

“Does Profit Sharing in the Netherlands depend on Sectoral Revenue Volatility?”



Master Thesis

“Does Profit Sharing in the Netherlands depend on Sectoral Revenue Volatility?”

March 2009

Abstract

“The rapid growth of interest in profit sharing schemes is related to shifts in technology and work organization which favour cooperation and interaction rather than isolated and routine tasks.” (Fitzroy and Kraft 1987: 24) The extent to which different sectors in the Netherlands make use of profit sharing differs noticeably. The question that arises here is: what is the relationship between the sectoral revenue volatility and the extent to which different sectors make use of profit sharing. Based on two theories, the agency theory and the prospect theory, this study will try to give an answer to that question. Agency theory concludes that employers should not use profit sharing in their company because the agent has to bear too much risk, as a result there should be no relationship between profit sharing and the volatility of the revenues. The prospect theory predicts two different outcomes. For the naïve type of employee the relationship should be positive and for the sophisticated employee the relationship should be negative. Data analysis confirms the hypothesis of the prospect theory in case of the naïve employee.

ERASMUS UNIVERSITY ROTTERDAM

Erasmus school of economics

Department of Economics

Supervisor: Dr. J. Delfgaauw

Name: Carlijn Janssen

Exam number: 279627

E-mail address: janssen.carlijn@gmail.com

Preface

This is the master thesis: *“Does Profit Sharing in the Netherlands depend on Sectoral Revenue Volatility”* and forms the conclusion of my Master of Science study Economics and Business at the Erasmus University Rotterdam. After five and a half wonderful years, I will complete my student life in Rotterdam.

I would like to use this opportunity to thank the following people that have made this thesis possible. First, my gratitude goes to Josse Delfgaauw, who was my supervisor. I thank him for taking the time to read and comment on this thesis and providing me with useful advice. Moreover, I would like to thank my dear friends Kim Sen and Sanne Blauw, who both took the time to read my thesis and correct and improve my English.

Most of all I would like to thank my parents and my sister, who have always believed in me and supported me during my studies. Finally yet importantly, my gratitude goes to my boyfriend Maarten. Without him, this thesis would not exist. Maarten, thanks for your great support, pep talk and enthusiasm along the way.

Table of contents

Preface	3
Table of contents	4
1. Introduction	
<i>1.1. Background</i>	5
<i>1.2. Statement of the problem</i>	6
<i>1.3. Main research question</i>	7
2. Theoretical framework	
<i>2.1. Performance related pay</i>	9
<i>2.2. Profit sharing</i>	15
<i>2.3. Agency theory</i>	21
<i>2.4. Prospect theory</i>	29
<i>2.5. Conclusion</i>	43
3. Empirical Part: Data	
<i>3.1. Data Collection - Profit sharing</i>	45
<i>3.2. Data Collection - Revenues of different sectors</i>	46
<i>3.3. Data Analysis – Methods and Procedures</i>	47
<i>3.4. Data Analysis – Results</i>	48
<i>3.5. Data Analysis – Performing different tests</i>	50
4. Conclusion	55
5. Limitations and Delimitations	58
6. Appendices	
<i>6.1. Trend analyses</i>	61
<i>6.2. Volatility and Standard deviation</i>	68
<i>6.3. Output volatility</i>	68
<i>6.4. Output standard deviation</i>	69
<i>6.5. Test on normality</i>	70
<i>6.6. Test on misspecification</i>	71
<i>6.7. Test on heteroskedasticity</i>	72
<i>6.8. Revenue table</i>	73
7. References	75

1. Introduction

1.1. Background

Many firms in the Netherlands make use of performance related pay. In May 2008 the FNV union in the Netherlands published the results of a large investigation among its members (Tijdens and van Klaveren 2008). The study is about performance related pay and its main finding was that 62% of the FNV members receive a part of their wage in the form of performance related pay. The percentage is lower for non-union members, namely 47%.

Table 1 shows the percentages of employees that receive performance related pay in the Netherlands in different sectors (Loonwijzer enquête 2007/2008). Especially in the banking and insurance services there is a large amount of people (62%) that receive at least one kind of bonus. Other sectors that have a large share are ICT and Telecom (53%) and the Chemical Industry (51%).

Sector	13 th Month	Bonus	Profit Sharing	Stock Options	At least one kind of bonus
Agriculture and fisheries	4%	6%	8%	3%	16%
Feeding industry	5%	16%	13%	4%	30%
Textile, clothing and paper	2%	13%	9%	0%	23%
Chemical industry	7%	35%	22%	9%	51%
Metal and Electronics	5%	16%	20%	4%	35%
Other industries	6%	17%	13%	7%	32%
Whole sale	9%	28%	12%	2%	41%
Retail services	5%	13%	9%	2%	23%
Transport	6%	13%	10%	4%	25%
ICT and telecommunications	8%	35%	20%	7%	53%
Banking and insurance	11%	42%	27%	20%	62%
Business services	9%	21%	14%	4%	35%
Subtotal	7%	22%	16%	6%	37%
Remaining working population	4%	9%	7%	2%	17%
Total	6%	16%	12%	4%	29%

Table 1 : Performace Related Pay in the Netherlands

Common sense, as well as different studies tells us that performance related pay is an opportunity to give employees extra incentives to work harder (Lazear 2000, Fernie and Metcalf 1996, Piekkola 2005). Performance related pay stimulates employees to maximum

effort and development. Another advantage is that both collective and individual performance related pay give the employer the opportunity to adapt labor costs to the economic situation in a country. An interesting point, which is seen in practice, is that employers are reluctant to cut payments. Bewley (1998) interviewed over 300 business people in the U.S. during the recession of the early 1990's in order to learn why wages and salaries declined in only a few firms. The main reason he found was that employers were hesitant to cut payments because they believed doing so would hurt employee morale. This can lead to lower productivity and current or future difficulties with the recruitment and retention of employees. Employers thought that in the end, these effects would cost more than the savings from lower pay.

Gielen, Kerfhoofs and van Ours (2006) conclude that there is a rise in performance related pay in different sectors in the Netherlands. The form of performance related pay that particularly increases is profit sharing. Employees receive a part of the profit at the end of the year. During the contract negotiations, employer and employee together determine what the wage of the employee will be. Compare to international standards, Dutch senior managers receive a large part of their reward as bonuses or profit sharing. On the contrary, for middle managers and junior employees this is much lower. (*Watson Wyatt Global 50 Remuneration Planning Report, 2008*) According to this report, the total wage of a senior executive consists of thirty five percent of bonuses and profit sharing. The Netherlands stands on the 17th place worldwide. For middle managers this percentage is fifteen percent and for junior employees this percentage is eight percent.

This study will analyze the relationship between profit sharing and sectoral revenue volatility. The extent to which different sectors make use of profit sharing will be compared with the revenue volatility of different sectors.

1.2. Statement of the Problem

Profit sharing gains larger share in several firms in the Netherlands (Gielen e.a. 2006). One of the questions that arise here is whether those employees have direct influence on the bonus they receive. In most cases, employees cannot influence the results of the company. An employee cannot influence the total revenue of a company by himself, while the bonus he receives in profit sharing depends on the total performance of the company.

In my theoretical framework, I will look at two theories: the agency theory and the prospect theory. I will describe both theories and derive what both theories will predict regarding the relationship between profit sharing and sectoral revenue volatility.

Agency theory is a theory that explains the relationship between principals, such as the shareholders in a company and agents such as the company's executives. In this study, the principal is the employer and the agent is the employee. This theory will conclude that in the case of profit sharing, there is too much risk for the employee and employees cannot influence the profit of a whole company, so the use of profit sharing is not a good method to align the different interests. If there is a relationship between profit sharing and sectoral revenue volatility, the incentive-intensity principle predicts a negative relation.

To derive what the relationship will be between sectoral revenue volatility and profit sharing in case of the prospect theory I describe two different situations: the situation for a naïve employee and the situation for a sophisticated employee. The outcome for both employees is different. For the naïve employee the relationship is expected to be positive. For the sophisticated employee the relationship is expected to be negative.

The main contributions of this study are to analyze what the relationship will be between profit sharing and sectoral revenue volatility.

1.3. Main research question

To examine the relation between profit sharing and the sectoral revenue volatility the following main research question will be discussed:

“What is the relationship between the use of profit sharing in a sector and the revenue volatility of the sector, across different sectors in the Netherlands?”

The rest of this study is organized as follows. In chapter 2, I will present an overview of the literature that has been written about performance related pay and profit sharing. I will describe performance related pay in the Netherlands, and focus on profit sharing in general. In the theoretical framework, I will focus on two theories: the agency theory and the prospect theory. I will describe both theories and at the end, I will derive what both theories will predict about the volatility of the revenue and the use of profit sharing in different sectors. In

Chapter 3, I will present the data of the revenues of different sectors in the Netherlands from 1995 until 2007, and determine the volatility of the revenues. Then I will test the relationship between the volatility and the use of profit sharing. Chapter 4 concludes and at the end there will be some limitations and delimitations.

2. Theoretical framework

2.1. Performance related pay

"Companies in the Netherlands are continuing to strengthen the link between the pay levels and overall company performance," said Ms. Pilv, European Partner at Mercer. "Emphasis is clearly on variable pay – that is, annual bonus and long-term incentive (LTI) plans which have become more effective tools in motivating and rewarding performance." ("Executive pay in the Netherlands", van Elsdingen, January 2009, Mercer Consulting)

In 1927, the first law about collective labor agreements (Wet op de CAO) was introduced in the Netherlands. Since World War II the number of employees that has their wage determined by a CAO increased drastically. Employer and employee together determine what the wage is for the employee. Collective bargaining is regulated by the Law on collective agreements (Wet op de collectieve arbeidsovereenkomst, dating from 1927). When a conflict arises, parties to the agreement can go to the normal court. Sometimes, social partners make an agreement in the foundation of Labour, or Cabinet and social partners make an agreement. The extent to which such an agreement is binding differs considerably. Both individual employers and employers associations can be party to a collective agreement. For example, the FNV and CNV Unions in the Netherlands meet those certain criteria. The major difference between a collective agreement signed by unions and one signed by works council is that the latter is not binding for individual employees, while the former is.

Of fundamental importance is that employers bound by a collective agreement are obliged to offer the terms of employment agreed also to non-union members in their firm. Although these employees are free to accept or refuse, they almost always accept. This increases the group covered from around 25% of all employees to around 75%. In the beginning of the nineteen-nineties and again in 2002 and 2004, the Cabinet and the social partners have concluded social pacts. A major issue in these pacts is an agreement for moderate (and in the case of 2004 zero) wage rises. There are agreements on two levels, sector agreements and company agreements. The importance of company agreements has increased to a certain extent, but overall the ratio has remained more or less the same as far as employees covered are concerned. Especially in banking and finance there has been a change to company agreements.

The wage that is determined in an agreement depends on different factors, among others, function and work experience. Recently, the system in the Netherlands has changed. The old system of collective labor agreement is being replaced for the new system of performance related pay. The content of the new system includes the following objects: the reward for labor in quantity, duration, and composition can be adapted to the results of the employee. Employees will be rewarded based on their performance and competences. The key to all performance pay systems is the measurement required to determine the output on which to base payments. The main steps are setting objectives, evaluating the appraisal results, and linking achievements to pay. The term pay will be an important factor in this study so I will first define pay.

“Pay consists of a basic wage or salary which may be supplemented by overtime pay and bonuses (thirteenth month, profit-sharing or share-option schemes). Basic wage or salary is the weekly or monthly wage or salary which the employer undertakes to pay the employee in return for his or her work. It comprises neither overtime pay nor bonuses. Gross wage or salary is the total amount earned by the employee. It comprises the basic wage or salary, plus any overtime pay and bonuses. It is calculated before the deduction of social contributions and before taxes. Net wage or salary is the amount which employees actually receive after social contributions and taxes have been deducted from the gross wage or salary.” (Expatax, Wages and Taxation in the Netherlands, 2005)

Performance pay schemes link pay to a measure of individual, group or organizational performance. There is a wide variety of methods used, but all schemes assume that the promise of increased pay will provide an incentive to greater performance. The oldest form of performance related pay is piecework. Business theorist Frederick Winslow Taylor (1911) was a great patron of this method of payment. He believed money was the main incentive for increased productivity. In the Netherlands, piecework started in 1850 (*European Foundation for the Improvement of Living and Working Conditions, 2007*). Piecework is a payment system in which pay is based on the number of units produced. This form of payment by results is relatively common in freelance work and home-working. In the Netherlands, the piece-rate paid per unit is in practice fixed by the employer according to the cost price of the product, the employer's competitive position, the profit margin and the labor supply. Pay under such systems is called “stukloon”.

After World War II, piecework was replaced for job title related pay. Employees got the wages based on job title, education, and work experience. Their wages were written down in collective labor agreements. During the nineties linking pay to performance was something employers increasingly seek to achieve. Collective labor agreements were determined for a longer time, so performance related pay could not get a large share in labor agreements.

Performance related pay schemes can be based on two different time schemes. Short-term schemes usually offer bonus payments or commission on sales achieved. Payments vary and these schemes are normally used just to encourage staff to improve their own performance (individual performance related pay). Long-term schemes offer rewards like share options and profit sharing, and can help to encourage loyalty to the organisation and its aims (group or organizational performance related pay).

Different studies on the effect of performance related pay

The most famous study about the effect of performance related pay is from Lazear (2000).

Lazear asked the following question: “*What happens when a firm switches from paying hourly wages to paying piece rates?*” The theory predicts that productivity increases, the firm will be able to attract more competent employees, as well as output of the company will rise. His unique dataset from Safelite Glass Co. shows extremely large productivity effects after incentive payments.

Fernie and Metcalf (1996) analyzed pay and performance of British jockeys. The two hypotheses that were tested are (1) monitoring mechanisms and incentive contracts are used to align the different interests and (2) there should be a positive relation between pay and performance. Both hypotheses are validated by their study. The most important finding was that top British jockeys perform significantly better when they receive a percentage of prize money for winning races compared to being rewarded by fixed retainers.

McMillan, Whalley and Zhu (1989) did an analysis on post-1978 Chinese agricultural data. Chinese agricultural data suggest that more than 75% of productivity increase that is measured is due to payment system changes and the other part is due to price increases. Kahn and Sherer (1990) examine the relationship between financial incentives and performance.

They analyse managers with the following characteristics; high-level position, placed at the corporate headquarters and low seniority. Their main conclusion is that bonuses for those managers are more sensitive to performance than are the bonuses given to managers without those three characteristics. Another main thing is that the managers for whom bonuses are most sensitive to performance, have higher subsequent performance levels than other managers, even when it is controlled for past performance levels.

Piekkola (2005) did an analysis of productivity effects of performance-related pay in Finland and control for the skill structure of the employees. His main conclusions were that performance related pay improves both productivity and profitability by the same magnitude of around 6 percent, but only if the compensations are substantial enough and exceed on average 3.6 percent of wages for those who receive it. In the Netherlands, an investigation has been done by Gielen, Kerkhofs and van Ours (2006). They did an analysis on the productivity effects of performance related pay at firm level. Their main conclusion is that the introduction of performance related pay increases labor productivity with about 9% and employment with about 5 % in the Netherlands.

Negative effects of performance related pay

Marsden and French (1998) studied the performance pay systems in the Inland Revenue and the Employment Service within the National Health Service and in the teaching profession. The most widely held view among heads and deputies, who have now had pay linked to performance for six years, is negative. The impact on target setting has been very small and the impact on personal motivation is small or irrelevant. Another negative effect is that it is believed to damage morale in schools and weaken team functioning.

Careful examinations of the link between performance related pay and job satisfaction, are done by Pouliakas and Theodossiou (2004). Their study confronts the negative effect of performance related pay on intrinsic job satisfaction and the security of employment. For this study, they use the British Household Panel Survey. Their main conclusion is that no significant difference in the job utility of marginal work should arise between workers who receive performance related pay and those who receive alternative methods. Deckop and Mangel (1999) studied employees in the utility industry. Their main finding was that pay for performance had a negative impact on extrarole behaviors for employees low in value

alignment. On the contrary, for the employees in high value alignment the impact of pay for performance was positive.

Procter, McArdle, Rowlinson Forrester and Hassard (2007) analyzed the introduction and operation of a performance related pay system in a large electronics company. Their main findings were that companies face great difficulties in using such systems to effect cultural change. Those difficulties were resource constraints, criteria selection, subjectivity and the workforce lack of confidence. For such performance pay systems to work a necessary culture may already have to exist.

Conclusion

Proponents of performance-related pay claim that it improves the motivation of employees and assists in the recruitment and retention of high quality staff. Employers believe that performance related pay can lead to an opportunity to give their employees extra incentives to work harder. Performance related pay stimulates employees to maximize effort and development. Another advantage is that both collective and individual performance related pay give the employer the opportunity to adapt labour costs to the economic situation in the Netherlands. When the economy is not performing well it is easier for an employer to lower flexible wages than to lower fixed wages. On the other hand employers can reward their employees in times of economic prosperity. Employees think that performance related pay is more honest because of the “everybody gets what he or she deserves” principle. Many employees think that it is unfair when there is no difference in reward between employees who work hard and the “lazy” ones. (*CNV Union website: Flexible wages*)

An interesting point, which is seen in practice, is that employers are reluctant to cut payments. Bewley (1998) interviewed over three hundred business people in the U.S. during the recession of the early 1990's in order to learn why wages and salaries declined in only a few firms. The main reason he found was that employers were reluctant to cut payments because they believed doing so would hurt employee morale. This can lead to lower productivity and current or future difficulties with the recruitment and retention of employees. Employers thought in the end, these effects would cost more than the savings would be from lower pay.

On the other hand there are also some downsides of performance related pay. First, there may be disputes about how performance is measured and whether an employee has done enough to

be rewarded. Another point is that rewarding employees individually does very little to encourage teamwork; it may encourage unhealthy rivalry between employees. Finally, there is much doubt about whether performance-related pay actually does anything to motivate employees. This may be because the performance element is usually only a small percentage of total pay.

I have described performance related pay in general and I have shown some studies that have their focus on this subject. In the next paragraph, I describe profit sharing.

2.2 Profit sharing

Performance related pay could exist on three levels: individual level, group level and organizational level. Collective performance related pay (group and organization wide level) counts for all employees that are working in the sector or for the company itself. Examples are end of year payments and profit or stock sharing. These bonuses are based on the profit of the company, or companies involved. This study will focus on collective performance related pay, and particularly on profit sharing.

The classic definition of profit sharing was formulated and adopted by an International Congress on Profit Sharing in Paris in 1889. Profit sharing, the congress declared, “*is an agreement freely entered into, whereby employees receive shares, fixed in advance, of the profits*” (Schloss, 1898).

One concern about paying on a more group-oriented base is the so-called free rider problem. In economics "free riders" are those who consume more than their fair share of a resource, or shoulder less than a fair share of the costs of its production. The main issue for the employer is the question of how to prevent free riding from taking place, or at least how to limit its negative effects. If employees know that their colleagues make the effort, they will not work hard because the rewards are based on collective performance. Employees will share in those rewards regardless of the level of their individual performance.

Mc Laughlin (1994) concludes that pay for performance increases the incentive to free ride because there are positive externalities to the efforts of an individual team member and low returns for the individual. Drago and Garvey (1998) did a study in Australia. One of their conclusions is that task variety has a positive relationship with helping efforts. Profit sharing and piece rates have hardly any effect on helping efforts. In short, when agents are placed on individual pay for performance schemes, they are less likely to help their co-workers.

Alchian and Demsetz (1972) show that the free riding problem is particularly relevant in the jobs that involve elements of team production. On the topic of profit sharing, they say the following:

“We assume that if profit sharing had to be relied upon for all team members, losses from the resulting increase in central monitor shirking would exceed the output gains from the increased incentives of other team members not to shirk. If the optimal team size is only two owners of inputs, then an equal division of profits and losses between them will leave each with stronger incentives to reduce shirking than if the optimal team size is large, for in the latter case only a smaller percentage of the losses occasioned by the shirker will be borne by him. Incentives to shirk are positively related to the optimal size of the team under an equal profit-sharing scheme.... Profit sharing is more viable if small team size is associated with situations where the cost of specialized management of inputs is large relative to the increased productivity potential in team effort. (Alchian and Demetz 1972: 782)”

The output reflects the contribution of many individuals and the individual contribution is not easy to identify. The compensation is largely based on the output of the whole team.

Pfeffer (1998) gives two reasons why organizations should not be reluctant to design a collective pay system. The first reason is that under the circumstances of described by the theory of free riding, individuals often cooperate instead. Secondly, individuals do not make decisions about how much effort to put in their work in a social vacuum. Individuals are also influenced by peer pressure and the social relationships they have with their colleagues.

Erev, Bornstein and Rachely (1993) have tested the effectiveness of intergroup competition as a solution of the free riding problem. For there research they used a orange picking company. Groups of four people get the task to pick oranges under three different pay off conditions. Those conditions were individual performance related pay, group performance related pay and intergroup competition with a reward for the most efficient group. The most interesting examination was that the group performance related pay resulted in a thirty percent loss in production compared to the individual performance related pay. The competition between the different groups eliminated the loss of productivity.

Hamilton, Nickerson and Owan (2003) have evaluated the effects of switching from individual performance related pay to group performance related pay as well. For their research they used a garment plant that shifted from individual piece rate to group piece rate production over three years. The change to group performance at the plant improved worker

productivity by on average fourteen percent. An interesting fact is that, the productivity improvement was larger for the first groups and decreased as more workers engaged in group production. This fact provides support for the idea that teams utilize collaborative skills, which are less valuable in individual production. Workers with high productivity skills tended to join teams first. The high productivity workers take the loss in earnings for granted, suggesting that non pecuniary benefits like teamwork are important for them as well. Their last result is that more heterogeneous teams were more productive. This result is consistent with explanations emphasizing mutual team learning and intra team bargaining. Mutual team learning means that more able workers (more productive workers under individual piece rates) may be able to teach the less able workers to be more productive, to enlarge team productivity. Intra team bargaining suggests that the relationship between worker heterogeneity and team performance also could be the result of forming a team norm.

Overview of Profit Sharing: Advantages and Disadvantages

Profit Sharing is an incentive based compensation program to reward employees with a percentage of the company's profits. The company contributes a portion of its pre-tax profits to a pool that will be distributed among eligible employees. The amount distributed to each employee may be weighted by the employee's base wage so that employees with higher base wages receive a higher amount of the shared pool of profits. Generally, profits are paid on an annual basis. An overview of the advantages and disadvantages for employer and employees are in table 2.

<i>Employer Advantages</i>	<i>Employee Advantages</i>
<ul style="list-style-type: none"> • Helps employees focus on profitability • The costs of the profit sharing plan rise and fall with the company's profit • Enhances commitment to organizational goals 	<ul style="list-style-type: none"> • Brings groups of employees to work together toward a common goal • Employer contributions and earnings are tax-deferred until withdrawn
<i>Employer Disadvantages</i>	<i>Employee Disadvantages</i>
<ul style="list-style-type: none"> • Focuses only on the goal of profitability (which may be at the expense of quality) • It reduces pay equity and can make an authority liable to costly equal pay challenges if not operated fairly • The appraisal process can be affected detrimentally because of the focus on financial reward rather than developmental needs • Collective performance can lead to free riding among employees 	<ul style="list-style-type: none"> • The pay for each employee moves up or down together (no differences between individuals for merit or performance) • For smaller companies, profit sharing may result in drastic differences in earnings for employees, which is difficult to manage personally for risk averse people • Personal development and performance are not rewarded through profit sharing • Collective performance can lead to free riding among employees

Table 2: Advantages and Disadvantages of Profit Sharing

Different studies about the effect of profit related pay

Kruse (1993) studied over five hundred public companies in the U.S. to examine the relationship between productivity and the adoption and presence of a profit sharing plan. His study is unique because it uses company results before and after implementing profit sharing schemes. Profit sharing is found to be associated with average productivity rise of four to five percent. The productivity increase is larger for cash plans and small companies. Kruse gives four reasons why firms should implement a profit sharing scheme:

- To enhance productivity and cooperation
- Increase compensation flexibility
- Discourage unionization or gain concessions from unions
- Tax incentives, easy access to capital and avoid hostile takeovers in the USA

An article in the Organization for Economic Cooperation and Development (OECD) Employment Outlook (1995), based upon Estrin, Perotin, and Wilson (1995), provides an extensive survey of profit sharing and concludes that there is strong evidence of productivity gains in profit-sharing firms.

Fitzroy and Kraft (1987) say that profit sharing could motivate cooperation to increase productivity, when work organization facilitates interaction and horizontal monitoring, since productive effort yields positive externalities to workers under contractual surplus sharing. They tested the effect of profit sharing on factor productivity in a medium-sized metalworking firm in West Germany. Their main result was that both profit sharing and capital sharing have strong effects on productivity. Cahuc and Dormont (1997) studied the consequences on employment and productivity of the large increase in profit sharing since 1986 in France. They suggest that the large increase in profit sharing could be the consequence of the firm's behavior. Firms have a tendency to choose instigating profit sharing schemes with a fixed individual bonus. Therefore, potential positive effects of the rise in productivity on employment are offset by the rise in the labor cost. Pure profit sharing schemes, with bonuses expressed as a share of profit per worker, are likely to neutralize the negative effects on employment of such an increase in the labor costs. The different types of profit sharing schemes in France improve productivity but could have an ambiguous effect on employment.

Ciancanelli (1997) critically studied the relevance of profit related pay for the U.K. within the small firm sector. Since 1986, the U.K. government has actively encouraged profit sharing. Profit sharing attracts generous tax breaks, because the government believed that profit related pay would adjust pay more flexible downwards. Secondly, profit sharing would significantly improve morale, productivity and employee identification. On the contrary, an analysis of the theoretical arguments and the assumptions made regarding to the nature of the U.K. small firm sector that underlay these claims suggests, that the likelihood of achieving either of these expected benefits is small. A review of the empirical and available evidence on the practical implementation and operation of profit sharing schemes suggests that the tax relief only encourages firms to introduce “cosmetic” schemes that have no acceptable impact upon the behavior of either firms or employees. Moreover, the experience of a couple of firms that adopted profit sharing schemes indicates that, far from increasing morale and productivity, profit sharing often creates new conflicts and tensions between employees and employers.

These and other unintentional consequences show the difficulties of government attempts to use the tax system to alter the behavior of agents engaged in a variety of complex and heterogeneous bargaining situations.

Conclusion

Existing research tends to show that profits sharing for employees are associated with higher company productivity and profitability. As a group incentive, profit sharing encourages cooperation between different employees, share ideas and information and monitoring colleagues. Company size is expected to be a factor in the effect of profit sharing on productivity. Individual effects decrease as the number of employees increase. On the other hand profit sharing can create new tensions and conflicts between employers and employees. For employers, profit sharing can be a reason to increase compensation flexibility. The main purpose of this study is to focus on this reason; pointing towards sectors with revenues that have differences in volatility.

In the following section, I will discuss two theories: agency theory and prospect theory and derive what those theories predict about the relationship between the use of profit sharing and the volatility of a sector's revenue. Subsequently (in Chapter 3), I test these predictions using data from The Netherlands.

2.3. Agency theory

In this paragraph, I will describe the agency theory in general and the different concepts of contract design. At the end of this section, I will predict what the agency theory will say about the relationship between the use of profit sharing and the volatility of the revenues.

Multifold literature has been written about the agency theory. Agency theory is developed in the 1970s. Agency theory is a theory that explains the relationship between principals, such as the shareholders in a company and agents such as the company's executives. In this relationship, the principal delegates the work or hires an agent to perform the work. The theory attempts to deal with two specific problems: first, the goals of the principal and agent are in conflict (agency problem), and second, the principal and agent reconcile different tolerances for risk. An important issue in this case is “moral hazard”.

Moral hazard can be described as follows: *“The risk that a party to a transaction has not entered into the contract in good faith, has provided misleading information about its assets, liabilities or credit capacity, or has an incentive to take unusual risks in a desperate attempt to earn a profit before the contract settles.” (Holmstrom 1979: 87)*

Moral hazard can be present at any time when two parties come together to sign an agreement. Each party to a contract may have the possibility to gain from acting contrary to the principles laid out by the agreement. Moral hazard can be somewhat reduced by placing the responsibilities on both parties of a contract.

Moral hazard is related to information asymmetry, a situation in which one party to a transaction has more information than another has. The party that is insulated from risk generally has more information about its actions and intentions than the party paying for the negative consequences of the risk. Moral hazard occurs when the party with more information about its actions or intentions has a tendency or incentive to behave inappropriately from the perspective of the party with less information. In case of the agency problem the agent usually has more information about his actions or intentions than the principal does, because the principal usually cannot perfectly monitor the agent. The agent may have an incentive to act inappropriately from the viewpoint of the principal if the interests of the agent and the principal are not aligned.

Eisenhardt (1989) wrote an extensive overview article about the agency theory. Eisenhardt describes the agency theory as follows; “Agency theory is concerned with resolving two problems that can occur in agency relationships. The first agency problem that arises is when the desires or goals of the principal and agent conflict and it is difficult or expensive for the principal to verify what the agent is actually doing. The principal cannot verify that the agent has behaved appropriately. The second one is the problem of risk sharing that arises when the principal and agent have different attitudes toward risk. The principal and the agent may prefer different actions because of the different risk preferences.”

There are different opinions about agency problems. Jensen (1983) thinks that the agency theory is revolutionary and a powerful foundation. On the other hand Perrow (1986) argues that the theory lacks testable implications, is narrow and addresses no clear problem. He even concludes that the agency theory can be dangerous. An overview of the agency theory is given in Table 2 based on Eisenhardt (1989).

Overview of Agency Theory	
Key Idea	Principal-agent relationships should reflect efficient organization of information and risk bearing costs
Unit of analysis	Contract between principal and agent
Human Assumptions	Self interest, bounded rationality, risk aversion
Organizational assumptions	Partial goal conflict among participants Efficiency as the effectiveness criterion Information asymmetry between principal and agent
Information assumptions	Information as a purchasable commodity
Contracting problems	Agency (moral hazard and adverse selection) Risk sharing
Problem domain	Relationships in which the principal and agent have partly differing goals and risk preferences

Table 3: Overview of agency problem

In economics, the principal-agent problem or agency problem studies the difficulties that arise under conditions of asymmetric information when a principal hires an agent. A lot of mechanisms may be used to try to align the interests of the agent with the interest of the

principal, for example piece work, efficiency wages, profit sharing, performance measurement including financial statement or the fear of firing. The principal-agent problem is found in most employer and employee relationships.

The contract

One major factor is the contract of the employee. Individual contracts form an important method of restructuring incentives. The contracts connect as closely as possible the information available about the performance of the employee and the compensation for that performance. There are differences in the quantity and quality of information available about the performance of individual employees, the ability of employees to bear risk and the ability of employees to manipulate evaluation methods. Prendergast (1999) argues that the above statement is the reason why the structural details of individual contracts differ so much. There are different mechanisms such as piece rates, option sharing, discretionary bonuses, promotions, profit sharing, efficiency wages and deferred compensation.

Part of this variation in incentive structures and supervisory mechanisms may be attributable to variation in the level of intrinsic psychological satisfaction to be had from different types of work. Deci (1971) argues that individuals take a certain degree of pride in their work, and that introducing performance related pay can destroy this “psycho-social compensation”, because the exchange relation between employer and employee becomes much more narrow and this can lead to destroying most or all of the potential for social exchange.

The contract design

Milgrom and Roberts (1992) identify four basic principles of contract design:

- Informativeness Principle
- Incentive-Intensity Principle
- Monitoring Intensity Principle
- Equal Compensation Principle

I will describe the four principles and derive what those principles will predict about the relationship between profit sharing and the sectoral revenue volatility.

Informativeness Principle

When there is no perfect information, the informativeness principle can be applied to solve this problem. This principle essentially states that every measurement of performance that on the margin shows information about the effort level chosen by the agent, should be included in the compensation contract. This includes relative performance evaluation, measurement relative to other, similar agents, so it has to filter out some common background noise factors, such as fluctuations in demand. By removing some exogenous sources of randomness in the employee's income, a greater proportion of the fluctuation in the employee's income falls under his control and increasing his ability to bear risk. If taken advantage of, by greater use of piece rates, this should improve incentives.

The informativeness principle indicates that the determination of incentives should take into account the appropriate weighting any performance measure that reduces the aggregate error with which the employee's performance is measured and should exclude any measure that just increases the noise in the estimates of whether he has acted appropriately. If the employer could get a perfect performance measure that would let it infer exactly what action the employee had undertaken, then paying appropriately would lead the employee to take the efficient action. Without a perfect measure, however, there are efficiency losses.

Relationship between sectoral revenue volatility and profit sharing

In case of profit sharing, the compensation of an employee depends not just on his own performance but on the amount by which it exceeds or falls short of someone else's performance. The case here is that as a matter of principle the wage of an employee should not depend on things outside the employee's control because that is perceived as unfair. Another point is that it appears to make the employee bear an unnecessary risk. The profit of an organization is outside the employee's control. One employee cannot affect the profit of the whole organization, especially when it is a large organization. Moreover, the informativeness principle predicts that there should be no relation between the volatility of the revenue of different sectors and the use of profit sharing. For this conclusion to be drawn there should be a positive relation between the volatility of the firm's profit and the volatility of the sector revenue.

Incentive-Intensity Principle

Setting extreme incentives as possible is not necessarily optimal from the point of view of the employer. The incentive-intensity principle states that the optimal intensity of incentives depends on four factors:

- The incremental profits created by additional effort
- The precision with which the desired activities are assessed
- The agent's risk tolerance
- The agent's responsiveness to incentives.

According to Prendergast (1999), "*the primary constraint on performance-related pay is that its provision imposes additional risk on workers*". A characteristic result of the early on principal-agent literature was that piece rates tend to 100% of the reward package as the worker becomes more able to handle risk, as this ensures that workers fully internalize the consequences of their costly actions. In incentive terms, where we conceive employees as self-interested rational individuals who provide costly effort in the most general sense of the worker's input to the firm's production function, the more reward varies with the effort, the better the incentives for the worker to construct.

Relationship between sectoral revenue volatility and profit sharing

Standard agency theory argues that the principal should design a contract that ties an agent's compensation to his performance since the agent's actions are normally unobservable to the principal. The agency theory also argues that incentive intensity or pay performance sensitivity should decrease with the riskiness of performance. In a risky environment, the principal needs to compensate the agent with higher incentive intensity; however, this may increase compensation costs and lower profits.

The incentive-intensity Principle suggests that the incentive to the employee should be less responsive to changes in measured performance. In the case of the relationship between the volatility of the revenue of the different sectors and the use of profit sharing the incentive intensity principle say: The more risk averse the employee is, the more uncertain is the relationship between his effort and the observed performance measure, the more difficult it is for him to alter his behaviour in response to incentives and the smaller is the sensitivity of the employer's payoff to changes in the employee's actions. As the quality of the performance measure increases, the incentive intensity principle indicates that the responsiveness to

performance of an incentive should increase. Thus, a given level of profit sharing loads more risk on the agent when output volatility is high than if volatility is low. Hence, this Principle predicts a negative relation between sectoral volatility and the use of profit sharing.

Monitoring Intensity Principle

The monitoring intensity Principle is complementary to the incentive-intensity principle: in the circumstances in which the optimal intensity of incentives is highly corresponded to situations in which the optimal level of monitoring is high as well. As a result employers efficiently choose from different monitoring or incentive intensities. This is because monitoring is a costly way to reduce the variance of employee performance, which makes more difference to profits in the kind of situations where it is also optimal to make incentives intense.

Relationship between sectoral revenue volatility and profit sharing

The monitoring intensity principle determines how much should be spent to increase the quality of the performance measures. It indicates that more should be done to lower the variation in the performance measure. The more intense the incentives being provided with the intuition that as the intensity of incentives increases, the more cost incurred from loading risk on the employee. By spending resources to improve the quality of the performance measure, the employer can give stronger incentives without loading too much risk on the employee. The optimal solution balances the cost of more risk against the costs of improving the measure. The monitoring intensity principle will not directly predict a relationship between the volatility of the revenue of a sector and the use of profit sharing.

Equal Compensation Principle

The last principle is the equal compensation principle, which means that activities equally valued by the employer should be equally valuable in terms of compensation, including non-financial things such as pleasantness to the employee. This relates to the problem that employees may be engaged in several activities, and if some of these are not monitored or are monitored less heavily, these will be neglected, as activities with higher marginal returns to the employee are favoured. One negative effect that can arise is that targeting certain measurable variables may cause others to suffer. One example is that teachers are being rewarded by the test scores of their own students. Those teachers are likely to tend more towards teaching only for the exam and do not focus on less relevant but perhaps equally or

more important aspects of education like cooperation or working together. Holmstrom and Milgrom (1990) and Baker (1992) studied this effect known as “multi-tasking” The main problem here is that if a subset of relevant tasks is rewarded, non-rewarded tasks suffer relative ignorance. Because of multi-tasking, it is more difficult to completely specify and measure the variables on which reward is to be conditioned, and therefore the less likely that performance-related pay will be used.

Relationship between volatility of the revenue of a sector and Profit Sharing

The equal compensation principle addresses the reality that an employee acts on several different dimensions that are of interest to the employer and that affect different elements of its total utility. An employee can spend time networking, contact customers, preparing presentations, training other employees, providing specialist advice and so on. All of these activities are of value to the employer as the principal in the relationship. The issue is how to structure the incentives in circumstances when the employer cannot observe how the employee chooses to divide his time. Incentives for the employee to undertake different activities need to be equalized at the margin or else those activities that are given weaker incentives will be ignored, which places a serious constraint on incentive plans. The equal compensation principle will not directly predict what the relationship will be between the volatility of the revenue of a sector and the use of profit sharing.

Conclusion

The main issue of this study is to derive what the agency theory will predict about the relationship between the volatility of the revenue of a sector and the use of profit sharing in a sector. The main goal of the agency theory is to study to two specific problems:

- The goals of the principal and agent are in conflict
- The principal and agent reconcile different tolerances for risk

Both the monitoring intensity principle and the equal compensation principle will not directly predict what the relationship will be between the sectoral revenue volatility and profit sharing. The informativeness principle predicts that there should be no relationship between the sectoral revenue volatility and profit sharing. The employer cannot influence the firm’s total revenue and the employer has to bear too much risk. The incentive intensity principle indicates that the responsiveness of incentive to performance should increase. When the

volatility is high, the employee has weaker incentive to work hard. On the other hand, when the volatility is low, the employee has more incentive to work hard. Thus, a given level of profit sharing loads more risk on the agent when output volatility is high than if volatility is low. Hence, the incentive-intensity principle predicts a negative relationship between sectoral revenue volatility and the use of profit sharing.

The conclusion of this paragraph is that the agency theory predicts no significant effect between the use of profit sharing and the volatility of the revenue of the sector. An employee cannot control the revenue of a whole firm so there should not exist a relationship between those variables; otherwise the agent has to bear too much risk. When an organization is undergoing rapid changes in revenue (more volatility), the risk for the employee is too high. If there will be a relationship between those variables, those relationship should be negative based on the incentive-intensity principle.

2.4. Prospect Theory

In this paragraph, I will discuss the prospect theory of Kahneman and Tversky. This theory is based on three key elements: reference dependence, loss aversion and diminishing sensitivity. I will describe the three key elements and derive what the prospect theory will predict about the relationship between the volatility of the revenues and the use of profit sharing.

Kahneman and Tversky (1979) are the founders of the “Prospect Theory”. This is a model of choice, which explains the major violations of expected utility theory in choices between risky prospects with a small number of outcomes. The basics of this theory are a value function that is concave for gains and convex for losses. This value function is steeper for losses than for gains and a nonlinear transformation of the probability scale. The probability scale overweights small probabilities and underweights moderate and high probabilities.

In 1992 Kahneman and Tversky developed a new version of prospect theory that employs cumulative rather than separable decision weights and extends the theory in some aspects.

Kahneman and Tversky describe their cumulative prospect theory as follows:

“This cumulative prospect theory applies to uncertain as well as to risky prospects with any number of outcomes, and it allows different weighting functions for gains and for losses. Two principles, diminishing sensitivity and loss aversion, are invoked to explain the characteristic curvature of the value function and the weighting functions. A review of the experimental evidence and the results of a new experiment confirm a distinctive fourfold pattern of risk attitudes: risk aversion for gains and risk seeking for losses of high probability; risk seeking for gains and risk aversion for losses of low probability.” (Kahneman and Tversky, 1992: 318)

This theory is built on three elements: reference dependence, loss aversion and diminishing sensitivity. These three factors can give an explanation how employees deal with profit sharing and why employers are reluctant to cut pay, especially the flexible part of their wages. The three factors are discussed below and in the end I derive what prospect theory predicts regarding the relationship between the use of profit sharing and the volatility of a sector’s revenues.

Reference Dependence

Individuals normally perceive outcomes as gains and losses, rather than as final states of wealth or welfare. Gains and losses are defined relative to some neutral reference point. The reference point generally corresponds to the current asset situation. In this position, gains and losses match with the actual amount that individuals receive. However, the location of the reference point, and the consequent coding of outcomes as gains or losses can be affected by the formulation of the presented prospects, as well as by the expectations of the employee. Outcomes are defined relative to a reference point, which serves as the status quo or zero point of the value scale.

When persons respond to attributes such as volume or temperature, the past and present circumstance of experience defines an adaptation level or reference point. The stimuli are perceived in relative to this reference point. Therefore, a wage in a given year may be experienced as high or low depending on the wage to which the employee has adapted. The same level of prosperity may imply utter poverty for one person and great assets for another depending on their current situation. The weight on changes as the carriers of value should not be taken to imply that the value of a particular change is independent of initial position. Value should be treated as a function because of two arguments: firstly, the asset position that serves as reference point, secondly the size of the change (positive or negative) from that reference point.

Thaler (1985) was the first to study the existence of reference dependence in a pricing context. Since then, many researchers have analyzed the effect of reference price in the case of consumer choice and behaviour. His conclusion was that reference prices have a consistent and significant impact on consumer demand. Thaler uses the concept of mental accounting to move further toward a behaviourally based theory of consumer choice. Compared to the model of decisions under uncertainty the alternative theory has two key features. First, the utility function is replaced with the value function. Second, price is introduced directly into the value function using the concept of a reference price. The new concept of transaction utility is developed as a result.

Reference outcome

Suppose that an individual is expecting an outcome y and instead receives $y + \Delta y$. This part ($y + \Delta y$) can be defined as a reference outcome. The question Thaler asked is how to value such an outcome. A person who analyses his monthly wage and finds it to be the expected amount is unaltered. In the case that Δy does not equal 0 there is a choice of ways to frame the outcome corresponding to the segregation and integration analysis of simple compound outcomes.

Thaler has two different options to analyse this outcome. With reference outcomes the choice involves whether to:

- Value the unexpected component Δy unaccompanied, so-called *segregation*
- Value the unexpected component in combination with the expected component, so-called *integration*

Thaler gives the following example to explain this analysis of reference outcome.

*“Mr. A expected a Christmas bonus of \$300. He received his check and the amount was indeed \$300. A week later he received a note saying that there had been an error in this bonus check. The check was \$50 too high. He must return the \$50. * Mr. B expected a Christmas bonus of \$300. He received his check and found it was for \$250. It is clear who is more upset in this story. Mr. A had his loss segregated and it would inevitably be coded as a loss of \$50. Mr. B's outcome can be integrated by viewing the news as a reduction in a gain $-[v(300) - v(250)]$. (Thaler 1985: 661)”*

The following four principles determine whether segregation or integration is preferred:

- An increase in a gain should be segregated
- An increase in the absolute value of a loss should be integrated
- A decrease in a gain should be integrated
- A small reduction in the absolute value of a loss should be segregated

Thaler describes two theories in his article. Those theories are methods of raising price and suggested retail price. I will describe those theories in short and link them with the use of profit sharing and the effect on employees.

Methods of raising price

The main question in this method is: *“How can price be raised without generating excessive negative transaction utility and thus loss of good will?”* The methods of raising price theory gives two strategy options that can be tried. First, steps can be taken to increase the perceived reference price. This can be done in quite a few ways. One way is to clearly put forward a high reference price and another option is to increase the perceived costs of the product for example by providing extreme luxury. The second strategy is to raise the minimum purchase required and/or to attach the sale of the product to something else. Because of the shape of the value function in the domain of losses, a given price movement seems smaller and the larger is the amount with which it is being incorporated.

Suggested retail price

Many sellers offer a "suggested retail price" for their products and services. In the nonattendance of fair trade laws, suggested retail prices must be only suggestions, but there are diverse differences across products and services in the relationship between market prices and suggested retail prices. In some cases the suggested retail price is usually equal to the market price. In other cases the suggested retail price is higher than the market price by as much as hundred percent or more. The question that arises here is: *“what is the role of a suggested retail price that is twice the typical retail price?”* One possibility is that the suggested retail price is being offered by the seller as a “suggested reference price”. Then a lower selling price will give positive transaction utility. In addition, inexperienced buyers may use the suggested retail price as an index of quality. The prospect is that there should be a large difference between price and the suggested retail price when both factors are present. The suggested retail price will be more successful as a reference price and the less often the good is purchased. The suggested retail price is most likely to serve as a substitute for quality when the consumer has trouble determining quality in other ways, for example by examination. After this examination the conclusion is that large discounting, relative to suggested retail price should usually be seen for uncommonly purchased goods whose quality is hard to evaluate.

In the two cases of methods of raising price and suggested retail price it is all about transaction utility. To conclude when a consumer is faced with a price, the consumer evaluates that price by comparing it with some form of comparison standard: the so-called reference price; and this comparison leads consumers to perceive a gain if the actual price is

lower than the reference price or a loss if the actual price is higher than the reference price. The transaction utility is also very important in the case of profit sharing. Transaction utility is the difference between the amount paid and the reference price. In this study it will be the difference between the total wage and the reference wage. Depending on their reference wage, an employee sees the amount of wage he gets as a gain or a loss. Organizations can choose between two kinds of compensation; fixed pay or variable pay (for example profit sharing).

I have described reference dependence. Depending on the amount of wage he gets an employee experiences the amount of wage he gets as a gain or a loss. First I will describe what loss aversion and diminishing sensitivity are and in the end I will derive what the three elements of prospect theory will conclude about the relationship between profit sharing and sectoral revenue volatility.

Loss Aversion

Kahneman and Tversky (1979) found that the preferences between the positive prospects are inconsistent with the expected utility theory. Cox and Sadiraj (2002) define expected utility theory as *“the theory of decision-making under risk based on a set of axioms for a preference ordering that includes the independence axiom or an alternative that implies that the (expected) utility function that represents the ordering is linear in probabilities.”*

When there is a discussion about preferences, it is normally dominated by positive scenarios, scenarios that involve no losses. What will happen when the signs of the outcomes are inverted so that gains are replaced by losses? To answer this question two effects will be discussed: the reflection effect and the certainty effect. The reflection effect implies that risk aversion in the positive domain is accompanied by risk seeking in the negative domain.

The certainty effect means that people overweight outcomes that are considered certain, relative to outcomes, which are simply probable. In the positive domain, the certainty effect contributes to a risk averse preference for a sure gain over a larger gain that is merely probable. In the negative domain, the same effect leads to a risk seeking preference for a loss that is merely probable over a smaller loss that is certain. The same psychological principle, the overweighting of certainty, favors risk aversion in the domain of gains and risk seeking in the domain of losses.

The theory of loss aversion is tested in different cases. For example, Benartzi and Thaler (1995) show that the loss aversion hypothesis can explain why many investors have not learned to prefer stocks over bonds even after 70 years in which the average return of stocks was four times larger than that of bonds. According to this explanation, bonds are preferred because they eliminate the risk of (subjectively) costly losses.

Another interesting example is provided by Camerer (1997). He analyzed the behaviour of taxi drivers in New York City. This analysis suggests a loss aversion explanation to the observation that drivers tend to work more hours on bad days when the per-hour wage is low but quit earlier on good days in which the wage per-hour is high; a behavioural pattern that contradicts the prediction of the standard theory of labour supply. The authors suggest that the drivers set their reference point on the daily income target and act as if they are loss averse by trying to minimize the possibility of falling short of that reference point. However, direct experimental tests of the loss aversion hypothesis lead to contradictory conclusions.

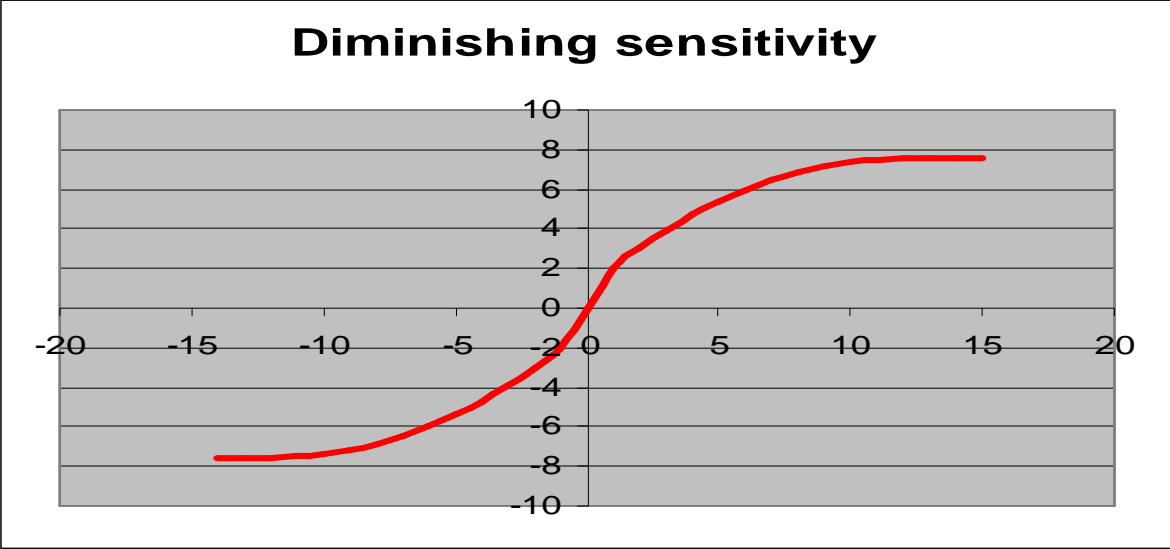
Thaler (1997) found deviations from maximization that can be explained by the loss aversion hypothesis. Thaler tested myopic loss aversion. Myopic loss aversion is the combination of a greater sensitivity to losses than to gains and a tendency to evaluate outcomes frequently. Thaler tested two different implications of myopic loss aversion experimentally. The first implication is that investors who display myopic loss aversion will be more willing to accept risks if they evaluate their investments less often. The second implication is that if all payoffs are raising enough to eliminate losses, investors will accept more risk. Both predictions are supported in a task in which investors learn from their experience. The investors who got the most frequent feedback and thus the most information took the smallest amount of risk and earned the smallest amount of money.

Barron (2003) did an analysis on “small-feedback-based” decisions and loss aversion. The small-feedback-based decisions have three characteristics: repeated options, each single choice is not very important (this means, the alternatives tend to have similar expected values that may be quite small) and the decision makers have no prior information. The decision makers get feedback on the similar situations from the past but that is all the information they get. One conclusion is that immediate feedback does not lead to expected value maximization and loss aversion seems to hold.

Katz (1964) did a study of choice with 400 trials. The participants were asked to guess which of the two light bubbles would be turned on (S or R). Option S was the more safe choice with less to lose and to win. The decision makers had no prior information. The loss aversion theory should predict a preference for S. The participants were indifferent instead. According to Erev (2007), the results from Katz experiment can be captured by the theory of diminishing sensitivity. Diminishing sensitivity will be discussed below.

Diminishing Sensitivity

Diminishing sensitivity derives from the fact that the marginal impact of a gain or a loss is dependent upon the distance from the reference point. To be precise, this characteristic produces outcomes that have smaller marginal effects when they are more distant from the reference point. Individuals are more sensitive to marginal changes near their reference point than to marginal changes remote from their reference point. For gains, this principle reinforces the implications of the classical economic assumption, with concave utility and a change from 20 euro into 30 euro having more impact than a change from 120 euro into 130 euro. For losses the principle implies a pattern opposite to the classical economic assumption as well, with convex utility and a change from -20 euro into -30 euro having more, rather than less, impact than a change from -120 euro to -130 euro.



Graph 1: Diminishing sensitivity

Instinctively the first euro lost hurts the most. In addition, the idea that changes in a variable have less impact the farther the variable is from a reference point is enveloping in both

economics and psychology. It brings up the properties of diminishing marginal rates of substitution in consumer theory, diminishing returns in producer theory, discounting in intertemporal choice, or the pattern of risk aversion over gains and risk seeking over losses in actions toward risk. In the background of neoclassical economics, this example is valid for gains as each new euro brings less extra utility than the one before (concave utility). However, for losses, it implies a different pattern since the closer to the reference point the higher rather than the lower impact on the outcome (convex utility). The difference with prospect theory (graph 2) is that prospect theory combines the three elements (includes loss aversion and reference dependence). The graph of prospect theory is steeper for losses than for gains because of loss aversion.

Köbberling (2004) suggests that this difference in predictions exists on relation of the fact that both theories focus on different aspects of utility. The different aspects are that the economic prediction deals with the goodness of money, depends on final wealth and is rational. At last the prospect theory concerns the general perception of quantity and depends on changes from a perceived reference point. Köbberling measured relative risk aversion in Belgium before and after the introduction of the Euro, and consider effects of changes in intrinsic value while keeping numbers constant, and effects of changes in numbers while keeping intrinsic value constant. The main conclusion was that increasing intrinsic value led to a significant increase of relative risk aversion, but changes in numbers did not have significant effects.

Herne (1998) provide an additional test of the reference dependent model focused on predictions about asymmetrically dominated reference points, loss aversion and diminishing sensitivity. The reference dependent model gives predictions concerning switches in the location of an asymmetrically dominated reference point even when there are no changes in the dominance relationship. Testing the impact of these switches involves a test of the diminishing sensitivity hypothesis. Herne is the first researcher who tested the diminishing sensitivity hypothesis.

About the relation between the three different fundamentals of the prospect theory Herne says the following:

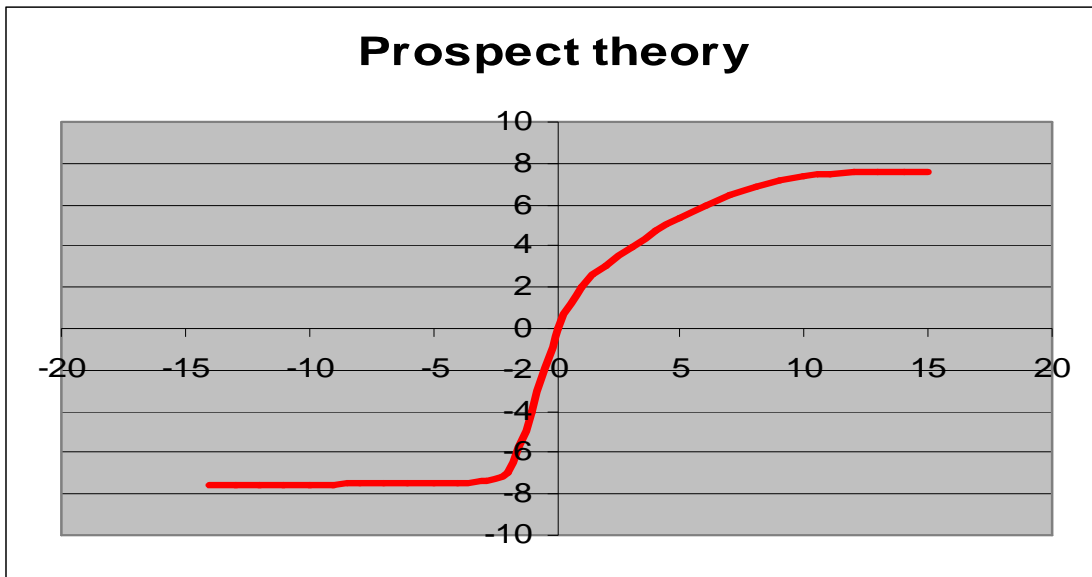
“In the reference dependence model, individual value functions are assumed to be S-shaped and defined relative to a reference point on each dimension. Loss aversion

makes the value function steeper for losses than for gains and diminishing sensitivity makes the function concave above the reference point and convex below it. Both loss aversion and diminishing sensitivity can give rise to preference reversals which depend on the location of the reference point.” (Herne 1998:188)

Herne did two experiments in Finland to test different hypothesis. The following three hypotheses were tested. Individuals tend to choose options which asymmetrically dominate the reference point. Secondly, because of diminishing sensitivity, this tendency is increased when the reference point is moved further away from the target option on the target's weak dimension. The last hypothesis is, when the reference point is moved further away from the target on the target's strong dimension, the number of preference reversals is decreased. With this last hypothesis Herne wants to test if diminishing sensitivity does not outweigh the effect of loss aversion. The results of the two experiments show support to the reference dependent model, loss aversion theory and the diminishing sensitivity hypothesis.

Prospect theory

The main object of the prospect theory is that individuals tend to think of possible outcomes usually relative to a certain reference point, also called the status quo. Individuals rather do that than to think of the final status. This phenomenon is called framing. Moreover, employees have different risk attitudes towards gains (outcomes above the reference wage) and losses (outcomes below the reference wage) and care generally more about potential losses than potential gains (loss aversion). Diminishing sensitivity shows that, people tend to overweight small losses, but underweight large gains. The prospect theory incorporates these observations in a modification of expected utility theory by replacing final wealth with payoffs relative to the reference point, by replacing the utility function with a value function, depending on this relative payoff, and by replacing cumulative probabilities with weighted cumulative probabilities. The prospect theory combines the different aspects (reference dependence, loss aversion and diminishing sensitivity). The individual value function is supposed to be S-shaped and the outcome is defined relative to a reference point. Loss aversion makes the value function steeper for losses than for gains and diminishing sensitivity makes the function concave above the reference point and convex below the reference point.

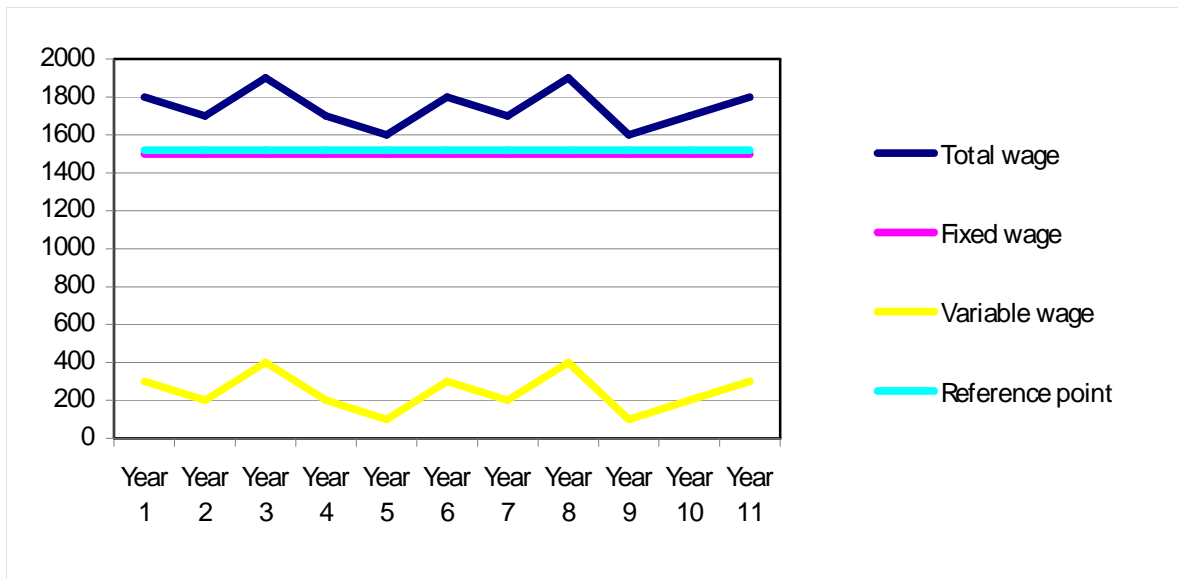


Graph 2: Prospect theory

Relationship between the sectoral revenue volatility and profit sharing

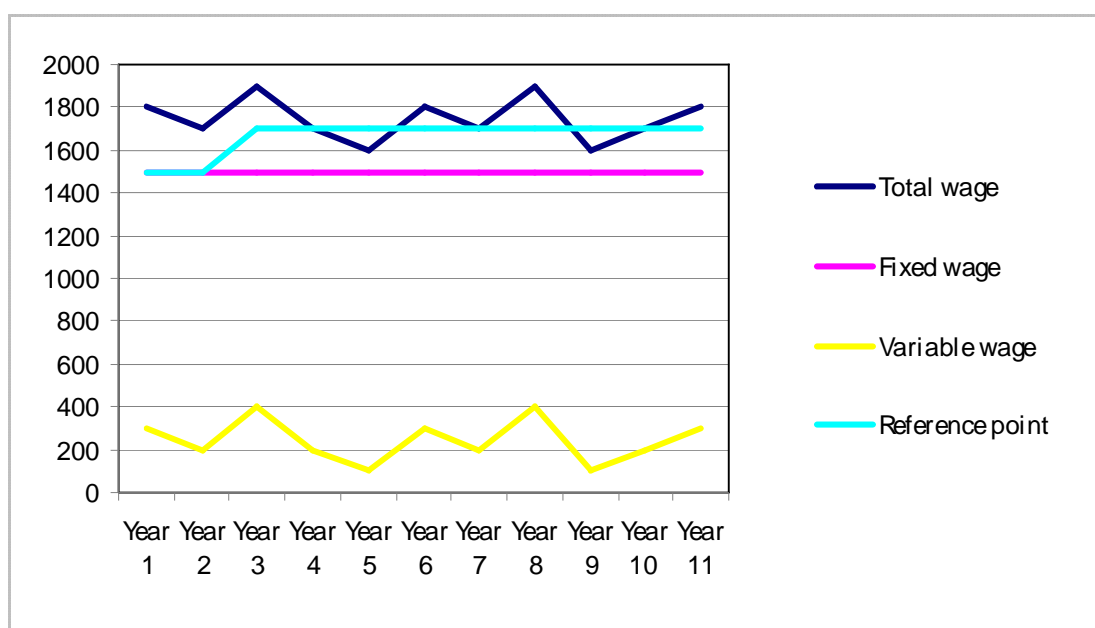
I have explained the different aspects of prospect theory. Now I will derive what prospect theory predicts regarding the relationship between sectoral revenue volatility and profit sharing. To draw a conclusion about this relationship I will look at two different types of employees. Both employees work for the same company and will receive the same amount of fixed wage and the same amount of profit sharing. The first type of employee is a naïve employee. An employee who does not know what the amount of wage is that he can really get for his job and the employer can offer him a fixed wage in his contract. The naïve employee will take his fixed wage as his reference point. This reference point will stay fixed over time and will independent of his variable wage. The second type of employee is a sophisticated employee. The sophisticated employee sets his reference point equal at his fixed wage in the beginning. The reference point of the sophisticated employee will change over time depending on his average wage.

Both types of employees have the same reference point in the beginning but the reference points will differ from each other over time. The naïve employee has a fixed reference point and the sophisticated employee has a reference point that is changing over time. (See graphs below)



Graph 3: Wage of naïve employee with fixed reference point

The naïve employee has a fixed wage of 1500 euro. The transaction utility is very important in this case. Transaction utility is the difference between the amount of total wage and the reference wage. Depending on their reference wage, an employee sees the amount of wage he gets as a gain or a loss. His reference wage is fixed. Graph 3 shows that his reference wage never exceeds his total wage. The employee experiences his total wage every year as a gain because the total wage is always higher than the reference wage. There is a difference in reference point between the naïve employee and the common employee. Graph 4 shows the situation of the sophisticated employee.



Graph 4: Wage of sophisticated employee with change of reference point

The sophisticated employee has a fixed wage of 1500 euro. This fixed wage is the same as for the naïve employee. In year 1 both reference wages are equal. The employee experiences his variable wage as a gain in the first three years because his reference wage is lower than his total wage. In year 4, the employee is indifferent because the reference wage and the total wage are equal. However, in year 5 the employee experiences his variable wage as a loss because his reference wage has increased over time. The same holds for year 9. Although he still receives a variable wage on top of his fixed wage, he does not experience this as a gain but as a loss.

When the participation constraint is binding and both types of employees have the same outside option utility, the fixed wage for the naïve employee can be placed lower than the fixed wage for the sophisticated employee.

The situation with two different employees creates two different predictions about the relationship between sectoral revenue volatility and profit sharing.

Naïve employee

Loss aversion refers to the tendency that the naïve employee strongly prefers avoiding losses than acquiring gains. This leads to risk aversion when the naïve employee evaluates a possible gain. The naïve employee prefers avoiding losses to making gains. Diminishing sensitivity means that the marginal value of both gains and losses for the naïve employee decreases with their distance from the reference point. A specific increase or decrease in wage has a greater impact on preference from a close rather than from a distant reference wage. For the naïve employee holds; he experienced his wage as a gain as long as his reference wage is below his total wage. This is the case because his fixed wage is lower than his total wage and equal to his reference wage. In this situation the prospect theory predicts a positive relationship between sectoral revenue volatility and profit sharing. As long as the employer does not set the reference wage too high the effect on the employee is positive. The naïve employee is more sensitive to changes near their status quo than to changes remote from their status quo. The further the total wage of an employee is removed from his reference wage, the smaller the marginal impact on the employee. When sectors are more volatile, the distances from the employee's reference point become larger. This has a relative smaller influence on employee's morale, while for firms the marginal benefit of profit sharing does not diminish in

volatility. Therefore, in case of a naïve employee, prospect theory predicts a positive relationship between the sectoral revenue volatility and profit sharing.

Sophisticated employee

On the other hand, individuals strongly prefer risks that might possibly mitigate a loss, called risk-seeking behavior. In case of profit sharing, diverse employees experience the change of their wages differently. A decline in wage has a larger impact than a similar rise in wage. According to the loss aversion hypothesis, the disutility of a loss of 100 euro is larger than the utility of an equivalent gain. For the sophisticated employee counts a different situation. The fixed wage of the sophisticated employee is 1500 euro's in accordance with the labor market. In year 1 his reference wage is equal to his fixed wage. After a couple of years his reference wage is raising, because the sophisticated employee get used to the variable wage he receives every year. During bad economic periods, the company's revenue is declining. The absolute value of profit sharing that the employee receives will decrease. The sophisticated employee will for example not receive the expected reference wage, but the sophisticated employee receives a wage that is below his reference wage. The flexible part of the wage is less or even zero. The employee will experience this as a loss. Loss aversion makes the value function steeper for losses than for gains and diminishing sensitivity makes the function concave above the reference wage and convex below the reference wage. If a particular sector is more volatile, the chance on an occurring loss will rise. According to the prospect theory there should be a negative relationship between sectoral revenue volatility and profit sharing in case of a sophisticated employee. Bewley supports this outcome. Employers are reluctant to cut pay because they believed doing so would hurt employee morale. This can lead to lower productivity and difficulties with recruitment of new employees.

Conclusion

In this paragraph, I have described what the prospect theory is and what the three key elements are (reference dependence, loss aversion and diminishing sensitivity). To derive what the relationship will be between sectoral revenue volatility and profit sharing I described two different situations. First I described the situation for a naïve employee. Second I described the situation for a sophisticated employee. The difference between those employees is that the naïve employee has a fixed reference wage and the sophisticated employee has a reference wage that is changing over time. The outcome for both employees is different. For

the naïve employee the relationship is expected to be positive. For the sophisticated employee the relationship is expected to be negative.

2.5 Conclusion

In this chapter, I have described performance related pay and profit sharing. After that, I discussed two theories: agency theory and prospect theory.

Proponents of performance-related pay claim that it improves the motivation of employees and assists in the recruitment and retention of high quality staff. Employers believe that performance related pay can lead to an opportunity to give their employees extra incentives to work harder. Performance related pay stimulates employees to maximize effort and development. Another advantage is that both collective and individual performance related pay give the employer the opportunity to adapt labour costs to the economic situation in the Netherlands. When the economy is not performing well it is easier for an employer to lower flexible wages than to lower fixed wages. On the other hand employers can reward their employees in times of economic prosperity. There are also some downsides of performance related pay. First, there may be disputes about how performance is measured and whether an employee has done enough to be rewarded. Another point is that rewarding employees individually does very little to encourage teamwork; it may encourage unhealthy rivalry between employees. Finally, there is much doubt about whether performance-related pay actually does anything to motivate employees. This may be because the performance element is usually only a small percentage of total pay.

Existing research tends to show that profits sharing for employees are associated with higher company productivity and profitability. As a group incentive, profit sharing encourages cooperation between different employees, share ideas and information and monitoring colleagues. Profit sharing can create new tensions and conflicts between employers and employees. For employers, profit sharing can be a reason to increase compensation flexibility.

The conclusion of the agency theory is that the theory predicts no significant effect between the use of profit sharing and the volatility of the sector. An employee cannot control the revenue of a whole firm so there should not exist a relationship between those variables; otherwise the agent has to bear too much risk. Both the monitoring intensity principle and the equal compensation principle will not directly predict what the relationship will be between the volatility of the revenue of a sector and the use of profit sharing. The informativeness

principle predicts that there should be no relationship between the volatility of the revenue of different sectors and the use of profit sharing. The employer cannot influence the firm's total revenue and the employer has to bear too much risk. The incentive intensity principle indicates that the responsiveness of incentive to performance should increase. When the volatility is high, the employee has weaker incentive to work hard. On the other hand, when the volatility is low, the employee has more incentive to work hard. Thus, a given level of profit sharing loads more risk on the agent when output volatility is high than if volatility is low. Hence, this Principle predicts a negative relationship between sectoral revenue volatility and the use of profit sharing.

The prospect theory combines the different aspects reference dependence, loss aversion and diminishing sensitivity. Employees have different risk attitudes towards gains (outcomes above the reference wage) and losses (outcomes below the reference wage) and care generally more about potential losses than potential gains (loss aversion). Diminishing sensitivity shows that, employees tend to overweight small losses, but underweight large gains. The individual value function of an employee is supposed to be S-shaped and the outcome is defined relative to a reference point. Loss aversion makes the value function steeper for losses than for gains and diminishing sensitivity makes the function concave above the reference point and convex below the reference point. To derive what the relationship will be between sectoral revenue volatility and profit sharing I described two different kinds of employees. First I described the situation for a naïve employee. Second I described the situation for a sophisticated employee. The outcome for both employees is different. For the naïve employee the relationship is expected to be positive. For the sophisticated employee the relationship is expected to be negative.

In the next chapter I will present the data and the methods I have used and determine which theory gives the right prediction.

3. Data

Based on the availability of consistent data for each sector, sectors will be selected for testing the basic model. The sample will include 14 sectors. The data needed for the basic model are to what extent different sectors in the Netherlands use profit sharing and the second is the volatility of the revenue of different sectors.

3.1. Data Collection – Profit sharing

Profit Sharing

The first one is the extent to which different sectors in the Netherlands make use of performance related pay with a focus on profit sharing. For this variable I used the “*Loonwijzer (Wage Indicator) enquête 2007/Q4 en 2008/Q1 from the FNV Bondgenoten in the Netherlands*”.

The Wage Indicator is an international, continuous web-based operation. A national website has content about wages, working conditions, labour standards or other work-related topics. It has a crowd pulling Salary Check providing free information on occupation-specific wages, controlled for individual factors. Wage Indicator has a continuous, international comparable questionnaire on work and wages with a prize incentive. The project started in 2000 in the Netherlands with a large-scale, paper-based survey to collect data on women's wages. In 2001 a Wage Indicator website was launched for the first time. Its Salary Check showed wage information for 45 occupations, using the coefficients of occupation-specific wage regression analyses, based on the survey data. Ever since, the Salary Check is updated annually, using the web survey data. After five years, it provides wage information for over 400 occupations.

Data about the use of profit sharing in the Netherlands has a lack of availability. The FNV assigned to the foundation “*Loonwijzer (Wage Indicator)*” to do a research among its 24.000 employees. Those employees have to answer different questions about their work. There were six questions related to flexible wages.

<i>Label</i>	<i>Question</i>
Wage fluctuations	Does your wage differ from month to month?
Incentive wage	Does your wage depend upon piece work?
End year payment	Does your end year payment depend upon your performance?
Performance related pay	Are there outside your scale opportunities to earn performance related pay?
Bonus	Did you receive a 13 th month or a bonus last year?
Profit sharing	Did you receive profit sharing last year?

Table 4: Questions about flexible wages

The answers to these questions are in table 1. The extent to which different sectors use profit sharing is shown in the table below.

<i>Sector</i>	<i>Profit Sharing</i>
Agriculture and fisheries	8%
Feeding industry	13%
Textile	9%
Clothing and Paper	9%
Chemical industry	22%
Metal	20%
Electronics	20%
Other industries	13%
Whole sale	12%
Retail services	9%
Transport	10%
ICT and telecommunications	20%
Banking and insurance	27%
Business services	14%
Subtotal	16%
Remaining working population	7%
Total	12%

Table 5 : Profit sharing in different sectors in the Netherlands

3.2 Data collection – Revenue

Volatility of the revenue of different sectors in the Netherlands

For the volatility of the revenue different sectors in the Netherlands I used the “*Standaard Bedrijfsindeling (SBI)*” (*Standard Sector Classification*) of the Central Bureau of Statistics in the Netherlands. Central Bureau of Statistics (CBS) in the Netherlands is responsible for collecting and processing data in order to publish statistics to be used in practice, by policymakers and for scientific research. The SBI is a hierarchic classification of economic activities. The SBI is based on the classification of the European Union (“*Nomenclature*

statistique des activités économiques dans la Communauté Européenne(NACE)) and on the classification of the United Nations (*“International Standard Industrial Classification of All Economic Activities”* (ISIC))

The CBS uses the SBI to classify different companies in their main activity. Until 2008 the SBI of 1993 was used by the CBS. In 2008 there is a change in international classification, so the SBI 1993 is replaced by the SBI 2008. In my research I will use the SBI 1993.

For my research I used the time series of the revenue of different sectors in the Netherlands from 1995 until 2007. In the appendices the revenues of the different sectors are shown.

Revenue is the amount of money that a company actually receives during a specific period, including discounts and deductions for returned merchandise. It is the "top line" or "gross income" figure from which costs are subtracted to determine net income. Revenue is calculated by multiplying the price at which goods or services are sold by the number of units or amount sold. The revenue is determined as follows. The revenue is the account value (exclusively VAT) of the self-made or assembled goods and services that are sold to a third party. The revenue is expanded with *“accijns, belasting van personenauto’s en motorrijwielen (BPM), verpakkingskosten en vrachtkosten, verminderd met kortingen en bonussen”* (including consumer and petrol taxes, excluding sales and bonuses). The total revenue exists of national revenue and cross border revenue. The revenues are collected from companies with at least twenty employees.

3.3. Data Analysis – Methods and Procedures

The first step in analyzing the relationship between the volatility of the revenues and profit sharing is to construct the variable of volatility. I constructed the volatility as follows. First I collected revenue data from 1995 until 2007 from the CBS. I conducted different trend analysis of all sectors. The graphs and the results can be seen in appendix 1.

$$rev = \beta_1 * YEAR + C \tag{1}$$

Where rev stands for revenue index (2000 =100).

Andersen, Bollerslev and Diebold (2002) define three different volatility measurements. I used the notional volatility measurement. I used the different linear trend lines to determine the volatility.

$$Vol = \sum_{1995}^{2007} (y_t - Ey_t)^2 / t \tag{2}$$

Vol stands for the volatility of the different sectors. Where *y* is the absolute revenue of year *t* and *Ey* is the expected revenue based on the trend analysis. Where *t* is the total amount of years, in this case thirteen. Volatility refers to the amount of uncertainty or risk about the size of changes in for example the revenue of a sector. A higher volatility means that a revenue value can potentially be spread out over a larger range of values. This means that the revenue of the sector can change dramatically over a short time period in either direction. A lower volatility means that the revenue of a sector does not fluctuate dramatically, but changes in value at a steady pace over a period of time.

Finally the last step is analyzing what the relationship is between the volatility and profit sharing.

$$Ps = \beta_1 * vol + \varepsilon \tag{3}$$

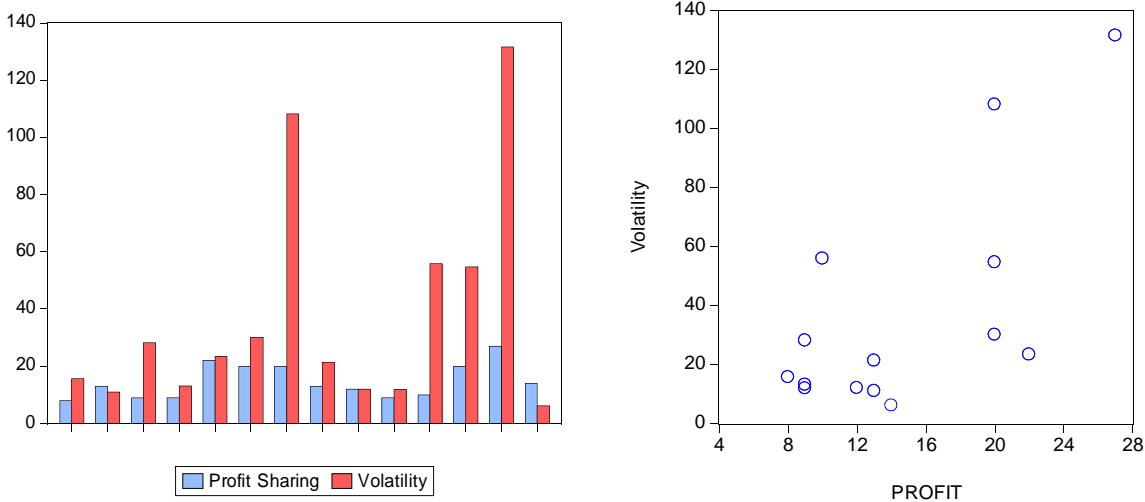
3.4. Data Analysis – Results

The final data that I have used in my regression analysis are in the table below.

Table 6: Overview sectoral revenue volatility and profit sharing		
Sectors	Volatility	Profit Sharing
Agriculture and fisheries	15.7	8
Food industry	11.0	13
Textile and clothing	28.2	9
Paper	13.1	9
Chemical industry	23.4	22
Metal	30.1	20
Electronics	108.2	20
Other Industries	21.4	13
Whole sale	12.0	12
Retail services	11.9	9
Transport	55.9	10
IT and telecom	54.7	20
Banking and insurance	131.6	27
Business services	6.1	14
Average volatility	37.4	
Standard deviation of the volatility	38.4	

Table 6: Overview sectoral revenue volatility and profit sharing

The average of the volatility is 37.4. The standard deviation of the volatility is 38.4. A high standard deviation indicates that the volatility is spread out over a large range of values. Standard deviation is a statistical measurement that sheds light on historical volatility. For example, a volatile sector like *Banking en Insurance* will have a high standard deviation while the deviation of a stable sector like *Food Industry* will be lower.



I conducted the regression analysis with the above variables. The results can be seen in the appendices 6.3. The following output became the final output:

Table 7: Output Least square regression analysis

Variable	Coefficient	T-statistic
C	10.72	6.196
Volatility	0.1066	3.238
Number of observations	14	
Adjusted R-squared	0.42	

Table 7: Output regression analysis

The volatility of the revenues of a sector has a positive effect on profit sharing. When the volatility is one unit higher, the use of profit sharing will rise with 0.107 percentage point. The high standard deviation of 38.4 is an indicator that there are large differences between the different sectors. Hence, an increase in volatility with one standard deviation increases the use of profit sharing by 4.1 percentage points. This is a substantial effect.

3.5. Data Analysis – Perform different tests

Ordinary Least Square analysis

According to Pindyck and Rubinfeld (1997) the two variable linear regression model has six important assumptions. In case of ordinary least square (OLS) the estimators should be unbiased and consistent.

1. The relationship between Y and X is linear
2. The X's are non stochastic variables whose values are fixed
3. The error has zero expected value
4. The error term has constant variance for all observations
5. The random variables are statistically independent
6. The error term is normally distributed

Those six assumptions lead to the Gauss-Markov Theorem:

“The estimators α and β are the best (most efficient) linear unbiased estimators of α and β in the sense that they have the minimum variance of all linear unbiased estimators”

Based on those six assumptions several tests can be performed. Those different tests are:

- Testing for misspecification (based on assumption 1)
- Testing for heteroskedasticity (based on assumption 4)
- Testing for normality (based on assumption 6)

Testing for misspecification

The Reset test (Regression Specification Error Test) is designed to detect omitted variables and incorrect functional form. Rejection of the null hypothesis implies the original model is inadequate and can be improved. A failure to reject the null hypothesis says the test has not been able to detect any misspecification. Detecting specification errors is sometimes possible by using Ramsey's RESET specification test. This test is based on a test-equation where the original equation is expanded with powers of the interpolation fit series. The number of terms to be added is user-defined. An F-test is used to test if the added terms are significant or not.

Ramsey reset test

F-statistic 0.094	Probability F(1,11) 0.764
-------------------	---------------------------

Log likelihood ratio 0.120	Probability Chi Square (1) 0.730
----------------------------	----------------------------------

If non-linear combinations of the explanatory variables have any power in explaining the exogenous variable, then the model is misspecified. If the null-hypothesis that all regression coefficients of the non-linear terms are zero is rejected, then the model suffers from misspecification. In this test the null hypothesis will be rejected. The model does not suffer from misspecification.

Testing for heteroskedasticity

Homoskedastic means that the error term has a constant variance. If the variance has a changing variance it is called heteroskedastic. The presence of heteroskedasticity yields ordinary least square estimators that are not efficient. The White test can discover if there is the presence of heteroskedasticity. The White test is a general test; that means that there is no need to specify the explanatory variable that can determine the heteroskedasticity of the errors. The null hypothesis of this test is that the errors are homoskedastic. An auxiliary regression will be constructed that has as the independent variable the squared OLS residuals and as the dependent variables; a constant term, the regressors, the squares of the regressors and their cross products. In the table below the value of *Observations*Rsquared* has to be compared with the value of *Scaled explained*. In this case the nR^2 is greater than Scaled explained the null hypothesis of homoskedasticity can be rejected. The value of the probability Chi square of 0.258, represents the probability that rejecting the null hypothesis of homoskedasticity is incorrect.

Heteroskedasticity Test: White

Observations* R squared 2.711	Probability Chi square (2) 0.258
Scaled explained SS 1.20	Probability Chi square (2) 0.549

To control for heteroskedasticity, there is an option in Eviews to create a heteroskedasticity corrected standard error regression. The output of this regression is in appendix 6.4.

Table 8: Regression analysis, White Heteroskedasticity consistent standard errors		
<i>Variable</i>	<i>Coefficient</i>	<i>T-statistic</i>
C	10.72	6.994
Volatility	0.1066	5.121
Number of observations	14	
Adjusted R-squared	0.42	

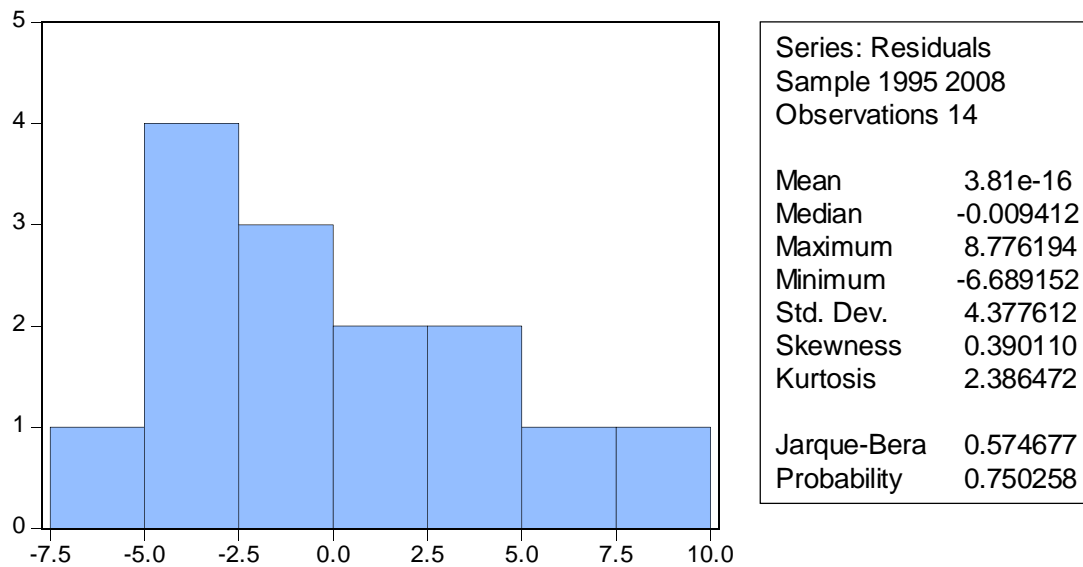
Table 8: Regression controlled for heteroskedasticity

The coefficient and the constant did not change from the uncorrected OLS regression. The uncorrected standard error is smaller. The slope coefficient remain significant at the 5% level.

Testing for normality

A histogram is a useful device for describing the data associated with a particular value. A histogram tabulates the frequency distribution of the data. The histogram below presents the distribution of the residuals of the regression analysis of the volatility. The histogram can provide useful descriptive information which can be particularly helpful to evaluate whether the residuals are normally distributed or not. *Skewness* is a statistic that provides useful information about the symmetry of a probability distribution. If S is equal to zero then there is a symmetric distribution, this could be a normal distribution. In this case, S is not equal to zero. *Kurtosis* provides a measure of the thickness of the tails of a distribution. For a normal distribution K is equal to 3. When the tails of distribution are thinner than the normal, Kurtosis will be smaller than 3. In this case, the Kurtosis shows thinner tails than in case of normal distribution. A more formal test of normality is given by the *Jarque-Bera* statistic. For the JB test, the null hypothesis states the sample has a normal distribution, against alternative hypothesis that it is non-normal. The p-value shows the probability of incorrectly rejecting the null hypothesis. When the p-value is significant (less than 0.10 or less than 0.05) the null hypothesis should be rejected and the conclusion will be that the sample is not normally distributed.

When the p value is not significant (greater-than 0.10 or 0.05), there is not enough evidence to reject the null hypothesis and the assumption will be that the sample is normally distributed. A better check is to look at the histogram and see if the residuals are normally distributed (bell shaped).



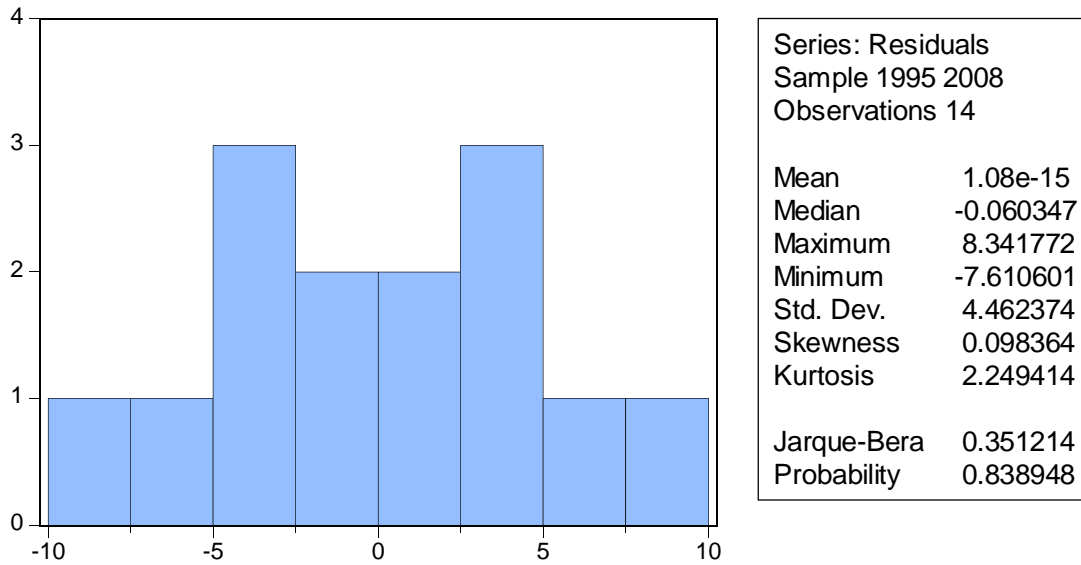
The graph shows that the residuals are not normally distributed. If the residuals are not normally distributed, the residuals should not be used in Z tests or in any other tests derived from the normal distribution, such as t tests, F tests and chi-square tests. If the residuals are not normally distributed, then the dependent variable or at least one explanatory variable may have the wrong functional form, or more important variables may be missing. Correcting one or more of these systematic errors may produce residuals that are normally distributed. To correct one of the errors the same test is performed for the standard deviation. Appendix 6.4 shows the output. Table 9 shows that the relationship between the standard deviation of the volatility and profit sharing is positive.

Table 9: Regression analysis profit sharing and standard deviation

<i>Variable</i>	<i>Coefficient</i>	<i>T-statistic</i>
C	6.632	2.299
Standard deviation	1.463	3.105
Number of observations	14	
Adjusted R-squared	0.44	

Table 9: Output standard deviation

The test for normality is performed for the standard deviation and the output is different.



The graph shows that the residuals are more close to the normal distribution than the graph of the residuals of the volatility. The reason for that is that the square root of the volatility makes sure that sectors with a high volatility like the banking and insurance sector get less heavy weight in the final output. Table 9 shows that the positive relationship still holds.

Conclusion

After conducting the regression analysis there appears to be a positive relationship between profit sharing and the revenue volatility of different sectors in the Netherlands. In addition of analysing the relationship between profit sharing and the revenue volatility I performed different tests. Through those test my results are more reliable. The model does not suffer from misspecification. Second, the model is controlled for heteroskedasticity. Finally, the error terms are not normally distributed. Moreover, the residuals of the standard deviation are normally distributed. Sectors with high volatility get less weight through to the square root. In the next chapter I will draw a conclusion and give an answer to the main research question.

4. Conclusion

In this chapter, the observable outcomes of my analysis are presented and then on the basis of these outcomes my research question will be answered. My research question is the following:

“What is the relationship between the use of profit sharing in a sector and the revenue volatility of the sector, across different sectors in the Netherlands?”

First, I have discussed two theories; the agency theory and the prospect theory.

Agency theory

The main goal of the agency theory is to study to two specific problems:

- The goals of the principal and agent are in conflict
- The principal and agent reconcile different tolerances for risk

The informativeness principle predicts that there should be no relationship between the volatility of the revenue of different sectors and the use of profit sharing. The incentive intensity principle indicates that the responsiveness of incentive to performance should increase. When the volatility is high, the employee has weaker incentive to work hard. On the other hand, when the volatility is low, the employee has more incentive to work hard. The incentive-intensity principle predicts a negative relationship between the two variables. Both the monitoring intensity principle and the equal compensation principle will not directly predict what the relationship will be between the volatility of the revenue of a sector and the use of profit sharing. The conclusion is that the agency theory predicts no significant effect between the use of profit sharing and the volatility of the revenue of the sector. An employee cannot control the revenue of a whole firm so there should not exist a relationship between those variables, otherwise the agent has to bear too much risk. When an organization is undergoing rapid changes in revenue (more volatility), the risk for the employee is too high. When there is a relationship between those variables, based on the incentive-intensity principle this relationship should be negative.

Prospect theory

The main object of the prospect theory is that employees tend to think of possible outcomes usually relative to a certain reference point. Employees rather do that than to think of the final status (total wage). Employees have different risk attitudes towards gains (outcomes above the reference wage) and losses (outcomes below the reference wage) and care generally more about potential losses than potential gains (loss aversion). Diminishing sensitivity shows that, employees tend to overweight small losses, but underweight large gains. The prospect theory incorporates these observations in a modification of expected utility theory by replacing final wealth with payoffs relative to the reference point, by replacing the utility function with a value function, depending on this relative payoff, and by replacing cumulative probabilities with weighted cumulative probabilities. Employees are more sensitive to changes near their status quo than to changes remote from their status quo. The further the total wage of an employee is removed from his reference wage, the smaller the impact on the employee. When sectors are more volatile, the distances from the employee's reference point became larger. This has a relative smaller influence on employee's morale.

To derive what the relationship will be between sectoral revenue volatility and profit sharing I described two different kinds of employees. First I described the situation for a naïve employee. The naïve employee has a fixed reference wage. Second I described the situation for a sophisticated employee. The sophisticated employee has a reference wage that is changing over time. The outcome for both employees is different. For the naïve employee the relationship is expected to be positive. For the sophisticated employee the relationship is expected to be negative.

After conducting the regression analysis there appears to be a positive relationship between profit sharing and the revenue volatility of different sectors in the Netherlands. The output of my data analysis supports the theory of profit sharing support productivity related motivations. (Kruse, 1996) Apart from productivity effects, a potential benefit to employers is that profit sharing and employee ownership build in a degree of compensation flexibility. When exogenous events lower company profitability, these plans automatically decrease employee compensation without the need for costly renegotiation of the hourly wage, or worker layoffs that may sacrifice firm specific skills. This may lead firms experiencing high volatility in company performance, or new firms with uncertain prospects, to favor such plans as a means of sharing variability or uncertainty with workers.

There are some delimitations and limitations in my analysis. I will discuss the limitations and delimitations in the next chapter.

5. Delimitations and limitations

5.1. Delimitations

The scope of this study is narrowed by the nature of the sample as well as the choice of methodology. The sample that I have used is from 1995 until 2007. Lack of data availability ensured that it was difficult to do a reliable analysis. Another delimiting factor is the number of sectors I have used. The total number of sectors is fourteen. The reason for that is that the profit sharing data are coming from a survey. This survey did not use more sectors than those fourteen. The CBS uses the “SBI 93”. This classification system uses more different sectors. An option for further research is that companies in those different sectors of the CBS will be used to collect data about profit sharing.

5.2. Limitations

Company data

The data I have used are coming from different sectors. An interesting alternative for further research could be to use company data. Company data is easier to compare with profit sharing data. To collect the different data, annual reports of different companies could be used to collect information about the revenues and profit sharing.

Other variables

There can be other unidentified factors that have their influence on profit sharing, for example union influence. D’Art and Turner (2003) found an interesting relationship between the trend in union influence and the presence of a profit sharing scheme for all employees. Firms with profit sharing report a larger decrease in union influence than firms without profit sharing. Long (2000) recommends that profit sharing can be highly beneficial to an organization even if there is no direct effect on employee effort and motivation. For example, profit sharing may increase cooperation, organizational identification, increased job satisfaction and increased interest in company performance. Positive effects of profit sharing for the company were improved employee motivation and performance, increased ability to attract and retain employees, improved company performance and the fact that employees were given a piece of the action.

Number of employees

I did not control for number of employees who have to deal with profit sharing. According to Kruse (1993), the most serious problem with profit sharing as an employee incentive is that the positive effect of any extra effort must be shared with all other workers in the firm. With a total of N employees, each receives an average of only $1/N$ of any increased profits going to employees, leading to a very weak individual incentive as N grows large.

Classification system

The Central Bureau of Statistics changed the SBI 93 in 2008 to the SBI 08. For my research I used the SBI 93. To get a most updated research it is better to use this new classification in further research.

Lack of data availability

For my model I used the revenue data of 14 sectors for the time period of 1995-2007. Lack of data availability causes the analysis not to be as correct as it should be. According to Tabachnick I should use at least 20 different sectors to conduct a regression analysis. Numerous rules-of-thumb have been suggested for determining the minimum number of subjects required to conduct multiple regression analyses. These rules-of-thumb are evaluated by comparing their results against those based on power analyses for tests of hypotheses of multiple and partial correlations. Tabachnick and Fidell (1989) suggest the following rule of thumb.

“If either standard multiple or hierarchical regression is used, one would like to have 20 times more cases than IVs. That is, if you plan to include 5 IVs, it would be lovely to measure 100 cases. In fact, because of the width of the errors of estimating correlation with small samples, power may be unacceptably low no matter what the cases-to-IVs ratio if you have fewer than 100 cases. However, a bare minimum requirement is to have at least 5 times more cases than IVs - at least 25 cases if 5 IVs are used.”

Omitted variables

Definition of Omitted Variable Bias: *“Omitted variable bias is a standard expression for the bias that appears in an estimate of a parameter if the regression run does not have the appropriate form and data for other parameters.” (Pindyck and Rubinfeld 1997)*

The term omitted variable refers to any variable not included as an independent variable in the regression analysis that might have an influence on the dependent variable.

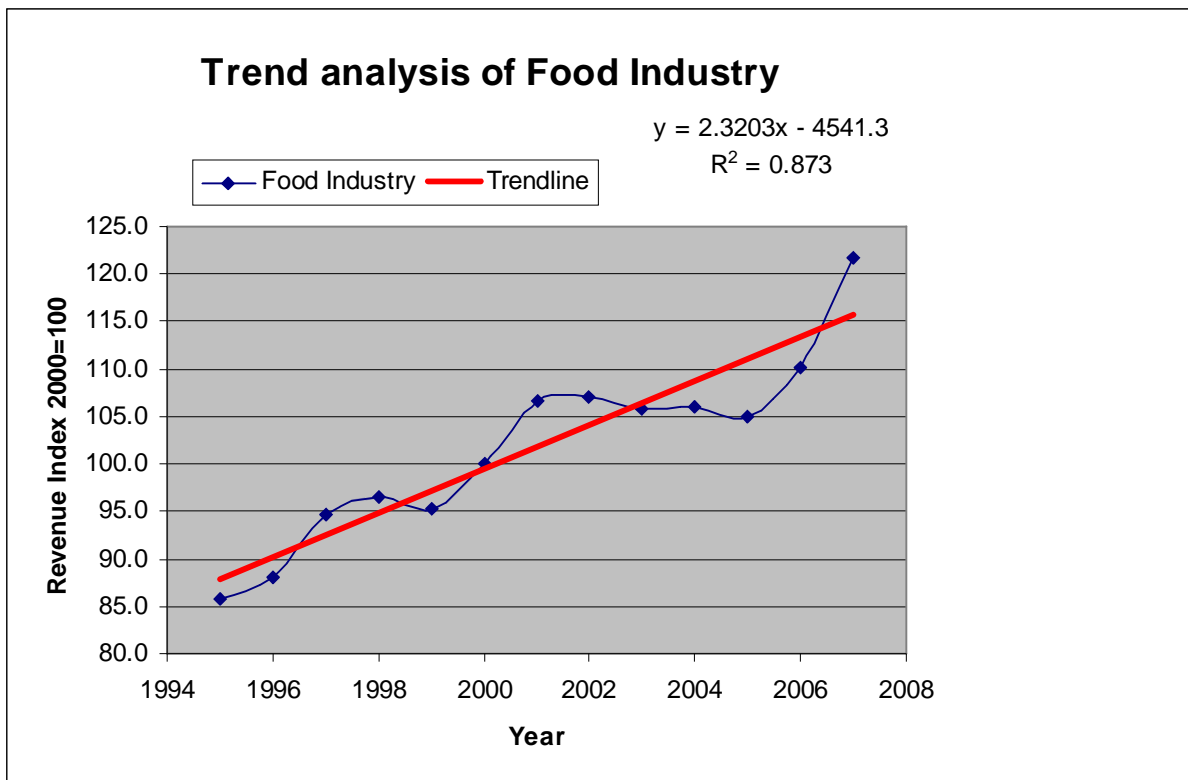
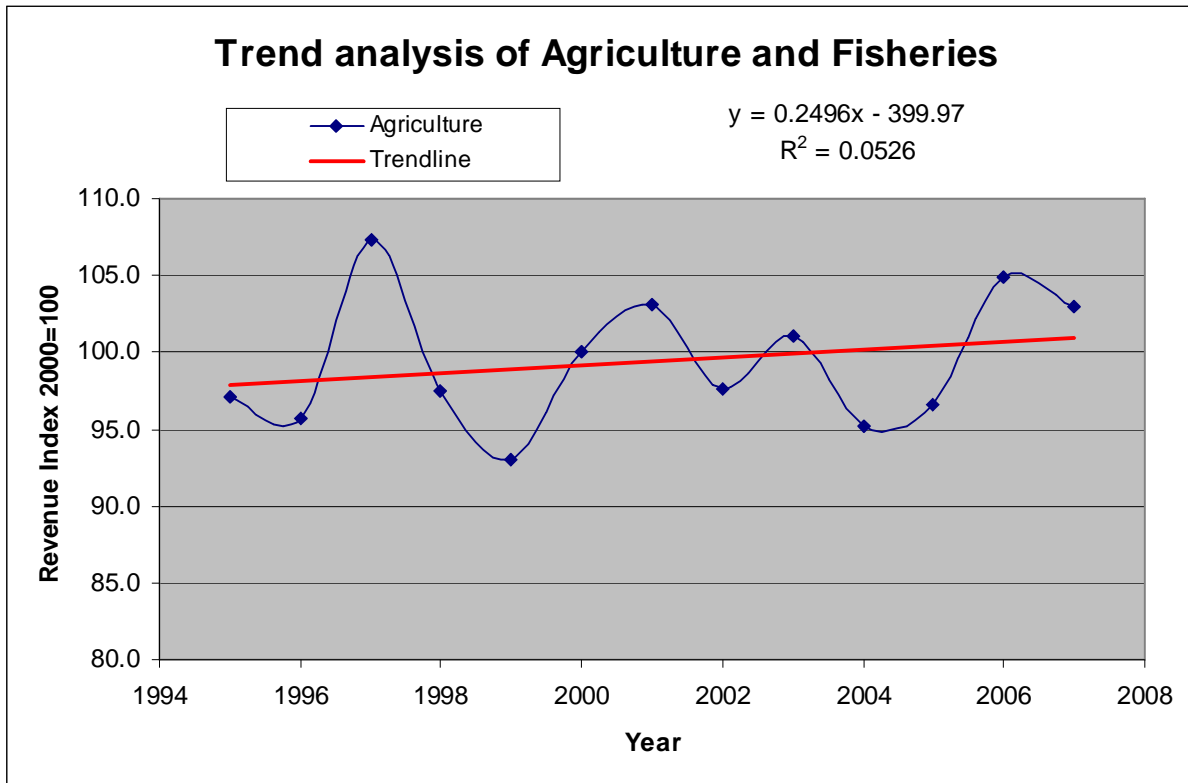
Two conditions must hold for omitted variable bias to exist in linear regression (Greene 1993):

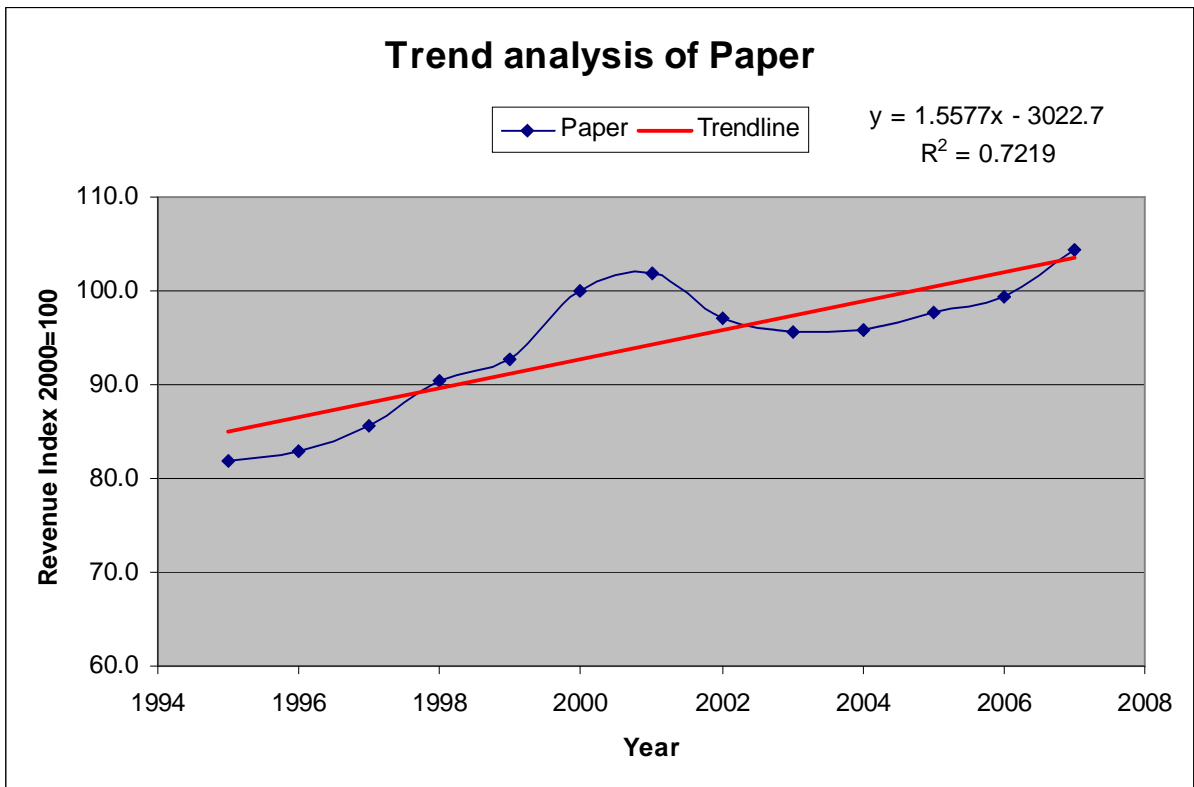
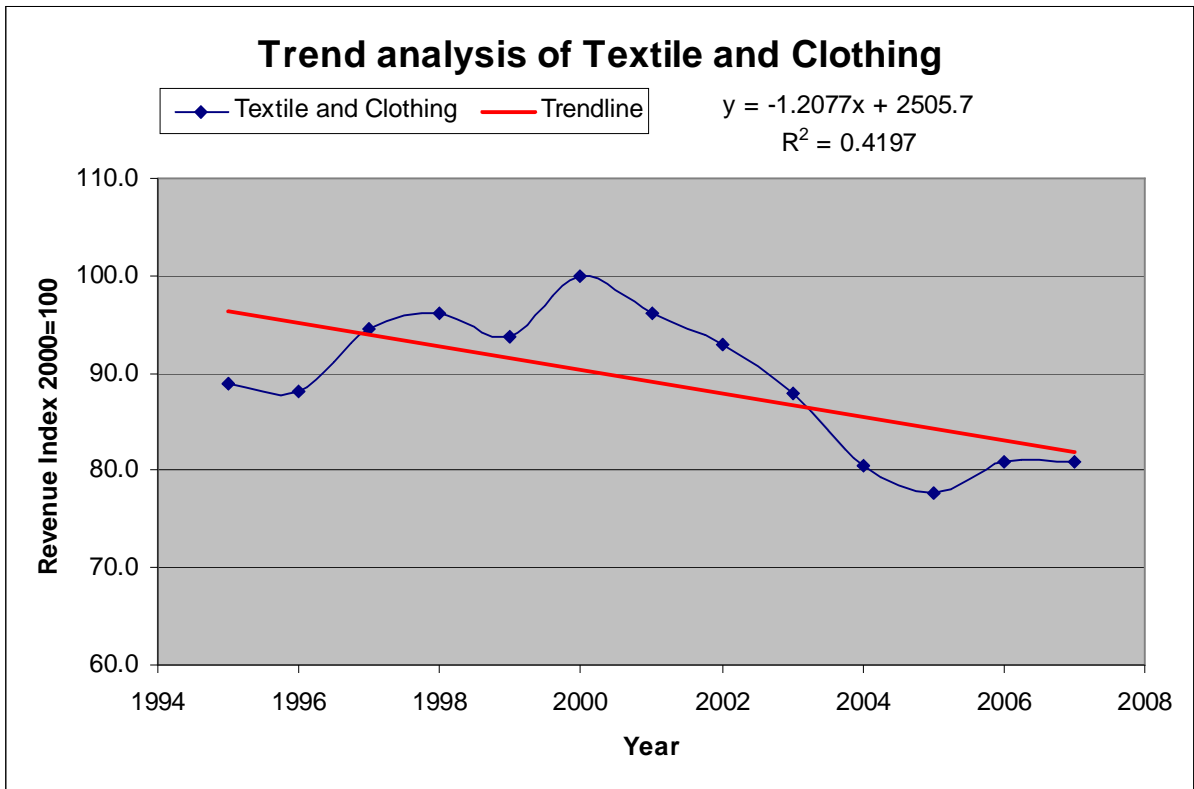
- *the omitted variable must be a determinant of the dependent variable*
- *the omitted variable must be correlated with one or more of the included independent variables*

The positive relationship between profit sharing increases and revenue volatility increases might be a sign of change in labour demand or change in productivity. The omitted variables are in this cases change in labour demand and change in productivity.

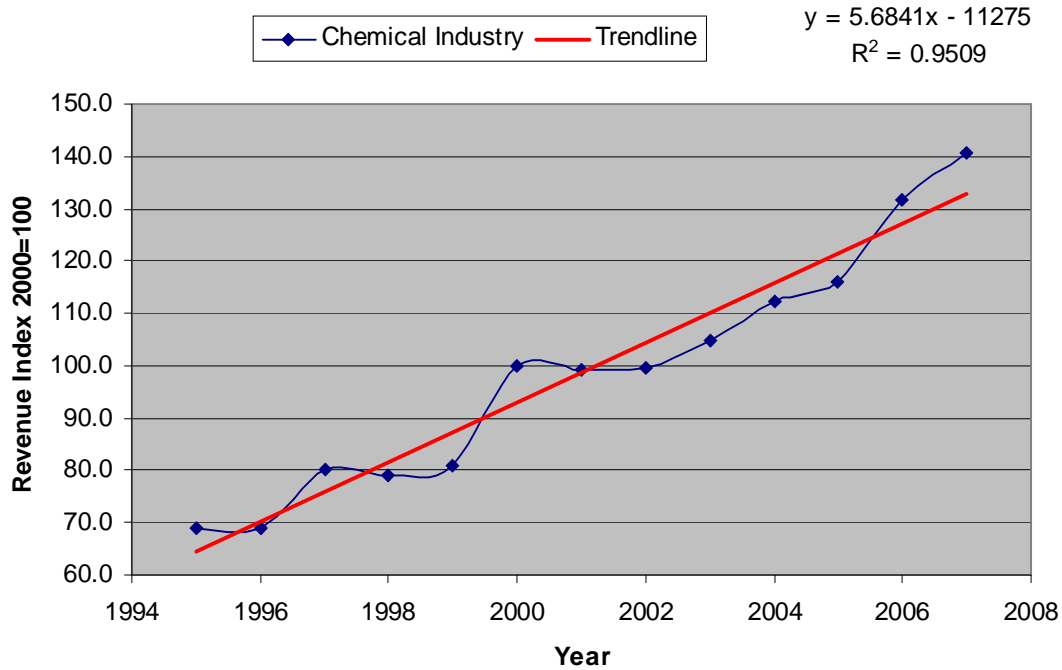
6. Appendices

6.1 Trend analysis from different sectors in The Netherlands

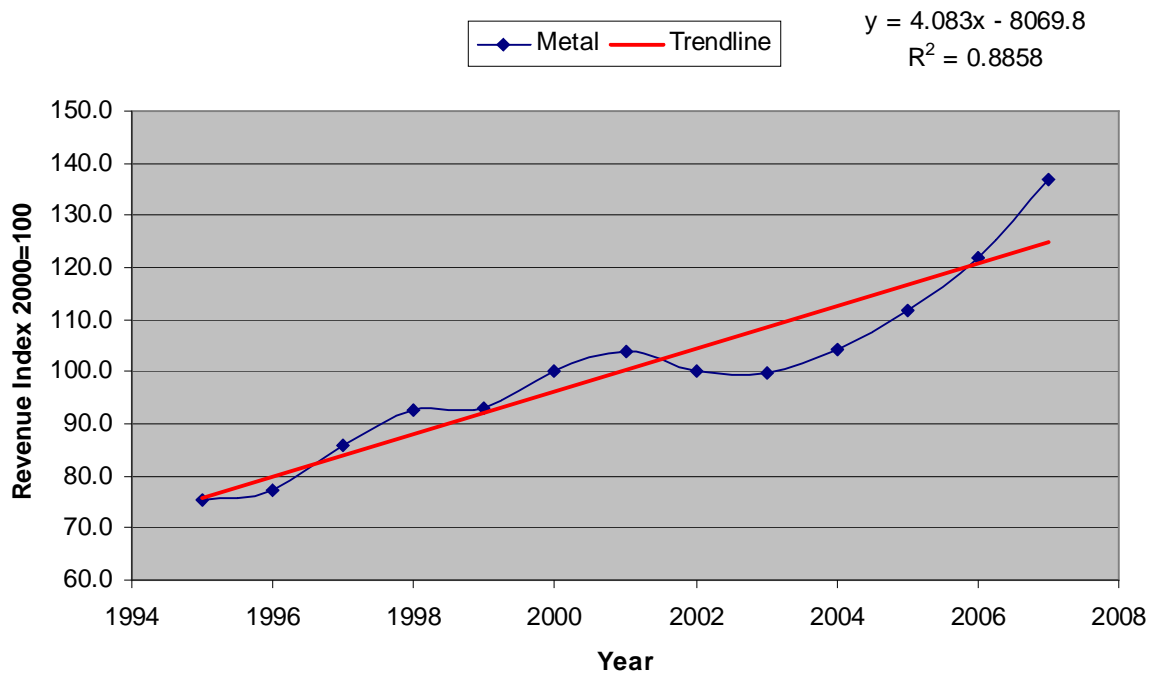


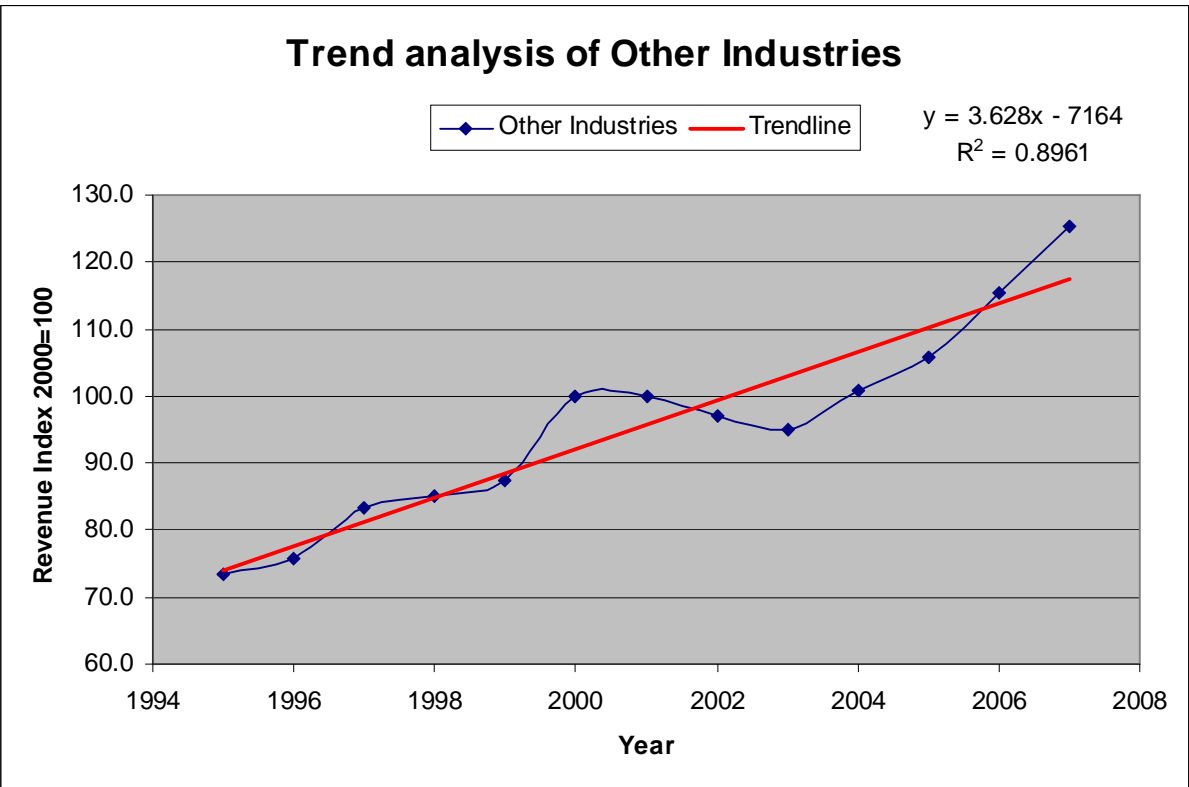
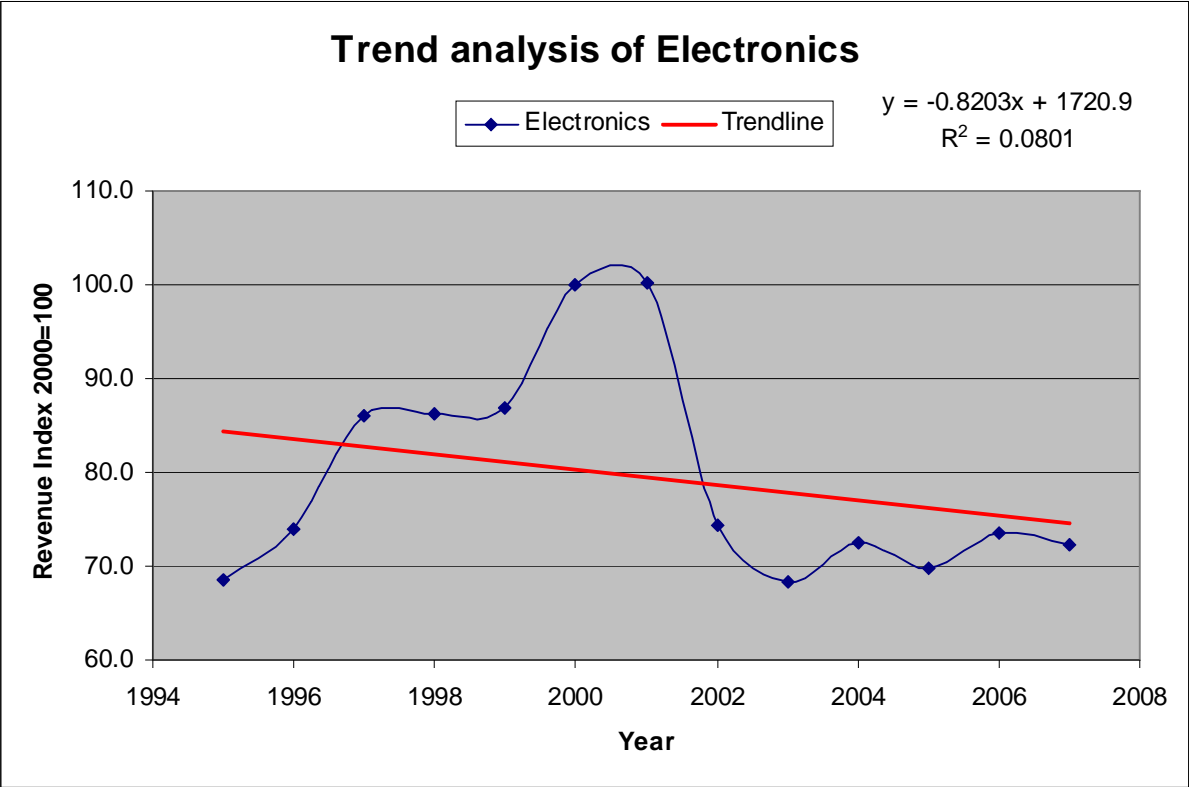


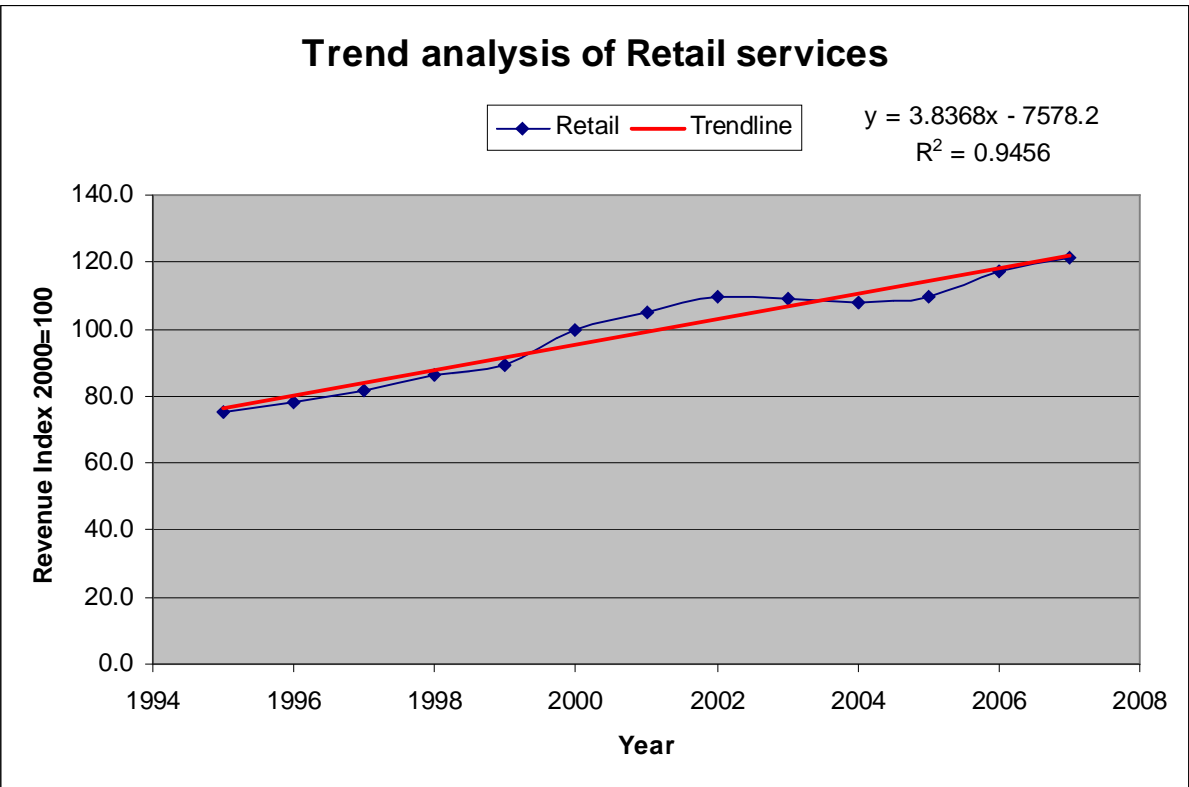
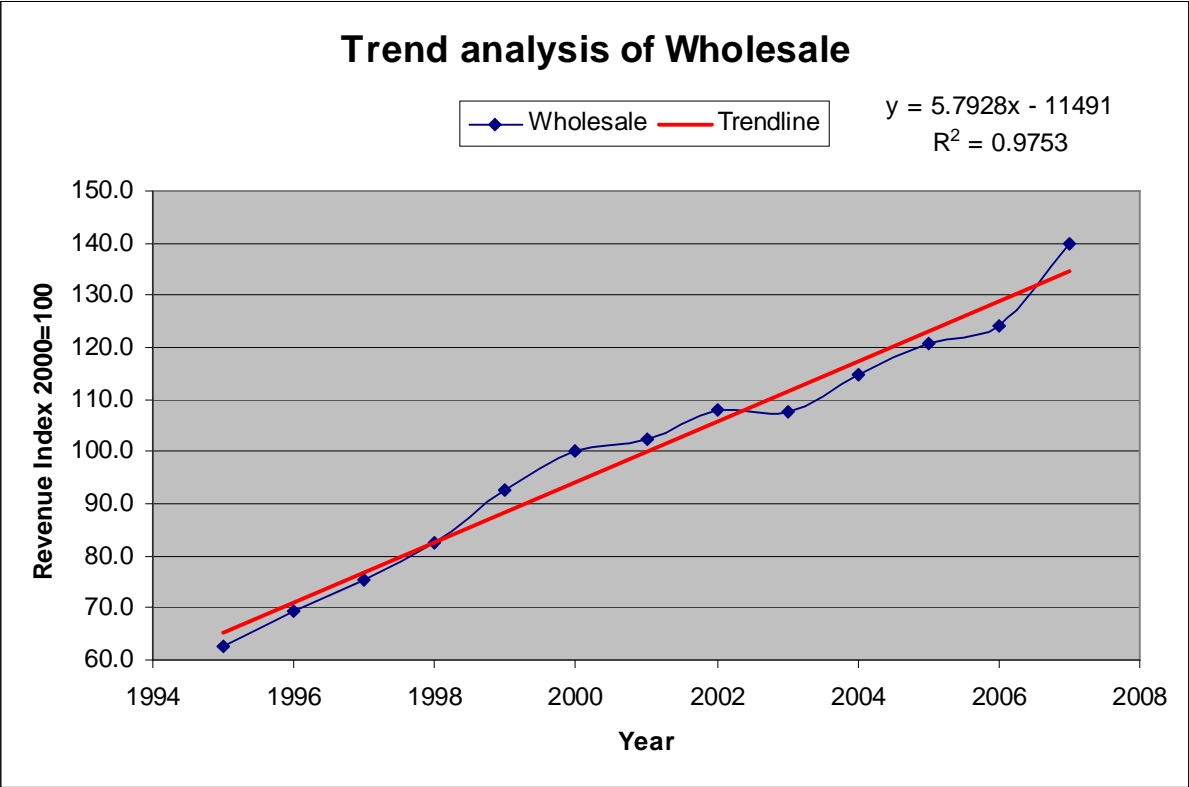
Trend analysis of Chemical Industry

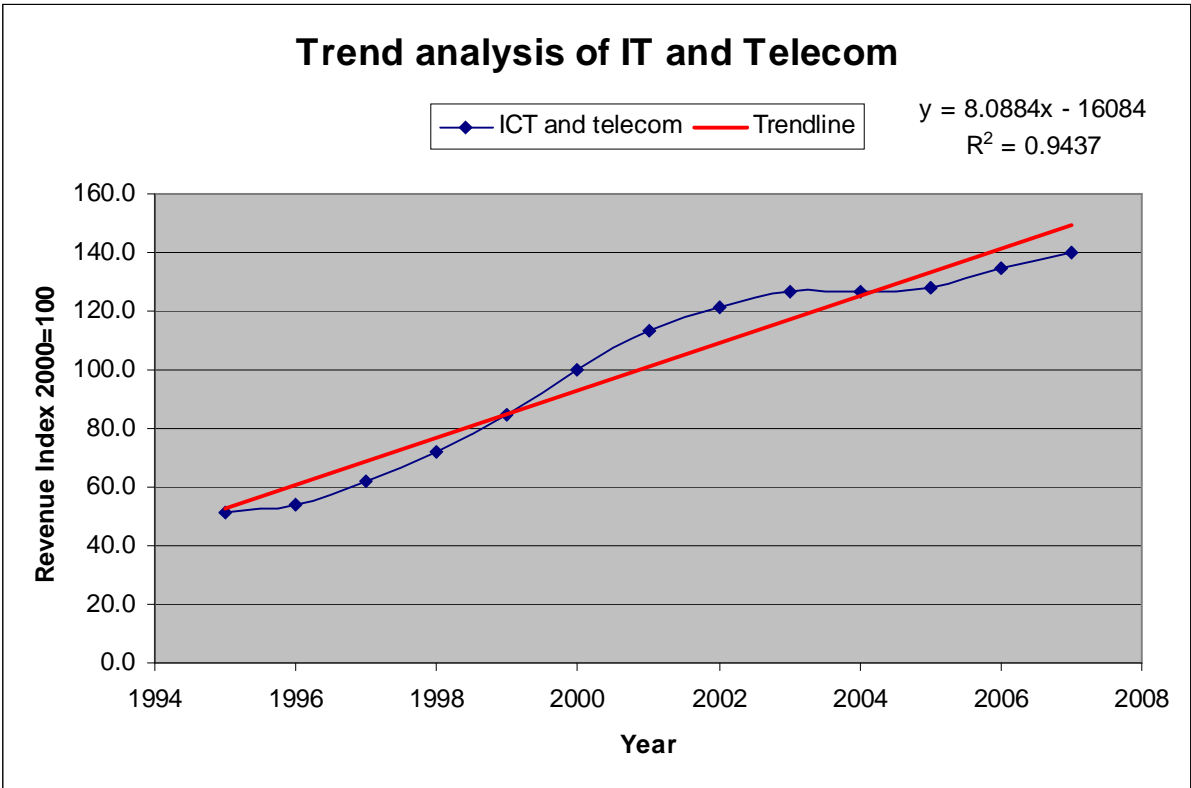
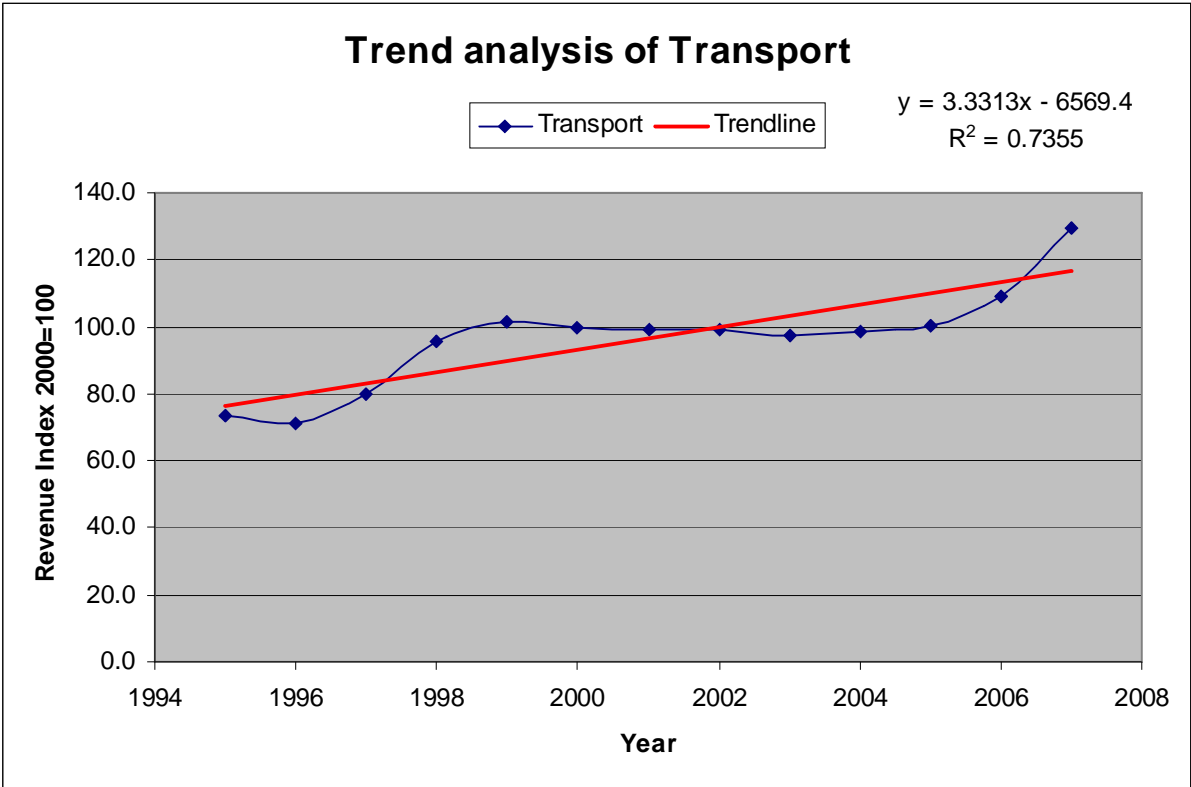


Trend analysis of Metal Industry

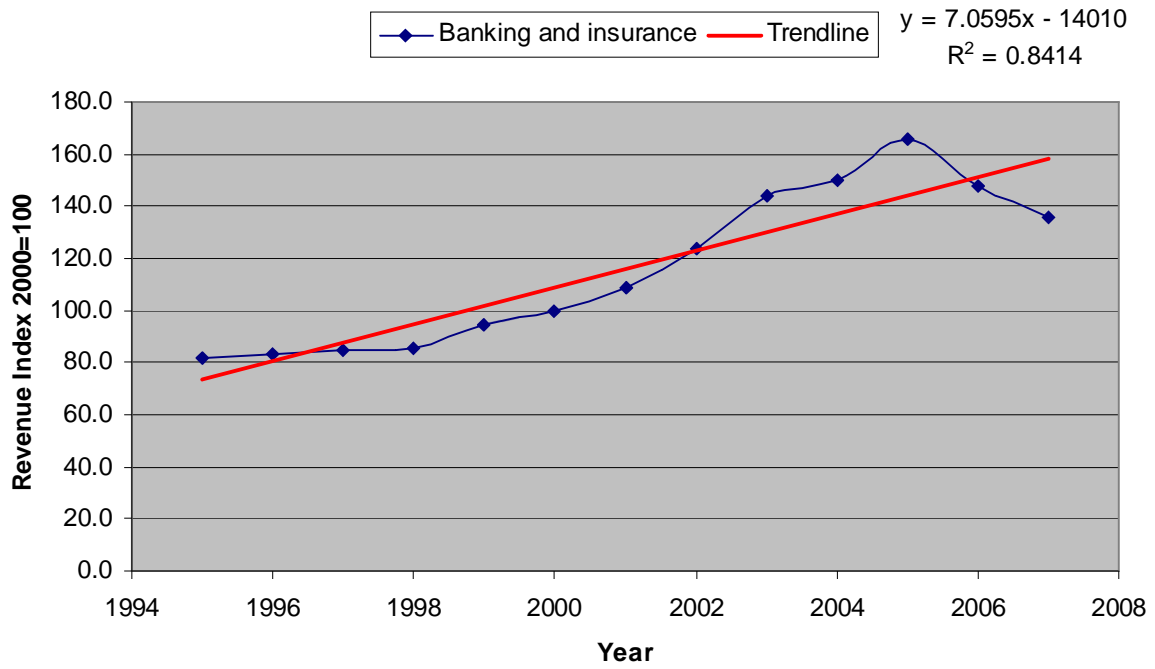




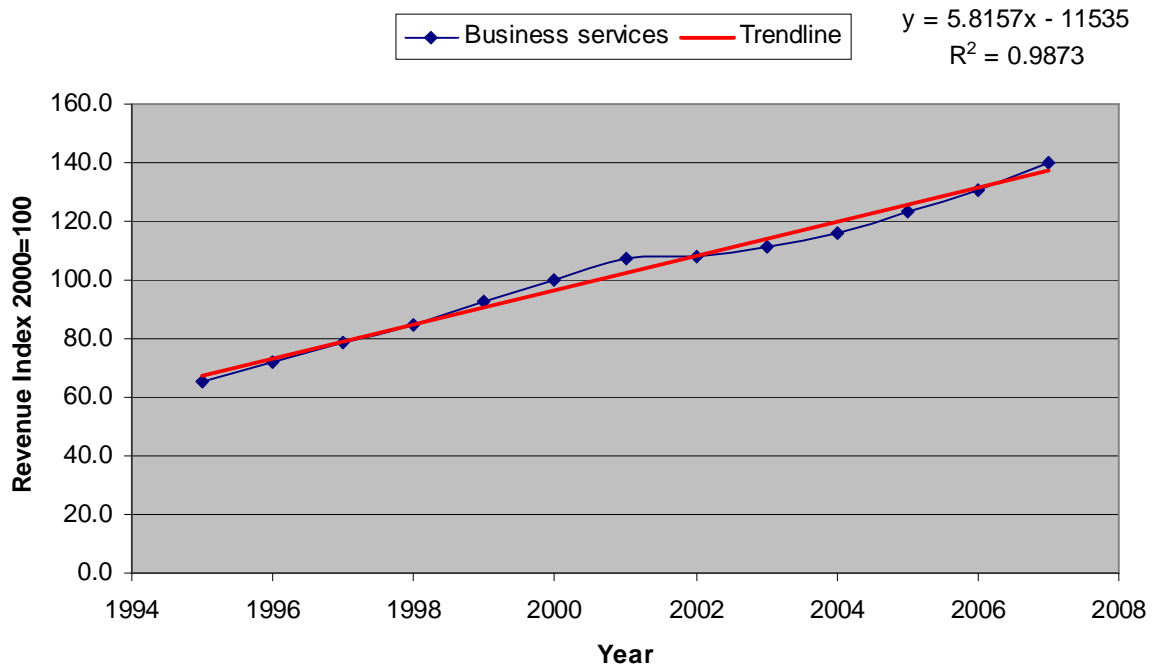




Trend analysis of Banking and Insurance



Trend analysis of Business services



6.2 Standard Deviation and Volatility

Sectors	Volatility	Standard deviation	Profit Sharing
<i>Agriculture and fisheries</i>	15.7	4.0	8
<i>Food industry</i>	11.0	3.3	13
<i>Textile and clothing</i>	28.2	5.3	9
<i>Paper</i>	13.1	3.6	9
<i>Chemical industry</i>	23.4	4.8	22
<i>Metal</i>	30.1	5.5	20
<i>Electronics</i>	108.2	10.4	20
<i>Other Industries</i>	21.4	4.6	13
<i>Whole sale</i>	12.0	3.5	12
<i>Retail services</i>	11.9	3.4	9
<i>Transport</i>	55.9	7.5	10
<i>IT and telecom</i>	54.7	7.4	20
<i>Banking and insurance</i>	131.6	11.5	27
<i>Business services</i>	6.1	2.5	14

6.3 Output Eviews Volatility

Dependent Variable: PROFIT

Method: Least Squares

Date: 01/16/09 Time: 14:56

Sample: 1995 2008

Included observations: 14

	Coefficient	Std. Error	t-Statistic	Prob.
C	10.72876	1.731314	6.196887	0.0000
Volatility	0.106626	0.032925	3.238491	0.0071
R-squared	0.466378	Mean dependent var		14.71429
Adjusted R-squared	0.421909	S.D. dependent var		5.992670
S.E. of regression	4.556363	Akaike info criterion		6.002490
Sum squared resid	249.1253	Schwarz criterion		6.093784
Log likelihood	-40.01743	Hannan-Quinn criter.		5.994039
F-statistic	10.48782	Durbin-Watson stat		1.674121
Prob(F-statistic)	0.007107			

6.4 Output Eviews Standard deviation

Dependent Variable: PROFIT

Method: Least Squares

Date: 01/16/09 Time: 15:07

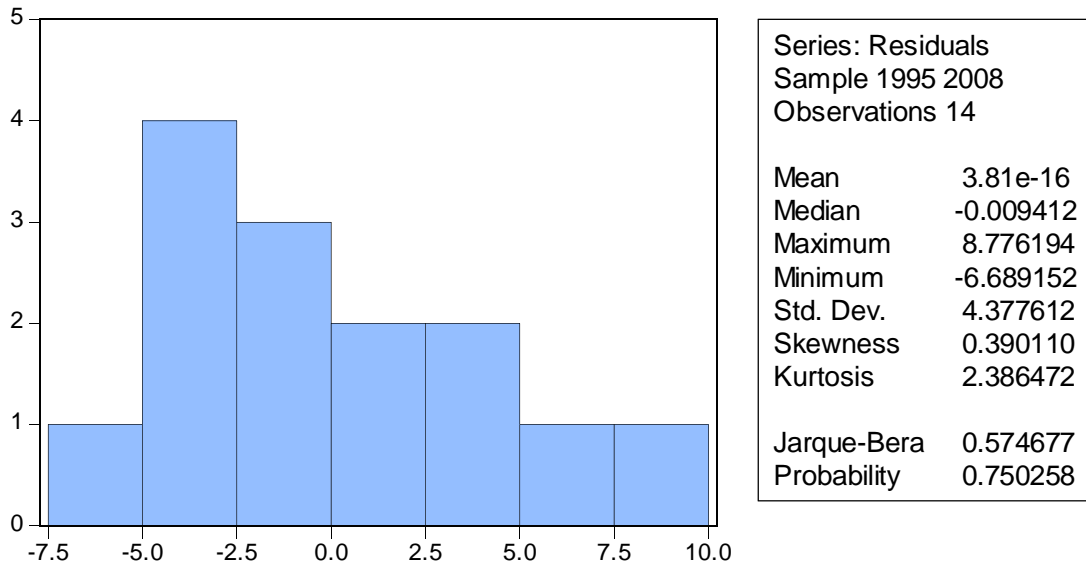
Sample: 1995 2008

Included observations: 14

	Coefficient	Std. Error	t-Statistic	Prob.
C	6.631788	2.883810	2.299662	0.0402
Standard deviation	1.463842	0.471432	3.105098	0.0091
R-squared	0.445513	Mean dependent var		14.71429
Adjusted R-squared	0.399306	S.D. dependent var		5.992670
S.E. of regression	4.644586	Akaike info criterion		6.040845
Sum squared resid	258.8661	Schwarz criterion		6.132139
Log likelihood	-40.28592	Hannan-Quinn criter.		6.032394
F-statistic	9.641632	Durbin-Watson stat		1.611738
Prob(F-statistic)	0.009103			

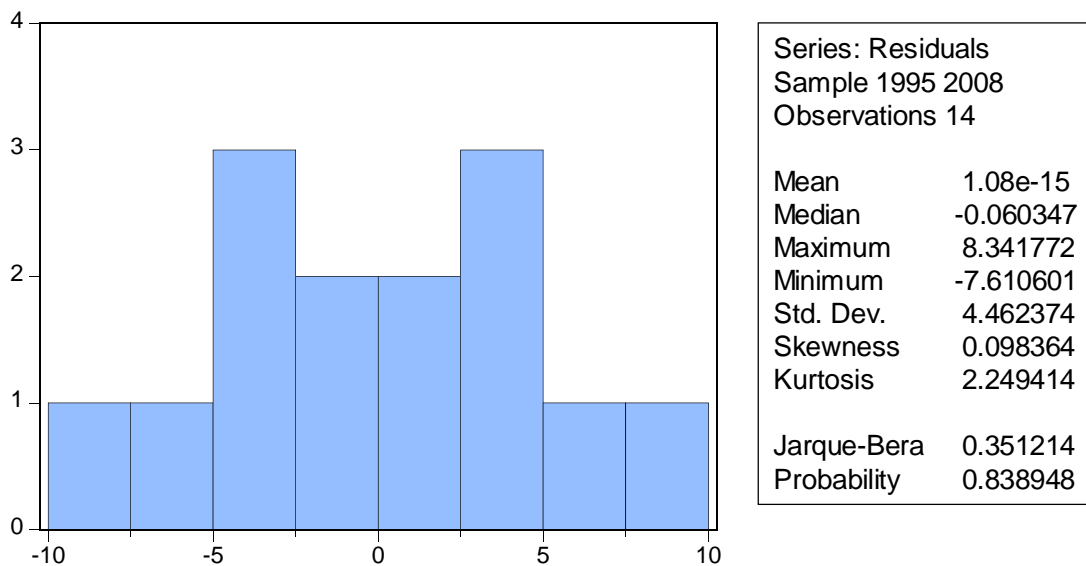
6.5 Test on Normality

Volatility



The graph shows no normal distribution between the residuals.

Standard deviation



The graph shows some normal distribution between the residuals.

6.6 Test on Misspecification

Ramsey RESET Test:

F-statistic	0.094468	Prob. F(1,11)	0.7643
Log likelihood ratio	0.119718	Prob. Chi-Square(1)	0.7293

Test Equation:

Dependent Variable: PROFIT

Method: Least Squares

Date: 03/09/09 Time: 16:03

Sample: 1995 2008

Included observations: 14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.067392	8.844140	0.912174	0.3812
VARIANCE	-0.004524	0.363249	-0.012453	0.9903
FITTED^2	0.029371	0.095561	0.307356	0.7643

R-squared	0.470922	Mean dependent var	14.71429
Adjusted R-squared	0.374725	S.D. dependent var	5.992670
S.E. of regression	4.738662	Akaike info criterion	6.136796
Sum squared resid	247.0040	Schwarz criterion	6.273737
Log likelihood	-39.95757	Hannan-Quinn criter.	6.124120
F-statistic	4.895434	Durbin-Watson stat	1.689289
Prob(F-statistic)	0.030155		

6.7 Test on hetetoskedasticity

Heteroskedasticity Test: White

F-statistic	1.317723	Prob. F(2,10)	0.3105
Obs*R-squared	2.711483	Prob. Chi-Square(2)	0.2578
Scaled explained SS	1.200984	Prob. Chi-Square(2)	0.5485

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 02/23/09 Time: 13:37

Sample: 1996 2008

Included observations: 13

	Coefficient	Std. Error	t-Statistic	Prob.
C	0.279036	13.56242	0.020574	0.9840
VARIANCE	1.023313	0.658525	1.553947	0.1512
VARIANCE^2	-0.007858	0.004849	-1.620772	0.1361
R-squared	0.208576	Mean dependent var		16.98390
Adjusted R-squared	0.050291	S.D. dependent var		21.62928
S.E. of regression	21.07839	Akaike info criterion		9.133548
Sum squared resid	4442.985	Schwarz criterion		9.263921
Log likelihood	-56.36806	Hannan-Quinn criter.		9.106750
F-statistic	1.317723	Durbin-Watson stat		2.188073
Prob(F-statistic)	0.310490			

Output controlled for Heteroskedasticity

Dependent Variable: PROFIT

Method: Least Squares

Date: 02/24/09 Time: 12:21

Sample: 1995 2008

Included observations: 14

White Heteroskedasticity-Consistent Standard Errors & Covariance

	Coefficient	Std. Error	t-Statistic	Prob.
C	10.72876	1.534036	6.993813	0.0000
Volatility	0.106626	0.020823	5.120667	0.0003
R-squared	0.466378	Mean dependent var		14.71429
Adjusted R-squared	0.421909	S.D. dependent var		5.992670
S.E. of regression	4.556363	Akaike info criterion		6.002490
Sum squared resid	249.1253	Schwarz criterion		6.093784
Log likelihood	-40.01743	Hannan-Quinn criter.		5.994039
F-statistic	10.48782	Durbin-Watson stat		1.674121
Prob(F-statistic)	0.007107			

6.8. Revenue table different sectors in The Netherlands

Revenue Index 2000=100													
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Agriculture/fisheries	97.1	95.7	107.4	97.5	93.0	100.0	103.1	97.6	101.1	95.2	96.6	104.9	103.0
<i>Expected Agri/Fish</i>	98.0	98.2	98.5	98.7	99.0	99.2	99.5	99.7	100.0	100.2	100.5	100.7	101.0
<i>Difference</i>	-0.8	-2.6	8.9	-1.2	-6.0	0.8	3.6	-2.1	1.1	-5.0	-3.9	4.2	2.1
<i>Result</i>	0.7	6.6	78.8	1.5	35.4	0.6	13.2	4.5	1.2	25.0	15.0	17.4	4.2
Food industry	85.8	88.1	94.6	96.5	95.3	100.0	106.6	107.0	105.7	106.0	104.9	110.1	121.6
<i>Expected Food</i>	87.7	90.0	92.3	94.7	97.0	99.3	101.6	103.9	106.3	108.6	110.9	113.2	115.5
<i>Difference</i>	-1.9	-1.9	2.3	1.8	-1.7	0.7	5.0	3.1	-0.6	-2.6	-6.0	-3.1	6.1
<i>Result</i>	3.6	3.7	5.1	3.4	2.8	0.5	24.8	9.4	0.3	6.7	36.0	9.7	36.7
Textile and clothing	89.0	88.2	94.6	96.2	93.8	100.0	96.2	92.9	88.0	80.4	77.6	80.9	80.8
<i>Expected Textile/Clothing</i>	96.3	95.1	93.9	92.7	91.5	90.3	89.1	87.9	86.7	85.5	84.3	83.1	81.8
<i>Difference</i>	-7.3	-6.9	0.7	3.5	2.3	9.7	7.1	5.0	1.3	-5.1	-6.7	-2.2	-1.0
<i>Result</i>	53.9	48.0	0.5	12.1	5.3	94.1	50.5	25.2	1.8	25.7	44.4	4.6	1.1
Paper	81.9	83.0	85.7	90.5	92.7	100.0	101.8	97.1	95.7	95.8	97.7	99.3	104.4
<i>Expected Paper</i>	84.9	86.5	88.0	89.6	91.1	92.7	94.3	95.8	97.4	98.9	100.5	102.0	103.6
<i>Difference</i>	-3.0	-3.5	-2.3	0.9	1.6	7.3	7.5	1.3	-1.7	-3.1	-2.8	-2.7	0.8
<i>Result</i>	9.1	12.0	5.4	0.8	2.4	53.3	56.9	1.7	2.8	9.8	7.8	7.5	0.6
Chemical industry	68.9	69.0	80.2	79.1	80.9	100.0	99.2	99.7	104.8	112.4	116.2	131.7	140.5
<i>Expected Chemicals</i>	64.8	70.5	76.1	81.8	87.5	93.2	98.9	104.6	110.3	115.9	121.6	127.3	133.0
<i>Difference</i>	4.1	-1.5	4.1	-2.7	-6.6	6.8	0.3	-4.9	-5.5	-3.5	-5.4	4.4	7.5
<i>Result</i>	17.0	2.1	16.4	7.5	43.8	46.2	0.1	23.7	29.7	12.5	29.4	19.3	56.4
Metal	75.4	77.4	85.9	92.5	93.1	100.0	103.7	100.1	99.6	104.2	111.9	121.9	136.8
<i>Expected Metal</i>	75.8	79.9	84.0	88.0	92.1	96.2	100.3	104.4	108.4	112.5	116.6	120.7	124.8
<i>Difference</i>	-0.4	-2.5	1.9	4.5	1.0	3.8	3.4	-4.3	-8.8	-8.3	-4.7	1.2	12.0
<i>Result</i>	0.1	6.1	3.8	19.9	1.0	14.4	11.7	18.2	78.3	69.4	22.2	1.4	144.5
Electronics	68.5	74.0	86.1	86.3	86.9	100.0	100.2	74.3	68.3	72.6	69.7	73.5	72.3
<i>Expected Electronics</i>	84.4	83.6	82.8	81.9	81.1	80.3	79.5	78.7	77.8	77.0	76.2	75.4	74.6
<i>Difference</i>	-15.9	-9.6	3.3	4.4	5.8	19.7	20.7	-4.4	-9.5	-4.4	-6.5	-1.9	-2.3
<i>Result</i>	252.9	91.8	11.1	19.0	33.4	388.1	429.3	19.0	91.0	19.5	42.2	3.5	5.1
Other Industries	73.4	75.7	83.2	85.1	87.3	100.0	100.1	96.9	95.0	100.7	105.9	115.5	125.3
<i>Expected Other Industries</i>	73.9	77.5	81.1	84.7	88.4	92.0	95.6	99.3	102.9	106.5	110.1	113.8	117.4
<i>Difference</i>	-0.5	-1.8	2.1	0.4	-1.1	8.0	4.5	-2.4	-7.9	-5.8	-4.2	1.7	7.9
<i>Result</i>	0.2	3.2	4.3	0.1	1.1	64.0	20.0	5.6	62.2	33.8	18.0	3.0	62.5
Whole sale	62.5	69.4	75.5	82.5	92.8	100.0	102.2	108.0	107.7	114.7	120.7	124.1	140.0
<i>Expected Wholesale</i>	65.6	71.4	77.2	83.0	88.8	94.6	100.4	106.2	112.0	117.8	123.6	129.4	135.1
<i>Difference</i>	-3.1	-2.1	-1.7	-0.5	4.0	5.4	1.8	1.8	-4.3	-3.1	-2.8	-5.3	4.9
<i>Result</i>	9.9	4.3	3.0	0.3	15.8	29.2	3.3	3.3	18.4	9.6	8.1	27.6	23.8
Retail services	75.3	78.1	81.6	86.1	89.0	100.0	105.0	109.4	108.9	108.0	109.4	117.2	121.5
<i>Expected Retail services</i>	76.2	80.1	83.9	87.7	91.6	95.4	99.2	103.1	106.9	110.7	114.6	118.4	122.3
<i>Difference</i>	-0.9	-1.9	-2.3	-1.7	-2.6	4.6	5.7	6.4	2.0	-2.8	-5.2	-1.3	-0.8
<i>Result</i>	0.8	3.8	5.2	2.8	6.6	21.2	33.0	40.5	3.8	7.7	26.7	1.6	0.6
Transport	73.3	71.3	80.1	95.4	101.4	100.0	99.4	99.0	97.7	98.8	100.1	109.0	129.3
<i>Expected Transport</i>	76.5	79.9	83.2	86.5	89.9	93.2	96.5	99.9	103.2	106.5	109.9	113.2	116.5

<i>Difference</i>	-3.2	-8.6	-3.1	8.9	11.5	6.8	2.9	-0.9	-5.5	-7.7	-9.8	-4.2	12.8
<i>Result</i>	10.5	73.5	9.6	78.5	133.0	46.2	8.2	0.7	30.2	59.7	95.2	17.5	163.4
IT and telecom	51.1	54.2	61.8	71.7	84.4	100.0	113.1	121.1	126.6	127.0	128.0	134.9	139.8
<i>Expected IT and telecom</i>	52.4	60.4	68.5	76.6	84.7	92.8	100.9	109.0	117.1	125.2	133.2	141.3	149.4
<i>Difference</i>	-1.3	-6.2	-6.7	-4.9	-0.3	7.2	12.2	12.1	9.5	1.8	-5.3	-6.4	-9.6
<i>Result</i>	1.7	38.8	45.4	24.0	0.1	51.8	148.8	145.9	90.9	3.4	27.6	41.2	91.9
Banking/ insurance	81.4	83.6	85.1	85.5	94.1	100.0	108.6	123.5	143.9	150.1	165.8	147.6	135.6
<i>Expected Banking/insur.</i>	73.7	80.8	87.8	94.9	101.9	109.0	116.1	123.1	130.2	137.2	144.3	151.4	158.4
<i>Difference</i>	7.7	2.8	-2.7	-9.4	-7.8	-9.0	-7.4	0.4	13.7	12.9	21.5	-3.8	-22.8
<i>Result</i>	59.5	8.0	7.3	88.3	60.8	81.0	55.4	0.2	188.8	166.5	461.2	14.4	519.1
Business services	65.5	72.0	78.4	84.6	92.5	100.0	107.2	108.3	111.2	115.8	123.5	130.7	139.7
<i>Expected Business ser.</i>	67.3	73.1	79.0	84.8	90.6	96.4	102.2	108.0	113.8	119.7	125.5	131.3	137.1
<i>Difference</i>	-1.8	-1.2	-0.6	-0.2	2.0	3.6	5.0	0.3	-2.6	-3.9	-1.9	-0.6	2.6
<i>Result</i>	3.2	1.3	0.3	0.0	3.9	13.0	24.9	0.1	6.8	15.1	3.8	0.3	6.6

7. References

- Alchian A.A. and Demsetz H. (1972) *“Production, Information Costs and Economic Organization”* The American Economic Review, Vol. 62, no. 5, pp 777-795, Dec 1972
- Andersen, T. G., Bollerslev, T. and Diebold, F. (2002) *“Parametric and Nonparametric Volatility Measurement”* PIER Working Paper No. 02-019.
- Bewley, T. (1998), *“Why not cut pay?”* European Economic review 42
- Cahuc P. and Dormont B. (1997) *“Profit-sharing: Does it increase productivity and employment? A theoretical model and empirical evidence on French micro data”* Labour Economics, Volume 4, issue 3 September 1997Pages 293-319
- Ciancanelli P. Gallhofer S. Haslam J. Watson R. (1997) *“Profit Related Pay and the U.K. Small Firm Labour Market”* Small Business Economics, Volume 9, Number 3, June 1997 , pp. 225-238(14) Springer
- Cox. J.C. & Sadiraj V. (2002). *“Risk Aversion and Expected Utility Theory: Coherence for Small- and Large-Stakes Gambles”*, Journal of Economic Literature, 2002
- D’Art D. and Turner T. (2003) *“Profit sharing, firm performance and union influence in selected European countries”* Emerald Personnel Review Volume 33, No.3 2004, page 335-350
- Deci, E.L. (1971) *“Effects of externally mediated rewards on intrinsic motivation”*, Journal of Personality and Social Psychology, 18, 105-115
- Deckop J.R. and Mangel R. (1999) *“Getting more than you pay for: Organizational citizenship behavior and pay-for-performance plans”* Academy of Management Journal Volume 42 Number 4, page 420-428

- Drago R. and Garvey G.T. (1998) *"Incentives for Helping on the Job: Theory and Evidence"*, Journal of Labor Economics, 1998, Vol. 16, no.1
- Eisenhardt, K.M. (1989) *"Agency Theory: An assessment and Review"*, The Academy of Management Review, Vol.14, No.1 pp. 57-74
- Erev, I., G. Bornstein, and G. Rachely, (1993). *"Constructive Intergroup Competition as a Solution to the Free Rider Problem: A Field Experiment"* Journal of Experimental Social Psychology Volume 29, issue 6, page 463-478.
- Erev, I. Ert E. and Yechiam E. (2006) *"Loss aversion, diminishing sensitivity and the effect of experience on repeated decisions"*, Technion Working Paper
- Fernie S. and Metcalf D. (1996), *"It's Not What You Pay it's the Way that You Pay it and that's What Gets Results: Jockeys' Pay and Performance"* Centre for Economic Performance, Londen School of Economics, Volume 13 issue 2 Jan 2003
- Fitzroy F.R. and Kraft K. (1987) *"Cooperation, Productivity and Profit Sharing"* The Quarterly Journal of Economics, Vol. 102, No. 1 (Feb., 1987), pp. 23-35
- Gielen, A.C. Kerkhofs, M.J.M. van Ours, J.C. (2006), *"Prestatieloon en productiviteit"*, Economische statistische berichten August 2006 373-375
- Granger, C.W.J. (1969) *"Investigating causal relations by Econometric Models and Cross-Spectral Methods"* Econometrica volume 37 page 424-438, 1969
- Greene W.H. (1993) *"Econometric Analysis"* Macmillan. pp. 245-246
- Hamilton, B., J. Nickerson, and H. Owan, (2003). *"Team Incentives and Worker Heterogeneity: An Empirical Analysis of the Impact of Teams on Productivity and Participation"* Journal of Political Economy Volume 111 issue 3, page 465-497.
- Herne, K. (1998) *"Testing the Reference-dependent Model: An experiment on Asymmetrically Dominated Reference Points"* Journal of Behavioral Decision Making, Vol. 11, 181-192 (1998)

Ho J.L.H. & Lee L.C. & Wu A. (2008) *“Risk, Employee Incentive Intensity and Firm Performance: Empirical Evidence”*

Holmstorm, B. (1979) *“Moral Hazard and Observability”* The Bell Journal of Economics, Volume 10, number 1 page 74-96

Jensen, M. (1983) *“Organization theory and methodology”*, Accounting Review 62, p 109-121

Kahn L.M. and Shere P.D.(1990), *“Contingent pay and managerial performance”*, ILR Review, Volume 43 year 1990 pages: 107-120

Kahneman, D. & Tversky A. (1991), *“Loss aversion in Riskless Choice: A Reference Dependent Model*, Quarterly Journal of Economics, CVII (1991)

Kahneman, D. & Tversky A. (1979), *“Prospect theory: An analysis of decision under risk”*, Econometrica 47, 263-291

Kahneman, D. & Tversky, A. (1982). *“On the study of statistical intuitions”* Cognition, 11, 123-141.

Kahneman, D. & Tversky, A. (1992), *“Advances in Prospect theory: Cumulative Representation of Uncertainty”* , Journal of Risk and Uncertainty, 5:297-323 (1992)

Katz, L. (1964) *“Effects of Differential Monetary Gain and Loss on Sequential Two-Choice Behavior,”* Journal of Experimental Psychology, LXVIII (1964), 245-249

Köbberling, V. Schwierien C. and Wakker P.P. (2004), *“Prospect-Theory’s Diminishing Sensitivity versus Economic’s Intrinsic Utility of Money: How the Introduction of the Euro Can Be Used to Disentangle the Two Empirically”* Department of Economics, University of Maastricht, The Netherlands March, 2004

Kramer K. (2008) *“Watson Wyatt Global 50 Remuneration Planning Report 2008”*

Kruse, D.L. (1993) “*Does Profit Sharing affect productivity?*” NBER working paper No.4542 November 1993

Kruse, D.L. (1993) “*Why do firms adopt Profit-Sharing and Employee Ownership Plans?*” British Journal of Industrial Relations December 1996 Volume 34, page 515-530

Lazear, E.P. (2000), “*Performance pay and Productivity*”, The American Economic Review, December 2000 Vol. 90, nr. 5, Page 1346-1361

Long, R.J. (2000) “*Employee profit sharing: consequences and moderators*” Industrial Relations, Vol. 55 No. 3, pp. 477-503.

Marsden D. & French S. (1998), “*What a Performance: Performance Related Pay in the Public services*”, Centre for Economic Performance, July 1998

Mc Laughlin K.J. (1994), “*Rent Sharing in an Equilibrium Model of Matching and Turnover*” Journal of Labour Economics, Volume 12, issue 4, 1994, page 499-523

McMillan J., Whalley J. and Zhu L. (1989), “*The impact of China’s Economic Reforms on Agricultural Productivity Growth*”, The Journal of Political Economy, Vol. 97, No. 4 (Augustus 1989), 781-807

Milgrom, P. and Roberts. J. (1992) “*Economics, Organization and Management*” Prentice Hall, Inc. International Editions.

Mirlees, J. (1976), “*The optimal structure of incentives and authority within an organization*”, Bell Journal of Economics, vol. 7, pp. 105-131.

Nicolau, J.L. (2008), “*Testing reference dependence, loss aversion and diminishing sensitivity in Spanish tourism*”, Investigaciones Economicas: Vol. XXXII (2), 231-255

Perrow, C. (1986) “*Complex organizations*” New York: Random House

Pfeffer, J. (1998), "*Six Dangerous Myths About Pay*", Harvard Business Review May-June 1998, Reprint 98309

Piekkola H. (2005), "*Performance Related Pay and Firm Performance in Finland*", International Journal of Manpower, July 2005

Pindyck, R.S. and Rubinfeld D.L. (1997) "*Econometric Models and Economic Forecasts*" Irwin McGraw-Hill fourth edition

Pouliakas, K. & Theodossiou I. (2004), "*Confronting Objections to Performance Pay: A Study of the Impact of Individual and Gain-sharing Incentives on the Job Satisfaction of British Employees*", MPRA Paper, No. 1629, May 2004

Prendergast, C. (1999). "*The Provision of Incentives in Firms*" Journal of Economic Literature (March): 7-63.

Prendergast, C. (1999), "*The Provision of Incentives in Firms*", Journal of Economic Literature, 1999, 37(1), Page: 7-63.

Prendergast, C. (2000). "*What Trade-off of Risk and Incentives*". The American Economic Review 90(2): 421-425.

Prendergast, C. (2002). "*Uncertainty and Incentives*" Journal of Labor Economics Volume 20, issue 2, Page 115-137.

Prendergast, C. (2002) "*The Tenuous Trade-off between Risk and Incentive*". Journal of Political Economy 5: 1071-1102

Procter S.J. , McArdle L. , Rowlinson M. , Forrester P. and Hassard J. (2007) "*Performance Related Pay in Operation: A case study from the Electronics Industry*" Human Resource Management Journal Volume 3 Issue 4 page 60-74

Silva S. (1998), "*Performance Related and Skill-based Pay: An Introduction*", International Labor Office Geneva, August 1998

Tabachnick, B. G., & Fidell, L. S. (1989). *“Using multivariate statistics”* (2nd. ed.). Cambridge, MA: Harper & Row.

Tijdens, K. and van Klaveren M. (2008) *“Flexibele beloning in Nederland”*. Loonwijzer 2008

Thaler, R. (1985) *“Mental accounting and consumer choice”*, Marketing science Vol. 4, No. 3, Summer 1985 Printed in U.S.A.

Thaler R.H., Tversky A., Kahneman D. And Schwartz A. (1992) *“The effect on myopia and loss aversion on risk taking: an experimental test”* The Quarterly Journal of Economics, May 1997, Vol. 112, No. 2, Pages 647-661

Van Elsdingen, J. (2009) *“Survey: Executive pay in the Netherlands”*, Mercer Consulting

Data collection

CBS (Statistics Netherlands), Productiegegevens Nijverheid (exclusief bouwnijverheid) 1995-2007 (*Voedingsindustrie, Chemische industrie, Textiel en Kledingindustrie, Papier industrie, Metaalindustrie, Elektrische apparaten industrie, Transportmiddelen industrie,*)

CBS (Statistics Netherlands) Bedrijfsleven; arbeids- en financiële gegevens, per branche, 1995-2007 (*Detailhandel, Groothandel en handelsbemiddeling, Telecommunicatiebedrijven, Computerservice en informatie technologie, Zakelijke dienstverlening*)

CBS (Statistics Netherlands), Productie verbruik en inkomensvorming 1990-2007 (*Landbouw, bosbouw en visserij*)

De Nederlandsche Bank, Monetaire en Financiële statistische tijdsreeksen Bank en Verzekeringswezen 1995-2007

Loonwijzer (Wage Indicator) enquête 2007/Q4 en 2008/Q1 from the FNV Bondgenoten in the Netherlands