# Beyond the Call of Duty?

## Essays on motivation and self-selection of bureaucrats

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## Essays on motivation and self-selection of bureaucrats

# Meer dan de plicht vraagt?

## Essays over de motivatie en zelf-selectie van ambtenaren

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# Voorwoord

Bij het afscheid van mijn vorige baan kreeg ik een boek met de titel "Op de tractor naar de Zuidpool" . Volgens de collega die het mij gaf was promoveren als vrouw aan de economiefaculteit vergelijkbaar met een reis als vrouw alleen op een tractor naar de Zuidpool. Hij had gelijk.

Maar gelukkig wist ik dat toen nog niet. Ik begon toen net als Manon Ossevoort, het tractormeisje, aan het nastreven van een droom. Al toen ik afstudeerde in 1996, had ik de droom om eens te promoveren. Alleen was het er tot 2007 nooit van gekomen om die droom te realiseren. Ik had het al haast uitgesteld tot na mijn pensioen. Maar toen kwam de vacature bij de Erasmus School of Economics voor het Mature Talent Project. Een project voor vrouwen die na een jaar of tien werkervaring weer terugwilden naar de wetenschap en binnen twee jaar wilden promoveren. Er stond nog net niet bij "Met drie kinderen en partner, wonende te Hillegom". Afijn, het was op mijn lijf geschreven.

De afgelopen jaren ben ik op reis geweest door de wetenschap om mijn Zuidpool te bereiken: Het proefschrift is af. Dat heb ik voor op Manon Ossevoort, die nog steeds de Zuidpool niet heeft bereikt. Maar de weg naar mijn Zuidpool was als de hare. Het was een tocht vol verrassingen, "door (voormalig) oorlogsgebieden, door de woestijn, door verlaten streken, rijke steden en door de sloppenwijken." Of, om het in mijn termen uit te drukken, door de speltheorie, de econometrie, de eenzaamheid van het wetenschappelijke werk, door de verrukking van het ontdekken van nieuwe mechanismen, de vrijheid van het uitwerken van interessante ideeën, maar ook langs marginale effecten, interactietermen, multinomiale logistische regressie en differentiatie van integralen.

Een proefschrift is niet alleen een proeve van bekwaamheid, maar soms ook een

beproeving. Keer op keer heb ik mezelf moeten bewijzen. Niet zo zeer ten opzichte van de buitenwereld, maar vooral ten opzichte van mezelf. En dat viel niet altijd mee. Ik ben me de afgelopen jaren meer bewust geworden van mijn beperkingen en heb mijn zelfkennis vergroot. Ik leef op als ik met anderen samenwerk, maar als ik lang alleen ploeter komen de twijfels over mijn kunnen haast verlammend bovendrijven. Mijn energie laait op onder deadlines, maar als de deadlines ver weg lijken, is mijn energie soms maar een klein waakvlammetje. Wetenschap vergt een zekere monomanie, ik ben helaas niet monomaan. Ik heb regelmatig aan stoppen gedacht, ware het niet dat ik slecht met iets stoppen kan.

Gelukkig was niet alles kommer en kwel op mijn reis door de wetenschap. Waar Manon Ossevaart onderweg op haar tractor door Afrika allerlei nieuwe culturen ontmoet, heb ik ook een nieuwe cultuur ontdekt op mijn reis: De wetenschappelijke variant van de Homo Economicus. Een geval apart, zou ik een paar jaar geleden hebben gezegd. Na jaren bij de Raad voor Werk en Inkomen te hebben gewerkt, waar de collega's bekend en vertrouwd waren en dol op overleg, moest ik wennen aan de specifieke humor en de veel geringere sociale interactie op de faculteit. Inmiddels zijn er veel nieuwe collega's bijgekomen, is de sociale interactie toegenomen en ben ik gehecht geraakt aan de Homo Economicus van de Erasmus. Ook de jonge Homo Economicus van de Erasmus, de studenten, heb ik in mijn hart gesloten. Niet alleen bij de Erasmus ben ik op mijn reis door de wetenschap nieuwe, interessante mensen tegengekomen, maar ook op de congressen in Neurenberg, Bristol en niet te vergeten Barcelona.

Zoals een reis naar de Zuidpool niet kan zonder supportteam en thuisbasis, had ik dit proefschrift niet kunnen schrijven zonder de steun van mijn collega's en familie. De collega's van algemene economie ben ik dankbaar voor de steun en het vertrouwen dat jullie de afgelopen tijd uitstraalden in de goede afloop van het project. Jullie geloof daarin was soms groter dan het mijne. Alle Barcelonagangers wil ik bedanken voor de saamhorigheid die ik daar heb ervaren. Alle Mature Talents voor de uitwisseling van ervaringen en Suzanne in het bijzonder. Jij verdreef de eenzaamheid in H8-34 en gaf het goede voorbeeld door gewoon aan te pakken. Josse wil ik bedanken voor alle keren dat hij mij iets over economie en Scientific Workplace

heeft uitgelegd. Otto, bedankt voor het vertrouwen in de toekomst.

Ik wil Robert bedanken, omdat je de beste promotor was die ik me had kunnen wensen. We werden op basis van één van de vier onderzoeksideeën die ik had aan elkaar gekoppeld. Dat idee vormde de basis voor de rest van onze samenwerking. Een samenwerking die ons overigens door Philip Hans Franses min of meer werd opgedrongen, maar wonderwel is uitgepakt. Wat niet wegneemt, dat ik je af en toe heb vervloekt. Maar niet zo vaak. Meer nog heb ik met bewondering en verwondering gekeken hoe zo'n jong iemand zo'n vakvolwassen wetenschapper kan zijn. Je hebt me het belang laten zien van goede ideeën, van het houden van focus bij de uitwerking daarvan, van het gebruik van goede methoden, van unieke data en van het uiteindelijk vlot, maar zorgvuldig opschrijven van het resultaat. Ik heb veel van je geleerd en dat was, naast het schrijven van een proefschrift, mijn doel toen ik het warme bad van de Raad voor Werk en Inkomen verliet. Ik ben je niet alleen dankbaar voor alles wat je me geleerd hebt, maar minstens evenzeer voor alle keren dat je me uit de put hebt getrokken en het optimisme dat je uitstraalde over de afronding van het proefschrift.

Erik, Lene, Ko en Rik, de afgelopen jaren was ik vaak druk en afwezig. Ik hoop er de komende tijd weer meer voor jullie te zijn. Hoewel je het natuurlijk nooit weet met mij, want stilzitten is niet mijn sterkste kant. Maar een proefschrift schrijf ik niet nog eens. Dat beloof ik. Ik hoop dat jullie vandaag trots op mij kunnen zijn en onthouden dat niets onmogelijk is als je het echt wilt. Pa en ma, jullie houden nooit op met voor mij te zorgen en klaar te staan wanneer dat nodig is. Ik hoop dat het nooit andersom hoeft te zijn, maar mochten jullie mijn hulp of steun nodig hebben, dan zal ik er zijn. Ik heb een grote schuld in te lossen in deze. Annemiek, buurvrouw Wortman, dank voor de steun en het steeds uitleggen waarom een theoretisch model uitwerken toch zinvol kan zijn. Tenslotte Yvonne, mijn beste vriendin sinds mijn veertiende. Jij hebt me altijd gesteund, ondanks dat je een andere reis gemaakt hebt de afgelopen jaren en diepere dalen gezien hebt dan ik. Ik ben onnoemelijk trots op je.

Dan is mijn laatste woord gericht aan de wetenschap. Mijn doel was om te promoveren en dat heb ik bereikt. Maar het is niet het einde van mijn reis door de

wetenschap. Halverwege het promotietraject had ik het niet verwacht, maar ik wil nog niet weg. Ik wil verder. Er is nog veel te leren, er zijn nog veel nieuwe ideeën niet bedacht, nog steeds ideeën die verder uitgewerkt moeten worden en onderzoeken om af te ronden. Bovendien heb ik zo langzamerhand mijn plek gevonden. Waar ik hiervoor een beleidsmedewerker was met interesse voor wetenschappelijk onderzoek, ben ik nu een wetenschapper met interesse voor beleid. Het doel is hetzelfde, beter beleid door beter onderzoek. Mijn positie is echter veranderd. Ik ben een Erasmus Homo Economicus geworden.

Margaretha Buurman

# Contents

# Chapter 1

# Introduction

## 1.1 Motivation, aim, and scope

The existence and effects of public service motivation (PSM), or altruism, among bureaucrats, is a well-debated topic among economists and administrative scientists (see e.g. Perry and Hondeghem 2008a, Besley and Ghatak 2005, Francois 2000 and 2007). However, the debate about motivation of public sector workers and its effects on the quality and quantity of public services is not restricted to academia. Many journalists, politicians, and common civilians discuss this issue in the media, parliament, and the streets. The reasons for this lively debate is twofold. First of all, public sector workers are usually paid through taxes. Taxpayers want value for money. A second reason for the public interest in the motivation of bureaucrats and its effects, is that the public, as the clients of public services, encounters the merits and demerits of the efforts provided by public sector workers. All the more, since the public often has few alternative providers to choose from. Welfare recipients have no other option than to ask their municipality for benefits. Children attending primary schools can often only choose from a few neighbouring schools. Crime victims go to their local police officer and the injured go to the nearest hospital.

The people employed at public agencies influence the nature, quality, and quantity of the services provided. And by doing so, public sector workers are sometimes able to make a difference in people's lives. A caseworker can influence the life of a welfare recipient by deciding to help him search for a job or sanction him for not

searching enough. The teacher influences the accomplishments of the pupils entrusted to his care by giving extra attention to the ones in dire need of help. Nurses can make the injured feel more at ease. Although the services provided are also influenced by the availability of budgets, agency rules, and levels of discretion assigned to the individuals working in those bureaucracies, many scholars conjecture that the motivation of public sector workers is important for performance in the public sector. Examples are Francois (2000) and Delfgaauw and Dur (2008), who study the effects of motivation on effort provision and selection into the public sector using theoretical models. In addition, a number of empirical studies provide some (albeit modest) evidence for the effects of motivation on (self-reported) performance in the public sector. See Brewer (2008), Perry, Hondeghem, and Wise (2009), and Petrovsky (2009) for overviews.

Although motivation is an important element influencing the performance of public sector workers, not all public sector workers will be motivated by the same aspects of public sector work nor to the same extent. This difference in motivation and its consequences is the central focus of this thesis. The first part of the thesis explores the variation in motivation between private and public sector workers and analyzes the factors that influence differences in motivation within these two sectors. The second part of this thesis studies a particular aspect of public sector workers' motivation, namely the motivation towards clients, and its effects on allocation decisions and the sorting into street-level bureaucracy. Furthermore, we study theoretically the consequences of the introduction of incentives for allocation and sorting decisions. The lessons learned can be applied to optimize public sector personnel policies.

The remainder of this introduction proceeds as follows. Section 2 summarizes some main insights from the literature and discusses the research gaps this thesis attempts to fill. Section 3 reviews the different forms of altruism or public service motivation in more depth. Finally, section 4 sketches an overview of the thesis.

## 1.2 Relation to the literature

If motivation is key for the quantity and quality of public services provided, the first question to ask is whether public service motivation or altruism among public sector workers indeed exists. Many, many studies in public administration and more and more studies in economics look at differences in motivation among bureaucrats using stated preferences or stated behaviour. That is, the researchers use answers to questions on the importance of certain job aspects (e.g. useful to society as in Lewis and Frank 2002), by observing differences in job satisfaction among public and private sector employees (e.g. Georgellis and Tabvuma 2010), by analyzing the differences in claimed donations to charity or volunteer work among public and private sector employees (e.g. Houston 2006) or the stated levels of unpaid overtime (Gregg et al. 2008). These studies, as well as Perry et al. (2009) in their overview of the public service motivation (PSM) literature, in general conclude that the levels of PSM among public sector workers are higher than among private sector workers.

Public service motivation is, however, not the only reason to seek employment in the public sector. Other motivations, such as for example balance between time to spend with the family and at work, are important as well (Leijsink and Steijn 2008). Another highly relevant issue is whether public sector employees are also more risk-averse than private sector employees. Many claim that since job security is higher and pay is less variable in the public sector, people who are very risk averse sort into the public sector. Introducing pay-for-performance might therefore have different effects in the public sector than in the private sector. Although the evidence from studies using stated preferences (see e.g. Rainey 1982, Crewson 1997, Houston 2000, and Lewis and Frank 2002) is mixed, studies using stated behaviour (Bellante and Link 1981, Hartog et al. 2002, Guiso and Paiella 2008, Roszkowski and Grable 2009) show that public sector workers are generally less risk tolerant than private sector workers. While the use of stated preferences and stated behaviour is valuable in itself and shows correlation with observed behaviour (Dohmen et al. 2009), it is also known to suffer from disadvantages as "memory lapses, judgmental errors, socially desirable responses, and common source bias", as mentioned by Brewer (2008: 141-142). Therefore, we use revealed preferences data to add to the existing body of

knowledge on the differences between private and public sector employees' altruism and risk aversion in the first part of this thesis.

The second part of this thesis studies the differences in motivation among employees within the public sector and the consequences thereof for sorting within the public sector. In the studies mentioned above, most of the attention is focused on the differences in motivation between public and private sector employees. However, the public sector is a large sector which entails many different kinds of activities. Public sector work diverges from pen-pushers at ministries to nurses in hospitals, from secretaries behind desks to teachers in front of classes. Thus sorting based on differences in motivation may not be restricted to a choice between a public or private sector job, but might also apply to choices between different kinds of jobs within the public sector. Although the topic of public service motivation is well debated, relatively little attention has been paid, especially in economics, towards this last issue. Prendergast (2007) is one of the first economists to take interest in the subject why some public sector workers, as for instance social workers, seem biased towards clients, whereas others, as policemen or tax officers, often seem biased against clients. His model predicts that the sorting into bureaucracy tends to be "bifurcated", that is, agencies employ bureaucrats with very high and very low levels of pro-client motivation.

However, sorting might not be restricted to sorting over occupations as teaching, policing and casework. It could also occur within those occupations. This could be due to differences in missions between employers, as for instance in Besley and Ghatak (2005), or due to differences in clientele. The job of a teacher in an inner city school might differ immensely from the job of a teacher in a suburbal school due to differences in pupil population. This is exactly the research gap we try to fill in the second part of this thesis. We focus our attention hereby on a specific type of public sector employee: The street-level bureaucrat. That is, the employees dealing with clients, pupils, and other citizens on a day-to-day basis. Thus, teachers, nurses, caseworkers, and policemen. They often have a dual task of helping clients on the one hand and sanctioning them on the other. Furthermore, by the nature of their job they have a lot of discretion when performing their duties. This leads us to study a

new angle in this field of research: The consequences of motivation for the allocations made by street-level bureaucrats, whereas others, as for example Prendergast (2007) and Brekke and Nyborg (2008), focus on the consequences for effort provision and sorting. We assume that street-level bureaucrats care for the clients they encounter, but not all to the same extent (see e.g. Lipsky 1980). This altruistic concern affects their job choice and also the allocation decisions they take on the job. Sorting and behaviour are also influenced by incentives provided by the organization. Francois (2007) looks into the relation between incentives, effort provision, and sorting. He shows, theoretically, that introducing pay-for-performance in the public sector can have a detrimental effect on its productivity, because people with a lower motivation will now apply for the job as well and push aside the highly motivated workers who donate labour voluntarily (see also Delfgaauw and Dur 2007). However, the effect of incentives on allocation decisions and sorting has not been studied by economists up to this moment. Our research therefore provides additional theoretical insights on this subject.

Off course, motivation is not the only factor influencing performance or sorting. Another important factor is ability. Although research on the consequences of differences in motivation on effort provision and sorting of employees into the public sector is growing (e.g. Besley and Ghatak 2005, Prendergast 2007, Francois 2007, Brekke and Nyborg 2008, Delfgaauw and Dur 2008), relatively little research takes ability into account as well. Delfgaauw and Dur (2010) show that returns to ability are higher in the private sector, due to the existence of an observable public sector motivation which represses public sector wages. Therefore, the most capable managers self-select into the private sector. A natural way to continue this strand of research would be to look into the consequences of unobservable motivation and observable ability for sorting within the public sector. This is exactly what we do in the last chapter of this thesis, when studying the effects of the sorting of motivated teachers into inner city schools, both theoretically and empirically.

## 1.3 Motivation for public sector work

Before we give an overview of the research in the rest of this thesis, we first take a closer look into the concept of motivation. Motivation is according to the Longman dictionary of contemporary English (2008) "an eagerness or willingness to do something without being told or forced to do it". Motivation can be distinguished into extrinsic motivation, that is a motivation "coming from outside", as for instance motivation provided by financial incentives or opportunities for promotion, and intrinsic motivation, as a "part of the nature or character of someone or something" (Longman 2008). People can be intrinsically motivated to carry out a task, because they enjoy doing so or care for the results achieved. The motivation of people to sort into the public sector can be divided along the same lines.

Perry and Hondeghem (2008b: 3) make a useful distinction. First, they allow for the existence of "public sector motivation", that is, more extrinsic reasons to sort into the public sector, as for instance the possibilities public sector work offers to combine having children with a job, job security, social benefits, education and the social status of being a public servant. This as opposed to "public service motivation", which appeals to the concept of intrinsic motivation. Perry and Wise (1990: 368) define public service motivation as "an individual's predisposition to respond to motives grounded primarily or uniquely in public institutions and organizations". Perry (1996: 20) argues that this concept has four underlying dimensions, namely "attraction to public policy making, commitment to the public interest, compassion, and self-sacrifice" The first dimension could be regarded as a particular form of intrinsic motivation, namely the motivation to carry out the job itself. That is, the motivation stems from what you do, not particularly for whom or why you are doing it. The three latter dimensions of public service motivation appeal more to the concept of altruism, frequently used in economics.

Altruism is the wish to help others without immediate benefits to oneself. Or to put it more formally, altruism is "a preference for the good of some other people in itself, and it also denotes acting in favour of this good for this motive" (Kolm 2006: 8). Altruism is a very broad concept. A first distinction that we can make is based on the subject of altruism. Some people might be altruistic towards everybody, needy or

not, while others might only help the ones in dire need or people to whom they have feelings of empathy, compassion or sympathy. Thus, altruism can be directed to all people in society, but also to the group of people one feels most connected to, such as family, friends and acquaintances (see also Baron et al. 2009, Kolm 2006). A second distinction is between pure and impure altruism. Purely altruistic or output-oriented altruistic people care for the level of giving to other people, regardless if they donate themselves or others do so. Impurely altruistic people enjoy giving in itself. That is, they enjoy the "warm-glow" of giving (Andreoni 1989, Francois and Vlassopoulos 2008). Or, in a work context, they enjoy exerting effort in for instance the public sector, even though they realize that, when they would quit their job, others would replace them leaving the total amount of public services provided constant. Impure altruism gives rise to non-pecuniary benefits from working in the public sector and relates to the concept of action-oriented altruism as introduced by Francois and Vlassopoulos (2008). The differences between a purely altruistic public servant and an impurely altruistic public servant is, that the first only considers employment in the public sector when the contributions of others would be below his own level of contributions. For instance, when he has a higher ability to deliver services or exerts more effort than the others. Then, by working in the public sector he could add something extra to the public good produced, as he prefers more of the public good to less. Impurely altruistic workers would consider public sector employment, because of the sheer love of the work they do in the public sector. As soon as the non-pecuniary benefits of this involvement in public sector work and the pecuniary benefits are above the outside option utility, the impurely altruistic employee would select into the public sector. This could imply that even when there are more capable employees available, the impurely altruistic employee would prefer to do the job himself, because of the non-pecuniary benefits it renders him.

A final distinction among the different forms of altruism worth mentioning here, is between altruism as the sheer care for another person's well-being by taking his utility into account and more paternalistic forms of altruism. This paternalism implies that a public servant does not take the utility a client derives from receiving a good into account, but that the public servant derives utility of the allocation itself

of a particular good or service to the client.

All the different forms and aspects of altruism can coexist next to each other. That is, some public sector employees might be motivated by purely altruistic motives, while others mainly enjoy the warm-glow of exerting effort in the public sector, and some are motivated by both.

## 1.4 Overview of the thesis

The difference in motivation among employees in the public domain and the consequences thereof is the central theme of this thesis. The first part of this thesis, chapter two, focuses on the difference in motivation between private and public sector workers empirically. The second part of this thesis comprises chapter three and four and studies the effects of altruistic feelings towards clients among street-level bureaucrats, both theoretically and empirically.

In the first part of this thesis, chapter two, we assess whether public sector employees have a stronger inclination to serve others and are more risk averse than employees in the private sector. A unique feature of our study is that we use revealed rather than stated preferences data. Respondents of a large-scale survey were offered a substantial reward and could choose between a widely redeemable gift certificate, a lottery ticket, or making a donation to a charity. The first question we answer is whether public sector employees are less likely to choose the risky option (lottery) and more likely to choose the pro-social option (charity) rather than the safe and selfish option (gift certificate) than private sector workers. Second, we examine whether the inclination to donate to charity depends on an employee's tenure in the public or private sector as to get some insight in whether working in the public sector leads employees to adapt to a public service ethic or that the more altruistic people are more likely to self-select into the public sector. Third, using the reward-question, we only get an indication of people's marginal willingness to make risky and altruistic choices. However, there might be a difference between the marginal willingness and average willingness to make those choices. If people already take many risks during working hours or have an insecure income, they might not be so

willing to choose the risky option at the margin. Or if people donate much labour to the public cause, they might be less willing to choose to donate to charity at the margin. We cannot test this hypothesis for the risky choice, since we do not have any additional information about the level of risk employees take at work. However, we do have an indication about the labour donations people make by using a survey question which asks whether people consider their salary to be sufficient for the work that they do.

In the second part of this thesis we look into the differences in motivation towards clients among public servants. Chapter three develops a model of street-level bureaucrats who differ in their client-oriented altruism and have a dual task of helping some clients and sanctioning others. The dual nature of the job implies that it is not straightforward what kind of people should optimally be hired by such street-level bureaucracies. While the helping aspect of the job makes altruistic or client-oriented people the ideal candidates, these people are likely to take clients' interests too much into account when encountering clients who should be sanctioned. In addition to this normative issue of what would be optimal candidates, the positive issue of what kind of people find a career in a street-level bureaucracy actually worthwhile is perhaps even more important. While assessment centers and talented HR managers may give agencies a glimpse of job applicants' motivations, their true motivations often remain hidden, implying that agencies should use other, more implicit instruments to promote self-selection of the most desired types of workers. These may include paying low base salaries and offering bonuses for good performance.

This chapter studies these issues by developing a model of a street-level bureaucracy, such as an employment agency, which serves different types of clients, some of which are in need of help (willing but unable clients) and others who should be sanctioned (non-willing clients). In addition, there exists a group of clients who should neither be helped nor sanctioned (willing and able clients). The agency hires bureaucrats whose task is to meet clients, assess their type, and allocate either help, no help, or a sanction. Bureaucrats are hired from a pool of potential job applicants who differ in their altruism towards clients they meet, ranging from complete indifference to highly altruistic. The agency cannot observe job applicants' types.

However, it can affect the sorting of job applicants by its personnel policy. We start with a simple case where bureaucrats are paid flat wages to see which allocations they make and which types of agents sort into bureaucracy. Next, we analyse what happens when pay-for-performance is introduced. Furthermore, we look at the consequences of differences in client composition for the sorting of bureaucrats.

Chapter four presents a different model to explain the sorting of another group of street-level bureaucrats: The sorting of teachers into underprivileged schools. Teachers in the model differ in observable ability, as for instance education and experience, and in unobservable motivation to work with underprivileged children. It is not clear beforehand which types of teachers will be hired by inner city or underprivileged schools. These schools might hire teachers who combine high motivation and low ability. However, other combinations of ability and motivation among inner city school teachers are possible as well. In this chapter we first come up with empirical predictions based on the analysis of the sorting model. Next, we test these predictions empirically using unique Dutch survey data on the motivation and ability of teachers, where ability is measured by years of experience and level of education and intrinsic motivation is measured using questionnaire items on motivation towards pupils.

Chapter five provides a summary of the results, conclusions, and directions for future research.

# Chapter 2

# Public Sector Employees: Risk Averse and Altruistic?

*Joint with Robert Dur and Seth van den Bossche*

## 2.1 Introduction

It is often argued that preferences and work motivations of public sector employees differ from those of private sector employees. Some of these differences stem from sectoral differences in the nature of jobs. Many jobs in the public sector involve helping people in need or contributing to society at large, rendering these jobs attractive to people who have a strong willingness to serve others or the public interest.[1] Another, less honorable motivation for seeking a job in the public sector is avoidance of risk. In most countries, employers in the public sector offer higher job security and less volatile wage compensation than employers in the private sector (Clark and Postel-Vinay 2009, Bonin et al. 2007). As a result, highly risk-averse people may find it attractive to opt for a job in the public sector (Bellante and Link 1981).

This chapter employs a unique dataset to assess whether public sector employees

[1] See the large literature in public administration on 'public service motivation' (e.g. Perry and Wise 1990, Perry 1996, Rainey and Steinbauer 1999, Wright 2001) and several recent theoretical studies in economics (e.g. Dixit 2001, Besley and Gathak 2005, Francois 2007, Delfgaauw and Dur 2008). Perry et al. (2009) and Francois and Vlassopoulos (2008) provide overviews of these literatures.

have a stronger inclination to serve others and are more risk averse than people employed in the private sector. In contrast to previous empirical studies, we explore revealed preferences rather than stated preferences. Our data come from a questionnaire held in 2000 covering more than 3000 employees in The Netherlands. Upon completing the questionnaire, each participant was offered a reward worth 25 guilders (11,34 euro; about 15% of daily disposable household income in 2000). Participants could choose between receiving a widely redeemable gift certificate, receiving a national lottery ticket, or donating the reward to a charity of their choice. We hypothesize that, as compared to private sector employees, public sector employees more likely choose to donate to charity (the safe and pro-social choice) and less likely choose the lottery ticket (the risky choice) rather than choose the gift certificate (the safe and selfish choice).

Our results lend strong support to the hypothesis that public sector employees are more risk averse than private sector employees. People holding a public sector job are much less likely to choose the lottery ticket rather than the gift certificate. This holds both before and after controlling for income, gender, age, and several other observable characteristics. The difference is substantial: Our estimation results imply that the odds for a public sector worker of choosing the lottery ticket rather than the gift certificate are 0.68 times the odds for a private sector worker.

We find only weak evidence for the hypothesis that public sector employees more likely choose the pro-social option of donating to charity rather than choose the selfish option of taking the gift certificate. On the contrary, our analysis reveals that, after controlling for observable individual characteristics, public sector employees are significantly *less* likely to donate to charity. The odds for a public sector worker of donating his reward to charity rather than taking the gift certificate are 0.74 times the odds for a private sector worker. Behind this average figure is a remarkable relation between inclinations to donate to charity and employee's tenure in a public sector organization. Employees who have just started a job in the public sector are *more* likely than their private sector counterparts to donate to charity rather than to take the gift certificate. However, within a few years, this difference disappears and later on even reverses. Importantly, we find no tenure effects for private sector

workers' inclination to donate to charity, nor does tenure affect the likelihood of choosing the risky option in either of the sectors. Moreover, the tenure effect for public sector worker's inclination to donate to charity remains intact when we allow for public-sector specific age effects.

This tenure effect is well in line with the observations made by Blau (1960: 347, 348) in his study of case workers in a public welfare agency. He finds that "the attitudes of most new case workers toward clients were strongly positive, if somewhat sentimental and idealistic (...) the new case worker was typically full of sympathy for clients' problems. But as he encountered clients who blamed him personally for not helping them enough, even though agency procedure limited him, and clients met his trusting attitude by cheating and lying, the newcomer tended to experience a 'reality shock' (...) This disillusioning experience might make a worker bitter and callous, or induce him to leave the job, and even those who did not have either of these extreme reactions tended to change their orientation to clients." "In sum, experience increased the case worker's ability to serve recipients but decreased his interest in doing so." (Blau 1960: 359). Likewise, Van Maanen (1975) reports swift declines in motivation among police recruits during their first year in a big-city department, which are partly accounted for by more pessimistic beliefs about the likelihood of receiving favorable responses from the community to 'working especially hard.' Similar findings are reported by De Cooman et al. (2009) using data from a repeated survey among Flemish teachers who just started their professional career. They find that, within two years time, "work values became somewhat less ideological and more self-oriented." Further, teachers "attached greater importance to extrinsic values, including rewards, security, career, and recognition, and less importance to altruistic values including social service, though these changes were relatively small." (p. 105-106)[2]

It is important to note that our analysis gives an indication of people's *marginal* willingness to accept risk and to make charitable contributions; it does not reveal people's overall risk aversion or pro-social attitude. The two need not coincide. For instance, employees in the private sector may generally be more risk tolerant

[2]Similar patterns have been observed among volunteers, see Tschirhart et al. (2001) and references therein.

than public sector employees, but exhibit more risk averse behavior at the margin because in their professional life they are already exposed to more risk than public sector employees. Likewise, public sector employees may be less willing to donate their reward to charity as they already serve the public interest in their professional life on a day-to-day basis. Unfortunately, we lack data on how much risk people face and how much they contribute to the public interest in daily life. However, we do find some indirect evidence for the idea that public sector employees less likely donate to charity because they feel they already contribute a lot to society at work. One of the questions in the survey asked people whether they consider their salary to be sufficient for the work that they do. People responding negatively to this question less likely donate their reward to charity rather than take the gift certificate. Importantly, this effect is significantly stronger for employees in the public sector, both statistically and economically (the effect is twice as large). This suggests that public sector employees consider the contributions they make on the job as a substitute for making charitable donations. Feeling underpaid explains a large part of the average difference between pro-social inclinations in the sectors. This is partly due to the stronger effect of feeling underpaid on public sector employees' likelihood to donate. Further, a much larger fraction of employees in the public sector feel that they are underpaid (56% in the public sector as compared to 42% in the private sector). Comparing dissatisfied employees in the public and private sector, we find no significant difference in the early stages of the career, while later on public sector employees are significantly less likely to donate. Satisfied public sector employees significantly more often choose to donate in the early stage of their career, while later on there is no significant difference with their private sector counterparts.

Although we can only assess people's risk and pro-social attitude at the margin, we do think our results are of great relevance for recent debates about remuneration of employees in the public sector (see, e.g., Burgess and Ratto 2003, National Commission on the Public Service 2003, OECD 2005a and 2008). First, measuring tolerance for additional risk of public sector employees gives some indication of the effects of introducing or strengthening pay-for-performance for workers in the public sector. Making employees' pay more dependent of their performance usually

increases the risks employees face, as their performance not only depends on their effort, but also on random events. Our results suggest that public sector employees have a stronger distaste for taking risks than their counterparts in the private sector, implying that (with the current workforce) pay-for-performance is a more costly instrument to induce effort in the public sector than in the private sector. Second, measuring pro-social inclinations at the margin gives an idea about how much society can rely on public sector employees' altruistic motivations when additional helping opportunities arise. Our results give rise to some pessimism: Many public sector employees feel that they are underpaid relative to the contributions that they make, which makes them hesitant to provide further contributions.

We proceed as follows. The next section briefly describes earlier studies on differences in preferences and motivations between public and private sector employees. Section 3 describes the data. Section 4 presents the main results and Section 5 concludes.

## 2.2 Related literature

A rich literature in public administration and a growing number of studies in economics have examined differences in preferences and motivations between public and private sector employees. Existing empirical studies can be divided into two groups: Those that use stated preferences or motivations (e.g., by asking respondents how important job security or helping other people is to them) and those that infer preferences and motivations from stated behavior (e.g., self-reported donations to charity, self-reported purchase of insurance, stated willingness to pay for a hypothetical lottery, et cetera). Our study is the first using revealed preferences data rather than stated preferences data; that is, we use data on what people actually do, not on what they say they do or what they claim is important to them. This has some clear and well-known advantages. In particular, stated preferences data may be vulnerable to self-stereotyping, self-serving biases, lack of attention by respondents, and strategic motives (Roszkowski and Grable 2007, Dohmen et al. 2009). For instance, it has been shown that in experiments with hypothetical payments subjects appear more

generous and more risk-preferring than when real money is at stake (Camerer and Hogarth 1999).

Most studies comparing public and private sector workers have assessed in how far public sector workers have a particular willingness to serve the public interest, to help others, and to make personal sacrifices in order to do so. For instance, Rainey (1982) and Lewis and Frank (2002) find that public sector workers more often rate work attributes such as 'Useful to society' and 'Help others' as (very) important (see also Kilpatrick et al. 1964, Buchanan 1975, Crewson 1997, Houston 2000, and Steijn 2008 among others). Houston (2006) uses data on self-reported pro-social behavior, such as volunteering, donating blood, and making charitable contributions. He finds that nonprofit and public sector employees are more likely to report being a volunteer and blood donor, while no such relation is found for charitable contributions. Likewise, Brewer (2003) shows that public sector employees report higher levels of participation in nonpolitical civic affairs. Recently, Gregg et al. (2009) exploit British panel data and find that individuals who are more inclined to donate labor (as measured by stated unpaid overtime) select into the non-profit sector.

Other studies have examined whether public and private sector workers differ in risk preferences. Studies using stated preferences about job security find mixed evidence (see e.g. Rainey 1982, Crewson 1997, Houston 2000, and Lewis and Frank 2002). By contrast, Bellante and Link (1981) use answers to questions like the condition and insurance of cars owned, the use of seat belts, the extent of medical coverage, and smoking and drinking habits to construct a measure of risk aversion. They find that, thus defined, risk-averse people are more likely to be employed in the public sector than in the private sector. Likewise, Roszkowski and Grable (2009) use data on clients of financial planners who had completed a test of financial risk tolerance. They find that public sector employees score significantly lower than private sector employees, even after controlling for a rich set of observables. Similar results are obtained by Hartog et al. (2002) for The Netherlands and by Guiso and Paiella (2008) for Italy using large-scale survey data on people's willingness to pay for a hypothetical lottery and for a hypothetical risky security, respectively. Several

recent papers in economics have added to this body of evidence using the 2004 wave of the German Socio-Economic Panel data, which contains questions on people's attitude towards risk-taking. Bonin et al. (2007) show that working in the public sector implies a significantly lower earnings risk than working in the private sector and that individuals who are less risk tolerant more likely end up working in an occupation with low earnings risk. Using the same data, Luechinger et al. (2007) and Pfeifer (2008) directly estimate the effect of self-reported risk attitude on sector of employment and report similar findings: People who are less willing to take risk are more likely to be found in the public sector.

## 2.3 Data and empirical strategy

We use data from the TNO Work Situation Survey (TAS), a Dutch survey developed by TNO (an independent research organization, partly funded by the Dutch government) in cooperation with the Ministry of Social Affairs and Employment. The survey was conducted in 2000 among about 8000 employees and self-employed persons in all sectors of the economy. The response rate was 53%, resulting in 4334 respondents (see Smulders et al. 2001 and Bakhuys Roozenboom et al. 2007).[3] The survey includes a rich set of demographic variables and data on a wide range of work-related topics, such as employment conditions, pay, hours worked, job and pay satisfaction, attitude towards work, intention to leave, job security, health-related issues, and workplace characteristics.

Our key variable of interest is the type of reward chosen by the respondents for completing the survey (see Appendix A for the exact question and possible answers).[4] Respondents could choose between receiving a widely redeemable gift certificate, receiving a national lottery ticket, or donating the reward to a charity of their choice. All types of reward had the same face value: 25 guilders (11.34 euro),

[3]See for more information in English: http://www.eurofound.europa.eu/ewco/surveys/ national/countries/netherlands2005_6_tas.htm

[4]The survey was repeated in 2002 and 2004. We do not use these data in our analysis because in 2002 the data-collecting company did not report data on our key variable and in 2004 the reward for respondents was substantially lower and differed between completing the internet questionnaire (10 euros) and the written questionnaire (7,50 euros).

about 15% of daily disposable household income in 2000.[5]

Since respondents indicated their main economic sector in the survey, but not whether their organization belongs to the public or private sector, we recoded the main economic sectors into public or private, using a data file we obtained on request from Statistics Netherlands. The sectors thus included in the public sector are education, hospitals, nursing homes, welfare work, and central and local government. Four economic sectors contain a substantial mix of private and public organizations; we omit these sectors from our analyses.[6] Furthermore, we confine ourselves to employees, leaving out the self-employed, owners of firms, and (unpaid) family workers. We also restrict the sample to respondents between 20 and 64 years of age, because there are very few respondents under 20 years of age and 65 is the regular Dutch retirement age. These selections leave us with a sample of 3126 respondents.

Our empirical strategy is to examine whether an otherwise comparable respondent differs in his choice of reward depending on the sector of employment. If public sector workers are more altruistic and more risk averse at the margin, we should find that public sector workers are more likely to donate the reward to charity and less likely to choose the lottery ticket rather than to opt for the gift certificate. Since our dependent variable has three potential categorical outcomes (lottery ticket, charity, gift certificate) we analyze our data using a multinomial logistic regression model. We take gift certificate as our reference category, as this is the safe and selfish alternative.[7]

Obviously, the choice of the reward does not only depend on a respondent's risk

[5] As can be seen from Appendix A, donating to charity is the only option where the respondent remains completely anonymous, which is potentially worrisome. However, the research organization and data-collecting company are both well-known and trusted companies in the Netherlands. Furthermore, the research is not conducted on behalf of their employers, but on behalf of the Ministry of Social Affairs and TNO. Thus, it is not very likely that many respondents worried about their anonymity when choosing their reward.

[6] These four sectors are: Other type of industry (which also comprises workers in sheltered employment), other type of transport and communication (which includes public transport), other type of healthcare (among others general practitioners and midwifes) and culture, sports, and recreation.

[7] We also ran multinomial probit regressions as well as binary logistic regressions (grouping charity and gift certificate as the safe options; grouping gift certificate and lottery as the selfish options; taking only the gift certificate as the selfish option, dropping the lottery ticket; and taking only the gift certificate as the safe option, dropping the charity). All these models produced results similar to the multinomial logistic regression model and are for brevity not reported.

preferences and pro-social attitude, but also on other characteristics such as income. People with a low income may be more likely to choose the gift certificate, as this could be exchanged for basic necessities such as food or clothing. Therefore, we control for net monthly income in the regression analyses, as well as for whether the respondent is the breadwinner of his household. Since our categorical income measure is somewhat crude, especially in the highest category, we also add managerial position to our analysis. This is likely to pick up some additional income effects. Moreover, we include the following demographic controls: Age, sex, region, education, marital status, and the number of children living at the home.

An important issue is whether public and private sector employees had different attitudes before they sorted into their sector of employment or changed their attitudes afterwards. To account for such tenure effects, we add employee's tenure at the organization and interact it with the employee's sector of employment.[8] Finally, we check whether feelings of underpayment affect employee's choice of reward using the question "Is your salary sufficient for the work that you do?" and we also interact this variable with the employee's sector of employment.

Table 1 contains the descriptive statistics of our subsample. Some interesting differences between public and private sector employees are visible. First of all, private sector employees choose the lottery ticket (48%) more often than public sector employees (36%). Public sector employees on the other hand choose to donate to charity (23%) somewhat more often than private sector employees (21%). Further, there are substantial differences in socio-demographic variables. Public sector workers are slightly older on average than private sector employees, 44 versus 42 years old, and are far more often female, 42% versus 18%. Public sector employees are (therefore) also less likely to be the breadwinner in the household than private sector employees (67% versus 79%). The majority of public sector employees completed higher vocational education or university studies (66%), against only a minority of private sector employees (36%). Nevertheless, the differences in income are not that large.

[8] Unfortunately, we lack data on respondent's sectoral tenure.

Table 1: Descriptive statistics

| Variable | Obs | Public Sector | Private Sector | Total |
|---|---|---|---|---|
| Reward: | 3126 | | | |
| Gift certificate | | 41.0% | 31.3% | 34.3% |
| Lottery ticket | | 35.7% | 48.1% | 44.2% |
| Charity | | 23.3% | 20.7% | 21.5% |
| Sex: Male (%) | 3122 | 57.6% | 82.4% | 74.8% |
| Age: | | | | |
| Mean (years) | 3126 | 44.2 | 41.9 | 42.6 |
| Standard Deviation | | (8.8) | (9.3) | (9.2) |
| Education: | 3058 | | | |
| No education attended/finished | | 0.2% | 0.6% | 0.5% |
| Primary school | | 0.7% | 2.8% | 2.2% |
| Lower secondary school | | 6.2% | 21.4% | 16.6% |
| Intermediate secondary school or intermediate vocational training | | 26.9% | 39.6% | 35.6% |
| Higher secondary school or higher vocational training | | 50.7% | 28.2% | 35.2% |
| (Post-) University | | 15.2% | 7.5% | 9.9% |
| Net monthly income: | 2997 | | | |
| Less than fl. 500,- | | 0.6% | 0.6% | 0.6% |
| fl. 500,- until fl. 1000,- | | 1.9% | 1.5% | 1.6% |
| fl. 1000,- until fl. 1500,- | | 3.8% | 3.0% | 3.3% |
| fl. 1500,- until fl. 2000,- | | 7.4% | 4.4% | 5.4% |
| fl. 2000,- until fl. 2500,- | | 11.8% | 9.9% | 10.5% |
| fl. 2500,- until fl. 3000,- | | 14.3% | 19.3% | 17.7% |
| fl. 3000,- until fl. 3500,- | | 16.6% | 18.4% | 17.8% |
| fl. 3500,- until fl. 4000,- | | 13.6% | 15.0% | 14.5% |
| fl. 4000,- until fl. 5000,- | | 19.7% | 15.7% | 17.0% |
| fl. 5000,- until fl. 6000,- | | 5.6% | 6.2% | 6.0% |
| fl. 6000,- or more | | 4.7% | 5.9% | 5.5% |
| Breadwinner: Yes (%) | 3105 | 67% | 79% | 76% |
| Marital Status: | 3125 | | | |
| Married/cohabitating without children living at home | | 25.9% | 25.0% | 25.3% |
| Married/cohabitating with children living at home | | 53.5% | 59.9% | 58.0% |
| Single parent | | 6.0% | 2.2% | 3.4% |
| Single | | 14.6% | 12.8% | 13.4% |
| Number of children living at home | | | | |
| Mean | 3125 | 1.2 | 1.2 | 1.2 |
| Standard Deviation | | 1.2 | 1.1 | 1.2 |

(Continued on the next page)

Table 1: Descriptive statistics (continued)

| Variable | Obs | Public Sector | Private Sector | Total |
|---|---|---|---|---|
| Managerial position/employer?: | 3113 | | | |
| No | | 69.8% | 62.1% | 64.5% |
| 1-4 employees | | 10.3% | 16.7% | 14.7% |
| 5-9 employees | | 5.5% | 9.3% | 8.2% |
| 10-19 employees | | 6.2% | 5.4% | 5.7% |
| 20-49 employees | | 4.8% | 4.0% | 4.2% |
| 50 employees | | 3.4% | 2.5% | 2.8% |
| Province: | 3126 | | | |
| Groningen | | 5.0% | 3.1% | 3.7% |
| Friesland | | 4.1% | 4.3% | 4.3% |
| Drenthe | | 4.5% | 4.2% | 4.3% |
| Overijssel | | 6.9% | 7.4% | 7.3% |
| Gelderland | | 12.5% | 12.4% | 12.4% |
| Utrecht | | 3.0% | 3.9% | 3.6% |
| Noord Holland | | 15.2% | 16.8% | 16.3% |
| Zuid Holland | | 23.6% | 23.4% | 23.4% |
| Zeeland | | 3.1% | 2.4% | 2.6% |
| Noord Brabant | | 12.3% | 13.3% | 13.0% |
| Limburg | | 7.8% | 7.2% | 7.4% |
| Flevoland | | 2.0% | 1.6% | 1.7% |
| Tenure: | | | | |
| Mean (years) | 3098 | 13.8 | 11.8 | 12.4 |
| Standard Deviation | | (10.1) | (10.3) | (10.3) |
| Salary sufficient for the work you do? : Yes (%) | 2887 | 44.5% | 58.3% | 53.9% |
| **Total number of observations** | | **966** | **2160** | **3126** |

*Note*: Table 1 reports the descriptive statistics of the unweighted subsample used in our regression analysis.

There is, however, a large difference in the answers to the question "Is your salary sufficient for the work you do?". Less than half of public sector employees answers this question in the affirmative (44%), while more than half of the private sector employees is satisfied with their salary (58%). Finally, tenure among public sector employees in our sample is also longer than that of private sector employees, 13.8 versus 11.8 years.

## 2.4 Results

Table 2 reports the results of our multinomial logistic regression analyses.[9] In model 1 we take up the public sector dummy as the sole explanatory variable. Public sector

[9]For ease of presentation, we treated managerial position, income, and education as continuous variables in table 2. We also ran regressions using the ordinal categories of these variables. This gave nearly the same results at the same significance levels.

employees are, as expected, significantly less likely than private sector employees to choose the lottery ticket rather than the gift certificate. However, in contrast to our expectations, public sector employees are also less likely than private sector employees to opt for a donation to charity rather than for the gift certificate.[10] This effect, however, is not significant and relatively small. Model 1 only explains little variation in the choice of reward. Although it does fine in predicting the choice of the lottery ticket, it performs extremely poor in predicting the choice of the charity. As we noticed in the previous section, there are many more differences between public and private sector employees than just sector of employment. Therefore, we add several controls in model 2.

Remarkably, model 2 shows results quite close to model 1: Compared to private sector employees, public sector employees are 0.74 times as likely to choose the charity rather than the gift certificate. This time, the effect is significant at the 5%-level. Public sector employees are also significantly less likely to choose the lottery ticket over the gift certificate, as in the previous model. Our estimation results imply that the odds for a public sector worker of choosing the lottery ticket rather than the gift certificate are 0.68 times the odds for a private sector worker.

The choice for the lottery ticket is significantly related to some of the demographic variables. Women are less likely to choose the lottery ticket over the gift certificate, as are employees with a higher level of education. Couples with children living at home are more likely to choose the lottery ticket than singles. However, the larger the number of children, the less likely employees choose the lottery ticket. Finally, income and other variables affecting people's budget do not really matter.[11] Income does, however, matter for donating to charity. All budget-related variables show that as people's budget increases, the odds of choosing the charity over the gift certificate increase as well. A higher income or higher managerial position increases the odds of choosing the charity over the gift certificate significantly, as does not being the

[10] The multinomial logitistic regression assumes that the odds ratio between two choices is independent of the other alternatives. Hence the difference with table 1. We also estimated a multinomial probit model, which relaxes the independence restrictions. Results are similar to those of the multinomial logitistic regressions reported here.

[11] The results for the control variables are close to those of Hartog et al. (2002) and Dohmen et al. (2009), except for the effect of education, which is positive in these earlier studies.

breadwinner. Furthermore, some of the demographic variables also have an effect. Couples with children living at home are less likely to choose the charity over the gift certificate than singles, although this effect is only significant at the 10%-level. Older employees are more likely to choose the charity over the gift certificate, as are employees with a higher level of education.[12] Lastly, note that the fit of model 2 is substantially better than that of the previous model.[13]

Model 3 examines whether and if so how public sector workers' risk and pro-social attitudes develop during their career. As we discussed in the Introduction, several earlier studies have found that altruistic motivations decline with tenure among public sector employees (Blau 1960, Van Maanen 1975, and Cooman et al. 2009). We therefore add to model 2 employee's tenure at the organization as well as tenure interacted with the employee's sector, and similarly for tenure squared to allow for nonlinear effects.[14] Tenure does not affect the chances of taking the lottery ticket rather than the gift certificate in either of the sectors. Figure 1a plots the point-estimates of the combined public sector dummies against tenure. Clearly, public sector employees are significantly more risk averse than private sector employees for almost all levels of tenure and there is no clear pattern in this difference over people's tenure. However, we do find strong tenure differences for public sector employees in the odds of taking the charity rather than the gift certificate, while there is no such tenure effect for private sector employees. Figure 1b, which is again based on the estimation results of model 3, shows that at the start of their careers, public sector employees are more likely to donate to charity rather than take the gift certificate than their private sector counterparts, although this is effect is not significant. After a few years, this (insignificant) positive effect has disappeared and

[12] Houston (2006) reports similar findings for these socio-demographic variables, except for gender. He obtains a significant positive effect of being female on the odds of donating to charity, whereas we find a negative, but not significant effect.

[13] We included ethnic minority, firm size, and age squared as additional controls in previous regressions. However, as those variables had no significant effect, we left them out of our final regressions.

[14] We also ran regressions including interaction terms of age and public sector so as to rule out that any possible tenure effects are actually driven by respondent's age. The interaction effect with age was never significant, nor did it change the effects and significance of tenure. Obviously, since our data are cross-sectional, we can not completely rule out that tenure effects are intertwined with cohort and selection effects.

even reverses. Indeed, during the main part of their careers, public sector employees are significantly less likely to donate to charity than private sector employees.

One of the reasons for a negative effect of tenure on pro-social inclinations of public sector employees might be that their tenure-wage profile is flatter than that of private sector employees, which may give rise to growing feelings of underpayment. We control for these feelings of underpayment using the variable "Is your salary sufficient for the work that you do?" and its interaction with the public sector dummy. We are particularly interested in whether public sector employees' likelihood of donating to charity is more strongly affected by feelings of underpayment than that of private sector employees. This would support the idea that donations to charity and contributions to society at the workplace are considered as substitutes by public sector employees.

Model 4 shows no significant effect of feeling underpaid on the odds of choosing the lottery ticket over the gift certificate. The other coefficients explaining the choice of the lottery over the gift certificate are not much affected. Figure 2a plots the point-estimates of the combined public sector dummies for employees who think their salary is sufficient for the work they do. During the main part of their career public sector employees are significantly less likely to choose the lottery ticket over the gift certificate than private sector employees. This pattern is almost identical for employees who do feel underpaid, as we can see in figure 2b.

We find striking effects of feelings of underpayment on the odds of choosing the charity over the gift certificate. Employees who feel underpaid are significantly less likely to donate to charity, and particularly so in the public sector. The odds for a dissatisfied employee of donating his reward to charity rather than taking the gift certificate are 0.68 and 0.41 times the odds for a satisfied employee, in respectively the private and public sector.[15] As is clear from table 2, this difference between private and public sector workers is also statistically significant. We thus find a clear indication that public sector employees consider donations to charity as a substitute for their job-related net contribution to society. Further, it can be seen from table 2 that among the satisfied employees, public sector employees are

[15] The odds for the public sector can easily be computed using the estimated coefficients in table 2.

significantly more likely to donate than private sector employees at the start of their career. However, as before, within a few years this effect disappears, see figure 2c. Figure 2d plots the point estimates of the public sector dummy for dissatisfied employees. Clearly, among these employees, there is no significant difference in pro-social inclinations between public and private sector employees at the start of their career. As tenure increases, public sector employees become less and less inclined to donate to charity. After about seven years, the difference becomes statistically significant. Comparing figures 1b, 2c, and 2d, it follows that controlling for feelings of underpayment hardly affects the tenure profile in public sector employee's inclination to donate to charity. Inspection of the data shows that, somewhat surprisingly, there is no clear relationship between feelings of underpayment and tenure. Hence, other factors seem to play a role here, e.g. Blau (1960)'s disillusionment effect, which we discussed in the Introduction.

Table 2: Results of multinomial logistic regression

| **Lottery ticket** [#] | **Model 1** | | **Model 2** | |
|---|---|---|---|---|
| | **B** | **exp B** | **B** | **exp B** |
| Public Sector | -.568*** | 0.567 | -.379*** | .684 |
| | (.089) | | (.102) | |
| Female | | | -.543*** | 0.581 |
| | | | (.138) | |
| Age (years) | | | .008 | 1.008 |
| | | | (.005) | |
| Education | | | -.129** | .879 |
| | | | (.055) | |
| Income | | | .025 | 1.025 |
| | | | (.030) | |
| Breadwinner (1=No) | | | .116 | 1.123 |
| | | | (.132) | |
| Marital Status: | | | | |
| - Married/cohabitating without children living at home | | | .257 | 1.293 |
| | | | (.167) | |
| - Married/cohabitating with children living at home | | | .497** | 1.644 |
| | | | (.194) | |
| - Single parent | | | -.044 | .957 |
| | | | (.299) | |
| - Single | | | 0[a] | . |
| Children living at home (number) | | | -.215*** | .807 |
| | | | (.065) | |
| Managerial position | | | .053 | 1.055 |
| | | | (.037) | |
| Regional Dummies | No | | Yes | |
| Tenure | | | | |
| Tenure_Squared | | | | |
| Tenure*Public Sector | | | | |
| Tenure_Squared*Public Sector | | | | |
| Salary sufficient for work you do? (1=No) | | | | |
| Public Sector*Salary sufficient for work you do? (1=No) | | | | |
| Intercept | .430*** | | .248 | |
| | (.049) | | (.468) | |
| % Correct Predicted Lottery | 75.1% | | 76.0% | |

(Continued on the next page)

Table 2: Results of multinomial logistic regression (continued)

| **Lottery ticket** [#] | **Model 3** | | **Model 4** | |
|---|---|---|---|---|
| | **B** | **exp B** | **B** | **exp B** |
| Public Sector | -.507** | .602 | -.431* | .650 |
| | (.209) | | (.244) | |
| Female | -.546*** | .580 | -.570*** | .566 |
| | (.139) | | (.145) | |
| Age (years) | .013** | 1.013 | .016** | 1.016 |
| | (.006) | | (.006) | |
| Education | -.147*** | .863 | -.144** | .865 |
| | (.057) | | (.059) | |
| Income | .030 | 1.030 | .026 | 1.026 |
| | (.031) | | (.033) | |
| Breadwinner (1=No) | .116 | 1.123 | .173 | 1.189 |
| | (.133) | | (.139) | |
| Marital Status: | | | | |
| - Married/cohabitating without children living at home | 0.262 | 1.299 | .253 | 1.288 |
| | (.168) | | (.176) | |
| - Married/cohabitating with children living at home | .515*** | 1.673 | .457** | 1.580 |
| | (.195) | | (.203) | |
| - Single parent | -.064 | .938 | -.158 | .854 |
| | (.303) | | (.313) | |
| - Single | 0[a] | . | 0[a] | . |
| Children living at home (number) | -216*** | .806 | -.204*** | .815 |
| | (.066) | | ( .068) | |
| Managerial position | .053 | 1.055 | .049 | 1.050 |
| | (.037) | | (.039) | |
| Regional Dummies | Yes | | Yes | |
| Tenure | -.016 | .984 | -.014 | .986 |
| | (.017) | | (.018) | |
| Tenure_Squared | .000 | 1.000 | .000 | 1.000 |
| | (.001) | | (.001) | |
| Tenure*Public Sector | .020 | 1.020 | .002 | 1.002 |
| | (.031) | | (.032) | |
| Tenure_Squared*Public Sector | .000 | 1.000 | .000 | 1.000 |
| | (.001) | | (.001) | |
| Salary sufficient for work you do? (1=No) | | | -.057 | .944 |
| | | | (.116) | |
| Public Sector*Salary sufficient for work you do? (1=No) | | | .029 | 1.030 |
| | | | (.199) | |
| Intercept | .193 | | -.041 | |
| | (.482) | | (.511) | |
| % Correct Predicted Lottery | 76.2% | | 74.0% | |

(Continued on the next page)

Table 2: Results of multinomial logistic regression (continued)

| **Charity**[#] | **Model 1** | | **Model 2** | |
|---|---|---|---|---|
| | **B** | **exp B** | **B** | **exp B** |
| Public Sector | -.153 | .858 | -.297** | .743 |
| | (.103) | | (.121) | |
| Female | | | -.178 | .837 |
| | | | (.160) | |
| Age (years) | | | .026*** | 1.026 |
| | | | (.006) | |
| Education | | | .138** | 1.148 |
| | | | (.070) | |
| Income | | | .178*** | 1.195 |
| | | | (.037) | |
| Breadwinner (1=No) | | | .431*** | 1.539 |
| | | | (.156) | |
| Marital Status: | | | | |
| - Married/cohabitating without children living at home | | | -.070 | .932 |
| | | | (.192) | |
| - Married/cohabitating with children living at home | | | -.405* | .667 |
| | | | (-.229) | |
| - Single parent | | | -.192 | .825 |
| | | | (.338) | |
| - Single | | | 0[a] | . |
| Children living at home (number) | | | -.066 | .936 |
| | | | (.076) | |
| Managerial position | | | .095** | 1.099 |
| | | | (.042) | |
| Regional Dummies | No | | Yes | |
| Tenure | | | | |
| Tenure_Squared | | | | |
| Tenure*Public Sector | | | | |
| Tenure_Squared*Public Sector | | | | |
| Salary sufficient for work you do? (1=No) | | | | |
| Public Sector*Salary sufficient for work you do? (1=No) | | | | |
| Intercept | -.412*** | | -2.916 | |
| | (.061) | | (.544) | |
| % Correct Predicted Charity | 0 | | 18.1% | |

(continued on the next page)

| | | |
|---|---|---|
| Nagelkerke R2 | .016 | .116 |
| McFadden R2 | .007 | .051 |
| Likelihood Ratio Test Final Model, Chi-Square (df) | 43.9(2)*** | 312.3(44)*** |
| Pearson Chi-Square (df) | 0(0)*** | 5692(5664) |
| Deviance Chi-Square (df) | 0(0)*** | 5739(5664) |
| % Correct Predicted without model | 44.2% | 44.6% |
| % Correct Predicted with model | 45.9% | 49.3% |
| **Total number of observations** | **3126** | **2898** |

Note: cell entries are the unstandardized parameter estimates (B) and odds ratios (exp B).
Standarderrors are in parentheses. Regression results based on the unweighted subsample.
[#]Base Outcome = Gift Certificate
*=signicant at 10%-level, **=significant at 5%-level, ***=significant at 1%-level.
a= Base Category

Table 2: Results of multinomial logistic regression (continued)

| **Charity**[#] | **Model 3** | | **Model 4** | |
|---|---|---|---|---|
| | **B** | **exp B** | **B** | **exp B** |
| Public Sector | .230 | 1.258 | .568** | 1.764 |
| | (.236) | | (.268) | |
| Female | -.175 | .839 | -.248 | .780 |
| | (.162) | | (.170) | |
| Age (years) | .029*** | 1.029 | .031*** | 1.031 |
| | (.007) | | (.008) | |
| Education | .146** | 1.157 | .143* | 1.153 |
| | (.071) | | (.074) | |
| Income | .187*** | 1.206 | .149*** | 1.161 |
| | (.038) | | ( .040) | |
| Breadwinner (1=No) | .432*** | 1.541 | .473*** | 1.604 |
| | (157) | | (.164) | |
| Marital Status: | | | | |
| - Married/cohabitating without children living at home | -.063 | .939 | -.031 | .969 |
| | (.193) | | (.203) | |
| - Married/cohabitating with children living at home | -.371 | .690 | -.360 | .698 |
| | (.231) | | (.239) | |
| - Single parent | -.188 | .829 | -.340 | .712 |
| | (.341) | | (.361) | |
| - Single | 0[a] | . | 0[a] | . |
| Children living at home (number) | -.070 | .933 | -.060 | .942 |
| | (.077) | | (.079) | |
| Managerial position | .091** | 1.095 | .101** | 1.106 |
| | (.042) | | (.044) | |
| Regional Dummies | Yes | | Yes | |
| Tenure | -.001 | .999 | .002 | 1.002 |
| | (.021) | | (.022) | |
| Tenure_Squared | .000 | 1.000 | .000 | 1.000 |
| | (001) | | (.001) | |
| Tenure*Public Sector | -.075** | .928 | -.087** | .917 |
| | (.036) | | (.037) | |
| Tenure_Squared*Public Sector | .002 | 1.002 | .002* | 1.002 |
| | (.001) | | (.001) | |
| Salary sufficient for work you do? (1=No) | | | -.392*** | .676 |
| | | | (.148) | |
| Public Sector*Salary sufficient for work you do? (1=No) | | | -.497** | .609 |
| | | | (.237) | |
| Intercept | -3.158*** | | -2.799*** | |
| | .560 | | (.587) | |
| % Correct Predicted Charity | 19.7% | | 25.2% | |
| Nagelkerke R2 | .123 | | .140 | |
| McFadden R2 | .054 | | .062 | |
| Likelihood Ratio Test Final Model, Chi-Square (df) | 328.5(52)*** | | 349.7(56)*** | |
| Pearson Chi-Square (df) | 5737(5686) | | 5325(5262) | |
| Deviance Chi-Square (df) | 5747(5686) | | 5302(5262) | |
| % Correct Predicted without model | 44.6% | | 44.0% | |
| % Correct Predicted with model | 49.7% | | 49.7% | |
| **Total number of observations** | **2873** | | **2662** | |

Note: cell entries are the unstandardized parameter estimates (B) and odds ratios (exp B).
Standarderrors are in parentheses. Regression results based on the unweighted subsample.
[#]Base Outcome = Gift Certificate
*=signicant at 10%-level, **=significant at 5%-level, ***=significant at 1%-level.
a= Base Category

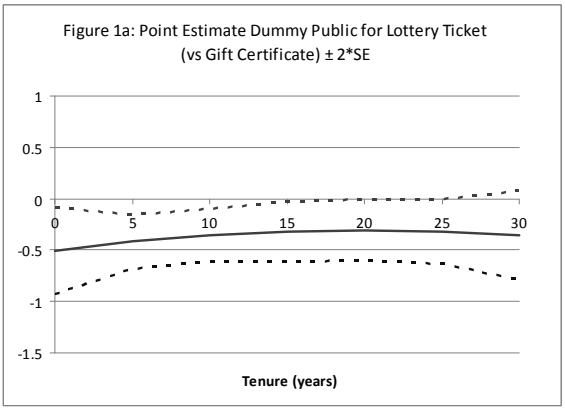


Figure 1a: Point Estimate Dummy Public for Lottery Ticket
(vs Gift Certificate) ± 2*SE
1
0.5
0
-0.5
-1
-1.5
0
5
10
15
20
25
30
Tenure (years)

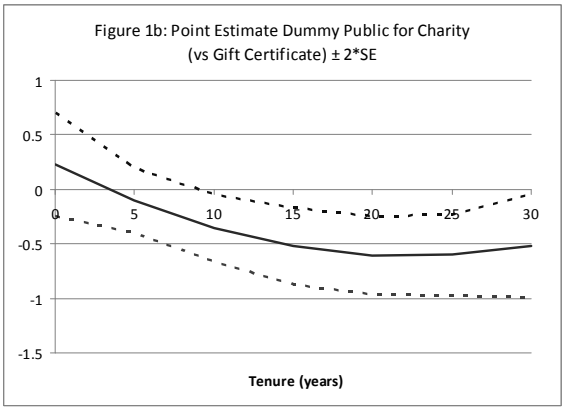


Figure 1b: Point Estimate Dummy Public for Charity
(vs Gift Certificate) ± 2*SE
1
0.5
0
-0.5
-1
-1.5
0
5
10
15
20
25
30
Tenure (years)

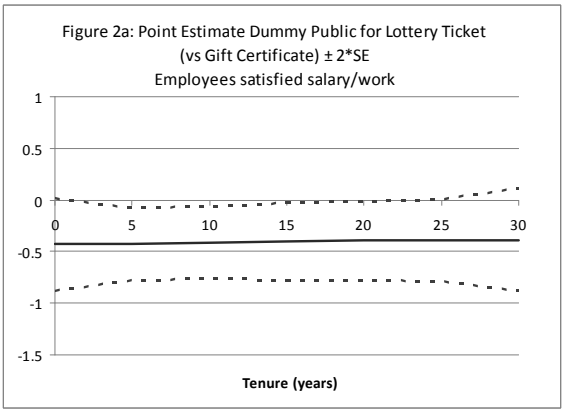


Figure 2a: Point Estimate Dummy Public for Lottery Ticket
(vs Gift Certificate) ± 2*SE
Employees satisfied salary/work
1
0.5
0
-0.5
-1
-1.5
0
5
10
15
20
25
30
Tenure (years)

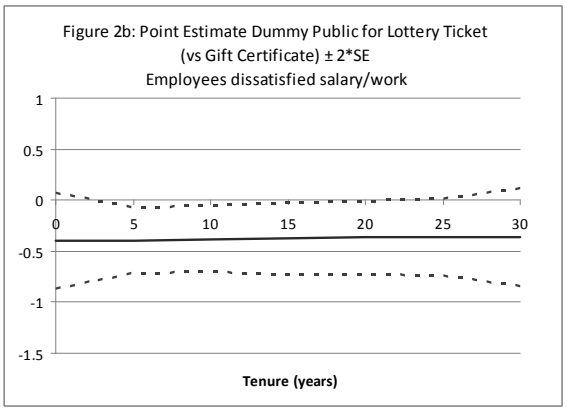


Figure 2b: Point Estimate Dummy Public for Lottery Ticket
(vs Gift Certificate) ± 2*SE
Employees dissatisfied salary/work
1
0.5
0
-0.5
-1
-1.5
0
5
10
15
20
25
30
Tenure (years)

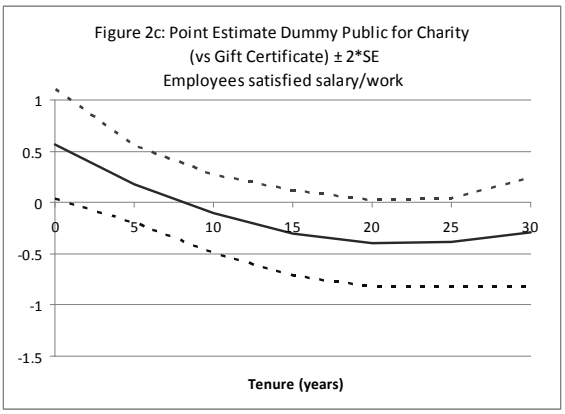


Figure 2c: Point Estimate Dummy Public for Charity
(vs Gift Certificate) ± 2*SE
Employees satisfied salary/work
1
0.5
0
-0.5
-1
-1.5
0
5
10
15
20
25
30
Tenure (years)

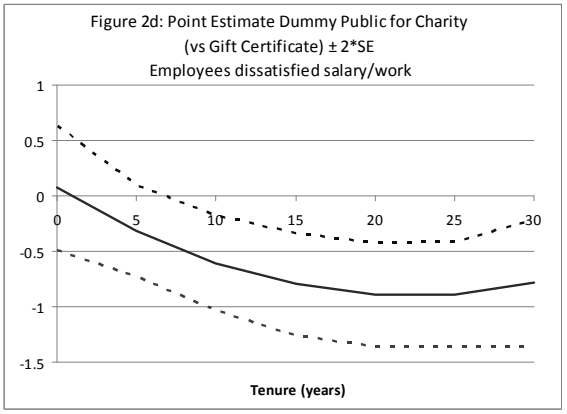


Figure 2d: Point Estimate Dummy Public for Charity
(vs Gift Certificate) ± 2*SE
Employees dissatisfied salary/work
1
0.5
0
-0.5
-1
-1.5
0
5
10
15
20
25
30
Tenure (years)

## 2.5 Concluding remarks

Summarizing, we have found clear support for the hypothesis that public sector employees are more risk averse than private sector employees. However, in contrast to our expectations, we have also found that public sector employees are on average less inclined to make charitable contributions than private sector employees. This effect is partly due to the fact that many more people in the public sector feel underpaid. Moreover, we have found that feelings of underpayment have much larger repercussions for the odds of donating to charity in the public sector than in the private sector, suggesting that public sector employees consider the contributions they make on the job as a substitute for charitable donations. Our findings suggest that many public sector employees feel that they already donate a lot to society by exerting effort on the job for relatively little pay and, therefore, are less willing to make any further contributions than their private sector counterparts. Lastly, we have found a clear effect of tenure on pro-social inclinations in the public sector, which arises independently of feelings of dissatisfaction about pay. As public sector employees' tenure increases, they become less and less inclined to make charitable contributions, while there is no tenure effect for private sector employees. Such evolution of preferences for public sector employees is well in line with studies by Blau (1960), Van Maanen (1975), and De Cooman et al. (2009) documenting swift declines in altruistic motivations with tenure among public sector employees. All of these studies are about a specific group of bureaucrats, namely the street-level bureaucrats. However, the effect of tenure is not restricted to this group. Further analysis of our data shows that we clearly observe an effect of tenure among street-level bureaucrats as well as pen-pushing bureaucrats, although the effect of tenure is somewhat less strong in magnitude and significance among the latter. We do notice a difference, however, in the effects of feeling underpaid among both groups. Dissatisfaction with pay has no stronger effect on the tendency among pen-pushing bureaucrats to donate to charity than on private sector workers. However, it does have a larger effect among street-level bureaucrats than among private sector workers. Furthermore, street-level bureaucrats much more often encounter feelings of underpayment than private sector workers or pen-pushing bureaucrats. Therefore

pen-pushing bureaucrats, dissatisfied or not, are much more likely to donate to charity rather than to take the gift certificate than private sector workers at the start of their career. Street-level bureaucrats are not significantly more likely to donate to charity at the start of their career than private sector workers.

# 2.A Appendix

Final question of the survey:

Below you can indicate if you would like to receive a gift certificate or a state lottery ticket (without jackpot). When you choose for one of these options we need your name and address. You can also choose a charity, in that case we donate f. 25,- (11,34 euro) for every completed questionnaire to one of the organizations below. If you choose to donate to charity you do not need to fill out a name and address.

1 ☐ Gift certificate (f 25,-)
2 ☐ Lottery ticket

Name:
Address :
Postal code and Place :

Charity:

3 ☐ Amnesty International
4 ☐ Unicef
5 ☐ Ronald McDonald House Charities
6 ☐ War Child
7 ☐ Carnation Foundation
8 ☐ Wilhelmina Foundation
9 ☐ Hart Foundation
10 ☐ Animal protection
11 ☐ Greenpeace

THANK YOU FOR YOUR COOPERATION!

# Chapter 3

# Incentives and the Sorting of Altruistic Agents into Street-Level Bureaucracies

*Joint with Robert Dur*

## 3.1 Introduction

Street-level bureaucrats often have the dual task of helping some clients while disciplining others. Caseworkers are a case in point. On the one hand, their job is to allocate employment services and give job search assistance to clients who are willing but unable to find a job. On the other hand, they are supposed to sanction clients who rather live on a benefit than work from 9 to 5.[1]

The dual nature of the job implies that it is not straightforward what kind of people should optimally be hired by such street-level bureaucracies. While the helping aspect of the job makes altruistic or client-oriented people the ideal candidates, these people are likely to take clients' interests too much into account when encoun-

[1] Other examples of street-level bureaucrats with such dual tasks easily come to mind. For instance, teachers' main task is to help students learn, but from time to time their job also involves expelling disruptive students from the classroom. Soldiers taking part in peacekeeping missions often engage in both humanitarian activities and combat. And police officers both help and sanction people.

tering clients who should be sanctioned. In addition to this normative issue of what would be optimal candidates, the positive issue of what kind of people find a career in a street-level bureaucracy actually worthwhile is perhaps even more important. While assessment centers and talented HR managers may give agencies a glimpse of job applicants' motivations, their true motivations often remain hidden, implying that agencies should use other, more implicit instruments to promote self-selection of the most desired types of workers. These may include paying low base salaries and offering bonuses for good performance.

This chapter studies these issues by developing a model of a street-level bureaucracy that serves different types of clients, some of which are in need of help (willing but unable clients) and others who should be sanctioned (non-willing clients). In addition, there exists a group of clients who should neither be helped nor sanctioned (willing and able clients). The agency hires bureaucrats whose task is to meet clients, assess their type, and allocate either help, no help, or a sanction. Bureaucrats are hired from a pool of potential job applicants who differ in their altruism towards clients they meet, ranging from complete indifference to highly altruistic. The agency cannot observe job applicants' types. However, it can affect the sorting of job applicants by its personnel policy. We study two different settings which are often observed in practice: 1) the bureaucracy pays a base salary only; 2) on top of the base salary, the bureaucracy offers agents bonus pay or non-pecuniary rewards for good performance (or, equivalently, gives penalties for bad performance). We obtain the following results.

First, when bureaucrats' compensation consists of a base salary only, the bureaucrats' decisions are in line with the agency's preferences, except for the allocations to non-willing clients. Thus, willing and unable clients receive help while willing and able clients get no help. However, as bureaucrats are (weakly) altruistic towards clients, bureaucrats do not sanction non-willing clients, but allocate no help instead. The most altruistic types among the potential job applicants self-select into the bureaucracy. Besides the base salary, the attractiveness of the job depends on the composition of the client population. In particular, the job becomes more attractive, and hence the base salary can be lower, when there are more clients in

need of help. If the agency has monopsony power, we show that it can be optimal to hire fewer agents than necessary to serve all clients, so as to reduce salary costs. Our model thus offers an explanation for why street-level bureaucracies are often plagued by limited resources and an overload of clients, as observed by e.g. Lipsky (1980).

Second, bonus pay (or non-pecuniary rewards) for good performance induces the least altruistic among the hired bureaucrats to sanction non-willing clients. Generally, it is optimal for the agency to set bonus pay such that it induces only part of the bureaucrats to sanction: Some bureaucrats care so much about the feelings of non-willing clients that it is too costly to induce those bureaucrats to impose sanctions. Besides affecting bureaucrats' decisions, we show that bonus pay can be used by the agency to extract rents from the most altruistic bureaucrats. Since these bureaucrats do not sanction, a rise in bonus pay increases their income by less than the income of bureaucrats who do sanction. Optimal bonus pay is therefore higher than the value of sanctioning for the agency.

Third, the effect of pay-for-performance on the sorting of agents into bureaucracy crucially depends on whether the expected joys of helping the willing and unable clients exceed the expected sorrows of sanctioning non-willing clients. If the client population consists mainly of people in need of help, and the willing clients' benefit from help is high relative to the unwilling clients' pain of sanctions, there is still self-selection of the most altruistic types into the job. If this condition does not hold, the only way through which the agency can make sure that at least some of its agents sanction non-willing clients is by offering a combination of base salary and bonus pay that is more generous than the agents' outside option. As a result, there is sorting from both the top and the bottom of the altruism distribution, with highly altruistic agents choosing no sanction for the non-willing clients and earning low income and agents with a low level of altruism imposing sanctions and earning high bonus pay. When the bureaucracy values sanctions for non-willing clients sufficiently, the bureaucracy optimally sets personnel policy such that it only hires agents from the bottom of the altruism distribution. We thus show that bonus pay can have a profound impact on the type of workers self-selecting into street-level bureaucracies.

We proceed as follows. The next section describes how our research relates to the literature and discusses some stylized facts about the motivation of caseworkers, which we take as the leading example in our research. Section 3 describes the model. Section 4 analyzes the simple case where bureaucracies pay flat wages. Next, section 5 studies the implications of pay-for-performance. Section 6 concludes.

## 3.2 Related literature and some stylized facts

Our research contributes to a recent literature in economics on incentives and workers' motivation in the public sector (Francois, 2000 and 2007, Dixit, 2002, Glazer, 2004, Besley and Ghatak, 2005, Prendergast, 2007, Delfgaauw and Dur, 2008 and 2009, Brekke and Nyborg 2008, and Vlassopoulos 2008). Francois and Vlassopoulos (2008) provide a survey of this literature. Closest to our research is Prendergast (2007) who studies sorting of purely altruistic agents into a street-level bureaucracy and shows that, generally, both the most and least desired types self-select into bureaucracy. There are four key differences between his paper and our research. First, we focus on jobs which involve a *dual* task of helping some clients and sanctioning others. Second, Prendergast (2007) focuses on effort provision of the agents, assuming that agents cannot lie about the client's type. In contrast, we assume that agent's information about client's type does not involve effort cost and is soft, giving discretion to the agent in his allocation decision. Third, while in Prendergast (2007) bureaucrats earn flat wages, we allow bureaucracies to use incentives. Last, we assume that agents are impurely altruistic in the sense that they only care about clients they meet and we abstract from hostile agents. We discuss the implications of these last two assumptions along the way.

There is abundant evidence that a substantial part of people working in street-level bureaucracies are concerned about clients. Lipsky (1980: 72) observes that "Those who recruit themselves for public service work are attracted to some degree by the prospect that their lives will gain meaning through helping others." More recently, Le Grand (2003: 38) concludes that a part of public service employees (the 'act relevant knights' in his terms), are "motivated by the need to perform the

helping acts themselves". Other recent empirical studies showing that public sector workers often have a strong intrinsic motivation to help clients include Edmonds et al. (2002) and Frank and Lewis (2004).

Caseworkers are perhaps the clearest example of street-level bureaucrats with dual tasks (helping some clients while sanctioning others). There is a rich empirical literature studying the motives and client-orientation of caseworkers. Blau (1960: 347) studies the attitude towards clients of personnel in a public welfare agency and concludes that "Most persons who took a job in the welfare agency were partly motivated by an interest in working with and helping poor people. They tended to look forward to establishing a warm, although not intimate, relationship with deserving and grateful clients, and considered the case worker as the agent of society who extended a helping and trusting hand to its unfortunate members." Marston et al. (2005: 146) provide strong evidence for client-advocacy in a Danish employment project. They cite a bureaucrat as saying that: "How am I supposed to activate people who are running around in the streets without a home– I can't (...) but I need to give them a temporary place to stay– or do something for them." Heckman et al. (1996: 2) find that caseworkers in a US job-training program have "a strong desire to aid the least well off." Lastly, Considine (2000: 290) finds that Australian caseworkers do not like to sanction clients: "They found it off-putting to subject job-seekers to the framing of highly legalistic agreements in their first weeks." They also "saw sanctioning as a last resort which implied a breakdown in their service and thus a loss of face for them and their agency."

However, not all street-level bureaucrats and caseworkers have such warm feelings towards clients. Hernandez et al. (2003: 15-16) interviewed participants to vocational rehabilitation programs. While 21% of the participants report having a counselor who is committed, 29% find their counselor unresponsive, "particularly when they failed to return telephone calls and follow through with specific tasks that were discussed during appointments (for example, offering but never providing job placement services)." Using Swiss survey data, Behncke et al. (2007: 8-9) also find striking differences between caseworkers' attitudes towards clients. In their sample, 52% of caseworkers state that "the wishes of the unemployed should be

satisfied". However, 9% of caseworkers "assign placements in jobs and active labour market programmes independent of the wishes of the unemployed". Lastly, Blau (1960: 347) notices that a few of the caseworkers in his study were motivated by considerations such as a desire to dominate people.

## 3.3 The model

Our model revolves around a principal (the benefit administration or public employment service) with $S$ clients (unemployed workers or people on social benefits). The principal hires an endogenous number of agents (casemanagers or caseworkers) to serve these clients. The task of an agent is to meet clients and to allocate to each of them either an employment service, a sanction, or no help at all. Employment services can consist of schooling, job search assistance, assessments et cetera. A sanction can be a pecuniary penalty, but also a non-pecuniary penalty, for instance workfare where the client is obliged to do production work. For convenience, we normalize the number of clients each agent meets to one.

In what follows, we describe the possible allocations and associated payoffs to the principal, agents, and clients, which are summarized in table 3.1.

**Principal** The principal's preferred allocation depends on the client's type. Clients differ in two respects: Their motivation and their ability to find a job. For convenience, we assume that clients belong to either one of the following four types.[2] The first type of clients, denoted by $l$, is willing to work, but not able to find a job without help. They need assistance in the form of employment services to improve their labor skills or to increase the effectiveness of their job search effort. When a client of type $l$ receives employment services, the principal's payoff $U_p$ increases by $b - c > 0$, where $b$ represents the gains from clients finding a job and leaving welfare with a higher probability, and $c$ stands for the costs of the employment services. Without help, the willing but unable clients would not likely find a job, leaving the principal a payoff we normalize to zero. Giving them a sanction is considered to be unfair

[2] Our labelling of clients resembles the ones mentioned in e.g. Marston et al. (2005: 149), Sol et al. (2007: 21), and Bunt et al. (2008: 37).

by the principal. The principal would receive some kind of payment $z$: The money collected from the penalty, the production value of the client under workfare, or possible positive effects of sanctions on the probability of leaving welfare and finding a job (see for instance Van den Berg et al., 2004). However, the principal loses $x$ (well-being) from the wrongful treatment of the willing client. The principal's net payoff from this allocation is assumed to be negative, $z - x < 0$.

The second type of clients, denoted by $m$, is willing and able to find a job. The best decision for the principal would be *not* to help those clients resulting in a payoff we normalize to zero. Giving them employment services would entail costs, but does not help them to find a job faster, resulting in a payoff of $-c < 0$ for the principal. A sanction would be considered unfair, implying a payoff of $z - x < 0$, as is the case for the first type of clients.

The third type of clients is able to find a job, but not willing to do so. The fourth type of clients is neither willing, nor able to find a job. We label these last two types by their common denominator: The non-willing, $n$. According to the principal they should all receive a punitive sanction for misbehavior, resulting in a payoff $z > 0$.[3] Allocating them employment services is a waste of money, $-c < 0$.[4] Allocating no help to them leaves the principal a payoff normalized to zero.

The principal knows the distribution of clients' types, but does not know the type of each individual client. He needs agents to sort this out for him and allocate the right service to his clients. The principal has a monopoly in supplying allocations: Clients cannot choose who monitors their job search behavior. The principal pays each agent a base salary $w$, which lowers the principal's payoff. Further, the principal may use incentives which are discussed below. Hiring agents to make allocations is only optimal when the principal's utility from doing so is equal to or higher than the principal's reservation utility, that is allocating all clients the same treatment. We assume throughout that the principal always finds it worthwhile to hire a strictly

[3] In addition to the monetary payoff of imposing a sanction, there could be some feelings of satisfaction or justification that a non-willing client gets punished. To save on notation, we ignore these potential benefits.

[4] Although this might seem a strong assumption, relaxing it does not change our results much as long as the non-willing clients dislike employment services or as long as a sanction should be allocated as well.

positive number of agents. The principal hires agents from a pool of $R$ heterogenous individuals which is sufficiently large ($R > S$) so that the principal is never supply-constrained. Further, the principal is a monopsonist in the labor market for agents. This assumption only plays a role in the subsections where we derive the number of agents the principal wants to hire. We shall also discuss what happens when the principal has no monopsony power; that is, competes with other bureaucracies for agents.

**Clients** Clients are fully informed about their own willingness and ability to find a job. The utility of a client, $U_c$, depends on his type and on the allocation made to him. Like the principal's payoff, we normalize clients' payoff to zero in case they receive no help. All clients dislike sanctions. These give them a negative payoff, $-v < 0$. Because willing and unable clients like to have a job and need help to find it, they appreciate employment services. This gives them a positive payoff, $k > 0$. Willing and able clients are indifferent between receiving employment services and no help.[5] Non-willing clients prefer receiving no help and enjoying their leisure time to participating in employment services, which gives them a negative payoff $-g$. Receiving employment services is, however, preferred to getting a sanction, $-v < -g < 0$.

There are $L > 0$ willing and unable clients, $M > 0$ willing and able clients, and $N > 0$ non-willing clients. The total number of allocations, denoted by $Q$, is endogenously determined by the principal (through his decision on the number of agents he wishes to hire), but cannot exceed the total number of clients, $Q \leq L + M + N = S$.

**Agents** As soon as an agent meets a client, he knows the client's type. Hence, investigating a client does not involve cost of effort and, when the agent allocates a service or sanction, he is always fully informed about the client's willingness and

[5] If the willing and able clients strictly prefer no help to participating in employment services, our results do not change. If they strictly prefer participating in employment services to receiving no help, there is an additional incentive problem, but our main arguments remain unaffected. In this case, the clients' and principal's preferences differ in two respects instead of one.

Table 3.1: Payoff to principal, client and agent of different allocations

| **Client's type** | **Allocation** | **Payoff** | | |
|---|---|---|---|---|
| | | **Principal** | **Client** | **Agent** |
| Willing, unable $l$ | Sanction | $z-x-w$ | $-v$ | $w-\theta_j v$ |
| | No help | $-w$ | 0 | $w$ |
| | Employment services | $b-c-w$ | $k$ | $w+\theta_j k$ |
| Willing, able $m$ | Sanction | $z-x-w$ | $-v$ | $w-\theta_j v$ |
| | No help | $-w$ | 0 | $w$ |
| | Employment services | $-c-w$ | 0 | $w$ |
| Non-willing $n$ | Sanction | $z-w$ | $-v$ | $w-\theta_j v$ |
| | No help | $-w$ | 0 | $w$ |
| | Employment services | $-c-w$ | $-g$ | $w-\theta_j g$ |

ability to work.[6] Agent's utility $U_a$ depends first of all on his base salary $w$ (see table 3.1). Second, the agent may be altruistic towards the client he meets. This is represented by $\theta_j U_c$, where $\theta_j$ measures agent $j$'s altruism towards his client, and $U_c$ is the utility of the client the agent meets. Since agents only have altruistic feelings towards clients they meet, they are impurely altruistic or have 'warm glow' preferences in the sense of Andreoni (1989, 1995). We assume that for any $j$, $0 \leq \theta_j \leq \overline{\theta} < 1$,[7] and that in the population of potential agents the altruism parameter $\theta$ is distributed according to the cumulative distribution function $\int_0^{\theta} f(\theta)\, d\theta$. Importantly, an agent's altruism is private knowledge. Altruistic agents take into account how their allocation decisions affect clients' welfare. Without significant loss of generality, we assume that whenever the agent is indifferent between allocations, the agent gives priority to what the client prefers. When the client is also indifferent, the agent decides to allocate what the principal prefers. The agent will only accept the job as a caseworker when his expected utility from doing so is equal to or above his reservation utility, $\bar{A}$.

[6] We thus abstract from the issue of how much effort an agent exerts to determine the correct allocation which is central in Prendergast (2007).

[7] We also discuss along the way what would happen when some agents have negative, hostile feelings towards their clients ($\theta_j < 0$), as in Prendergast (2007).

**Incentives** As we shall see, the principal's and agents' preferences are not always in line. Hence, the principal may want to use incentives. For simplicity, we shall restrict attention to the following simple incentive scheme: The principal pays the agent a bonus, denoted by $\pi$, for each correct allocation, and does not overrule wrong allocations. For instance, we can think of a bonus for job placements when correct decisions lead to maximum job placements. Overruling is not possible, because when the principal observes the outcome, time has passed and the allocation has already been put into effect. The same holds when agents are rewarded for not deviating too much from a benchmark. The bonus for the agents can take a pecuniary or non-pecuniary form; for convenience, we shall speak of pecuniary bonuses henceforth.[8]

**Timing** The principal offers a contract, describing the base salary and bonus. Each agent decides whether or not to take the job. Then, each agent who took the job meets a client and takes a decision about the allocation. Lastly, the clients', principal's and agents' payoffs are realized.

## 3.4 Flat wages

We start by analyzing the case where the principal gives no incentives ($\pi = 0$) and just pays a base salary $w$.[9] We solve the game by backward induction and start by agents' decisions on allocations.

### 3.4.1 Which allocations do agents make?

The principal's and agents' preferences align when agents meet clients who are willing to work. When meeting a client who is willing but unable, agents allocate employment services, because this gives these agents a payoff of $w + \theta_j k$, which is

[8] It is straightforward to show that bonuses for correct decisions and penalties for wrong decisions (such as layoff in case of bad performance evaluations) yield equivalent results.

[9] A practical example of this is discussed by Riccuci and Lurie (2001: 34), who conclude that "there are neither 'carrots' nor 'sticks' to motivate the workers" in the social welfare offices in Texas, Michigan and Georgia. Even though these offices use performance measures, "workers said that all front-line welfare workers are likely to receive the same performance ratings" (Riccuci and Lurie, 2001: 35).

higher than the payoff of allocating a sanction, $w - \theta_j v$, or allocating no help, $w$. When meeting a client who is willing and able, agents' payoff of allocating no help is $w$, which is equal to the payoff of giving employment services and higher than the payoff of sanctioning, $w - \theta_j v$. Whenever an agent is indifferent between allocations, he makes the allocation the client prefers. And if the client is indifferent too, the agent takes the decision the principal prefers. In this case: No help. However, when meeting a non-willing client, the principal would prefer that agents allocate a sanction, but the agents allocate no help instead, resulting in a payoff of $w$. This payoff is higher than when they impose a sanction, $w - \theta_j v$, or give employment services, $w - \theta_j g$, because these allocations harm non-willing clients. So, the agents' decisions are not fully in line with those desired by the principal: Agents are not willing to sanction the non-willing clients, as the agents want to avoid the negative feelings they get from imposing sanctions on clients. Instead, they allocate no help to these clients.

### 3.4.2 Which agents take the job?

An agent takes the job when his expected utility from taking the job is higher than or equal to his outside option utility, $EU_a \geq \bar{A}$. Using our previous results on agents' allocation decisions, the expected utility for agent $j$ from taking the job is

$$EU_a = w + \frac{Lk\theta_j}{L + M + N}. \tag{3.1}$$

That is, the agent enjoys his base salary and, with probability $\frac{L}{L+M+N}$, helps a willing and unable client, which raises his utility by $k\theta_j$. The agent derives no such additional utility when encountering a willing and able client or when encountering a non-willing client because, as we have seen, the agent will allocate these clients no help. Since $Lk > 0$, the participation constraint can be written as:

$$\theta_j \geq \widetilde{\theta} = \left(\bar{A} - w\right) \left[\frac{Lk}{L + M + N}\right]^{-1}. \tag{3.2}$$

We can distinguish three cases for the threshold level of agent's altruism $\widetilde{\theta}$. First, $\widetilde{\theta} > \overline{\theta}$. In this case, nobody is willing to take the job. Second, if $\widetilde{\theta} \leq 0$, then the whole labor force is willing to apply. In the third and most interesting case where $0 < \widetilde{\theta} \leq \overline{\theta}$, only agents with a sufficiently high level of altruism are willing to take the job. We focus on this third case.[10] Notice that this implies that $\bar{A} - w > 0$: The base salary does not make up for foregoing the outside option. The reason is that the job gives agents an opportunity to help willing but unable clients, which increases altruistic agents' utility.

The self-selection of the agents is affected by the composition of the client population, the quality of employment services and sanction policy, and the principal's personnel policy. We discuss the influence of these aspects in turn.

**Client population** The higher the number of willing and unable clients, the more attractive the job becomes for altruistic agents, because there are a lot of clients needing employment services and thus a big chance of getting the warm feelings of helping them. So even for agents with a relatively low level of altruism $\theta_j$, the job becomes interesting:

$$\frac{\partial \widetilde{\theta}}{\partial L} = \frac{-k\left(\bar{A} - w\right)(M+N)}{(Lk)^2} < 0.$$

The higher the number of willing and able clients, the less interesting the job becomes. These clients need no help. Thus there are lower expected benefits from helping clients to compensate for the low-paying job:

$$\frac{\partial \widetilde{\theta}}{\partial M} = \frac{\bar{A} - w}{Lk} > 0.$$

The same holds for the number of non-willing clients. Because the agents do not impose sanctions, the agents avoid the negative feelings this would evoke for the clients and thus themselves. But they do not get positive feelings of helping clients either. When there are more of these non-willing clients, less people are willing to

[10] When we would allow for agents with $\theta_j < 0$ (hostile agents), we would get a result similar to Prendergast (2007). That is, agents from both ends of the spectrum, with very positive and very negative attitudes to clients, take the job. The latter would impose sanctions on all types of clients as they enjoy making people worse off.

take the job:

$$\frac{\partial \widetilde{\theta}}{\partial N} = \frac{\bar{A} - w}{Lk} > 0.$$

**Employment services and sanction policy** The employment services offered by the bureaucracy can be more or less attractive to clients. Clients, for example, often like employment services where they themselves can have a say. The more attractive the employment services for clients, the more interesting the job becomes for agents:

$$\frac{\partial \widetilde{\theta}}{\partial k} = \frac{-L\left(\bar{A} - w\right)(L + M + N)}{(Lk)^2} < 0.$$

Making the sanction policy more or less fierce has no effect in the flat-wage case, because agents do not impose sanctions anyway:

$$\frac{\partial \widetilde{\theta}}{\partial v} = 0.$$

**Personnel policy** The principal in this case has a simple personnel policy: He only offers a base salary, $w$. Raising this salary makes the job attractive to a larger number of agents:

$$\frac{\partial \widetilde{\theta}}{\partial w} = \frac{-(L + M + N)}{Lk} < 0. \tag{3.3}$$

### 3.4.3 Optimal personnel policy

We have seen that agents are willing to take the job when they are sufficiently altruistic; more precisely, when condition (3.2) holds. But how many agents does the principal want to hire? Recall that each agent makes one allocation. Using equation (3.2), the total number of allocations can be written as $Q = R\int_{\widetilde{\theta}}^{\overline{\theta}} f(\theta)\, d\theta$. Further, using our results on agents' allocation choices in section 3.4.1, the principal's expected payoff of hiring an agent is $\frac{L}{L+M+N}(b-c) - w$. Hiring an agent increases the number of employment services allocated to willing and unable clients, but comes at the cost of paying the base salary. The principal's optimization problem can thus

be written as

$$\max_{w} \left[ \frac{(b-c)L}{L+M+N} - w \right] R \int_{\widetilde{\theta}}^{\overline{\theta}} f(\theta)\, d\theta,$$

where $\widetilde{\theta}$ is described by equation (3.2). The first-order condition describing the optimal base salary is:

$$\frac{\partial EU_p}{\partial w} = \left[ \frac{(b-c)L}{L+M+N} - w \right] Rf(\widetilde{\theta}) \left[ \frac{Lk}{L+M+N} \right]^{-1} - R \int_{\widetilde{\theta}}^{\overline{\theta}} f(\theta) d\theta = 0. \quad (3.4)$$

The condition shows us that by raising the base salary the principal attracts a number of additional agents, $Rf(\widetilde{\theta}) \left[ \frac{Lk}{L+M+N} \right]^{-1}$. This raises the principal's expected payoff as these agents allocate employment services to the willing and unable clients, and lowers his payoff by the salary he has to pay them $\left[ \frac{(b-c)L}{L+M+N} - w \right]$. Raising the base salary also implies that the principal has to pay higher salaries to all agents he hires, which costs $-R \int_{\widetilde{\theta}}^{\overline{\theta}} f(\theta)\, d\theta$. In the optimum, the principal equates these marginal benefits and costs or, if the resulting number of potential allocations exceeds the number of clients, hires $S$ agents. Importantly, the principal may optimally choose to hire too few agents to serve all clients. This stems from the principal's monopsony power: To attract more agents, he must increase all agents' base salary, which may not make up for the payoff resulting from an increase in allocations. Hence, insufficient staffing and an overload of clients may be an optimal choice. If the principal lacks monopsony power, either all or none of the clients would be served, depending on whether the market wage is lower or higher than the expected payoff of an allocation.

## 3.5 Pay-for-performance

As we have seen in the previous section the principal and agents' preferences are not always in line: Agents do not sanction non-willing clients. Can the principal change the behavior of the agents and at what cost? In this section we investigate what happens when the principal rewards agents with a bonus $\pi > 0$ for each correct allocation made, without overruling the agents' allocations when a wrong decision

has been detected.[11] As discussed in section 3.3, an example of such an incentive scheme is making agent's pay dependent of his clients' labor market performances.[12]

### 3.5.1 Which allocations do agents make?

Agents' allocations to the willing and unable clients (employment services) and to the willing and able clients (no help) were already in line with the preferences of the principal in the flat-wage case studied above. Pay-for-performance does not change the agents' allocations to these clients; it only increases the payoff to the agents of making this allocation by $\pi$. However, when the agent meets a non-willing client, bonus pay may induce an agent to impose a sanction rather than to allocate no help. His payoff of sanctioning becomes $w + \pi - \theta_j v$, while the payoff of allocating no help remains $w$ and the payoff of allocating employment services remains $w - \theta_j g$. Hence, if the bonus $\pi$ is high enough, the payoff of sanctioning is higher than the payoff of allocating no help. More specifically, an agent will give non-willing clients a sanction when his level of altruism is lower than the threshold level:

$$\theta_j < \widehat{\theta} = \pi / v. \tag{3.5}$$

When $\theta_j \geq \widehat{\theta} = \pi / v$, the agent's decision is not affected by the bonus: He allocates no help to the non-willing clients, because the bonus does not compensate for the negative feelings the agent experiences when sanctioning a non-willing client.

### 3.5.2 Which agents take the job?

As before, an agent applies for the job when his expected utility from the job is higher than his outside option utility, $EU_a \geq \bar{A}$. We need to distinguish two groups

[11] Alternatively, the principal may give a bonus only when an agent imposes a sanction. This incentive scheme, however, induces some agents to sanction not only non-willing clients, but also the willing and able clients, which is costly to the principal. Restricting the bonus for correct allocations to a bonus for correct sanctions only does not affect any of the main results; it merely leads to an increase in the base salary as the agents' expected bonus pay goes down.

[12] Klerman et al. (2005: 129) observe such individual rewards for caseworkers in California, as does Weissman (1997: 37) in Los Angeles County and Burgess et al. (2004) in Jobcentre Plus in the UK. For example, caseworkers having more than 10 job placements in the preceding month got rewards such as free movie tickets or banners with their name on it.

of agents: Those that sanction non-willing clients and those that do not.

**The agent does not sanction** $\left(\theta_j \geq \widehat{\theta} = \pi/v\right)$ The agent's expected utility, equation (3.1), changes into:

$$EU_a = w + \frac{(L+M)\,\pi}{L+M+N} + \frac{L\theta_j k}{L+M+N} \geq \bar{A},$$

implying the following participation constraint:

$$\theta_j \geq \widetilde{\theta} = \left(\bar{A} - w - \frac{(L+M)\,\pi}{(L+M+N)}\right)\left[\frac{Lk}{L+M+N}\right]^{-1}. \tag{3.6}$$

Compared to the case of flat wages, the participation constraint has changed in only one way: The agent earns a bonus $\pi$ for the allocations to willing clients $(L+M)$. All comparative statics have the same sign as in the absence of bonuses, except for the effect of a higher number of willing and able clients:

$$\frac{\partial\widetilde{\theta}}{\partial M} = \frac{\bar{A} - w - \pi}{Lk} \gtrless 0.$$

While, as before, a higher number of willing and able clients reduces the expected non-pecuniary payoffs from the job, pay-for-performance implies that it now increases the expected pecuniary payoffs. Hence, the number of agents willing to take the job may now increase or decrease with the number of willing and able clients. Further, note that an increase in the bonus makes the job more attractive:

$$\frac{\partial\widetilde{\theta}}{\partial\pi} = \frac{-(L+M)}{Lk} < 0.$$

This effect is smaller than that of raising the base salary (which is again given by (3.3)), because agents who do not sanction only receive the bonus when encountering willing clients. As we shall see, this has important implications for the optimal level of the bonus.

**The agent sanctions** $\left(\theta_j < \widehat{\theta} = \pi/v\right)$ Expected utility of agents who optimally decide to sanction non-willing clients reads:

$$EU_a = w + \pi + \frac{\theta_j \left(Lk - Nv\right)}{L + M + N} \geq \bar{A},$$

implying the following participation constraint:

$$\text{if } Lk - Nv > 0, \text{ then } \theta_j \geq \widetilde{\widetilde{\theta}} = \left(\bar{A} - w - \pi\right) \left[\frac{Lk - Nv}{(L + M + N)}\right]^{-1}; \quad (3.7)$$

$$\text{if } Lk - Nv < 0, \text{ then } \theta_j \leq \widetilde{\widetilde{\theta}} = \left(\bar{A} - w - \pi\right) \left[\frac{Lk - Nv}{(L + M + N)}\right]^{-1}. \quad (3.8)$$

First, consider the case where $Lk - Nv > 0$. That is, given that an agent sanctions non-willing clients, the job brings higher expected joys of helping the willing and unable clients than expected sorrows of sanctioning the non-willing clients. Then, as before, only agents with a sufficiently high level of altruism are willing to apply for the job, $\widetilde{\widetilde{\theta}} \leq \theta_j \leq \overline{\theta}$. Compared to agents who do not sanction, pecuniary payoffs are higher, because the agent gets a bonus for every allocation he makes. Non-pecuniary payoffs are lower, however, because the agent suffers a loss when sanctioning non-willing clients. As before, the principal pays less than agent's outside option utility $\left(w + \pi < \bar{A}\right)$, for otherwise all agents in the economy would apply for the job.

Next, consider the case where $Lk - Nv < 0$. It is easy to see that in this case, if the expected pecuniary payoffs are smaller than the outside option utility, $w + \pi < \bar{A}$, only agents with hostile feelings $\theta_j < \widetilde{\widetilde{\theta}} < 0$ would be willing to apply. However, we have assumed $\theta_j \geq 0$ for any $j$, and so if the principal wants to attract agents who choose to sanction non-willing clients, he must offer $w + \pi \geq \bar{A}$. Agents interested in a job like this are the ones with low levels of altruism, those that do not care too much about the clients' feelings, $0 \leq \theta_j \leq \widetilde{\widetilde{\theta}}$, as described by (3.8).

The comparative static results are similar to those derived above with two exceptions. First, raising the bonus has the same effect as raising the base salary, because agents who sanction receive bonuses for all allocations they make, rendering the base salary and bonus pay perfect substitutes:

$$\text{if } Lk - Nv > 0, \text{ then } \frac{\partial \widetilde{\bar{\theta}}}{\partial w} = \frac{\partial \widetilde{\bar{\theta}}}{\partial \pi} = \frac{-(L+M+N)}{Lk-Nv} < 0;$$
$$\text{if } Lk - Nv < 0, \text{ then } \frac{\partial \widetilde{\bar{\theta}}}{\partial w} = \frac{\partial \widetilde{\bar{\theta}}}{\partial \pi} = \frac{-(L+M+N)}{Lk-Nv} > 0.$$

Although the signs are opposite in the two cases, the interpretation is the same: Raising the bonus or base salary attracts more agents, in the first case from the top and in the second case from the bottom of the altruism distribution (see (3.7) and (3.8)). Second, making the sanction policy more harsh (raising $v$) makes agents less willing to apply for the job:

$$\frac{\partial \widetilde{\bar{\theta}}}{\partial v} = \frac{N\left(\bar{A} - w - \pi\right)(L+M+N)}{(Lk-Nv)^2},$$

which is positive if $w + \pi < \bar{A}$ and negative if $w + \pi > \bar{A}$, both implying that fewer agents apply. In the first case, some agents from the top no longer apply, while in the second case some agents from the bottom are no longer interested in taking the job (see (3.7) and (3.8)).

### 3.5.3 Optimal personnel policy

By setting the base salary $w$ and the bonus $\pi$, the principal determines the number of agents that will be hired as well as affects their allocation decisions. Following the analysis in the previous subsection, there are two cases that need to be distinguished: The case where the expected non-pecuniary payoffs of the job for agents willing to sanction are positive, $Lk - Nv > 0$, and the case where these are negative, $Lk - Nv < 0$.

**Non-pecuniary payoffs positive when agents sanction** ($Lk - Nv > 0$) In this case, the job is mainly a job of helping needy people getting a better chance on the labor market, even for agents who sanction non-willing clients. Hence, as we have seen, the job is particularly attractive to altruistic agents. Using our results on the allocations agents make (section 3.5.1) and which agents take the job (section

3.5.2), we know that, if the principal decides to induce at least part of the agents to sanction non-willing clients, $R\int_{\widehat{\theta}}^{\overline{\theta}} f(\theta)d\theta$ allocations will be made by agents who are willing to take the job but not willing to sanction, and $R\int_{\widetilde{\widetilde{\theta}}}^{\widehat{\theta}} f(\theta)d\theta$ allocations will be made by agents who are willing to take the job and sanction non-willing clients. The resulting expected payoffs to the principal of these two groups of agents are respectively $\left[\frac{(b-c)L}{L+M+N} - w - \frac{(L+M)\pi}{L+M+N}\right]$ and $\left[\frac{(b-c)L+zN}{L+M+N} - w - \pi\right]$ per agent. The principal's optimization problem can thus be written as:

$$\max_{w,\pi}\left[\frac{(b-c)\,L}{L+M+N} - w - \frac{(L+M)\,\pi}{L+M+N}\right] R\int_{\widehat{\theta}}^{\overline{\theta}} f\,(\theta)\,d\theta + \left[\frac{(b-c)\,L+zN}{L+M+N} - w - \pi\right] R\int_{\widetilde{\widetilde{\theta}}}^{\widehat{\theta}} f\,(\theta)\,d\theta \tag{3.9}$$

where $\widehat{\theta}$ is described by (3.5) and $\widetilde{\widetilde{\theta}}$ by (3.7). It is easy to verify that the participation constraint of agents who do not sanction, described by (3.6), is not binding, unless $\widehat{\theta} \leq \widetilde{\theta}$. In the latter case, the bonus is too low to induce any agents to sanction non-willing clients and, hence, the optimization problem is the same as in the case of flat wages, which we studied in the previous section. If $\widehat{\theta} > \widetilde{\theta}$, the first-order conditions for the optimal base salary and bonus are:

$$\frac{\partial EU_p}{\partial w} = \left[\frac{(b-c)\,L+zN}{L+M+N} - w - \pi\right] Rf(\widetilde{\widetilde{\theta}})\left[\frac{Lk-Nv}{L+M+N}\right]^{-1} - R\int_{\widetilde{\widetilde{\theta}}}^{\overline{\theta}} f(\theta)d\theta = 0 \tag{3.10}$$

$$\frac{\partial EU_p}{\partial \pi} = \frac{N\,(z-\pi)}{L+M+N} Rf(\widehat{\theta})\frac{1}{v} + \left[\frac{(b-c)L+zN}{L+M+N} - w - \pi\right] Rf(\widetilde{\widetilde{\theta}})\left[\frac{Lk-Nv}{L+M+N}\right]^{-1} - \frac{L+M}{L+M+N} R\int_{\widehat{\theta}}^{\overline{\theta}} f(\theta)d\theta - R\int_{\widetilde{\widetilde{\theta}}}^{\widehat{\theta}} f(\theta)d\theta = 0 \tag{3.11}$$

Raising the base salary $w$ has the same effects as in the case of flat wages, except that the additional agents sanction non-willing clients (which raises the marginal benefits) and need to be paid bonuses (which reduces the marginal benefits). Furthermore, as before, when raising the base salary, the principal has to pay a higher salary to all

agents, which is reflected by the last term of (3.10). Due to this monopsony effect, the principal may again optimally choose to hire too few agents to serve all clients.

Raising the bonus $\pi$ has three effects. Firstly, it induces $Rf(\widehat{\theta})\frac{1}{v}$ agents to sanction and receive a bonus rather than allocate no help to non-willing clients. This results in a total increase of the principal's payoff described by the first term in (3.11): The principal gains $z$ from each additional sanction to non-willing clients at the cost of paying an additional bonus $\pi$. Secondly, as for the base salary, by raising the bonus the principal attracts additional agents willing to sanction, which is reflected by the second term in (3.11). Notice that this term is identical to the first term in (3.10), which reiterates our result above that raising the base salary or the bonus have the same effect on recruitment of agents willing to sanction. Lastly, the marginal costs of raising the bonus are described by the last two terms of (3.11): Agents are compensated better for correct decisions.

In the optimum the principal equates the marginal benefits and costs of raising the bonus and of raising the base salary. Combining the first-order conditions gives:

$$(\pi - z)\,\frac{f(\widehat{\theta})}{v} = \int_{\widehat{\theta}}^{\overline{\theta}} f(\theta)d\theta,$$

which implies that the optimal bonus $\pi$ exceeds the value to the principal of sanctioning a non-willing client ($z$). The intuition follows. By raising the bonus, some additional agents are induced to impose sanctions, which raises the principal's payoff by $(\pi - z)$, as discussed above. Hence, it is optimal for the principal to raise the bonus at least to the point where the bonus equals the value to the principal of sanctioning non-willing clients. This echoes the familiar result that, with risk-neutral agents, optimal bonus pay equals the full marginal product. However, there is an additional benefit of raising the bonus. Recall that an increase in the bonus enables the principal to reduce the base salary by the same amount without losing any agents, because the bonus and base salary are perfect substitutes for the marginal agents. Expected wage compensation for agents who do not sanction decreases, however. They bear the full loss of the reduction in the base salary, but gain only partly from the increase in the bonus as they do not sanction. Raising the bonus thus enables the principal to extract rents from the agents who do not sanction non-willing clients.

In the optimum, the bonus therefore exceeds the principal's value of sanctioning non-willing clients.[13] Nevertheless, if $\overline{\theta}$ is sufficiently high, the optimal bonus does not induce all agents to sanction non-willing clients. The principal simply finds it too costly to induce highly altruistic agents to impose sanctions.

**Non-pecuniary payoffs negative when agents sanction** ($Lk - Nv < 0$) In this case, the job is mainly about disciplining instead of helping clients for agents who find it optimal to impose sanctions on non-willing clients. As we have seen in section 3.5.2, in order to induce at least some of the agents to sanction non-willing clients, the total pecuniary payoffs of the job for these agents must at least be equal to the outside option utility, $w + \pi \geq \bar{A}$, implying that some agents from the bottom of the altruism distribution sort into the agency. Using our previous results on which allocations agents make (section 3.5.1) and who will take the job (section 3.5.2), we know that $R\int_0^{\widetilde{\widetilde{\theta}}} f(\theta)\, d\theta$ allocations are made by agents willing to sanction and $R\int_{\widetilde{\theta}}^{\overline{\theta}} f(\theta)\, d\theta$ allocations are made by agents not willing to sanction.[14] The principal's optimization problem can thus be written as:

$$\max_{w,\pi} \left[\frac{(b-c)L + zN}{L+M+N} - w - \pi\right] R\int_0^{\widetilde{\widetilde{\theta}}} f(\theta)\, d\theta + \left[\frac{(b-c)L}{L+M+N} - w - \frac{\pi(L+M)}{L+M+N}\right] R\int_{\widetilde{\theta}}^{\overline{\theta}} f(\theta)\, d\theta, \tag{3.12}$$

[13] Obviously, more sophisticated separating contracts may enable the principal to extract even more rents from the altruistic agents. We leave an analysis of this for future research. Note also that rent extraction can only occur when the principal has monopsony power. When there are many identical principals, competition rules out rent extraction, and the optimal bonus $\pi$ is equal to the principal's value of sanctioning a non-willing client ($z$).

[14] Using (3.5), (3.6), and (3.8), it is easy to verify that in all cases where the principal hires neither all nor none of the potential agents, it holds that $\widetilde{\widetilde{\theta}} < \widehat{\theta} < \widetilde{\theta}$. In other words, none of the agents hired from the top of the altruism distribution sanction, while all agents hired from the bottom do sanction non-willing clients. Hence, the incentive constraint (3.5) is redundant.

where $\widetilde{\theta}$ is described by (3.6) and $\widetilde{\widetilde{\theta}}$ by (3.8). The first-order conditions are:

$$\frac{\partial EU_p}{\partial w} = \left[\frac{(b-c)\,L + zN}{L+M+N} - w - \pi\right] Rf\left(\widetilde{\widetilde{\theta}}\right)\left[-\frac{Lk - Nv}{L+M+N}\right]^{-1} + \left[\frac{(b-c)\,L}{L+M+N} - w - \frac{\pi\,(L+M)}{L+M+N}\right] Rf\left(\widetilde{\theta}\right)\left[\frac{Lk}{L+M+N}\right]^{-1} - R\int_0^{\widetilde{\widetilde{\theta}}} f\,(\theta)\,d\theta - R\int_{\widetilde{\theta}}^{\overline{\theta}} f\,(\theta)\,d\theta = 0 \tag{3.13}$$

$$\frac{\partial EU_p}{\partial \pi} = \left[\frac{(b-c)\,L + zN}{L+M+N} - w - \pi\right] Rf(\widetilde{\widetilde{\theta}})\left[-\frac{Lk - Nv}{L+M+N}\right]^{-1} + \left[\frac{(b-c)\,L}{L+M+N} - w - \frac{\pi\,(L+M)}{L+M+N}\right] Rf(\widetilde{\theta})\left[\frac{L+M}{L+M+N}\right]\left[\frac{Lk}{L+M+N}\right]^{-1} - R\int_0^{\widetilde{\widetilde{\theta}}} f(\theta)d\theta - \frac{L+M}{L+M+N}R\int_{\widetilde{\theta}}^{\overline{\theta}} f(\theta)d\theta = 0 \tag{3.14}$$

The first term in (3.13) shows that, as before, by raising the base salary $w$, the principal attracts more agents who are willing to sanction. However, in this case, he also attracts more agents who are not willing to sanction, resulting in additional payoffs described by the second term of (3.13). Furthermore, the principal has to pay a higher salary to all agents, described by the third and fourth term in (3.13), which can lead to the same monopsony result for the optimal number of allocations as before: Too few agents to serve all clients. The first two terms in (3.14) show that by raising the bonus, the number of agents willing to sanction as well as the number of agents not willing to sanction increase. Finally, the last two terms of (3.14) describe the increase in bonus paid to all hired agents. Combining the first-order conditions and rewriting gives:

$$\left[\frac{(b-c)\,L}{L+M+N} - w - \frac{\pi\,(L+M)}{L+M+N}\right] f\left(\widetilde{\theta}\right)\left[\frac{Lk}{L+M+N}\right]^{-1} = \int_{\widetilde{\theta}}^{\overline{\theta}} f\,(\theta)\,d\theta,$$

$$\left[\frac{(b-c)\,L+zN}{L+M+N}-w-\pi\right]f\left(\widetilde{\widetilde{\theta}}\right)\left[-\frac{Lk-Nv}{L+M+N}\right]^{-1}=\int_0^{\widetilde{\widetilde{\theta}}}f\left(\theta\right)d\theta.$$

Clearly, in the optimum, the principal hires agents from the top and the bottom of the altruism distribution until the expected gains from hiring additional agents from each group are equal to the increase in rents he has to leave to this group of agents. Highly altruistic agents do not sanction non-willing clients and are paid low income and agents with low altruism sanction and earn high bonus pay. Hence, when the non-pecuniary payoffs of the job are negative for agents who sanction, pay-for-performance has a profound effect on the sorting of agents. While in the case of flat wages, only the most altruistic types opt for the job, with pay-for-performance sorting from the top and bottom of the altruism distribution results. When the value to the principal of sanctioning non-willing clients, $z$, is sufficiently high, it may even be optimal for the principal to hire agents from the bottom of the altruism distribution only. The same holds when $\overline{\theta}$ (the most altruistic agent's degree of altruism) is sufficiently low. In these cases, the benefits of hiring the most altruistic agents (low wage costs) do not compensate for the costs (that some non-willing clients do not get a sanction). However, the opposite may also be the case. When the value of sanctioning is sufficiently low or when there is sufficient mass of highly altruistic agents, the principal does not find it worthwhile to offer high pecuniary payoffs so as to attract agents who are willing to sanction. This results in sorting of the most altruistic types only, as in the case of flat wages.

## 3.6 Concluding remarks

We have studied the effects of pay-for-performance in street-level bureaucracies where agents have the dual task of helping some clients while disciplining others. Our theoretical work has some clear predictions which can be tested in future empirical research, e.g. using data such as those used by Behncke et al. (2007) combined with data on how agents are compensated. In particular, our study suggests that pay-for-performance can have important effects on the self-selection of agents into street-level bureaucracies. While organizations paying flat wages are predicted to be

attractive mainly to highly altruistic (or client-oriented) types, organizations using pay-for-performance are also (and sometimes only) attractive to agents who have a neutral stance towards clients. Further, our analysis predicts that understaffing (as measured by, e.g., unexplained differences in caseloads per agent, see Bloom et al. (2003)) is related to the degree of competition between agencies and to the composition of their client population. More specifically, our results suggest that bureaucracies facing less competition in the labor market for agents are more likely understaffed, and the more so when their clients more likely qualify for help or a sanction.

While we have focussed on pay-for-performance as a means to align the agents' and principal's interests, there are of course several other ways to do so. We discuss three of these alternatives here. A first alternative is to monitor (a part of) the agents' allocations before they are put into effect and to punish and overrule an agent when a wrong allocation is detected (see e.g. Van der Veen 1990). In an earlier draft of this chapter, we explored this case. If the agent only cares about the effects on the client's welfare of his own decisions and not those by the principal, the results are similar to the case of pay-for-performance studied above. However, some results change when we assume that the agent, once he has met the client, cares also about how clients are affected by later decisions taken by the principal. Then, like bonus pay, monitoring induces part of the bureaucrats with lower levels of altruism to sanction non-willing clients. But when the monitoring rate is sufficiently high, there are further consequences for sorting: Sorting into the job from the bottom of the altruism distribution only, even by agents not willing to sanction. The reason is that, with a high monitoring rate, the agency is likely to overrule the bureaucrat when observing that the bureaucrat has not imposed a sanction on non-willing clients. When the bureaucrat's sorrows of these sanctions are larger than the joys of helping others, the job is no longer attractive to altruistic people and the agency needs to offer a relatively high wage to attract people who will all be little concerned about clients' welfare.

A second alternative way of aligning the principal and agents' interests is to advise the agent on what allocation to make using a statistical assignment program

which uses data on clients' characteristics (profiling). Many countries use such a procedure (see OECD, 2007, Black et al., 2003, Rosholm et al., 2004). One reason to introduce profiling is to avoid casemanagers' bias. Or, as Bell and Orr (2002: 281) put it, to promote that "identical persons will get the same treatment, regardless of who their caseworker might be". Profiling constrains agents' room for discretion if the agency penalizes agents for diverting too often from the advised allocations. This can be considered as a special case of monitoring and is thus likely to lead to the same results as described in the previous paragraph.

A third alternative is to use clients' complaints to find out when a wrongful decision has been taken by an agent. However, complaints would be uninformative in our model, because agents do not sanction willing clients. The only clients who would complain about sanctions are non-willing clients, who are sanctioned deservedly. All other allocations are in line with the clients' preferences. No complaints are to be expected in those cases. Complaints, however, are informative in models where agents need to exert effort to make a correct allocation, as studied by Prendergast (2007).

We have abstracted from any private costs to agents of sanctioning clients, like for example physical threats, lots of paperwork, or the chance to become engaged in the legal process of sanctions and appeal (see e.g. Considine 2000). Such private costs would make agents even less willing to sanction non-willing clients. To induce agents to impose sanctions, the bonus would need to compensate agents for these private costs in addition to the sorrows arising from agents' altruism towards clients.

We have assumed that agents differ in their altruism towards their clients, but that each agent's level of altruism is the same towards all of his clients. Thus, we assumed that agents do not discriminate against some clients. But as Lipsky (1980: 108) observes: "some clients simply evoke workers' sympathy or hostility (...) workers may be inclined to 'give the underdog a break' or may favour clients with similar ethnic backgrounds, as when racial or ethnic favoritism prevails in discriminatory decision making." These feelings can impact agents' allocation decisions in important ways. Feelings of reciprocity (Fehr and Gächter, 2000, Fong et al., 2006, and Fong, 2007) can also play a role. People tend to treat friendly and deserving

people better than hostile and undeserving people. In our model, reciprocity could imply that agents treat willing clients more favorably than non-willing clients, thus improving the alignment of the principal's and agents' interests. However, these reciprocal feelings are in practice not likely to be strong enough to achieve perfect alignment, which is also clear from the empirical literature discussed in section 2.

Lastly, an agent's altruism does not need to be stable over time. As Blau (1960: 347-348) notices "the attitudes of most new case workers toward clients were strongly positive, if somewhat sentimental and idealistic (...) But as he encountered clients who blamed him personally for not helping them enough (...) and clients met his trusting attitude by cheating and lying, the newcomer tended to experience a 'reality shock' (...) This disillusioning experience might make a worker bitter and callous, or induce him to leave the job, and even those who did not have either of these extreme reactions tended to change their orientation to clients." This is clearly an interesting topic for future research.

# 3.A Notation

- $\bar{A}$ = agent's outside option utility
- $L$ = number of willing and unable clients (type $l$).
- $M$ = number of willing and able clients (type $m$).
- $N$ = number of non-willing clients (type $n$).
- $Q$ = number of allocations
- $R$ = number of potential agents
- $S$ = number of clients
- $U_a$ = agent's utility function
- $U_c$ = client's utility function
- $U_p$ = principal's utility function
- $b$ = principal's benefit when a willing and unable client receives employment services
- $c$ = principal's cost when a client receives employment services
- $f(\theta)$ = density function of agents' types
- $g$ = non-willing client's cost of employment services
- $k$ = willing and unable client's benefit of employment services
- $v$ = client's cost of a sanction
- $w$ = agent's base salary
- $z$ = principal's benefit when a non-willing client receives a sanction
- $z - x$ = principal's net benefit when a willing client receives a sanction
- $\pi$ = bonus for making a correct allocation
- $\theta$ = agent's level of altruism towards clients

# Chapter 4

# The Sorting of Motivated Teachers into Inner City Schools

"Did you get close to giving up?"

"No, I love teaching. I mean, I truly, truly love to teach."

Ed Burns[1]

## 4.1 Introduction

Teaching in an inner city school is a hard job. Or as Ed Burns — a former inner city teacher says: "Psychologically, there's no way to prepare for it. The closest preparation I think I had was when I went to Vietnam in the infantry. (..) You get a class of 35 kids, of which five or six are thugs — what the DSM calls "oppositionally defiant children". So they're fighting and disruptive and cursing you like sailors."[2] However, despite the violence, the disruptive students, and hard working conditions,

[1] Writer and Producer Ed Burns in a interview with HBO about his experience as a teacher in Baltimore's inner city. He used this experience in season four of the television series *The Wire* (http://www.hbo.com/the-wire/inside#/the-wire/inside/interviews/interview/ed-burns.html).

[2] Ibid. DSM refers to the 'Diagnostic and Statistical Manual of Mental Disorders', which psychiatrists use to classify mental disorders.

some teachers seem to have a preference for working in those inner city schools, because they simply find working with underprivileged students more forfilling. As Ed Burns puts it: "I used to stay at the school for chess club in a computer room, and some of the kids would come up for lunch. When they're really close, when you can really interact with them, they're wonderful, vibrant human beings."[3] Jacob is another example of a motivated teacher. He prefers to work in a secondary vocational training school in one of Amsterdam's worst neighbourhoods instead of working in "a 'white' pre-university college, where pupils hardly need their teacher" (Jurgens 2004).

Although some motivated teachers are willing to take a job in an inner city school, many teachers probably prefer working in the suburbs, in the neighbourhood of their own homes with pupils resembling themselves. As a New York City teacher says about teachers working in tougher schools: "God bless them — I personally could not do what they're doing. I know of teachers who have been assaulted in those schools. They certainly deserve more money, but they also deserve security" (Farkas et al. 2000: 21). Inner city schools are indeed well-known for their problems with staffing their school appropriately, not only quantitatively, but qualitatively as well. Those schools often have teachers without the appropriate certification, who are underqualified and less-experienced. In the words of Ed Burns: "In a place like Baltimore, most schools start the school year short of teachers. So, if you've got two arms, two legs and two eyes, they're begging for you."[4]

Since teachers differ in their motivation and ability, it is not clear beforehand which types of teachers will be hired by inner city or underprivileged schools. These schools might indeed hire the teachers who combine the high motivation and low ability of the teachers mentioned above. However, other combinations of ability and motivation among inner city school teachers are also possible. In this chapter I formally study the sorting of teachers into inner city schools. First, I develop a theoretical sorting model with unobservable teacher motivation and observable teacher ability. Second, I test the model's empirical predictions using unique Dutch survey data on the motivation and ability of teachers.

[3] Ibid.
[4] Ibid.

Teachers in the model differ in observable ability, as for instance education and experience, and in unobservable motivation to work with underprivileged children. Teachers derive utility from working with underprivileged children, because they can make a difference in the lives of those children, whereas the impact on the life of a privileged child is much smaller. Privileged children have well-educated parents who can help and support them. Even when these parents do not have enough time to help the children themselves, they will have enough money to spend on extra lessons. However, there are also costs of teaching underprivileged children, as for example a higher chance of getting assaulted. For sufficiently highly motivated teachers, the benefits of teaching in an inner city school outweigh the costs.

Schools in my model differ in only one respect: The percentage of underprivileged children attending their school, which is either high or low. The schools offer the same flat base salary to all teachers, which resembles the situation in The Netherlands, as well as in many other OECD countries (OECD 2005b), where wages are determined at a central level and there is little flexibility in wage-setting at the school level. Sorting in this context crucially depends on the supply of teachers of the different types versus the number of positions the privileged and underprivileged school have. Two different cases can be distuinguished: 1) The case with more highly motivated teachers than positions at the underprivileged school, impying low or intermediate costs of working with the underprivileged 2) The case with less highly motivated teachers than positions at the underprivileged school, implying relatively high costs of working with the underprivileged. I obtain the following results.

First, when there are many highly motivated teachers, the underprivileged school is in a luxurious position. It will hire the candidates with on average the highest ability. Whether or not it is also able to hire the candidates with the highest motivation depends on the costs of working with underprivileged children. When those costs are intermediate, teachers with a relatively high motivation prefer to work at the underprivileged school and this school will hire the most able among them. The privileged school hires the remaining teachers to fill all its positions. When the costs of working with the underprivileged are sufficiently low, all teachers prefer to work at the underprivileged school. Then teachers do not self-select based on motivation.

Since motivation is unobservable, the underprivileged school can only select teachers on the basis of ability. This may be costly for underprivileged schools, when motivation is more important for improving a student's results than ability. Thus, surprisingly, low costs of working at an underprivileged school can lead to a lower expected payoff for those schools compared to a situation with intermediate costs of working at an underprivileged school.

Second, when there are few highly motivated teachers compared to the number of positions at the underprivileged school, the underprivileged school has little choice in candidates. Therefore, the teachers hired by the underprivileged school have on average lower ability than those at the privileged school. The sorting on motivation again crucially depends on the costs of working with the underprivileged. When the costs of working at the underprivileged school are sufficiently high, all teachers prefer to work at the privileged school. Since no sorting on motivation will take place, the underprivileged school faces its worst case scenario. It hires the remaining teachers of low ability and expected average motivation. When those costs are intermediate, many relatively lowly motivated teachers will prefer a position at the privileged school. The underprivileged school hires the remaining teachers. That is, the highly motivated candidates with any ability preferring to work at the underprivileged schools and the remainder of the candidates with relatively low motivation and low ability who did not get their favoured position at the privileged school.

In the second part of this chapter I test the empirical predictions using Dutch survey data from 2006 on teacher motivation and ability, where ability is measured by years of experience and level of education. I use a sample of 1658 observations on primary school teachers and 1632 observations on secondary school teachers. In both samples, teachers working at underprivileged schools more often state that their school has trouble filling its vacancies. Hence, the Dutch situation is probably best described by the second case of the theoretical model, with less highly motivated teachers than positions to fill at the underprivileged schools, implying high or intermediate costs of working with the underprivileged. When the costs of working with underprivileged children are high, the key hypothesis to be tested is whether these schools hire the teachers with the lowest observable ability. There will be

no correlation between ability and motivation at either school. When the costs of working with underprivileged children are intermediate, the privileged school hires the teachers with the highest ability and relatively low motivation, the underprivileged school hires the rest. We should then observe a negative sorting on ability and positive sorting on motivation. Furthermore, we would expect a positive correlation between ability and motivation among teachers sorting into the underprivileged school.

Testing the empirical predictions on the primary school teachers sample leads to the conclusion that it is hard to explain the sorting of Dutch primary school teachers with this model: None of the variables measuring intrinsic motivation and ability has a significant effect in the full primary school teacher sample. A possible explanation for these results is that Dutch teachers have long careers in the same school. During their career their motivation to stay in the school might differ from the motivation to sort into the school. Furthermore, the school's student population could have changed as well. Therefore, I next restrict the sample to teachers who started their current job in the last 5 years. Among these teachers, those with many years of teaching experience and high motivation are more likely to sort into underprivileged schools than teachers with the same level of experience and a low motivation, which is in line with the model. However, this effect is opposite for teachers with lower ability levels (both are weakly significant, that is, at the 10%-significance level). Moreover, the effect of education is ambiguous.

Testing the empirical predictions on the secondary school teacher sample yields more support for the theory. There is no significant effect of motivation and experience on the sorting of teachers into underprivileged schools. There is, however, a clear negative effect of education on the sorting of teachers into underprivileged schools. This effect remains after restricting the sample to teachers with five years or less of experience at their current school, to teachers teaching in the lower grades, and after restricting the sample to big cities. The results are by and large in line with the situation of high costs of working at underprivileged schools: On average, teachers prefer working at privileged schools and these schools hire the teachers with the highest ability. Within schooltypes I cannot find evidence of sorting into under-

privileged schools based on education, possibly due to the fact that the variation of underprivileged and privileged schools within schooltypes is relatively small.

This chapter proceeds as follows. Section 2 presents some stylized facts and discusses related literature. Section 3 contains the setup of the model. Section 4 analyzes the model and gives us the predictions for the empirical analysis. Section 5 describes the setting of the Dutch educational sector and the data I use. In section 6 I test the predicions using regression analysis. Section 7 concludes.

## 4.2 Some stylized facts and related literature

There is a broad literature in public administration showing that many people sort into the public sector because of a so called public service motivation, that is, a willingness to serve society (see for example Lewis and Frank 2002, Crewson 1997, Houston 2000, Perry et al. 2009). This idea has recently catched ground in economics as well. Many scholars have developed theoretical models showing the effects of public service motivation, or (impure) altruism as economists tend to call it, on effort provision and sorting into the public sector (e.g. Besley and Ghatak 2005, Prendergast 2007, Francois 2007, Brekke and Nyborg 2008, Delfgaauw and Dur 2008). Most of these studies focus on heterogeneity in motivation, assuming that ability is identical. Recently, Delfgaauw and Dur (2010) study the sorting into the public sector of managers who differ in observable motivation and ability. They show that the most capable managers are privately employed, because the returns to ability are higher in the private sector. However, public service motivation or altruism does not only affect whether one is willing to work in the public sector, but can also affect where in the public sector one is willing to work. Buurman and Dur (2008) predict, using a theoretical model, that street-level bureaucrats base there job-choice on the expected non-pecuniary payoffs of working with a specific group of clients. The more clients are in need of help, the more unobservably altruistic people enjoy their job of helping them and the lower pecuniary benefits, as for example salary, can be in order to attract employees. In this chapter I extend the idea of sorting of agents within the public sector by taking their unobservable motivation

as well as their observable ability into account and apply it to a specific case: The sorting of teachers into inner city schools.

People have different reasons to take a job as a teacher. Some teachers have extrinsic reasons for becoming a teacher, for instance job security, pay, working conditions such as working hours, holidays, and combining work and family life. However, for many teachers intrinsic motivation seems to be most important (OECD 2005b). This intrinsic motivation has different aspects. Some teachers like to teach for the sheer love of the subject they teach (math, English, science). Others are interested in teaching, because they like to do something for society or, because they like working with children (OECD 2005b). Still others, e.g. the teachers mentioned in the introduction, are especially interested in working with underprivileged children. This difference in preferences among teachers to work with underprivileged children is confirmed by Jackson (2009).[5] Jackson looks into the consequences for teacher sorting among schools of a reshuffling of students over schools due to the end of the student busing in Charlotte-Mecklenburg. Due to the end of the busing, students started to attend schools in the neighbourhood of their homes instead of schools with more or less equal student populations. This caused teacher turnover to go up. However, not only at schools where large inflows of black students were to be expected, but also on other schools, where outflows of black students were to be expected. This indicates that not all teachers prefer to teach the relatively easy student populations.

Nevertheless, many teachers would not consider a job at an inner city school, because of harsh working conditions. For example, only 29% of novel teachers in rural and suburban areas would seriously consider working in a public school in a big city when offered substantially more money (Farkas et al. 2000). A focus group of teachers in the same research project states that more money would not induce them to teach in nearby New York, because they had an "image of a chaotic school environment short on supportive parents, administrators or kids." (Farkas et al. 2000: 21). This view is supported by research in Texas, where the share of teachers reporting very negatively on several working conditions is much larger in

[5] Jackson uses race as a proxy for student attributes such as income level and achievement.

urban areas than in suburban areas. In 1999-2000 a share of 9.2% of the teachers in urban areas reports very negatively on administrative support, whereas only 7.2% of suburban teachers shares such a view. In urban areas 22.1% of the teachers has a negative view on parental support, against 13.7% in suburban areas. And 12.4% of urban teachers has a negative opinion on the adequacy of the materials, while only 7.6% of suburban teachers shares that opinion (Hanushek and Rivkin 2007). Hard working conditions do not only scare off potential teachers, but are also a reason for existing teachers to leave their job or the profession (see e.g. OECD 2005b, Ingersoll 2001). Teachers are more likely to leave Norwegian schools when the share of minority students or students with special needs at these schools is higher (Falch and Strøm 2009). Ingersoll (2001) finds that turnover in urban areas in the US (14,4%) is above the average rate (13,2%).[6] He also observes that dissatisfied urban teachers moving to another teaching job, mention student discipline problems and a lack of student motivation much more often than dissatisfied teachers in the entire sample of schools. The lack of student motivation and an unsafe environment catch the eye as reasons for the dissatisfaction of urban teachers leaving the profession, compared to other teachers.

Harsh working conditions is one of the reasons why many teachers do not want to work in inner city schools. Another reason is that teachers like to work in the neighbourhood of their own homes or the place where they grew up. Boyd et al. (2005) show that teachers in the state of New York have a strong preference to take their first job as a teacher in the region where they went to high school, or in a region that resembles the region where they went to high school. This implies, according to Boyd et al., that even when all teachers originating from urban areas take up a job in an urban area, a shortage of urban teachers remains in quantitative terms. It also implies a shortage in quality, since those teachers are drawn from urban schools, that is, schools usually performing less than suburban schools.

Sorting of teachers among schools does not only depend on differences in motivation to work in inner city schools, but also on differences in observed qualifications. Because many teachers are not willing to work in an inner city school, these schools

[6]Ingersoll (2004) finds a larger difference in turnover among public school teachers on urban high-poverty schools (22%), rural high poverty schools (16.4%) and low-poverty schools (12.8%).

are left with hard to staff vacancies. These vacancies are filled with the least able among teachers, the ones who have few alternatives. This sorting on ability is clearly visible in many US research projects. Lankford et al. (2002) observe that in the state of New York the underprivileged students in urban areas have teachers with lower observable qualifications (e.g. experience, certification, failed general knowledge or liberal arts exam, B.A. from least competitive college) than students in other parts of the state. Clotfelter et al. (2007) find the same sort of results for North Carolina. Jackson (2009) shows that schools where the number of black students grew due to the abolishing of the school bus system, also lost high quality teachers in terms of observable qualifications as years of experience and certification test scores.

However, when looking at quality in terms of value added to student achievement by teachers, the sorting of teachers is less clear. Hanushek et al. (2005) look at teacher quality in terms of standardized gains in annual test scores on mathematics in a large urban district in Texas.[7] Several important conclusions can be drawn from this research project by using the teacher fixed effect in the combined teacher and student panel dataset as an indicator of teacher quality. First of all, teacher quality matters: When teacher quality in terms of value added improves by a standard deviation this raises the standardized gains in test scores by 0.22 standard deviation. Second, teacher education and certification do not influence the value added by teachers. Third, more experience leads to gains in test scores in the first four years of a teacher's career. Especially having a first year teacher implies a substantially lower standardized gain in test score compared to having a teacher with six years or more of experience. Fourth, the correlation between the standardized gains in test results, which teachers manage to accomplish, for students of low, middle and high ability is high. This implies that high quality teachers are good for students at different ability levels, while low quality teachers perform relatively poorly for students at all levels.[8] Finally, teachers who remain in the urban schools are at least as good as those who leave. Murnane (1984), based on research in another urban

[7] Hanushek et al (2005) state that the results for reading are qualitatively the same.

[8] Research looking at observable teacher characteristics leads to different conclusions. Vlachos (2008) concludes that students' grades are on average not affected by teachers' cognitive and social skills. However, higher social skills do have a positive effect on the grades of students with a lower ability, whereas higher cognitive skills have a negative effect.

area, also rejects the hypothesis that the most effective teachers in terms of value added leave the urban school system. On the contrary, the evidence seems to point in the direction that the most ineffective teachers leave, although these effects are not significant, possibly due to the small sample size.

At first sight the findings that inner city schools employ teachers with the lowest observable qualifications, but that it is not the teachers with the lowest quality in terms of value added who leave those schools, might seem contradictionary. However, the evidence on the influence of observed teacher qualifications is not that strong (See e.g. Hanushek and Rivkin 2006, Wayne and Youngs 2003 and OECD 2005b for an overview). And even studies which find that observed qualifications matter (e.g. Aaronson et al. 2007), point out that much of the variation in value added is not explained by observable teacher characteristics. Furthermore, researchers agree that there is more to teaching than what is observed in administrative data. For example, a part might be explained by the motivation of teachers to exert effort, their enthusiasm for teaching, and their classroom behaviour. Therefore, I take motivation as well as ability into account in the educational production function and sorting among teachers.

Since observable qualifications only matter to some extent, it is not easy to recognize good teachers when you hire them. The OECD (2005b:10), for example, concludes that "Many, if not most, of the key attributes of successful teachers will only become evident once they are in the job." This is also supported by Hanushek et al. (2005) who observe that there is not much evidence that good teachers who leave the urban district are offered higher salaries or better working conditions in other districts, which, as Hanushek et al. point out, could be due to a lack of interest principals in those districts have in hiring qualitatively good teachers or, more convincingly, to the difficulties principals have in identifying good teachers.

## 4.3 The model

In order to formulate clear hypotheses for my empirical research, I first analyze a simple model of teacher sorting among schools.

**Schools** Schools, labelled $j$, differ only in one respect: $\beta_j$ the percentage of underprivileged children. I assume this $\beta_j$ to be observable to schools and teachers.[9] For simplicity, there are only two schools: One school has a high percentage of underprivileged children $\overline{\beta}$ and the other school has a low percentage of underprivileged children $\underline{\beta}$. I also assume that each class needs one teacher to teach them. The pupil-teacher ratio in a class is fixed and exogenous. The total number of classes, and thus teacher positions, is $P$. The number of positions of the school of type $\overline{\beta}$ with many underprivileged children is $nP$ and the number of positions of the school of type $\underline{\beta}$ with many privileged children is $(1-n)P$. Both schools have a similar production function $q_j = \iint f(\alpha_i, \theta_{i,}) g(\alpha_i, \theta_i) d\alpha d\theta$. That is, the school $j$'s production, $q_j$, total value added to pupils, is the sum of the value added by all teachers with ability $\alpha_i$ and motivation $\theta_i$ employed at school $j$, where $g(\alpha_i, \theta_i)$ represents the joint probability density function of teachers' ability and motivation. The value added of an individual teacher $i$ with ability $\alpha_i$ and motivation $\theta_i$ is $f(\alpha_i, \theta_i)$. I assume that having a higher ability or motivation increases the value a teacher adds to his pupils. Thus, $f_{\alpha_i}(\alpha_{i,}\theta_i) > 0$, $f_{\theta_i}(\alpha_{i,}\theta_i) > 0$. Furthermore $f_{\alpha_i\alpha_i}(.) < 0$, $f_{\theta_i\theta_i}(.) < 0$, and $f_{\alpha_i\alpha_i}(.) f_{\theta_i\theta_i}(.) > f^2_{\alpha_i\theta_i}(.)$. An individual teacher's motivation is unobservable to the schools, but the distribution of motivation among teachers is common knowledge: Motivation is uniformly distributed with lower bound $\underline{\theta}$ and upper bound $\overline{\theta}$, and strictly positive, $0 < \underline{\theta} \leq \theta_i \leq \overline{\theta}$. Furthermore, a teacher's ability is observable to the schools, strictly positive, uniformly distributed and ranges from $0 < \underline{\alpha} \leq \alpha_i \leq \overline{\alpha}$. The total number of teachers available in the population is $T$. Schools pay all of their teachers a flat base salary $w$, which is fixed and exogenous for all schools. For example, a flat wage as determined by the government or a central labour agreement between unions and employers' organizations. The schools maximize the value added by teachers, where the wage bill is a given. Furthermore, schools do not want to leave any vacancy open[10], nor do they want to hire more teachers than there are classes to teach. I normalize the payoff of the school's outside option, not hiring a

[9] In the Netherlands, for example, this information is publicly available at the website of the organisation responsible for the allocation of the education budget among schools (www.oic.cfi.nl).

[10] Hiring a teacher with the lowest motivation and ability always outweighs the costs of his wage, because schools do not want to leave the class unattended.

teacher, to zero. Thus, school $j$'s expected payoff can be written as:

$$EUs_j = \iint [f(\alpha_i, \theta_{i,}) - w] g(\alpha_i, \theta_i) d\alpha d\theta > 0, \tag{4.1}$$

subject to the restriction that the number of teachers hired by each school is equal to the number of positions. That is, $\iint g(\alpha_i, \theta_i) d\alpha d\theta = nP$ or

$\iint g(\alpha_i, \theta_i) d\alpha d\theta = (1-n)P$, respectively for the underprivileged and privileged school.

**Teachers** Teachers, labelled $i$, enjoy utility from their income, $w$. In addition, and in line with the evidence discussed in previous sections, I assume they also enjoy teaching underprivileged children. The joys of teaching underprivileged children increases with the teacher's motivation $\theta_i$ and the percentage $\beta_i$ of underprivileged children a school has. For convenience, I assume these joys to be represented by $\beta_j \theta_i$. Unfortunately, teaching in schools with a high percentage of underprivileged children has disadvantages as well. Some of these children are violent towards teachers and less motivated to learn. Sometimes the schools in areas with many underprivileged children have less financial means, lack the latest technical support, and are situated in older, less healthy, and sometimes even detrimental environments. This bears a cost $k$ on the teachers, which increases with the percentage of underprivileged students, $\beta_j k$.[11] Finally, the teacher has an outside option which leads to a utility of $\bar{A} \geq 0$. This is the utility another job or unemployment benefit would give him. In order to be willing to take the job, a teacher's expected utility needs to be above this outside option utility:

$$EUt_{ij} = w + (\theta_i - k)\beta_j > \bar{A} \tag{4.2}$$

I assume that (4.2) holds strictly for all teachers in all schools. Thus, a teacher's expected outside option utility is always less than the utility of a job at his second-best school. In appendix A I show at which wage level condition (4.2) holds strictly.

[11] I impose that $k$ is equal for all teachers.

Finally, the cumulative distribution function of all teachers is $\int_{\underline{\alpha}}^{\overline{\alpha}} \int_{\underline{\theta}}^{\overline{\theta}} g(\theta, \alpha) d\theta d\alpha = T$.

**The timing of the model** The timing of the model is as follows. First, the two principals post the advertisements for their positions, say a few months before the new school year starts. Then teachers apply. Teachers can apply to more than one position at a time at no cost. Next, the schools offer a contract to their preferred candidates. If a teacher receives more than one offer, he will accept the contract of the school he prefers. I assume that the school year starts immediately after this hiring process, implying that teachers remain unemployed and positions remain unfilled if no deal is made during the process.

## 4.4 Analysis

We are interested in the distribution of the different types of teachers over the two schools. Therefore, we analyze a very simple case, where the number of positions equals the number of teachers, thus $P = T$. For convenience, I normalize this number to 1, such that $P = T = \int_{\underline{\alpha}}^{\overline{\alpha}} \int_{\underline{\theta}}^{\overline{\theta}} g(\theta, \alpha) d\theta d\alpha = 1$. I will discuss along the way what happens when we relax this assumption and allow the number of positions to be larger than the number of available teachers, $P > T$.

### 4.4.1 Who wants to apply where?

Let us first analyze which teachers will apply to the privileged and underprivileged school, when the schools post their positions. We can distinguish three different cases here. First of all, the most interesting case, where $\underline{\theta} \leq k \leq \overline{\theta}$. As can be seen from (4.2), teachers have an expected utility of $w + (\theta_i - k)\overline{\beta} > \bar{A}$ when applying to the school with a large number of underprivileged children. They have an expected utility of $w + (\theta_i - k)\underline{\beta} > \bar{A}$, when applying to the school with a small number of underprivileged children. Thus, as long as their motivation $\theta_i$ is above the private costs of teaching underprivileged children, $\theta_i \geq k$, relatively highly motivated

teachers prefer to work at the underprivileged school.[12] The rest of the teachers with relatively low motivation, $\theta_i < k$, prefer a job at a privileged school. Second, if $k > \overline{\theta}$ all teachers prefer to work at the privileged school. Third, if $k \leq \underline{\theta}$ all teachers prefer to work at the underprivileged school. However, in all three cases teachers prefer teaching in any school above their outside option (condition (4.2) holds strictly) and have no costs of applying. Thus, independently of the exact level of $k$, all teachers will apply at both schools.

If some teachers prefer their outside option to teaching in either school, there are more positions than teachers, $P > T$. As long as the remaining teachers prefer teaching in either school to their outside option (condition (4.2) still holds for those teachers), teachers' preferences for working at a particular type of school do not change. Moreover, since there are no costs of applying, these teachers will still (weakly) prefer to apply at both schools.[13]

### 4.4.2 Which teachers will be hired?

We can distinguish two different cases, depending on the number of teachers with motivation $\theta_i \geq k$ compared to the number of positions at the underprivileged school. The first case is the case where the number of highly motivated teachers with $\theta_i \geq k$, denoted by $rT$, who prefer to work at the underprivileged school is larger than or equal to the number of positions at that school, thus $rT \geq nP$. The second case is the case where the number of highly motivated teachers is smaller than the number of positions at the underprivileged school, $rT < nP$.

**Many highly motivated teachers:** $rT \geq nP$ At first glance, both schools have many applicants to choose from, as all teachers apply at both schools. Thus,

[12] I assume that when indifferent between teaching to underpriviliged and priviliged children, the teacher will prefer teaching underpriviliged children.

[13] If condition (4.2) does not hold and a part of the remaining teachers prefers their outside option to teaching at their second-best school, we have two different cases. First, some or all of the teachers with motivation $\theta_i < k$ prefer their outside option to teaching at the underpriviliged school. Those teachers will only apply for a job at the priviliged school. Second, when (some of) the highly motivated teachers with $\theta_i \geq k$ prefer their outside option to teaching at the priviliged school, then these teachers will only apply for a job at the underpriviliged school. Furthermore, this implies that teachers with lower motivation are not willing to apply for any teaching job. See appendix A.

to whom will the schools offer a contract when $P = T$? The schools do not know the motivation of each individual teacher, but they do know the share of highly motivated teachers in the population of teachers $rT$, with motivation $\theta_i \geq k$. They also know that motivation and ability are uncorrelated, thus among teachers in every level of ability a share $r$ of all these teachers has motivation $\theta_i \geq k$ and will prefer to work at the underprivileged school whenever they can choose between a job at this school or the privileged school. Therefore, the underprivileged school will offer candidates with $\alpha_i \geq \widehat{\alpha}$ a contract as hiring the candidates with the highest ability renders the highest expected payoff, as can be seen from (4.1). The underprivileged school chooses the level of $\widehat{\alpha}$ in such a way, that the share $r$ of teachers with ability $\alpha_i \geq \widehat{\alpha}$ who will accept this job, the teachers with motivation $\theta_i \geq k$, exactly equals the number of positions at this school $nP$. The school does not have to fear that too many candidates will accept the contract. The reason is that the privileged school also prefers to hire teachers with the highest level of ability, because these render the highest expected utility, see (4.1). Hence, candidates with $\alpha_i \geq \widehat{\alpha}$ and $\theta_i < k$ will also receive a competing offer from the privileged school and accept it as this is their preferred option as can be seen from (4.2). Unfortunately for the privileged school, hiring only candidates with $\alpha_i \geq \widehat{\alpha}$ and $\theta_i < k$ does not suffice. The school knows that, to fill its remaining positions, it has to offer all other candidates, with $\alpha_i < \widehat{\alpha}$ and $\theta_i < k$, a job as well. As this last group of teachers only receives an offer from the privileged school, they will surely accept it, because the expected utility from this offer lies above their outside option utility.

The expected payoff of the underprivileged school can thus be written as[14]:

$$EUs_{\underline{\beta}} = \int_{\widehat{\alpha}}^{\overline{\alpha}} \int_{k}^{\overline{\theta}} [f(\theta, \alpha) - w]\, g(\theta, \alpha) d\theta d\alpha, \tag{4.3}$$

subject to

$$\int_{\widehat{\alpha}}^{\overline{\alpha}} \int_{k}^{\overline{\theta}} g(\theta, \alpha) d\theta d\alpha = nP,$$

since the principal does not want to leave the class unattended nor does he want to

[14]For ease of exposition I suppress subscripts $i$.

have unproductive teachers.

The expected payoff of the privileged school can be written as:

$$EUs_{\underline{\beta}} = \int_{\underline{\alpha}}^{\overline{\alpha}} \int_{\underline{\theta}}^{k} [f(\theta,\alpha) - w]\, g(\theta,\alpha) d\theta d\alpha + \int_{\underline{\alpha}}^{\widehat{\alpha}} \int_{k}^{\overline{\theta}} [f(\theta,\alpha) - w]\, g(\theta,\alpha) d\theta d\alpha, \quad (4.4)$$

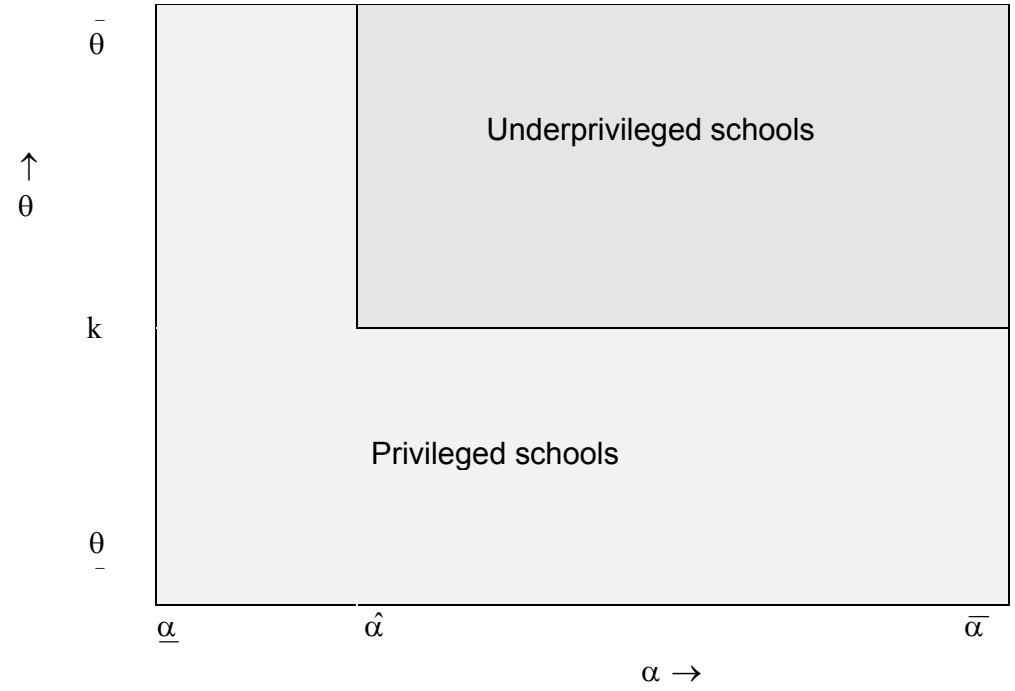
subject to

$$\int_{\underline{\alpha}}^{\overline{\alpha}} \int_{\underline{\theta}}^{k} g(\theta,\alpha) d\theta d\alpha + \int_{\underline{\alpha}}^{\widehat{\alpha}} \int_{k}^{\overline{\theta}} g(\theta,\alpha) d\theta d\alpha = (1-n)P.$$

Figure 1 illustrates the equilibrium distribution of types in the case with $\underline{\theta} < k \leq \overline{\theta}$. The underprivileged school hires the teachers with the highest ability and highest motivation, while the privileged school hires the rest. That is, teachers with low ability and any motivation sort into the privileged schools together with teachers of high ability and low motivation. Thus, there is a negative correlation between ability and motivation among teachers sorting into the privileged school. In the special case where $k \leq \underline{\theta}$, all teachers prefer working at the underprivileged school. This school offers a contract to exactly the number of teachers it needs with ability $\alpha_i \geq \widehat{\alpha}$.[15] The others are hired by the privileged school. In this case there is no correlation between ability and motivation of teachers.

[15] Even if the payoff of motivation is much higher than that of ability, randomizing the hiring of teachers would not lead to better results than hiring the ones with the highest ability, since we assume that ability and motivation are independently distributed among the teachers in the population. This would also be the case when teachers motivation and ability are not uniformly distributed. However, when motivation and ability are not indepently distributed the results could change. For example, when ability and motivation are negatively correlated randomizing or hiring the lowly able could lead to higher payoffs than hiring the ones with the highest ability.

**Figure 1: The sorting of teachers among schools when $rT \geq nV$**




What happens when the number of positions is larger than the number of teachers, $P > T$? The underprivileged school will not have any vacant positions left, as I have assumed that $rT \geq nP$. However, the privileged school will be left with vacant positions: This school is only able to hire the remaining $(rT - nP)$ highly motivated candidates with low ability and $(1-r)T$ candidates with relatively low motivation. As $P > T$ the number of positions $(1-n)P$ is larger than the number of applicants $(rT - nP) + (1-r)T$ at the privileged school.[16]

**Few highly motivated teachers:** $rT < nP$ When the number of highly motivated teachers is smaller than the number of positions at the underprivileged school, the privileged school is in the more favourable position. It offers all highly

[16] I have assumed that condition (4.2) holds for all teachers $T$. If it does not hold for all highly motivated teachers $\theta_i \geq k$, because the wage is not high enough, $w < \widehat{\widehat{w}}$, then (some of) the remaining highly motivated teachers $(rT - nP)$ prefer their outside option to a job at the priviliged school, see appendix A. This increases the hiring problem of the priviliged school. This also implies that all of the lowly motivated teachers with $\theta_i < k$, would prefer their outside option to teaching, as $\widetilde{w} > \widehat{\widehat{w}}$. Hence, the hiring problem of the priviliged school becomes even more severe.

able teachers with $\alpha_i \geq \widehat{\alpha}$ a contract, choosing the level of $\widehat{\alpha}$ such that the share of $(1-r)$ contracts accepted by the teachers with motivation $\theta_i < k$ exactly equals its number of positions $(1-n)P$. The privileged school does not run the risk of hiring more teachers than it has positions to fill by offering all these teachers a contract, since it will not be able to attract the relatively highly motivated teachers among them. These highly able teachers will surely receive a competing offer from the underprivileged school as well and these competing offers will be accepted by teachers with a relatively high motivation, $\theta_i \geq k$. As this time the underprivileged school is in the less favourable position, it has to offer the candidates with $\alpha_i < \widehat{\alpha}$ and $\theta_i \leq k$ a job as well, to fill its remaining positions when the number of teachers is equal to the number of positions, $P = T$.

In this case, the expected payoff of the underprivileged school can be written as:

$$EUs_{\overline{\beta}} = \int_{\underline{\alpha}}^{\overline{\alpha}} \int_{k}^{\overline{\theta}} [f(\theta,\alpha) - w]\, g(\theta,\alpha) d\theta d\alpha + \int_{\underline{\alpha}}^{\widehat{\alpha}} \int_{\underline{\theta}}^{k} [f(\theta,\alpha) - w]\, g(\theta,\alpha) d\theta d\alpha, \quad (4.5)$$

subject to

$$\int_{\underline{\alpha}}^{\overline{\alpha}} \int_{k}^{\overline{\theta}} g(\theta,\alpha) d\theta d\alpha + \int_{\underline{\alpha}}^{\widehat{\alpha}} \int_{\underline{\theta}}^{k} g(\theta,\alpha) d\theta d\alpha = nP.$$

The expected payoff of the privileged school is:

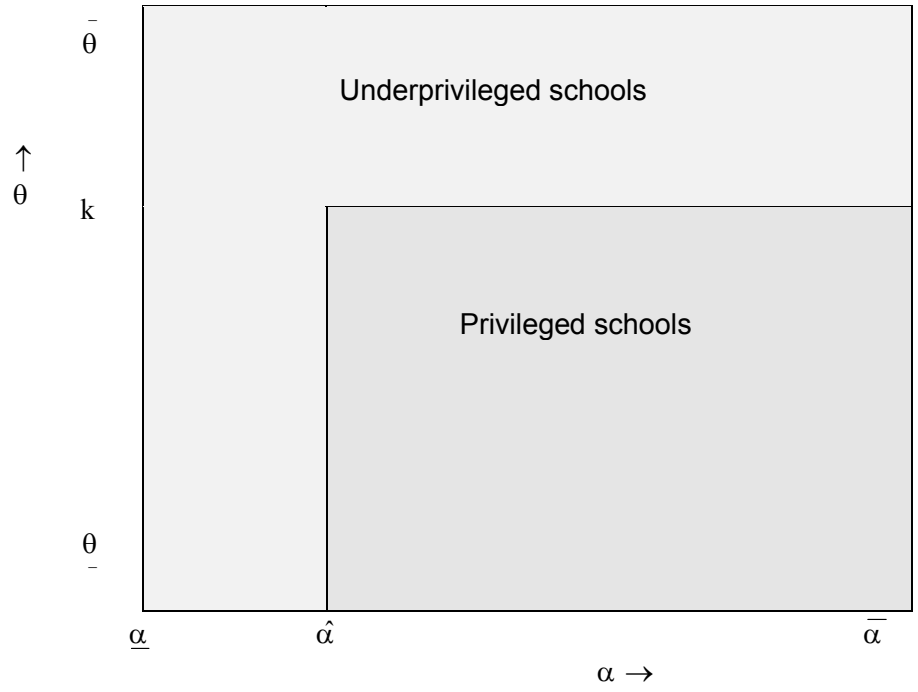
$$EUs_{\underline{\beta}} = \int_{\widehat{\alpha}}^{\overline{\alpha}} \int_{\underline{\theta}}^{k} [f(\theta,\alpha) - w]\, g(\theta,\alpha) d\theta d\alpha, \quad (4.6)$$

subject to $\int_{\widehat{\alpha}}^{\overline{\alpha}} \int_{\underline{\theta}}^{k} g(\theta,\alpha) d\theta d\alpha = (1-n)P$.

Thus, as illustrated by figure 2, in the case where $\underline{\theta} < k \leq \overline{\theta}$ the privileged school employs the teachers with relatively high ability and low motivation. The underprivileged school employs highly motivated teachers with all kinds of ability. In addition it employs a group of teachers with relatively low ability and low motivation. This implies that among the teachers employed at the underprivileged schools there is a positive correlation between ability and motivation. In the special case where $k > \overline{\theta}$, all teachers prefer working at the privileged school. This school then offers a contract to the number of teachers it needs with ability $\alpha_i > \widehat{\alpha}$ . The rest of

the teachers is hired by the underprivileged school. There is no correlation between motivation and ability in either type of school.

**Figure 2: The sorting of teachers among schools when *rT < nV***




What happens when there are more positions than teachers, $P > T$? If the number of teachers with a relatively low motivation is still larger than the number of positions at the privileged school, $(1-r)T > (1-n)P$, then the privileged school has no problems hiring a sufficient number of teachers. The underprivileged school, however, does have a problem. The school is able to hire the highly motivated teachers and the remaining part of the lowly motivated teachers, $rT + (1-r)T - (1-n)P$. As $T < P$, this number is smaller than the number of its positions, $nP$.[17]

[17]When condition (4.2) does not hold for all remaining teachers, this hiring problem gets worse. If there are more lowly motivated teachers than positions at the priviliged school, $(1-r)T > (1-n)P$, but a part of those teachers not employed by the priviliged school prefers his outside option to a job at the underpriviliged school, the hiring problem of the underpriviliged school becomes larger. Last, when in addition to $rT < nP$ also $(1-r)T < (1-n)P$, both schools have problems hiring a sufficient number of teachers.

### 4.4.3 Changing costs of working with the underprivileged

In the analysis above the costs $k$ of working with the underprivileged are constant. It is interesting to know how the expected payoff of the schools is affected by a change in those costs, for example, by a government policy of installing weapon detectors at the school entrance.

**Many highly motivated teachers:** $rT \geq nP$ What happens to the expected payoff of the underprivileged school when $k$ changes marginally? Differentiating (4.3) with respect to $k$, subject to the restriction that $\int_{\widehat{\alpha}}^{\overline{\alpha}} \int_{k}^{\overline{\theta}} g(\theta, \alpha) d\theta d\alpha = nP$, gives us:

$$\frac{\partial EU_{\overline{\beta}}}{\partial k} = -\int_{\widehat{\alpha}}^{\overline{\alpha}} \left[f(k, \alpha) - w\right] g(k, \alpha) d\alpha + \frac{\int_{k}^{\overline{\theta}} \left[f(\theta, \widehat{\alpha}) - w\right] g(\theta, \widehat{\alpha}) d\theta}{\int_{k}^{\overline{\theta}} g(\theta, \widehat{\alpha}) d\theta} \int_{\widehat{\alpha}}^{\overline{\alpha}} g(k, \alpha) d\alpha \gtreqless 0. \quad (4.7)$$

Thus, when the costs $k$ of working with underprivileged children increase, the underprivileged school will lose a number of $\int_{\widehat{\alpha}}^{\overline{\alpha}} g(k, \alpha) d\alpha$ agents with motivation $k$. These could have rendered the school a payoff of $\int_{\widehat{\alpha}}^{\overline{\alpha}} \left[f(k, \alpha) - w\right] g(k, \alpha) d\alpha$. To keep the total number of teachers employed constant, the school will hire exactly the same number of agents ($\int_{\widehat{\alpha}}^{\overline{\alpha}} g(k, \alpha) d\alpha$) with a lower ability. The average payoff of those additional agents is $\frac{\int_{k}^{\overline{\theta}} [f(\theta, \widehat{\alpha}) - w] g(\theta, \widehat{\alpha}) d\theta}{\int_{k}^{\overline{\theta}} g(\theta, \widehat{\alpha}) d\theta}$. That is, the total payoff of all agents with marginal ability $\widehat{\alpha}$, divided by the total number of agents with marginal ability $\widehat{\alpha}$. Thus, the principal is willing to give up a total payoff of $\int_{\widehat{\alpha}}^{\overline{\alpha}} \left[f(k, \alpha) - w\right] g(k, \alpha) d\alpha$ by hiring less lowly motivated agents in return for receiving a total payoff of $\frac{\int_{k}^{\overline{\theta}} [f(\theta, \widehat{\alpha}) - w] g(\theta, \widehat{\alpha}) d\theta}{\int_{k}^{\overline{\theta}} g(\theta, \widehat{\alpha}) d\theta} \int_{\widehat{\alpha}}^{\overline{\alpha}} g(k, \alpha) d\alpha$ by hiring the less able in exchange. This could have positive, neutral or negative consequences for the expected payoff of the school. Rearraging (4.7) shows that decreasing costs $k$ of working with underprivileged children has negative consequences for the payoff of the underprivileged school, when:

$$\frac{\int_{k}^{\overline{\theta}} \left[f(\theta, \widehat{\alpha}) - w\right] g(\theta, \widehat{\alpha}) d\theta}{\int_{k}^{\overline{\theta}} g(\theta, \widehat{\alpha}) d\theta} > \frac{\int_{\widehat{\alpha}}^{\overline{\alpha}} \left[f(k, \alpha) - w\right] g(k, \alpha) d\alpha}{\int_{\widehat{\alpha}}^{\overline{\alpha}} g(k, \alpha) d\alpha},$$

that is, the average productivity of the teachers with marginal ability is higher than the average productivity of the teachers with marginal motivation. This depends on the marginal product of teacher's ability and motivation. For example, if the marginal product of motivation is always higher than the marginal product of ability, decreasing the costs $k$ of working with the underprivileged can have unpleasant consequences for the underprivileged school, because it loses some of its highly motivated teachers with motivation $\left[k, \overline{\theta}\right]$ and ability $\widehat{\alpha}$ in return for the a group of teachers with motivation $k$ and ability $[\widehat{\alpha}, \overline{\alpha}]$. However, when ability rather than motivation is key, lowering the costs $k$ may be in the underprivileged school's interest.

Since the total number of teachers is equal to the total number of positions, a change in $k$ has the exact opposite effect on the expected payoff of the privileged school:

$$\frac{\partial EU_{\overline{\beta}}}{\partial k} = \int_{\widehat{\alpha}}^{\overline{\alpha}} \left[f(k,\alpha) - w\right] g(k,\alpha) d\alpha - \frac{\int_k^{\overline{\theta}} \left[f(\theta,\widehat{\alpha}) - w\right] g(\theta,\widehat{\alpha}) d\theta}{\int_k^{\overline{\theta}} g(\theta,\widehat{\alpha}) d\theta} \int_{\widehat{\alpha}}^{\overline{\alpha}} g(k,\alpha) d\alpha \gtreqless 0. \quad (4.8)$$

**Few highly motivated teachers:** $rT < nP$ Differentiating (4.5) with respect to $k$ subject to the restriction that $\int_{\underline{\alpha}}^{\overline{\alpha}} \int_k^{\overline{\theta}} g(\theta,\alpha) d\theta d\alpha + \int_{\underline{\alpha}}^{\widehat{\alpha}} \int_{\underline{\theta}}^{k} g(\theta,\alpha) d\theta d\alpha = nP$ shows that the effect of a change in $k$ has the following consequences for the underprivileged school's expected payoff :

$$\frac{\partial EU_{\overline{\beta}}}{\partial k} = -\int_{\widehat{\alpha}}^{\overline{\alpha}} \left[f(k,\alpha) - w\right] g(k,\alpha) d\alpha + \frac{\int_{\underline{\theta}}^{k} \left[f(\theta,\widehat{\alpha}) - w\right] g(\theta,\widehat{\alpha}) d\theta}{\int_{\underline{\theta}}^{k} g(\theta,\widehat{\alpha}) d\theta} \int_{\widehat{\alpha}}^{\overline{\alpha}} g(k,\alpha) d\alpha \leq 0. \quad (4.9)$$

When the costs of working with underprivileged children $k$ increase, less teachers are eager to work for the underprivileged school. Thus, $\int_{\widehat{\alpha}}^{\overline{\alpha}} g(k,\alpha) d\alpha$ agents with motivation $k$, which would have provided the underprivileged school with payoffs

$\int_{\widehat{\alpha}}^{\overline{\alpha}} [f(k,\alpha) - w]\, g(k,\alpha) d\alpha$ now prefer working at the privileged school. The privileged school will raise its requirements regarding the ability level of the even larger abundance of teachers it can now choose from. The remaining number of teachers, $\int_{\widehat{\alpha}}^{\overline{\alpha}} g(k,\alpha) d\alpha$, of lower ability have to be hired by the underprivileged school in order to leave no classes unattended. These teachers render the underprivileged school an expected value added of $\frac{\int_{\underline{\theta}}^{k} [f(\theta,\widehat{\alpha}) - w] g(\theta,\widehat{\alpha}) d\theta}{\int_{\underline{\theta}}^{k} g(\theta,\widehat{\alpha}) d\theta} \int_{\widehat{\alpha}}^{\overline{\alpha}} g(k,\alpha) d\alpha$.

A decrease in $k$ has a positive effect on the underprivileged school's expected payoff. This can be seen from rearranging (4.9). Decreasing $k$ is beneficial for the underprivileged school, when:

$$\frac{\int_{\widehat{\alpha}}^{\overline{\alpha}} [f(k,\alpha) - w]\, g(k,\alpha) d\alpha}{\int_{\widehat{\alpha}}^{\overline{\alpha}} g(k,\alpha) d\alpha} > \frac{\int_{\underline{\theta}}^{k} [f(\theta,\widehat{\alpha}) - w]\, g(\theta,\widehat{\alpha}) d\theta}{\int_{\underline{\theta}}^{k} g(\theta,\widehat{\alpha}) d\theta}.$$

This will always (weakly) be the case, since the average ability and average motivation of teachers in the term on the left-hand side is weakly higher than in the term on the right-hand side and the school's expected utility of a teacher is higher, the more competent and motivated the teacher is. Thus, stated otherwise, increasing costs of working with underprivileged children $k$ is always cumbersome for the underprivileged school. When the costs of working with the underprivileged are high, $k > \overline{\theta}$, the underprivileged school faces its worst case scenario.

Again the results for the privileged school are exactly opposite. This school benefits from increases in $k$:

$$\frac{\partial EU_{\overline{\beta}}}{\partial k} = \int_{\widehat{\alpha}}^{\overline{\alpha}} [f(k,\alpha) - w]\, g(k,\alpha) d\alpha - \frac{\int_{\underline{\theta}}^{k} [f(\theta,\widehat{\alpha}) - w]\, g(\theta,\widehat{\alpha}) d\theta}{\int_{\underline{\theta}}^{k} g(\theta,\widehat{\alpha}) d\theta} \int_{\widehat{\alpha}}^{\overline{\alpha}} g(k,\alpha) d\alpha \geq 0. \quad (4.10)$$

### 4.4.4 Testable predictions

This paragraph summarizes the most important results from the theoretical analysis. I have the following two sets of testable predictions, depending on the number of highly motivated teachers compared to the number of positions in the type of school

with many underprivileged students.

First of all, when there are many motivated teachers compared to positions at the underprivileged school, $rT \geq nP$, I have the following empirical predictions for intermediate values of the costs of working with underprivileged children ($\underline{\theta} \leq k \leq \overline{\theta}$):

1. the underprivileged school hires the teachers with the highest ability and motivation;
2. the privileged school hires the rest of the available teachers;
3. there is a negative correlation between ability and motivation among teachers in the privileged school.

When the costs of working with the underprivileged are low, $k < \underline{\theta}$, I have the following predictions:

1. the underprivileged school hires the teachers with the highest ability;
2. the privileged school hires the rest;
3. there is no sorting on motivation and, therefore, no correlation between ability and motivation among teachers in either school.

Second, when there are few motivated teachers compared to positions at the underprivileged school, $rT < nP$, the following predictions remain for intermediate costs of working with underprivileged children ($\underline{\theta} \leq k \leq \overline{\theta}$):

1. the privileged school hires the teachers with the highest ability and relatively low motivation;
2. the underprivileged school hires the rest;
3. there is a positive correlation among ability and motivation among teachers in the underprivileged school.

When the costs of working with the underprivileged are sufficiently high, $k > \overline{\theta}$, then:

1. the teachers with the highest ability are all hired by the privileged school;
2. the rest is hired by the underprivileged school;
3. there is no sorting on motivation and, therefore, no correlation between ability and motivation among teachers in either school.

## 4.5 Data

I use an exceptionally rich dataset about the motivation of people employed in the Dutch educational sector in 2006. In section 4.5.1 I first describe the Dutch educational sector. In section 4.5.2 I describe the data used.

### 4.5.1 The Dutch educational sector

**Size of the Dutch educational sector** The entire Dutch educational sector is large. It employed about 5 percent of the Dutch active labour force in 2006 (Ministerie van OCW 2008: 40). In this study we focus on a part of this sector, namely (compulsory) primary and secondary education. In 2006 175,300 persons (131,400 full time equivalents) were employed in primary education. Among those, there were 101,300 teachers, 7,700 educational support staff, 11,000 managers and 11,400 administrative and organizational support staff (Ministerie van OCW 2008: 80). Primary education was attended in the school year 2005/2006 by 1,600,000 children, usually between four and twelve years old. Of those pupils, 240,000 were of an ethnic minority and 350,000 were from a disadvantaged social group[18] (www.statline.cbs.nl). After primary education, pupils attend secondary education. This is divided in different types of schools from lower vocational training up to pre-university education. Depending on the type of education it takes four till six years to receive a diploma. Afterwards pupils can attend further education, that is, intermediate or higher vocational training, or university. In 2006 secondary education employed 102,700 persons (84,400 full time equivalents): 75,500 teachers, 4,100 managers and 23,100 other staff members (Ministerie van OCW 2008: 81). Secondary education was attended by 940,000 students in the school year 2005/2006. Of those students 130,000 were of an ethnic minority (www.statline.cbs.nl).

**Teachers' qualifications** Qualified teachers in primary schools need a degree in primary teaching from a higher vocational training institute. Qualified teachers in secondary education have either a first degree or second degree qualification. Qual-

[18] Pupils from a disadvantaged social group include children from parents with a low level of education, children from boatmen and gipsies.

ified teachers of the second degree have a degree from a higher vocational training institute and are allowed to teach in the first three years of secondary education and the final year of lower vocational training. Teachers of the first degree are allowed to teach all levels. To get a first degree in teaching, a second degree teacher has to follow an additional training at a vocational training institute, or follow the university teacher training programme instead (www.werkeninhetonderwijs.nl). In addition to qualified teachers, also a group of underqualified teachers is allowed to teach. That group consists of teachers-in-training and qualified teachers teaching outside their own subject or at a higher level (with some restrictions) (Ministerie van OCW 2007: 34). In 2005 about 80 percent of the teachers in secondary education was fully qualified to teach their subjects, 6 percent was not qualified and 14 percent was underqualified. In the four large cities there were less fully qualified teachers. Only 73 percent of the teachers was fully qualified there, 10 percent unqualified and 16 percent underqualified. In addition to regional differences there are also differences among the different types of schools. At lower vocational schools (VMBO) the percentage of not fully qualified teachers is between 20 and 27 percent, while at senior general education (Havo) this is 16 percent and at pre-university education (VWO) it is 13 percent (Ministerie van OCW, 2005: 26, 27).

**Teachers' salaries** Teachers' salaries are determined in a central labour agreement per educational sector (Ministerie van OCW 2008: 68). Teachers are usually remunerated on the basis of their seniority. That is, the number of years they are employed in education. There is little differentiation in remuneration between and within schools in the Netherlands. This absence of differentiation is somewhat puzzling at first glance, because schools in secondary education have room for individual differentiation and there are regional differences in the tightness of the teacher labour market. However, it seems quite difficult to break through the Dutch cultural norms of equality in the teacher labour market (Waterreus et al. 2006: 566-567, Vrielink et al. 2004, Ministerie van OCW 2007: 64-65, Ministerie van OCW 2008: 30). From 2009 onwards, extra budget will become available for teachers' salaries. This money will make more differentiation and a better teacher remuneration possible. Sec-

ondary schools in urban regions in the Western part of the Netherlands will receive an additional budget in order to solve their labour market problems (Ministerie van OCW 2008: 13, 15).

**Differences in labour market tensions** There was not too much tension on the labour market for teachers in the school year 2005/2006, as the unfilled vacancy rate (unfilled vacancies as percentage of total employment) was below the critical level of 1% (Rigter et al. 2006: 59, Paulussen-Hoogenboom et al. 2006: 46, Ministerie van OCW 2008: 39). However, there were regional differences in teacher shortages. In primary education there was an unfilled vacancy rate of 0.2% on average, while in the four largest cities it was more than twice as high, that is 0.5% (Rigter et al. 2006: 59). In secondary education the unfilled vacancy rate was on average 0.2%, while in the four largest cities it was 0.3% (Paulussen-Hoogenboom et al. 2006: 46, 47). The differences between schools with and without a large number of students from an ethnic minority was larger. Schools with less than 5% students from an ethnic minority had an unfilled vacancy rate of 0.3% on average during the school years 2004-2005 and 2005-2006. Schools with more than 25% students of an ethnic minority had an unfilled vacancy rate of 0.6% on average in those years (Paulussen-Hoogenboom et al. 2006: 51).

### 4.5.2 Dataset and Empirical Strategy

#### Data

The data I use is collected by SBL (The Association for the Professional Qualities of Teachers)[19] in their research project "Education Talking". The aim of this project was to gain insight in the motivation and satisfaction of employees working in all education sectors in the Netherlands, thus from primary to higher education, in order to set an agenda for educational policy renewals. A websurvey was issued among employees working in education in the Netherlands in March-April 2006. Respondents were approached directly at schools as well as through posters, free cards in

[19] SBL developed and promotes a quality standard of education in the Netherlands by formulating the required competences for teachers, and by focusing attention on professionalism.

teachers' and teacher assistants' pigeon holes, websites, teacher magazines, mailings and e-mails from schools, advertisements in a national newspaper, articles in several newspapers and magazines, mailings and articles of professional and intermediary organizations and flyers at teacher conferences. All in all this led to a response of over 12.000 education workers. The sample is not representative of all educational workers, because there is some overrepresentation of elderly employees and some underrepresentation of employees from secondary and higher education. However, this does not have large consequences for the external validity of the outcome, since there is not too much difference in answers among respondents of different age or sector with the exception of employees from higher education (SBL 2006).

I restrict myself to employees in primary and secondary education. Intermediate and higher vocational training institutes, as well as universities are less well spread over the country and are more likely to be local monopolies in the labor market as well as the market for students. Therefore, I leave them out of the sample. I also excluded special education institutions from the sample. Furthermore, I restricted the sample to teachers as I am interested in how intrinsic motivation to work with students affects the sorting of teachers among schools. I removed teachers with hardly any or no education from the sample. Since a certain level of education is required to be allowed to teach, this implies that those data entrees are probably wrong. This leaves me with a sample of 6164 teachers in primary and secondary education.

My dependent variable is the school in which a teacher works. To be precise: It is the extent to which a school has many underprivileged students. In order to get such a measure of schools with underprivileged children I use two questions from the survey. "Does your school have students from an ethnic minority?" ((Almost) All students are from an ethnic minority, More than half the students are from an ethnic minority, less than half of the students are from an ethnic minority, (Almost) none of the students are from an ethnic minority). Second, I also use "Does your school have many at-risk students" (Many, Not Many and Not Few, Few). I applied Principal Component Analysis (PCA), extracted one component and saved the results as a new variable to get one measure of "Underprivileged Children." The results of the

Principal Component Analysis were (just) sufficient to allow for such a new variable. The results of the Principal Component Analysis are in Appendix B. I use the new variable "Underprivileged Children" as dependent variable in my Ordinary Least Squares estimation. The higher the score on this variable, the more underprivileged students attend this school.

Ability and intrinsic motivation are important explanatory variables according to my theoretical model. As a proxy for ability I use the self-reported years of experience and the teacher's highest level of educational level. I also added several other observable variables to control for sex, marital status and being the breadwinner. To obtain a measure for intrinsic motivation and other motivational control variables I conducted a Principal Component Analysis on almost 50 statements on motivation. In the survey respondents were asked how they agreed to those statements on a scale of 1 to 7 ('This statement does not suit me at all' to 'This statement suits me very well') on what motivated them. For example:

- I like to work with students;
- I like to have a good salary;
- I must have the feeling that my job is important;
- I want to provide students with good prospects;
- Students who need extra care can count on me;
- New developments in education stimulate my professionalisation.

Appendix C shows the results of the Principal Components Analysis. I extracted the following twelve components: Intrinsic Motivation[20], Employment Conditions, Exchange, Excellence, Organization, Recognition, Safe Environment, Team Work, Common View, Social Interaction, Autonomy and Leadership. Although all the individual items in the PCA have less than 5% missing values, the removal of missing values listwise reduces the sample size from 6164 to 3733 observations.

[20]Based on our theoretical model one might want to split intrinsic motivation in two separate components: Intrinsic motivation towards all students and intrinsic motivation towards underprivileged students. However, in the data this distinction was not visible. Principal component analysis on the five items concerning intrinsic motivation shows only one factor. Furthermore, regression analysis with the item concerning students at risk and the rest of the items shows too much multicollinearity.

**Descriptive Statistics**

**Primary Education** Table 1 contains the descriptive statistics of the primary school sample. The sample is divided in two, to see if there are any differences for schools with a high percentage of underprivileged children and schools with a low percentage of underprivileged children. A school with a high percentage of underprivileged children is chosen to have a value for the factor of underprivileged children equal to or above zero and a school with many privileged children is supposed to have a factor of underprivileged children below zero. The differences are small and almost always insignificant, except for experience and marital status. The teachers in underprivileged schools are more likely to be single parents than those in the privileged schools. On the other hand, the teachers in the privileged school more often have a partner and children. A somewhat counterintuitive observation is that the percentage of privileged school teachers with less than five years of experience is higher than that of the underprivileged school teachers. However, this difference is not significant. The difference between teachers in underprivileged schools and privileged schools with 6-10 years of experience does differ significantly: A larger part of the teachers in underprivileged schools has 6-10 years of experience.

**Secondary Education** The descriptive statistics of the secondary schoolteacher sample in table 2 show some interesting differences with the primary schoolteachers' sample.

First of all, secondary school teachers differ significantly from primary schoolteachers in several respects. They have a lower intrinsic motivation to teach than primary school teachers, but care more about their employment conditions. They also care more about excellence in their job, having autonomy, and leadership. However, secondary school teachers care less about exchange of knowledge, a well-run organization, a safe environment, recognition and a common view than primary school teachers.

Table 1: Descriptive Statistics Primary School Sample

| Variable | Obs | Underpriviliged Children (Factor >=0) | Obs | Priviliged Children (Factor<0) | Obs | Total |
|---|---|---|---|---|---|---|
| Underpriviliged Children | 1328 | | 1451 | | 2779 | |
| Mean | | 0.90 | | -0.86 | | -0.02 |
| St.dev. | | 0.76 | | 0.37 | | 1.06 |
| Intrinsic Motivation | 815 | | 849 | | 1674 | |
| Mean | | 0.20 | | 0.24 | | 0.18 |
| St.dev. | | 0.82 | | 0.79 | | 0.85 |
| Employment Conditions | 815 | | 849 | | 1674 | |
| Mean | | -0.06 | | -0.01 | | -0.03 |
| St.dev. | | 0.96 | | 1.01 | | 0.99 |
| Exchange | 815 | | 849 | | 1674 | |
| Mean | | 0.21 | | 0.16 | | 0.18 |
| St.dev. | | 0.81 | | 0.89 | | 0.85 |
| Excellence | 815 | | 849 | | 1674 | |
| Mean | | -0.05 | | -0.13 | | -0.09 |
| St.dev. | | 0.95 | | 0.93 | | 0.94 |
| Organization | 815 | | 849 | | 1674 | |
| Mean | | 0.09 | | 0.06 | | 0.07 |
| St.dev. | | 0.91 | | 0.94 | | 0.93 |
| Recognition | 815 | | 849 | | 1674 | |
| Mean | | 0.21 | | 0.22 | | 0.21 |
| St.dev. | | 0.84 | | 0.87 | | 0.86 |
| Safe Environment | 815 | | 849 | | 1674 | |
| Mean | | 0.10 | | 0.11 | | 0.10 |
| St.dev. | | 0.85 | | 0.89 | | 0.88 |
| Team Work | 815 | | 849 | | 1674 | |
| Mean | | 0.00 | | -0.03 | | -0.01 |
| St.dev. | | 0.91 | | 0.97 | | 0.94 |
| Common View | 815 | | 849 | | 1674 | |
| Mean | | 0.17 | | 0.14 | | 0.16 |
| St.dev. | | 0.81 | | 0.86 | | 0.84 |
| Social Interaction | 815 | | 849 | | 1674 | |
| Mean | | -0.01 | | -0.02 | | -0.01 |
| St.dev. | | 0.81 | | 0.89 | | 0.85 |
| Autonomy | 815 | | 849 | | 1674 | |
| Mean | | -0.22 | | -0.26 | | -0.24 |
| St.dev. | | 0.97 | | 0.99 | | 0.98 |

(To be continued)

Table 1: Descriptive Statistics Primary School Sample (Continued)

| Variable | Obs | Underpriviliged Children (Factor >=0) | Obs | Priviliged Children (Factor<0) | Obs | Total |
|---|---|---|---|---|---|---|
| Leadership | 815 | | 849 | | 1674 | |
| Mean | | -0.19 | | -0.20 | | -0.20 |
| St.dev. | | 0.90 | | 0.95 | | 0.92 |
| Age | 1328 | | 1451 | | 2787 | |
| Mean | | 43.36 | | 43.52 | | 43.42 |
| St.dev. | | 11.34 | | 11.26 | | 11.32 |
| Experience in education | 1325 | | 1448 | | 2789 | |
| Less than 1 year | | 1.8% | | 2.4% | | 2.2% |
| 1-5 year | | 20.3% | | 20.6% | | 20.5% |
| 6-10 year | | 17.4% | | 13.8% | | 15.5% |
| 11-15 year | | 9.9% | | 9.3% | | 9.6% |
| 16-20 year | | 7.2% | | 9.3% | | 8.3% |
| 21-25 year | | 10.2% | | 12.6% | | 11.4% |
| 26-30 year | | 13.7% | | 12.3% | | 12.9% |
| more than 30 year | | 19.5% | | 19.5% | | 19.6% |
| Education | 1328 | | 1451 | | 2795 | |
| MBO | | 1.5% | | 2.2% | | 1.9% |
| Havo/VWO | | 3.5% | | 2.8% | | 3.1% |
| HBO | | 90.1% | | 90.8% | | 90.5% |
| WO | | 4.8% | | 4.2% | | 4.5% |
| Marital Status | 1320 | | 1439 | | 2775 | |
| Married-Cohabitating with children living at home | | 39.2% | | 43.0% | | 41.1% |
| Married-Cohabitating without children living at home | | 39.0% | | 37.9% | | 38.4% |
| Single | | 14.7% | | 13.0% | | 13.9% |
| Single Parent | | 4.6% | | 3.4% | | 4.0% |
| Living at home | | 2.4% | | 2.6% | | 2.6% |
| Breadwinner | 1328 | | 1451 | | 2787 | |
| Yes | | 51.2% | | 49.0% | | 50.1% |
| Sex | 1323 | | 1448 | | 2787 | |
| Female | | 76.0% | | 74.1% | | 75.0% |

Table 2: Descriptive Statistics Secondary School Sample

| Variable | Obs | Underpriviliged Children (Factor >=0) | Obs | Priviliged Children (Factor<0) | Obs | Total |
|---|---|---|---|---|---|---|
| Underpriviliged Children | 1238 | | 1427 | | 2661 | |
| Mean | | 0.64 | | -0.88 | | -0.18 |
| St.dev. | | 0.62 | | 0.35 | | 0.90 |
| Intrinsic Motivation | 722 | | 916 | | 1646 | |
| Mean | | -0.23 | | -0.30 | | -0.27 |
| St.dev. | | 1.14 | | 1.11 | | 1.13 |
| Employment Conditions | 722 | | 916 | | 1646 | |
| Mean | | 0.08 | | 0.04 | | 0.06 |
| St.dev. | | 1.05 | | 1.00 | | 1.02 |
| Exchange | 722 | | 916 | | 1646 | |
| Mean | | -0.14 | | -0.35 | | -0.25 |
| St.dev. | | 1.08 | | 1.11 | | 1.10 |
| Excellence | 722 | | 916 | | 1646 | |
| Mean | | 0.11 | | 0.10 | | 0.10 |
| St.dev. | | 1.08 | | 1.06 | | 1.06 |
| Organization | 722 | | 916 | | 1646 | |
| Mean | | -0.02 | | -0.16 | | -0.10 |
| St.dev. | | 1.01 | | 1.10 | | 1.06 |
| Recognition | 722 | | 916 | | 1646 | |
| Mean | | -0.22 | | -0.15 | | -0.18 |
| St.dev. | | 1.14 | | 1.04 | | 1.09 |
| Safe Environment | 722 | | 916 | | 1646 | |
| Mean | | -0.07 | | -0.16 | | -0.12 |
| St.dev. | | 1.12 | | 1.10 | | 1.11 |
| Team Work | 722 | | 916 | | 1646 | |
| Mean | | -0.03 | | -0.03 | | -0.03 |
| St.dev. | | 1.11 | | 1.07 | | 1.08 |
| Common View | 722 | | 916 | | 1646 | |
| Mean | | -0.12 | | -0.20 | | -0.16 |
| St.dev. | | 1.13 | | 1.15 | | 1.14 |
| Social Interaction | 722 | | 916 | | 1646 | |
| Mean | | -0.08 | | 0.08 | | 0.01 |
| St.dev. | | 1.14 | | 1.08 | | 1.11 |
| Autonomy | 722 | | 916 | | 1646 | |
| Mean | | 0.19 | | 0.31 | | 0.26 |
| St.dev. | | 1.01 | | 0.95 | | 0.98 |

(To be continued)

Table 2: Descriptive Statistics Secondary School Sample (Continued)

| Variable | Obs | Underpriviliged Children (Factor >=0) | Obs | Priviliged Children (Factor<0) | Obs | Total |
|---|---|---|---|---|---|---|
| Leadership | 722 | | 916 | | 1646 | |
| Mean | | 0.14 | | 0.24 | | 0.19 |
| St.dev. | | 1.09 | | 1.00 | | 1.04 |
| Age | 1238 | | 1427 | | 2680 | |
| Mean | | 45.78 | | 45.29 | | 45.51 |
| St.dev. | | 10.80 | | 10.78 | | 10.80 |
| Experience in education | 1238 | | 1424 | | 2677 | |
| Less than 1 year | | 3.0% | | 2.6% | | 2.7% |
| 1-5 year | | 21.0% | | 18.8% | | 19.9% |
| 6-10 year | | 17.7% | | 15.3% | | 16.4% |
| 11-15 year | | 9.5% | | 9.8% | | 9.7% |
| 16-20 year | | 8.1% | | 8.8% | | 8.4% |
| 21-25 year | | 11.1% | | 11.4% | | 11.3% |
| 26-30 year | | 11.8% | | 15.4% | | 13.7% |
| more than 30 year | | 17.9% | | 17.7% | | 17.8% |
| Education | 1238 | | 1427 | | 2680 | |
| HBO | | 63.7% | | 50.0% | | 56.3% |
| WO | | 36.3% | | 50.0% | | 43.7% |
| Marital Status | 1234 | | 1416 | | 2664 | |
| Married-Cohabitating with children living at home | | 42.1% | | 43.7% | | 42.7% |
| | | 38.5% | | 39.2% | | 38.7% |
| Married-Cohabitating without children living at home | | | | | | |
| Single | | 13.9% | | 12.5% | | 13.0% |
| Single Parent | | 3.7% | | 2.7% | | 3.2% |
| Living at home | | 1.8% | | 1.9% | | 1.9% |
| Breadwinner | 1238 | | 1427 | | 2680 | |
| Yes | | 67.9% | | 66.5% | | 67.2% |
| Sex | 1232 | | 1421 | | 2666 | |
| Female | | 43.7% | | 39.4% | | 41.3% |
| Category | 1238 | | 1427 | | 2680 | |
| VMBO first three years | | 18.7% | | 7.7% | | 12.8% |
| VMBO last year | | 33.1% | | 14.9% | | 23.3% |
| Havo-VWO first three years | | 17.8% | | 27.5% | | 23.0% |
| Havo-VWO last two or three years | | 30.4% | | 49.9% | | 40.8% |

Second of all, the differences between teachers in underprivileged and privileged schools are somewhat larger and more often significant than among primary school-teachers. Secondary school teachers in underprivileged schools care significantly more about the exchange of knowledge and being in a well run organization than

teachers in privileged schools. Privileged school teachers on the other hand care significantly more about social interaction, autonomy and leadership. There are more female teachers in underprivileged schools. The percentage of teachers with less than ten years of experience is higher in underprivileged schools than in privileged schools (41.7% versus 36.7%). Teachers in underprivileged schools have a lower education than teachers in privileged schools, only 36.3% of teachers has a university degree, while 50.0% at the privileged schools. This could be due to the fact that in the underprivileged schoolteachers sample only 30.4% teaches in the last years of Havo/VWO, where you need a first degree in teaching, and almost half (49.9%) of the teachers in privileged schools teaches in those years.

**Estimation**

I estimate the effect of ability and motivation on the sorting into underprivileged schools using ordinary least squares (OLS). Let $y$ be the measure for the extend to which a school has underprivileged children. Furthermore, $\mathbf{X_m}$ stands for the variable measuring intrinsic motivation, $\mathbf{X_a}$ stands for a vector of variables measuring ability, $\mathbf{X_m X_a}$ is a vector of interaction terms between a teacher's intrinsic motivation and ability, $\mathbf{X_o}$ stands for other observable teacher characteristics such as age and sex, $\mathbf{X_c}$ is a vector of other motivational controls and, finally, $\varepsilon$ is the error term. The regression equation is:

$$y = \alpha + \boldsymbol{\beta}\mathbf{X_m} + \boldsymbol{\gamma}\mathbf{X_a} + \boldsymbol{\psi}\mathbf{X_m X_a} + \boldsymbol{\delta}\mathbf{X_o} + \boldsymbol{\mu}\mathbf{X_c} + \varepsilon.$$

Table 3 shows the translation of our theoretical predictions into testable empirical ones. I have to make additional translations to be able to test these predictions, because I have categorical variables and interaction terms. This makes the interpretation of the coefficients not straightforward. For example, if the coefficient of the motivational variable of someone with less than one year of experience is $\beta$, then the coefficient of someone with one to five years of experience would be $\beta + \psi_0$, for someone with five to ten years of experience $\beta + \psi_1$, and so forth.

To illustrate the tests, let us have a look at the predictions for the case where

there are less motivated teachers than positions at underprivileged schools and intermediate costs of working in those schools, $\underline{\theta} \leq k \leq \overline{\theta}$. Teachers with a low level of ability, $\alpha \leq \widehat{\alpha}$, must accept a job at the underprivileged school, $\gamma < 0$. Since our ability variables are categorical this would imply that the coefficients for the different categories are decreasing in increasing ability, thus $\gamma_0 > \gamma_1 > \gamma_2$ and so forth.

Teachers with a high level of ability, $\alpha > \widehat{\alpha}$, have a choice which job to take. Above this threshold level, my theory predicts that the higher the teacher's motivation, the more willing he is to sort into a more underprivileged school. Below this threshold level, motivation does not matter, since these teachers have no other choice than to accept the job at the underprivileged school. We can test this by using the categorical variables of experience and education in the model. For the lowest levels of ability, we expect no effect of motivation. That is, an estimate of intrinsic motivation of zero: $\beta + \psi = 0$. For the higher levels of ability we expect a positive effect of motivation on the sorting into underprivileged schools, thus $\beta + \psi > 0$. Furthermore, we would expect a positive correlation between ability and motivation among teachers in the underprivileged schools, thus, for example $\psi_2 > \psi_1 > \psi_0$.[21]

For high costs of working with underprivileged children, $k > \overline{\theta}$, there is no sorting on motivation ($\beta = 0$) and there is no correlation between ability and motivation at either school ($\psi = 0$). Thus, at all ability levels the estimate of intrinsic motivation will not be different from zero, $\beta + \psi = 0$, and the coefficient for ability will be negative, $\gamma < 0$, implying $\gamma_0 > \gamma_1 > \gamma_2$

[21] To be precise, when one of the ability categories with $\alpha \leq \widehat{\alpha}$ is the base category, then we woud expect $\beta = 0$ and $\psi_i = 0$ for that category. For ability categories with $\alpha > \widehat{\alpha}$, we would then expect $\beta + \psi_i > 0$ and $\psi_2 > \psi_1 > \psi 0$.

When one of the ability categories of $\alpha > \widehat{\alpha}$ is the base category, we would expect $\beta > 0$ and $\psi_i > 0$ for that category. Furthermore, we would expect $\psi_2 > \psi_1 > \psi_0$.

Table 3: Predictions for the empirical analysis

| Case | Prediction | Coefficient |
|---|---|---|
| *More motivated teachers than positions at underprivileged schools, rT≥nP* | | |
| $\underline{\theta} \leq k \leq \overline{\theta}$ | Underprivileged school hires teachers with highest ability | $\gamma > 0$ |
| | Underprivileged school hires teachers with highest motivation | $\beta > 0$ , when $\alpha > \hat{\alpha}$ , else $\beta = 0$ |
| | A positive correlation between motivation and ability at the underprivileged school | $\psi > 0$ , when $\alpha > \hat{\alpha}$ , else $\psi = 0$ |
| $k < \underline{\theta}$ | Underprivileged school hires teachers with highest ability | $\gamma > 0$ |
| | No sorting on motivation | $\beta = 0$ |
| | No correlation between ability and motivation at either school | $\psi = 0$ |
| *Less motivated teachers than positions at underprivileged schools, rT<nP* | | |
| $\underline{\theta} \leq k \leq \overline{\theta}$ | Underprivileged school hires teachers with lowest ability | $\gamma < 0$ |
| | Underprivileged school hires teachers with highest motivation | $\beta > 0$ , when $\alpha > \hat{\alpha}$ , else $\beta = 0$ |
| | A negative correlation between motivation and ability at the privileged school | $\psi > 0$ , when $\alpha > \hat{\alpha}$ , else $\psi = 0$ |
| $k > \overline{\theta}$ | Underprivileged school hires teachers with lowest ability | $\gamma < 0$ |
| | No sorting on motivation | $\beta = 0$ |
| | No correlation between ability and motivation at either school | $\psi = 0$ |

## 4.6 Empirical results

### 4.6.1 Primary Education

The first question is which set of predictions to test. Therefore we need to know whether the underprivileged or the privileged schools are more likely to have hiring problems. On average, teachers stating that their schools have hiring problems work on a school with more underprivileged children (Underprivileged School, M=0.12, SE=0.05) than teachers stating that their school have no hiring problems (Underprivileged School, M=-0.04, SE=0.02). This difference is significant $t(2737) = -2.970, p = 0.003$. This implies that we are likely to be in the case with less motivated teachers than vacancies at the underprivileged school, $rT < nP$. This is in line with the data in section 4.5.1. Given this case we would expect one of both sets of predictions from the bottom half of table 3 to hold.

**All primary school teachers** The first and second column in table 4 show the final model[22], explaining the sorting of primary school teachers into schools with underprivileged children. The first column contains the final model for the full sample of primary school teachers (N=1658). We can reject the null hypothesis that all coefficients are equal to zero ($F = 1.766$, $p = 0.010$). However, the model explains very little of the sorting of teachers into underprivileged schools ($\overline{R}^2 = 0.012$). If anything, we can conclude that the sorting of primary school teachers into underprivileged schools is not easy to predict using our data on Dutch primary schoolteachers. The effects of intrinsic motivation, experience, and education are not significant, neither are the interaction terms. This is not in line with the predictions of the theoretical model. The results come closest to the $k > \overline{\theta}$ case, where the costs of working at an underprivileged school are too high for even the intrinsically motivated teachers to volunteer for working at an underprivileged school. However, the coefficients for ability were not significant in the regression analysis, whereas I would have expected them to be negative in the $k > \overline{\theta}$ case.[23] To check whether a model without the interaction terms would be more in line with the $k > \overline{\theta}$ case, the second column shows these results. This model shows again insignificant effects of intrinsic motivation, experience, and education.

An important variable explaining the teacher's choice of school is probably the place where a teacher lives. A teacher who prefers to live in the city is more likely to end up teaching underprivileged children than a teacher who lives and works in the suburbs. Unfortunately, data on the place of residence of the teachers are not available for this sample. Data on the urbanicity of the neighbourhood where the school is located are available. However, restricting the primary schoolteacher sample to teachers working in urban areas (with more than 100.000 residents) leaves too few observations for the regression analysis.

[22] Insignificant controls were dropped from the final model. Furthermore, age was excluded from the final regressions, because the correlation with experience was over 0.8. The coefficients with and without age do not differ much, neither do the significance levels of experience.

[23] Ordered logit regressions with "Does your school have students from an ethnic minority?" or "Does your school have many at-risk students" as dependent variables does not lead to different conclusions. Furthermore, binary logit with schools divided in two types (underprivileged or privileged) does not lead to any significant results either and the joint test of the coefficients shows that we cannot reject the null hypothesis that all coeffificients are equal to zero.

Table 4 : Sorting of Primary School Teachers into Schools with Underprivileged Students

| Dependent variable: Underprivileged Schools | Full Sample | | < 5 year current job | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| **Theoretical model** | | | | |
| Intrinsic Motivation | .016 | -0.040 | .283* | -0.034 |
| | (.077) | (.033) | (.155) | (.057) |
| Experience: | | | | |
| Less than one year | -0.117 | -0.155 | -0.167 | -0.259 |
| | (.196) | ( .191) | (.239) | (.235) |
| 1-5 years | .025 | .000 | .045 | -0.071 |
| | (.087) | (.085) | (.174) | (.172) |
| 6-10 years | .080 | .073 | -0.061 | -0.099 |
| | (.092) | (.090) | (.204) | (.201) |
| 11-15 years | -0.052 | -0.046 | -0.043 | -0.204 |
| | (.108) | (.105) | (.251) | (.234) |
| 16-20 years | -0.073 | -0.131 | 0.011 | -0.154 |
| | (.123) | (.119) | (.268) | (.263) |
| 21-25 years | -0.078 | -0.049 | -0.598** | -0.463* |
| | (.111) | (.104) | (.257) | (.247) |
| 26-30 years | .143 | .120 | -0.033 | -0.117 |
| | (.103) | (.100) | (.227) | (.227) |
| more than 30 years (base) | | | | |
| Education: | | | | |
| MBO | -0.331 | -0.151 | -1.176 | .307 |
| | (.247) | (.215) | (1.018) | (.557) |
| Havo/VWO | -0.253 | -0.233 | -0.457 | -0.567* |
| | (.182) | (.157) | (.407) | (.327) |
| HBO (base) | | | | |
| WO | .003 | .004 | .013 | -0.011 |
| | (.129) | (.128) | (.178) | (.174) |
| Experience* Intrinsic Motivation: | | | | |
| Less than one year*Intrinsic | -0.174 | | -0.489* | |
| | (.216) | | (.260) | |
| 1-5 years*Intrinsic | -0.113 | | -0.337* | |
| | (.105) | | (.175) | |
| 6-10 years*Intrinsic | -0.028 | | -0.465* | |
| | (.110) | | (.266) | |
| 11-15 years*Intrinsic | .009 | | -0.731** | |
| | (.119) | | (.309) | |
| 16-20 years*Intrinsic | -0.307** | | -0.850** | |
| | (.148) | | (.365) | |
| 21-25 years*Intrinsic | .072 | | .100 | |
| | (.135) | | (.301) | |
| 26-30 years *Intrinsic | -0.114 | | -0.166 | |
| | (.116) | | (.236) | |
| more than 30 years*intrinsic (base) | | | | |
| Education*Intrinsic: | | | | |
| MBO *Intrinsic | .450 | | 1.778* | |
| | (.288) | | (1.008) | |
| Havo/VWO*Intrinsic | .049 | | -0.492 | |
| | (.220) | | (.399) | |
| HBO*Intrinsic (base) | | | | |
| WO *Intrinsic | -0.036 | | .144 | |
| | (.128) | | (.223) | |

(To be continued)

Table 4 : Sorting of Primary School Teachers into Schools with Underprivileged Students (Continued)

| | Full Sample | | | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| **Observable Controls** | | | | |
| Sex (Female=0) | | | | |
| Breadwinner (Yes=0) | | | -0.187** | |
| | | | (.090) | |
| Marital Status (Single=base): | | | | |
| Married/cohabitating with children (Base) | | | | |
| Married/cohabitating without children | .040 | .039 | | |
| | (.062) | (.062) | | |
| Single | .230*** | .232*** | | |
| | (.083) | (.082) | | |
| Single parent | .407*** | .395*** | | |
| | (.145) | (.144) | | |
| Living with parents | .000 | -0.004 | | |
| | (.180) | (.180) | | |
| **Motivational controls** | | | | |
| Autonomy | .077*** | .078*** | | |
| | (.027) | (.027) | | |
| Organization | | | | |
| Exchange of knowledge | | | | |
| Team Work | | | | |
| Safe Environment | | | | |
| Recognition | | | | |
| Employment Conditions | | | -0.103** | -0.084* |
| | | | (.049) | (.049) |
| Leadership | | | | |
| Social Interaction | | | | |
| Excellence | | | | |
| Common View | | | | |
| **Constant** | -0.042 | -0.029 | 0.173 | .114 |
| | (.080) | (.079) | (.158) | (.156) |
| **Model Fit** | | | | |
| Number of observations | 1658 | 1658 | 638 | 638 |
| Goodness of Fit (P-value) | 1.766(.010)*** | 2.187(.004)*** | 1.529(.055)* | 1.024(.424) |
| R2 | 0.027 | 0.021 | 0.054 | 0.019 |
| R2 adjusted | 0.012 | 0.011 | 0.019 | 0.000 |

OLS with dependent variable "Schools with Underpriviliged Children".
Significance: *=10%, **=5% and ***=1%.
Standard error in parentheses.
Only significant controls included.

**Primary school teachers with less than five years of experience in current job** One of the reasons for the difficulty to predict the sorting of primary school teachers into underprivileged schools might be the fact that many teachers remain for many years in the same school. During this period their motivation to sort into the school could change from the motivation to stay in the school. Furthermore, the school's population could change over time as well. Examples of "white" schools turning into "black" schools over time are readily available. Therefore, I restrict the sample to teachers who have less than five years of experience in their current school.

The results are in the third and fourth column of table 4. The third column contains the model with the interaction terms included. It is statistically different from zero at the 10%-level ($F = 1.529$, $p = 0.055$). The effect of experience is non-linear and not significant. The effect of education is positive, contrary to our predictions, but not significant. The interaction between education and intrinsic motivation is non-linear and insignificant as well. Finally, the interaction between experience and intrinsic motivation is non-linear and significant at the 10%-level. This interaction term shows a significant difference of the effect of intrinsic motivation on sorting into more underprivileged schools. Among the more experienced teachers (more than 30 years), the ones with a high motivation sort into the more underprivileged schools than teachers with a low motivation. For example, a teacher with an experience of 30 years or more and a motivation of one standard deviation above the average sorts into a school scoring about a quarter of a standard deviation higher on the underprivileged variable than a teacher with average motivation (statistically significant at the 10%-level). This is in line with the model. However, among teachers of lower ability we would have expected a neutral effect of motivation, but unfortunately we see a negative effect. Teachers with a motivation of one standard deviation above the average are significantly (at the 10%-level) less likely to sort into the more underprivileged schools than teachers with an average motivation among the group of teachers with eleven to twenty years of experience.

A few of the controls had a significant effect. Breadwinners are more likely to sort into the more underprivileged schools than other teachers. Teachers who have a

high extrinsic motivation, the teachers who care more about their salary and other employment conditions, are less likely to sort into the more underprivileged schools.

The fourth column shows the model without interaction terms to test the $k > \overline{\theta}$ case. The model does not fit the data well as we cannot reject the null hypothesis that all explanatory variable coefficients are jointly zero.

### 4.6.2 Secondary Education

Again on average, teachers stating that their schools have hiring problems work on a school with more underprivileged children (Underprivileged School, M=-0.07, SE=0.03) than teachers stating that their school have no hiring problems (Underprivileged School, M=-0.24, SE=0.02). This difference is significant $t(2023) = -4.458, p = 0.000$. This implies that for secondary school teachers we are also most likely to be in the case with less motivated teachers than vacancies at the underprivileged school, $rT < nP$. Given this case we would also expect for the secondary schoolteachers that one of both sets of predictions from the bottom half of table 3 holds.

**All secondary school teachers** In the first column of table 5 we see model 1 explaining the sorting of teachers into underprivileged schools for teachers when costs of teaching in underprivileged schools are intermediate (N=1632). In this sample there is no effect of intrinsic motivation nor experience. The effect of education is negative. That is, if the teacher has a university degree, he is significantly less likely to work in an underprivileged school. The interaction effects of ability and intrinsic motivation are insignificant. In model 2 I left out the interaction terms, implying we are in the case where $k > \overline{\theta}$, the costs of teaching in underprivileged schools are high compared to the motivation to teach underprivileged children. The effect of motivation and experience is insignificant. The effect of education is negative again. Thus these estimates are largely in line with our theoretical predictions for the $k > \overline{\theta}$ case (no effect of intrinsic motivation and a negative effect of ability on the sorting into underprivileged schools). The models perform better in explaining the sorting of secondary school teachers into underprivileged schools than those of

primary school teachers, although the explained variance in model 1 and model 2 is still rather low ($\overline{R}^2 = 0.051$) and ($\overline{R}^2 = 0.053$). In both models teachers with a preference for autonomy, strong leaders and social interaction are less likely to sort into the more underprivileged schools, while teachers who think working in a well run organization and exchanging knowledge is important, are more likely to do so.

**Secondary school teachers with less than five years of experience in current job** For both cases, $k > \overline{\theta}$ or $\underline{\theta} < k \leq \overline{\theta}$, we look at the sorting of teachers with less than 5 years in their current job. Again there is no effect of intrinsic motivation and experience, and a negative effect of education on the sorting of teachers into underprivileged schools. This resembles the $k > \overline{\theta}$ case as well. Also the effects of most of the controls, except leadership, are qualitatively in line with those of model 1 and 2 of the full sample. There is no effect of leadership in this subsample.

**Teachers teaching in the cities** Data on the place of residence are also not available for teachers in the secondary school sample. However, this time I was able to run the analysis on the subsample of teachers working at schools in the cities. This at least allows us to see whether there is sorting among teachers working in urban areas (with more than 100.000 residents) into underprivileged and privileged schools based on ability and motivation. Again, as in the full sample, we can only see sorting based on education (table 6). The higher the teacher's education, the less likely he is to work at an underprivileged school. Furthermore, teachers who like to exchange knowledge are more likely to work at underprivileged schools and teachers who favour social interaction are less likely to work at underprivileged schools.

Table 5 : Sorting of Secondary School Teachers into Schools with Underprivileged Students

| Dependent variable: Underprivileged Schools | Full Sample | | < 5 year current job | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| **Theoretical model** | | | | |
| Intrinsic Motivation | .010 | .018 | .309 | -0.003 |
| | (.050) | (.020) | (.283) | (.036) |
| Experience: | | | | |
| Less than one year | -0.027 | .014 | -0.151 | -0.092 |
| | (.143) | ( .133) | (.270) | (.264) |
| 1-5 years | .004 | .008 | -0.094 | -0.086 |
| | (.076) | (.075) | (.237) | (.235) |
| 6-10 years | .004 | -0.007 | .011 | .002 |
| | (.077) | (.076) | (.250) | (.248) |
| 11-15 years | -0.038 | -0.036 | -0.036 | -0.025 |
| | (.093) | (.089) | (.273) | (.267) |
| 16-20 years | -0.206** | -0.195** | -0.016 | -0.101 |
| | (.098) | (.094) | (.336) | (.325) |
| 21-25 years | -0.066 | -0.052 | -0.118 | -0.108 |
| | (.088) | (.084) | (.277) | (.276) |
| 26-30 years | -0.091 | -0.107 | -0.141 | -0.151 |
| | (.083) | (.080) | (.299) | (.289) |
| more than 30 years (base) | | | | |
| Education: | | | | |
| HBO (base) | | | | |
| WO | -0.251*** | -0.251*** | -0.184** | -0.219*** |
| | (.046) | (.045) | (.083) | (.080) |
| Experience* Intrinsic Motivation: | | | | |
| Less than one year*Intrinsic | -0.087 | | -0.433 | |
| | (.126) | | (.308) | |
| 1-5 years*Intrinsic | -0.027 | | -0.399 | |
| | (.066) | | (.288) | |
| 6-10 years*Intrinsic | .077 | | -0.278 | |
| | (.062) | | (.292) | |
| 11-15 years*Intrinsic | .000 | | -0.345 | |
| | (.072) | | (.296) | |
| 16-20 years*Intrinsic | -0.028 | | -0.145 | |
| | (.086) | | (.355) | |
| 21-25 years*Intrinsic | -0.038 | | -0.411 | |
| | (.075) | | (.330) | |
| 26-30 years *Intrinsic | .043 | | -0.310 | |
| | (.068) | | (.345) | |
| more than 30 years*intrinsic (base) | | | | |
| Education*Intrinsic: | | | | |
| HBO*Intrinsic (base) | | | | |
| WO *Intrinsic | -0.001 | | .086 | |
| | (.039) | | (.075) | |

(To be continued)

Table 5 : Sorting of Secondary School Teachers into Schools with Underprivileged Students
(Continued)

| | Full Sample | | | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| **Observable Controls** | | | | |
| Sex (Female=0) | | | | |
| Breadwinner (Yes=0) | | | | |
| Marital Status (Single=base): | | | | |
| Married/cohabitating with children (Base) | | | | |
| Married/cohabitating without children | | | | |
| Single | | | | |
| Single parent | | | | |
| Living with parents | | | | |
| **Motivational controls** | | | | |
| Autonomy | -0.076*** | -0.077*** | -0.134*** | -0.138*** |
| | (.022) | (.022) | (.041) | (.040) |
| Organization | .056*** | .055*** | .090** | .082** |
| | (.021) | (.021) | (.040) | (.040) |
| Exchange of knowledge | .074*** | .072*** | .135*** | .137*** |
| | (.021) | (.021) | (.042) | (.041) |
| Team Work | | | | |
| Safe Environment | | | | |
| Recognition | | | | |
| Employment Conditions | | | | |
| Leadership | -0.050** | -0.051** | | |
| | (.021) | (.021) | | |
| Social Interaction | -0.069*** | -0.069*** | -0.066* | |
| | (.020) | (.020) | (.037) | |
| Excellence | | | | |
| Common View | | | | |
| **Constant** | 0.004 | .006 | 0.058 | .061 |
| | (.061) | (.060) | (.232) | (.231) |
| **Model Fit** | | | | |
| Number of observations | 1632 | 1632 | 557 | 557 |
| Goodness of Fit (P-value) | 4.987(.000)*** | 7.494(.000)*** | 2.298(.001)*** | 3.349(.000)*** |
| R2 | 0.064 | 0.061 | 0.083 | 0.069 |
| R2 adjusted | 0.051 | 0.053 | 0.047 | 0.048 |

OLS with dependent variable "Schools with Underprivileged Children".
Significance: *=10%, **=5% and ***=1%.
Standard error in parentheses.
Only significant controls included.

Table 6 : Sorting of Secondary School Teachers into Schools with Underprivileged Students in the Cities

| Dependent variable: Underprivileged Schools | Cities > 100.000 inhabitants | |
|---|---|---|
| | Model 1 | Model 2 |
| **Theoretical model** | | |
| Intrinsic Motivation | -0.066 | -0.021 |
| | (.100) | (.038) |
| Experience: | | |
| Less than one year | .087 | .073 |
| | (.336) | ( .263) |
| 1-5 years | .137 | .137 |
| | (.160) | (.157) |
| 6-10 years | 0.011 | -0.029 |
| | (.161) | (.157) |
| 11-15 years | .071 | .023 |
| | (.195) | (.185) |
| 16-20 years | -0.027 | .046 |
| | (.233) | (.213) |
| 21-25 years | .069 | .105 |
| | (.181) | (.174) |
| 26-30 years | .255 | .219 |
| | (.187) | (.182) |
| more than 30 years (base) | | |
| Education: | | |
| HBO (base) | | |
| WO | -0.285*** | -0.279*** |
| | (.095) | (.091) |
| Experience* Intrinsic Motivation: | | |
| Less than one year*Intrinsic | .042 | |
| | (.273) | |
| 1-5 years*Intrinsic | -0.048 | |
| | (.125) | |
| 6-10 years*Intrinsic | .164 | |
| | (.111) | |
| 11-15 years*Intrinsic | .117 | |
| | (.139) | |
| 16-20 years*Intrinsic | -0.140 | |
| | (.195) | |
| 21-25 years*Intrinsic | -0.091 | |
| | (.129) | |
| 26-30 years *Intrinsic | .137 | |
| | (.148) | |
| more than 30 years*intrinsic (base) | | |
| Education*Intrinsic: | | |
| HBO*Intrinsic (base) | | |
| WO *Intrinsic | .011 | |
| | (0.82) | |

(To be continued)

Table 6 : Sorting of Secondary School Teachers into Schools with Underprivileged Students in the Cities (Continued)

| | Cities > 100.000 inhabitants | |
|---|---|---|
| | Model 1 | Model 2 |
| **Observable Controls** | | |
| Sex (Female=0) | | |
| Breadwinner (Yes=0) | | |
| Marital Status (Single=base): | | |
| Married/cohabitating with children (Base) | | |
| Married/cohabitating without children | | |
| Single | | |
| Single parent | | |
| Living with parents | | |
| **Motivational controls** | | |
| Autonomy | | |
| Organization | | |
| Exchange of knowledge | .115*** | .114*** |
| | (.042) | (.042) |
| Team Work | | |
| Safe Environment | | |
| Recognition | | |
| Employment Conditions | | |
| Leadership | | |
| Social Interaction | -0.096** | -0.101*** |
| | (.039) | (.039) |
| Excellence | | |
| Common View | | |
| **Constant** | .234* | .244* |
| | (.134) | (.131) |
| **Model Fit** | | |
| Number of observations | 542 | 542 |
| Goodness of Fit (P-value) | 2.095(.004)*** | 2.969(.001)*** |
| R2 | 0.071 | 0.058 |
| R2 adjusted | 0.037 | 0.038 |

OLS with dependent variable "Schools with Underprivileged Children".
Significance: *=10%, **=5% and ***=1%.
Standard error in parentheses.
Only significant controls included.

**Differences among schooltypes** The above regressions show that across schooltypes a university degree leads to sorting into the more privileged schools. However, any secondary schoolteacher is allowed to teach in the first three grades of secondary school and the upper grade of the VMBO (the lower vocational training), but only teachers with a first degree (post-HBO education or university degree) are allowed to teach in the upper grades of Havo/VWO. Furthermore, there is a strong correlation between the type of school (Havo/VWO versus VMBO) and the extend to which they have underprivileged students. That is, teachers working at a VMBO-school more often state that they work at an underprivileged school (M=0.24, SE=0.03) than teachers working at a Havo/VWO-school (M=-0.41, SE=0.02). This difference is significant $t(2659) = 19.204, p = 0.000$. Thus, the fact that we see sorting across schooltypes can be due to the effect that the requirements for teaching are higher in the upper grades of secondary school or that the sorting into underprivileged schools coincides with the sorting across schooltypes. To disentangle these effects we look at a subsample of teachers teaching in schooltypes for which a HBO-education is sufficient. I thus delete the upper grades from Havo/VWO from the sample. The first two columns of table 7 show the results. For the model with interaction terms, neither ability, nor motivation, nor their interaction terms are significant. For the model without interaction terms, we see that the effect of having an university degree is negative and significant at the 10%-level. This would imply high costs of working at underprivileged schools and therefore only the low ability teachers, who have little choice, end up working there.

To see whether there was sorting within schooltypes as well we also looked at the following two subsamples: Teachers teaching in VMBO and teachers teaching in Havo/VWO. This unfortunately led to relatively small subsamples with not enough variation within the samples (see the last four columns of table 7). The only model for which we could reject the null hypothesis that all coefficients are jointly zero was the model for the case where $\underline{\theta} < k \leq \overline{\theta}$ in the VMBO-subsample. However, none of the parameters from the theoretical model was significantly different from zero in this model.

Table 7 : Sorting of Secondary School Teachers into Schools with Underprivileged Students

| Dependent variable: | First three grades + VMBO 4 | | VMBO | | Havo/VWO | |
|---|---|---|---|---|---|---|
| Underprivileged Schools | Model 1 | Model 2 | Model 1 | Model 2 | Model 1 | Model 2 |
| **Theoretical model** | | | | | | |
| Intrinsic Motivation | 0.020 | .024 | .005 | -0.037 | -0.010 | .000 |
| | (.072) | (.028) | (.088) | (.035) | (.056) | (.021) |
| Experience: | | | | | | |
| Less than one year | -0.192 | -0.098 | -0.218 | .066 | .161 | .139 |
| | (.205) | ( .185) | (.278) | ( .250) | (.143) | ( .134) |
| 1-5 years | -.050 | -0.066 | -0.006 | .038 | -0.007 | -0.012 |
| | (.112) | (.111) | (.131) | (.129) | (.080) | (.078) |
| 6-10 years | -0.035 | .053 | -0.103 | -0.074 | .017 | .016 |
| | (.115) | (.115) | (.132) | (.133) | (.083) | (.080) |
| 11-15 years | -0.066 | -0.059 | -0.085 | -0.074 | -0.004 | -0.002 |
| | (.138) | (.135) | (.160) | (.160) | (.102) | (.093) |
| 16-20 years | -0.243 | -0.231 | -0.393 | -0.348* | -0.057 | -0.052 |
| | (.153) | (.151) | (.177) | (.179) | (.102) | (.096) |
| 21-25 years | -0.050 | -0.062 | -0.090 | -0.074 | -0.079 | -0.092 |
| | (.133) | (.129) | (.150) | (.149) | (.095) | (.090) |
| 26-30 years | -0.066 | -0.098 | -0.139 | -0.208 | -0.063 | -0.055 |
| | (.127) | (.124) | (.145) | (.144) | (.090) | (.084) |
| more than 30 years (base) | | | | | | |
| Education: | | | | | | |
| HBO (base) | | | | | | |
| WO | -0.112 | -0.131* | .041 | .030 | -0.015 | -0.017 |
| | (.080) | (.076) | (.114) | (.111) | (.050) | (.048) |
| Experience* Intrinsic Motivation: | | | | | | |
| Less than one year*Intrinsic | -0.200 | | -0.218 | | .052 | |
| | (.182) | | (.278) | | (.125) | |
| 1-5 years*Intrinsic | -0.059 | | -0.006 | | .021 | |
| | (.093) | | (.131) | | (.072) | |
| 6-10 years*Intrinsic | .083 | | -0.103 | | .002 | |
| | (.091) | | (.132) | | (.066) | |
| 11-15 years*Intrinsic | -0.072 | | -0.085 | | -0.002 | |
| | (.103) | | (.160) | | (.082) | |
| 16-20 years*Intrinsic | -0.152 | | -0.393 | | -0.009 | |
| | (.142) | | (.177) | | (.091) | |
| 21-25 years*Intrinsic | .014 | | -0.090 | | .035 | |
| | (.108) | | (.150) | | (.080) | |
| 26-30 years *Intrinsic | .071 | | -0.139 | | -0.014 | |
| | (.108) | | (.145) | | (.071) | |
| more than 30 years*intrinsic (base) | | | | | | |
| Education*Intrinsic: | | | | | | |
| HBO*Intrinsic (base) | | | | | | |
| WO *Intrinsic | -0.112 | | .058 | | .006 | |
| | (.080) | | (.079) | | (.044) | |

(To be continued)

Table 7 : Sorting of Secondary School Teachers into Schools with Underprivileged Students
(Continued)

| | First three grades + VMBO 4 | | VMBO | | Havo/VWO | |
|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 | Model 1 | Model 2 |
| **Observable Controls** | | | | | | |
| Sex (Female=0) | | | | | | |
| Breadwinner (Yes=0) | | | | | | |
| Marital Status (Single=base): | | | | | | |
| Married/cohabitating with children (base) | | | | | | |
| Married/cohabitating without children | -0.003 | | | | | |
| | (.072) | | | | | |
| Single | .038 | | | | | |
| | (.096) | | | | | |
| Single parent | .444*** | | | | | |
| | (.165) | | | | | |
| Living with parents | -0.167 | | | | | |
| | (.198) | | | | | |
| **Motivational controls** | | | | | | |
| Autonomy | -0.103*** | -0.096*** | -0.123*** | | | |
| | (.031) | (.031) | (.041) | | | |
| Organization | | | | | .040* | .041* |
| | | | | | (.022) | (.022) |
| Exchange of knowledge | .077*** | .074** | .086** | | | |
| | (.030) | (.030) | (.038) | | | |
| Team Work | | | | | | |
| Safe Environment | .049* | | | | | |
| | (.029) | | | | | |
| Recognition | | | | | | |
| Employment Conditions | | | | | | |
| Leadership | | | -0.062* | | | |
| | | | (.036) | | | |
| Social Interaction | -0.060** | -0.059 | | | -0.040* | -0.041** |
| | (.028) | (.028) | | | (.021) | (.021) |
| Excellence | | | | | .063*** | .062*** |
| | | | | | (.023) | (.023) |
| Common View | | | -0.066* | -0.081** | | |
| | | | (.035) | (.035) | | |
| **Constant** | 0.085 | 0.095 | 0.346*** | .302*** | -0.447*** | -0.443*** |
| | (.106) | (.105) | (.100) | (.100) | (.068) | (.066) |
| **Model Fit** | | | | | | |
| Number of observations | 952 | 952 | 580 | 580 | 1044 | 1044 |
| Goodness of Fit (P-value) | 1.812(.009)*** | 2.269(.003)*** | 1.947(.007)*** | 1.448(.156) | .945(.529) | 1.527(.108) |
| R2 | 0.047 | 0.037 | 0.068 | 0.025 | 0.018 | 0.017 |
| R2 adjusted | 0.021 | 0.021 | 0.033 | 0.008 | -0.001 | 0.006 |

OLS with dependent variable "Schools with Underprivileged Children".
Significance: *=10%, **=5% and ***=1%.
Standard error in parentheses.
Only significant controls included.

## 4.7 Concluding remarks

This chapter formally analyses the sorting of teachers with unobservable motivation and observable ability into underprivileged schools. The model predicts that when there are few motivated teachers and intermediate costs of working with underprivileged children, teachers with high motivation and all sorts of ability sort into the underprivileged school, as well as a group of lowly able and lowly motivated teachers not employed by the privileged school. When the costs of working with the underprivileged are high, there is no sorting on motivation and the underprivileged school is left with the teachers of low ability.

The international empirical literature shows support for the theory. As does anecdotal evidence for the Netherlands, as for example an inner city school principal in Rotterdam, proclaiming that "Teachers don't live in this neighbourhood any more, so we depend on idealists" (Valk, 2003:3). Testing the model using Dutch survey data shows that the sorting of secondary schoolteachers is largely in line with the case where there are high costs of working with the underprivileged: There is no sorting on motivation and teachers with a higher ability, as measured by education, are less likely to work in the more underprivileged schools. The effect of the other indicator of ability, teacher's experience, is not significant. The results for the primary school example are more ambiguous: There is no sorting on ability and only some sorting on motivation, although not always in the predicted direction.

Many different reasons could explain the fact that the theory is not fully supported by the Dutch data. First of all, there are some limitations to the theory. It does, for instance, not capture all the possible variables influencing teacher sorting. Second, the same goes for the data. We might need a more comprehensive dataset to test the theory to control for other reasons for teacher sorting, as for example place of residence. Third, there might also be a more positive reason why we found little support for teacher sorting: There might not be a big difference between privileged and underprivileged schools in the Netherlands, especially in primary schools. Although there is clear anecdotal evidence that some schools in the big cities have a more problematic student population to teach, the majority of schools might not differ too much in that respect and therefore sorting might be absent.

Fourth, the theoretical predictions were based on a model with only two types of schools: Privileged versus underprivileged. One could argue that a theoretical model with a continuum of schooltypes would lead to better predictions. To see how this would alter the predictions we look at the case with intermediate costs of working at underprivileged schools and a shortage of highly motivated teachers. The crucial part in the analysis is that teachers with $\theta_i \geq k$ always prefer to work at a school with as a high a percentage of underprivileged children as possible, since this renders them the highest utility (see (4.2)), and teachers with $\theta_i < k$ will prefer teaching in schools with as a high a percentage of privileged children as possible. Remember that all teachers apply everywhere, since there are no costs of applying and any teaching job renders more utility than teacher's outside option utility. Thus the most priviliged school offers contracts to the teachers with the highest level of ability ($\alpha > \widehat{\alpha}$), teachers with $\theta_i < k$ will accept it. The next school in line will offer a contract to all teachers with $\widehat{\alpha} > \alpha > \widehat{\widehat{\alpha}}$. At the other side of the spectrum the most underprivileged school will offer a contract to the teachers with the highest ability as well, the teachers with motivation $\theta_i \geq k$ will accept it. The next underprivileged school in line will offer contracts to teachers of the next ability level, and so forth. In this case the intermediate types of schools are the worst off: They end up with the teachers of the lowest ability and possibly lowest motivation. However, the data (see table 4 and 5) are not in line with this model. When the costs of working with the underprivileged are very high, $k > \overline{\theta}$, the predictions are the same as in the two-type model: All teachers prefer to work at the privileged school and the ones with the highest ability are hired by the most privileged school, and so forth.

Fifth, one could argue that with a continuum of schools there is also a difference in costs of working with the underprivileged at the different schools. Thus, for example, the costs of working with underprivileged children at school 1 ($k_1$) are higher than the costs of working with the underprivileged at school 2 ($k_2$) whenever $\beta_1 > \beta_2$. In that case the privileged school will attract the teachers with the highest ability and lowest motivation. The next school will attract a group of teachers with the same ability, but slightly higher motivation and a group of teachers with lower ability but also on average slightly higher motivation, and so forth. This implies that the most

underprivileged school will hire the teachers with the highest ability and highest motivation and a group of teachers with the lowest ability and any motivation, as in our two typemodel. However, our data do not support these hypotheses any better than the current hypotheses.

Finally, in this chapter motivation is captured by the answers on several questions about stated preferences. The use of stated preferences has some well-known disadvantages, as for example self-serving bias. It would have been better to use revealed preferences data (see e.g. Buurman, Dur and Van den Bossche 2009). Unfortunately, revelealed preferences data on teacher motivation are not available.

# 4.A Appendix A

In order to prefer teaching in any school above their outside option, condition (4.2) has to hold. Here I show how high the wage has to be for condition (4.2) to hold. First of all, I look at the conditions under which teachers are willing to take their preferred job. For teachers with low motivation, $\theta_i < k$, the wage has to be higher than their outside option utility plus their non-pecuniary costs of teaching in a privileged school, $w > \widetilde{w} = \bar{A} - (\theta_i - k)\underline{\beta}$, and for teachers with high motivation, $\theta_i \geq k$, the wage has to be higher than the outside option utility minus their non-pecuniary benefits of teaching in an underprivileged school, $w > \widetilde{\widetilde{w}} = \bar{A} - (\theta_i - k)\underline{\beta}$. Next, I look at the conditions under which teachers are also willing to take a job at the school of their second choice. Rearranging (4.2) shows that teachers with motivation $\theta_i < k$ are willing to accept a job at an underprivileged school as long as the wage $w$ is high enough: $w > \widehat{w} = \bar{A} - (\theta_i - k)\overline{\beta}$. Thus the wage needs to be above the outside option utility $\bar{A}$ and the non-pecuniary payoffs of teaching in the underprivileged school which are negative for those teachers, $(\theta_i - k)\overline{\beta} < 0$. Teachers with motivation $\theta_i \geq k$ have zero or positive non-pecuniary payoffs, $(\theta_i - k)\underline{\beta} \geq 0$, even when teaching in the privileged school, their second-best school. For those teachers to prefer teaching in the second-best school to their outside option, the wage needs to be above the outside option utility minus the non-pecuniary payoffs of teaching, $w > \widehat{\widehat{w}} = \bar{A} - (\theta_i - k)\underline{\beta}$. Since the wage is equal to every teacher, this implies that when (4.2) holds for teachers with low motivation, it will certainly hold for teachers with higher motivation, since $\widehat{w} > \widehat{\widehat{w}}$ .

It is easy to see that, $\widehat{w} > \widetilde{w} > \widehat{\widehat{w}} > \widetilde{\widetilde{w}}$. Whenever the wage is high enough for a teacher with motivation $\theta_i < k$ to accept a job at his second-best school, he will also accept a job at his preferred school. Furthermore, all teachers with a higher motivation than his, those with $\theta_i \geqq k$, are willing to accept a job at both schools as well. Stated otherwise, whenever the wage is not high enough to attract a sufficient number of teachers, the least motivated among the potential teachers are not willing to apply for a job as teacher. Thus (4.2) will always hold if $w > \widehat{w}$.

## 4.B Underprivileged School

To construct a measure for the number of underprivileged children we used the two variables "Students from an ethnic minority" and "Students at-risk", see table B.1 and B.2 for descriptive statistics.

A principal component analysis (PCA) was conducted on these 2 items to construct a factor. The Kaiser-Meyer-Olkin (KMO) measure shows that the sampling adequacy for the analysis is exactly at the acceptable limit of KMO=0.5 (Field, 2009). The KMO-values for the individual items were 0.5 as well. Bartlett's test of sphericity $\chi^2(1) = 1372, p < .000$, indicating that correlations between items were sufficiently large for PCA. The factor had an eigenvalue of 1.4 and explained 72% of the variance. The scree plot showed indeed one factor. We saved the factor scores as variable using the regression method and used it as dependent variable in our regression analysis. Table B.3 shows the factor loading and table B.4 the descriptive statistics of the new variable "Underprivileged school".

Table B.1 Does your school have students from an ethnic minority?

| | Frequency | Percentage |
|---|---|---|
| Almost no students from an ethnic minority | 2701 | 43.8 |
| Less than half of the students is from an ethnic minority | 2421 | 39.3 |
| More than half of the students is from an ethnic minority | 529 | 8.6 |
| Almost all students are from an ethnic minority | 493 | 8 |
| Missing | 20 | 0.3 |
| Total | 6164 | 100 |
| | | |

Table B.2 Does your school have at-risk students?

| | Frequency | Percentage |
|---|---|---|
| Few | 2188 | 35.5 |
| Neither few nor many | 2381 | 38.6 |
| Many | 1565 | 25.4 |
| Missing | 30 | 0.5 |
| Total | 6164 | 100 |
| | | |

Table B.3 Component Matrix

| | Component |
|---|---|
| Students from an ethnic minority | 0.851 |
| Students lagging behind | 0.851 |

Extraction method: Principal Component Analysis. One component extracted.

Table B.4 Descriptive statistics Underprivileged School

| | N | Minimum | Maximum | Mean | St.Dev. |
|---|---|---|---|---|---|
| Underprivileged School | 6123 | -1.21 | 2.27 | 0 | 1 |

# 4.C Motivational Variables

The questionnaire contains many questions about motivation. I conducted a Principal Component Analysis (PCA) with orthogonal rotation (varimax)[24]. Table C.1 shows the descriptive statistics of the items used in this analysis.

The KMO = 0.96 for this analysis, which indicates that the sampling is more than adequate for the analysis, as were all the individual KMO values. Bartlett's test of sphericity $\chi^2(1891) = 97594.1293, p < .000$, indicating that correlations between items were sufficiently large for PCA. Twelve components had an eigenvalue over Kaiser's criterion of 1. Together they explained 56% of the variance. The scree plot was somewhat ambiguous, but could justify 12 components. I saved the twelve component scores as variables using the regression method. These twelve variables are the motivational variables in the regression analysis. Table C.2 shows the factor loading after rotation (only loadings > 0.4 are shown) and table C.3 the descriptive statistics of the new variables.

The first component captures items on exchange of knowledge with other people (Exchange). The second component loads on items which are important for people who like to excel in their job (Excellence). The third component captures the importance people attach to a well run organization (Organization). The fourth component is about recognition and appreciation by parents, students, and so forth (Recognition). The fifth component stands for intrinsic motivation to teach. It loads highly on items related to working with students, as for example "Students who need extra care can count on me".The sixth component represents the importance of a safe working environment (Safe_Environment). Component number seven represents the importance people attach to working as a team (Team_Work) and component number eight for the importance of having a common view or vision (Common_View). Component number nine loads highly on items concerning the importance of social interaction with colleagues (Social_Interaction). The tenth component loads highly

[24]One could argue that, theoretically, the components need not be orthogonal and perhaps an oblique rotation would be more appropriate. However, based on the component correlation matrix of the oblimin rotation with Kaiser Normalization we need not worry too much about the correlation between the components. The intrinsic motivation component loaded high on the same items in both cases.

on employment conditions as salary. Component eleventh catches the importance of having autonomy in the job (Autonomy). Finally, component twelve represents the importance teachers attach to strong leadership (Leadership).

Table C.1 Descriptive Statistics Items PCA (to be continued)

| | N | Min | Max | Mean | Std. Dev. |
|---|---|---|---|---|---|
| I like to do my job well | 6152 | 1 | 7 | 6.77 | 0.54 |
| I like to develop myself in my job | 6136 | 1 | 7 | 6.39 | 0.88 |
| I like to inspire my colleagues | 6083 | 1 | 7 | 5.97 | 1.10 |
| I like to be involved in educational developments | 6052 | 1 | 7 | 5.94 | 1.20 |
| I like to be informed about everything in education | 6047 | 1 | 7 | 5.91 | 1.15 |
| I like to touch every individual student with my teaching | 6141 | 1 | 7 | 6.18 | 1.04 |
| I like to get incentives to improve myself | 6112 | 1 | 7 | 5.93 | 1.15 |
| I like to be leading in keeping education up-to-date | 6049 | 1 | 7 | 5.10 | 1.51 |
| My knowledge and experience should be used to improve the teaching in my school | 6088 | 1 | 7 | 5.93 | 1.14 |
| I like to inspire new generations of students | 6100 | 1 | 7 | 6.30 | 0.91 |
| I like to renew with my colleagues | 6015 | 1 | 7 | 5.66 | 1.41 |
| I think that a more experienced colleague should have a role as coach and counsellor | 6149 | 1 | 7 | 5.52 | 1.50 |
| I think that the job should be organized in such a way that we can easily make use of each other's knowledge and experience | 6125 | 1 | 7 | 6.28 | 0.95 |
| I think that we should use knowledge and experience from outside our school more often and they should use our's | 6090 | 1 | 7 | 5.33 | 1.58 |
| I like to cooperate with people from outside our school | 6062 | 1 | 7 | 5.19 | 1.52 |
| I enjoy other people calling upon my knowledge and experience | 6068 | 1 | 7 | 6.17 | 0.92 |
| I enjoy calling upon the knowledge and experience of others | 6014 | 1 | 7 | 5.96 | 1.09 |
| I think it is important to be a member of a union or professional organization | 5981 | 1 | 7 | 4.91 | 2.20 |
| I enjoy working with students | 6147 | 1 | 7 | 6.69 | 0.62 |
| I like to have a good salary | 6126 | 1 | 7 | 6.10 | 1.33 |
| I must have the feeling that my job is important | 6094 | 1 | 7 | 6.38 | 0.90 |
| I like to provide students with good prospects | 6086 | 1 | 7 | 6.58 | 0.74 |
| Students who need extra care can count on me | 6104 | 1 | 7 | 6.40 | 0.88 |
| I think that enthousiastic colleagues are inspiring | 6078 | 1 | 7 | 6.35 | 1.00 |
| Critical parents challenge me in my development | 6065 | 1 | 7 | 5.02 | 1.53 |
| New developments in education stimulate my professionalisation | 6004 | 1 | 7 | 5.06 | 1.66 |
| I think that the use of new technologies stimulates my professionalisation | 5884 | 1 | 7 | 5.23 | 1.55 |
| Appreciation by my students | 6141 | 1 | 7 | 6.28 | 0.85 |
| Appreciation by the parents of my students | 6119 | 1 | 7 | 5.90 | 1.06 |
| Appreciation by my colleagues | 6089 | 1 | 7 | 6.12 | 0.92 |

Table C.1 Descriptive Statistics Items PCA (continued)

| | N | Min | Max | Mean | Std. Dev. |
|---|---|---|---|---|---|
| Appreciation by the schoolleaders or my boss | 6112 | 1 | 7 | 6.17 | 1.01 |
| Social recognition | 6048 | 1 | 7 | 5.89 | 1.23 |
| Informal contacts with colleagues | 6132 | 1 | 7 | 5.83 | 1.23 |
| To read articles, magazines, books, look for information on websites | 6119 | 1 | 7 | 5.91 | 1.09 |
| Classroom observation and debriefing by colleagues | 6083 | 1 | 7 | 5.20 | 1.54 |
| Performance appraisal with my boss | 6109 | 1 | 7 | 5.29 | 1.64 |
| Training | 6118 | 1 | 7 | 6.00 | 1.12 |
| Assistance and guidance by external experts | 6085 | 1 | 7 | 5.23 | 1.63 |
| To participate in networks with other schools and knowledge centers | 6081 | 1 | 7 | 5.11 | 1.58 |
| To learn as a team from other schools | 6041 | 1 | 7 | 5.23 | 1.53 |
| Adapt an existing method to current developments in education | 5987 | 1 | 7 | 5.45 | 1.50 |
| To respond to individual differences among students | 5969 | 1 | 7 | 5.91 | 1.32 |
| To work with new learning methods | 5873 | 1 | 7 | 5.42 | 1.71 |
| I like to know what is expected of me in my job | 6128 | 1 | 7 | 5.94 | 1.16 |
| I like to determine my own methods | 6129 | 1 | 7 | 6.03 | 1.06 |
| I like to see an inspiring vision on education in my school | 6104 | 1 | 7 | 6.03 | 1.13 |
| I like the work of me and my colleagues to be based on a common vision | 6106 | 1 | 7 | 5.97 | 1.21 |
| I like the schoolleaders to determine the vision on education | 6113 | 1 | 7 | 3.68 | 1.81 |
| I like the team to determine the vision on education | 6047 | 1 | 7 | 6.02 | 1.19 |
| I like the organisation of education to work smoothly | 6077 | 1 | 7 | 6.30 | 0.94 |
| I like our personnel policy aiming for improvement and development of education | 6084 | 1 | 7 | 6.11 | 1.08 |
| I like to have a personnel policy that takes my age into account | 6052 | 1 | 7 | 5.16 | 1.90 |
| I want to be safe at my workplace | 6048 | 1 | 7 | 6.65 | 0.74 |
| I like to work in a clean environment | 6000 | 1 | 7 | 6.35 | 0.99 |
| I like clear behavioral rules in our school | 5955 | 1 | 7 | 6.52 | 0.81 |
| I want to be able to count on my colleagues | 5865 | 1 | 7 | 6.58 | 0.71 |
| Clear goals for improvement | 6084 | 1 | 7 | 5.32 | 1.43 |
| A plan | 6039 | 1 | 7 | 5.44 | 1.45 |
| Encouragement from the schoolleaders to experiment | 6049 | 1 | 7 | 5.38 | 1.57 |
| Schoolleaders who verify the achievement of goals | 6070 | 1 | 7 | 5.10 | 1.67 |
| To cooperate with colleagues | 6088 | 1 | 7 | 6.23 | 0.98 |
| Realizing the value of what you're doing | 6027 | 1 | 7 | 6.22 | 1.07 |
| | | | | | |
| Total number of observations (listwise) | 3733 | | | | |

Table C.2 Rotated Component Matrix (to be continued)

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| To learn as a team from other schools | 0.71 | | | | | |
| To participate in networks with other schools and knowledge centers | 0.71 | | | | | |
| Assistance and guidance by external experts | 0.70 | | | | | |
| I like to cooperate with people from outside our school | 0.66 | | | | | |
| I think that we should use knowledge and experience from outside our school more often and they should use our's | 0.65 | | | | | |
| To work with new learning methods | 0.62 | | | | | |
| New developments in education stimulate my professionalisation | 0.59 | | | | | |
| To respond to individual differences among students | 0.57 | | | | 0.41 | |
| Training | 0.57 | | | | | |
| Adapt an existing method to current developments in education | 0.56 | | | | | |
| Classroom observation and debriefing by colleagues | 0.52 | | | | | |
| I like to renew with my colleagues | 0.49 | 0.44 | | | | |
| Performance appraisal with my boss | 0.45 | | | | | |
| I think that the use of new technologies stimulates my professionalisation | 0.44 | | | | | |
| I like to get incentives to improve myself | 0.41 | | | | | |
| Critical parents challenge me in my development | 0.40 | | | | | |
| I like to be involved in educational developments | | 0.75 | | | | |
| I like to be informed about everything in education | | 0.70 | | | | |
| I like to develop myself in my job | | 0.62 | | | | |
| My knowledge and experience should be used to improve the teaching in my school | | 0.58 | | | | |
| I like to inspire my colleagues | | 0.54 | | | | |
| I like to be leading in keeping education up-to-date | 0.44 | 0.54 | | | | |
| I like to do my job well | | 0.47 | | | | |
| I like to inspire new generations of students | | 0.45 | | | 0.40 | |
| To read articles, magazines, books, look for information on websites | | 0.40 | | | | |
| A plan | | | 0.78 | | | |
| Clear goals for improvement | | | 0.77 | | | |
| Schoolleaders who verify the achievement of goals | | | 0.63 | | | |
| Encouragement from the schoolleaders to experiment | | | 0.62 | | | |
| Realizing the value of what you're doing | | | 0.45 | | | |
| To cooperate with colleagues | | | 0.40 | | | |
| Appreciation by my colleagues | | | | 0.74 | | |
| Appreciation by the schoolleaders or my boss | | | | 0.74 | | |
| Appreciation by the parents of my students | | | | 0.70 | | |
| Appreciation by my students | | | | 0.65 | | |
| Social recognition | | | | 0.57 | | |

Table C.2 Rotated Component Matrix (continued)

| | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|
| To learn as a team from other schools | | | | | | |
| To participate in networks with other schools and knowledge centers | | | | | | |
| Assistance and guidance by external experts | | | | | | |
| I like to cooperate with people from outside our school | | | | | | |
| I think that we should use knowledge and experience from outside our school more often and they should use our's | | | | | | |
| To work with new learning methods | | | | | | |
| New developments in education stimulate my professionalisation | | | | | | |
| To respond to individual differences among students | | | | | | |
| Training | | | | | | |
| Adapt an existing method to current developments in education | | | | | | |
| Classroom observation and debriefing by colleagues | | | | | | |
| I like to renew with my colleagues | | 0.40 | | | | |
| Performance appraisal with my boss | | | | | | |
| I think that the use of new technologies stimulates my professionalisation | | | | | | |
| I like to get incentives to improve myself | | | | | | |
| Critical parents challenge me in my development | | | | | | |
| I like to be involved in educational developments | | | | | | |
| I like to be informed about everything in education | | | | | | |
| I like to develop myself in my job | | | | | | |
| My knowledge and experience should be used to improve the teaching in my school | | | | | | |
| I like to inspire my colleagues | | | | | | |
| I like to be leading in keeping education up-to-date | | | | | | |
| I like to do my job well | | | | | | |
| I like to inspire new generations of students | | | | | | |
| To read articles, magazines, books, look for information on websites | | | | | | |
| A plan | | | | | | |
| Clear goals for improvement | | | | | | |
| Schoolleaders who verify the achievement of goals | | | | | | |
| Encouragement from the schoolleaders to experiment | | | | | | |
| Realizing the value of what you're doing | | | | | | |
| To cooperate with colleagues | | | | | | |
| Appreciation by my colleagues | | | | | | |
| Appreciation by the schoolleaders or my boss | | | | | | |
| Appreciation by the parents of my students | | | | | | |
| Appreciation by my students | | | | | | |
| Social recognition | | | | | | |

Table C.2 Rotated Component Matrix (continued)

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| I must have the feeling that my job is important | | | | | | |
| Students who need extra care can count on me | | | | | 0.65 | |
| I enjoy working with students | | | | | 0.64 | |
| I like to touch every individual student with my teaching | | | | | 0.61 | |
| I like to provide students with good prospects | | | | | 0.53 | |
| I think that enthousiastic colleagues are inspiring | | | | | | |
| I like clear behavioral rules in our school | | | | | | 0.74 |
| I like to work in a clean environment | | | | | | 0.72 |
| I want to be safe at my workplace | | | | | | 0.63 |
| I want to be able to count on my colleagues | | | | | | 0.55 |
| I like the organisation of education to work smoothly | | | | | | 0.51 |
| I like to know what is expected of me in my job | | | | | | 0.43 |
| I think that a more experienced colleague should have a role as coach and counsellor | | | | | | |
| I enjoy other people calling upon my knowledge and experience | | | | | | |
| I think that the job should be organized in such a way that we can easily make use of each other's knowledge and experience | | | | | | |
| I enjoy calling upon the knowledge and experience of others | | | | | | |
| I like the team to determine the vision on education | | | | | | |
| I like the work of me and my colleagues to be based on a common vision | | | | | | |
| I like to see an inspiring vision on education in my school | | | | | | |
| I like our personnel policy aiming for improvement and development of education | | | | | | |
| Informal contacts with colleagues | | | | | | |
| I like to have a personnel policy that takes my age into account | | | | | | |
| I think it is important to be a member of a union or professional organization | | | | | | |
| I like to have a good salary | | | | | | |
| I like to determine my own methods | | | | | | |
| I like the schoolleaders to determine the vision on education | | | | | | |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
12 components extracted. Rotation converged in 11 iterations.

Table C.2 Rotated Component Matrix (continued)

| | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|
| I must have the feeling that my job is important | | | | | | |
| Students who need extra care can count on me | | | | | | |
| I enjoy working with students | | | | | | |
| I like to touch every individual student with my teaching | | | | | | |
| I like to provide students with good prospects | | | | | | |
| I think that enthousiastic colleagues are inspiring | | | | | | |
| I like clear behavioral rules in our school | | | | | | |
| I like to work in a clean environment | | | | | | |
| I want to be safe at my workplace | | | | | | |
| I want to be able to count on my colleagues | | | | | | |
| I like the organisation of education to work smoothly | | | | | | |
| I like to know what is expected of me in my job | | | | | | |
| I think that a more experienced colleague should have a role as coach and counsellor | 0.60 | | | | | |
| I enjoy other people calling upon my knowledge and experience | 0.55 | | | | | |
| I think that the job should be organized in such a way that we can easily make use of each other's knowledge and experience | 0.52 | | | | | |
| I enjoy calling upon the knowledge and experience of others | 0.48 | | | | | |
| I like the team to determine the vision on education | | 0.49 | | | | |
| I like the work of me and my colleagues to be based on a common vision | | 0.46 | | | | |
| I like to see an inspiring vision on education in my school | | | | | | |
| I like our personnel policy aiming for improvement and development of education | | | | | | |
| Informal contacts with colleagues | | | 0.65 | | | |
| I like to have a personnel policy that takes my age into account | | | | 0.60 | | |
| I think it is important to be a member of a union or professional organization | | | | 0.52 | | |
| I like to have a good salary | | | | 0.51 | | |
| I like to determine my own methods | | | | | 0.73 | |
| I like the schoolleaders to determine the vision on education | | | | | | 0.85 |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
12 components extracted. Rotation converged in 11 iterations.

Table C.3 Descriptive Statistics Components

| | N | Min | Max | Mean | St.Dev |
|---|---|---|---|---|---|
| Exchange | 3733 | -4.54 | 2.92 | 0.00 | 1.00 |
| Excellence | 3733 | -6.86 | 2.72 | 0.00 | 1.00 |
| Organization | 3733 | -5.02 | 2.90 | 0.00 | 1.00 |
| Recognition | 3733 | -8.63 | 3.20 | 0.00 | 1.00 |
| Intrinsic Motivation | 3733 | -8.32 | 3.57 | 0.00 | 1.00 |
| Safe Environment | 3733 | -7.74 | 3.62 | 0.00 | 1.00 |
| Team Work | 3733 | -6.04 | 3.51 | 0.00 | 1.00 |
| Common View | 3733 | -7.55 | 4.06 | 0.00 | 1.00 |
| Social Interaction | 3733 | -6.10 | 4.31 | 0.00 | 1.00 |
| Conditions of Employment | 3733 | -4.95 | 4.42 | 0.00 | 1.00 |
| Autonomy | 3733 | -6.33 | 3.35 | 0.00 | 1.00 |
| Leadership | 3733 | -3.42 | 5.15 | 0.00 | 1.00 |
| | | | | | |
| Valid N (listwise) | 3733 | | | | |

# 4.D Notation

**Notation 1** $\beta_j$ = *percentage of underprivileged children at school* $j$.

**Notation 2** $P$ = *number of positions (equals the number of classes of pupils to teach).*

**Notation 3** $q_j$ =*school* $j$*'s production function.*

**Notation 4** $\alpha_i$ = *teacher* $i$*'s ability.*

**Notation 5** $\theta_i$ =*teacher* $i$*'s motivation.*

**Notation 6** $f(\alpha_i, \theta_i)$ =*value added of teacher* $i$ *with ability* $\alpha_i$ *and motivation* $\theta_i$.

**Notation 7** $g(\alpha_i, \theta_i)$ =*joint probability density function of teachers' motivation and ability.*

**Notation 8** $w$ = *the teacher's wage.*

**Notation 9** $EUs_j$ =*school* $j$*'s expected payoff.*

**Notation 10** $EUt_{ij}$ =*teacher* $i$*'s expected utility of working at school* $j$.

**Notation 11** $\bar{A}$ =*teacher's reservation wage.*

**Notation 12** $T$ =*total number of teachers.*

**Notation 13** $n$ =*percentage of all vacancies at the underprivileged school.*

**Notation 14** $k$ =*costs of working for underprivileged children.*

**Notation 15** $r$ =*percentage of teachers* $T$ *with motivation* $\theta_i \geq k$.

**Notation 16** $\lambda$ =*Lagrange Multiplier.*

# Chapter 5

# Summary and Directions for Further Research

Motivation is an important element influencing the performance of public sector workers. However, not all public sector workers will be motivated by the same aspects of public sector work nor to the same extent. This difference in motivation and its consequences is the central focus of this thesis. The first part of the thesis explores the variation in motivation between private and public sector workers and analyzes the factors that influence differences in motivation within these two sectors. The second part of this thesis studies a particular aspect of public sector workers' motivation, namely the motivation towards clients, and its effects on allocation decisions and the sorting into street-level bureaucracy. Furthermore, we study theoretically the consequences of the introduction of incentives for allocation and sorting decisions. The lessons learned can be applied to optimize public sector personnel policies.

## 5.1 Summary

If motivation is key for the quantity and quality of public services provided, the first question to ask is whether public service motivation or altruism among public sector workers indeed exists. This is the subject of chapter two. Many studies using stated preferences or stated behaviour show that public sector workers have a higher level

of public service motivation than private sector employees. The same goes for risk aversion: Public sector workers are more risk averse than private sector workers, at least according to studies using stated behaviour. Although these studies are valuable in itself, there also have some well-known disadvantages due to the use of stated behaviour and stated preferences. These disadvantages include socially desirable answers and self-serving bias. Therefore, we use revealed preferences data to add to the existing body of knowledge on the differences between private and public sector employees' altruism and risk aversion in the first part of this thesis. We assess whether public sector employees have a stronger inclination to serve others and are more risk averse than employees in the private sector.

Respondents of a large-scale survey were offered a substantial reward and could choose between a widely redeemable gift certificate, a lottery ticket, or making a donation to a charity. Our multinomial regression analysis shows that public sector employees are significantly less likely than private sector workers to choose the risky option (lottery) over the safe option (gift-certificate). They are more likely, at the start of their career, to choose the pro-social option (charity) over the selfish option (gift-certificate) than private sector employees. However, when tenure increases, this difference in pro-social inclinations disappears and, later on, even reverses. In the private sector, we find no such pattern. Furthermore, tenure does not influence the choice of the lottery ticket over the gift certificate in either of the sectors. The effect of tenure on the choice of the pro-social option is not due to any public-sector specific age effect: It remains intact after controlling for these.

Our data only allow us to tell something about risk-aversion and altruism at the margin, because the reward for answering the survey provides some additional funds for altruistic or risky choices. We do not know how much risk people take in their daily life, nor do we know how much they contribute to the public interest. Maybe people are not willing to donate to charity, because they already contribute to the public good beyond their call of duty at work. Regrettably, we cannot control for the average risks people take in their daily life. However, one of the survey questions asked people whether they consider their salary to be sufficient for the work that they do. Using the answers to this question we can infer that quite a few public

sector employees do not contribute to charity, because they feel that they already contribute enough to society at work for too little pay.

The second part of this thesis comprises chapter three and four and studies the effects of altruistic feelings towards clients among street-level bureaucrats, both theoretically and empirically. Many street-level bureaucrats (such as caseworkers) have the dual task of helping some clients, while sanctioning others. In chapter three we develop a model of such a street-level bureaucracy and study the implications of its personnel policy on the self-selection and allocation decisions of agents who differ in unobservable altruism towards clients. When bureaucrats are paid flat wages, they do not sanction, and the most altruistic types sort into bureaucracy.

The attractiveness of the job does not only depend on the base salary, but also on the composition of the client population. When there are more clients in need of help, the street-level bureaucrats enjoys more non-pecuniary benefits of helping them. Thus the pecuniary benefits, the base salary, can be lower to attract the same number of employees. Furthermore, if the agency is a monopsonist on the labour market it might be optimal to hire less agents than necessary to serve all clients, in order to reduce the salary costs. Thus, our model is able to explain why street-level bureaucrats often experience an overload of clients.

Pay-for-performance induces some of the bureaucrats to sanction, but necessitates an increase in the expected wage to compensate for the sorrows of sanctioning unwilling clients. When it is too costly to induce all agents to sanction unwilling clients, this can result in sorting from both the top and bottom of the altruism distribution. However, when the value to the agency of sanctioning unwilling clients is sufficiently high, it might compensate the agents by offering a base salary and bonus above agents' outside option utility. The personnel attracted to such a job is drawn from the bottom of the altruism distribution. Thus, the pecuniary and non-pecuniary benefits of the job can have a substantial impact on the types of bureaucrats selecting into it.

In chapter four we continue our research on this theme by first developing a sorting model in which agents not only differ in their unobservable motivation towards clients, but also in their observable ability to work with them. We apply

this to a special case: The sorting of teachers into inner city schools. Inner city or underprivileged schools often have difficulties attracting qualified personnel. The model predicts that underprivileged schools attract highly motivated teachers of all abilities and a group of lowly motivated and lowly able teachers, when highly motivated teachers are scarce and costs of working with the underprivileged are intermediate. Thus, we expect a positive correlation between ability and motivation among teachers sorting into underprivileged schools. When the costs of working with the underprivileged are high, there is no sorting on motivation and underprivileged schools end up with teachers of low ability. There will be no correlation between ability and motivation at either type of school.

In the second part of this chapter we test the empirical predictions using Dutch survey data from 2006 on teachers' stated motivation and ability, where ability is measured by years of experience and level of education. The data indicate that the sorting of teachers into Dutch secondary schools corresponds most with the case of high costs of working with the underprivileged: Teachers prefer working at the privileged schools and those schools prefer hiring teachers with the highest ability, that is education. We see no significant effect of motivation and experience on the sorting of teachers into underprivileged schools. The effect of education remains after restricting the sample to teachers with five years or less of experience at their current school, to teachers teaching in the lower grades, and after restricting the sample to the big cities. Within schooltypes, we cannot find evidence of sorting into underprivileged schools based on education, possibly due to the fact that the variation of underprivileged and privileged schools within schooltypes is relatively small. Among primary school teachers, the results are more ambiguous.

## 5.2 Directions for further research

This thesis adds additional evidence based on revealed preferences to the existing body of knowledge on public sector motivation that uses stated behaviour or preferences. As in these earlier studies, the conclusion is that altruism among bureaucrats exists, but not among all bureaucrats to the same extent. Of particular interest

are our findings that pro-social behaviour among bureaucrats seems to fade away over tenure. Although similar findings on the decrease of public service motivation can be found in articles on public servants by Blau (1960), Van Maanen (1975), Moynihan and Panday (2007), and Cooman et al. (2009), chapter two is the first, to our knowledge, to show differences among the decrease in pro-social behaviour among public servants versus private sector employees. The decline in pro-social behaviour among public servants raises two important questions. First of all, why does it occur? Second, what are the consequences thererof. The last question is all the more important, since due to the recent financial crisis and emanating budget deficits, many governments try to solve their budget problems by reducing the number of people employed in the public sector. This could lead to a vacancy stop or last-in-first-out lay-offs, which increase tenure by the incumbent employees.

The fading of altruism with tenure in public sector organizations is remarkable. However, it is not clear what the cause of this decline is. It could be due to naive beliefs of public sector employees about the state of the world, which is updated by the on-the-job experience of a public sector worker. Thus, when a civil servant starts to work in the public sector, he believes that the pecuniary benefits and non-pecuniary benefits of the job outweigh his outside option utility. For instance, a rooky caseworker might believe that the joys of working with needy and deserving clients provides benefits that, together with his salary, are larger than his reservation wage. A policymaker at a ministry might believe that he can change the rules as to help the poor and needy. As time goes by, both the caseworker and the pen-pusher might discover that the same people they try to help, were not as needy or deserving as the bureaucrats thought they would be. A caseworker will not only meet clients willing to work, but also clients unwilling to find themselves a job. This group might be larger than the caseworker had imagened before taking up the job. The pen-pusher at the ministry might encounter a similar experience when reading reports about the number of clients committing fraud or people evading taxes. Thus, the bureaucrat's view on the world changes as he discovers that the clients he tries to help are different than the ones he had in mind when accepting the job. Therefore, his pro-social behaviour could diminish as he learns about this.

Another explanation for the disillusionment effect is that pen-pushing and street-level bureaucrats expect other non-pecuniary benefits from helping clients, for example gratitude. However, many clients are not grateful, since their appeal on government funds is usually larger than the funds the government is able to provide them with. Thus, instead of gratitude, many bureaucrats have to deal with clients' disappointment or even worse, with clients leveling a reproach at them for not receiving enough benefits. This could also lead to a diminishing level of public service motivation. In the former case bureaucrats update their beliefs on the deprivation of the clients, whereas in the second case they update their beliefs about the gratitude clients provide them with. Whatever the reason for the naivety among bureaucrats, in both cases experience leads naive bureaucrats to update their beliefs about the state of the world. This might result in bureaucrats' reconsideration of the benefits of the job and a change of occupation. Although the above mentioned studies of Blau (1960), Van Maanen (1975), and Cooman et al. (2009) provide qualitive evidence on the mechanisms described here, a more formal study has not yet appeared. Thus, an interesting step for further research would be to study this issue using principal-agent and game theory, in particular Bayesian updating. Again, an important question is not just who is willing to work for the government, but also who should the government hire? Should the government hire the naive, but motivated bureaucrats or the bureaucrats with relatively low motivation and a realistic view on the world? If the loss of naivety leads to turnover, the government might be better off by screening applicants beforehand and hiring the less naive, or the ones willing to spend their professional lives in the public sector for more extrinsic reasons, such as job security. And especially so, when within tenure experience leads to an increase in the employee's ability to perform the job or recruitment costs are high.

To answer the question of whom should be hired properly, we also need to study formally the consequences the loss of public service motivation has on the bureaucrat's effort provision and allocation decisions. Since effort in the public sector is often not or not completely verifiable, a bureaucrat can at least partly compensate for the loss of non-pecuniary benefits by reducing his efforts. The loss of public service

motivation could also have an effect on the allocation decisions street-level bureaucrats make, when within tenure experience lowers their feelings towards clients. The government could react to these changes by raising the salary over tenure or by providing bureaucrats with incentives. Whether this is an optimal response remains to be seen. It could also be optimal to hire new idealistic recruits to replace the current workforce. Studying these issues formally could provide us with predictions to be tested in future empirical research.

Testing these predictions empirically is not an easy job. A first prerequisite to conduct such a test is to enhance the current research on the effects of public service motivation. Much of the work on this issue is theoretical in nature. Furthermore, the empirical studies available mostly use stated preferences and stated behaviour to infer public service motivation and use surveys data, thus stated performance, as the dependent variable measuring effects (see e.g. Brewer 2008, Petrovsky 2009). Much can thus be gained by using revealed preferences on motivation and objective performance measures. Although it will not always be easy to observe performance in the public sector in an objective way, we can improve upon the current state of the research. First of all, a part of the effects of public sector work is observable. For instance, in educational research a lot of progress has been made by measuring the value added by teachers (see e.g. Hanushek and Rivkin 2006) or the performance of caseworkers (see e.g. Heckman, Smith, and Taber 1996). Second, for the part where performance is not that easily observable, as for instance among policymakers, progress can be made as well by using employees' performance as stated by the managers instead of the performance stated by employees themselves.

The research in the second part of this thesis shows that, theoretically, differences among public servants in motivation towards clients, could lead to sorting within occupations due to differences in clientele. Several stylized facts are in support of this theory. However, the empirical evidence provided in this thesis is not fully in support of the presented theory. That could be due to several reasons, as for example the use of stated preferences and the absence of important information on the teacher's place of residence. Another reason might be that, coincidentally, the Dutch educational sector is not that plagued by such large differences in student population as to

attract differently motivated teachers to different types of schools. An obvious way to proceede would of course be to test this theory further using better data, for different sectors, and even different countries. To test the effects of incentives on sorting, effort, and allocation decisions, we need to conduct field experiments and collect data over several years.

# Samenvatting
# (Summary in Dutch)

## Introductie

Het bestaan en de effecten van de motivatie van ambtenaren voor de publieke zaak, ook wel altruïsme genoemd, is een veelvuldig bediscussieerd thema onder economen en bestuurskundigen (zie bijvoorbeeld Perry en Hondeghem 2008a, Besley en Ghatak 2005, Francois 2000 en 2007). De discussie over de motivatie van ambtenaren en de effecten daarvan op de hoeveelheid en kwaliteit van publieke diensten blijft echter niet beperkt tot de academische wetenschap. Veel journalisten, politici en burgers bediscussiëren dit onderwerp in de media, het parlement en zelfs op straat. De reden voor dit levendige debat is tweeledig. Allereerst worden ambtenaren vaak betaald uit de belastingopbrengsten. De belastingbetalers zien dan ook graag dat hun geld goed besteed wordt. Ten tweede is er veel belangstelling voor de motivatie van ambtenaren en de effecten daarvan, omdat hetzelfde publiek dat deze discussie voert ook de klant is van die ambtenaren. Daarbij valt vaak weinig te kiezen tussen publieke dienstverleners. Bijstandsgerechtigden kunnen alleen bij hun gemeente terecht voor een uitkering. Ouders kunnen voor hun kinderen vaak maar uit een paar basisscholen in de buurt kiezen. Misdaadslachtoffers doen aangifte bij de lokale politie-agent, gewonden gaan naar het dichtsbijzijnde ziekenhuis.

De mensen die werkzaam zijn als ambtenaar beïnvloeden de aard, kwaliteit en hoeveelheid van de te leveren publieke diensten. En daardoor kunnen ze soms een verschil maken in het leven van mensen. Een bijstandsconsulent kan het lot van een bijstandsgerechtigde beïnvloeden door hem te helpen met het zoeken naar een baan

of door hem juist een sanctie te geven wegens onvoldoende sollicitatie-inspanningen. Een leraar kan de vorderingen van zijn leerlingen beïnvloeden door speciale aandacht te geven aan zorgleerlingen. Verpleegsters kunnen er voor zorgen dat patiënten op hun gemak gesteld worden voor een operatie. Hoewel de service ook beïnvloed wordt door de beschikbaarheid van budgetten, de regels van de instelling en de mate van discretionaire bevoegdheid die de ambtenaren hebben, gaan veel wetenschappers er vanuit dat de motivatie van ambtenaren een belangrijke factor is die hun presteren beïnvloedt. Voorbeelden zijn Francois (2000) en Dur en Delfgaauw (2008) die de effecten van motivatie op de inspanningen van ambtenaren en hun selectie in de publieke sector onderzoeken met behulp van theoretische modellen. Daarnaast zijn er een aantal empirische studies die (zij het bescheiden) bewijs leveren voor de effecten van motivatie op de (zelf-gerapporteerde) prestaties in de publieke sector. Zie Brewer (2008), Perry, Hondeghem en Wise (2009) en Petrovsky (2009) voor overzichten.

Hoewel motivatie een belangrijk element is dat de prestaties van ambtenaren beïnvloedt, zullen niet alle ambtenaren even gemotiveerd zijn of motivatie putten uit dezelfde elementen van hun werk. Dit verschil in motivatie en de consequenties ervan is het centrale thema van dit proefschrift. Het eerste deel van dit proefschrift onderzoekt de variatie in motivatie tussen private en publieke sector werknemers en analyseert de factoren die invloed hebben op het verschil in motivatie tussen beide sectoren. Het tweede deel van dit proefschrift bestudeert een speciaal onderdeel van de motivatie van ambtenaren, namelijk hun motivatie om met mensen te werken, en de gevolgen daarvan op de beslissingen die zij nemen in hun werk en de keuze voor een bepaald type werkgever.

## Literatuur

Als motivatie zo belangrijk is voor de kwaliteit en de hoeveelheid van de te leveren publieke diensten, dan is de eerste vraag die opkomt of er daadwerkelijk bewijs is voor het bestaan van een motivatie voor de publieke zaak of altruïsme onder ambtenaren. Veel studies in de bestuurskundige literatuur en steeds meer studies in de economis-

che literatuur kijken naar de verschillen in motivatie tussen ambtenaren met behulp van zelfverklaarde voorkeuren of zelfverklaard gedrag. Dat wil zeggen, de onderzoekers gebruiken de antwoorden op vragen over het belang van bepaalde baankenmerken (zoals bijvoorbeeld 'nuttig voor de maatschappij' in de studie van Lewis en Frank 2002), door te kijken naar verschillen in tevredenheid over het werk tussen publieke en private sector werknemers (zoals Georgellis en Tabvuma 2010 doen), door de verschillen in zelfverklaard donatiegedrag of vrijwilligerswerk te analyseren tussen private en publieke sector werknemers (zie Houston 2006) of door de zelfverklaarde hoeveelheid onbetaald overwerk te vergelijken (Gregg et al. 2008). Net als Perry et al. (2009) in hun overzichtsstudie van deze literatuur, concluderen deze studies in het algemeen dat het niveau van motivatie voor de publieke zaak groter is onder ambtenaren dan onder andere werknemers.

Liefde voor de publieke zaak is echter niet de enige reden om in de publieke sector aan de slag te gaan. Andere redenen, zoals de wens om zorg en arbeid te combineren (Leijsink en Steijn 2008), zijn ook belangrijk. Een van de punten die veel aandacht trekt is de vraag of werknemers in de publieke sector meer risico-avers zijn dan werknemers in de private sector. Velen denken dat dit het geval is, omdat het loon en de baanzekerheid in de publieke sector minder aan fluctuaties onderhevig zijn dan in de private sector. Als de meer risico-averse mensen inderdaad aan de slag gaan in de publieke sector, dan betekent dit dat de introductie van bijvoorbeeld resultaatsafhankelijke beloning andere effecten kan hebben in de publieke dan in de private sector. Het bewijs voor de hypothese dat mensen in de publieke sector risico-averser zijn is, op basis van studies die gebruik maken van zelfverklaarde voorkeuren, niet overtuigend (zie bijvoorbeeld Rainey 1982, Crewson 1997, Houston 2000, en Frank en Lewis 2002). Maar studies die gebruik maken van zelfverklaard gedrag laten wel zien dat werknemers in de publieke sector over het algemeen een lagere risicotolerantie hebben dan werknemers in de private sector (Bellante en Link 1981, Hartog et al. 2002, Guiso en Paiella 2008, Roszkowski en Grable 2009). Hoewel dergelijke studies waardevolle informatie bevatten en zelfverklaarde voorkeuren en zelfverklaard gedrag wel een samenhang vertonen met waargenomen gedrag (Dohmen et al. 2009), zijn er ook nadelen bekend van het gebruik hiervan, zoals "geheugen-

verlies, beoordelingsfouten, sociaal wenselijke antwoorden en 'common source' bias" genoemd door Brewer (2008: 141-142). Daarom gebruiken wij in het eerste deel van dit proefschrift geopenbaarde voorkeuren, dat wil zeggen daadwerkelijke keuzes, om de kennis over het verschil in altruïsme tussen publieke en private sector werknemers te vergroten.

Het tweede deel van dit proefschrift onderzoekt de verschillen in motivatie onder werknemers in de publieke sector onderling en de consequenties daarvan voor de selectie van werknemers binnen de publieke sector. In de bovengenoemde studies, gaat de meeste aandacht uit naar de verschillen tussen publieke en private werknemers. Maar de publieke sector is een grote sector die zeer uiteenlopende activiteiten omvat. Werk in de publieke sector loopt uiteen van dossiervreters op ministeries tot verpleegsters aan de rand van het bed, van secretaresses achter bureaus tot leraren voor de klas. Dus de baankeuze van werknemers hoeft niet beperkt te blijven tot de keuze tussen publiek en privaat, maar zal zich ook uitstrekken tot het scala aan beroepen binnen de publieke sector. Hoewel het thema van de motivatie voor de publieke zaak uitgebreid beschreven is, heeft het thema van baankeuzes binnen de publieke sector tot nu toe veel minder aandacht gekregen. Zeker binnen de economische wetenschap. Prendergast (2007) is een van de eerste economen die aandacht heeft besteed aan het vraagstuk waarom sommige ambtenaren zeer begaan lijken met de klanten, zoals bijvoorbeeld bijstandsconsulenten, terwijl anderen juist zeer wantrouwend staan tegenover het publiek, denk bijvoorbeeld aan belastinginspecteurs en politieagenten. Zijn model voorspelt dat er twee uitersten afkomen op banen bij instellingen in de publieke sector. Dat wil zeggen enerzijds de mensen die meer dan deze instellingen begaan zijn met het lot van cliënten en anderzijds de mensen die veel minder dan deze instellingen begaan zijn met het lot van de cliënten.

De selectie van mensen hoeft niet beperkt te blijven tot de selectie in bepaalde type beroepen, zoals leraar, politie of bijstandsconsulenten. Ook binnen beroepen kan selectie optreden. Dit kan komen door een verschil in missie tussen de diverse werkgevers, zoals bijvoorbeeld beschreven door Besley en Ghatak (2005), of door verschil in samenstelling van de cliëntpopulatie. De baan van een leraar op een school in de binnenstad kan heel anders zijn dan de baan van een leraar op een school in een

van de voorsteden door het verschil in leerlingenpopulatie. Dit is precies de witte vlek die we in het tweede deel van dit proefschrift proberen in te vullen. We richten onze aandacht hierbij op een speciaal type ambtenaar, de zogenaamde "street-level" bureaucraat. Dat wil zeggen, de ambtenaren die dag in dag uit in aanraking komen met cliënten, leerlingen en andere burgers. Dus, dienstverleners als leraren, politieagenten en verpleegsters. Zij hebben vaak een tweeledige taak van enerzijds mensen helpen en anderzijds mensen bestraffen. Bovendien hebben zij door de aard van het werk vaak een heleboel discretie bij het vervullen van hun taken. Dit stelt ons in staat om een nieuwe invalshoek te bestuderen: De consequenties van motivatie op de beslissingen die deze bureaucraten nemen. Dit in tegenstelling tot anderen, zoals Prendergast (2007) en Brekke en Nyborg (2008), die focussen op de gevolgen van verschillen in motivatie op het inspanningsniveau en selectie. Wij gaan er vanuit dat deze dienstverleners geven om de cliënten die zij tegen komen in hun werk. Daarom houden zij rekening met het nut dat de cliënt aan een beslissing ontleent. Echter niet allemaal in dezelfde mate (zie Lipsky 1980). Dit heeft invloed op hun baankeuze. Baankeuzes hangen ook af van de prikkels die een werkgever hanteert. Francois (2007) kijkt naar de relatie tussen incentives, inspanningen en baankeuzes. Hij toont aan met behulp van een theoretisch model dat de introductie van resultaatafhankelijke beloning in de publieke sector een negatief effect kan hebben op de productiviteit, omdat mensen met een lage intrinsieke motivatie daardoor ook interesse krijgen in een baan in de publieke sector en degenen met een hoge intrinsieke motivatie verdrijven (zie ook Delfgaauw en Dur 2007). De relatie tussen prikkels en de beslissingen (zoals het toewijzen van uitkeringen of sancties) die ambtenaren nemen is tot op heden nog niet onderzocht door economen. Ons onderzoek levert inzichten op basis van theorie over dit vraagstuk.

Natuurlijk is motivatie niet de enige factor, die de selectie van ambtenaren voor een bepaalde baan beïnvloedt. Een andere belangrijke factor is hun talent. Hoewel er steeds meer onderzoek komt naar de relatie tussen motivatie, inspanningen en selectie van werknemers in de publieke sector (zie Besley en Ghatak 2005, Prendergast 2007, Francois 2007, Brekke en Nyborg 2008, Delfgaauw en Dur 2008), is er nog maar weinig onderzoek dat ook de relatie tussen selectie, motivatie en het talent van

werknemers analyseert. Delfgaauw en Dur (2010) tonen aan dat het talent van managers meer oplevert in de private sector dan in de publieke sector, omdat de motivatie voor de publieke zaak de lonen in de publieke sector drukt. Daarom komen de meest talentvolle managers in de private sector terecht. Een natuurlijk vervolg op dit type onderzoek is onderzoek naar de relatie tussen motivatie, talent en baankeuze binnen de publieke sector. Daarom bestuderen we in het laatste hoofdstuk van dit proefschrift zowel theoretisch als empirisch de effecten van motivatie en talent op de selectie van leraren in scholen met veel zorgleerlingen.

## Motivatie voor de publieke zaak

Voordat we een overzicht geven van de belangrijkste resultaten van dit proefschrift gaan we eerst nader in op het begrip motivatie. Motivatie is volgens de Longman dictionary of contemporary English (2008) "een wil of gretigheid om iets te doen zonder dat dit opgedragen of verplicht is". Motivatie kunnen we onderscheiden in extrinsieke motivatie, dat is een motivatie "gevoed door externe bronnen", zoals bijvoorbeeld financiële prikkels of promotiekansen, en intrinsieke motivatie, dat wil zeggen een motivatie die "deel uitmaakt van de aard of het karakter van iets of iemand" (Longman 2008). Mensen kunnen intrinsiek gemotiveerd zijn om een taak uit te voeren, omdat ze het leuk vinden om te doen of omdat ze geven om het resultaat van de uitvoering van de taak. De motivatie van mensen om aan de slag te gaan in de publieke sector kan op dezelfde wijze onderverdeeld worden. Perry en Hondeghem (2008b: 3) maken een bruikbaar onderscheid. Ten eerste onderscheiden ze "public sector motivation", dat zijn meer extrinsieke redenen om in de publieke sector aan de slag te gaan zoals bijvoorbeeld de mogelijkheden om arbeid en zorg te combineren, baanzekerheid, sociale voorzieningen, scholing en de sociale status van ambtenaren. Ten tweede onderscheiden ze "public service motivation", dat meer raakt aan het begrip intrinsieke motivatie. Perry en Wise (1990: 368) definiëren de motivatie voor de publieke zaak als "een individu's predispositie om te appelleren aan motieven die primair aanwezig zijn in het werk in publieke instituties of organisaties". Perry (1996: 20) toont aan dat motivatie voor de publieke zaak vier onderliggende dimen-

sies kent, namelijk de aantrekkingskracht die beleid maken uitoefent op sommigen, betrokkenheid bij het publieke belang, compassie en zelf-opoffering. De eerste dimensie kan gezien worden als een speciale vorm van intrinsieke motivatie, namelijk de vreugde die ontleend wordt aan de aard van het werk zelf. De overige vormen appelleren meer aan het begrip altruïsme, zoals economen dat vaak gebruiken.

Altruïsme is de wens om anderen te helpen zonder directe voordelen voor jezelf. Of, meer formeel uitgedrukt, altruïsme "is een voorkeur voor het welzijn van anderen en de daden die dit bewerkstelligen" (Kolm 2006: 8). Altruïsme is een erg breed begrip. Een eerste onderscheid dat we kunnen maken is gebaseerd op het onderwerp van het altruïsme. Sommige mensen hebben altruïstische gevoelens voor iedereen, terwijl anderen vooral deze gevoelens koesteren voor degenen in nood of mensen voor wie ze empathische gevoelens, of gevoelens van compassie of sympathie koesteren. Altruïsme kan zich dus richten tot iedereen in de maatschappij, maar ook beperken tot een groep mensen met wie men zich het meest verwant voelt, zoals familie, vrienden en kennissen (zie ook Baron et al. 2009, Kolm 2006). Een tweede onderscheid is tussen altruïsme in zijn zuivere en in zijn onzuivere vorm. Zuivere altruïsten, ook wel output-georienteerde altruïsten, geven om het niveau van welzijn van anderen, zonder dat het daarbij uitmaakt of zijzelf of derden daar aan bijdragen. Onzuiver altruïsme houdt in dat men graag zelf een bijdrage levert aan het welzijn van anderen. Dat betekent dat mensen warme gevoelens ondervinden van het geven op zichzelf (Andreoni 1989, Francois en Vlassopoulos 2008). In een werkomgeving betekent dit dat onzuivere altruïsten vreugde ontlenen aan het leveren van inspanningen in de publieke sector, zelfs als ze zich realiseren dat als zij stoppen met hun werk en iemand anders hun plaats inneemt, het totale aanbod aan publieke diensten constant blijft. Door deze inspanningen genieten zij naast hun loon ook inkomsten die niet in geld uit te drukken zijn. Deze niet-monetaire voordelen van het werken in de publieke sector hangen nauw samen met het begrip actie-georienteerd altruïsme, zoals dat door Francois en Vlassopoulis (2008) geïntroduceerd is. Het verschil tussen een ambtenaar die om zuiver altruïstische redenen in de publieke sector werkt en een die om onzuiver altruïstische redenen in de publieke sector werkt, is dat de eerste alleen voor zo'n baan zou kiezen als zijn eigen bijdrage leidt tot een hoger welzi-

jnsniveau dan de bijdrage van anderen. Bijvoorbeeld, als hij meer talent heeft om een bepaalde dienst te leveren of meer inspanningen zal uitoefenen. Iemand met onzuiver altruïstische gevoelens zal kiezen voor een baan in de publieke sector als zijn vreugde van het uitoefenen van dit werk samen met het loon meer nut oplevert dan inkomsten elders. Dat betekent dat zo iemand ook voor een baan in de publieke sector zal kiezen als er andere, beter geschikte, kandidaten zijn. Een laatste onderscheid in verschijningsvormen van altruïsme dat we hier onder de aandacht willen brengen, is het verschil tussen altruïsme waarbij men puur kijkt naar het nut dat anderen ontlenen aan acties, afgezet tegen een meer paternalistische vorm van altruïsme, waarbij men nut ontleent aan de toewijzing van een bepaald goed aan iemand.

Al deze verschillende vormen van altruïsme kunnen naast elkaar voorkomen. Dat wil zeggen dat sommige ambtenaren vooral gemotiveerd zullen zijn door zuiver altruïstische motieven, terwijl anderen vooral de warme gevoelens die hun werk oplevert waarderen en een laatste groep aan beide zaken tegelijkertijd motivatie ontleent.

## Samenvatting van de resultaten

In het eerste deel van dit proefschrift vullen we de bestaande literatuur over publieke sector motivatie aan door gebruik te maken van een unieke dataset met gegevens over daadwerkelijke keuzes die werknemers maken bij de ontvangst van een beloning voor het invullen van een enqûete. De respondenten konden kiezen tussen een staatslot (risicovolle keuze), een donatie aan een goed doel naar keuze (altruïstische optie) en een VVV-bon (de veilige en egoistische keuze). Met behulp van deze gegevens stellen we vast of ambtenaren een sterkere geneigdheid hebben om anderen te dienen en meer risico-avers zijn dan werknemers in de publieke sector.

De resultaten van onze multinomiale logistische regressie tonen aan dat werknemers in de publieke sector significant minder vaak de voorkeur geven aan het staatslot ten opzichte van de kadobon in vergelijking met werknemers in de private sector. Aan het begin van hun carrière zijn ze meer geneigd dan werknemers in de private

sector om te kiezen voor een donatie aan een goed doel in plaats van een kadobon. Maar naarmate hun dienstverband langer duurt, verdwijnt dit verschil tussen publieke en private sector werknemers. Sterker, het draait zelfs om. In de private sector zien we geen daling van de geneigdheid om voor het goede doel te kiezen over de tijd heen. Bovendien heeft in geen van beide sectoren de lengte van het dienstverband invloed op de keuze voor het staatslot ten opzichte van de kadobon. Het effect van de duur van het dienstverband op de keuze voor het goede doel in de publieke sector hangt niet samen met enig leeftijdsspecifiek effect in de publieke sector. Na het controleren voor dergelijke effecten blijft het effect van de duur van het dienstverband zichtbaar.

Onze data stellen ons alleen in staat om iets te zeggen over risicoaversie en altruïsme aan de marge, want de beloning voor het invullen van de enquête verschaft de respondenten additionele middelen om aan een goed doel of lot te besteden. We weten niet hoeveel risico mensen in hun dagelijks leven nemen of hoeveel ze al aan een goed doel geven. Misschien kiezen de ambtenaren niet voor de donatie aan een goed doel, omdat ze menen dat ze in het dagelijks leven al meer voor de publieke zaak doen dan de plicht van hen vraagt. Helaas hebben we geen informatie over de risico's die mensen lopen in het dagelijks leven. Wel weten we iets over de mate waarin mensen bijdragen aan de publieke zaak tijdens hun werk. Eén van de vragen in de enquête informeert of de respondenten van mening zijn dat hun salaris voldoende is voor het werk dat zij doen. Afgaand op de antwoorden op deze vraag kunnen we afleiden dat veel mensen in de publieke sector hun beloning niet aan het goede doel doneren, omdat zij vinden dat ze op het werk al meer dan genoeg voor de maatschappij doen voor te weinig loon.

Het tweede deel van dit proefschrift omvat hoofdstuk drie en vier en bestudeert zowel theoretisch als empirisch de effecten van altruïstische gevoelens voor cliënten onder publieke dienstverleners. Veel dienstverleners in de publieke sector (zoals bijstandsconsulenten) hebben de tweeledige taak van het enerzijds straffen van cliënten en anderzijds helpen. In hoofdstuk drie ontwerpen we een model voor zo'n soort publieke organisatie en bestuderen de effecten van het personeelsbeleid op de zelf-selectie en beslissingen van ambtenaren die verschillen in niet-observeerbare mo-

tivatie richting hun cliënten. Als deze werknemers een vast salaris ontvangen dan geven ze geen sancties en kiezen de meest altruïstische types voor een baan bij de instelling.

De aantrekkingskracht van de baan hangt niet alleen af van het basissalaris dat de werknemers ontvangen, maar ook van de samenstelling van de cliëntenpopulatie. Als er veel cliënten zijn die hulp nodig hebben dan beleven de werknemers van de instelling veel meer vreugde aan het werk, dat wil zeggen meer niet-monetaire voordelen. Dat betekent dat het loon in zo'n instelling lager kan zijn dan in een instelling met weinig hulpbehoevende cliënten om toch evenveel werknemers aan te trekken.

Het kan ook voordelig zijn om niet alle cliënten te helpen als de instelling de enige vragende partij op de arbeidsmarkt is. Dat betekent namelijk dat de instelling, door de vraag naar werknemers laag te houden, het salaris voor al zijn werknemers laag kan houden. De uitgespaarde loonkosten wegen op tegen het nadeel dat niet elke cliënt geholpen wordt. Dus ons model geeft een verklaring voor het vaak waargenomen effect dat in dergelijke instellingen de werknemers vaak te maken hebben met een overvolle 'caseload'.

Resultaatafhankelijke bonussen verleiden de werknemers om cliënten te sanctioneren indien nodig, maar tegelijkertijd brengen ze een verhoging van het loon met zich mee om te compenseren voor de negatieve gevoelens die de werknemers ervaren als ze sancties moeten uitdelen. Als het te kostbaar is om alle werknemers over te halen om te sanctioneren, dan ontstaat een tweedeling in het personeel. Een deel is zeer altruïstisch en zal niet sanctioneren. Een ander deel is minder altruïstisch, sanctioneert wel en vraagt meer compensatie voor het uitdelen van deze sancties. Als tenslotte het sanctioneren van cliënten sterk gewaardeerd wordt door de instelling en veel oplevert, dan kan de instelling alle werknemers overhalen om te sanctioneren door via een combinatie van bonus en basissalaris een hoog inkomen aan ze te verschaffen en ze zo meer te betalen, dan ze op alternatieve wijze kunnen verdienen. Een dergelijke baan is echter alleen aantrekkelijk voor mensen aan de onderkant van de altruïsme verdeling. De monetaire en niet-monetaire voordelen van een baan hebben dus een grote invloed op het type werknemer dat zich tot zo'n baan aangetrokken voelt.

In hoofdstuk vier bouwen we voort op dit thema door eerst een selectiemodel te ontwikkelen waarin de werknemers niet alleen verschillen in hun niet-observeerbare motivatie richting cliënten, maar ook in hun observeerbare talent om met deze cliënten te werken. Dit model passen we toe op een specifiek voorbeeld: De selectie van leraren in scholen in de binnenstad. De scholen in de binnensteden, of ook wel scho-len met veel zorgleerlingen, hebben vaak moeite met het aantrekken van voldoende gekwalificeerd personeel. Als zeer gemotiveerde leraren schaars zijn en de kosten van het werken met zorgleerlingen gemiddeld, dan voorspelt het model dat scholen met veel zorgleerlingen de groep leraren met een grote motivatie en allerlei talent aantrekt en de groep leraren met een lage motivatie en weinig talent. In dit geval verwachten we een positieve correlatie tussen de motivatie en het talent van de leraren op scholen met veel zorgleerlingen. Indien de kosten van het werken met deze leerlingen heel hoog zijn, dan willen leraren hier liever niet werken. Dan verwachten we dus geen selectie op basis van motivatie. Op deze scholen belanden dan uiteindelijk vooral de leraren met weinig talent.

In het tweede gedeelte van dit hoofdstuk testen we de empirische predicties met behulp van Nederlandse enqûetegegevens uit 2006 over de motivatie en het talent van leraren. Talent meten we hierbij door middel van de hoogst afgeronde opleiding van leraren en hun ervaring in jaren. De data laten zien dat de selectie van leraren in het voorgezet onderwijs in Nederland vooral overeen lijkt te komen met de situatie van hoge kosten van het werken met zorgleerlingen. Dat wil zeggen dat de leraren liever werken op scholen met weinig zorgleerlingen en deze scholen het liefst leraren met veel zichtbaar talent, in dit geval opleiding, aannemen. We zien geen significant effect van motivatie of ervaring op de selectie van leraren in het voortgezet onderwijs. Het effect van opleiding blijft zichtbaar na het beperken van de steekproef tot leraren met minder dan vijf jaar ervaring op hun huidige school, na het beperken van de steekproef tot leraren die alleen les geven in de onderbouw, en na het beperken van de steekproef tot de grote steden. Binnen schooltypes kunnen we geen bewijs vinden voor selectie van leraren op basis van hun hoogst genoten opleiding in scholen met veel zorgleerlingen. Mogelijk komt dit doordat er weinig variatie is in het aandeel zorgleerlingen binnen schooltypes. Onder leraren in het

basisonderwijs zijn de resultaten niet eenduidig.

## Vervolgonderzoek

Dit proefschrift voegt nieuw bewijs toe aan de bestaande literatuur over publieke sector motivatie. Hierbij maken we in tegenstelling tot de bestaande studies geen gebruik van zelfverklaarde voorkeuren of zelfverklaard gedrag, maar waargenomen gedrag. Dat wil zeggen daadwerkelijke keuzes. Ook op basis van dit onderzoek kunnen we concluderen dat er onder een deel van de ambtenaren inderdaad een voorkeur voor pro-sociale keuzes aanwezig is, maar lang niet onder alle ambtenaren in dezelfde mate. Met name interessant zijn onze bevindingen dat het pro-sociale gedrag van ambtenaren gedurende de looptijd van het dienstverband lijkt te verdwijnen. Hoewel soortgelijke bevindingen over het verdwijnen van de motivatie voor de publieke zaak onder ambtenaren zijn gevonden in artikelen van Blau (1960), Van Maanen (1975), Moynihan en Panday(2007) en Cooman et al. (2009), is hoofdstuk twee het eerste onderzoek, naar wij weten, dat verschil laat zien in de motivatie over de loop van het dienstverband tussen publieke en private sector werknemers. Deze afname van motivatie voor de publieke zaak roept twee belangrijke vragen. Allereerst, wat veroorzaakt dit? Ten tweede, wat zijn de gevolgen ervan? De laatste vraag is momenteel des te belangrijker, omdat door de financiele crisis en de daaruit voortvloeiende budgettaire tekorten veel overheden hun budgettaire problemen proberen op te lossen door het aantal mensen dat in de publieke sector werkt terug te dringen. Dit kan leiden tot vacaturestops of ontslagen volgens de "last in-first-out" methode. Dat betekent dat de lengte van het dienstverband van het zittende personeel waarschijnlijk zal toenemen.

Het verdwijnen van altruïstische neigingen bij ambtenaren gedurende het dienstverband is opmerkelijk. Het is echter onduidelijk waardoor dit veroorzaakt wordt. Het kan komen doordat ambtenaren aan het begin van hun dienstverband naïeve ideeen hebben over de toestand in de wereld, die door hun werkervaring als ambtenaar bijgesteld worden. Een ambtenaar die begint als werknemer in de publieke sector denkt dat zijn monetaire en niet-monetaire inkomsten uit de baan opwegen tegen

de alternatieve inkomsten die hij zou kunnen vergaren. Een "groene" bijstandsconsulent kan er van overtuigd zijn dat de vreugde van het werken met cliënten die een hoge nood hebben en ondersteuning verdienen samen met zijn salaris opwegen tegen elk alternatief. Een beleidsmaker op een ministerie kan aan het begin van zijn carrière verwachten dat hij door het veranderen van de regels de zwakkeren in deze samenleving kan helpen. Maar na verloop van tijd zullen zowel de bijstandsconsulent als de beleidsmaker ontdekken dat de mensen die zij proberen te helpen niet altijd zo noodruftig waren als zij dachten, noch altijd hun ondersteuning verdienden. Een bijstandsconsulent zal niet alleen cliënten ontmoeten die graag aan het werk willen en een duwtje in de rug nodig hebben, maar ook cliënten die niet op zoek naar een baan willen. Deze groep kan groter zijn dan de bijstandsconsulent zich aan het begin van zijn carrière had voorgesteld. De dossiervreter op het ministerie kan een zelfde soort ervaring hebben als hij ontdekt, via bijvoorbeeld onderzoeksrapporten, dat er cliënten zijn die zijn regels niet in acht nemen door bijvoorbeeld te frauderen met hun uitkering of belastingen te ontduiken. Door dergelijke ervaringen kan de ambtenaar ontdekken dat de cliënten waarvoor hij zijn werk verricht andere zijn dan hij voor ogen had bij de start van zijn dienstverband. Dit kan ertoe leiden dat uiteindelijk ook zijn pro-sociale gedrag verandert.

Een andere verklaring voor dit desillussie effect is dat zowel de dossiervreters als de dienstverlenende ambtenaren andere niet-monetaire vreugden ondervinden van het helpen van cliënten, zoals bijvoorbeeld dankbaarheid. Maar in de praktijk zullen cliënten lang niet altijd dankbaar zijn, want hun beroep op de overheid is doorgaans groter dan de budgetten kunnen toestaan. Dus in plaats van dankbaarheid te ontvangen, zullen veel ambtenaren moeten leren omgaan met de teleurstelling die cliënten ervaren, of erger, met de verwijten die cliënten tot hen richten, omdat ze vinden dat ze niet voldoende geholpen zijn door deze ambtenaren. Dit kan ook leiden tot minder pro-sociaal gedrag bij de ambtenaren. In de vorige paragraaf stelden ambtenaren hun beeld van het werk bij, omdat ze ontdekten dat cliënten niet altijd zo noodlijdend waren als ze dachten. In deze paragraaf stellen ze hun gedrag bij, omdat ze minder dankbaarheid ontvangen dan gedacht. In beide gevallen is het ervaring dat er toe leidt dat de naïeve ambtenaren hun wereldbeeld bijstellen. Dit

kan er toe leiden dat ze ook de opbrengsten van hun baan in een ander licht zien en van beroep willen veranderen. Hoewel de eerder genoemde studies van Blau (1960), Van Maanen (1975) en Cooman et al. (2009) kwalitatief bewijs leveren voor de mechanismen die hier boven beschreven worden, zijn er nog geen studies verschenen met een meer formele bestudering van dit mechanisme. Het zou dan ook een interessante stap voor vervolgonderzoek zijn om deze problematiek te bestuderen met behulp van principaal-agent modellen en speltheorie. Ook hierbij is niet alleen de vraag wie er voor de overheid wil werken interessant, maar ook wie zou de overheid moeten inhuren. Moet de overheid de naïeve, gemotiveerde ambtenaar inhuren of ambtenaren met relatief weinig motivate en een realistische kijk op de wereld? Als verlies van naïeviteit leidt tot verloop, dan is de overheid misschien beter af door van te voren ambtenaren beter te te selecteren en de minder naïeve sollicitanten aan te nemen of degenen die vooral voor een carrière in de ambtenarij kiezen vanwege de extrinsieke voordelen, zoals baanzekerheid. Dit is waarschijnlijk des te meer het geval naarmate de ervaring binnen het dienstverband leidt tot betere prestaties of het inhuren van nieuwe werknemers erg veel energie kost.

Om de vraag wie men het beste kan inhuren goed te beantwoorden moeten we ook op een meer formele wijze de consequenties onderzoeken van een verlies aan motivatie voor de publieke zaak op de inzet van ambtenaren en hun beslissingen. Aangezien inzet niet of niet volledig observeerbaar is in de publieke sector, kunnen ambtenaren een deel van de lager dan verwachte niet-monetaire inkomsten compenseren door hun inzet gelijktijdig terug te dringen. Ook kan het verlies van motivatie voor de publieke zaak een effect hebben op de beslissingen of toewijzingen die ze maken als de werkervaring hun gevoelens ten opzichte van cliënten verandert. De overheid kan hier op reageren door het salaris te verhogen gedurende de jaren of door de ambtenaren financiële prikkels te geven. Of dat een optimale reactie is, valt te bezien. Het kan ook optimaal zijn om de huidige werknemers te vervangen door nieuwe, idealistische sollicitanten. Het onderzoeken van deze zaken in een theoretisch model kan ons nieuwe inzichten bieden, die we vervolgens kunnen toetsen in empirische onderzoek.

Het testen van deze voorspellingen is overigens geen sinecure. Een eerste vereiste voor zo'n test is het verbeteren van het huidige onderzoek naar de effecten van

motivatie voor de publieke zaak. Veel van het werk tot nu toe is theoretisch van aard. Bovendien gebruiken de empirische studies die er nu zijn vooral zelfverklaarde preferenties en gedrag als maatstaf voor motivatie en enqûetegegevens, dus zelfverklaarde prestaties, als maatstaf om het effect te meten (zie bijvoorbeeld Brewer 2008, Petrovsky 2009). Veel kan dus gewonnen worden door gebruik van geobserveerd gedrag om motivatie vast te stellen en objectieve prestatiemaatstaven. Hoewel het natuurlijk niet altijd eenvoudig is om objectieve prestatiemaatstaven te gebruiken in de publieke sector, kan er ten opzichte van de huidige onderzoeken het nodige verbeteren. Ten eerste is een deel van de effecten wel degelijk observeerbaar. Denk bijvoorbeeld aan de voortgang die in het onderwijsonderzoek is geboekt met het gebruik van maatstaven voor het meten van toegevoegde waarde bij het meten van de prestaties van leraren (zie onder andere Hanushek en Rivkin 2006) of de prestaties van werkconsulenten (zie onder andere Heckman, Smith en Taber 1996). Ten tweede kunnen we bij moeilijk meetbare prestaties, zoals de prestaties van beleidsmakers, verbetering boeken door niet de zelfverklaarde prestaties van werknemers te gebruiken, maar de prestaties die hun managers aan hen toedichten.

Het onderzoek in het tweede gedeelte van dit proefschrift laat met behulp van een theoretisch model zien dat verschillen in de houding van de ambtenaren ten opzichte van hun cliënten kan leiden tot selectie van werknemers op basis van verschillen in clientèle bij de werkgevers. Verschillende "stylized facts" zijn in overeenstemming met dit gegeven. Het empirische bewijs in dit proefschrift is echter niet helemaal in overeenstemming met de theorie. Daar kunnen verschillende oorzaken aan ten grondslag liggen. We maken gebruik van zelfverklaarde motivatie. Ook ontbreken er het belangrijke variabelen, zoals de plaats waar de docent woont. Een andere oorzaak zouden kunnen zijn dat de Nederlandse onderwijssector niet geteisterd wordt door grote verschillen per school in studentenpopulatie en er om die reden weinig selectie plaatsvindt. Een evidente richting voor vervolgonderzoek is dan ook het nader testen van de theorie met betere data, voor andere sectoren en zelfs andere landen. Om het effect van het gebruik van prikkels op selectie, inzet en toewijzingen te onderzoeken moeten we veldexperimenten uitvoeren en data over een tijdspanne van meerdere jaren verzamelen.

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