. The intuition is straightforward. As the marginal rents from motivation of a single worker decrease in e_m , it is optimal for the public agency to set e_m relatively low and attract additional motivated workers. Thereby, the public agency increases the total rents from motivation generated in the public sector, resulting in lower costs of public goods production.¹³

Comparing the cost per unit of effort for each worker type, it follows that the public agency prefers to hire motivated workers. It has to pay lazy and regular workers as much for their effort as the private sector does, which implies that total cost would be pQ . Even if the public agency would let motivated workers work as hard as they do in the private sector, total cost would be lower than pQ , namely $pQ - n_m \gamma_m V(e_m^*)$, as the agency can fully extract the rents from motivation. Since the agency optimally sets $e_m < e_m^*$, it follows that total cost are even lower. Clearly, when the public agency offers the optimal contract to attract motivated workers, lazy and regular workers have no incentive to opt for a public sector job.

Next, consider the case where Q is sufficiently large, such that two worker types are needed. Still, the agency prefers to hire all of the motivated workers as they

¹³It is easy to verify that if $V(e)$ would be a linear function, the public firm optimally sets $e_m = e_m^*$.

are the only workers who are willing to work for less than p per unit of effort. The interesting question is which worker type the public agency prefers to hire in addition to the motivated workers. Total cost Z is given by:

$$Z = w_m N_m + w_k n_k \quad (4.11)$$

and the production constraint is given by:

$$e_m N_m + e_k n_k = Q \quad (4.12)$$

where $k \in \{r, l\}$. To attract and separate the two types, the agency creates two contracts that meet the following conditions. First, the contracts must meet the participation constraint of both types:

$$\begin{aligned} IR_k & \quad w_k - \theta_k C(e_k) \geq U_k^* \\ IR_m & \quad w_m + \gamma_m V(e_m) - \theta_m C(e_m) \geq U_m^* \end{aligned}$$

Second, the contracts must meet the revelation constraints, that is, each worker must prefer the contract designed for his type to the other contract:¹⁴

$$\begin{aligned} IC_k & \quad w_k - \theta_k C(e_k) \geq w_m - \theta_k C(e_m) \\ IC_m & \quad w_m + \gamma_m V(e_m) - \theta_m C(e_m) \geq w_k + \gamma_m V(e_k) - \theta_m C(e_k) \end{aligned}$$

Consider first the case where the public agency decides to attract motivated and regular workers, $k = r$. This resembles a standard adverse selection problem, where workers differ in their productivity inside the agency, but have the same outside option (since $\theta_r = \theta_m$). As in the standard model, the participation (or Individual Rationality) constraint of the ‘low’ type and the revelation (or Incentive Compatibility) constraint of the ‘high’ type are binding, while the other two constraints are non-binding (see e.g. Laffont and Martimort, 2002, chapter 2). The optimisation problem of the public agency is to minimise cost (4.11) with respect to e_m and e_r ,

¹⁴We assume that workers choose which contract to sign after applying. If a worker had to choose for which contract to apply, motivated workers would have to take into account that not all workers applying for the contract designed for the other type may get a job, as the number of applications may exceed the number of jobs. This would weaken IC_m , and hence further reduce the rents that motivated workers obtain. Further, we also assume that the public firm can commit not to renegotiate the contracts after the types have been revealed, such that the ratchet effect has no bite.

subject to IR_r , IC_m , and the production constraint (4.12). This gives the following two first-order conditions for e_m and e_r , respectively:

$$-\frac{N_m}{e_r} [U_r + \theta_r C(e_r)] + N_m [\theta_m C'(e_m) - \gamma_m V'(e_m)] = 0 \quad (4.13)$$

$$[e_r \theta_r C'(e_r) - U_r^* - \theta_r C(e_r)] \left[\frac{Q - e_m N_m}{e_r^2} \right] + N_m [\gamma_m V'(e_r) + C'(e_r)(\theta_r - \theta_m)] = 0 \quad (4.14)$$

By substituting $e_r = e_r^*$ into first-order condition (4.14) and using (4.4) and (4.5), the first term drops out. Since the second term is positive, it follows that the public agency induces the regular workers to exert less effort than they do in the private sector, $e_r < e_r^*$. Substituting this result into equation (4.13), we find that the contract for the motivated workers is also distorted. The public agency induces the motivated workers to exert more effort than they would do in the private sector *if* they would be motivated to work in the private sector, $e_m > e_m^x$.

Intuitively, as in the standard adverse selection model, the public agency makes the contract of the regular workers less attractive to motivated workers by decreasing the level of effort in that contract. Thereby, it can extract a greater part of the rents from motivation from the motivated workers. However, this decrease in effort implies that the public agency needs to hire more regular workers to meet the production constraint, which is costly. It can decrease these costs by increasing the effort of motivated workers. In the optimum, the cost of an additional unit of effort by giving stronger incentives to the motivated workers is equal to the cost of an additional unit of effort by hiring an additional regular worker.¹⁵

Next, consider the case where the public agency decides to attract motivated and lazy workers, $k = l$. If the revelation constraint of motivated workers IC_m is binding, the optimisation problem of the public agency is similar to that above, leading to first-order conditions (4.13) and (4.14) with $r = l$. Hence, the public agency distorts

¹⁵ Allowing for part-time jobs in the private sector makes contract distortions less costly. Regular workers would take a part-time job in the private sector alongside their public sector job, thereby increasing their utility. Hence, the cost of the downward distortion for the public firm is lower, implying that the firm can extract more rents from the motivated workers.

both contracts by giving lazy workers weaker incentives than private firms do, and motivated workers stronger incentives than private firms would.

Interestingly, however, when the public agency attracts lazy workers, it is also possible that the revelation constraint does not bind, i.e. that the contract for lazy workers is less appealing to motivated workers than working in the private sector.¹⁶ In this case, IR_m and IR_l are binding, while IC_m and IC_l are non-binding. Then, the optimisation problem of the public agency is to minimise cost (4.11) with respect to e_m and e_l , subject to IR_l , IR_m , and the production constraint (4.12). This gives the following two first-order conditions for e_m and e_l , respectively:

$$-\frac{N_m}{e_l} [U_l^* + \theta_l C(e_l)] + N_m [\theta_m C'(e_m) - \gamma_m V'(e_m)] = 0 \quad (4.15)$$

$$[e_l \theta_l C'(e_l) - U_l^* - \theta_l C(e_l)] \left[\frac{Q - e_m N_m}{e_l^2} \right] = 0 \quad (4.16)$$

By substituting $e_l = e_l^*$ and using (4.4) and (4.5), we find that the first term between brackets of first-order condition (4.16) is zero. Hence, the public agency sets the level of effort for the lazy workers equal to their optimal level of effort in the private sector. Obviously, their wage must also be at the same level as in the private sector. Substituting this result into first-order condition (4.15) gives $e_m = e_m^x$. Hence, neither contract is distorted and the contract offered to motivated workers extracts all of their rents (as IR_m is binding).¹⁷

The final step is to show which type of workers the public agency optimally attracts in addition to the motivated workers. Let us start with the case we just discussed, where the participation constraint of motivated workers IR_m is binding if the agency attracts lazy workers. The public agency pays p per unit of effort to lazy workers and extracts all of the motivational rents from motivated workers. When, instead, the public agency attracts regular workers, the revelation constraint of the motivated workers is always binding. Therefore, the public agency can not extract

¹⁶Note that this can never happen when the public firm hires regular workers rather than lazy workers, since regular and motivated workers have the same outside option.

¹⁷If the public firm could distinguish between worker types, contracts would not be distorted, as only the participation constraints of the attracted worker types bind. The public firm would then prefer to attract motivated workers, and would be indifferent between lazy and regular workers.

all of the rents from motivation. Moreover, it distorts the contract of the regular workers, implying that the cost per unit of effort of regular workers is greater than p . Hence, total cost are lower if the public agency attracts lazy rather than regular workers.

Next, consider the case where the revelation constraint of motivated workers IC_m is binding if the public agency attracts lazy workers. In Appendix 4.A.2, we prove that total cost Z decrease in the general work ethic of the non-motivated worker type θ_k , $\partial Z/\partial \theta_k < 0$. Hence, besides motivated workers, the public agency prefers to attract the economy's laziest workers. The intuition is straightforward. The extraction of motivational rents from motivated workers by the public agency is hampered by the revelation constraint for motivated workers IC_m . To induce motivated workers to choose the proper contract, they must receive all rents they would obtain by choosing the other type's contract. A contract satisfying a lazy worker's participation constraint has lower wage and lower required effort than a contract satisfying a regular worker's participation constraint. Therefore, a lazy worker's contract is less appealing to a motivated worker than a regular worker's contract, implying that the public agency can extract more rents, and hence attracts motivated workers at lower cost, if it attracts lazy workers rather than regular workers.¹⁸

It follows that the public agency can produce the same output at lower cost by attracting lazy rather than regular workers. Moreover, the public agency may deliberately provide weak incentives to lazy workers, implying that lazy workers in the public sector exert less effort than lazy workers who are employed in the private sector. The laziness of civil servants may thus be a sign of cost-efficient government!

4.6 Social welfare

In this section, we impose that the public agency maximises social welfare, which we define as the sum of utilities of all workers in the economy. Recall that, so

¹⁸Without motivated workers, $N_m = 0$, it follows from first-order condition (4.14) that the government does not distort the contract of regular or lazy workers. Then, the government is indifferent between lazy and regular workers, as both are willing to work in the public sector for p per unit of effort. Hence, the contract distortions and the preference for lazy workers stem from the presence of motivated workers.

far, we ignored taxation as our assumption of lump-sum taxes implies that none of the decisions by the workers or the cost-minimising public agency are affected by taxation. However, taxes do affect workers' utility and, hence, social welfare. The total amount of taxes is simply the sum of the wages of the public sector workers (Z). Since utility is linear in income, social welfare can be written as:¹⁹

$$\Psi = \sum_i [(N_i - n_i)U_i^* + n_i U_i] - Z \quad (4.17)$$

By using (4.3) and noting that $Z = \sum_i n_i w_i$, the above expression can be rewritten to:

$$\Psi = \sum_i \{(N_i - n_i)U_i^* + n_i [-\theta_i C(e_i) + \gamma_i V(e_i)]\} \quad (4.18)$$

Hence, the public agency maximises total utility in the private sector minus the net cost of effort in the public sector.

In Appendices 4.A.3 and 4.A.4, we prove that the optimal choice of a welfare-maximising public agency is identical to that of a cost-minimising public agency when effort is unverifiable (except for condition (4.8)), and when effort is verifiable and Q is sufficiently small, respectively. Thus, when effort is unverifiable, regular workers are least attractive to the public agency, and lazy and motivated workers may both be the best choice. When effort is verifiable and Q is sufficiently small, the public agency attracts motivated workers, and induces them to exert a level of effort smaller than private firms do, $e_m < e_m^*$.

When effort is verifiable and Q is sufficiently large, the public agency hires all motivated workers (as they have the lowest net cost of effort in the public sector) and n_k workers without public service motivation, implying that social welfare (4.18) can be rewritten as:

$$\Psi = \sum_i (N_i U_i^*) - n_k [U_k^* + \theta_k C(e_k)] - N_m [U_m^* + \theta_m C(e_m) - \gamma_m V(e_m)] \quad (4.19)$$

where $k \in \{r, l\}$. Note that (4.19) neither contains w_m nor w_k . The reason is that

¹⁹Since the public firm's output Q is fixed, we can safely ignore the utility from public goods in the optimisation problem.

utility is linear in income, and so the distribution of income does not affect social welfare. Hence, without affecting social welfare, the public agency sets wages such that the participation constraints IR_m and IR_k and the revelation constraints IC_m and IC_k are all satisfied. Maximising (4.19) with respect to e_m and e_k , subject to production constraint (4.12), yields the following first-order conditions for the optimal effort requirements in the contracts:

$$\frac{N_m}{e_k} [U_k^* + \theta_k C(e_k)] - N_m [\theta_m C'(e_m) - \gamma_m V'(e_m)] = 0 \quad (4.20)$$

$$\frac{Q - N_m e_m}{e_k^2} [U_k^* + \theta_k C(e_k) - e_k \theta_k C'(e_k)] = 0 \quad (4.21)$$

Using (4.4) and (4.5), it follows that first-order condition (4.21) is zero for $e_k = e_k^*$. Hence, the non-motivated worker type is induced to exert the same level of effort as in the private sector. This implies that the public agency is indifferent between hiring lazy and regular workers, as both types need to be paid p per unit of effort. Substituting this result into first-order condition (4.20), it follows that the effort of motivated workers is (implicitly) given by (4.6), the level of effort motivated workers would exert in the private sector *if* they would derive utility from working there, $e_m = e_m^x$. Hence, a welfare-maximising public agency does not distort the contracts of its employees.²⁰

The welfare maximising contracts differ from those offered by the cost-minimising public agency. This implies that, when the public agency maximises social welfare, social welfare is higher, but also that total cost and, hence, taxes are higher. Apart from the difference in taxes, lazy and regular workers attain the same level of utility, U_i^* , in both cases. Hence, as taxes are higher, welfare maximisation makes lazy and regular workers worse off. It follows that only motivated workers benefit from having a welfare maximising government. When motivated workers constitute a minority

²⁰Because utility is linear in income, the distribution of income does not affect social welfare. When the social welfare function is extended to allow for distributional concerns, as in e.g. Boyer and Laffont (2003, Section 6), the public firm may distort contracts. Then, rent extraction from motivated workers may be considered optimal for distributive reasons. Rent extraction may also be optimal when taxes are distortionary, as in e.g. Laffont and Tirole (1993). Then, the social planner trades off the inefficiencies arising from taxation against the inefficiency of distorting the contracts of the workers in the public sector.

in society, politicians are likely to act in the interest of lazy and regular workers and strive for minimum cost of public goods production.

4.7 Concluding remarks

This chapter has shown that, in addition to workers with a public service motivation, the public sector may prefer to hire the economy's laziest workers and provide them with weaker incentives than the market sector does. Even though this reduces aggregate welfare, a majority of society may be better off, as motivated workers can be hired at lower wage, and hence public goods are produced at lower cost. When effort is to a large extent unverifiable in the public sector, the public sector may hire too many lazy workers as they crowd out motivated workers.

We have restricted Q such that two worker types are sufficient. It is a straightforward repetition of the analyses to allow for values of Q such that the public agency needs all three worker types. When the difference in general work ethic θ between lazy and regular workers is sufficiently large, the contract for lazy workers is not distorted, whereas the public agency distorts the contracts for motivated and regular workers. Otherwise, the contract for lazy workers will be distorted as well. In the limit, when $Q \rightarrow \infty$, the public agency does not distort any contract, as can be seen from first-order condition (4.14). When the agency needs a great number of non-motivated workers, the costs of distorting the contract for non-motivated workers are large compared to the benefits of rent extraction from the motivated workers.

We have abstracted from interactions between the workers. Work morale, however, may be affected by the behaviour of one's colleagues. The enthusiasm of coworkers may be stimulating, whereas shirking colleagues may reduce the incentive to work (Stowe, 2002). Likewise, motivated workers may consider the wage paid to lazy workers to be unfair given the difference in effort. Then, attracting lazy workers may be detrimental to the effort of motivated workers. Further, if the pace of production depends on the 'weakest link', it may not be optimal to hire lazy workers.

4.A Appendices

4.A.1 Conditions under which hiring two types of workers is optimal

Unverifiable effort in the public sector

Because the public agency can not induce workers to exert a certain level of effort, it is necessary to attract a second worker type as soon as $Q > N_i e_i$, where i is the worker type the agency prefers to employ when Q is sufficiently low. As argued in the main text, it might happen that the public agency can not single out its most preferred type. Then, the public agency always employs two worker types.

Verifiable effort in the public sector

First, consider the case where the participation constraint of motivated workers IR_m binds when the public agency attracts lazy workers, while the revelation constraint IC_m is non-binding. Marginal cost of effort when hiring a lazy worker is p . This implies that the public agency hires lazy workers as soon as the marginal cost of effort of motivated workers exceeds p . Differentiating the participation constraint (4.7) of motivated workers with respect to e_m gives:

$$\frac{\partial w_m}{\partial e_m} = \theta_m C'(e_m) - \gamma_m V'(e_m) \quad (4.A1)$$

Hence, the public agency attracts a second worker type when $Q > N_m e_m^\xi$, where e_m^ξ is defined by:

$$\theta_m C'(e_m^\xi) - \gamma_m V'(e_m^\xi) = p \quad (4.A2)$$

Note that (4.A2) is identical to (4.6). Hence, $e_m^\xi = e_m^x$, which is the optimal level of effort motivated workers would exert in the private sector *if* they would derive utility from working in the private sector.

Next, consider the case where the revelation constraint of motivated workers IC_m binds when the public agency attracts lazy workers, while the participation constraint IR_m is non-binding. It is obvious that the public agency attracts only motivated workers when $Q \leq N_m e_m^\xi$. Now consider higher levels of Q . When the agency does not attract lazy workers, total cost can be found by substituting the

production constraint $Q = N_m e_m$ and the participation constraint (4.7) of motivated workers into total cost $Z_1 = N_m w_m$:

$$Z_1 = N_m \left[U_m^* + \theta_m C\left(\frac{Q}{N_m}\right) - \gamma_m V\left(\frac{Q}{N_m}\right) \right] \quad (4.A3)$$

It is easy to verify that Z_1 is a continuous and convex function of Q . When, instead, the public agency attracts both motivated and lazy workers, total cost discontinuously increase, as the public agency can no longer extract all motivational rents from the motivated workers. Suppose the public agency would not distort the contracts of its workers, $e_l = e_l^*$ and $e_m = e_m^\xi (= e_m^x)$. Then, total cost when the public agency attracts both lazy and motivated workers, Z_2 , is a linear function of Q , as the marginal cost of effort equals p . Hence, Z_1 and Z_2 intersect at some level of $Q > N_m e_m^\xi$. Since the public agency optimally distorts contracts when it attracts both lazy and motivated workers so as to decrease cost, the minimum level of Q at which it is optimal to attract lazy workers is smaller than the level at which Z_1 and Z_2 intersect.

Verifiable effort, social planner

When effort is unverifiable, hiring a second worker type is inevitable when $Q > N_i e_i$ (where i is the worker type the agency prefers to employ when Q is sufficiently small) as well as when the agency can not single out its most preferred type. In case of verifiable effort, the marginal welfare loss of a unit of effort when hiring workers without public service motivation is p , while it equals $-\theta_m C'(e_m) + \gamma_m V'(e_m)$ when hiring motivated workers only. Hence, a welfare-maximising agency hires a second type of worker when $Q > N_m e_m^\xi$, where e_m^ξ is defined by (4.A2).

4.A.2 Proof that $\frac{\partial Z}{\partial \theta_k} < 0$

By substituting the production constraint (4.12), IR_k , IC_m , and (4.5) into total cost (4.11), we find:

$$Z = \{p e_k^* - \theta_k [C(e_k^*) - C(e_k)]\} \left(\frac{Q - e_m N_m}{e_k} + N_m \right) + N_m \{ \theta_m [C(e_m) - C(e_k)] - \gamma_m [V(e_m) - V(e_k)] \}$$

A marginal increase in θ_k leads to a decrease in Z :

$$\frac{\partial Z}{\partial \theta_k} = -[C(e_k^*) - C(e_k)] \left(\frac{Q - e_m N_m}{e_k} + N_m \right) < 0$$

where, by the envelop theorem, all effects through e_k^* , e_k , and e_m are zero, and the sign follows from $e_k < e_k^*$ (see first-order condition (4.14)).

4.A.3 Cost-minimisation and welfare-maximisation yield identical results when effort is unverifiable

A cost-minimising public agency attracts the worker type that minimises $Z = n_i w_i$. After substituting the production constraint $n_i = Q/e_i$ and (4.7), we find that:

$$Z = \frac{Q}{e_i} [U_i^* + \theta_i C(e_i) - \gamma_i V(e_i)]$$

A welfare-maximising public agency attracts the worker type that maximises (4.18). After substituting the production constraint $n_i = Q/e_i$, we find that:

$$\Psi = \sum_i (N_i U_i^*) + \frac{Q}{e_i} [-U_i^* - \theta_i C(e_i) + \gamma_i V(e_i)]$$

Obviously, since $\sum_i (N_i U_i^*)$ is exogenously given, minimisation of Z and maximisation of Ψ result in the same optimal worker type. The only difference lies in the response to the crowding-out problem. While a welfare-maximising agency sets w_m when $w_m/e_m < w_l/\bar{e}$, a cost-minimising agency only does so when condition (4.8) is satisfied.

4.A.4 Cost-minimisation and welfare-maximisation yield identical results when effort is verifiable and Q is small

A welfare-maximising public agency maximises (4.18) with respect to e_i , subject to the production constraint $n_i = Q/e_i$. This gives first-order condition:

$$-[\theta_i C'(e_i) - \gamma_i V'(e_i)] + \left[\frac{U_i^* + \theta_i C(e_i) - \gamma_i V(e_i)}{e_i} \right] = 0$$

which is, except for opposite signs, identical to first-order condition (4.10) derived in Section 4.5. Hence, the optimal contract of a welfare-maximising public agency is identical to that of a cost-minimising public agency.

Chapter 5

Dedicated Doctors: Public and Private Provision of Health Care with Altruistic Physicians

5.1 Introduction

In many countries, physicians have to take a modern version of the Oath of Hippocrates before entering the profession, in which they pledge to act in the interest of their patients. For instance, the Declaration of Geneva, adopted in 1948 by the General Assembly of the World Medical Association, contains the phrase “*the health of my patient will be my first consideration*”, and the General Medical Council in the UK instructs doctors to “*make the care of your patient your first concern*” (General Medical Council, 2001).

There is ample anecdotal evidence of physicians living up to their oath. In the wake of extreme events, such as the September 11 attacks and hurricane Katrina, many physicians work around the clock to provide care.¹ *Médecins Sans Frontières* is able to find hundreds of health professionals willing to work in remote, undevel-

¹Several health professionals describe the events in New Orleans after Katrina in the *New England Journal of Medicine*, Volume 353(15); see also CNN (2005).

oped regions of the world, despite offering little remuneration. In a more routine setting, over 70 percent of NHS employees in England claim to work more than their contractual hours, the majority working unpaid overtime. The most commonly mentioned reason for working overtime is “*to provide the best care I can for patients*” (Healthcare Commission, 2006). This suggests that at least some health professionals are willing to step beyond the boundaries of their contractual duties to provide better care. When we accept that physicians may differ in altruism towards their patients, the question that arises is: which patients benefit from the altruistic physicians? And relatedly, how is the allocation of these benefits affected by the system of health care provision?

This chapter develops a model in which patients differ in income and physicians differ in altruism to analyse how different systems of health care provision affect the allocation of patients to doctors and, hence, patients’ welfare. We compare a purely public system of health care provision, where all patients are treated in a National Health Service, to a mixed system of health care provision, where a perfectly competitive private health care sector exists parallel to the NHS. We show that allowing for private provision of health care benefits both rich and poor patients.

We distinguish between altruistic and regular physicians. Only altruistic physicians intrinsically care about patient welfare, but since their number is limited some patients will be treated by a regular doctor. Under both systems of health care provision, patients can obtain treatment for free in the NHS, financed through taxation, and physicians working for the NHS have to adhere to a minimum treatment quality. Patients who, under the mixed system, receive treatment in the private sector must pay the price of treatment themselves.² As any patient who is not treated by an altruistic physician will be treated by a regular physician, each altruistic physician infers that he can increase patient welfare by providing better treatment and, if treating patients in the private sector, by asking a lower price than regular physicians.

In the NHS, regular physicians provide the minimum treatment quality, whereas altruistic physicians optimally provide better treatment. We assume that in the NHS

²Allowing for private health insurance does not affect the results if only rich patients buy insurance. Propper (2000) shows that insurance coverage in the UK indeed increases in income.

patients are randomly matched to physicians, and patients and physicians cannot observe each others' type. Hence, under purely public provision of health care, every patient has the same probability of receiving treatment from an altruistic physician. Under mixed provision, physicians decide whether to work for the NHS or set up a private practice and patients choose whether to obtain treatment in the NHS or buy treatment in the private sector. Competition ensures that regular physicians in the private sector must be equally well off as in the NHS. Obviously, free treatment in the NHS implies that the only way to attract patients to a private practice is to offer high-quality treatment, and only rich patients are willing to pay for high quality.³

We show that all patients are better off under mixed provision than under purely public provision, i.e. allowing for private provision of health care benefits both rich and poor patients. Rich patients are able to buy high-quality treatment in the private sector. As in Besley and Coate (1991), this leads to lower cost of public provision and, hence, to lower taxes. Altruistic physicians face the choice between improving the utility of a patient who otherwise pays for high-quality treatment in the private sector and providing higher treatment quality to a patient who otherwise receives low-quality treatment in the NHS. As the marginal benefit of additional treatment quality is higher for NHS patients than for private sector patients, working in the NHS is more rewarding for an altruistic physician. Hence, despite the opportunity to open up a private practice under mixed provision, altruistic physicians choose to stay in the NHS. This implies that the departure of rich patients benefits the remaining NHS patients (that is, the poor patients) by increasing their probability of receiving the superior treatment provided by altruistic physicians. Hence, allowing for private provision of health care increases the expected treatment quality received by patients in the NHS.

This mechanism implies that not only allowing but also encouraging people to go to the private sector may have favourable consequences for NHS patients. Focussing on redistribution, Cullis and Jones (1985) show that subsidising private treatment can benefit those who do not make use of the subsidy through lower taxes, as long as

³Apart from the distinction between altruistic and regular physicians, our setup is close to Besley and Coate (1991), who study the redistributive effects of public provision of private goods.

the cost of the subsidy are smaller than the decrease in total cost of public provision.⁴ In our framework, there is an additional beneficial effect of subsidising treatment in the private sector from the point of view of patients in the NHS. As the subsidy increases the number of patients who opt for treatment in the private sector, the remaining patients in the NHS have a higher probability of receiving the high-quality treatment provided by altruistic physicians.

Lastly, we analyse the effect of allowing physicians to ‘moonlight’, i.e. to operate in both the NHS and the private sector simultaneously. This gives physicians the possibility to transfer patients from the NHS to their private practice. Barros and Olivella (2005) and González (2005) analyse physicians’ incentive to transfer the most profitable patients (‘cream-skimming’). Ma (2004) and Biglaiser and Ma (2006) argue that moonlighting increases efficiency, as it allows for bargaining between regular doctors and their NHS patients to arrive at better treatment in a private practice.⁵ In our framework, allowing for moonlighting is beneficial for some patients, but harmful for the poorest patients. Moonlighting makes it less ‘risky’ to opt for treatment in the NHS, as patients need not fear receiving the minimum treatment quality. Hence, more relatively rich patients choose (initially) to go to the NHS in the hope of being treated by an altruistic physician, which reduces for each NHS patient the probability of receiving treatment from an altruistic physician.

The next section discusses some related literature. Section 5.3 describes the model, and Section 5.4 compares purely public provision to mixed provision of health care. In Section 5.4, we also discuss the scope for subsidising private health care, and analyse the effects of moonlighting. Section 5.5 concludes.

⁴Relatedly, Hoel and Sæther (2003) argue that a waiting list for treatment in the public sector can be beneficial to the poor despite the cost of waiting, as it drives rich people to the private sector.

⁵Brekke and Sørsgard (2006) argue that if doctors have market power, so that they can increase the profits from their private practice by reducing their labour supply, then allowing doctors to work in the private sector alongside a salaried job in the NHS may lead to a reduction in total health care capacity.

5.2 Related literature

The assumption that some health care professionals are altruistic is not uncommon in the literature. Altruistic physicians have featured in several studies of the agency relation between physicians, patients, and/or purchasers of health care.⁶ In Chalkley and Malcomson (1998), doctors care about treatment quality and can reduce the cost of treatment by exerting effort. Building on Ellis and McGuire (1986), they derive the optimal mix of prospective payment and cost-reimbursement when both effort and quality are unobservable to the purchaser. Jack (2005) generalises the results of Chalkley and Malcomson (1998) by deriving the optimal reimbursement scheme when physicians differ in altruism, see also Choné and Ma (2006).⁷ Ma (2004) and Biglaiser and Ma (2006) assume that a group of dedicated doctors always provides high-quality treatment in the public sector and analyse the effects of allowing regular doctors to be employed in the public and the private sector simultaneously. In contrast to these papers, the current chapter assumes that quality of treatment is verifiable and so does not look at optimal incentive schemes. Instead, we analyse how the system of health care provision affects which patients receive treatment from altruistic physicians.

As to the source of physicians' altruism, Arrow (1963) and Evans (1984) argue that physicians' concern for patient welfare has developed to reduce the adverse effects arising from the information asymmetry between patients and physicians. One aim of the extensive training of physicians is to install a sense of moral obligation towards patients into their beliefs and norms, so that they abstain from abusing their superior knowledge. These ethical considerations can be linked to the identity approach of Akerlof and Kranton (2000), where people prefer to behave like people in 'their' social class are supposed to behave. Applied to physicians, this would imply that physicians act in the interest of patients so as to comply with the ideal

⁶For a discussion of the interdependence of physicians' and patients' utility, see Mooney and Ryan (1993). McGuire (2000) surveys the physician agency literature.

⁷Heyes (2005) argues that if nurses differ in their intrinsic motivation to provide care, paying higher wages may attract less motivated personnel. For similar arguments in a more general context, see Dixit (2002). Besley and Ghatak (2005) and Francois (2000) argue that organisations' ability to attract workers who value working for the organisation reduces the need for providing monetary incentives.

of a good physician.

Our setup is close to the literature on the redistributive aspects of public provision of private goods. In Besley and Coate (1991), the poor obtain a free but low-quality good in the public sector, whereas the rich prefer to buy a high-quality good in the private sector. Even when public provision is financed by a head tax, this has redistributive consequences, as the taxes paid by the rich help to pay for the provision of the good to the poor. This mechanism also operates in an optimal taxation framework, see e.g. Blomquist and Christiansen (1995) and Boadway and Marchand (1995). Epple and Romano (1996a,b) and Gouveia (1997) show in a median voter setting that there is always a majority favouring a mixed system of public and private provision over a system of either solely public or solely private provision.⁸ Our contribution lies in the addition of differences in providers' concern for customer welfare, which turn out to strengthen the case for mixed provision. Moreover, we show that it increases the scope for subsidising private provision.

5.3 The model

There is a population of patients of size P .⁹ Patients differ only in income $Y \in [Y_L, Y_H]$. Income is continuously distributed according to density function $f(Y)$ with cumulative distribution function $F(Y)$. Each patient needs treatment from a physician; physicians cannot observe a patient's income. Patients' utility $u(y, q)$ depends on the quality of their treatment q and on the consumption of a composite good y . For simplicity, we assume that utility is separable in income and treatment quality:

$$u(y, q) = U(y) + V(q) \tag{5.1}$$

Utility is increasing and concave in both elements: $U_y > 0, U_{yy} < 0, V_q > 0, V_{qq} < 0$.

We distinguish between two systems of health care provision. In the purely public

⁸Jofre-Bonet (2000) models strategic interaction between public and private providers of health care, and concludes that mixed provision outperforms both purely private and purely public provision.

⁹We assume that there are no healthy people. None of the results is affected if each person needs treatment with a given probability.

system, treatment is provided within a National Health Service only. In the mixed system of health care provision, there is private provision of health care parallel to the NHS. Under both systems, treatment in the NHS can be obtained free of charge. The NHS runs a balanced budget, and the cost of public provision of health care are financed by a proportional income tax τ . We assume that treatment quality is verifiable. Physicians working in the NHS are obliged to provide at least treatment quality \bar{q} and receive a salary from the NHS. Under the mixed system, patients and physicians choose between the NHS and the perfectly competitive private sector. In the private sector, physicians offer one or more bundles of treatment quality and price and patients must pay the price of treatment themselves.¹⁰

There are two types of physicians: regular and altruistic physicians. Each physician treats at most one patient. In total, there are sufficient physicians to treat all patients, but there is a limited number $N < P$ of altruistic physicians. For convenience, we normalise the utility of both physician types from working outside health care to zero.

Regular doctors have standard preferences:

$$Z^R = w - c(q)$$

where w is the financial reward a doctor obtains for treating a patient, and $c(q)$ denotes the effort cost of providing treatment of quality q , with derivatives $c_q > 0$ and $c_{qq} \geq 0$. Thus, providing higher treatment quality becomes increasingly more costly.¹¹ As there are sufficient doctors, the participation constraint of regular doctors must bind. This implies that for providing treatment of quality q , regular doctors must receive compensation $w = c(q)$.

The preferences of altruistic doctors are similar to the preferences of regular doctors, except that an altruistic doctor to some extent cares about patients' utility. More specifically, an altruistic doctor values increasing the utility of a patient above

¹⁰Allowing for private health insurance, such that the cost of treatment in the private sector is zero at the point of consumption, does not affect the results, as long as only rich patients buy insurance. Propper (2000) shows that the likelihood of taking private insurance in the UK indeed increases in income.

¹¹Observe that doctors' utility is assumed to be linear in income, whereas patients' utility is concave in income. This is solely for simplicity, and does not affect any of the results qualitatively.

the level of utility this patient would have obtained elsewhere. Equivalently, altruistic doctors may care about total patient welfare, which increases when an altruistic doctor provides his patient with greater utility than this patient would have received had she not been treated by this doctor.¹² This is captured by the utility function of altruistic doctors:

$$Z^A = w - c(q) + \gamma[u(y, q) - u^o] \quad (5.2)$$

where γ is the weight of altruism in the utility function and u^o is the ‘outside option’ of the patient. Clearly, patients will not accept lower utility from treatment by an altruistic doctor than u^o . Hence, the last term in the utility function of altruistic doctors is nonnegative. Altruistic doctors can increase the utility of their patient by providing higher treatment quality than this patient would otherwise receive, and, if working in the private sector, by asking a lower price for treatment.¹³ Notice that altruistic physicians care about the absolute increase in utility, irrespective of whether the patient is rich or poor. Allowing altruistic physicians to place greater weight on the utility of poor patients than on the utility of rich patients strengthens the results.

Whereas physicians working in the NHS receive a salary, physicians in the private sector are free to choose the price of their treatment. We impose one reasonable restriction on physicians’ choices:

Assumption 1: $w \geq 0$.

Assumption 1 precludes situations where physicians are so altruistic that when they work in the private sector, they charge negative prices. In reality, physicians may be tempted to, on top of free treatment, slip some money to very needy patients. This, however, must be the exception rather than the rule, as one cannot live on altruistic utility alone.¹⁴

We assume that the process of matching patients and physicians is instantaneous

¹²This implies that the altruistic physicians inhabit pure altruism, as in Francois (2000). Instead, in Glazer (2004) and Besley and Ghatak (2005) agents are impurely altruistic, which implies that they care about their personal contribution to output (‘warm-glow’).

¹³Given that patients’ utility is concave in income, altruistic doctors would prefer spreading money over all (poor) patients rather than granting one patient a large reduction in the price of treatment. We assume that physicians do not engage in redistribution.

¹⁴An equivalent assumption is made in Ma (2004) and Choné and Ma (2006).

and costless, and we abstract from coordination problems such that each patient is matched to one physician. In the NHS, patients are assigned randomly to physicians, and do not observe the type of their physician before treatment. We assume that if an altruistic physician wants to work in the NHS, he is always matched to a patient. In the private sector, patients are assigned to their most preferred type of physician with probabilities depending upon supply and demand for this physician type. For instance, if all altruistic physicians work in the private sector and $M > N$ patients want to be treated by an altruistic physician, then each of the M patients has probability N/M to be matched to an altruistic physician and the remainder is treated by a regular physician in the private sector.

5.4 Results

5.4.1 Purely public provision

Suppose that the NHS is the only provider of health care. The NHS enforces the (exogenously given) minimum treatment quality \bar{q} , and because there are not sufficient altruistic physicians to treat all patients, the NHS must employ regular physicians. To attract regular physicians, the NHS must offer a wage $w = c(\bar{q})$. Since regular physicians have no incentive to provide better quality than \bar{q} , patients with income Y_i treated by a regular physician in the NHS obtain utility $u[(1 - \tau_p)Y_i, \bar{q}]$. Each altruistic physician infers that if he does not treat a patient, one more patient will be treated by a regular physician. Hence, patients' outside option u^o is the utility a patient obtains from treatment by a regular physician. From (5.2), it follows that altruistic doctors who provide treatment quality \bar{q} are also willing to work in the NHS for salary $w = c(\bar{q})$. However, since altruistic physicians care about patients' utility, they may choose to deviate from the treatment offered by regular physicians. Altruistic physicians cannot affect the price of treatment for the patient (which equals zero in the NHS), but may optimally decide to provide better treatment quality.¹⁵ Note that if an altruistic doctor is willing to provide better

¹⁵Allowing for a monetary transfer from a physician to his NHS patient does not affect the results.

quality, he is also willing to accept a lower wage than regular doctors. In theory, the NHS could extract the rents of altruistic doctors by offering a wage scheme which is decreasing in treatment quality. This seems unrealistic and difficult to enforce, and hence we will assume that the NHS sticks to one wage for all doctors: $w = c(\bar{q})$. Total cost of purely public provision of health care thus equals $c(\bar{q})P$, yielding tax rate $\tau_p = c(\bar{q}) / \int_{Y_L}^{Y_H} Y f(Y) dY$.

Substituting for w and u^o in the utility function of altruistic physicians (5.2) and taking account of the random matching of patients and physicians gives:

$$Z^A = c(\bar{q}) - c(q) + \gamma \int_{Y_L}^{Y_H} \{u[(1 - \tau_p)Y, q] - u[(1 - \tau_p)Y, \bar{q}]\} f(Y) dY \quad (5.3)$$

An altruistic physician maximises utility with respect to q , subject to $q \geq \bar{q}$. Using (5.1), let q^A be the resulting optimal level of treatment quality, as given by first-order condition:

$$-c_q(q^A) + \gamma V_q(q^A) = 0 \quad (5.4)$$

Note that q^A does not depend on the (expected) income of the patient. Using the treatment quality provided by regular physicians \bar{q} , it follows from (5.4) that altruistic physicians provide higher treatment quality than their less altruistic colleagues if:

$$\gamma V_q(\bar{q}) > c_q(\bar{q}) \quad (5.5)$$

Otherwise, altruistic physicians offer the same treatment as regular physicians. Hence, if altruistic physicians are sufficiently altruistic, i.e. if γ is sufficiently high, then they provide higher treatment quality than regular physicians, thereby increasing both the utility of their patient and their own utility. Throughout the chapter, we will assume that condition (5.5) is satisfied.

5.4.2 Mixed provision

Now suppose that a perfectly competitive private sector of health care provision exists parallel to the NHS. Each physician chooses whether to work for the NHS or in the private sector, and each patient decides whether to obtain treatment in

the NHS or in a private practice. We focus on an equilibrium where some patients are being treated in the private sector and others in the NHS. We will show that in equilibrium, all altruistic physicians work in the NHS, relatively poor patients receive treatment in the NHS, and rich patients buy treatment in the private sector.

Since there are sufficient physicians, competition between regular physicians ensures that they are indifferent between working in the NHS and working in the private sector. In the previous subsection, we have seen that regular physicians provide treatment quality \bar{q} in the NHS and receive wage $w = c(\bar{q})$. This implies that regular physicians in a private practice are willing to provide quality q at price $w = c(q)$. Hence, a patient with income Y_i treated by a regular physician in the private sector maximises utility (5.1), subject to the budget constraint $y + c(q) = (1 - \tau_m)Y_i$, where τ_m is the tax rate needed to cover the cost of public provision of health care. Optimal treatment quality q_i^* is implicitly given by first-order condition:

$$-c_q(q_i^*)U_y[(1 - \tau_m)Y_i - c(q_i^*)] + V_q(q_i^*) = 0 \quad (5.6)$$

This yields utility $u[(1 - \tau_m)Y_i - c(q_i^*), q_i^*]$. Concavity of $U(\cdot)$ and $V(\cdot)$ ensures that both treatment quality q_i^* and consumption of the composite good are increasing in income. Obviously, the availability of free treatment quality \bar{q} in the NHS implies that patients are only willing to pay for treatment in the private sector if the treatment quality they receive is sufficiently greater than \bar{q} . This immediately implies that the price regular physicians receive for treating a patient in the private sector is higher than the wage a regular physician earns when working in the NHS. The benefits of these higher earnings, however, are fully offset by the cost of providing higher treatment quality.

In the previous subsection we have seen that the optimal treatment quality provided by altruistic physicians in the NHS is independent of the (expected) income of patients in the public sector. Hence, given that condition (5.5) is fulfilled, altruistic physicians who operate in the NHS optimally provide treatment quality q^A , as implicitly defined by (5.4).

The following lemma describes patients' choice between treatment in the NHS and treatment in the private sector.

Lemma 1 *Consider any combination of treatment bundles offered in the private sector for which some patients choose treatment in the NHS and other patients choose treatment in the private sector. There is one level of income at which patients are indifferent between the NHS and the private sector. Let Y_M denote this endogenously determined level of income. Patients with income $Y_i > Y_M$ buy treatment in the private sector, whereas patients with income $Y_i < Y_M$ receive treatment in the NHS.*

Proof. Suppose that patients in the NHS have probability α to be matched to an altruistic physician. For a patient with income Y_i , expected utility from treatment in the NHS then equals:

$$Eu_{nhs} = \alpha u[(1 - \tau_m)Y_i, q^A] + (1 - \alpha) u[(1 - \tau_m)Y_i, \bar{q}] \quad (5.7)$$

Consider a bundle of treatment quality q' and cost w' offered by one or more altruistic physicians in the private sector. Suppose that patients who apply for treatment by an altruistic physician in the private sector who offers this treatment bundle have probability β to be matched to an altruistic physician. Then, the expected utility of a patient with income Y_i from applying for treatment by an altruistic physician in the private sector equals:¹⁶

$$Eu_{priv} = \beta u[(1 - \tau_m)Y_i - w', q'] + (1 - \beta) u[(1 - \tau_m)Y_i - c(q_i^*), q_i^*] \quad (5.8)$$

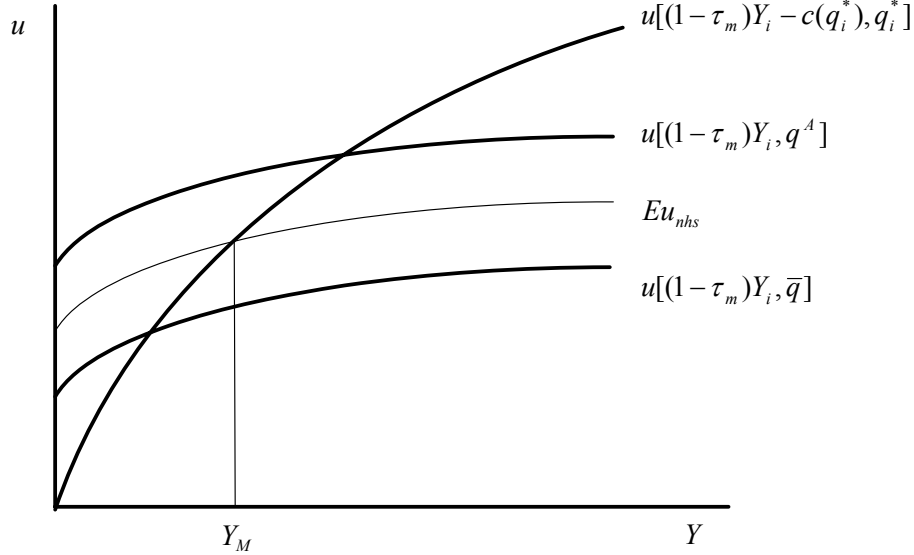
Differentiating (5.7) and (5.8) with respect to Y_i gives, using (5.1):

$$\begin{aligned} \frac{\partial Eu_{nhs}}{\partial Y_i} &= (1 - \tau_m)U_y[(1 - \tau_m)Y_i] \\ \frac{\partial Eu_{priv}}{\partial Y_i} &= (1 - \tau_m)\{\beta U_y[(1 - \tau_m)Y_i - w'] + (1 - \beta)U_y[(1 - \tau_m)Y_i - c(q_i^*)]\} \end{aligned}$$

where the effects through a change in q_i^* are zero by the envelop theorem. Using assumption 1 and $U_{yy} < 0$, it follows that for any α , β , and bundle of treatment

¹⁶The choice of a single patient between the NHS and private health care affects the cost of public provision and, hence, the tax rate τ_m . However, in a sufficiently large population this effect is small, and for notational convenience we assume throughout the paper that individual patients neglect this tax effect in deciding whether to opt for treatment in the NHS or in the private sector.

Figure 5.1: Patients' utility



quality q' and cost w' , we have for any given level of Y_i that $\frac{\partial Eu_{nhs}}{\partial Y_i} < \frac{\partial Eu_{priv}}{\partial Y_i}$.¹⁷ Hence, for any treatment bundle offered by altruistic physicians in the private sector, expected utility from private treatment increases more strongly with income than expected utility from treatment in the NHS.¹⁸ It follows that if there is any treatment bundle offered by altruistic physicians in the private sector that makes that a patient with income Y_i prefers treatment in the private sector over treatment in the NHS, then all patients with higher income also prefer treatment in the private sector. Similarly, if given all treatment bundles offered, a patient with income Y_i prefers treatment in the NHS, then all patients with lower income also prefer the NHS over the private sector. It follows that given all treatment bundles offered in the private sector, there can be only one patient type indifferent between treatment in the NHS and treatment in the private sector. ■

¹⁷Note that it is not possible that $\beta = 1$ and $w' = 0$ simultaneously, since offering costless treatment in the private sector that is attractive to any patient attracts all patients who prefer treatment in the NHS over treatment by a regular physician in the private sector. This either violates $\beta = 1$ or the restriction that some patients must prefer treatment in the NHS.

¹⁸Note that this argument also holds when altruistic physicians offer the same treatment bundles as regular physicians or, equivalently, if no altruistic physician works in the private sector.

The intuition behind Lemma 1 is given with the help of Figure 5.1, which depicts patients' utility from treatment in the NHS and treatment the private sector when all altruistic physicians work in the NHS. In the NHS, patients receive either treatment quality q^A or \bar{q} , and, hence, the expected utility from treatment in the NHS lies in between the two relatively flat curves. Since patients have to pay for treatment by a regular physician in the private sector and $U_{yy} < 0$, utility from private sector treatment increases more strongly with income than utility from NHS treatment. By definition, at income level Y_M the expected utility from treatment in the NHS equals the utility from treatment by a regular physician in the private sector. Patients with income above Y_M choose to buy treatment in the private sector, whereas patients with income smaller than Y_M receive treatment in the public sector. This yields tax rate $\tau_m = F(Y_M)c(\bar{q}) / \int_{Y_L}^{Y_H} Y f(Y) dY$.

Now consider any treatment bundle offered by an altruistic physician in the private sector. By $U_{yy} < 0$ and assumption 1, the slope of a curve depicting the utility derived from this treatment bundle cannot be flatter than the slopes of the curves describing the utility from treatment in the NHS. Hence, treatment bundles offered by altruistic physicians in the private sector can shift Y_M to the left, but cannot solely attract the poorest patients.

Lemma 1 implies that in equilibrium the poorest patients are treated in the NHS whereas the richest patients buy treatment in the private sector. Hence, altruistic physicians know that if they decide to work in a private practice, they will treat a relatively rich patient, whereas if they work for the NHS, they get to treat a relatively poor patient. The following Proposition gives the equilibrium allocation of patients and altruistic physicians.

Proposition 1 *In an equilibrium where some patients choose treatment in the NHS and other patients choose treatment in the private sector, all altruistic physicians work in the NHS. The allocation of patients is as described by Lemma 1, with Y_M implicitly determined by:*

$$\frac{N}{F(Y_M)P} u[(1-\tau_m)Y_M, q^A] + \left(1 - \frac{N}{F(Y_M)P}\right) u[(1-\tau_m)Y_M, \bar{q}] = u[(1-\tau_m)Y_M - c(q_M^*), q_M^*] \quad (5.9)$$

This equilibrium exists if $Y_L < Y_M < Y_H$, which is satisfied when:

$$u[(1 - \tau_m)Y_L, \bar{q}] > u[(1 - \tau_m)Y_L - c(q_L^*), q_L^*]$$

and

$$\frac{N}{P}u[(1 - \tau_m)Y_H, q^A] + \left(1 - \frac{N}{P}\right)u[(1 - \tau_m)Y_H, \bar{q}] < u[(1 - \tau_m)Y_H - c(q_H^*), q_H^*]$$

Proof. See Appendix. ■

The intuition behind Proposition 1 is straightforward. By working for the NHS, an altruistic physician can increase the utility of a relatively poor patient who otherwise receives treatment quality \bar{q} from a regular physician. Alternatively, he can increase the utility of a relatively rich patient in the private sector, by providing better quality at a lower price than the patient otherwise buys from a regular physician. Since the treatment quality provided by regular physicians in the private sector must be higher than \bar{q} , the marginal benefit of an increase in treatment quality is higher for NHS patients than for private sector patients. Hence, for altruistic physicians, providing better treatment quality than regular physicians is more rewarding when treating a patient in the NHS. Although altruistic physicians can further increase the utility of patients in the private sector by offering a lower price for treatment than regular physicians, this additional instrument is not effective enough to outweigh the higher utility gain patients in the NHS obtain from the increase in treatment quality.¹⁹

For patients, the equilibrium is captured in Figure 5.1. The presence of altruistic physicians in the NHS makes treatment in the NHS attractive. However, treatment quality is uncertain in the NHS (either q^A or \bar{q}), whereas a patient buys a certain treatment quality in the private sector, as given by (5.6). Sufficiently rich patients prefer to buy even higher treatment quality in the private sector than altruistic physicians provide for free in the NHS. Somewhat poorer patients prefer treatment by an altruistic physician in the NHS over treatment in the private sector, but

¹⁹It immediately follows that if the private sector patients have bought private insurance, such that their cost of treatment is zero at the point of consumption, altruistic physicians are even more inclined to treat NHS patients. Hence, allowing for private insurance does not affect the results.

choose to buy treatment in the private sector so as to avoid the possibility of being treated by a regular physician in the NHS. Still poorer patients also prefer treatment by a regular physician in the private sector over treatment by a regular physician in the NHS, but the difference in utility is small enough so that the presence of altruistic physicians in the NHS makes it worthwhile to run the risk of ending up with treatment quality \bar{q} . The poorest fraction of patients simply prefers either treatment in the NHS over treatment by a regular physician in the private sector.

5.4.3 Comparing purely public and mixed provision

The following Proposition compares a purely public system of health care provision with a mixed system of health care provision, from the point of view of the patients.

Proposition 2 *Allowing for private provision of health care benefits all patients.*

Proof. Under purely public provision, all patients have probability N/P to receive treatment quality q^A and otherwise receive quality \bar{q} . Hence, the expected utility of a patient with income Y_i under public provision is:

$$Eu(y, q) = \frac{N}{P}u[(1 - \tau_p)Y_i, q^A] + \left(1 - \frac{N}{P}\right)u[(1 - \tau_p)Y_i, \bar{q}] \quad (5.10)$$

Proposition 1 has shown that under a mixed system of health care provision, i.e. when private provision of health care is allowed for, relatively rich patients buy treatment in the private sector, even though all altruistic physicians work in the NHS. This immediately implies that these patients are better off under the mixed system than under the purely public system, as otherwise they would not leave the NHS. Under mixed provision, patients in the NHS have probability $N/F(Y_M)P$ to be treated by an altruistic physician, implying that for a patient with income Y_i the expected utility from treatment in the NHS is given by:

$$Eu_{nhs}(y, q) = \frac{N}{F(Y_M)P}u[(1 - \tau_m)Y_i, q^A] + \left(1 - \frac{N}{F(Y_M)P}\right)u[(1 - \tau_m)Y_i, \bar{q}] \quad (5.11)$$

As $\tau_p > \tau_m$ and $0 < F(Y_M) < 1$, it follows that the expected utility of treatment in the NHS is higher under mixed provision than under purely public provision. ■

Intuitively, rich patients benefit from private provision of health care, as they are able to secure high-quality treatment in the private sector. The withdrawal of the rich patients from the NHS benefits the remaining NHS patients in two ways. First, the tax rate decreases, as less patients make use of the public service. Second, since all altruistic physicians optimally decide to work in the NHS, the probability to be matched to an altruistic physician in the NHS increases. Hence, on average, NHS patients receive higher treatment quality under mixed provision than under public provision.²⁰

5.4.4 Subsidising private health care

Proposition 2 has shown that allowing for private provision of health care alongside public provision benefits relatively poor patients by attracting the rich patients to the private sector. In other words, in expected terms a patient in the NHS gains from a reduction in the number of her fellow NHS patients. This suggests a role for subsidising private health care.

Suppose that every patient treated in the private sector receives a, possibly negative, subsidy s , with the restriction that s should not be larger than the cost of treatment. The total cost of health care provision then equals $\{F(Y_M)c(\bar{q}) + [1 - F(Y_M)]s\}P$, yielding tax rate:

$$\tau_s = \{F(Y_M)c(\bar{q}) + [1 - F(Y_M)]s\} / \int_{Y_L}^{Y_H} Y f(Y) dY$$

It is easily verified that, analogous to Proposition 2, all patients prefer mixed provision with any $s \leq c(\bar{q})$ at which some patients seek treatment in the private sector over a purely public system (or, equivalently, a prohibitive tax on private treatment). Clearly, the patients opting for private care are better off by revealed preference. When $s < c(\bar{q})$, all patients benefit from a reduced tax burden, as each patient treated in the private sector reduces the cost of health care provision by

²⁰If altruistic physicians place greater weight on the utility of relatively poor patients than on the utility of richer patients, poor patients benefit even more from private provision. As altruistic physicians infer that on average they treat a poorer patient under mixed provision than under public provision, they optimally provide even better treatment quality under mixed provision.

$c(\bar{q}) - s$. When $s = c(\bar{q})$, mixed provision is essentially a voucher system, where every patient receives a voucher which can be used to obtain treatment quality \bar{q} in both the NHS and the private sector. The cost of this voucher system are identical to the cost of a purely public system. However, the presence of altruistic physicians in the NHS implies that the remaining patients in the NHS also strictly prefer the voucher system, as the withdrawal of the relatively rich patients from the pool of NHS patients increases their probability of being treated by an altruistic physician.

Let us now consider the effect of an increase in subsidy s . Given a subsidy s , the expected utility of a patient with income Y_i who opts for treatment in the NHS is given by (5.11) with τ_m replaced by τ_s . When treated in the private sector, this patient's utility equals

$$u_{priv}(y, q) = U[(1 - \tau_s)Y_i - c(q_i^*) + s] + V(q_i^*)$$

where q_i^* is defined by the first-order condition for optimal treatment quality in the private sector (5.6) with $(1 - \tau_m)Y_i = (1 - \tau_s)Y_i + s$. Recall that by definition, Y_M is the endogenously determined level of income at which a patient is indifferent between treatment in the NHS and treatment in the private sector.

The effect of a marginal increase in s on the total cost of health care provision and, hence, on the tax rate is ambiguous:

$$\frac{\partial \tau_s}{\partial s} = \frac{[c(\bar{q}) - s]f(Y_M)\frac{\partial Y_M}{\partial s} + [1 - F(Y_M)]}{\int_{Y_L}^{Y_H} Y f(Y) dY} \quad (5.12)$$

The first term in the numerator gives the net savings from the reduction in the number of patients treated in the NHS, and the second term gives the increase in infra-marginal subsidies paid to the private sector patients. Using (5.1), we find that a marginal increase in s affects the utility from treatment in the NHS (5.11) through the tax rate and through a change in the probability of treatment by an altruistic physician:

$$\frac{\partial Eu_{nhs}(y, q)}{\partial s} = -Y_i \frac{\partial \tau_s}{\partial s} U_y[(1 - \tau_s)Y_i] - \frac{Nf(Y_M)}{PF(Y_M)^2} \frac{\partial Y_M}{\partial s} \{V(q^A) - V(\bar{q})\} \quad (5.13)$$

The utility from private treatment is affected directly by the change in the subsidy and indirectly through the change in the tax rate (the effect through q_i^* is zero by the envelop theorem):

$$\frac{\partial u_{priv}(y, q)}{\partial s} = \left(1 - Y_i \frac{\partial \tau_s}{\partial s}\right) U_y[(1 - \tau_s)Y_i - c(q_i^*) + s] \quad (5.14)$$

It follows that an increase in s reduces the number of patients treated in the NHS. If Y_M would not change, the second term of (5.13) would vanish. However, since $(1 - Y_M[\partial \tau_s / \partial s]) > 0$ and $U_y[(1 - \tau_s)Y_i - c(q_i^*) + s] \geq U_y[(1 - \tau_s)Y_i] > 0$ for all patients, that would imply that treatment in the private sector becomes more attractive to patients with income Y_M relative to treatment in the NHS.²¹ Hence, the patients who were indifferent at the original level of s now prefer treatment in the private sector, implying that Y_M must decrease: $\partial Y_M / \partial s < 0$.

If the effect of the reduction of the number of NHS patients in (5.12) outweighs the effect of the increase in infra-marginal subsidies, then a higher subsidy leads to lower cost of health care provision and, hence, lower taxes, $\partial \tau_s / \partial s < 0$. This implies that everyone benefits from a higher subsidy, as can be seen from (5.13) and (5.14). The increase in s reduces the (public) cost of health care provision and increases the (expected) treatment quality for all patients.

Now suppose that the increase in s increases total health care cost. From (5.14), it follows that private sector patients generally benefit from the higher subsidy.²² NHS patients are hurt by the increase in the tax. However, (5.13) shows that they may still benefit from the higher subsidy, since the probability of receiving treatment from an altruistic physician increases. Hence, for NHS patients, the presence of altruistic physicians makes subsidising treatment in the private sector more appealing.

The discussion in this subsection is summarised in the following proposition.

Proposition 3 *The presence of altruistic physicians increases the benefits of subsidising private provision of health care.*

²¹That $(1 - Y_M[\partial \tau_s / \partial s]) > 0$ when $\partial Y_M / \partial s = 0$ follows from (5.12). For any $Y_M < Y_H$ it holds that $\int_{Y_M}^{Y_H} Y f(Y) dY > [1 - F(Y_M)]Y_M$.

²²If the income distribution is sufficiently skewed, then it is possible that the increase in taxes paid by patients with top incomes outweigh the increase in subsidy received.

5.4.5 Moonlighting

We have assumed that under the mixed system, physicians either work for the NHS or work in a private practice. In this subsection, we study the effects of allowing for ‘moonlighting’, i.e. allowing physicians to operate a private practice alongside their NHS job. This enables physicians to transfer their NHS patients to their private practice, if this is mutually beneficial.²³ For a monopolistic doctor in the private sector, this gives an incentive to select highly profitable patients for treatment in the private sector (Barros and Olivella, 2005, González, 2005). Ma (2004) and Biglaiser and Ma (2006) show that moonlighting can increase efficiency by enabling a patient and a physician to share the surplus arising from a transfer to the private sector, in a model where the number of patients who enter the NHS is fixed.

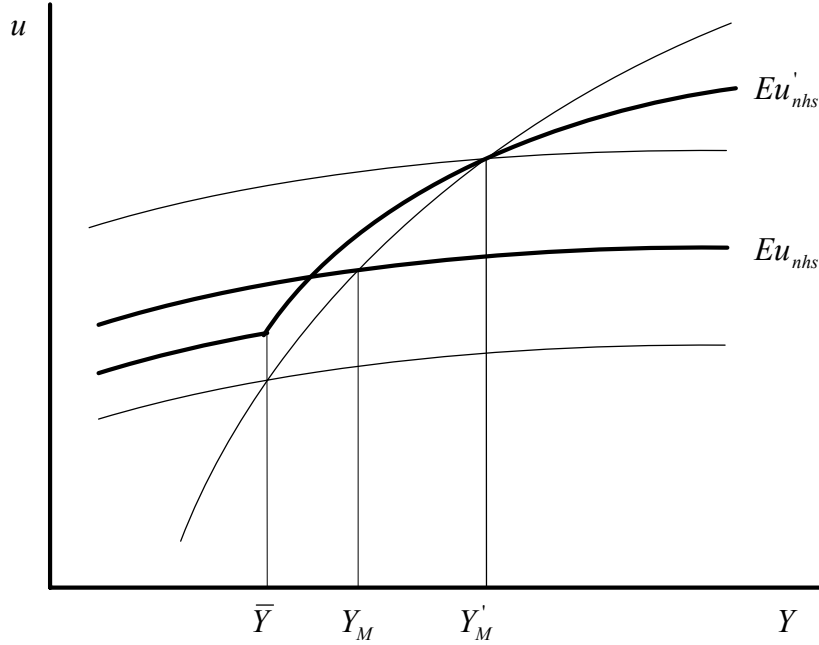
In our framework, allowing for moonlighting benefits some patients, but has adverse effects on the poorest patients by increasing the number of patients who (at least initially) opt for treatment in the NHS. As shown in Figure 5.1, when moonlighting is not allowed relatively poor private sector patients would obtain higher utility from treatment by an altruistic physician in the NHS than from their treatment in the private sector. They refrain from treatment in the NHS because they fear receiving the low-quality treatment provided by regular physicians in the NHS. Similarly, for some relatively rich NHS patients, the utility of treatment by a regular physician in the private sector exceeds the utility of treatment by a regular physician in the NHS.

Figure 5.2 extends Figure 5.1 to show the effects of moonlighting. Allowing for moonlighting implies that patients matched to a regular physician in the NHS can choose between receiving quality \bar{q} for free and buying their optimal treatment quality in the private sector, as given by (5.6). Hence, as depicted in Figure 5.2, all patients with income $Y_i > \bar{Y}$ are willing to be transferred to the private sector after being matched to a regular physician in the NHS, where \bar{Y} is implicitly defined by:

$$u[(1 - \tau_m)\bar{Y}, \bar{q}] = u[(1 - \tau_m)\bar{Y} - c(\bar{q}^*), \bar{q}^*]$$

²³In our setup, this is identical to assuming that patients in the NHS observe their physician’s type before treatment and are able to subsequently withdraw from the NHS and enter the private sector.

Figure 5.2: The effect of moonlighting on patients' utility



However, since the relatively poor private sector patients need not fear receiving treatment quality \bar{q} anymore, more patients will apply for treatment in the NHS, in the hope of receiving treatment from an altruistic physician. In fact, all patients who obtain higher utility from treatment by an altruistic physician in the NHS than from treatment a regular physician in the private sector have an incentive to go to the NHS. This implies that the income at which patients are indifferent between applying for treatment in the NHS and in the private sector increases from Y_M to Y'_M , where Y'_M is implicitly defined by:

$$u[(1 - \tau_m)Y'_M, q^A] = u[(1 - \tau_m)Y'_M - c(q_M^*), q_M^*]$$

As regards patients' utility, Figure 5.2 shows that allowing for moonlighting implies that the expected utility from opting for treatment in the NHS shifts from Eu_{nhs} to Eu'_{nhs} .²⁴ Clearly, relatively rich NHS patients as well as private sector

²⁴Here, we abstract from changes in the tax rate. The effect of allowing for moonlighting on the

patients with income up to Y'_M benefit from moonlighting. However, moonlighting harms the poorest patients. They do not gain (enough) from the opportunity to buy higher quality treatment when matched to a regular physician, and because more patients opt for treatment in the NHS, they have a lower probability of receiving the high-quality treatment provided by altruistic physicians.

The following proposition summarises the arguments made in this subsection.

Proposition 4 *Allowing physicians to transfer NHS patients to their private practice is beneficial for patients with middle/high income, but harms the poorest patients.*

5.5 Concluding remarks

This chapter has shown that when physicians are allowed to start up a private practice, physicians who intrinsically care about the patients' well-being prefer to work in the public sector. This implies that in expected terms, even poor patients obtain higher treatment quality after allowing for private provision of health care. Under mixed provision, rich patients are able to buy high-quality treatment in the private sector. The withdrawal of the rich from the NHS implies that the remaining, relatively poor NHS patients have higher probability to be treated by one of the altruistic physicians. Along the same lines, we have argued that subsidising private provision of health care can benefit NHS patients, by further increasing the number of patients who leave for the private sector. Conversely, allowing physicians to transfer patients from the NHS to a private practice harms the poorest patients, through an increase in the number of patients who enter the NHS.

We have assumed that physicians treat the same number of patients in the NHS as in the private sector. Concavity of patients' utility function implies that altruistic physicians would prefer to improve the treatment of many patients a little over greatly improving the treatment of a few. If altruistic physicians could treat more patients in a private practice than in the NHS, they may be tempted to work in the private sector. On the one hand, a private practice may offer more flexibility

total cost of health care provision is ambiguous. Without moonlighting, the cost are $c(\bar{q})F(Y_M)P$. With moonlighting the cost are uncertain, as it depends on the matching of physicians and patients. Expected cost are equal to $c(\bar{q})\{F(\bar{Y})P + [1 - F(\bar{Y})/F(Y'_M)]N\}$.

to increase working hours, but on the other hand individual patients in the private sector may demand more attention from their physician. Moreover, the NHS may guarantee a steady inflow of patients. And even if altruistic physicians can treat more patients in a private practice, this has to make up for a less favourable patient base, as a private practice attracts richer patients than the NHS.

5.A Appendix

Proof of Proposition 1. Suppose that all altruistic physicians work in the NHS. Given that condition (5.5) is satisfied, altruistic physicians optimally provide treatment quality q^A as implicitly defined by (5.4). Each NHS patient has probability $N/F(Y_M)P$ to receive treatment quality q^A . Otherwise, NHS patients receive quality \bar{q} . Private sector patients with income Y_i optimally buy treatment quality q_i^* from regular physicians, as implicitly defined by (5.6). Hence, the level of income at which patients are indifferent between NHS and private treatment, Y_M , is implicitly determined by the equality in the proposition. Lemma 1 implies that patients with income $Y_i < Y_M$ opt for treatment in the NHS and patients with income $Y_i > Y_M$ prefer treatment in the private sector.

Patients are being treated in both the NHS and the private sector if $Y_L < Y_M < Y_H$. The first inequality in the Proposition states that the poorest patient must prefer treatment in the NHS over treatment in the private sector even when $N = 0$. Similarly, the second inequality in the Proposition states that patients with income Y_H must prefer treatment in the private sector if all other patients are treated in the NHS.

Lastly, we have to proof that given this allocation of patients, altruistic physicians prefer to work in the NHS. Consider an individual altruistic physician choosing between the NHS and the private sector. Substituting optimal treatment quality q^A into (5.3) and using (5.1) gives the utility of an altruistic physician from working in the NHS:

$$Z^A = c(\bar{q}) - c(q^A) + \gamma[V(q^A) - V(\bar{q})] \quad (5.A1)$$

Alternatively, the altruistic physician can work in the private sector. When he offers a bundle of treatment quality q' and cost w' , all private sector patients for whom it holds that this treatment bundle yields higher utility than treatment by a regular physician, $u[(1 - \tau_m)Y_i - w', q'] > u[(1 - \tau_m)Y_i - c(q_i^*), q_i^*]$, will apply for treatment by the altruistic physician.²⁵ Here, we derive that even if the altruistic

²⁵As all private sector patients not treated by an altruistic physician will be treated by a regular physician, they optimally apply for treatment by an altruistic physician when this gives higher utility than treatment by a regular physician, even if the probability to be matched to an altruistic

physician could provide his private sector patient with the optimal treatment bundle for this patient type, the altruistic physician prefers to treat a NHS patient rather than any patient in the private sector. Obviously, offering one or more treatment bundles which are optimal for certain patient types also attract other patient types, and to discourage some patients types from applying the altruistic physician may optimally distort treatment bundles. As this implies that treating a patient in the private sector brings about even lower expected utility for the altruistic physician than we derive below, the findings below are sufficient to proof that altruistic physicians indeed prefer to work in the NHS, as stated in the Proposition.

Providing treatment quality q'_i at cost w'_i to a patient with income $Y_i \in [Y_M, Y_H]$ yields utility:

$$Z^A = w'_i - c(q'_i) + \gamma\{u[(1 - \tau_m)Y_i - w'_i, q'_i] - u[(1 - \tau_m)Y_i - c(q_i^*), q_i^*]\} \quad (5.A2)$$

where we have used that the outside option of the patient is treatment by a regular physician in the private sector, yielding utility $u[(1 - \tau_m)Y_i - c(q_i^*), q_i^*]$. Maximising (5.A2) with respect to q'_i and w'_i , subject to $u(y, q) \geq u^o$, gives first-order conditions:

$$-c_q(q'_i) + \gamma V_q(q'_i) = 0 \quad (5.A3)$$

$$1 - \gamma U_y[(1 - \tau_m)Y_i - w'_i] = 0 \quad (5.A4)$$

From (5.A3), it follows that the optimal treatment quality is independent of income. Moreover, the optimal quality is equal to the optimal quality provided by altruistic physicians in the NHS, q^A , as (5.A3) is identical to (5.4), the first-order condition for altruistic physicians' optimal treatment quality in the public sector. Substituting for the optimal treatment bundle a patient with income Y_i obtains from a regular physician and using (5.6), we find that both first-order conditions imply that the altruistic physician improves his patient's utility when:

$$\gamma V_q(q_i^*) > c_q(q_i^*) \quad (5.A5)$$

physician is infinitesimal.

If this inequality is violated, the altruistic physician would optimally offer the same treatment bundle to a patient with income Y_i as regular physicians. Otherwise, i.e. when γ is sufficiently high, the altruistic physician offers both higher treatment quality and lower treatment cost to a patient with income Y_i than regular physicians. Note that since q_i^* increases with income, condition (5.A5) is satisfied for smaller values of γ for patients with relatively low income than for patients with higher income.

Clearly, the altruistic physician prefers treating a NHS patient over providing the same treatment bundle as regular physicians to a patient in the private sector, as the latter does not yield altruistic utility. Comparing (5.5) to (5.A5), it is easily verifiable that for some levels of γ , the altruistic physician optimally refrains from improving the utility of any patient in the private sector but does improve the utility of NHS patients. By (5.9), $\bar{q} < q_i^*$ for all patients in the private sector. It follows that $c_q(q_i^*) \geq c_q(\bar{q})$ and concavity implies that $V_q(q_i^*) < V_q(\bar{q})$. Hence, for some values of γ condition (5.5) is satisfied, but condition (5.A5) is violated, implying that for these values of γ altruistic physicians prefer to work in the NHS.

Now suppose that γ is sufficiently high, such that (5.A5) is satisfied for at least some private sector patients. Again, treating a patient for whom condition (5.A5) is violated is less rewarding than treating a NHS patient. By (5.A3), (5.A5) is violated if a patient optimally buys treatment quality $q_i^* \geq q^A$ when treated by a regular physician. Consider any patient for whom condition (5.A5) is satisfied. We have to show that even if the altruistic physician could provide the optimal treatment bundle to his private sector patient, treating a patient in the NHS is more rewarding than treating any patient in the private sector. Subtracting (5.A2) with $q'_i = q^A$ from (5.A1) and using (5.1), this implies that we have to show that:

$$\gamma[V(q_i^*) - V(\bar{q})] > w'_i - c(\bar{q}) + \gamma\{U[(1 - \tau_m)Y_i - w'_i] - U[(1 - \tau_m)Y_i - c(q_i^*)]\} \quad (5.A6)$$

for all patients with income $Y_i \in [Y_M, Y_H]$ for whom condition (5.A5) is satisfied, where w'_i is given by (5.A4). From assumption 1 and by combining conditions (5.6), (5.A4), and (5.A5), we know that $0 \leq w'_i < c(q_i^*)$.

First, suppose that $w'_i = c(q_i^*)$. The last term on the right-hand side of (5.A6)

vanishes, and the condition boils down to $\gamma[V(q_i^*) - V(\bar{q})] > c(q_i^*) - c(\bar{q})$. This is always satisfied, as if (5.A5) is fulfilled we have that $q_i^* < q^A$, and from (5.A3) we know that $\gamma V_q(q) > c_q(q)$ for any $q < q^A$. Altruistic physicians are willing to incur the cost of increasing treatment quality up to q^A . Second, suppose that $0 \leq w \leq c(\bar{q})$. It suffices to show that $V(q_i^*) - V(\bar{q}) > U[(1 - \tau_m)Y_i - w'_i] - U[(1 - \tau_m)Y_i - c(q_i^*)]$. From Figure 5.1, we know that private sector patients prefer treatment by a regular physician in the private sector over treatment by a regular physician in the NHS, $u[(1 - \tau_m)Y_i - c(q_i^*), q_i^*] > u[(1 - \tau_m)Y_i, \bar{q}]$ for all $Y_i \in [Y_M, Y_H]$, i.e. all private sector patients are willing to pay $c(q_i^*)$ for an increase in treatment quality from \bar{q} to q_i^* . Using (5.1), this implies that condition (5.A6) is satisfied.

Lastly, suppose that $c(\bar{q}) < w'_i < c(q_i^*)$. Let q^w be the treatment quality provided by a regular physician in the private sector in exchange for w'_i , as given by $w'_i = c(q^w)$. From the two arguments of the previous paragraph, it follows from (5.A3) that $\gamma[V(q^w) - V(\bar{q})] > c(q^w) - c(\bar{q})$ as $q^w < q^A$ and that $\gamma[V(q_i^*) - V(q^w)] > \gamma\{U[(1 - \tau_m)Y_i - w'_i] - U[(1 - \tau_m)Y_i - c(q_i^*)]\}$ as private sector patients are willing to pay $c(q_i^*) - w'_i$ for an increase in treatment quality from q^w to q_i^* . Hence, for any w'_i condition (5.A6) is satisfied. This implies that even when the altruistic physician can provide the optimal treatment bundle to a private sector patient, treating a patient in the NHS yields higher utility than treating any patient in the private sector. Hence, all altruistic physicians optimally work in the NHS. ■

Chapter 6

The Effect of Job Satisfaction on Job Search: Not Just Whether, But Also Where*

6.1 Introduction

Workers change jobs when a new job opportunity yields higher expected utility than the current job, net of mobility costs. Similarly, workers start searching for another job when they feel that some aspects of their current job can be improved upon. At an aggregate level, labour mobility is needed to accommodate differences in growth between firms, industries, or nations. At the firm level, however, the recruitment and selection process can make turnover a costly affair. Moreover, firms expecting workers to quit as well as workers searching for another employer are less likely to invest in firm-specific skills, thereby reducing productivity. Knowledge about workers' reasons to (intend to) leave the firm can help to improve retention and, hence, reduce the cost that accompany turnover. Similarly, knowledge about workers' reasons to (intend to) leave their current industry can shape policy measures to reduce personnel shortages in vital sectors of the economy.¹

Labour mobility and workers' assessment of their job have been related in the

*A version of this chapter is forthcoming in *Labour Economics*.

¹From a more cynical perspective, this knowledge may also be helpful in times of downsizing.

literature. The seminal paper by Freeman (1978) shows that the probability that a worker voluntarily leaves his job decreases with his job satisfaction. The robustness of this negative relation between job satisfaction and turnover has been established in e.g. Akerlof et al. (1988) and Clark et al. (1998). Furthermore, Clark (2001) and Kristensen and Westergaard-Nielsen (2004) show that satisfaction with several job domains also correlates with the probability that a worker quits. Another series of papers concludes that the negative effect of job satisfaction on labour mobility runs through workers' turnover intentions or job search behaviour.² Sousa-Poza and Henneberger (2004) find a strongly negative relation between job satisfaction and intentions to quit in a cross-national analysis covering 25 countries, as do Shields and Price (2002) in a sample of British nurses. Using Finnish data, Böckerman and Ilmakunnas (2004) report strong relations between job satisfaction and both intentions to quit and job search. The link between turnover intentions or job search and actual turnover has been established by e.g. Hartog et al. (1988), Hartog and Van Ophem (1996), and Keith and McWilliams (1999).

In this chapter, we show that workers' assessment of their job not only affects *whether* they search for a new position, but that it also influences *where* they try to take up this new position. More precisely, we show that workers' reasons to search for another job affect whether they seek another job in their organisation, seek to move to another organisation in the industry, or seek to leave the industry altogether. In other words, workers' satisfaction with specific job aspects relates to both the intensity and the direction of their job search efforts.

We exploit data from a survey conducted in 2003 among public sector employees in the Netherlands. Respondents had to state their satisfaction with various job domains and their job search intensity. The job seekers were subsequently asked where they searched for another job and had to indicate the importance of 19 different job aspects in their decision to start searching.³ Correcting for selection into the

²This work follows a vast literature in psychology. A meta-analysis of this literature establishes that job satisfaction and turnover intentions are strongly related, and that turnover intentions is the best predictor of actual turnover (Tett and Meier, 1993).

³The 19 job domains are listed in Table 6.3. This list covers many potential reasons for searching, but is not exhaustive. For instance, it has been shown that workers are more likely to search for another job in case of a mismatch between their educational attainment and their job, both with respect to the field of education (Wolbers, 2003) as well as to the level of education

subsample of job seekers using Heckman's (1979) two-step sample selection model, we pose two questions. First, what is the relation between workers' reasons to search for another job and their decision to search within or outside their current organisation? Second, given that a worker tries to leave his organisation, what is the relation between his reasons to search and the decision to search within or outside the industry?⁴

An intuitive pattern emerges. Employees uncomfortable with a job domain which differs little across jobs within an organisation, such as commuting time or management, try to leave their organisation. On the contrary, when problems are job-rather than organisation-specific, as in case of a lack of autonomy, employees look for another position in their organisation. Dissatisfaction with job aspects that have an industry-specific component, like work pressure and job duties, induces workers to look for jobs in other industries.

To sharpen intuition, consider a junior nurse on the lookout for a new job. If she wants more autonomy, she may try to find a senior position in her current hospital. Conversely, she prefers a job in another hospital if her job search is caused by commuting time, whereas she may decide to leave the industry altogether if her dissatisfaction stems from a dislike for caring for patients.

The existence of a relation between workers' reasons for searching and the direction of their search efforts can be understood by observing that on-the-job experience provides workers with information about the qualities of their own and other jobs in their organisation and industry.⁵ A worker can use this information to infer where he might find a job that connects better to his preferences than his current job. Looking for another job within the organisation or industry is only useful if jobs are sufficiently heterogeneous with respect to the job domain the worker wants to

(Allen and Van der Velden, 2001).

⁴Whether the absence of private sector employees in our sample affects the results is an open question. There is evidence that public and private employees differ in the importance they attach to good conditions on certain job aspects, see e.g. Frank and Lewis (2004). However, this does not imply that workers' reaction to dissatisfactory conditions differs between public and private employees.

⁵Johnson (1978) and Jovanovic (1979) argue that over time, workers learn about the qualities of their job and quit if the match turns out to be poor. Discussing patterns of individual job mobility, Neal (1999) concludes that "*many workers are apparently using on-the-job experience as a means of gaining information about possible careers*" (p. 239).

improve upon. Hence, the combination of information on why workers search for another job and where they decide to search gives a unique view on workers' assessment of the relative heterogeneity of job domains across jobs within organisations and industries.

In the first-step regression of the selection model (i.e. the selection equation), we relate domain job satisfaction to workers' decision to start searching for another job. This part of the analysis is closely related to Clark (2001) and Kristensen and Westergaard-Nielsen (2004). They study the relation between domain job satisfaction and workers' decision to quit, which allows for a ranking of the impact of job domains on labour mobility. Our findings square well with the findings of these studies, further confirming the strong connection between job satisfaction, job search, and turnover.

The remainder of this chapter is organised as follows. The next section describes the data and Section 6.3 gives a description of the estimation method. Section 6.4 reports and discusses the relation between domain job satisfaction and workers' decisions on whether and where to search for another job. Section 6.5 concludes.

6.2 Data

In 2003, the Dutch Ministry of the Interior and Kingdom Relations undertook a large-scale survey among employees who worked continuously for one public sector organisation in 2002. Aggregate data were collected from the salary administration of the participating employers.⁶ A sample of 78,800 workers received a questionnaire, 28,312 workers returned it. Weights have been applied to reflect the aggregate information on gender, age, tenure, province, and wage.

The main purpose of the survey was to get insight into the job satisfaction of public personnel. Hence, the survey included questions on job satisfaction and on job search. We exclude 2,849 workers who reported a change in position within their

⁶This includes information on respondents' current industry of employment, which has been classified in the following 14 categories: the central government, three forms of local government (municipality, province, and water-government), the police, defense, the judicial system, academic hospitals, and six forms of education and research (primary, secondary, vocational, and higher vocational education, universities, and research institutes).

employers' organisation in 2002 from the analysis, as these workers may have based their answers to the questions on search behaviour on the situation before rather than after their internal job change. Note that this implies that all respondents in the analysis held one position continuously throughout 2002. Furthermore, we remove 3,555 respondents for failure to comment upon their job search behaviour or job satisfaction, and another 1,897 respondents for non-response to questions on personal or job characteristics except for earnings and size of the organisation.⁷ This leaves 20,011 respondents.

To assess workers' job satisfaction, respondents had to indicate, on a 5-point scale ranging from *'very dissatisfied'* to *'very satisfied'*, their satisfaction with 15 different job domains as well as with their job in general. The part of the survey on job search started with the question *'Have you searched for another job or position in 2002?'*, with possible answers *'No, not at all'*, *'Yes, I have been looking around'*, and *'Yes, I have intensively searched for another job/position'*. Table 6.1 reports summary statistics for job satisfaction and for job search intensity, as well as for the available worker and job characteristics.⁸ Most respondents are satisfied with their job, as 55 percent claim to be somewhat satisfied with their job, and another 19 percent are very satisfied. Only 13 percent of the respondents express dissatisfaction. About 30 percent of the respondents indicate to have searched for another job or position. Of these, one out of six has searched intensively. The relation between job satisfaction and job search is depicted in Figure 6.1. Clearly, the distribution of job satisfaction scores is much more skewed towards satisfaction for workers who do not search than for workers who do search for another job.

The relation between job search and job satisfaction also emerges from mean

⁷Excluding the 1,724 respondents who did not provide answers on either earnings or the size of their organisation has no effect on the results.

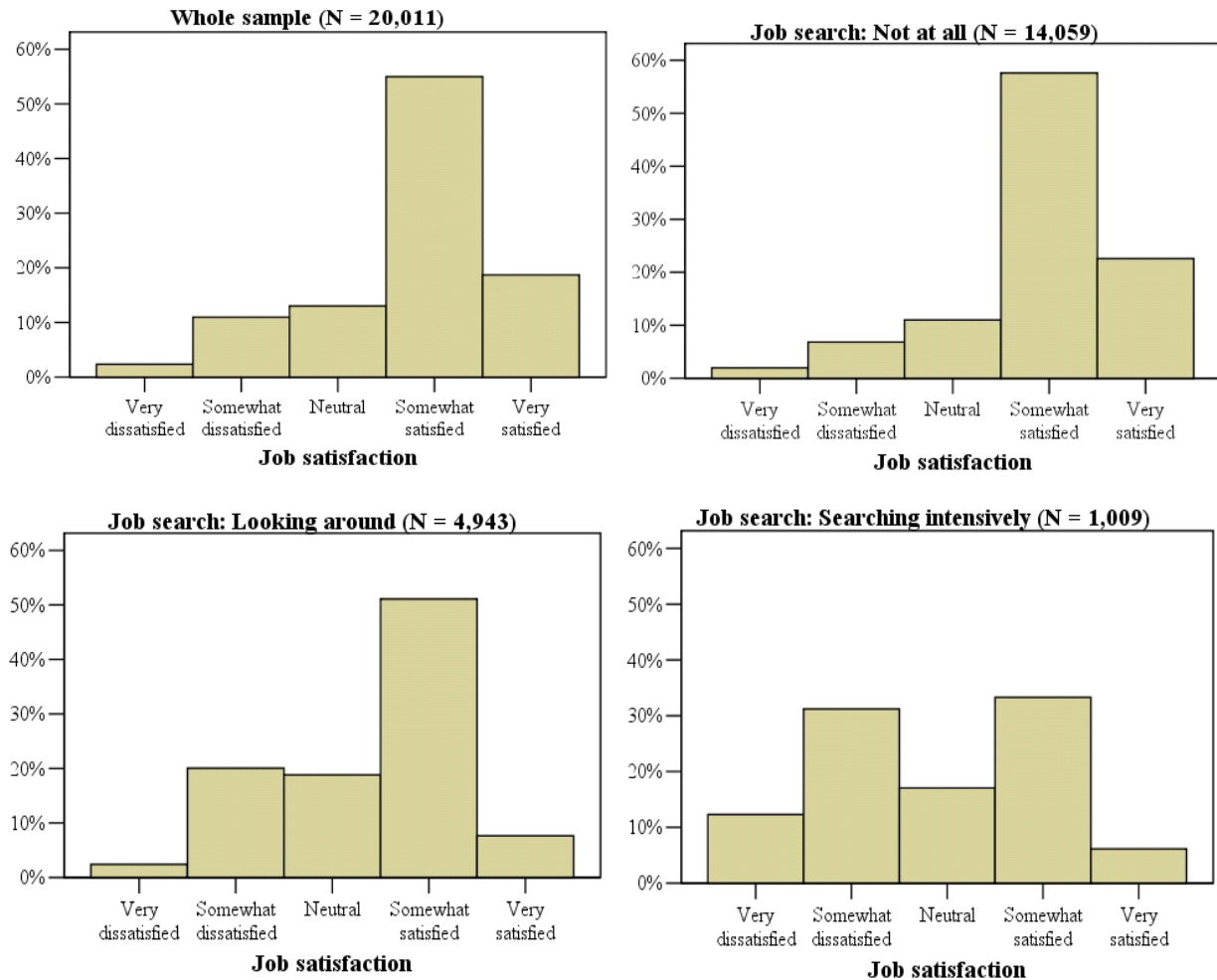
⁸'Married / cohabitating' and 'children' are dummy variables representing whether or not the worker has a partner and children, respectively. The education dummies depend on the highest attained level of schooling. 'Low education' consists of respondents with primary school and lower vocational education, and 'medium education' comprises respondents who completed high school or medium vocational education. Tenure is computed as the number of months from the starting date of the employment spell at the current employer up to December 2002. For the 203 respondents who gave only the starting year but not the starting month of this employment spell, we have set the starting month at July. The information on respondents' age, monthly wage, and organisational size has been collected using the categories listed in Table 6.1.

Table 6.1: Descriptive statistics

Variables	Mean	SD
Job satisfaction:		
Very dissatisfied	0.023	
Somewhat dissatisfied	0.110	
Neutral	0.130	
Somewhat satisfied	0.550	
Very satisfied	0.187	
Job search:		
Not at all	0.703	
Looking around	0.247	
Searching intensively	0.050	
Female	0.449	
Minority	0.034	
Age:		
15 - 19	0.004	
20 - 24	0.042	
25 - 29	0.085	
30 - 34	0.116	
35 - 39	0.133	
40 - 44	0.175	
45 - 49	0.174	
50 - 54	0.165	
55 - 59	0.089	
60 - 69	0.018	
Married / cohabitating	0.806	
Children (dummy)	0.538	
Low education	0.139	
Medium education	0.245	
Higher vocational education	0.438	
University	0.179	
Tenure (in months)	151.085	121.717
Experience (in years)	20.163	10.536
Contractual hours	32.751	8.244
Temporary contract	0.083	
Monthly wage (euro):		
Less than 1250	0.096	
1251 - 1500	0.074	
1501 - 1750	0.085	
1751 - 2000	0.103	
2001 - 2500	0.183	
2501 - 3000	0.140	
3001 - 3500	0.118	
3501 - 4000	0.067	
4001 - 4500	0.040	
4501 - 5000	0.023	
More than 5000	0.031	
No response	0.040	
Size (number of employees):		
0 - 10	0.006	
11 - 20	0.024	
21 - 50	0.064	
51 - 100	0.075	
101 - 500	0.281	
501 - 1000	0.100	
1001 - 5000	0.225	
More than 5000	0.181	
No response	0.044	
Observations	20,011	

Data source: BZK, Personeelsonderzoek 2003.

Figure 6.1: Job satisfaction and job search



Data source: BZK, personeelsonderzoek 2003.

satisfaction scores. Table 6.2 relates the mean satisfaction scores for all job domains and for the job overall to job search intensity.⁹ The respondents are especially positive about their contract duration, commuting time, and job duties, but fairly negative about their financial prospects and work pressure. Job search intensity is negatively related to satisfaction with all job domains. The difference in mean satisfaction scores between workers who do not search at all and workers who search intensively is largest for the job overall, followed by atmosphere, (future) job duties,

⁹This is the only instance in this chapter where we, for expositional reasons, treat the satisfaction scores as cardinal.

Table 6.2: Mean satisfaction scores

Satisfaction with	All	Job search intensity		
		Not at all	Looking around	Searching intensively
Job overall	3.77	3.95	3.46	2.99
Contract duration	4.20	4.25	4.15	3.91
Rewards	3.31	3.41	3.12	3.10
Financial prospects	2.61	2.71	2.40	2.34
Work pressure	2.82	2.87	2.71	2.74
Facilities at work	3.18	3.21	3.14	3.08
Physical working conditions	3.10	3.18	2.96	2.89
Job duties	4.02	4.19	3.71	3.45
Future job duties	3.48	3.68	3.11	2.89
Education / training opportunities	3.41	3.54	3.18	2.92
Atmosphere at work	3.94	4.13	3.62	3.30
Commuting time	4.08	4.18	3.88	3.78
Personnel management	2.98	3.15	2.67	2.44
Management of the organisation	2.88	3.04	2.58	2.43
Style of leadership	3.02	3.21	2.66	2.40
Autonomy / responsibility	3.97	4.12	3.69	3.41
Observations	20,011	14,059	4,943	1,009

Data source: BZK, Personeelsonderzoek 2003.

Tests of equality of the means across rows all reject the hypothesis of equality at the 0.01 level.

management, and autonomy.

Respondents who indicated that they had searched for another job were subsequently asked to indicate the importance of 19 different job aspects in their decision to start searching, on a 5-point scale ranging from *'very important'* to *'not important at all'*.¹⁰ Moreover, the job seekers had to rank the three most important reasons to start searching. We use this information to construct 'reason-to-search' variables in the following way, as proposed by Mathios (1989). A reason-to-search variable is assigned the value 0 if the respondent did not consider this reason to search as

¹⁰The four job domains added to the 15 job domains listed in Table 6.2 are 'threat of restructuring', 'threat of losing job', 'contractual hours', and 'combination of work and private life', see Table 6.3.

Table 6.3: Means of the reason-to-search variables

Reasons to search	All	Direction of search efforts		
		In current organisation	In current industry	Outside current industry
Threat of restructuring	0.30	0.40	0.26	0.30
Threat of losing job	0.18	0.22	0.18	0.20
Contract duration	0.25	0.26	0.26	0.29
Rewards	0.79	0.66	0.83	0.82
Financial prospects	1.00	1.11	0.96	1.00
Work pressure	0.84	0.67	0.86	1.00
Facilities at work	0.31	0.26	0.33	0.36
Physical working conditions	0.36	0.35	0.35	0.41
Job duties	1.01	1.11	0.93	1.02
Future job duties	1.22	1.45	1.19	1.15
Education / training opportunities	0.47	0.60	0.43	0.43
Atmosphere at work	0.88	0.84	0.91	0.89
Contractual hours	0.25	0.25	0.25	0.26
Combination of work and private life	0.57	0.51	0.55	0.58
Commuting time	0.56	0.34	0.67	0.55
Personnel management	0.89	0.77	0.91	0.99
Management of the organisation	1.01	0.93	1.03	1.10
Style of leadership	1.08	1.02	1.13	1.13
Autonomy / responsibility	0.94	1.20	0.86	0.78
Observations	4,794	1,806	2,505	2,234

Data source: BZK, Personeelsonderzoek 2003

important (3-5 on the 5-point scale), the value 1 if the respondent considered the reason to search important (1-2 on the 5-point scale), but did not indicate it as one of the three most important reasons to search, the value 2 if this reason to search was the third most important reason, the value 3 if it was the second most important reason, and the value 4 if it was the most important reason to search for a new job.¹¹

¹¹As acknowledged by Mathios (1989), it is obvious that this specification imposes arbitrary weights on the answers regarding the importance of job domains. The robustness of our results is checked by using three different specifications. The first two specifications use only the most important reason for searching and the three most important reasons for searching (equally weighted), respectively. These specifications yield qualitatively similar results, but perform worse than the 0-1-2-3-4 specification in terms of explanatory power. Furthermore, we used a specification which imposes no structure of weights, by inserting a dummy variable for each level of importance of all

Furthermore, job seekers were asked where they searched for another job: within their current organisation, within their current industry, and/or in other industries.¹² Table 6.3 lists the means of the reason-to-search variables for all job seekers together, as well as separated by the direction of their search efforts.¹³ The main reasons for searching appear to be pay, job duties, and management. Furthermore, Table 6.3 hints at the main message of this chapter. The differences in the importance of the reason-to-search variables between the second, third, and fourth column point to a relation between workers' reasons for searching and the direction of their search efforts. For instance, workers who search within their organisation attach relatively much importance to autonomy and future job duties, and relatively little importance to work pressure and commuting time. Likewise, work pressure is more important in the decision to search for those who search for a new job outside their industry than for those who search within their industry. The purpose of this chapter is to analyse these differences in greater detail.

6.3 Estimation method

We focus on two questions. First, what is the relation between workers' reasons for searching for another job and their decision to search within or outside their current organisation? We estimate a binary probit of the effects of workers' reasons for searching on the probability that workers search outside their organisation, controlling for the available worker and job characteristics.¹⁴ Obviously, these estimations are based on the workers who actually searched for another job, which is a

job domains. Again, qualitatively similar results emerge.

¹²Note that 'other industries' includes, besides the other public industries, the whole private sector.

¹³As 1,060 out of the 5,952 job seekers in the sample did not answer all questions on their reasons for searching, and 98 job seekers did not indicate where they searched for another job, Table 6.3 is based on 4,794 respondents. Note also that respondents were allowed to indicate more than one direction of their search efforts. Hence, respondents may appear in more than one column of Table 6.3.

¹⁴In addition to the worker and job characteristics listed in Table 6.1, all estimations include quadratic terms for tenure, experience, and contractual hours and control for the current industry of employment. For expositional reasons we do not report the results for the control variables, but an earlier version of this paper contains the regression coefficients of these variables as well as some discussion of their effect on search behaviour (Delfgaauw, 2005).

subsample of our sample of public servants. Figure 6.1 indicates that selection into this subsample is not random, as dissatisfied workers are more likely to search for another job than satisfied workers.

We correct for this selection effect using Heckman's (1979) two-step sample selection model, which has been modified by Van de Ven and Van Praag (1981) to account for a probit in the second step. The first-step selection equation is a binary probit of the probability that a worker searched for another job (i.e. the probability that the worker is present in the sample of job seekers). Let x_i be the set of explanatory variables in this regression, which includes workers' domain job satisfaction measures, and let $\hat{\beta}$ be the estimated parameter vector. We then calculate the inverse Mills ratio $\lambda_i = \phi(x_i\hat{\beta})/\Phi(x_i\hat{\beta})$, where $\phi(\cdot)$ is the standard normal density function with cumulative distribution $\Phi(\cdot)$, and use it as an additional regressor in the probit of the probability of searching outside the current organisation.

The second question we address is: What is the relation between workers' reasons for searching and their decision to search within or outside their current industry, given that they search outside their organisation? Again, we use a binary probit to estimate this relation. This estimation is based on the subsample of workers who only search outside their current organisation. Since selection into this subsample is governed by the probit regression of the probability of searching outside the organisation, we can again apply the two-step sample selection model by using the probit of the probability of searching outside the organisation as the selection equation.

In both regressions on the direction of search efforts, we stack workers who search only within against workers who only search outside their organisation or industry. This creates a clear distinction between searching within and searching outside, but has the disadvantage that we have to drop all respondents who searched both within and outside their organisation or industry. In the appendix, we present the results of two corresponding multinomial logits which take into account the possibility of searching both within and outside the organisation or industry. Even though these estimations do not correct for sample selection, they are indicative of how the motives of workers who search both within and outside compare to the motives of workers who search in one direction only.

6.4 Results

6.4.1 Job satisfaction and job search

Before analysing the effects of workers' reasons for searching on their decision to search within or outside their organisation and industry, we briefly look at the results of the first-step selection equation of workers' decision to search for another job. This is essentially an analysis of the determinants of job search, allowing us compare its results to findings in the literature.

Table 6.4 gives the results of the probit regression, where the dependent variable is zero when the respondent did not search for another job in 2002, and one otherwise.¹⁵ Besides the control variables, the estimation reported in the first column includes a binary variable which takes value 1 when the respondent is either somewhat dissatisfied or very dissatisfied with the job in general (1-2 on the 5-point scale). Clearly, dissatisfied workers are more likely to search than satisfied workers, corresponding to findings by Shields and Price (2002), Sousa-Poza and Henneberger (2004), and Böckerman and Ilmakunnas (2004). A change in this dummy variable from satisfied to dissatisfied decreases the probability that a worker does not search at all by more than 30 percentage points.

In the third column, the dummy for overall job dissatisfaction is replaced by similar dummies for domain job dissatisfaction. For most job aspects, dissatisfaction raises the probability of job search significantly. The main instigators of job search are dissatisfaction with (future) job duties, followed by dissatisfaction with the atmosphere at work, commuting time, and autonomy. The main exception is dissatisfaction with facilities at work, which has a negative effect on search intensity. Clark (2001) and Kristensen and Westergard-Nielsen (2004) relate satisfaction with 7 job domains to workers' decision to quit their job, using British and Danish data, respectively. For British workers, job security correlates most with the probability that a worker quits, followed by pay, the use of initiative, the work itself, and hours of work. For Danish workers, satisfaction with type of work and with earnings have

¹⁵Using the ordered structure of the information on workers' search intensity yields results similar to those reported in Table 6.4.

Table 6.4: The determinants of job search (probit)

Variables	Coefficient		Coefficient	
<i>Dissatisfaction with:</i>				
Job overall	0.853	(0.028)***		
Contract duration			0.087	(0.049)*
Rewards			0.081	(0.026)***
Financial prospects			0.195	(0.024)***
Work pressure			-0.025	(0.023)
Facilities at work			-0.136	(0.025)***
Physical working conditions			0.030	(0.024)
Job duties			0.356	(0.042)***
Future job duties			0.698	(0.032)***
Education / training			0.089	(0.028)***
Atmosphere at work			0.485	(0.034)***
Commuting time			0.343	(0.032)***
Personnel management			0.080	(0.028)***
Management of the organisation			0.176	(0.028)***
Style of leadership			0.171	(0.026)***
Autonomy / responsibility			0.285	(0.039)***
Observations	20,011		20,011	
Loglikelihood	-10,980.934		-9,996.171	
McFadden's R ²	0.098		0.179	
<i>Control variables only:</i>				
Loglikelihood	-11,481.176			
McFadden's R ²	0.057			

Data source: BZK, Personeelsonderzoek 2003.

Robust standard errors in parentheses.

In addition to the worker and job characteristics listed in Table 6.1, the estimations control for current industry of employment and include a constant and quadratic terms for tenure, experience, and contractual hours.

* significant at the 0.10 level. ** significant at the 0.05 level. *** significant at the 0.01 level.

most predictive power, but satisfaction with job security appears to have little impact. Given the absence of a job domain reflecting job security in our data, our findings are well in line with these studies, apart from a smaller effect of financial rewards. The smaller effect of rewards may be due to the relatively compressed wage structure in the Dutch public sector, but may also arise from the difference between searching and quitting.¹⁶

6.4.2 Direction of search efforts: within or outside the current organisation

When discomfort with a certain job domain cannot be remedied in the current job, workers start searching for another job. They will aim their search efforts at places where they expect to find a job that eases their discomfort. For some job domains, the conditions may vary sufficiently across jobs within an organisation to make an internal job change a viable option. For other job domains, however, conditions are more homogeneous within an organisation, implying that workers need to find a new employer. For instance, a police officer who moves from a junior to a senior position within his department gets more responsibility, but may not improve his relation with the department chief.

Hence, we expect that an organisation-specific problem drives workers out of their organisation, whereas more job-specific problems may be solved by internal job search. Unfortunately, not all job domains are easily classified as either job-specific or organisation-specific. In some organisations, employees can obtain a higher wage or different job duties by taking up another position, whereas in other organisations employees are placed within a certain job category with prescribed wages and tasks. For several job domains, however, the classification is clear. Commuting time and management do not differ between jobs in most organisations. Contract duration is also an organisation-specific problem, as it only hinders workers whose fixed-term contracts are not renewed and, hence, have little chance of obtaining another position

¹⁶The ranking of the strength of the effects of domain job satisfaction on job search is largely preserved when the effects are estimated by including the satisfaction variables one by one in the estimation, as in Clark (2001) and Kristensen and Westergaard-Nielsen (2004), rather than simultaneously.

within their organisation. Conversely, a lack of autonomy is primarily a job-specific problem, which can be remedied by obtaining a higher-level job in the organisation.

Table 6.5 gives the results of the probit regression of workers' decision to search within or outside their organisation, where we correct for sample selection by including the inverse Mills ratio calculated from the probit regression of job search on domain job satisfaction (Table 6.4, second column).¹⁷ The dependent variable is zero if the respondent searched within his current organisation (909 respondents), and 1 if the respondent searched outside the organisation (2,989 respondents). The 896 respondents who searched both within and outside their organisation are left out of the analysis.¹⁸

Jointly, the reason-to-search variables have a highly significant influence on the direction of search efforts, and several have an individually significant effect as well. As hypothesised, we find that workers having problems with their contract duration or commuting time are less likely to search within their current organisation. Dissatisfaction with management works in the same direction, although only the effect of personnel management is statistically significant. When workers search for more autonomy or responsibilities, they are indeed more likely to look within their current organisation.

An increase in responsibilities is often associated with an increase in rank. Lluís (2005) reports that more than 20 percent of intra-firm job change in Germany concerns a promotion. Hence, we might expect that also a significant fraction of internal job search has to do with the desire to be promoted. Besides autonomy, the reasons for searching that are most likely to capture promotion desires are rewards, financial prospects, and (future) job duties. We indeed find that when workers seek better financial prospects or nicer future job duties, they are more likely to look for another job within their current organisation. Job duties has the right sign, but the effect is not statistically significant, which may reflect that some workers who dislike their

¹⁷Including instead the inverse Mills ratio calculated from the probit regression of job search on overall job satisfaction (Table 6.4, first column) does not affect the results. The correction for sample selection is indeed necessary, as the coefficient of the inverse Mills ratio is significantly different from zero.

¹⁸Removing these 896 respondents from the analysis of the determinants of job search in the previous subsection has no effect on any of the results.

Table 6.5: Searching within or outside the organisation (probit)

Dependent variable: 0 = searching within organisation 1 = searching outside organisation			
Variables	Coefficient		Marginal effect
<i>Reason to search:</i>			
Threat of restructuring	-0.081	(0,028)***	-0.021
Threat of losing job	0.006	(0,043)	0.002
Contract duration	0.078	(0,038)**	0.020
Rewards	0.131	(0,024)***	0.033
Financial prospects	-0.066	(0,022)***	-0.017
Work pressure	0.068	(0,023)***	0.017
Facilities at work	0.072	(0,044)	0.018
Physical working conditions	-0.040	(0,035)	-0.010
Job duties	-0.019	(0,021)	-0.005
Future job duties	-0.077	(0,022)***	-0.019
Education / training	-0.080	(0,030)***	-0.020
Atmosphere at work	-0.014	(0,023)	-0.003
Contractual hours	-0.076	(0,039)*	-0.019
Work vs private life	0.012	(0,029)	0.003
Commuting time	0.237	(0,031)***	0.060
Personnel management	0.113	(0,028)***	0.029
Management of the organisation	0.041	(0,026)	0.010
Style of leadership	0.030	(0,024)	0.008
Autonomy / responsibility	-0.163	(0,021)***	-0.041
Inverse Mills ratio ^a	-0.423	(0,076)***	
Observations	3,898		
Loglikelihood	-1,605.916		
McFadden's R ²	0.241		
<i>Control variables only:</i>			
Loglikelihood	-1,778.467		
McFadden's R ²	0.160		

Data source: BZK, Personeelsonderzoek 2003.

Robust standard errors in parentheses.

^a Calculated from the results of the regression in Table 6.4, second column.

In addition to the worker and job characteristics listed in Table 6.1, the estimation controls for current industry of employment, and includes a constant and quadratic terms for tenure, experience, and contractual hours.

* significant at the 0.10 level. ** significant at the 0.05 level. *** significant at the 0.01 level.

current job duties are not qualified to do other work in their organisation.

The finding that workers who want higher earnings are more likely to search outside the organisation is not in line with the promotion argument. Apparently, the effect of workers who try to increase their salary through a promotion is offset by the search efforts of workers who feel that they have more chance of obtaining a better salary at another firm. Indeed, wage gains accompanying a change in employer can be significant. For instance, Topel and Ward (1992) show that for young men in the US, about one-third of total wage growth occurs through changes in employer, and a typical move from one employer to another yields a 10 percent wage gain.¹⁹

Work pressure and lacking facilities at work also induce workers to search for a new employer. When work pressure stems from organisational culture or from an (industry-wide) shortage of qualified personnel, then internal job change does not reduce work pressure. Similarly, it is hard to imagine that facilities differ widely across jobs within an organisation.

Lastly, if workers search for different contractual hours, better opportunities for training, or feel threatened by a restructuring, then they are more likely to look for another position within the organisation. Böheim and Taylor (2004) show indeed that within-employer mobility facilitates the adjustment of work hours in the direction desired by employees. Yet, between-employer mobility improves this adjustment even more, see also Altonji and Paxson (1992). The result on training can be explained by observing that many firms cater training opportunities to the skills needed for the job, implying that training opportunities can differ across jobs within an organisation. For instance, Oosterbeek (1996) shows that workers in low-level jobs have less opportunities for training than workers in higher-level jobs. As workers will have better information about the training opportunities within their organisation than about training in other firms, workers who want more training may look first for another position within their organisation.

That an upcoming restructuring does not chase away employees, but rather in-

¹⁹Notice, however, that the literature on the wage effects of mobility compares workers who stay with workers who quit. The latter workers thus found and accepted another job, whereas our job seekers have not found a better position. Hence, some of our respondents may simply have had few opportunities for job change.

duces them to search for a new position within their organisation may seem counter-intuitive. Yet, a restructuring not only destroys positions, but may also open up and create positions. The results of the multinomial logit analysis, reported in Table 6.A1, provide further insight. Workers who are threatened by restructuring or fear losing their jobs for other reasons are most likely to search both within and outside their organisation, which seems to be a wise strategy. Probably, workers who search in one direction only have simply less to fear from the restructuring than workers who search in both directions.²⁰

The magnitudes of these effects are substantial. The marginal effects in Table 6.5 give the change in the probability that a worker searches outside the organisation of a one-point increase in the reason-to-search variable, evaluated at the sample means of all other variables. Given the 0-1-2-3-4 specification of the reason-to-search variables, the difference in this probability between workers for whom a reason to search is most important in the decision to start searching and workers for whom the reason to search is not important is about four times the marginal effect.²¹ Thus, if workers' primary reason to search is commuting time, rewards, or personnel management, then they are 17, 11, and 10 percentage points more likely to search outside their organisation, respectively, than workers who attribute no importance to these job domains. Similarly, if workers' most important reason to search is autonomy, future job duties, or financial prospects, then they are 19, 8, and 7 percentage points less likely to search outside their organisation, respectively.²²

²⁰Table 6.A1 further shows that for most other job domains, the category of workers who search in both directions falls in between the two categories of workers who search in one direction only. Acknowledging that caution is warranted because these estimates are not corrected for sample selection, we interpret this as further support for the pattern found in the main analysis. Thus, a greater importance of e.g. personnel management in a workers' decision to search for another job makes it more (less) likely that the worker searches outside (within) the current organisation.

²¹The nonlinear nature of the probit model and the relatively high fraction of job seekers who search outside their current organisation imply that this difference is actually somewhat smaller (larger) than four times the marginal effect for reason-to-search variables which have a positive (negative) effect on the probability to search outside the organisation.

²²These effects can add up to large differences between workers. For instance, a worker who ranks autonomy as the most important reason to search for another job, followed by future job duties and financial prospects, is more than 50 percentage points more likely to search within the organisation than a worker for whom commuting time is the most important reason to search, rewards second most important, and personnel management third most important.

6.4.3 Direction of search efforts: within or outside the current industry

Just like jobs within an organisation, jobs within an industry also have features in common. If a worker is looking to improve upon a job domain which is influenced by the industry, then jobs outside the industry may be better suited than other jobs within the industry. For instance, a scholar who hates teaching and doing research has little to gain from moving to another university. Hence, we might expect that if workers want to improve upon a job domain which has an industry-specific component, they search for a job in another industry.

For most job domains, the strength of the influence of industry is hard to assess, and probably differs across industries. Yet, two job domains that are likely to be affected by the industry are job duties and work pressure. Furthermore, given the prevalence of wage bargaining at industry-level in the Dutch public sector, we expect that workers who want better rewards or financial prospects also seek employment outside their current industry.

Table 6.6 gives the results of the probit regression of workers' decision to search within or outside their industry. We correct for selection into the subsample of job seekers who search outside their organisation by including the inverse Mills ratio calculated from the probit regression of the probability of searching outside the organisation (Table 6.5). The dependent variable takes the value zero if the respondent searched for another job within the current industry (1,335 respondents), and the value 1 if the respondent searched in other industries (1,106 respondents). The remaining 548 respondents who searched both within and outside their current industry are left out of the analysis.

Jointly, the reason-to-search variables are statistically significant, although their explanatory power is considerably smaller than in Table 6.5. Most reason-to-search variables have a negligible effect on workers' decision to stay in or leave their industry. Still, we find that when work pressure or job duties trigger job search, employees try to leave the industry. Dissatisfaction with financial prospects is also positively related to the probability that a worker seeks to leave the industry, but, in contrast to our expectations, the effect of rewards is negative. Possibly, industry-specific skills

Table 6.6: Searching within or outside the industry (probit)

Dependent variable: 0 = searching within industry 1 = searching outside industry		
Variables	Coefficient	Marginal effect
<i>Reason to search:</i>		
Threat of restructuring	0.038 (0,035)	0.015
Threat of losing job	-0.048 (0,045)	-0.019
Contract duration	-0.029 (0,041)	-0.011
Rewards	-0.080 (0,029)***	-0.031
Financial prospects	0.071 (0,027)***	0.028
Work pressure	0.040 (0,025)*	0.016
Facilities at work	0.027 (0,046)	0.011
Physical working conditions	0.063 (0,038)*	0.025
Job duties	0.083 (0,023)***	0.033
Future job duties	-0.002 (0,025)	-0.001
Education / training	0.036 (0,040)	0.014
Atmosphere at work	-0.010 (0,024)	-0.004
Contractual hours	-0.011 (0,045)	-0.004
Work vs private life	0.013 (0,030)	0.005
Commuting time	-0.170 (0,037)***	-0.067
Personnel management	-0.041 (0,031)	-0.016
Management of the organisation	-0.026 (0,028)	-0.010
Style of leadership	-0.042 (0,026)	-0.017
Autonomy / responsibility	-0.009 (0,032)	-0.004
Inverse Mills ratio ^a	-1.238 (0,295)***	
Observations	2,441	
Loglikelihood	-1,483.230	
McFadden's R ²	0.118	
<i>Control variables only:</i>		
Loglikelihood	-1,542.279	
McFadden's R ²	0.083	

Data source: BZK, Personeelsonderzoek 2003.

Robust standard errors in parentheses.

^a Calculated from the results of the regression in Table 6.5.

In addition to the worker and job characteristics listed in Table 6.1, the estimation controls for current industry of employment and includes a constant and quadratic terms for tenure, experience, and contractual hours.

* significant at the 0.10 level. ** significant at the 0.05 level. *** significant at the 0.01 level.

have a role in this negative effect of dissatisfaction with rewards on the probability of leaving the industry, if workers expect that their skills are not as valuable in other industries.²³

We further find that workers who face tough working conditions want to leave their industry. Probably, some workers have limited opportunities to find a different type of work within their industry. Excessive commuting time induces workers to search for another job within their industry, suggesting that these workers are relatively positive about other aspects of their current job and, hence, try to find a better located job similar to their current job.²⁴

Again, the magnitudes of these effects are large. Workers for whom job duties is the most important reason to search are 13 percentage points more likely to search outside their industry than workers who do not consider job duties important, evaluated at the sample means of the other variables. For work pressure, physical working conditions, and financial prospects, these figures are 6, 10, and 13 percentage points, respectively. If commuting time is the primary reason for searching, workers are 25 percentage points less likely to search outside their industry; for rewards this figure is 12 percentage points.

In Table 6.7, we qualitatively summarise our findings. Rather than searching randomly, workers appear to base the direction of their search efforts on the job domains they want to see improved. Generally, workers will use their knowledge of other jobs in their organisation and industry to infer where they can expect

²³It is remarkable that the effects of rewards and financial prospects differ in sign in both regressions. Workers who want higher earnings try to leave their organisation but not their industry, whereas workers who seek better prospects search either within their organisation or, when internal search is pointless, outside their industry. The difference must stem from the distinction between current and future earnings. When current salary cannot be raised within the organisation, workers may try to find a similar job with an employer who has a higher valuation of their skills. Financial prospects seem to be more related to career opportunities. Thus, respondents seeking better prospects look for advancement within their organisation or, when this is not possible, apparently infer that they may not be able to reach the top positions in their current industry.

²⁴The results of the multinomial logit in Table 6.A2 indicate that workers who want less work pressure, better financial prospects, or better working conditions are primarily less likely to search only within their industry, whereas workers who want to reduce their commuting time are less likely to search only outside their industry. There are no reasons for searching which make it more likely that workers search both within and outside the industry rather than either within or outside. Although these results should be treated with caution, this suggests that the exclusion of workers who search in both directions does not have a large effect on the results.

Table 6.7: Qualitative summary of findings

Reason to search:	Effect on probability of searching	
	outside the organisation	outside the industry
Threat of restructuring	-	0
Threat of losing job	0	0
Contract duration	+	0
Rewards	+	-
Financial prospects	-	+
Work pressure	+	+
Facilities at work	+	0
Physical working conditions	0	+
Job duties	0	+
Future job duties	-	0
Education / training	-	0
Atmosphere at work	0	0
Contractual hours	-	0
Work vs private life	0	0
Commuting time	+	-
Personnel management	+	0
Management of the organisation	0	0
Style of leadership	0	0
Autonomy / responsibility	-	0

to find a job that mitigates their problems. Hence, Table 6.7 captures workers' assessment of their chances to find better conditions on the various job domains within their organisation, within their industry, and elsewhere. In other words, Table 6.7 pictures workers' assessment of the relative heterogeneity of job domains across jobs within organisations and industries. Thus, for job domains like training, hours, and autonomy, workers feel that the conditions are sufficiently heterogeneous across jobs within an organisation to make internal job search worthwhile, in contrast to the conditions for job domains like rewards, work pressure, and management. When the discomfort cannot be resolved internally, workers may even need to leave their industry if conditions on the troubling job domain are too homogeneous across organisations within the industry, as in case of work pressure and financial prospects.

6.5 Concluding remarks

The economics literature on job satisfaction has shown that workers' job satisfaction influences their intentions to stay in or leave their job. Besides confirming this finding in a large sample of employees in the Dutch public sector, this chapter shows that workers' satisfaction with various job domains affects the direction of their job search efforts. Provided that workers search where they expect to find mitigation of their discomfort, our findings give a unique view of workers' assessment of the relative heterogeneity of job domains across jobs within organisations and industries.

The results indicate that in general, firms facing high cost of turnover should focus their attention to earnings, work pressure, and personnel management. At the industry level, poor financial prospects and working conditions and unpleasant job duties feed workers' desire to leave the industry. Hence, when personnel shortages loom, improving these job domains should be given priority, especially for high-turnover occupations like nursing (Andrews and Dziegielewski, 2005) and teaching (Ingersoll, 2001). A similar conclusion is reached by the Audit Commission (2002) after surveying workers who left the British public sector. They found that bureaucracy and workload were important reasons to leave the public sector, and that better pay, less workload, and more managerial support might have persuaded workers to stay.

A potential drawback of our data is that it consists of employees who did not change jobs in 2002. This implies that there may be a sorting effect, insofar as those who did change jobs in 2002 differed in their motives for job search from those who searched but did not change jobs. In the next chapter, we analyse the relation between job movers' reasons for quitting their job and their decision to stay in or leave the industry, using similar survey data of job-to-job movers who ended an employment spell at a public sector organisation in the Netherlands in 2001. Hence, for industry change, we can compare the intentions of the job seekers in the present sample to the motives of the job movers in the next chapter. Except for dissatisfaction with rewards, which induces job movers to leave their industry, dissatisfaction with job domains that induce job seekers to search within (outside) the industry also induce job movers to take up another position within (outside) the

industry. Hence, the lack of job movers in the present sample does not appear to drive the results.

One critique on relating job satisfaction to job search is that job search may be nothing more than an alternative measure of job satisfaction (cf. Clark, 2001). A more tangible measure of job search behaviour is whether or not an employee has actually applied for another position. In our sample, almost 59 percent of the job seekers said to have applied for another job in 2002. There is a clear distinction by search intensity, as 52 percent of the respondents who were 'looking around' had applied for another job, against 89 percent of the respondents who 'searched intensively'. Using the application decision as our measure of job search has no qualitative effect on our findings. Hence, we feel confident that domain job satisfaction not only affects workers' job search behaviour, but also bears on job mobility.

6.A Appendix

Table 6.A1: Reasons to search within or outside the organisation, or both (multinomial logit)

Variables	Direction of search efforts: ^a			
	Within organisation		Outside organisation	
	Coefficient	(SE)	Coefficient	(SE)
<i>Reason to search:</i>				
Threat of restructuring	-0.033	(0.049)	-0.138	(0.043)***
Threat of losing job	-0.131	(0.076)*	-0.141	(0.060)**
Contract duration	-0.133	(0.070)*	-0.030	(0.054)
Rewards	-0.067	(0.049)	0.157	(0.040)***
Financial prospects	-0.020	(0.043)	-0.129	(0.037)***
Work pressure	-0.079	(0.047)*	0.030	(0.037)
Facilities at work	-0.045	(0.091)	0.090	(0.071)
Physical working conditions	-0.054	(0.068)	-0.116	(0.057)**
Job duties	0.018	(0.040)	-0.004	(0.034)
Future job duties	-0.039	(0.041)	-0.160	(0.035)***
Education / training	0.029	(0.055)	-0.120	(0.051)**
Atmosphere at work	-0.018	(0.045)	-0.012	(0.036)
Contractual hours	0.104	(0.081)	-0.059	(0.069)
Work vs private life	0.006	(0.058)	0.016	(0.049)
Commuting time	-0.114	(0.067)*	0.306	(0.051)***
Personnel management	-0.135	(0.054)**	0.105	(0.043)**
Management of the organisation	-0.083	(0.049)*	-0.004	(0.039)
Style of leadership	-0.113	(0.046)**	-0.017	(0.037)
Autonomy / responsibility	0.122	(0.040)***	-0.150	(0.035)***
Observations	4,794			
Loglikelihood	-3,768.699			
McFadden's R ²	0.149			

Data source: BZK, Personeelsonderzoek 2003.

^a Reference category: searching both within and outside the organisation

In addition to the worker and job characteristics listed in Table 6.1, the estimation controls for current industry of employment and includes a constant and quadratic terms for tenure, experience, and contractual hours.

* significant at the 0.10 level. ** significant at the 0.05 level. *** significant at the 0.01 level.

Table 6.A2: Reasons to search within or outside the industry, or both (multinomial logit)

Variables	Direction of search efforts: ^a			
	Within industry		Outside industry	
	Coefficient	(SE)	Coefficient	(SE)
<i>Reason to search:</i>				
Threat of restructuring	0.037	(0.072)	0.059	(0.074)
Threat of losing job	-0.029	(0.095)	-0.107	(0.098)
Contract duration	-0.111	(0.073)	-0.121	(0.077)
Rewards	0.034	(0.051)	0.005	(0.053)
Financial prospects	-0.103	(0.052)**	-0.013	(0.054)
Work pressure	-0.148	(0.045)***	-0.014	(0.046)
Facilities at work	-0.148	(0.084)*	-0.051	(0.084)
Physical working conditions	-0.130	(0.076)*	-0.014	(0.076)
Job duties	-0.082	(0.048)*	0.065	(0.049)
Future job duties	-0.004	(0.048)	-0.048	(0.051)
Education / training	-0.032	(0.075)	-0.017	(0.081)
Atmosphere at work	0.000	(0.046)	-0.006	(0.049)
Contractual hours	-0.060	(0.087)	-0.134	(0.091)
Work vs private life	0.084	(0.063)	0.123	(0.065)*
Commuting time	-0.034	(0.053)	-0.170	(0.057)***
Personnel management	-0.095	(0.053)*	-0.066	(0.055)
Management of the organisation	-0.005	(0.051)	-0.001	(0.053)
Style of leadership	-0.078	(0.048)	-0.104	(0.051)**
Autonomy / responsibility	0.063	(0.050)	-0.078	(0.055)
Observations	2,989			
Loglikelihood	-2,777.706			
McFadden's R ²	0.106			

Data source: BZK, Personeelsonderzoek 2003.

^a Reference category: searching both within and outside the organisation

In addition to the worker and job characteristics listed in Table 6.1, the estimation controls for current industry of employment and includes a constant and quadratic terms for tenure, experience, and contractual hours.

* significant at the 0.10 level. ** significant at the 0.05 level. *** significant at the 0.01 level.

Chapter 7

Where To Go?

Workers' Reasons to Quit and Intra- versus Interindustry Job Mobility*

7.1 Introduction

In many countries, the public sector faces problems recruiting and retaining skilled personnel (OECD, 2001). Borjas (2003) shows that since 1970, the private sector in the US has become financially more attractive to high-skilled workers, as wage dispersion has increased more in the private sector than in the public sector. The Audit Commission (2002) reports that the main reasons for workers to leave the public sector in the UK are bureaucracy, workload, pay, and management. Workers felt that these problems were specific to the public sector. Still, many workers remained in the public sector, as “*personal fulfilment made up for the lack of financial rewards*” (p. 29). Clearly, nonpecuniary factors influence workers’ decision to stay in or leave the public sector. Moreover, it suggests that workers use their on-the-job experience to evaluate other jobs in their sector.

*A version of this chapter is forthcoming in *Applied Economics*.

Neal (1999) draws a similar conclusion. He examines labour mobility in the US and distinguishes between ‘simple’ and ‘complex’ job change. Complex job mobility involves a change in career, empirically defined as a change in both industry and occupation. Neal develops a model in which workers first search for a suitable career and subsequently search for a suitable employer. Evidence from the National Longitudinal Survey of Youth supports the model. Complex job changes are less common among experienced workers than among unexperienced workers, and the likelihood of a complex job change falls sharply after a worker has changed employer without changing career. Based on this evidence, Neal concludes that “*many workers are apparently using on-the-job experience as a means of gaining information about possible careers*” (p. 239).

This chapter shows that workers’ self-proclaimed reasons for quitting their job affect their decision to stay in their current industry or to move to another industry. We employ data from a survey among employees who either accepted or left a public sector job in the Netherlands in 2001. Employees who quit their previous job had to indicate the importance of 19 different job aspects in their decision to leave the job. We find that the motives for job change of workers who stay in their industry differ from the motives of workers who change industry, in a fairly intuitive pattern.

Workers are more likely to move to another industry when pay, work pressure, working conditions, job duties, or management are important in the decision to quit. In contrast, dissatisfaction with the opportunities for training, the atmosphere at work, the number of hours worked, or commuting time makes it more likely that a worker stays in the current industry. We argue that correlation of job aspects among jobs within an industry may explain most of these findings, as the first group of job aspects is more likely to have an industry-specific component than the latter. Moreover, we show that the different motives for job change lead to differences in wage growth: the apparent wage premium of interindustry job movers is fully explained by workers’ reasons for quitting.

Although the diversity of jobs within an industry is large, the jobs open to a specific worker may share some features. The salary spread may be limited, especially when firms offer ‘competitive’ salaries or when salary negotiations take place

at industry-level. Similarly, the jobs open to a specific worker may have tasks in common, and working conditions may depend partially on the specific industry. Conversely, other job aspects are determined solely by the combination of a worker and an organisation. For instance, commuting time and the atmosphere at work are unlikely to be influenced by the industry.

When jobs within an industry have features in common, experience in one job generates information on other jobs, but only on those job aspects that have an industry-specific component. If one of these job aspects causes a worker to quit, this worker may need to change industry in order to find a better suited job. Conversely, dissatisfaction with a job aspect for which jobs within the industry differ sufficiently does not necessitate a change in industry. A move to another hospital is of little use to a nurse who dislikes her job duties, but may solve the problems of a nurse who dislikes her colleagues. Similarly, a teacher may shorten commuting time by moving to another school, but it is unlikely that he improves his salary substantially. Our findings thus suggest that, in line with Neal (1999), workers use their on-the-job experience to update their expectations of other jobs in the industry.

It is interesting to note that respondents considered financial matters less important in their decision to quit than job duties, atmosphere at work, and management. This chapter is not the first study documenting that nonpecuniary factors are important determinants of quit behaviour. For instance, Akerlof et al. (1988) find that more people quit for nonpecuniary reasons than for pecuniary reasons, and argue that “*any realistic portrait of labor turnover must include a role for nonpecuniary rewards*” (p. 498). Nonetheless, many authors have ignored these factors in studies of labour mobility, possibly due to lack of data.¹

Further, we look into the main reasons for workers to leave the public sector altogether. We find that public sector workers who quit for pay or management take up employment in the private sector relatively often. In contrast, when the possibilities for training are important in the decision to quit, workers are more likely to stay in the public sector. These findings are an indication of the relative strengths and weaknesses of public sector jobs.

¹See, among many others, Topel and Ward (1992), Light and McGarry (1998), Campbell (2001), McCaughlin and Bills (2001), and Lima (2004).

The remainder of this chapter is organized as follows. The next section shortly discusses the literature on the causes and consequences of job mobility. Section 7.3 describes the data. In Section 7.4, we report the effects of workers' reasons for quitting on their wage growth and relate these findings to earlier work on the relation between wages and workers' evaluation of different job aspects. This provides us with an indication of how our data compare to the data used in other studies. Section 7.5 discusses the effects of workers' reasons for quitting on the decision to stay in or leave the industry of employment. Section 7.5 also looks into workers' reasons to leave the public sector altogether. Section 7.6 concludes.

7.2 Job mobility

A large literature has evolved on the causes and consequences of job mobility. Bartel (1982) studies the effects of several job attributes on quit behaviour, and finds that for young men, repetitive work and bad working conditions increase the probability that a worker quits, whereas for older men repetitive work may actually decrease this probability. Higher starting wages decrease the likelihood of a separation (Topel and Ward, 1992), whereas workers are more likely to quit jobs that are complex (Weiss, 1984), or that pose health and safety risks (Viscusi, 1979). Altonji and Paxson (1992) show that females whose family composition has changed obtain larger changes in the number of hours worked when they move to another employer than by staying in the same job. The authors argue that adjusting working hours to changing preferences may be easier by changing jobs than within a job.

Workers' own assessment of their job also provides information on the likelihood of a quit. Freeman (1978) already found that job satisfaction is negatively related to the probability that a worker quits, see also Akerlof et al. (1988) and Clark et al. (1998). A decomposition of job satisfaction into satisfaction with different job aspects reveals that satisfaction with job security is the best predictor of quits among UK workers (Clark, 2001), whereas satisfaction with the type of work appears most important in Denmark (Kristensen and Westergaard-Nielsen, 2004).

Concerning the consequences of a quit, Topel and Ward (1992) find that one-

third of the total wage growth of young men in their first ten years in the labour market occurs through job changes. Akerlof et al. (1988) show that workers who quit out of dissatisfaction with pay usually obtain a wage increase, whereas a substantial fraction of workers who quit for nonpecuniary reasons take a wage cut. Still, both groups report being better off after the job change. Keith and McWilliams (1997) find that the wage growth of employees who quit for family-related reasons is smaller than the wage growth of both non-movers and workers who quit for non-family-related reasons. Relatedly, a common finding in the literature is that job movers who voluntarily left their job fare better financially than workers who are laid off or discharged (McLaughlin, 1991, Keith and McWilliams, 1997).²

A common feature of these studies is that the data used contain both movers and non-movers. As we only have information on workers who entered or left a public sector job, we cannot compare movers to non-movers. The contribution of this chapter lies in the extensive set of reasons for quitting, which we can relate to a worker's decision to stay in or leave the current industry and to the change in a worker's wage.

7.3 The data

In 2002, the Dutch Ministry of the Interior and Kingdom Relations conducted a survey among employees who started in or left a public sector job in 2001. Information about employees who had either entered or left an organisation in the public sector was collected from salary administrations. Representative samples were drawn and 22,000 employees who left an organisation and 20,250 employees who entered an organisation received a questionnaire, yielding 7,854 and 6,942 respondents, respectively.³ The data are weighted in two steps. First, weights are applied so as to reflect the information from the salary administrations on gender, age, tenure, province, and wage for each industry in the public sector independently. These industries are the central government, local governments, education, research, the police, the

²The literature on displaced workers is surveyed by Kletzer (1998) and Kuhn (2002).

³Employees who moved from one job in the public sector to another may have received two questionnaires. However, there is no evidence of duplicate cases in the dataset.

judicial system, defense, and university hospitals.⁴ Second, each industry receives a weight corresponding to its share in total public sector employment.

We merge the two samples, and divide the respondents in four groups, depending on their former and new industry of employment. *Stayers* move to another employer within the same industry, *movers* leave their former industry of employment but remain employed in the public sector, *leavers* move from the public sector to the private sector, and *entrants* move from the private sector to the public sector. This gives 3,105 stayers, 1,967 movers, 2,483 entrants, and 1,103 leavers.⁵ Partial non-response reduces these numbers to 2,261, 1,430, 1,912, and 717, respectively. We have removed another 64 stayers, 34 movers, 79 entrants, and 28 leavers because they reported implausible wage levels or wage changes.⁶

One of the main purposes of the survey was to gain insight into employees' reasons for entering or leaving a public sector job. The respondents who had left a job were asked to indicate on a 5-point scale the importance of 19 job aspects in their decision to leave their old job. Furthermore, they had to rank the three most important reasons for quitting. We construct 'reason-to-quit' variables in the following way, as proposed by Mathios (1989). A reason-to-quit variable is assigned the value 0 if the respondent did not consider this job aspect important in the decision to quit (1-3 on the 5-point scale), the value 1 if the respondent considered the job aspect important (4-5 on the 5-point scale), but did not indicate it as one of the three most important reasons for quitting, the value 2 if this job aspect was the third most important reason, the value 3 if this job aspect was the second most important reason, and the value 4 if it was the most important reason for quitting.⁷

⁴The data also distinguish nine different industries in the private sector.

⁵The focus on job-to-job mobility removes 2,904 respondents from the sample who did not have a job before entering their public sector job, as well as 3,234 respondents who did not take up another job after leaving their public sector job.

⁶We have set the floor and the ceiling for both the former and the new hourly wage at 3 euro and 60 euro, respectively. The floor is slightly below the legal minimum wage for 18-year old employees, and the ceiling is (in terms of monthly income) slightly above a Minister's wage in the Netherlands. The cut-off levels for relative wage change have (arbitrarily) been set such that workers whose hourly wages more than halved or more than tripled were excluded. Inspection of the data reveals that most of these cases involve typo's, misspecifications, or misinterpretation of the questions (for instance, some respondents appear to report yearly rather than monthly income).

⁷This specification imposes arbitrary weights on the questions regarding the importance of job aspects, which is also acknowledged by Mathios (1989). We have checked the robustness of our

Table 7.1: Means of the reason-to-quit variables

Reasons to quit	All	Stayers	Movers	Leavers	Entrants
Threat of restructuring	0.22	0.17	0.18	0.14	0.35
Threat of losing job	0.20	0.18	0.19	0.13	0.26
Contract duration	0.32	0.37	0.37	0.24	0.24
Rewards	0.62	0.52	0.63	0.84	0.65
Financial prospects	0.79	0.66	0.79	1.06	0.85
Work pressure	0.61	0.64	0.60	0.47	0.64
Facilities at work	0.26	0.25	0.24	0.25	0.28
Physical working conditions	0.32	0.26	0.29	0.27	0.44
Job duties	1.17	0.90	1.38	1.16	1.35
Future job duties	1.16	1.02	1.36	1.38	1.11
Education / training opportunities	0.57	0.45	0.54	0.43	0.79
Atmosphere at work	1.06	1.13	0.96	0.98	1.07
Contractual hours	0.32	0.28	0.23	0.19	0.49
Combination of work and private life	0.69	0.74	0.61	0.52	0.75
Commuting time	0.71	0.98	0.59	0.34	0.63
Personnel management	0.87	0.84	0.86	1.20	0.78
Management of the organisation	0.91	0.81	0.98	1.26	0.84
Style of leadership	1.00	1.01	1.03	1.28	0.86
Autonomy / responsibility	0.86	0.84	0.91	0.92	0.88
Observations	6,115	2,197	1,396	689	1,833

Data source: BZK, Mobiliteitsonderzoek 2002.

Table 7.1 lists for each group of job movers the means of the reason-to-quit variables. Interestingly, financial motives appear less important than dissatisfaction with management, (future) job duties, or the atmosphere at work.⁸ Several

results by using different specifications. Specifications including only the most important reason for quitting or the three most important reasons for quitting (equally weighted) yield qualitatively similar results, but perform worse than the 0-1-2-3-4 specification in terms of explanatory power. Furthermore, we used a specification which imposes no structure of weights, by inserting a dummy variable for each level of importance of all job aspects. Again, qualitatively similar results emerge, although for several job aspects, the magnitude of the coefficients is not monotonically increasing in the level of importance. Still, the estimated effects of job aspects being ‘most important’ relative to being ‘not important’ closely resemble the results of the estimations reported here.

⁸Note that this need not imply that employees care little about the level of their wage. Due to the rather compressed wage structure in the Netherlands, employees may rationally expect a job change to yield little financial gain.

differences between the four groups emerge from Table 7.1. Relatively few stayers indicate that they were unhappy with their job duties, whereas commuting time is mentioned more frequently by stayers than by the other groups. Leavers complain relatively little about commuting time and work pressure, but complain most about their former management and pay. Movers voice dissatisfaction about (future) job duties relatively strongly, whereas entrants often emphasize (the lack of) possibilities for training and the number of hours worked. The threat of involuntary separations also prevails more often among entrants than among the other groups.⁹

Summary statistics for several worker and job characteristics are listed in Table 7.2.¹⁰ In line with Neal (1999), stayers are on average more experienced than the other groups. Furthermore, the fraction of stayers with higher vocational education is relatively large. Entrants have less education, experience, and tenure, and earn less than the other groups. Leavers obtain the largest wage growth, whereas stayers receive the smallest increase in hourly wage. The average increase in hourly wage is 9.15 percent, which is close to the estimates by Topel and Ward (1992).

This study focusses on job-to-job mobility. We also have data on the reasons to quit of 237 employees who left a public sector job but did not take up another job. In comparison to the figures in Table 7.1 and Table 7.2, these employees were more often female, less educated, and worked fewer hours. They considered work pressure and in particular the combination of work and private life more important in their

⁹Unfortunately, the survey among employees who entered a public sector job did not explicitly ask whether the respondent quit their previous job. Hence, there may be some actual layoffs and discharges in the sample. The survey among employees who left a public sector job did ask whether the employee voluntarily left the job or had been displaced. Given the evidence in the literature that the consequences of a separation differ between workers who quit and workers who are displaced, we have checked whether elimination of all respondents who considered threats of involuntary separations important in their decision to quit would affect our results. It turns out that all results are qualitatively similar in this restricted sample, except for the effect of the reason-to-quit variable 'contractual hours' on wage growth, which becomes smaller and insignificant (see Table 7.3).

¹⁰The variables married and children at home are dummy variables, representing whether or not the respondent has a partner or children, respectively. The education dummies depend on the highest completed level of schooling. Low education comprises respondents who completed primary school only and respondents who completed lower vocational education. Medium education consists of workers with high school education or medium vocational education, and higher vocational education and university speak for themselves. Tenure describes the number of years a worker has been employed by his former employer. Experience is measured as the number of years since the respondent finished education. Hourly wages are computed from the respondents' monthly income and contractual hours.

Table 7.2: Summary statistics

Variables	Stayers	Movers	Leavers	Entrants
Female	0.532 (0.499)	0.542 (0.498)	0.379 (0.486)	0.462 (0.499)
Minority	0.029 (0.167)	0.038 (0.191)	0.042 (0.200)	0.054 (0.226)
Married / cohabitating	0.806 (0.395)	0.766 (0.424)	0.777 (0.416)	0.680 (0.467)
Children	0.535 (0.499)	0.473 (0.499)	0.435 (0.496)	0.368 (0.483)
Low education	0.035 (0.185)	0.074 (0.261)	0.073 (0.261)	0.136 (0.343)
Medium education	0.140 (0.347)	0.209 (0.407)	0.256 (0.437)	0.337 (0.473)
Higher vocational education	0.604 (0.489)	0.392 (0.488)	0.379 (0.485)	0.304 (0.460)
University	0.221 (0.415)	0.325 (0.469)	0.292 (0.455)	0.223 (0.416)
Tenure (in years)	7.370 (7.427)	6.870 (6.615)	7.060 (6.670)	4.690 (5.463)
Experience (in years)	13.635 (9.326)	11.684 (8.701)	11.490 (8.109)	10.051 (8.276)
Hours worked in old job	33.024 (7.941)	32.586 (7.900)	35.379 (5.688)	32.819 (8.859)
Hours worked in new job	33.186 (7.764)	32.913 (7.421)	35.473 (5.293)	34.079 (7.034)
Hourly wage old job (€)	15.611 (5.581)	14.855 (5.884)	15.591 (6.109)	12.643 (5.967)
Hourly wage new job (€)	16.978 (6.346)	16.406 (6.696)	17.424 (7.250)	13.761 (6.066)
Δ log hourly wage	0.079 (0.180)	0.096 (0.241)	0.105 (0.219)	0.098 (0.257)
Observations	2,197	1,396	689	1,833

Data source: BZK, Mobiliteitsonderzoek 2002.

Standard deviations in parentheses.

decision to quit. By contrast, financial prospects and future job duties were less important. This points to the argument that some women may invest less in human capital, because they expect to withdraw (temporarily) from the labour market at some point in time to dedicate themselves to their family (see Weiss and Gronau, 1981, Blau and Ferber, 1986, and Polachek and Kim, 1994).

7.4 Workers' reasons to quit and wage growth

Workers change jobs to improve upon job aspects causing discomfort. Hence, it is likely that the new job offers better conditions with respect to these troubling job aspects. Unfortunately, we can not assess the effect of the reasons to quit on all job aspects, as the survey did not ask workers to compare job aspects of their former and new job. The data do allow us to estimate the effect of workers' reasons for quitting on their wage growth. Hence, we estimate:

$$\Delta(w_i) = \alpha + \beta Q_i + \gamma X_i + e_i \quad (7.1)$$

where $\Delta(w_i)$ is the difference in log hourly wage between the new and the former job of employee i and Q_i is a vector of the 19 reason-to-quit variables. X_i is a vector of other explanatory variables, containing the change in the number of hours worked, tenure, tenure-squared, experience, experience-squared, and dummies for gender, minority, partner, children, educational levels, and former and new industry.¹¹

The results of the estimation of equation (1) reported in Table 7.3 square well with the findings of previous studies. In line with Keith and McWilliams (1997), but in contrast to Loprest (1992), we find no evidence of a smaller wage effect of a job change for females. On the contrary, after the inclusion of the reasons-to-quit variables, the coefficient on the female dummy turns positive. Wage growth is positively related to the level of education, as in Connolly and Gottschalk (2000), Lima (2004), and Villanueva (2004), using data on US, Portuguese, and German workers, respectively. Employees with a partner obtain a significantly smaller wage increase

¹¹Elimination of constant characteristics from the set of explanatory variables turns out not to affect the results.

Table 7.3: The effects of the reason-to-quit variables on wage growth (OLS)

Variables	Reasons to quit excluded		Reasons to quit included	
	Coefficient		Coefficient	
Constant	0.112	(0.019)***	0.054	(0.021)**
Female	0.000	(0.006)	0.011	(0.006)*
Minority	0.012	(0.014)	0.002	(0.014)
Married	-0.022	(0.007)***	-0.017	(0.007)**
Children	0.006	(0.006)	0.008	(0.007)
Medium education	0.021	(0.012)*	0.021	(0.012)*
Higher voc. education	0.044	(0.012)***	0.048	(0.012)***
University	0.040	(0.013)***	0.046	(0.013)***
<i>Reason to quit:</i>				
Threat of restructuring			-0.009	(0.004)**
Threat of losing job			-0.009	(0.004)**
Contract duration			0.004	(0.003)
Rewards			0.027	(0.003)***
Financial prospects			0.014	(0.003)***
Work pressure			-0.012	(0.003)***
Facilities at work			0.001	(0.005)
Physical working conditions			-0.001	(0.004)
Job duties			0.003	(0.002)
Future job duties			0.001	(0.002)
Education / training			-0.002	(0.003)
Atmosphere at work			0.001	(0.002)
Contractual hours			0.008	(0.004)**
Work vs private life			-0.007	(0.003)***
Commuting time			-0.003	(0.002)
Personnel management			0.002	(0.003)
Management of the organisation			-0.001	(0.003)
Style of leadership			0.002	(0.003)
Autonomy / responsibility			0.010	(0.002)***
Observations	6,115		6,115	
R ²	0.076		0.118	

Data source: BZK, Mobiliteitsonderzoek 2002.

Standard errors in parentheses.

* significant at the 0.10 level. ** significant at the 0.05 level. *** significant at the 0.01 level.

Also included, but not reported, were the change in the number of working hours, tenure, tenure-squared, experience, experience-squared and dummies for the former and new sector of employment.

than singles. Villanueva (2004) reports a marriage effect of similar magnitude.

The reason-to-quit variables are jointly significant at the 0.01 level, and several are individually significant as well. We find that the threat of an employer-initiated separation leads to significantly smaller wage growth. This is in line with evidence that job changers who quit obtain larger wage increases than job changers who are laid-off or discharged (McLaughlin, 1991, Keith and McWilliams, 1997). However, we can not rule out that this result is caused by a (small) number of actual layoffs and discharges in the sample. This suspicion is reinforced by the finding that the effect becomes insignificant if we restrict the sample to the survey among employees who left a public sector job (recall that this survey explicitly asked workers whether they quit their job or were displaced).

In line with Akerlof et al. (1988), we find that employees leaving their job out of dissatisfaction with pecuniary rewards obtain relatively high wage growth. The specification of the reason-to-quit variables implies that an employee for whom rewards was the most important reason to quit obtains a wage increase which is 10.8 percentage points higher than an employee for whom rewards were not important in the decision to quit.

Responsibility and autonomy are also being rewarded, as employees complaining about this job aspect receive significantly larger wage increases. Predictions of both theory and previous empirical work are mixed. Efficiency wage theory predicts a positive relation between employees' autonomy and wages, while the theory of compensating differentials suggests that employees may be willing to give up a fraction of their income in return for more autonomy (see e.g. Dur and Glazer, 2004). In line with our result, some authors find a negative relation between supervision and pay (Krueger, 1991, Kruse, 1992, Rebitzer, 1995), while some find a positive relation (Smith et al. 1997), and others find no relation (Leonard, 1987, Brunello, 1995). Similarly, Brown and Sessions (2002) report a positive relation between supervisors' pay and the number of supervisees, but Frey and Kucher (1999) find no effect of the number of subordinates on supervisors' wages.

Somewhat surprising is the positive relation between a quit for the number of hours worked and the wage change. Inspection of the data reveals that workers for

whom the number of hours worked was important in their decision to quit on average increase the number of hours worked, but variation is large.

Lastly, dissatisfaction with work pressure or with the combination of work and private life appears to induce workers to accept significantly smaller wage growth. The specification of the reason-to-quit variables implies that the difference between the wage growth of an employee for whom work pressure was the most important reason for quitting and an employee who had no problem with work pressure is 4.8 percentage points, about half of the average wage increase in the sample. This is close to estimates by Villanueva (2004), using data from the German Socio-Economic Panel. He finds that job movers who indicate that their work load has worsened obtain 5 percent higher wage growth, whereas an improvement of work load yields 3 percent smaller wage growth, both relative to workers without a change in work load.

Overall, the findings presented in this section fit reasonably well into the previous literature on the relation between wages and workers' evaluation of different job aspects. This bolsters our confidence that the findings in the next section extend beyond the population under study here. The next section shows that workers' evaluation of job aspects not only affects their wage, but also their decision on where to (seek) work.

7.5 Where to go?

7.5.1 Intra- vs interindustry mobility

The theory of job shopping postulates that workers are uncertain about their valuation of jobs (Johnson, 1978, Jovanovic, 1979). By spending time on a job, workers learn their true valuation of the job. As such, a job is an experience good. A separation occurs when it becomes clear that the match between the worker's preferences or productivity and the conditions of the job is bad. At this point, the worker is still clueless about his valuation of other jobs, and, hence, randomly applies for a new position. This theory explains several empirical findings, including the positive relation between tenure and wages in cross-sectional data and the relatively high

turnover frequency of workers early in their career.

Yet, it is hard to imagine that working in one job provides no information on at least some aspects of other jobs in the economy. The information a worker obtains in the current job extends in particular to similar jobs within the industry. University professors know that the job duties of a position at another university will include a mix of teaching, research, and management tasks, despite lacking the experience of working at this university. In general, when the jobs within an industry open to a specific worker have one or more job characteristics in common, working in one job yields information on the other jobs. Then, workers' expectations of other jobs in the industry are affected by their valuation of certain job aspects in their current job. This implies that a bad experience with a job aspect correlated among jobs within the industry makes a change in industry more likely. Hence, workers' experience in a job not only influences the decision to stay in or leave the job, but also the decision to stay in or leave the industry.

A priori, it is unfeasible to create an indisputable division of the 19 job aspects listed as potential reasons for quitting into correlated and independent features of jobs within an industry. Yet, it can be argued that some job aspects are more influenced by the industry than others. For instance, atmosphere at work and commuting time are largely determined by the organisation and the worker, and are unlikely to be related among jobs within an industry. Other job aspects, such as job duties, rewards, and working conditions, are more likely to be related among the subset of jobs within an industry open to a single worker. Intuitively, working in one hospital provides a decent indication of job duties and salary at other hospitals, but may be less informative about the atmosphere at another hospital. Hence, we would expect that workers quitting for atmosphere at work or commuting time are more likely to stay in the industry than workers who quit for job duties, rewards, or working conditions.

The information on workers' reasons to quit provides us with the opportunity to test this prediction. For that matter, we explore the differences in the reasons to quit of stayers, movers and leavers. These employees all quit jobs in public sector

industries, but only stayers have taken a new job in the same industry.¹² Table 7.4 shows the results of a logistic regression of the reasons to quit on the decision to stay in or leave the industry of employment. The dependent variable is 0 if the respondent is a stayer, and 1 if the respondent is a mover or a leaver. Hence, a positive coefficient implies a positive relation between the variable and the probability that a respondent leaves the industry, whereas a negative coefficient implies that the variable increases with the probability that a respondent stays in the industry.

From Table 7.4, we conclude that workers' reasons to quit indeed affect their decision to stay in or leave the industry. The arising pattern supports the argument that workers update their expectations of specific aspects of other jobs in the industry. Workers who quit for pay, work pressure, working conditions, or job duties are more likely to move to another industry. These job aspects are likely to be partially determined by the industry, as it seems unlikely that moving to a similar job yields substantially higher pay, radically different job duties, or more favourable working conditions. Therefore, moving to another job within the industry may not suffice to improve upon these job aspects. By contrast, a quit for training opportunities, atmosphere at work, the number of hours worked, or commuting time decreases the probability that the worker moves to another industry. Arguably, these job aspects are primarily determined by the organisation and the worker, and are hardly influenced by the industry. Somewhat puzzling are the positive coefficients on management and leadership. Possibly, management style varies less within an industry than across industries.

Overall, the findings in Table 7.4 suggest an extension of the theory of job shopping. By forming a match, workers not only obtain information on their own job, but also on certain aspects of other jobs in the industry. Hence, workers' experience on the job not only aides them in deciding whether to stay in or leave the job, but also in deciding where to go.

¹²The lack of data on employees who change jobs within the private sector hinders a similar estimation for industries in the private sector.

Table 7.4: Reasons to stay in or leave the industry

Variables	Coefficient	
Dependent variable: 0 = stayer 1 = mover or leaver		
Constant	2.702	(0.434)***
Female	-0.071	(0.083)
Minority	0.284	(0.197)
Married	0.015	(0.094)
Children	-0.143	(0.085)*
Medium education	-0.215	(0.189)
Higher voc. education	-0.533	(0.192)***
University	-0.190	(0.208)
Log hourly wage old job	-0.353	(0.130)***
<i>Reason to quit:</i>		
Threat of restructuring	-0.003	(0.056)
Threat of losing job	0.048	(0.056)
Contract duration	-0.076	(0.041)*
Rewards	0.096	(0.036)***
Financial prospects	0.095	(0.034)***
Work pressure	0.099	(0.034)***
Facilities at work	-0.020	(0.069)
Physical working conditions	0.138	(0.054)**
Job duties	0.141	(0.028)***
Future job duties	0.115	(0.030)***
Education / training	-0.171	(0.044)***
Atmosphere at work	-0.079	(0.029)***
Contractual hours	-0.119	(0.058)**
Work vs private life	-0.026	(0.036)
Commuting time	-0.193	(0.034)***
Personnel management	0.040	(0.035)
Management of the organisation	0.212	(0.035)***
Style of leadership	0.081	(0.032)**
Autonomy / responsibility	-0.021	(0.031)
Observations	4,282	
Loglikelihood	-2,388.663	
Nagelkerke's R ²	0.315	
<i>Control variables only:</i>		
Loglikelihood	-2,528.778	
Nagelkerke's R ²	0.247	

Data source: BZK, Mobiliteitsonderzoek 2002.

Standard errors in parentheses.

* significant at the 0.10 level. ** significant at the 0.05 level. *** significant at the 0.01 level

Also included, but not reported, were the number of working hours, tenure, tenure-squared, experience, experience-squared, and dummies for the former sector of employment.

7.5.2 Workers' reasons to leave the public sector

The information on the reasons for quitting can also be used to determine which job aspects drive workers out of the public sector. Thereby, we get an indication of the job aspects that need attention if retention rates are to be improved. By regrouping the respondents, we can use the same method as in the previous subsection. Stayers and movers have changed jobs within the public sector, whereas leavers have moved from a public sector job to a job in the private sector. Table 7.5 reports the result of a logistic regression where the dependent variable is 0 if the respondent is a stayer or a mover, and 1 if the respondent is a leaver.

We find that employees who quit their public sector job out of dissatisfaction with rewards, financial prospects, or management are more likely to move to a job in the private sector. Similar, but somewhat less strong effects are found for physical working conditions and future job duties. This resembles the reasons given by UK workers for their exit from the public sector (Audit Commission, 2002). Employees with children are less likely to leave the public sector, suggesting that it is easier to combine the care for children with working in the public sector than with working in the private sector. Likewise, Table 7.5 suggests that the public sector offers better conditions regarding the opportunities for education and training than the private sector. These findings are an indication of the relative strengths and weaknesses of public sector jobs. Yet, a similar analysis among private sector workers is needed for a more conclusive comparison between public and private sector jobs.

The relatively high discontent with management among workers who leave the public sector may be related to Dixit's (2002) observation that public agencies often face multiple principals. When the management of a public agency is unable to translate the diverse interests and pressures of the principals into a clear organisational goal and consistent objectives, workers may lose confidence in their management's capacities. Private firms are less prone to pursue conflicting goals, as the ultimate objective of a private firm is to generate shareholder value.

Table 7.5: Reasons to stay in or leave the public sector

Variables	Coefficient	
Dependent variable: 0 = stayer or mover 1 = leaver		
Constant	-2.217	(0.557)***
Female	-0.229	(0.105)
Minority	0.197	(0.231)
Married	0.078	(0.118)
Children	-0.280	(0.106)***
Medium education	0.113	(0.206)
Higher voc. education	-0.392	(0.220)*
University	-0.214	(0.240)
Log hourly wage old job	0.171	(0.167)
<i>Reason to quit:</i>		
Threat of restructuring	-0.024	(0.075)
Threat of losing job	-0.045	(0.079)
Contract duration	-0.117	(0.059)**
Rewards	0.153	(0.042)***
Financial prospects	0.131	(0.041)***
Work pressure	-0.015	(0.048)
Facilities at work	-0.015	(0.089)
Physical working conditions	0.132	(0.071)*
Job duties	0.008	(0.036)
Future job duties	0.092	(0.038)**
Education / training	-0.178	(0.065)***
Atmosphere at work	-0.029	(0.038)
Contractual hours	-0.074	(0.084)
Work vs private life	-0.063	(0.050)
Commuting time	-0.380	(0.057)***
Personnel management	0.121	(0.042)***
Management of the organisation	0.154	(0.041)***
Style of leadership	0.108	(0.039)***
Autonomy / responsibility	0.013	(0.039)
Observations	4,282	
Loglikelihood	-1,649.991	
Nagelkerke's R ²	0.180	
<i>Control variables only:</i>		
Loglikelihood	-1,747.911	
Nagelkerke's R ²	0.109	

Data source: BZK, Mobiliteitsonderzoek 2002.

Standard errors in parentheses.

* significant at the 0.10 level. ** significant at the 0.05 level. *** significant at the 0.01 level

Also included, but not reported, were the number of working hours, tenure, tenure-squared, experience, experience-squared, and dummies for the former sector of employment.

Table 7.6: Reasons to quit and the wage growth of intra- and interindustry job movers

Variables	Reasons to quit excluded		Reasons to quit included	
	Coefficient		Coefficient	
Movers	0.007	(0.008)	0.002	(0.007)
Leavers	0.016	(0.009)*	0.001	(0.009)
Reasons to quit	NO		YES	
Observations	4,282		4,282	
R ²	0.088		0.125	

Data source: BZK, Mobiliteitsonderzoek 2002.

Standard errors in parentheses.

* significant at the 0.10 level. ** significant at the 0.05 level. *** significant at the 0.01 level.

Except for the dummies for the new sector of employment, all variables included in the specifications of Table 6.3 are also included here.

7.5.3 The wage effects of a change in industry

Section 7.4 analysed the effect of workers' reasons for quitting on their wage development, without examining directly the effect of a change in industry. By exploring differences in wage growth between stayers, movers, and leavers, we can compare the wage growth of intra-industry job movers (stayers) to the wage growth of interindustry job movers (movers and leavers). Table 7.6 presents the differences in wage growth between intra- and interindustry job movers, both with and without controlling for workers' reasons for quitting.¹³ The estimation without the reason-to-quit variables indicates that leavers obtain on average a significantly larger wage increase than stayers. Lima (2004) reports a wage premium for a change in industry of similar magnitude in a large sample of Portuguese workers. However, the second column of Table 7.6 makes clear that the differences in wage growth between stayers, movers, and leavers are fully explained by differences in the reasons for quitting the initial job. Hence, we conclude that neglecting workers' reasons to quit may yield incorrect estimates of the effect of a change in industry on wage growth.

¹³The difference with the estimations in Table 7.3 is that the dummies for the new industry of employment have been replaced by dummies for movers and leavers, with stayers as base category.

Data limitations prevent differentiating between workers entering, leaving, and staying in specific industries. Studies using matched employer-employee data have shown that unobserved worker heterogeneity explains most of the interindustry wage differentials (Abowd et al., 1999, Goux and Maurin, 1999). Relatedly, McLaughlin and Bils (2001), who find that workers leaving declining industries and workers entering growing industries tend to have higher wage growth than their new colleagues who did not change industry, conjecture that *“the wage changes of interindustry movers could be [explained] by an extension to compensating wage differentials for industry attributes”* (p. 131). Although on a more aggregate level, the results in Table 7.6 confirm that differences in wage growth between intra- and interindustry job movers may be explained by heterogeneous preferences for industry-specific components of job characteristics.

7.6 Conclusions

Analysing data from a survey of public sector workers in the Netherlands, this chapter has shown that job movers' experience in their initial job affects their decision to stay in or leave their industry of employment. When pay, work pressure, working conditions, job duties, or management are important in the decision to quit, workers are more likely to move out of their industry. By contrast, a quit for the atmosphere at work, commuting time, the opportunities for training, or working hours makes a change in industry less likely. This suggests that workers use their experience in the initial job to update their expectations on other jobs in the industry, as the first set of job aspects is more likely to be related among jobs within an industry than the latter. Moreover, we show that different motives for quitting lead to differences in wage growth, as the apparent wage premium of interindustry job movers relative to intra-industry job movers vanishes once workers' reasons to quit are controlled for. Lastly, we find that many workers who quit out of dissatisfaction with pay or management leave the public sector altogether. Hence, improvement of these job aspects should receive priority if employee turnover in the public sector is to be reduced.

A similar, but economy-wide survey of job movers would improve the analysis of the effects of workers' reasons for quitting. With the addition of job movers within the private sector, an analysis of the relatively attractive and repulsive aspects of public and private sector jobs would be feasible. Moreover, a larger sample size would enable us to assess the main reasons for entering and leaving specific industries. As called for by McLaughlin and Bils (2001), this may facilitate the estimation of industry attributes and their effect on workers' wages.

Chapter 8

Summary and directions for further research

The starting point of this thesis has been the premise that people not solely work for money, and that working is not an altogether dreadful experience. Although many people will agree with this statement, economic models of human behaviour at the workplace often assume exactly the opposite. Applying the techniques used in standard economic analysis, this thesis has examined the implications of heterogeneity in the intrinsic motivation of workers for optimal monetary incentive schemes and for the recruitment and selection of employees. Furthermore, the thesis has looked into the relation between workers' satisfaction with various aspects of their job and their decision whether or not to search for another job, and if so, where to look for or take up a new position. Here, we summarise the main findings and give some suggestions for further research.

8.1 Summary

In Chapters 2 to 5, we have looked at optimal monetary incentive schemes and the recruitment and (self-)selection of employees when workers differ in intrinsic motivation. In Chapter 2, we have started by showing that firms value intrinsically motivated workers. At a given level of monetary incentives, motivated workers provide more effort than non-motivated workers. Moreover, since motivated workers

derive utility from working, they are willing to provide a given level of effort in exchange for a lower wage than non-motivated workers. Thus, the stronger a worker's motivation, the lower the wage needs to be to attract the worker. Hence, the recruitment of intrinsically motivated workers can yield both higher productivity and lower wage cost for a firm.

However, since intrinsically motivated workers obviously prefer to receive a high wage, they may want to hide their motivation from the firm, so as to increase their wage. This makes the recruitment of highly motivated personnel difficult. In Chapter 2, we have constructed a model where workers differ in their intrinsic motivation to work for a particular firm. We have studied how the firm can use the wage scheme to recruit a highly motivated worker when the firm is uncertain about the level of motivation of potential hires. We have argued that in order to attract any applicants at all, the firm must credibly promise not to extract all motivational rents from the hiree, by committing to a minimum wage. For without this commitment, workers know that the firm would fully exploit their intrinsic motivation through a reduced wage offer. We have shown that the optimal level of the minimum wage depends on whether or not the firm can observe the level of intrinsic motivation of applicants during the selection process. If the firm can observe the level of intrinsic motivation of applicants, it always picks the best-motivated applicant, and the optimal minimum wage is given by a trade-off between wage cost and the probability of getting at least one applicant. If motivation is not observable, the firm has to choose one of the applicants randomly. This gives the firm an incentive to discourage low-motivation workers from applying, by setting a lower wage. This prediction is in line with evidence that firms that have extensive screening procedures pay higher wages (Huang and Cappelli, 2006).

Chapter 3 has examined the effect of intensifying competition between firms when workers differ in intrinsic motivation, by comparing a market served by one public agency to a perfectly competitive market where multiple firms offer jobs with similar intrinsic qualities. In recent decades, we have witnessed many cases of liberalisation and privatisation, often inspired by the (perceived) inefficiency of public organisations. Surveys of the empirical literature find that liberalisation and

privatisation generally lead to higher productivity, lower employment, and higher wages for the retained workers (Megginson and Netter, 2001, Kikeri and Nellis, 2002). These effects are often attributed to the strengthening of monetary incentives after liberalisation (Megginson et al. 1994). Relatedly, Burgess and Metcalfe (1999) find that public organisations provide their workers with weaker financial incentives than comparable private organisations. Competition from private organisations has shown to strengthen incentives and to increase wages in the Swedish health care sector (Hjertqvist, 2001) and at public schools in the US (Hoxby, 1994, 2002).

In Chapter 3, we distinguish between high- and low-motivation workers, and assume that there are insufficiently many high-motivation workers to serve demand. Firms in a competitive market compete for the best-motivated workers, as these are willing to exert more effort and, hence, are more productive. This competition drives wages up to the point where workers fully obtain the value of their production. Before liberalisation, the public agency is the only organisation that offers jobs with intrinsic qualities and, therefore, it has monopsony power over the high-motivation workers. As workers' motivation is not observable, the public agency cannot make contracts contingent on motivation, implying that it must leave some motivational rents to the high-motivation workers. Otherwise, high-motivation workers would pretend to be low-motivation workers. However, Chapter 3 has shown that its monopsony power enables the public agency to extract part of the motivational rents, by providing weaker incentives than firms in competition, which is in accordance with the empirical evidence. Weaker incentives lead to lower productivity, lower wages, and higher employment. The public monopsonist also has lower wage cost than firms in a competitive market, implying that it can charge a lower price. It follows that only the high-motivation workers benefit from liberalisation, as they get to keep all motivational rents. The remainder of society loses as a result of the price increase.

Chapter 3 has shown that the provision of weak incentives by public organisations need not be a sign of inefficiency, but rather can be a means to reduce wage cost when workers differ in intrinsic motivation. However, as argued by Lazear (1986), weak incentives are also attractive to less productive workers. A stereotype view of civil

servants suggest that some public sector workers indeed provide little effort. Besides the popular image of the dedicated civil servant, another depiction of civil servants, abounding in jokes and stories, is that of the lazy, incompetent bureaucrat who only cares about forms and coffee. This is reflected in surveys among US citizens, which find that people tend to be negative about bureaucrats and bureaucracy in general, although they are more positive about specific civil servants and agencies (Katz et al., 1975, Goodsell, 1985).

In Chapter 4, we have studied which worker types are attracted by a public agency when workers not only differ in their intrinsic motivation to work for the agency, as in Chapter 3, but also differ in general productivity. More specifically, we have assumed that low-motivation workers come in two types, lazy and regular workers, where lazy workers have higher cost of providing effort than regular workers. Workers can choose to work for the public agency or in a competitive private sector. Chapter 4 has shown that when there are insufficiently many motivated workers, the public agency prefers to attract lazy rather than regular workers to work alongside the motivated workers. Moreover, it optimally provides the lazy workers with weaker incentives than private firms. Thereby, the public agency can extract more motivational rents from motivated workers (i.e. offer a lower wage per unit of effort). The optimal contract for a lazy worker has a lower wage and lower effort requirement than the optimal contract for a regular worker. This implies that for motivated workers, pretending to be not motivated is less appealing when it yields a contract designed for a lazy worker. Hence, Chapter 4 has argued that the laziness of bureaucrats may be a sign of efficiency.

Chapter 5 has examined how the system of health care provision affects the allocation of patients to physicians when some physicians intrinsically care about patients' welfare. In many countries, physicians have to take a modern version of the Oath of Hippocrates, in which they pledge to act in their patients' interest. In Chapter 5, we have constructed a model where patients differ in income and where altruistic physicians enjoy improving the utility of their patients, in contrast to regular physicians. Patients can receive treatment for free in a National Health Service, and physicians working in the NHS have to adhere to a minimum treatment

quality.

We have shown that allowing for private provision of health care parallel to the NHS benefits both rich and poor patients. Rich patients are better off because they are able to buy high-quality treatment in the private sector. Altruistic physicians then face the choice between treating patients who already obtain high-quality treatment in the private sector and helping patients who otherwise receive (relatively) low-quality treatment in the NHS. They optimally decide to work in the NHS, because they can have a larger impact on NHS patients' utility. This implies that poor patients also benefit from allowing for private provision of health care, as the withdrawal of the rich implies that the remaining patients in the NHS have a higher probability of receiving the superior treatment provided by altruistic physicians. Chapter 5 has also shown that this mechanism increases the scope for subsidising private provision of health care, as a subsidy increases the number of patients who leave the NHS. Conversely, allowing physicians to transfer NHS patients to their private practice (if this is mutually beneficial) is shown to be harmful for the poorest patients, by increasing the number of patients who (at least initially) opt for treatment in the NHS.

In Chapters 6 and 7, we have studied how workers' own assessment of various aspects of their job affects both whether and where they would like to obtain another position. Chapter 6 has examined search behaviour, using data from a survey among employees in the Dutch public sector. All respondents had to state their satisfaction with various job domains and their job search intensity. In line with Freeman (1978) and Clark (2001), we have shown that both for satisfaction with the job overall as well as for satisfaction with almost all job domains, more satisfied workers are less likely to search for another job.

The survey also asked job seekers whether they searched within their current organisation, within the industry, or outside the industry, and they had to indicate the importance of 19 job domains in their decision to search. In Chapter 6, we have established an intuitive relation between workers' reasons for searching and the direction of their search efforts. Workers try to leave their current organisation when they want to improve upon a job domain that varies little across jobs within an

organisation, like management or commuting time. Conversely, problems with a job domain that differs more across jobs within an organisation, such as autonomy, are more likely to induce workers to search within their organisation. Workers attempt to leave their industry when they feel uncomfortable with a job domain that may have an industry-specific element, like job duties. We have argued that this indicates that workers use information about their own job and other jobs in their organisation and industry to infer both whether and where they may find a job that better suits their preferences.

Whereas Chapter 6 is based on a survey among employees who stayed in their public sector job throughout 2002, in Chapter 7 we have used data from an equivalent survey among employees who entered or left an organisation in the Dutch public sector in 2001. Respondents had to indicate the importance of 19 job domains in their decision to leave their former job. In line with Akerlof et al. (1988), non-pecuniary job aspects like job duties, management, and autonomy are more often mentioned than pecuniary job aspects. In Chapter 7, we have examined the relation between workers' reasons to quit and their decision to take up another job within the same industry, in another part of the public sector, or in the private sector.

We have shown that when workers leave their job because of a job aspect that may have an industry-specific component, like (future) earnings, work pressure, or job duties, they are more likely to leave their current industry of employment. Conversely, problems with contractual hours, opportunities for training, or commuting time induce workers to take up another job within their industry. The main reasons to quit of workers who leave the public sector altogether are pay and management. Chapter 7 has also shown that workers' reasons to quit affect their wage growth. Wage growth is significantly higher for workers who quit their job out of dissatisfaction with their rewards or their autonomy, whereas workers who quit for work pressure or work-life balance put up with significant lower wage growth. Moreover, Chapter 7 has shown that the difference in (average) wage growth between intra- and interindustry job movers can be fully explained by differences in the reasons for quitting.

8.2 Directions for further research

In Chapters 2 to 5 of this thesis, we have assumed that the level of intrinsic motivation of a specific worker to work in a certain job is fixed. One direction of further research is to abandon this assumption and acknowledge that intrinsic motivation can be subject to change, for two reasons. First, workers may be uncertain about their intrinsic motivation to work in a certain job. Initially, a worker may have limited information about the intrinsic qualities of a new job. In various ways, the worker may learn about the attractiveness of the work. Along these lines, Benabou and Tirole (2003) argue that if the principal has better information about the work than an employee, then the provision of strong monetary incentives may be interpreted by the employee as a signal that the work is dreadful, which leads to a downward adjustment in her (expected) intrinsic motivation. Similarly, the attitude of co-workers and clients and the intensity of monitoring by management may also yield information about the intrinsic qualities of the job.

Second, the level of intrinsic motivation may be directly affected by other aspects of the job. Experiments in psychology have shown that the provision of a monetary reward may reduce individuals' intrinsic motivation to perform a task, see e.g. Deci (1971). Similarly, workers can become more enthusiastic about their job through involvement in decision-making, after an increase in autonomy, or from the introduction of teamwork. As argued in the Concluding remarks of Chapter 4, we have abstained from interaction effects between differently motivated colleagues. However, it is certainly conceivable that enthusiastic co-workers are inspiring, while working with grumbling colleagues is depressing, as in Stowe (2002). Another job aspect that may affect intrinsic motivation is task assignment. For instance, a recurrent complaint among workers in Dutch hospitals and nursing homes is the reduction in time available for social interaction with patients and clients, caused by personnel shortages or strict time-management. If employees intrinsically value giving attention to patients, then limited opportunities for doing so reduce their enjoyment of working, causing lower effort and high turnover. This research area seems particularly well-suited for conducting (field) experiments.

Another interesting direction for future work is the interplay between intrinsic

motivation and career advancement. In many organisations, job duties change when a worker progresses through the ranks. This implies that workers who enjoy the tasks performed at the field level may have mixed feelings about a promotion. Moreover, after landing a higher-level position, these workers have an incentive to stay involved in field-level tasks, even if this comes at the expense of more important tasks. For instance, a dean who once started his career out of love for doing research may be unwilling to spend most of his time managing the school, which may be detrimental for the research output of the whole school. These considerations are important for designing the hierarchical structure of an organisation, for determining the rules and standards for promotion, and for task assignment. Recently, DeVaro and Samuelson (2004) make an argument along these lines to explain the finding that workers in non-profit firms are less likely to receive promotions than workers in for-profit firms. Since non-profits are particularly attractive to people who intrinsically share the goals of the organisation, non-profits have less need for promotions as an external incentive.

In the coming years, economic research using subjective data will continue to grow. One particularly interesting question is whether regularities found in the literature using objective data are also present in subjective data. For instance, the literature on industry wage differentials has shown that workers in some industries obtain significantly higher wages than seemingly identical workers in other industries (see Krueger and Summers, 1988). Similarly, Brown and Medoff (1989) show that large firms tend to pay higher wages than smaller firms, and Borjas (2003) finds that the wage structure is more compressed in the public sector than in the private sector. Careful analysis using workers' subjective assessment of their job may tell us whether workers who receive 'inexplicable' high wages are really better off, or are merely compensated for high work pressure and other discomforting features of their job. An original approach is taken by Clark (2003). He compares industrial wage differentials to industry 'satisfaction differentials', where the latter is the unexplained variation in job satisfaction across industries after controlling for a set of worker and job characteristics. It turns out that high-wage industries need not be high-satisfaction industries and vice versa.

Samenvatting

(Summary in Dutch)

Introductie

Werk is voor veel mensen niet alleen de belangrijkste bron van inkomsten, maar behoort ook tot de voornaamste activiteiten in hun leven. In economische modellen die menselijk gedrag op de werkvloer beschrijven, worden werknemers traditioneel afgeschilderd als opportunistische, luie wezens die iedere mogelijkheid om zich te onttrekken aan het leveren van inspanning met beide handen aangrijpen. Alleen een financiële beloning kan werknemers ertoe aanzetten naar het werk te gaan en zich daar nuttig te maken. Taken die niet strikt noodzakelijk zijn of niet in de functieomschrijving staan, worden niet uitgevoerd en voor iedere minuut overwerk eisen werknemers (financiële) compensatie.

Weinig mensen zullen zich herkennen in het hierboven geschetste beeld. Werk is meer dan een bron van inkomsten. Veel mensen zijn trots op hun werk of vinden het (tot op zekere hoogte) leuk om te werken. In een enquête onder de Amerikaanse beroepsbevolking gaf 70 procent van de ondervraagden aan ook door te gaan met werken als ze voldoende geld zouden hebben om comfortabel van te kunnen leven (Quinn en Staines, 1979). In een andere enquête werd door 95 procent van de Amerikaanse ondervraagden geclaimd dat ze zelfs hard zouden werken als hun baas hen niet kon controleren (Minkler, 2004). De belangrijkste reden die men hiervoor gaf was *“I enjoy my work”*. Enquêtes onder managers laten zien dat managers zich bewust zijn van het feit dat werknemers ook met niet-financiële middelen te motiveren zijn (Agell en Lundborg, 1999, Bewley, 1998). Deze bevindingen suggereren

dat het standaard economische model een (potentieel belangrijk) element van werk mist.

Psychologen en sociologen daarentegen gaan wel uit van de brede invloed die werk heeft op het leven van mensen. Werk biedt mensen de mogelijkheid een sociale positie te verwerven en zichzelf te ontwikkelen (Maslow, 1970). Daarnaast beweren psychologen dat ‘intrinsieke motivatie’ ten grondslag ligt aan een groot gedeelte van de gedragskeuzes die mensen maken. Met andere woorden, veel gedrag wordt gedreven door interne motieven, zonder dat er externe prikkels voor nodig zijn (DeCharms, 1968). Dit betekent dat mensen die intrinsiek gemotiveerd zijn om te werken, bijvoorbeeld omdat ze plezier hebben in hun werk, harder zullen werken dan wordt voorspeld door het standaard economische model. Dit is natuurlijk van belang voor bedrijven. Als werknemers verschillen in intrinsieke motivatie om bij een bepaald bedrijf te werken, dan zijn de prestaties van het bedrijf afhankelijk van de mate waarin het bedrijf in staat is om goed gemotiveerd personeel te werven.

Werknemers kunnen dus geïnteresseerd zijn in alle facetten van hun baan, in plaats van slechts in het salaris. In dit proefschrift staat het belang dat werknemers toekennen aan de niet-financiële aspecten van hun baan centraal. Het proefschrift bestudeert de implicaties van intrinsieke waardering van werk voor de (optimale) beloningsstructuur binnen een bedrijf en voor de werving en selectie van personeel. Daarnaast analyseren we, aan de hand van enquêtes, de relatie tussen de tevredenheid van werknemers met verschillende (financiële én niet-financiële) aspecten van hun baan en de beslissing of en wáár op zoek te gaan naar een nieuwe baan.

Hieronder gaan we kort in op de belangrijkste elementen in de analyse: intrinsieke motivatie, financiële prikkels en selectie-effecten, en de relatie tussen de tevredenheid van werknemers met hun baan en personeelsverloop. Daarna volgt een overzicht van de hoofdstukken van dit proefschrift.

Intrinsieke motivatie op de werkvloer

Mensen kunnen om veel redenen intrinsiek gemotiveerd zijn om inspanning te leveren op het werk. Werken kan mensen het gevoel geven dat ze een substantiële bijdrage leveren of dat ze moeilijk gemist kunnen worden. Het helpen van collega's of klanten kan bevredigend zijn en meewerken aan een ‘goed’ doel of project kan

inspirerend werken. Wat de reden ook is, mensen die intrinsiek nut ontleen aan hun werk zullen zich daarvoor inspannen, zelfs als er nauwelijks of geen financiële prikkels zijn.

In principe kan iedere baan intrinsieke motivatie oproepen, afhankelijk van de preferenties van de werknemer. Banen in het onderwijs of in de gezondheidszorg worden vaak genoemd als voorbeelden van banen waarvoor mensen intrinsiek gemotiveerd kunnen zijn, met name omdat werknemers in dit soort banen direct invloed hebben op het leven en de vooruitzichten van patiënten en scholieren. Natuurlijk zal het soort baan waarvoor iemand gemotiveerd is per persoon verschillen. Mensen met hoogtevrees zullen weinig intrinsieke motivatie hebben om te werken als glazenwasser, vegetariërs zullen weinig plezier ontleen aan een baan als slager en mensen met hooikoorts gaan niet graag als tuinman aan de slag. Het niveau van intrinsieke motivatie wordt dus bepaald door de combinatie van baan en werknemer.

De baten van intrinsiek gemotiveerde werknemers voor een bedrijf zijn duidelijk. Besley en Ghatak (2005), Francois (2000), Glazer (2002) en hoofdstuk 2 van dit proefschrift laten zien dat intrinsiek gemotiveerde werknemers harder werken en genoeg nemen met een lagere beloning voor hun inspanningen dan ongemotiveerde werknemers. Om hiervan te profiteren moet het bedrijf natuurlijk wel eerst in staat zijn om gemotiveerde werknemers aan te trekken. Anders dan met bepaalde vaardigheden het geval is, is intrinsieke motivatie moeilijk meetbaar. Hierdoor is de werving en selectie van gemotiveerd personeel geen eenvoudige klus. Hoewel bedrijven tijdens de sollicitatieprocedure kunnen proberen om een indruk te krijgen van de intrinsieke motivatie van een sollicitant, zal deze indruk nooit perfect zijn. Bovendien kunnen sollicitanten proberen om intrinsieke motivatie te simuleren of verbergen. De problemen die spelen bij de werving en selectie van personeel als mensen verschillen in intrinsieke motivatie is een van de onderwerpen van dit proefschrift.

Financiële prikkels en selectie

Er is weinig twijfel onder economen over de vraag of financiële prikkels effect hebben op het gedrag van mensen in het algemeen en werknemers in het bijzonder. Van stukloon, bonussen en andere vormen van prestatiebeloning wordt verwacht dat

ze werknemers aanzetten tot extra inspanningen. Daarnaast is prestatiebeloning vooral interessant voor productieve werknemers, wat inhoudt dat prestatiebeloning de werving van productief personeel kan vergemakkelijken. Verschillende studies hebben aangetoond dat de productiviteit inderdaad stijgt na invoering van prestatiebeloning, zowel via verhoogde inspanning van werknemers als door het selectie-effect (Lazear, 2000, Prendergast, 1999). Anekdoten over prestatiebeloningen die ongewenste effecten ten gevolg hadden, suggereren ook dat prestatiebeloning leidt tot gedragsveranderingen. Voorbeelden hiervan zijn onderwijzers die voor een examen de antwoorden uitdeelden nadat hun beloning afhankelijk was gemaakt van de examenresultaten van de leerlingen, en typistes die tijdens hun lunchpauze continu dezelfde toets bleven aanslaan nadat hun salaris deels werd gebaseerd op het aantal aanslagen (Kerr, 1975). Kortom, financiële prikkels beïnvloeden gedrag en kunnen, indien verstandig toegepast, leiden tot hogere productiviteit.

Baantevredenheid en mobiliteit

Werknemers gaan op zoek naar een nieuwe baan als ze het gevoel hebben dat ze in staat zijn een betere baan te vinden, en stappen over als de nieuwe baan een hoger (verwacht) nut oplevert dan de huidige baan. In principe kan ieder aspect van de huidige baan, ook een niet-financieel aspect, een motief zijn om te gaan zoeken naar een andere baan. Akerlof et al. (1988) laten zien dat meer Amerikaanse werknemers vrijwillig van baan veranderen vanwege niet-financiële redenen dan vanwege financiële redenen, en dat vrijwel alle overstappers stellen dat ze beter af zijn in hun nieuwe baan. In principe is arbeidsmobiliteit noodzakelijk voor het accommoderen van verschillen in groei tussen bedrijven en sectoren. Echter, voor individuele bedrijven kan personeelsverloop hoge kosten met zich meebrengen, via opleidingskosten en werving- en selectieprocedures. Bedrijven kunnen het personeelsverloop wellicht reduceren als zij inzicht krijgen in de redenen die werknemers hebben om hun baan op te zeggen. Voor sectoren waar een personeelstekort dreigt, zoals de onderwijssector in Nederland (Ministerie van OCW, 2006), kunnen de redenen die werknemers hebben om de sector te (willen) verlaten helpen bij het nemen van maatregelen die het tekort moeten voorkomen of verminderen.

In de economische literatuur over de oorzaken en effecten van arbeidsmobiliteit

is veel aandacht voor objectief meetbare baanaspecten, zoals het salaris. Voor baanaspecten die niet of nauwelijks objectief meetbaar zijn, zoals de inhoud van het werk en de omgang met collega's en het management, is traditioneel minder aandacht. Een alternatief voor objectieve maatstaven is het verzamelen van subjectieve data, door werknemers verschillende aspecten van hun eigen baan te laten beoordelen. In navolging van psychologen maken economen meer en meer gebruik van dit soort subjectieve data (Frijters en Ferrer-i-Carbonel, 2004), voornamelijk omdat is gebleken dat subjectieve data het gedrag van mensen helpt te verklaren. Freeman (1978) laat bijvoorbeeld zien dat de kans dat een werknemer binnenkort ontslag neemt significant groter is voor werknemers die ontevreden zijn met hun huidige baan dan voor tevreden werknemers; Clark (2001) trekt dezelfde conclusie voor het effect van ontevredenheid met bepaalde aspecten van de baan. Het ligt voor de hand dat (on)tevredenheid met verschillende baanaspecten niet alleen invloed heeft op de keuze om al dan niet op zoek te gaan naar een andere baan, maar ook invloed heeft op wáár mensen een nieuwe baan gaan zoeken. Een PhD-student die zich realiseert dat onderwijs en onderzoek niet aan haar besteed zijn, heeft weinig te zoeken op een andere universiteit. De vraag die rijst is: wat is de relatie tussen de redenen die een werknemer heeft om van baan te veranderen en zijn zoekgedrag, zowel wat betreft de intensiteit als de richting van de zoekinspanningen?

Overzicht van het proefschrift

Het centrale thema van dit proefschrift is het belang dat mensen toekennen aan niet-financiële aspecten van werk en het effect daarvan op het gedrag van werknemers en bedrijven. In hoofdstuk 2 tot en met 5 bestuderen we de effecten van heterogeniteit in de intrinsieke motivatie van werknemers op de optimale beloningsstructuur en op de werving en selectie van werknemers. In de hoofdstukken 6 en 7 wordt aan de hand van enquêteresultaten een link gelegd tussen de tevredenheid van werknemers met verschillende aspecten van hun (vorige) baan en hun zoek- en mobiliteitsgedrag.

Hoofdstuk 2 begint met de constatering dat intrinsiek gemotiveerde werknemers productiever zijn dan minder gemotiveerde werknemers en dat ze, omdat ze een

hoger nut ontlene aan werken, bereid zijn te werken voor een lager salaris (zie ook bijvoorbeeld Besley en Ghatak, 2005, en Francois, 2000). Intrinsiek gemotiveerde werknemers zijn dus waardevol voor bedrijven. De werving van intrinsiek gemotiveerd personeel kan echter lastig zijn. Als een bedrijf gemotiveerde werknemers een lager salaris biedt dan ongemotiveerde werknemers, dan hebben de gemotiveerde werknemers een prikkel om hun motivatie te verbergen tijdens de sollicitatieprocedure.

Om de problemen rond de werving en selectie van gemotiveerd personeel te kunnen bestuderen, stellen we in hoofdstuk 2 een model op waarin mensen verschillen in hun intrinsieke motivatie om bij een bedrijf te werken, en waarin het bedrijf onzeker is over de motivatie van potentiële sollicitanten. We laten zien dat het bedrijf moet beloven niet al het extra nut dat gemotiveerde werknemers ontlene aan het werken bij het bedrijf af te romen, door zich vast te leggen op een minimumsalaris (bijvoorbeeld via een CAO), omdat anders niemand solliciteert. Het bedrijf wil dit minimumsalaris natuurlijk laag zetten, maar hoe lager het minimumsalaris, hoe hoger de motivatie van een potentiële werknemer moet zijn om hem te doen solliciteren. Omdat het bedrijf voordat mensen solliciteren niet weet hoe hoog de motivatie van de meest-gemotiveerde persoon is, vergroot een lager minimumsalaris de kans dat er niemand solliciteert. Het optimale niveau van het minimumsalaris is ook afhankelijk van het vermogen van het bedrijf om de intrinsieke motivatie van sollicitanten te observeren. Als intrinsieke motivatie observeerbaar is, dan zal het bedrijf altijd de meest-gemotiveerde sollicitant aannemen. In dat geval wordt het salarisniveau bepaald door de afweging tussen de loonkosten en de kans dat er niemand solliciteert. Als het bedrijf de motivatie niet kan observeren, dan zal het 'blind' één van de sollicitanten moeten kiezen. Het bedrijf wil dan mensen met relatief lage motivatie uit de selectieprocedure weren. Dit kan door een lager minimumsalaris te zetten. Een hypothese die volgt uit dit model is dat bedrijven die beter de intrinsieke motivatie van sollicitanten kunnen inschatten een hoger loon zullen bieden dan bedrijven die de motivatie minder goed kunnen inschatten. Deze voorspelling wordt gesteund door recent onderzoek dat laat zien dat bedrijven die intensieve selectieprocedures hanteren hogere lonen betalen (Huang en Cappelli, 2006).

Privatisering en liberalisering

Hoofdstuk 3 gaat in op de gevolgen van het intensiveren van competitie tussen ondernemingen als werknemers binnen de sector verschillen in intrinsieke motivatie. Gedreven door technologische vooruitgang en een negatief beeld van publieke organisaties zijn de laatste decennia over de hele wereld veel bedrijven geprivatiseerd en veel sectoren geliberaliseerd, vaak tegelijkertijd. Verschillende empirische studies laten zien dat liberalisering en privatisering over het algemeen leiden tot hogere productiviteit, hogere lonen, lagere werkgelegenheid en sterkere financiële prikkels voor het (overgebleven) personeel (Kikeri en Nellis, 2002, Megginson en Netter, 2001). Burgess en Metcalfe (1999) vinden dat publieke organisaties over het algemeen zwakkere financiële prikkels geven dan private organisaties, en stellen dat dit een teken is dat publieke organisaties minder efficiënt opereren. In hoofdstuk 3 beweren wij echter dat zwakke prikkels in de publieke sector een teken van efficiëntie kunnen zijn.

In hoofdstuk 3 vergelijken we de situatie waar het aanbod in een sector wordt verzorgd door één publieke organisatie met de situatie waar meerdere (private) ondernemingen actief zijn, bijvoorbeeld na liberalisering van de sector. Doordat vóór de liberalisering de publieke organisatie de enige werkgever is met banen waarvoor werknemers intrinsiek gemotiveerd zijn, kan de publieke organisatie een gedeelte van het intrinsieke nut van de gemotiveerde werknemers afromen.¹ Na liberalisering zal er concurrentie ontstaan tussen bedrijven om de diensten van de gemotiveerde werknemers, omdat deze productiever zijn. De concurrentie leidt ertoe dat bedrijven geen winst maken op de productie van een werknemer en dus ook geen intrinsiek nut kunnen afromen. In andere woorden, na liberalisering is het loon van een werknemer gelijk aan de waarde van zijn productie. Dit betekent dat werknemers een sterke financiële prikkel hebben om inspanning te leveren, omdat de volledige opbrengst van hun inspanningen aan henzelf toekomt. We laten zien in hoofdstuk 3 dat de publieke organisatie het intrinsieke nut van gemotiveerde werknemers kan afromen door lagere financiële prikkels te geven dan werknemers krijgen op de competitieve

¹Het is niet mogelijk om al het intrinsieke nut af te romen door het salaris afhankelijk te maken van de motivatie van een werknemer, omdat de organisatie de motivatie van werknemers niet kan observeren.

markt (na liberalisering). Zwakkere prikkels leiden tot lagere inspanningen en dus lagere productiviteit, lagere lonen en hogere werkgelegenheid, wat overeenkomt met de bevindingen van de empirische literatuur. Het netto-effect is dat de publieke organisatie lagere loonkosten heeft dan bedrijven op een competitieve markt, wat inhoudt dat de publieke organisatie goedkoper produceert dan de competitieve markt. Het gevolg is dat alleen relatief hooggemotiveerde werknemers baat hebben bij liberalisering. Na liberalisering wordt het intrinsieke nut dat zij ontleen aan het werken in de sector niet langer afgeroomd. De rest van de samenleving is echter slechter af vanwege de hogere productiekosten in de sector.

Lage productiviteit dankzij efficiënt personeelsbeleid

Zwakke financiële prikkels in publieke organisaties kunnen dus een signaal zijn van efficiëntie, omdat ze gebruikt kunnen worden als middel om de loonkosten te reduceren als werknemers verschillen in intrinsieke motivatie. De sterkte van financiële prikkels heeft echter ook een selectie-effect. Zwakke prikkels zijn vooral interessant voor minder productieve werknemers (Lazear, 1986). In de beeldvorming rond ambtenaren speelt juist deze aantijging een grote rol. Tegenover het beeld van de bevlogen docent, de verpleegster die geeft om haar patiënten en de politieagent die vastberaden is om criminelen op te sporen, staat de stereotype luie, incompetent ambtenaar die zich verschuilt achter regels, procedures en formulieren en die zich voornamelijk bezighoudt met het drinken van koffie. Uit enquêtes onder burgers in de VS blijkt dat mensen inderdaad negatief zijn over ambtenaren en bureaucratie in het algemeen, maar positiever over specifieke publieke instanties (Katz et al., 1975, Goodsell, 1985). Hoofdstuk 4 gaat in op de selectie van werknemers door een publieke organisatie als werknemers niet alleen verschillen in intrinsieke motivatie om voor de organisatie te werken, maar ook verschillen in productiviteit in het algemeen. We veronderstellen dat er drie typen werknemers zijn. Naast intrinsiek gemotiveerde werknemers zijn er twee andere typen werknemers: standaardwerknemers en luie werknemers. Luie werknemers hebben hogere kosten van het leveren van inspanning dan standaardwerknemers. In de private sector zullen luie werknemers dus minder inspanning leveren dan standaardwerknemers.

Hoofdstuk 4 laat zien dat, mits er voldoende gemotiveerde werknemers zijn, de

publieke organisatie in staat is om alleen gemotiveerde werknemers aan te trekken en al het intrinsieke nut dat deze werknemers aan het werken voor de organisatie ontlenuen, af te romen. Als er niet voldoende gemotiveerde werknemers zijn, dan moet de publieke organisatie een tweede type werknemer aantrekken, wat het afromen van intrinsiek nut bemoeilijkt. Als gemotiveerde werknemers een hoger nut kunnen bereiken door zich ongemotiveerd voor te doen, dan zullen zij dat natuurlijk doen. We laten zien dat de publieke organisatie, naast de gemotiveerde werknemers, liever luie werknemers dan standaardwerknemers aantrekt. Bovendien geeft de organisatie zwakkere prikkels aan de luie werknemers dan de private sector, wat inhoudt dat luie werknemers minder inspanning leveren bij de publieke organisatie dan in de private sector. De verklaring is als volgt: doordat luie werknemers optimaal minder inspanning leveren dan standaardwerknemers, is het voor gemotiveerde werknemers vervelender om zich voor te doen als lui dan als standaard. Hierdoor kan de publieke organisatie meer nut afromen van de gemotiveerde werknemers en zo goedkoper produceren. De conclusie van hoofdstuk 4 is dat lage productiviteit van (een gedeelte van de) ambtenaren een teken kan zijn van efficiënt personeelsbeleid.

Altruïstische artsen

Hoofdstuk 5 gaat in op marktwerking in de sector gezondheidszorg. Veel mensen staan hier huiverig tegenover. Een argument tegen marktwerking in de zorg is dat het leidt tot lagere zorgkwaliteit voor arme mensen, bijvoorbeeld doordat de beste artsen hun vaardigheden in de private sector te gelde gaan maken. Hoofdstuk 5 bekiijkt deze claim vanuit de veronderstelling dat een gedeelte van de artsen altruïstisch is ten opzichte van patiënten. In veel landen, waaronder Nederland, leggen beginnende artsen een moderne versie van de Eed van Hippocrates af, waarin zij onder andere zweren om in het belang van hun patiënt te handelen. Het ligt voor de hand dat sommige artsen meer geven om hun patiënten dan andere artsen.² Als artsen inderdaad verschillen in hun altruïsme ten opzichte van patiënten, dan rijst de vraag: welke patiënten profiteren van het altruïsme van artsen en hoe wordt dit beïnvloed

²Uit een enquête onder ziekenhuispersoneel in Engeland blijkt bijvoorbeeld dat zo'n 70 procent van het personeel meer uren maakt dan contractueel vastgelegd; vaak zonder daarvoor betaald te worden. Een groot gedeelte van de overwerkers geeft als reden dat zij daardoor betere zorg kunnen leveren aan hun patiënten (Healthcare commission, 2006).

door de wijze waarop de markt is ingericht? Om deze vraag te beantwoorden, stellen we in hoofdstuk 5 een model op waarin patiënten verschillen in inkomen, waarin een gedeelte van de artsen altruïstisch is en waar hogere zorgkwaliteit leidt tot hoger nut voor de patiënt en tot hogere inspanningskosten voor de arts. Altruïstische artsen ontlenen nut aan het verhogen van het welzijn van de patiënt. We vergelijken een puur collectief systeem met een mixed publiek-privaat systeem. In beide systemen wordt gratis zorg aangeboden in publieke instellingen, gefinancierd vanuit algemene middelen. We veronderstellen dat in de publieke sector een minimum zorgkwaliteit wordt gehandhaafd, die niet afhankelijk is van de inrichting van de markt. Het verschil tussen de beide systemen ligt in de private sector. In het puur collectieve systeem is er geen private sector, zodat alle patiënten in de publieke sector behandeld worden. In het mixed systeem hebben artsen de mogelijkheid een private kliniek te openen, zodat patiënten kunnen kiezen tussen (gratis) publieke zorg en het kopen van zorg in een private kliniek.

Hoofdstuk 5 laat zien dat alle patiënten beter af zijn in het mixed systeem. In de publieke sector leveren standaardartsen de minimumkwaliteit, altruïstische artsen leveren hogere kwaliteit. Doordat de toewijzing van patiënten aan artsen willekeurig is, heeft iedere patiënt in de publieke sector dezelfde kans op behandeling door een altruïstische arts. Onder het mixed systeem komt de vraag naar private zorgverlening van rijke patiënten die bereid zijn te betalen voor (de zekerheid van) hoge zorgkwaliteit. Deze rijke patiënten zijn vanzelfsprekend beter af onder het mixed systeem dan onder het collectieve systeem, omdat de mogelijkheid om hoge zorgkwaliteit te kopen niet bestaat onder het collectieve systeem. Concurrentie tussen artsen zorgt ervoor dat het salaris voor standaardartsen in de private sector zodanig is dat zij indifferent zijn tussen werken in de publieke en in de private sector. Altruïstische artsen daarentegen kiezen ervoor om ook onder het mixed systeem in de publieke sector te werken. In de private sector kunnen zij het welzijn verhogen van een patiënt die al hoge zorgkwaliteit ontvangt van een standaardarts. Door in de publieke sector te werken, kunnen ze het welzijn verhogen van een (relatief arme) patiënt die anders het minimum aan zorgkwaliteit ontvangt van een standaardarts. Het laatste geeft zoveel meer bevrediging, dat dit opweegt tegen het hogere salaris dat

zij kunnen verdienen in de private sector. Voor de patiënten die ook in het publiek-private systeem ervoor kiezen om in de publieke sector behandeld te worden, betekent dit dat zij een grotere kans hebben op behandeling door een altruïstische arts onder het publiek-private systeem dan onder het collectieve systeem. Kortom, onder het mixed systeem zorgt de keuze van rijkere patiënten om zorg te kopen in de private sector ervoor dat de armere patiënten een hogere kans hebben op behandeling door een altruïstische arts dan onder het collectieve systeem. In hoofdstuk 5 bespreken we ook wat dit betekent voor de effecten van het subsidiëren van private gezondheidszorg en voor de effecten van het al dan niet toestaan dat artsen zowel in een private kliniek als in een publieke instelling kunnen werken.

De zoektocht naar een nieuwe baan: waar en waarom

In hoofdstuk 6 en 7 bestuderen we de relatie tussen de mening van werknemers over hun baan en hun zoek- en mobiliteitsgedrag op de arbeidsmarkt. Hoofdstuk 6 gaat in op het effect van de tevredenheid van werknemers met verschillende aspecten van hun huidige baan op zowel de beslissing om op zoek te gaan naar een nieuwe baan als op de keuze wáár te gaan zoeken naar een nieuwe baan. We gebruiken hiervoor de resultaten van een enquête onder mensen werkzaam in de Nederlandse publieke sector in 2002. We vinden, in lijn met de resultaten van onder andere Freeman (1978) en Clark (2001), dat voor zowel tevredenheid met de huidige baan in het algemeen als voor tevredenheid met vrijwel ieder aspect van de baan geldt dat hoe minder tevreden een werknemer is, hoe groter de kans dat de werknemer op zoek is naar een andere baan.

De respondenten die daadwerkelijk op zoek waren naar een andere baan, moesten aangeven of ze zochten binnen de huidige organisatie, binnen de huidige sector en/of buiten de huidige sector. Ook moesten ze voor 19 verschillende baanaspecten aangeven hoe belangrijk dit aspect was bij de beslissing om op zoek te gaan naar een andere baan. In hoofdstuk 6 laten we zien dat er een intuïtieve relatie is tussen de reden dat mensen zoeken en waar zij op zoek gaan naar een andere baan. Als werknemers een probleem hebben met een organisatiespecifiek baanaspect (een aspect waarin banen binnen een organisatie relatief weinig verschillen), zoals het management of de reistijd, dan proberen werknemers een baan buiten de organisatie te

vinden. De kans dat werknemers binnen de organisatie zoeken naar een andere baan is groter als de reden dat men zoekt een baanaspect is waarin relatief veel variatie is onder banen binnen een onderneming, zoals zelfstandigheid. Tenslotte proberen werknemers een baan te vinden in een andere sector als zij problemen hebben met een sectorspecifiek baanaspect, zoals de werkdruk en de inhoud van het werk. Deze resultaten wijzen erop dat mensen in hun zoektocht naar een baan die beter aansluit bij hun wensen, gebruikmaken van de informatie die zij hebben over hun huidige baan én over andere banen binnen de organisatie en de sector.

Waar hoofdstuk 6 gebruik maakt van de resultaten van een enquête onder werknemers die niet van baan zijn veranderd in 2002, gebruiken we in hoofdstuk 7 een vergelijkbare enquête onder werknemers die in 2001 zijn begonnen of vertrokken bij een organisatie in de Nederlandse publieke sector. De respondenten moesten voor 19 verschillende baanaspecten aangeven hoe belangrijk deze aspecten waren in hun beslissing om hun vorige baan te verlaten. De inhoud van het werk, het management en de mate van zelfstandigheid komen naar voren als de belangrijkste vertrekredenen. Hoofdstuk 7 gaat vervolgens in op de relatie tussen de drijfveren van werknemers om ontslag te nemen en hun keuze om te gaan werken bij een andere organisatie in dezelfde sector, in een ander deel van de publieke sector of in de private sector.

We vinden dat de resultaten voor de keuze om binnen de sector te blijven of naar een andere sector te gaan, grotendeels overeenkomen met de resultaten van hoofdstuk 6. Werknemers die van baan zijn veranderd vanwege een sectorspecifiek baanaspect, zoals werkdruk, de inhoud van het werk en de beloning, hebben relatief vaak de sector verlaten. Daarentegen leiden problemen met bijvoorbeeld het aantal uren, opleidingsmogelijkheden en reistijd ertoe dat werknemers relatief vaak naar een andere organisatie binnen de sector vertrekken. De belangrijkste vertrekredenen van de werknemers die de publieke sector verlaten zijn het salaris en het management. Daarnaast laat hoofdstuk 7 zien dat de redenen die werknemers hebben om van baan te veranderen ook effect hebben op het loonverschil tussen de oude en de nieuwe baan. De loongroei is significant hoger voor werknemers die hun baan verlaten uit ontevredenheid met het salaris of hun zelfstandigheid, terwijl werknemers die ontslag nemen vanwege werkdruk of de combinatie tussen werk en het privéleven genoeg

nemen met significant lagere loongroei. Tenslotte laten we zien dat het verschil in (gemiddelde) loongroei tussen werknemers die binnen de sector van baan veranderen en werknemers die overstappen naar een andere sector volledig verklaard wordt door verschillen in de vertrekredenen.

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