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# The Planned Retirement Age of Self-Employed and Employees

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# THE PLANNED RETIREMENT AGE OF SELF-EMPLOYED AND EMPLOYEES

*A research on the relationship between working conditions and the planned retirement age of self-employed and employees*

Master Thesis Public Administration: Economics and Governance

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## Abstract

Self-employed are becoming an essential part of the Dutch labour market. Nowadays, one out of ten workers is self-employed and the expectation is that this ratio will increase. Many self-employed do not accumulate supplementary pensions, while they prefer to have a happy old age like employees. The share of self-employed in the Dutch labour force has increased faster than the average in the European Union in the last decade. As a result, consequences for the labour market, taxes, and social security systems in the Netherlands may be greater than in other European countries.

This research addresses the question to what extent the planned retirement age of self-employed and employees is affected by working conditions. Data from 2015 of the Study on Transitions in Employment, Ability and Motivation of Dutch Research Institute TNO is used to present an understanding in the relationship between working conditions and the planned retirement age. The research group consists of 562 self-employed without employees and 7,754 employees, from 45 to 70 years old. First, the question that is addressed is whether the planned retirement age of self-employed and employees differ. Second, the question that is addressed is whether these differences are due to the working conditions of self-employed and employees. Three regression analyses are conducted: a multiple regression analysis for employees, a multiple regression analysis for self-employed, and a multiple regression analysis with interaction terms. Furthermore, an Oaxaca decomposition is established to explain whether the differences in the average planned retirement age of self-employed and employees are due to differences in the mean values of the working conditions, or due to differences in the effects of the working conditions.

The main conclusion of this research is that working conditions to a certain extent are associated with the planned retirement age of self-employed and employees. The research shows that there are actual differences in the planned retirement age of self-employed and employees. Also, the working conditions partly differ between self-employed and employees. Especially financial support shows a statistically significant difference in the effect on the planned retirement age of self-employed and employees. The negative effect of a good salary on the planned retirement age of self-employed is greater than the negative effect of a good salary on the planned retirement age of employees. The better their financial support, the earlier self-employed plan to retire. This research is an important addition to previous studies and shows the importance of research on self-employment. The research contributes to the debate of the adequacy of the retirement accumulation of self-employed and a future-proof pension system for self-employed and employees.

## Preface

This Master thesis is the end of a very educational and challenging year. Together with by Bachelor of Science, Public Administration (track: Economics, Governance and Management), the Master Public Administration (track: Economics and Governance) is the closing of my study time in Leiden and The Hague, where I not only learned the in's and out's of Public Administration and Economics, but I also developed myself as a critical and socially responsible professional with an analytical skill-set to address policy problems.

First, I would like to thank Swenneke van den Heuvel for the opportunity to work with the STREAM Data of Dutch Research Institute TNO. The ability to work at TNO and brainstorm on the empirical part of this research has contributed to this result. Her knowledge and enthusiasm, motivated me to complete this research. Second, I would like to thank my supervisor, Marike Knoef, for her guidance during my research. Marike challenged me to improve this research and her expertise on the subject was very useful. Our meetings were always helpful and thanks to the detailed feedback and comments, this thesis has become a piece that I am proud of. Overall, I am very pleased with the end result. For almost four months I have been writing on this research with pleasure.

I hope you enjoy your reading,

Sandra van de Meerakker

# 1. Introduction

*1.1 The topic*

Self-employed are an important part of the labour force in the Netherlands. The number of self-employed has grown in the last ten years (Bekker and Posthumus, 2010: 2). The number of self-employed as a percentage of the working population increased from 8 percent in 2003 to over 12 percent in 2015 (Statistics Netherlands, in Dutch: Centraal Bureau voor de Statistiek, CBS, 2017). Furthermore, the growth rate of self-employed in the last ten years in the Netherlands is twice as high as for example in Germany, which is close to the European Union average (Kösters and Souren, 2014: 247). In the Netherlands, self-employed are less protected against risks of unemployment, sickness, and disability than employees (Netherlands Bureau for Economic Policy Analysis, in Dutch: Centraal Planbureau, CPB, 2016: 5). Therefore, the large increase in the number of self-employed might have more impact on labour relations, taxation, and social security systems in the Netherlands than in other European countries. This is an important subject to debate in the public domain (Kösters and Souren, 2014: 247).

As anyone who lives in the Netherlands, self-employed are entitled to state pension when they reach the statutory retirement age (in Dutch: Algemene Ouderdomswet, AOW). About 90 percent of the employees accumulate supplementary pension entitlements facilitated by their employer, in addition to their state pension. Self-employed are personally responsible for the accumulation of their supplementary pension. However, many self-employed hardly accumulate supplementary pension (Dekker and Kösters, 2011: 258). Most self-employed find it important to save for their retirement, but their plans are difficult to achieve. Also, often self-employed face higher mortgage costs after retirement, due to higher outstanding debt and the loss of mortgage interest deduction (Mastrogiacomo, 2016: 3). In addition, Mastrogiacomo (2016: 3) argues that in many cases self-employed do not have substantially more private capital than employees with a comparable income. In contrast, Knoef et al. (2017: 50) show that on average self-employed accumulate more capital than employees. In particular, the entrepreneurial capacity and the net home value contribute significantly to the higher capital of self-employed (Knoef et al., 2017: 50). Yet, income inequality among self-employed is high, and in all cases the high pension risks of self-employed are emphasised, because self-employed accumulate less or no supplementary pension and self-employed often have a relatively low replacement rate (Knoef et al., 2017: 73). Altogether, these aspects show several difficulties of the pension system in the Netherlands for self-employed.

Another issue that is often mentioned in the debate about self-employment is the statutory retirement age. Since 2013, the statutory retirement age in the Netherlands increased. By 2021, the retirement age will be 67 years. Thereafter, the retirement age will be linked to the average life expectancy (Rijksoverheid, 2017a). With this policy change, conceivable problems might occur in groups where the insurance rate is low. Early retirement for self-employed seems to be impossible, because they often have barely supplementary pension. While many self-employed like to have a happy old age like employees, many self-employed accumulate little supplementary pension. In this context, there are some initiatives for a collective pension system for self-employed. On the one hand, self-employed would benefit from the advantages of a second pillar, but on the other hand compulsory options for self-employed are less obvious (Goudswaard, 2013: 70). Compulsory options for self-employed are in conflict with current policies assuming own responsibility, the preferences for voluntary participation, and freedom of choice for self-employed. Prior to this debate, it is important to look at the retirement preferences of self-employed and employees, to see whether this debate is even relevant.

Evidently, in order to capture the effects of the ageing population, it is important that more elderly people work longer, both self-employed and employees. Therefore, it is important to understand the retirement decisions of self-employed and employees. According to Beiro (2016: 259), a researcher at the CBS, self-employed want to work for almost four years longer than employees. In the Netherlands, the Labour Conditions Act (in Dutch: Arbowet) contains rules for employees and employers to promote health, safety, and welfare. There are occupational health and safety obligations that apply to both self-employed and employees, though there are also occupational health and safety obligations that do not apply to self-employed (Van Greuningen et al., 2012: 6). Hereby, research shows that self-employed in the construction sector encounter more physical stress than employees (Social and Economic Council, in Dutch: Sociaal-Economische Raad, SER, 2011: 19). When self-employed and employees experience different labour conditions, this might influence their planned retirement age. To provide more understanding in the difference between the planned retirement age of self-employed and employees, this research focuses on the effect of working conditions. This research adds important lessons regarding retirement of self-employed and employees, and the adequacy of the retirement accumulation of self-employed.

Data from the Study on Transitions in Employment, Ability and Motivation ("STREAM") of Dutch Research Institute TNO is used to present an understanding in the relationship of working conditions of self-employed and employees and their planned

retirement age. This research argues from a deductive approach. Data collection is used to evaluate hypotheses related to existing theory. The measurement is quantitative; multiple regression analyses are performed to estimate the relationship between the variables. Eventually, this research will give understandings for future policy and contributions to future policy.

### *1.2 Research question*

The goal of this research is to contribute to the on-going debate of self-employment and to provide more clarity about the differences between self-employed and employees and their retirement decisions. The theoretical part of this research focuses on the Dutch pension system and retirement decisions in general. The empirical part of this research focuses on working conditions and the planned retirement age of self-employed and employees. Therefore, the research question is:

*"To what extent do working conditions affect the planned retirement age of self-employed and employees?"*

### *1.3 Academic and practical relevance*

As described, the increase in the number of self-employed is an important subject to debate in the public domain. Nevertheless, actual policy changes for self-employed regarding pension and retirement have not been addressed, because it seems difficult to identify what is really needed. This research provides an understanding of the retirement decisions of self-employed and employees, and contributes to the discussion of the adequacy of the pension system for self-employed. Previous studies did not succeeded in a comprehensive understanding of the relationship between working conditions and the planned retirement age of self-employed and employees, although the importance is mentioned. For example, studies have shown that stressful working conditions with heavy workloads are related to an earlier planned retirement age (Herzog, House, and Morgan, 1991; Lin and Hsieh, 2001; Van Dam, Van der Vorst and Van der Heijden, 2009: 270). However, the assumed differences between self-employed and employees are not elaborated.

Previous Cabinet Rutte II refrained from the difficult issues regarding self-employed. Experts made a comparison with the mortgage issues. There were no politicians for years that took action, while it was clear that something had to change. Dutch economist and director of the CPB, Laura van Geest, says Cabinet Rutte II made it possible to reduce differences in

treatment of employees and self-employed (ZZP Nieuws, 2016). An official working group has recently analysed the causes and consequences of the emergence of self-employed in the Netherlands. The result of this interdepartmental policy research (in Dutch: Interdepartementaal Beleidsonderzoek, IBO) is a comprehensive report, which describes the complexity of the policy issues raised by the emergence of self-employed. They did not fully succeed in delivering a full report, because of the complexity and versatility of the subject (Rijksoverheid, 2015: 3). Therefore, it is interesting to focus on a specific aspect of the differences between self-employed and employees, namely the working conditions and the planned retirement age.

The aim of this research is to contribute to the debate regarding self-employment. The practical relevance is the added value to this debate. Whereas self-employed are an important part of the labour force in the Netherlands, this research is necessary to assess the implications for the entire labour market. In addition, this research is important when introducing a flexible retirement age, suggested by some political parties in the Netherlands. A flexible retirement age makes it possible to personally decide when to start receiving state pension. Consequently, the amount of the benefit changes. A flexible retirement age makes early retirement for self-employed possible. The academic relevance is the addition to existing scientific literature. So far, studies on the relationship between working conditions and the planned retirement age have not made a distinction between self-employed and employees.

### *1.4 Reading guide*

This research is outlined in a logical academic manner. Chapter two provides background information on characteristics and definitions of self-employed, the pension system in the Netherlands (Pay-As-You-Go pensions and funded pensions), the policy changes of the statutory retirement age in the Netherlands, and the subject in a historical and international perspective. Chapter three provides the theoretical framework. First, the theoretical ideas of the pension system are described. Second, the factors that affect retirement decisions of self-employed and employees are considered. Third, the working conditions and differences between self-employed and employees are discussed. Fourth, the hypotheses are established. Chapter four consists of the research design and data collection including the methodology, a description of the dataset, an operationalization of the dependent, independent, and control variables, and the descriptive statistics. Chapter five contains the regression analyses and empirical results. Finally, a conclusion (chapter six) and discussion (chapter seven) are drawn.

## 2. Background information

This chapter provides background information on the topic. First, the characteristics and definitions of self-employed are described. Second, the pension system in the Netherlands is discussed to see the advantages and disadvantages, and differences for self-employed and employees. Third, the increase of the statutory retirement age in the Netherlands is outlined, to consider the implications for self-employed and employees. Fourth, the topic is placed in a historical and international perspective to see whether the Netherlands is a special case or corresponds to other countries.

### *2.1 Self-employed versus employees*

Self-employed are a very heterogeneous labour market category (Van Stel, Wennekers and Scholman, 2014: 4). Before starting a research about self-employed, an important concern is the demarcation of the group. Therefore, it is important to outline the characteristics of self-employed and decide which definition is maintained in the research.

#### *2.1.1 Characteristics of self-employed*

The Dutch government distinguishes between 'classic' self-employed and 'new' self-employed. The new self-employed fit the image of a flexible economy and flexible labour. The classic self-employed, such as a baker or greengrocer, mainly sells products. The new self-employed primarily provides labour or services. This includes people who can be flexible hired to do work that would otherwise be done by an employee (Rijksoverheid, 2015: 11). The recent growth of self-employed in the Netherlands is mainly due to the growth of these new self-employed. The new self-employed are 77 percent of the total self-employed (Rijksoverheid, 2015: 12). Though, it should not be forgotten that the distinction between products and services is becoming harder to make, thereby the distinction between classic and new self-employed is somewhat short-sighted. However, this first division is important to consider when analysing self-employed.

The increase of self-employed in general is associated with several developments, for example structural changes in the economy and the emergence of new services. Changes in companies themselves, such as flexible production and their consequences on main activities also play an important role. Furthermore, recent developments in government based on liberalization and flexibility were an incentive for the growth of self-employed. For example, as of July 1, 2015, the Work and Security Act (in Dutch: Wet Werk en Zekerheid) ensures that people with temporary contracts and flex workers get more rights and dismissal rights

become more fair. The self-employed landscape fits the trend towards liberalization and flexibility. Labour becomes more flexible and more companies outsource activities more frequently, which provides opportunities for self-employed. Furthermore, the consumer demands are increasingly subject to change. Also, many people have the desire to be flexible to cope with labour and people want more freedom. Self-employment therefore offers more possibilities than a salaried job as employee (Pleijster and Van der Valk, 2007: 18).

The growth of self-employment should not only be considered form the incentives for choosing an individual to be self-employed, but also from the working demand of the industry to self-employed, because there are also people forced to work as self-employed. Furthermore, there are financial indictors and other interests that may affect the choice of self-employed or which encourages employers to the employment relationship of a self-employed relationship (Pleijster and Van der Valk, 2007: 24).

The number of self-employed without employees on the Dutch labour market increased the last ten years with almost 50 percent, while the number of employees stayed stable and the number of self-employed with employees slightly decreased. Also, during the crisis when employment was decreasing, the number of self-employed without employees increased (Rijksoverheid, 2015: 1). Self-employed are frequently men and better educated than employees. Among the self-employed 64 percent is male and 36 percent is female. Among employees the proportion of men and women is 53 percent men and 47 percent women (CBS, 2014: 10).

The average gross personal income of all self-employed in 2012 was nearly 39 thousand euros (CBS, 2014: 8). The gross personal income includes income from labour, income from own company, income insurance benefits, and social security benefits. The average gross personal income of self-employed is slightly higher than the average gross personal income of employees, which was nearly 37 thousand euros in 2012 (CBS, 2014: 8). Yet, the income security for employees is higher than for self-employed. Also, according to Parker (2004: 18), in most countries the incomes of the self-employed are more unequal than employees' are.

### *2.1.2 Definitions of self-employed*

Self-employed are not always commonly defined. Usually self-employed are defined as individuals who earn no wages, but obtain their income through own expense and risk to pursue trade or a profession (CBS, 2014: 4). Often the definition of self-employed gives a distinction between 'self-employed employers' (self-employed with employees) and 'own

account workers' (self-employed without employees) (Parker, 2004: 6). According to Parker (2004: 6), there are several issues in defining self-employed and measuring the number of self-employed. First, in most countries (for example UK and USA) 'owners of incorporated businesses' are defined as employees, despite the fact that they act like a self-employed and work for their own expense and risk (Parker, 2004: 6). Second, in many surveys used in empirical research, the self-employment status is answered by the respondent him- or herself (Parker, 2004: 6). This leads to differences in the classification of self-employed. Third, there is a 'grey area' between employment and self-employment. For example, bogus self-employment (in Dutch: schijnzelfstandigen), family workers, but also franchise holders with little control over the business that must conform to the franchisor (Parker, 2004: 7 and CBS, 2014: 4).

The International Labour Organization (ILO) has published a standard for defining labour market status, called the 'International Classification by Status in Employment' (ICSE). However, not all countries adopt this standard and therefore it is hard to compare self-employment between countries. The ILO defines self-employment jobs as "those jobs where the remuneration is directly dependent upon the profits (or the potential for profits) derived from the goods or services produced (where own consumption is considered to be part of the profits)" (ILO, 2017). Different types of self-employment jobs are distinguished. The self-employed group consists of self-employed with employees, self-employed without employees, member of producers' cooperatives, and contributing family workers. So, self-employed are defined here as individuals operating individual enterprises, employing others or not, and individuals working in household enterprises. The self-employed without employees are becoming a more important group of the labour force, when more and more workers are not pursuing their profession as an employee, but as own boss (Kösters, 2009: 7). Therefore, self-employed without employees are seen as a particular category (Kösters, 2009: 7).

So, defining the self-employed is a complex task. However, it is a necessary task to do in research regarding the self-employed. Important to keep in mind is the distinction between self-employed with and without employees as well as the new and classic self-employed. Also, the unequal income distribution of self-employed should be considered. As described in the interdepartmental policy research (Rijksoverheid, 2015: 3), the self-employed group is very broadly based, with a wide range of activities and professions, and with large differences in income from those activities. In the empirical part of this research only the self-employed without employees are considered, because in the research group this appears to be the largest

group. Therefore, a more specific statement can be made about the self-employed group. The distinction between new and classic self-employed has not been made in the research, however it is important to keep in mind that the increase of self-employment in the Netherlands is due to the increase of the new self-employed. Therefore, the research group in this research probably consists of more new self-employed.

### *2.2 The pension system in the Netherlands*

In this section the pension system in the Netherlands is described to zoom in on the differences between self-employed and employees. The Netherlands is frequently recognized as having one of the world's top ranking pension systems. This high ranking is due to the diversity of the Dutch pension system's funding sources, its accuracy in measuring costs and contributions to ensure fair distribution, and its strong regulation by the Dutch Central Bank (in Dutch: De Nederlandse Bank, DNB) and the Dutch Authority for the Financial Markets (in Dutch: Autoriteit Financiële Markten, AFM). But also because of the high participation rate and adequacy. This high participation threatens to reduce, when the group of self-employed is increasing. Therefore, analysing the Dutch pension system in this research is important. The Dutch pension system consists of three pillars: state pension, supplementary pension from the employer, and additional individual pension schemes.

The rules for pensions are listed in the Pensions Act (in Dutch: Pensioenwet). This law regulates the duties and responsibilities of pension funds, employers, and employees. The Dutch Central Bank and the Netherlands Authority for Financial Markets take care of monitoring. The Dutch pension system is quite unique. The system is characterized by the collectiveness, risk-sharing, and efficient implementation (Rijksoverheid, 2017b).

#### *2.2.1 Pay-As-You-Go pensions*

The first pillar is state pension. This is a basic income to make ends meet. Anyone who lives in the Netherlands automatically accumulates state pension. The amount of the pension is adjusted annually to the development of the minimum wage. In the Netherlands, the first pillar is regulated by a Pay-As-You-Go system. PAYG pensions, facilitated by the state, are paid out of current contributions. This means that the working population pays the state pension for the elderly. The charges are levied through premiums on wages or benefits. PAYG pensions are based on the fact that the state can accumulate assets in anticipation of future pension claims, but can also tax the working population to pay the pensions of the retired generation (Barr, 2012: 155). Pensioners do not pay state pension contributions. In

addition, the state pays a part of the state pension from the tax revenues. Thus, indirectly everyone, workers and pensioners, contribute to the rising state pension spending (Dutch Pension Fund Organisations, in Dutch: Vereniging van Bedrijfspensioenfondsen en Stichting voor Ondernemingspensioenfondsen, 2015: 9).

#### *2.2.2 Funded pensions*

The second pillar is supplementary pension from the employer. Usually employers pay about 2/3 of the total pension contributions and employees pay 1/3. Pension funds invest the premiums to pay off later supplementary pension. Therefore, this pillar is regulated by a funded pension system. Pensions are paid out of a fund accumulated over a period of time from contributions by participants (Barr, 2012: 155). Funding is a method of accumulating financial assets, which are exchanged at some later date. Also, the third pillar is regulated by a funded pension system. The third pillar consists of additional individual products. For example, annuities and life insurance (Rijksoverheid, 2017b). This saves people tax incentives for additional retirement, for example to supplement an inadequate pension or earlier retirement. There are several options specifically for self-employed, which are voluntary arrangements in the third pillar. This is a choice of the self-employed.

For the purpose of this research it is important to keep in mind that there are important differences in the pension provision of self-employed and employees. In the theoretical part of this research, the consequences of the pension system are considered further as well as the associated retirement decisions.

### *2.3 The statutory retirement age in the Netherlands*

The long-run fiscal pressure on social security is partly due to the substantial increase in life expectancy (Rosen and Gayer, 2010: 249). By living longer, people have more years of retirement. In comparison to many other countries, the Netherlands is relatively well prepared to deal with the issue of an ageing population as it incorporates different models of pension funding with a policy of solidarity and risk-sharing.

Since the introduction of a state pension for all elderly in 1956, life expectancy increased by five years (CBS, 2016). Together with decreased fertility rates, the working population of the Netherlands is declining relative to the elderly. In short, this means that fewer workers are bearing the costs to finance the state pension's benefits for the elderly. As a solution to these demographic changes, people must work longer to maintain a sustainable

state pension system. By raising the retirement age, state pension in the Netherlands will be affordable and can be guaranteed to future generations.

To maintain retirement income adequacy without endangering financial sustainability, a large majority of countries are forced to reduce the generosity of their pension systems and to increase the general awareness of pension risks and individual responsibility. Most European countries are already increasing the statutory retirement age or will do so in the coming years (European Commission, 2012: 10). In the Netherlands the retirement age is raised since 2013. The impact of this policy change on self-employed differs from the impact on employees. For healthy people with a well-paid job, working longer remains partially without engagement. However, for self-employed who do not save extra pension or are low insured, working longer is a must and they might have no other option.

### *2.4 Historical and international perspective*

The number of self-employed in the Netherlands is increasing more in comparison to other European countries. Self-employed across Europe have traditionally reported higher levels of job satisfaction than employees, because of the greater autonomy and flexibility of 'being your own boss' (Hatfield, 2015: 2). However, also in other countries, self-employed have little resource to basic employment rights, such as paid sick leave, holiday and maternity leave, which means that self-employed can easily find themselves financially unstable and/or vulnerable (Hatfield, 2015: 2).

Greece, Italy, Poland and Spain traditionally have a high proportion of self-employed, due to the extent of agricultural, service-based, and informal work in these countries. Self-employment can also represent a way out of unemployment in countries with poor labour market conditions (European Employment Observatory Review, EEOR, 2010: 11). Norway, Estonia, Demark, and Sweden have the lowest proportion of self-employed. Packard et al. (2012) suggest that countries with more active labour market policies have a lower occurrence of informal work, which may be one of the reasons why self-employment is lower in northern and western European countries. The UK, the Netherlands and Ireland are the only north and western European economies above the European average, with self-employment rates of around 14 to 15 percent (Hatfield, 2015: 8).

Since the recession, the self-employment rate steadily increased in the Netherlands and the UK. This growth has not been replicated across Europe. Many countries have seen little change in the relative share of the self-employed in the labour force, while some countries have seen a decline in the proportion of self-employed (Hatfield, 2015: 9).

The self-employment rate of older workers is higher than for other age groups. Older workers tend to have more experience and higher levels of human capital, as well as larger capital reserves and better access to capital to start a business (Hatfield, 2015: 13). Older workers with a weak labour market position are also relatively often self-employed (Been and Knoef, 2016: 492). Also, in all European countries self-employed are less likely to have made contributions to a private pension scheme. In Europe, in 2010, only 21 percent had done so, compared to 50 percent of employees (Hatfield, 2015: 14).

Across Europe, self-employment is a significant source of jobs, both for those who struggle to access employee jobs, as well as those requiring a greater degree of control over when and where they work. Self-employment is identified as one of the key drivers of economic growth. However, the living standards of self-employed appear to have fallen further than for employees (Hatfield, 2015: 33).

Ending this chapter, it seems that the Netherlands is a quite a unique case regarding self-employment. Therefore, this research only applies to the Netherlands. Historically there have been large changes in the number of self-employed. Therefore, in the empirical part of this research, most recent data is used which is from 2015.

# 3. Theoretical framework

In this chapter the theoretical framework is outlined. In section 3.1 the consequences of the pension system in the Netherlands are considered to analyse the differences between self-employed and employees. Adverse selection and moral hazard are the main reasons why there is government intervention for employees. The question is whether the government should also intervene for self-employed. In section 3.2 the retirement decisions are evaluated to see whether there are differences between self-employed and employees. In section 3.3 the working conditions of self-employed and employees are analysed by deliberating several studies. At the end of this chapter, the hypotheses are established which will be tested in the empirical part.

## *3.1 Consequences of the pension system*

Before analysing the retirement decisions of self-employed and employees, the pension system in the Netherlands is further deliberated in order to form good basis for the line of argumentation. When linking working conditions and the planned retirement age, the system behind this has to be reflected. Social security in the Netherlands is based on social insurances and social services. Social insurances include state pension. The main principle of the system is that all members of society must be able to play an equally active role in society. However, as described, self-employed are not required to be insured against sickness, unemployment, and disability like employees. Therefore, this equally active role can be questioned. For the aim of this research it is necessary to analyse the consequences of the system, because afterwards the differences between self-employed and employees can be better understood.

Furthermore, the social system in the Netherlands is strongly influenced by social and economic trends. The aging of the population and the consequences thereof for the system are very important matters. The aging leads to substantial cost increases in the pension system. Recent developments of economic independence, individualism, the flexibility of the labour market, and thereby the rise of self-employment, have implications for the future of the system.

### *3.1.1 Government intervention and market failures*

As described, the state provides social insurance. The state provides protection and attention to groups who cannot provide their own needs temporarily or permanently (Institute for Social Research, in Dutch: Sociaal en Cultureel Planbureau, SCP, 2005). In addition, people seek to maximize their well-being not at a single point in time, but ideally throughout their

lives. Someone who saves does so not because extra consumption today has no value, but because he or she values extra consumption in the future more highly than extra consumption today. Pension enables a person to transfer consumption from productive middle years to retired years, allowing to choose the preferred time path of consumption over working and retired life (Barr, 2012: 152).

In a world of certainty, individuals save during their working life to finance their retirement. However, people do not know how long they are going to live. Thus a pension based on individual saving faces the person with the risk of outliving those savings (Barr, 2012: 153). Though, the life expectancy of a large group of people is better known. Therefore, people could agree to pool their pension savings, with each individual drawing a pension based on (a) the total amount he or she had contributed to the pool and (b) the group's life expectancy. This is the essence of pensions, whereby an individual exchanges his or her pension accumulation at retirement for regular payments for the rest of his or her life (Barr, 2012: 153).

In an ideal world where nobody is poor on a lifetime basis, these objectives could be achieved by voluntary decisions and private insurance. According to Barr (2012: 153), there are two reasons why government involvement is necessary:

1. The simple models ignore market failures, and thus assume away the problems that government intervention is designed to address.
2. Public policy generally has objectives additional to improving consumption smoothing and insurance, for example poverty relief and redistribution.

Two forms of market failure situations caused by asymmetric information are adverse selection and moral hazard. Adverse selection is a situation in which an individual who is a poor risk can conceal this fact from the insurance company. Therefore, the purchaser of insurance may knows better than the supplier that he or she is a poor risk, and may conceal this fact in order to choose a policy that would not be offered if the insurer were perfectly informed (Barr, 2012: 153). Moral hazard is a situation in which an insured person can affect the insurance company's liability without its knowledge. Moral hazard is not per se a problem so long as individuals can influence the probability of the insured loss only at cost to themselves greater than the expected gain from so doing (Barr, 2012: 153).

In addition to these market failures, the SCP (2005) describes other reasons why the government should intervene. The paternalism and justice motive shows that the government wants to protect people from limited rational behaviour. In practice, people do not always

think and act rationally. Self-employed may act irrational, because of the choice to assure themselves whether or not to periods of unemployment, disability, or retirement (CPB, 2015: 11). Bad risks will not be insured without government intervention or only at high costs. That could be seen as unfair and therefore a reason for government intervention. However, the SCP (2005) mentions that intervention from this paternalistic view is at the expense of freedom of choice. Therefore, there is a trade-off between freedom of choice and protection (Rijksoverheid, 2015: 66). This trade-off is most relevant for the self-employed. Freedom of choice is one of the key drivers for people to become self-employed (besides forced self-employment). Because of this, the government does not intervene for self-employed.

### *3.1.2 Consequences for self-employed*

As described, self-employed largely have to take care of their own supplementary retirement. According to Mastrogiacomo (2016: 7), when it comes to the amount of the pension and the desired retirement date, self-employed more or less have the same aspirations as employees. However, comparing self-employed and employees shows that self-employed are not saving enough in the second pillar to achieve their expected replacement rate (Mastrogiacomo, 2016: 17). According to Mastrogiacomo (2016: 17), self-employed permanently seem to postpone their desired retirement savings and this indicates market failure. Furthermore, self-employed can postpone their retirement, but not the term of their mortgage. The costs of future debts make increasing awareness of this problem urgent (Mastrogiacomo, 2016: 17).

Adverse selection and moral hazard problems are applicable to the entire market for social insurance, as well as limited rational behaviour, and difficult insurable risks. However, this does not follow that the government must engage in a similar manner for the self-employed and employees. Again, the trade-off between protection and freedom of choice is different for self-employed and employees. On average, self-employed have less risk aversion (Brown et al., 2011: 425), so they benefit less on average of insurances and have a greater aversion to compulsory insurance. From a welfare point of view it can therefore be optimally that the government is cautious towards compulsory insurance for self-employed. The option to make retirement savings compulsory for self-employed is regularly on the political agenda, and the counterargument that often appears is that self-employed should be allowed to save freely (Mastrogiacomo and Alessie, 2015: 2). This argument may be less important now that the group of self-employed is growing, transitions occur between working as a self-employed and as an employee, and also the distinction between subgroups of self-employed workers is smaller (Rijksoverheid, 2015: 66).

The smaller risk aversion of self-employed also has other consequences. Self-employed often build equity in their company, although this is not the case for self-employed that mainly offer their own labour. In addition, self-employed often have to deal with fluctuating income and the need to invest in equipment (Rijksoverheid, 2015: 69). Current policy is based on a hard cut between self-employed and employees, while both groups are becoming more heterogeneous (Rijksoverheid, 2015: 75). This is an important consideration to acknowledge.

*3.2 Retirement decisions*

Often the life-cycle model is taken as a theoretical point of departure to determine the adequacy of retirement and retirement decisions. According to the life-cycle model, it is optimal to save such that the marginal utility of consumption is the same throughout life (Knoef et al., 2015: 12). This corresponds to the previous mentioned consumption smoothing as a purpose of pensions. The life-cycle model seeks to explain saving behaviour of a consumer by pointing at the fact that consumers normally prefer a more stable development in consumption than is feasible. The assumption of this model is that all individuals choose to maintain stable lifestyles and all individuals are able to make rational decisions in developing a lifetime plan for consumption and saving (Ang, 2009: 1349). However, as described before this is not always the case.

Various definitions of retirement have been used by economist and other social scientists, including: self-reported retirement; termination of work or looking for work; termination of full-time work; working less than a given number of hours; and leaving the main profession (Montalto et al., 2001: 5). Studies on retirement behaviour indicated that the labour supply decision of elderly workers is best represented by a dynamic process in which traditional explanatory variables, such as earnings, benefits, pensions, and health conditions, play an important role. Incentives for retirement vary between ages, depending on the structure of social insurance, pension provisions, and health insurance (Heyma, 2004: 739 and Boskin, 1975: 8).

Taylor and Shore (1995) examined the influence of a selected subset of variables on the retirement decisions. A comprehensive model of retirement behaviour that incorporated personal factors and environmental forces was also developed by Beehr (1986). The personal factors related to retirement include health and economic well-being, whereas environmental factors include two categories of work-related (e.g., job characteristics) and non-work factors (e.g., leisure interests). Beehr (1986) proposed that each of these factors might function as a "push" on the worker to leave the labour force or a "pull" to keep the worker in the labour

force. Thus, retirement should not be considered as a purely voluntary decision, because it is influenced by practical constraints (Taylor and Shore, 1995: 76).

However, the theoretical basis for understanding the retirement-planning process is limited (Taylor and Shore, 1995: 82). Retirement is a process that occurs over a period of time. Both individual characteristics and factors in the individual's environment influence the decision to retire (Beehr, 1986: 50).

### *3.2.1 Differences self-employed and employees*

Lazear (2005: 649) describes that there are several choices to become self-employed. Those people who have varied work and educational backgrounds are much more likely to start their own businesses than those who have focused on one role at work or are concentrated in one subject at school (Lazear, 2005: 649). Most of the studies on self-employment and entrepreneurship have been empirical, but it is useful to have theory to guide the empirics and to assist in interpretation of the results (Lazear, 2005: 650). Lazear uses a coherent model of the choice between self-employment and paid employment (Wagner, 2006: 2415). According to Lazear (2005: 649), this choice is driven by the broadness of skills. All-including education and experience should be more common among self-employed, whereas employees need more specific skill profiles.

Parker and Rougier (2007: 697) analysed the retirement behaviour of older self-employed. Self-employed face different institutional restrictions on retirement and possibly also different incentives to retire (Parker and Rougier, 2007: 697). Their research finds few significant determinants of self-employed retirement behaviour. Higher earnings around retirement decrease the probability of retirement, while age increases it (Parker and Rougier, 2007: 711). In comparison to retirement behaviour of employees, poor health, and gender turned out to be statistically insignificant for self-employed retirement behaviour (Parker and Rougier, 2007: 711). In addition, Quinn (1980, 17) argues that retirement decisions of self-employed are distinct from those of employees, because self-employed nearing the retirement age are less likely to leave the labour force because of lower benefits and higher social insurance contributions.

According to Montalto et al. (2000: 1), the planned retirement age increases substantially as people get older, and increases somewhat with higher noninvestment income. "Social security reform should recognize that the capacity to continue working and the ability to afford to retire both influence the age at which people plan to retire". Like Montalto et al. (2001: 3), the analysis in this research focuses on the planned retirement age of pre-retired

workers (ex-ante), instead of the observed age of retirement among retirees (ex post). A currently employed individual choosing a planned retirement age must consider whether resources will be adequate, whether working will be possible, and also his or her individual preferences for leisure (Montalto et al., 2001: 5). Related empirical research focuses on several determinants of the planned retirement age: personal and financial characteristics, local labour market conditions, attributes of the individual's job, health status, and current eligibility for social security. The results consistently confirm that higher earning power reduces the probability of retirement, while eligibility for and higher levels of retirement benefits, and higher financial wealth increase the probability of retirement.

According to Heyma (2004: 755) elderly employees retire early because of five main reasons: attractive retirement programmes that combine high replacement rates with more leisure time, early opportunities to use these programmes, high preferences for retirement, a layoff risk that rises with age, and health conditions that force people to retire. Each of these reasons by itself is important for retirement behaviour, but they are also strongly interrelated. However, recently early retirement is becoming less attractive. Therefore, these five reasons should be partially rejected in this research.

In addition, individuals have different preferences for leisure, different earnings capacities, different wealth, and therefore different preferences for the age of retirement (Van Vuuren, 2014: 576). All the discussed points agree well with the model of retirement planning advanced by Hershey (2004). This theory suggests there exists four major different sets of influences on retirement behaviour: (a) psychological influences (e.g., cognitive, personality, and motivational forces), (b) task characteristics (e.g., complexity, prior task experience, and physical tasks), (c) the cultural ethos (e.g., societal forces that shape the thoughts, attitudes, and perceptions of the individual), and (d) financial resources and economic forces (e.g., household income and general economic climate). Taken together, these factors are suggested to influence not only the intention to plan, but also the quality of individuals' planning efforts (Hershey et al., 2007: 27).

### *3.3 Working conditions*

The factors of retirement behaviour are largely in line with the so-called working conditions. Working conditions include the physical, social, and psychological climate in which one works. The 'Arbowet' is a Dutch law, which contains rules for employers and workers to promote health, safety, and welfare. The aim is to prevent accidents and diseases caused by work. There are occupational health and safety obligations that apply to both self-employed

and employees, though there are also occupational health and safety obligations that do not apply to self-employed. Several aspects of work perception have been thoroughly investigated as possible contributors to the intention and decision to leave work early (Van Greuningen et al., 2012: 6).

The Dutch government is well aware that the choice of self-employment means that these self-employed bear responsibility of the associated risks. However, the government feels that the self-employed in the context of health and safety must also be protected against serious risks and need to avoid danger to others. So, for the self-employed there are a number of occupational health and safety rules to ensure their own safety and that of others. Since July 2012, the Occupational Health and Safety Obligations for self-employed with employees changed. Until then only rules for serious risk and danger to others were applied, but in this new situation all the rules for self-employed are required to prevent and reduce occupational risks. This has the greatest result that self-employed receive the same protection as employees when they are at the same workplace. However, for self-employed without employees, the rules remain unchanged. In the new health and safety legislation for the self-employed, introduced in 2012, a distinction is made based on whether self-employed are working under hierarchical authority of a client or customer and whether there are other people working in the same location. The SER (2011: 21) in that time therefore recommended: working conditions, protection, and safety at the workplace must be equal for all who work (employers, employees and self-employed).

Though, among self-employed and employees there is a clear difference in workings hours. Self-employed indicate they want to work more hours than employees and do so. On average, they work 6 more hours per week, and also more often outside office hours (at night and on weekends). In addition, self-employed work more at home than employees. This is partly explained by the fact that self-employed are more likely than employees to have no fixed workplace or in their situation the separation between work and home is difficult, such as self-employed in agriculture (Ministry of Social Affairs and Employment, in Dutch: Ministerie van Sociale Zaken en Werkgelegenheid, 2016: 28).

Furthermore, research shows that self-employed in the construction sector experience more physical stress than employees. This is based presumably on the assumption that self-employed may also be treated differently than employees. This is due to the ignorance (or lack of awareness) of occupational health regulations. If a self-employed is really self-acting, the health and safety inspection could at best point to the risks and give information in unsavoury situations, because enforcement is often difficult (SER, 2011: 19).

According to Dal Bianco et al. (2015: 18), early exits from the labour market are more frequently observed among employees who have physically demanding or monotonous and repetitive jobs. Furthermore, poor quality of work is often associated with an increase in the intention to leave, as well as a decrease in performance and motivation (Dal Bianco et al., 2015: 18). There is also evidence that low autonomy jobs are associated with early retirement.

As described, there are similarities between the determinants of the planned retirement age and the working conditions. Therefore, it is appropriate to assume that the working conditions are associated with the planned retirement age. However, there is no consensus in the differences between self-employed and employees. So, this will be further analysed in the empirical part of this research.

### *3.4 Conceptualization and hypotheses*

Retirement has been defined in various ways by different researchers, largely depending on the research questions being addressed and the researcher's disciplinary background. Most often retirement is defined as an individual's exit from the labour force. The first question that has to be analysed is whether the planned retirement age of self-employed and employees differ (e.g., observed characteristics). After that the analyses will show whether this is because of the effect of working conditions (e.g., conditional characteristics).

As described, retirement may not be a purely voluntary decision, because is it influenced by practical factors. Theory used to link workers' productivity, job characteristics, health status, and subjective life expectancy to their retirement decisions. Furthermore, determinants that are mostly linked to retirement decisions in the literature are: employment status (wage, part-time, unemployment, characteristics of the workplace), financial situation (including household income, assets, home ownership, wealth, windfall effects, number of persons in the household), experience (current work, professional background, former entrepreneurship experience), minority behaviour, immigrant behaviour, family firm effects, and attitudinal effects (past failures, relatives with experience, confidence, knowing other entrepreneurs, opportunity perception) (Grilo and Thurik, 2008: 1121). Assuming that these are the most important determinants of the planned retirement age, the question is which of the determinants has got the most impact. In this research, the working conditions are distinguished into four categories: physical load, psychological load, social support, and financial support.

Physical load includes an excessive burden of posture and movement (e.g. lifting, pushing, unfavourable posture, repetitive movements or activities that require a lot of energy

from muscle groups or circulation, respiratory or metabolism). It is expected that physical load is negatively related to the planned retirement age, because higher exposure to physical load will lead to not willing and being able to work longer. Although, the government is trying to make working conditions for all people equal, it seems that self-employed still work longer, heavier and more irregularly. Their physical load is expected to be higher. Therefore, it is expected that physical load and the planned retirement age of self-employed are stronger negatively related than the planned retirement age of employees.

Psychological load includes mental stress, heavy job demands, job control, and high working pressure. It is expected that psychological load is negatively related to the planned retirement age, because higher exposure to psychological load will lead to not willing and being able to work longer. As stated before, self-employed are working more hours than employees, however self-employed can decide where and when they work. So, on the one hand self-employed might experience less psychological load. On the other hand, self-employed might experience more mental stress in finding work and keep working. Therefore, the empirical analyses have to indicate whether the expected negative effect is stronger for self-employed or employees.

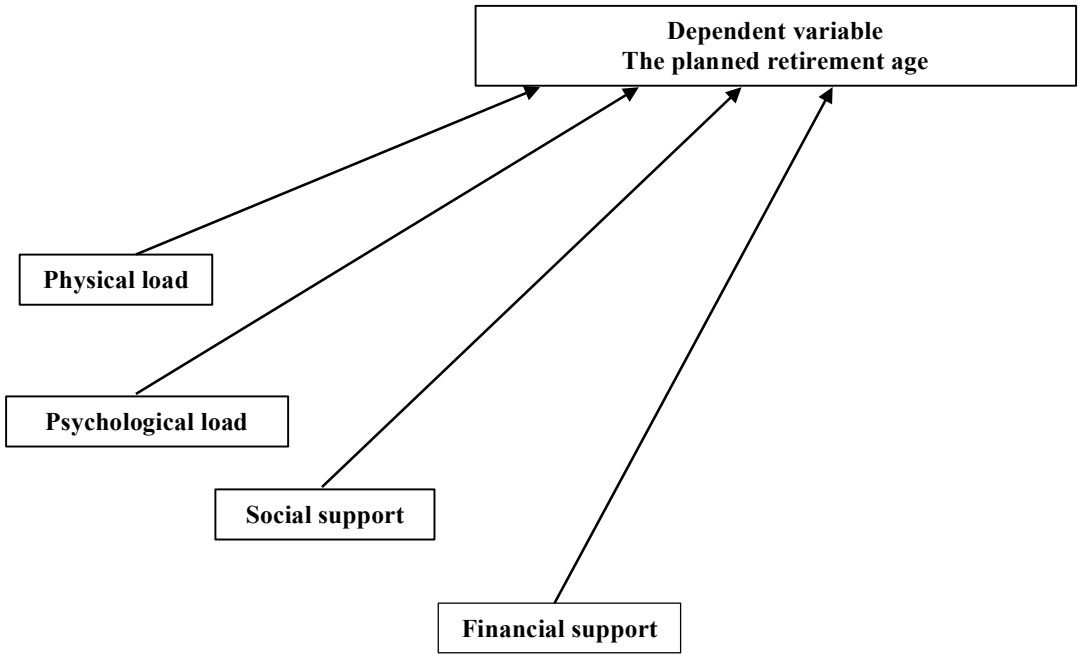
Social support includes help and support from colleagues in the workplace. It is expected that social support is positively related to the planned retirement age, because higher exposure to social support will lead to willing and being able to work longer. People will have more motivation, because of these social circumstances. However, self-employed without employees might experience less social contact with others. For this reason, it is expected that social support and the planned retirement age of employees are stronger positively related than the planned retirement age of self-employed.

Financial support during working life includes a good salary, the contribution to the household income and the financial situation of the household. It is expected that financial support is positively related to the planned retirement age, because more financial support will lead to willing and being able to work longer. However, it can also be argued that financial support is negatively related to the planned retirement age, because when people earn more, they can also save more and afford to stop working earlier. Nevertheless, it can be expected that self-employed find themselves more financially unstable or vulnerable, and therefore employees experience more financial support. The analyses have to indicate whether there is a positive or negative effect of the working conditions on the planned retirement age, and whether the effect differs between self-employed and employees.

The hypotheses are based on studies that used very differing sets of data and research methods. Therefore, the analyses in this research do not assume that the determinants will point in the expected direction. The focus in the analyses is to analyse the differences between self-employed and employees, and to indicate whether or not that there is a relationship between working conditions and the planned retirement age of self-employed and employees. Furthermore, the analysis will show whether the Dutch government should further try to equalize the working conditions of self-employed and employees as well as the pension system for self-employed and employees.

The hypothetical model is figured below. The direction of the links between the working conditions and the planned retirement age are not shown, because the elaborated literature does not provide explicit support. The differences between self-employed and employees will be showed in the analyses in the next chapter.

**Figure 1: Hypothetical model**



## 4. Research design and data collection

In this chapter the research design and data collection is outlined. First, the methodology section explains the methods used to analyse the relationship between the working conditions and the planned retirement age of self-employed and employees. Second, the dataset is outlined. Third, in the operationalization section the measurement is defined and the dependent, independent, and control variables are described. Fourth, the descriptive statistics are presented and considered.

### *4.1 Methodology*

This empirical part of the research offers analyses on data from the Study on Transitions in Employment, Ability and Motivation ("STREAM"). This study was designed to provide insight into the factors that influence transitions in employment (for example transitions from work to retirement which is relevant for this research), and productivity among older workers (Van den Heuvel et al., 2016). The determinants of transitions in employment used in STREAM (health, job characteristics, skills and knowledge, social support, and financial factors) match well with the aspects of working conditions in this research. The goal of this empirical part is to analyse the relationship between the working conditions and the planned retirement age. Data from STREAM assists in answering the research question. This will be done by multiple regression analyses, because there are several independent variables (the working conditions) and one dependent variable (the planned retirement age). Multiple regression analyses allow to determine the overall fit of the model and the relative contribution of each of the independent variables to the total variance explained. Furthermore, interaction terms will be added to better explain the relationships among the variables and to see whether there are significant differences between the effect of working conditions on the planned retirement age of self-employed and employees. Also, an Oaxaca decomposition will be conducted. The Oaxaca decomposition is a statistical method that explains the difference in the means of a dependent variable between two groups. The aim is to explain how much of the difference in mean outcomes across two groups is due to group differences in the levels of independent variables, and how much is due to differences in the extent of regression coefficients (Oaxaca, 1973: 696).

*4.1.1 Assumptions multiple regression analysis*

There are several assumptions that have to be met when performing a multiple regression analysis. First, it is assumed that the relationship between variables is linear. In practice this assumption can practically never be confirmed. However, multiple regression procedures are not greatly affected by minor deviations from this assumption. Further, it is assumed in multiple regression analysis that the variables follow the normal distribution. Even though most tests are quite robust with regard to violations of this assumption, it is good to review the distribution of the variables of interest by producing histograms. Moreover, it is assumed that the independent variables are not highly correlated with each other (i.e., no multicollinearity). Finally, it is assumed that the variance of error terms is similar across the independent variables (i.e., homoscedasticity).

Multiple regression analyses will be conducted to study the relationship between the planned retirement age and the working conditions. There are several independent variables (the working conditions) and one dependent variable (the planned retirement age). Eventually, the estimates will tell if there is a relationship between working conditions and the planned retirement, and whether the relationship differs between self-employed and employees.

*4.1.2 The Oaxaca decomposition*

The Oaxaca decomposition can be derived as follows. In this research two groups are considered, the self-employed (Group S) and the employees (Group E). The mean outcome difference to be explained ($\Delta\overline{\mathrm{Y}}$), the planned retirement gap, is simply the difference of the mean outcomes of the planned retirement age in Group S and Group E, denoted as $\overline{\mathrm{Y}}_{\mathrm{S}}$ and $\overline{\mathrm{Y}}_{\mathrm{E}}$, respectively:

$$\Delta\overline{\mathrm{Y}} = \overline{\mathrm{Y}}_{\mathrm{S}} - \overline{\mathrm{Y}}_{\mathrm{E}}$$

In the context of a linear regression, the mean outcome of Group S can be expressed as $\overline{\mathrm{Y}}_{\mathrm{S}} = \overline{\mathrm{X}}_{s}'\hat{\beta}_{S}$, where $\overline{\mathrm{X}}_{\mathrm{S}}$ contains the mean values of independent variables and $\hat{\beta}_{S}$ are the estimated regression coefficients. So, $\Delta\overline{\mathrm{Y}}$ can be rewritten as:

$$\Delta\overline{\mathrm{Y}} = \overline{\mathrm{X}}_{S}'\hat{\beta}_{S} - \overline{\mathrm{X}}_{E}'\hat{\beta}_{E} = \left(\overline{X}_{S}' - \overline{X}_{E}'\right)\hat{\beta}_{S} + \overline{X}_{E}'(\hat{\beta}_{S} - \hat{\beta}_{E})$$

The part of the difference between the planned retirement age of self-employed and employees, $\overline{\mathrm{Y}}_{\mathrm{S}} - \overline{\mathrm{Y}}_{\mathrm{E}}$, which can be explained by a difference in composition of the groups is

equal to $(X_S' - X_E')\hat{\beta}_S$. This is the part of the planned retirement gap due to differences in average characteristics between self-employed and employees. So, this is the impact of between-group differences in the independent variables (e.g. the gap is due to differences in the mean values of the working conditions within the groups). If self-employed and employees had the same levels of working conditions, these terms would be 0. The part that cannot be explained by the composition effects is equal to $X_E'(\hat{\beta}_S - \hat{\beta}_E)$. This is the corrected planned retirement age that shows how a self-employed with comparable characteristics as an employee has a higher planned retirement age. So, this is the difference not explained by these differences in observed characteristics (e.g. the gap is due to differences in the effects of the independent variables). In the next chapter the Oaxaca decomposition for this research will be presented.

*4.2 Dataset*

STREAM is a prospective cohort study among employees, self-employed, and non-employed individuals, aged 45 to 64 years at baseline. This is relevant for this research, because older workers are more aware of their retirement. STREAM is a longitudinal study, however in this research data from 2015 will be used to cope with the influences of the economic crisis and changes in employment of self-employed.

Participants fill in an online questionnaire on several topics: health, work, knowledge and skills, social circumstances, and financial situation. More than 12,000 employees, 1,000 self-employed, and 2,000 non-employed individuals participated at baseline in 2010. In 2016, almost half of them had participated in each wave. In 2015, a new cohort was invited to participate, to again include individuals aged 45-49, and to include more working individuals in the other age groups. For the data collection an existing Intomart GfK Internet panel is used. STREAM is conducted by Dutch Research Institute TNO. Collaborating partners are VU University Medical Center, Erasmus Medical Center, and the Netherlands Interdisciplinary Demographic Institute. STREAM is funded by the Ministry of Social Affairs.

In STREAM an Internet panel is used, so it is not a representative sample of the Dutch population. However, the aim in STREAM is to examine the influence of various determinants on the participation of older individuals in work, and for this aim heterogeneity is more important than representatively. This also applies to this research.

*4.3 Operationalization*

In this analysis the dependent variable is measured at the interval/ratio level. The independent variables are measured at the ordinal level. The dependent variable in this research is the planned retirement age and the independent variables are the working conditions (distinguished into physical load, psychological load, social support, and financial support). Also, several control variables are added: age, gender, general health, and education. The variables of STREAM that will be used in this research are described in the next sections.

*4.3.1 Dependent variable*

The dependent variable is the planned retirement age. In STREAM this variable is measured with the question: "Until what age would you like to continue working?" Respondents answered with their planned retirement age in years. Therefore, this dependent variable is a continue variable.

*4.3.2 Independent variables*

The independent variables are the working conditions, distinguished into physical load, psychological load, social support, and financial support. Several scales are used in STREAM that match with the distinction made in this research. The scales represent the items they are based on.

The first independent variable is physical load, which is based on five items: using a lot of force (e.g. lifting, pushing, pulling), using tools etc. causing body vibration, work in uncomfortable postures, stand for long periods of time, and kneel or squat for long periods of time. This independent variable is measured at the ordinal level. Respondents answer these questions with: always, often, sometimes, rarely, or (almost) never.

The second independent variable is psychological load. This variable is distinguished into two variables, namely mental load and emotional load. These scales are added in the STREAM data and therefore useful for this research. Mental load is based on three items: work requires you to think very hard, work requires that you keep in mind on your job, and work requires a lot of your attention. Emotional demands is based on three items: emotionally difficult situations, emotionally demanding, and emotionally involved. These independent variables are measured at the ordinal level. Respondents answer these questions with: always, often, sometimes, rarely, or (almost) never.

The third independent variable is social support. This variable is different for self-employed and employees. For employees this variable is based on four items: help and

support from your colleagues, colleagues willing to listen to work-related problems, help and support from your immediate superior, and superior willing to listen to work-related problems. For self-employed this variable is based on four items: help and support from colleagues/other entrepreneurs, colleagues/other entrepreneurs willing to listen to work-related problems, help and support from your customers or clients, and customers or clients willing to listen to work-related problems. These independent variables are measured at the ordinal level. Respondents answer these questions with: always, often, sometimes, rarely, or (almost) never.

The fourth independent variable is financial support. This variable is based on the question: "Good salary". Respondents answer these question with: not present at all, somewhat present, rather present, or highly present. This variable is chosen because this is also measured at the ordinal level.

### *4.3.3 Control variables*

Several control variables are included in the empirical part. Age and gender are included. Also, general health is included. This is measured at the ordinal level. Respondents answer the question "In general, would you say your health is…": excellent, very good, good, fair, or poor. Furthermore, education is included. This is measured at the ordinal level. Respondents fill in their education level, which is low, middle, or high.

### *4.3.4 Regression equations*

The regression equations look like:

Self-employed:

$$Y_s = \alpha_s + \delta_s(D=1) + \beta_{1s}X_{1s} + \beta_{2s}X_{2s} + \beta_{3s}X_{3s} + \beta_{4s}X_{4s} + \beta_{5s}X_{5s} + \gamma_{1s}Z_{1s} + \gamma_{2s}Z_{2s} + \gamma_{3s}Z_{3s} + \gamma_{4s}Z_{4s} + \varepsilon_s$$

Employees:

$$Y_e = \alpha_e + \delta_e(D=0) + \beta_{1e}X_{1e} + \beta_{2e}X_{2e} + \beta_{3e}X_{3e} + \beta_{4e}X_{4e} + \beta_{5e}X_{5e} + \gamma_{1e}Z_{1e} + \gamma_{2e}Z_{2e} + \gamma_{3e}Z_{3e} + \gamma_{4e}Z_{4e} + \varepsilon_e$$

| | | |
|---|---|---|
| $\alpha$ = Intercept/constant | $X_1$ = Physical load | $Z_1$ = Age |
| $\beta$ = Coefficients independent variables | $X_2$ = Mental load | $Z_2$ = Gender |
| $\gamma$ = Coefficients control variables | $X_3$ = Emotional load | $Z_3$ = General health |
| $\delta$ = Coefficients dummy variable | $X_4$ = Social support | $Z_4$ = Education |
| D = Dummy variable self-employed/employees | $X_5$ = Financial support | $\varepsilon$ = Error term |

The equation with the interactions terms looks like:

$$Y = \alpha + \delta D + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_1 D + \beta_7 X_2 D + \beta_8 X_3 D + \beta_9 X_4 D + \beta_{10} X_5 D + \gamma_1 Z_1 + \gamma_2 Z_2 + \gamma_3 Z_3 + \gamma_4 Z_4 + \gamma_5 Z_1 D + \gamma_6 Z_2 D + \gamma_7 Z_3 D + \gamma_8 Z_4 D + \varepsilon$$

*4.4 Descriptive statistics*

In this section the data that will be used for the multiple regressions analyses will be described and summarized in several tables. Important to keep in mind is that only the respondents that filled in their planned retirement age are considered, because this is the actual sample used in this research. The first table shows the descriptive statistics of the research group. The average age of the respondents of the sample in 2015 is 54.81 years. The average age of the employees (54.67 years) is slightly lower than the average age of self-employed without employees (56.67 years). Furthermore, there are slightly more men than women in the self-employed group (this corresponds to the general differences between self-employed and employees mentioned in previous chapters). However, it is striking that this variable shows a lot of missing values, namely 3,950 of 8,468 respondents. In the dataset, this variable is only measured in 2010. Also, for the new cohort added in 2015 this variable is not completed. In the following analyses this variable will not be included. In the regression equation this control variable will further be dropped for the same reason ($\gamma_2 Z_2$ and $\gamma_6 Z_2 D$).

The employment status question shows that 7,754 respondents of the sample are employee, 714 respondents of the sample are self-employed/entrepreneur, and 562 respondents of the sample are not-employed. Therefore, 7,2% of the respondents is self-employed/entrepreneur. Of this self-employed group, almost 80% is self-employed without employees, namely 562 respondents. Thus, the self-employed without employees are the largest part of the self-employed group, therefore in this analysis only the self-employed without employees are considered to make a more specific statement about the self-employed group, and because the increase of self-employed is mostly due to the increase in this group. In Appendix A a comparison of employment status and age is made between the STREAM data and data from StatLine to see if the distribution of the research group corresponds to the Dutch working population from 45 to 70 years old. This appears to be more or less the case.

The average experienced general health of the sample population is 2.65 (in-between “2: very good” and “3: good”). The average experienced general health of employees is 2.66 in comparison to 2.54 of self-employed without employees, so on average self-employed experience a slightly better general health (this also corresponds to the general differences

mentioned in previous chapters). The last control variable, education, shows that on average respondents have a 'middle' education level, namely 2.17 (in-between "2: middle" and "3: high"). Employees have a slightly lower education level (2.15) than self-employed without employees (2.38), this also corresponds to the general differences mentioned in previous chapters).

**Table 1: Descriptive statistics research group (only respondents considered that filled in their planned retirement age)**

| Variables | N | Mean | Minimum | Maximum | Std. Deviation |
|---|---|---|---|---|---|
| *Employment status* [c] | 8,468 | | | | |
| Employee | 7,754 | | | | |
| Self-employed/entrepreneur | 714 | | | | |
| Self-employed [a] | 562 | | | | |
| *Age* | 8,466 | 54.8076 | 45.00 | 70.00 | 6.35801 |
| Employee | 7,752 | 54.6673 | | | 6.28101 |
| Self-employed/entrepreneur | 714 | 56.3305 | | | 6.96596 |
| Self-employed [a] | 562 | 56.6690 | | | 7.11736 |
| *Gender* [b] | 4,518 | 1.36 | 1.00 | 2.00 | .480 |
| Employee | 4,080 | 1.37 | | | .483 |
| Self-employed/entrepreneur | 438 | 1.27 | | | .445 |
| Self-employed [a] | 350 | 1.30 | | | .458 |
| *Health in general* [d] | 8,450 | 2.65 | 1.00 | 5.00 | .856 |
| Employees | 7,736 | 2.66 | | | .853 |
| Self-employed/entrepreneur | 714 | 2.53 | | | .881 |
| Self-employed [a] | 562 | 2.54 | | | .846 |
| *Education* [e] | 8,468 | 2.17 | 1.00 | 3.00 | .772 |
| Employees | 7,754 | 2.15 | | | .772 |
| Self-employed/entrepreneur | 714 | 2.37 | | | .739 |
| Self-employed [a] | 562 | 2.38 | | | .729 |

[a]: Self-employed without employees
[b]: 1 = Male, 2 = Female
[c]: 1 = Employee, 2 = Self-employed/entrepreneur, 3 = Not-employed
[d]: 1 = Excellent, 2= Very good, 3= Good, 4= Fair, 5= Poor
[e]: 1 = Low, 2 = Middle, 3 = High

The second table shows the descriptive statistics of the planned retirement age. This table shows that the average planned retirement age of employees in the sample is 64.52 years and the average planned retirement age of self-employed without employees in the sample is 68.16 years. This indicates that the average planned retirement age of the self-employed is higher. However, the standard deviation of self-employed is higher compared to the standard

deviation of employees. This means that there are big differences within the self-employed respondents.

**Table 2: Descriptive statistics planned retirement age**

| Variables | N | Mean | Minimum | Maximum | Std. Deviation |
|---|---|---|---|---|---|
| Planned retirement age | 8,468 | 64.79 | 18 | 99 | 4.153 |
| Employees | 7,754 | 64.52 | 18 | 99 | 3.655 |
| Self-employed [b] | 562 | 68.16 | 50 | 99 | 7.304 |

[b]: Self-employed without employees

In Figure 1, below, two histograms are shown including the normal distribution. The left histogram presents the distribution of the planned retirement age of employees. The right histogram presents the distribution of the planned retirement age of self-employed without employees. The histograms show that the differences within the self-employed respondents are larger than the differences within the employee respondents. The planned retirement age of employees is more centered around the mean, which is 64.52. Most of the employees respondents plan to retire at an age of 65. This is earlier than the statutory retirement age. The planned retirement age of self-employed is more diverging. However, the majority of this group chooses for a higher planned retirement age than employees. Most of the self-employed respondents plan to retire at an age of 70. This is later than the statutory retirement age.

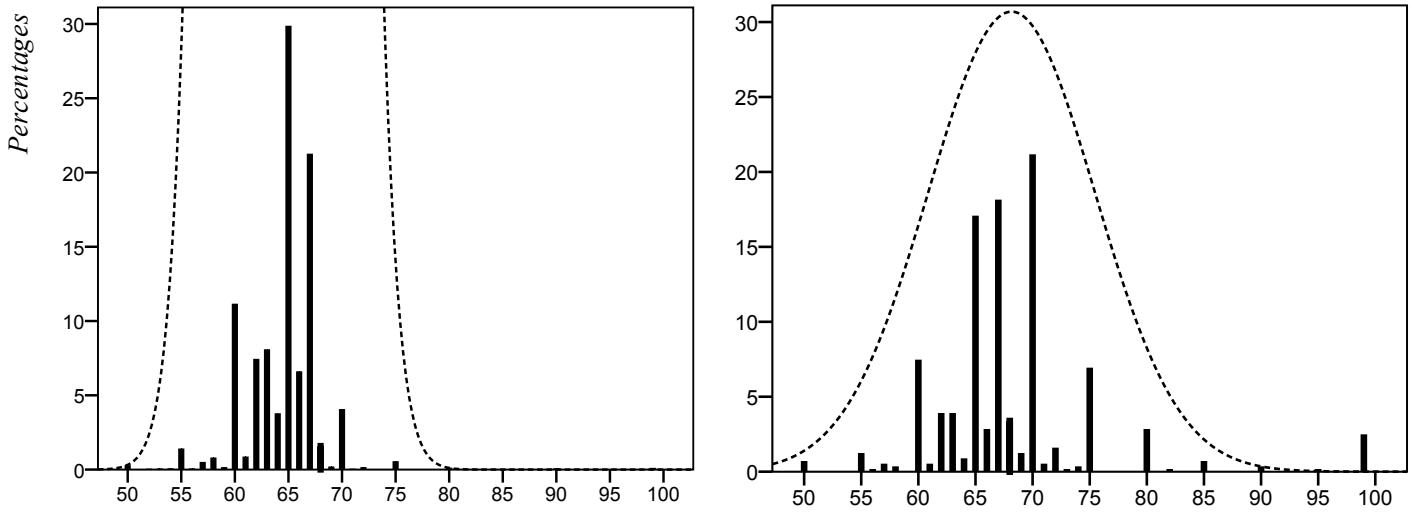



**Figure 2: Histogram of the planned retirement age**

Table 3 shows the descriptive statistics of the working conditions. Again, only the respondents that filled in their planned retirement age are considered. The average physical load of employees is 1.7699 and the average physical load of self-employed is 1.7762 (both in-between "1: (almost) never" and "2: rarely"). Although these averages are close, on average employees in this sample slightly experience more physical load in their work.

The average mental load of employees is 4.1832 and the average mental load of self-employed is 4.2338 (both in-between "4: often" and "5: always"). Although these averages are close, on average self-employed experience a little bit more mental load than employees. The average emotional load of employees is 2.4031 and the average emotional load of self-employed is 2.3173 (both in-between "2: rarely" and "3: sometimes"). Although these averages are again close, on average employees experience a little bit more emotional load than self-employed. So, altogether it is hard to make a strict distinction between self-employed and employees and their psychological (mental and emotional) load.

The average social support of employees is 3.5213 and the average social support of self-employed is 2.5854 (whereas "2: rarely", "3: sometimes", and "4: often"). Therefore, on average self-employed experience less social support than employees. Together with the averages of physical load, this is an important finding.

The average financial support of employees is 2.48 and the average financial support of self-employed is 2.25 (both in-between "2: somewhat present" and "3: rather present"). On average employees experience a better salary than self-employed. Together with the physical load and the social support, this is an important finding. In Appendix B percentages of the categories answered per question are showed to give more information about the distribution of the answers of self-employed and employees.

**Table 3: Descriptive statistics working conditions (only respondents considered that filled in their planned retirement age)**

| Variables | N | Mean | Minimum | Maximum | Std. Deviation |
|---|---|---|---|---|---|
| Physical load [a] | 8,462 | 1.7711 | 1.00 | 5.00 | .89580 |
| Employees | 7,748 | 1.7699 | | | .89653 |
| Self-employed/entrepreneur | 714 | 1.7844 | | | .88833 |
| Self-employed [b] | 562 | 1.7762 | | | .88994 |
| Mental load [a] | 8,459 | 4.1885 | 1.00 | 5.00 | .65746 |
| Employees | 7,747 | 4.1832 | | | .65649 |
| Self-employed/entrepreneur | 712 | 4.2467 | | | .66566 |
| Self-employed [b] | 561 | 4.2338 | | | .68981 |

| | | | | | |
|---|---|---|---|---|---|
| Emotional load [a] | 8,448 | 2.3993 | 1.00 | 5.00 | .86051 |
| Employees | 7,735 | 2.4031 | | | .86201 |
| Self-employed/entrepreneur | 713 | 2.3572 | | | .84351 |
| Self-employed [b] | 562 | 2.3173 | | | .81864 |
| Social support employees [a] | 7,746 | 3.5213 | | | .80610 |
| Social support self-employed [a b] | 562 | 2.5854 | 1.00 | 5.00 | .93222 |
| Financial support [c] | 8,446 | 2.46 | | | .854 |
| Employees | 7,735 | 2.48 | | | .846 |
| Self-employed/entrepreneur | 711 | 2.33 | | | .924 |
| Self-employed [b] | 559 | 2.25 | | | .926 |

[a]: 1 = (Almost) never, 5 = Always
[b]: Self-employed without employees
[c]: 1 = Not present at all, 4 = Highly present

Furthermore, two correlation analyses are conducted to see whether the variables correlate to each other. The correlation between the variables is analysed by Spearman's rho, because Spearman's rho is a measure of association for ordinal-level variables.

Table 4 shows that physical load, emotional load, social support (employees), and the control variables (age, health in general, and education) significantly correlate with the planned retirement age. Both physical load and emotional load significant negatively correlate with the planned retirement age of all respondents, which was also expected (the higher the physical and/or emotional load, the earlier respondents plan to retire). Social support significant positively correlates with the planned retirement age, which was also expected (the more social support, the later respondents plan to retire).

All three control variables significantly correlate with all variables. Therefore, these control variables can affect the correlation between the planned retirement age and the working conditions. Therefore, this must be checked by means of a partial correlation analysis. The correlation between the variables is calculated, while correcting for the influence of the control variables (e.g., these are held constant). Table 5 shows the partial correlation analysis that takes into account age, health in general, and education.

Table 5 shows that physical load, emotional load, social support (employees), and financial support significantly correlate with the planned retirement age. Again, physical load correlates significant negatively with the planned retirement age, emotional load correlates significant negatively with the planned retirement age, social support correlates significant positively with the planned retirement age, and financial support correlates significant negatively with the planned retirement age. Although, the correlations are not that strong, they show that there is a relationship between these working conditions and the planned retirement

age of the respondents. In the multiple regression analysis, the association between the working conditions and the planned retirement age will be further examined. Also, in the multiple regression analyses the distinction between self-employed and employees is made to see whether there are differences in the impact of working conditions on the planned retirement age of these groups.

**Table 4: Correlation analysis variables**

| | Planned retirement age | Physical load | Mental load | Emotional load | Social support employees | Social support self-employed | Financial support | Age | Health in general | Education |
|---|---|---|---|---|---|---|---|---|---|---|
| Planned retirement age | 1 | | | | | | | | | |
| Physical load | -.050**** | 1 | | | | | | | | |
| Mental load | -.002 | -.134**** | 1 | | | | | | | |
| Emotional load | -.093**** | .132**** | .302**** | 1 | | | | | | |
| Social support employees | .042**** | -.059**** | .080**** | -.074**** | 1 | | | | | |
| Social support self-employed | -.031 | .013 | .124**** | .090**** | - | 1 | | | | |
| Financial support | -.005 | -.241**** | .099**** | -.075**** | .238**** | .198**** | 1 | | | |
| Age | .260**** | -.036**** | .055**** | -.012* | -.030**** | -.081**** | -.025**** | 1 | | |
| Health in general | -.103**** | .110**** | -.008 | .122**** | -.145**** | -.086**** | -.155**** | .057**** | 1 | |
| Education | .020** | -.314**** | .232**** | .198**** | .023*** | .123**** | .116**** | -.037**** | -.135**** | 1 |

****, ***, ** and * correlations are statistically significant at respectively 1%, 5%, 10% and 20%.

**Table 5: Partial correlation analysis variables**

| Control variables | | Planned age | Physical load | Mental load | Emotional load | Social support employees | Social support self-employed | Financial support |
|---|---|---|---|---|---|---|---|---|
| Age | Planned retirement age | 1 | | | | | | |
| Health in general | Physical load | -.017* | 1 | | | | | |
| Education | Mental load | -.005 | -.060**** | 1 | | | | |
| | Emotional load | -.064**** | .185**** | .284**** | 1 | | | |
| | Social support employees | .029*** | -.051**** | .116**** | -.054**** | 1 | | |
| | Social support self-employed | -.031 | .087**** | .145**** | .088**** | - | 1 | |
| | Financial support | -.034**** | -.198**** | .096**** | -.082**** | .227**** | .173**** | 1 |

****, ***, ** and * correlations are statistically significant at respectively 1%, 5%, 10% and 20%.

# 5. Results

In this chapter the empirical results are showed and discussed. First, a multiple regression for employees is conducted. Second, a multiple regression for self-employed is conducted. Third, interaction terms are added to further explain the relationship between the variables. Fourth, an Oaxaca analysis is conducted to explain how much of the difference in mean outcomes across the groups is due to group differences in the levels of the independent variables, and how much is due to differences in the extent of regression coefficients.

## *5.1 Multiple regression analysis employees*

Table 6 shows the results of the multiple regression analysis for employees. In addition to the control variables, age and general health, the variables physical load, emotional load, social support, and financial support are statistically significant. Physical load is negatively associated with the planned retirement age of employees. As also shown in the partial correlation analysis, physical load negatively correlates with the planned retirement age. In table 6, this is reflected in the fact that the regression coefficient of physical load is statistically significant ($\beta$ = -0.104; p = 0.036). Emotional load is negatively associated with the planned retirement age of employees. As also shown in the partial correlation analysis, emotional load negatively correlates with the planned retirement age. In table 6, this is reflected in the fact that the regression coefficient of emotional load is statistically significant ($\beta$ = -0.294; p = 0.000). Social support is positively associated with the planned retirement age of employees. As also shown in the partial correlation analysis, social support positively correlates with the planned retirement age. In table 6, this is reflected in the fact that the regression coefficient of social support is statistically significant ($\beta$ = 0.126; p = 0.015). Financial support is negatively associated with the planned retirement age of employees. As also shown in the partial correlation analysis, financial support negatively correlates with the planned retirement age. In table 6, this is reflected in the fact that the regression coefficient of financial support is statistically significant ($\beta$ = -0.105; p = 0.039). This means that the working conditions physical load, emotional load, social support, and financial support, are associated with the planned retirement age of employees.

The standard errors are not that high compared to standard deviations of the independent variables. The predictions are therefore relatively accurate. However, the $R^2$ (0.083) and adjusted $R^2$ (0.082) are low. The R-square is the determination coefficient and displays the percentage of declared variance. In this regression model, the declared variance is

low. Therefore, in addition to the explained working conditions, there are other factors that influence the planned retirement age. In the following section the multiple regression of the planned retirement age of self-employed without employees is showed.

**Table 6: Results of the multiple regression analysis for employees with the planned retirement age as dependent variable**

| Variables | B | Std. Error | t | Sig. |
|---|---|---|---|---|
| (Constant) | 57.573**** | .521 | 110.494 | .000 |
| Physical load | -.104*** | .049 | -2.095 | .036 |
| Mental load | .045 | .066 | .680 | .497 |
| Emotional load | -.294**** | .051 | -5.759 | .000 |
| Social support employees | .126*** | .052 | 2.439 | .015 |
| Financial support | -.105*** | .051 | -2.069 | .039 |
| Age | .152**** | .006 | 23.720 | .000 |
| General health | -.372**** | .048 | -7.708 | .000 |
| Education | .067 | .057 | 1.168 | .243 |
| F | 86.289**** | | | .000 |
| $R^2$ | .083 | | | |
| Adjusted $R^2$ | .082 | | | |
| N | 7,676 | | | |

****, ***, ** and * correlation coefficients are statistically significant at respectively 1%, 5%, 10% and 20%.

*5.2 Multiple regression analysis self-employed*

Table 7 shows the results of the multiple regression analysis for self-employed without employees. All control variables (age, general health, and education) are statistically significant. Furthermore, financial support is statistically significant. As also shown in the partial correlation analysis, financial support negatively correlates with the planned retirement age. In table 7, this is reflected in the fact that the regression coefficient of financial support is statistically significant ($\beta$ = -0.680; p = 0.054). Also in this model the $R^2$ (0.066) and the adjusted $R^2$ (0.052) are low. Therefore, the declared variance is low.

The results of this multiple regression show that the impact of the working conditions on the planned retirement age of self-employed is relatively small. The regression coefficients of the independent variables are not statistically significant, except for financial support. It is difficult to outline concrete differences of the effects based on these models. Only financial support shows that the effect is larger for self-employed without employees ($\beta$ = -0.680) than the effect for employees ($\beta$ = -0.105). Therefore, it can be assumed that a good salary has a

greater negative influence on the planned retirement age of self-employed than on the planned retirement age of employees. To further explain the differences between self-employed and employees and their planned retirement age interaction terms are added. This is elaborated in the next section.

**Table 7: Results of the multiple regression analysis for self-employed with the planned retirement age as dependent variable**

| Variables | B | Std. Error | t | Sig. |
|---|---|---|---|---|
| (Constant) | 56.664**** | 3.466 | 16.347 | .000 |
| Physical load | .046 | .373 | .124 | .902 |
| Mental load | .242 | .495 | .489 | .625 |
| Emotional load | -.146 | .402 | -.363 | .717 |
| Social support self-employed | -.183 | .344 | -.532 | .595 |
| Financial support | -.680** | .352 | -1.931 | .054 |
| Age | .197**** | .043 | 4.570 | .000 |
| General health | -.646** | .370 | -1.745 | .081 |
| Education | 1.348**** | .458 | 2.945 | .003 |
| F | 4.852**** | | | .000 |
| $R^2$ | .066 | | | |
| Adjusted $R^2$ | .052 | | | |
| N | 558 | | | |

****, ***, ** and * correlation coefficients are statistically significant at respectively 1%, 5%, 10% and 20%.

*5.3 Interaction terms in regression model*

To further explain the model and the relationship among the variables, interaction terms are added. Adding interaction terms to a regression model expands understanding of the relationships among the variables in the model, because it shows whether or not the differences are statistically significant. Table 8 shows whether the effects of the working conditions are statistically different between the employees and the self-employed.

Table 8 shows the results of the regression analysis with interaction terms with the planned retirement age as dependent variable. The interaction terms show whether the effects for self-employed are statistically different than the effects of employees. Only the interaction term financial support ($\beta = -0.575$; $p = 0.004$) is statistically significant. This means that the effect of financial support on the planned retirement age of self-employed statistically differs from the effect of financial support on the planned retirement age of employees. Financial support affects the planned retirement age of self-employed with $\beta = -0.575$ more than the

planned retirement age of employees. Therefore, it can be assumed that a good salary has a greater negative influence on the planned retirement age of self-employed than on the planned retirement age of employees.

**Table 8: Results of regression analysis with interaction terms with the planned retirement age as dependent variable**

| Variables | B | Std. Error | t | Sig. |
|---|---|---|---|---|
| (Constant) | 57.573**** | .573 | 100.467 | .000 |
| Dummy variable (1 = self-employed; 0 = employee) | -.909 | 1.960 | -.464 | .643 |
| Physical load | -.104** | .054 | -1.905 | .057 |
| Mental load | .045 | .072 | .618 | .537 |
| Emotional load | -.294**** | .056 | -5.237 | .000 |
| Financial support | -.105** | .056 | -1.881 | .060 |
| Social support employees | .126*** | .057 | 2.217 | .027 |
| Social support self-employed | -.183 | .186 | -.983 | .325 |
| Age | .152**** | .007 | 21.568 | .000 |
| General health | -.372**** | .053 | -7.008 | .000 |
| Education | .067 | .063 | 1.062 | .288 |
| Physical load x Self-employed | .150 | .209 | .716 | .474 |
| Mental load x Self-employed | .198 | .278 | .712 | .476 |
| Emotional load x Self-employed | .148 | .224 | .657 | .511 |
| Financial support x Self-employed | -.575**** | .198 | -2.898 | .004 |
| Age x Self-employed | .045** | .024 | 1.858 | .063 |
| General health x Self-employed | -.273* | .207 | -1.320 | .187 |
| Education x Self-employed | 1.281**** | .255 | 5.015 | .000 |
| F | 68.954**** | | | .000 |
| $R^2$ | .125 | | | |
| Adjusted $R^2$ | .123 | | | |
| N | 8234 | | | |

****, ***, ** and * correlation coefficients are statistically significant at respectively 1%, 5%, 10% and 20%.

*5.4 Oaxaca analysis*

The estimates of the coefficients resulting from the regression analyses are used in the Oaxaca decomposition. The planned retirement age equations for self-employed and employees (variable 'gender' is not included) are:

$$Y_S = \alpha_S + \beta_{S1}X_{S1} + \beta_{S2}X_{S2} + \beta_{S3}X_{S3} + \beta_{S4}X_{S4} + \beta_{S5}X_{S5} + \gamma_{S1}Z_{S1} + \gamma_{S3}Z_{S3} + \gamma_{S4}Z_{S4} + \varepsilon_S$$

$$Y_E = \alpha_E + \beta_{E1}X_{E1} + \beta_{E2}X_{E2} + \beta_{E3}X_{E3} + \beta_{E4}X_{E4} + \beta_{E5}X_{E5} + \gamma_{E1}Z_{E1} + \gamma_{E3}Z_{E3} + \gamma_{E4}Z_{E4} + \varepsilon_E$$

Whereas, subscript "s" means self-employed and "e" means employees. Furthermore, the independent variables are: 1 = physical load, 2 = mental load, 3 = emotional load, 4 = social support, 5 = financial support. And the control variables are: 1 = age, 2 = health in general, and 3 = education.

The planned retirement age gap, $\Delta\overline{Y} = \overline{Y}_S - \overline{Y}_E$, is 68.16 – 64.52 = 3.64. The next step is to transform the equations for self-employed and employees into the decomposition formula. The error terms are not included, because sample averages and estimated coefficients are used. The sample averages of the error terms are 0.

$$\overline{Y}_S - \overline{Y}_E = \hat{\alpha}_S + \hat{\beta}_{S1}\overline{X}_{S1} + \hat{\beta}_{S2}\overline{X}_{S2} + \hat{\beta}_{S3}\overline{X}_{S3} + \hat{\beta}_{S4}\overline{X}_{S4} + \hat{\beta}_{S5}\overline{X}_{S5} + \hat{\gamma}_{S1}\overline{Z}_{S1} + \hat{\gamma}_{S3}\overline{Z}_{S3} + \hat{\gamma}_{S4}\overline{Z}_{S4} - \left(\hat{\alpha}_E + \hat{\beta}_{E1}\overline{X}_{E1} + \hat{\beta}_{E2}\overline{X}_{E2} + \hat{\beta}_{E3}\overline{X}_{E3} + \hat{\beta}_{E4}\overline{X}_{E4} + \hat{\beta}_{E5}\overline{X}_{E5} + \hat{\gamma}_{E1}\overline{Z}_{E1} + \hat{\gamma}_{E3}\overline{Z}_{E3} + \hat{\gamma}_{E4}\overline{Z}_{E4}\right)$$

This can be rewritten as:

$$\overline{Y}_S - \overline{Y}_E =$$

$$\hat{\beta}_{S1}(\overline{X}_{S1} - \overline{X}_{E1}) + \hat{\beta}_{S2}(\overline{X}_{S2} - \overline{X}_{E2}) + \hat{\beta}_{S3}(\overline{X}_{S3} - \overline{X}_{E3}) + \hat{\beta}_{S4}(\overline{X}_{S4} - \overline{X}_{E4}) + \hat{\beta}_{S5}(\overline{X}_{S5} - \overline{X}_{E5}) + \hat{\gamma}_{S1}(\overline{Z}_{S1} - \overline{Z}_{E1}) + \hat{\gamma}_{S3}(\overline{Z}_{S3} - \overline{Z}_{E3}) + \hat{\gamma}_{S4}(\overline{Z}_{S4} - \overline{Z}_{E4}) \quad (\textit{explained})$$

$$+ (\hat{\alpha}_S - \hat{\alpha}_E) + (\hat{\beta}_{S1} - \hat{\beta}_{E1})\overline{X}_{E1} + (\hat{\beta}_{S2} - \hat{\beta}_{E2})\overline{X}_{E2} + (\hat{\beta}_{S3} - \hat{\beta}_{E3})\overline{X}_{E3} + (\hat{\beta}_{S4} - \hat{\beta}_{E4})\overline{X}_{E4} + (\hat{\beta}_{S5} - \hat{\beta}_{E5})\overline{X}_{E5} + (\hat{\gamma}_{S1} - \hat{\gamma}_{E1})\overline{Z}_{E1} + (\hat{\gamma}_{S3} - \hat{\gamma}_{E3})\overline{Z}_{E3} + (\hat{\gamma}_{S4} - \hat{\gamma}_{E4})\overline{Z}_{E4} \quad (\textit{unexplained})$$

So, the first part explains the planned retirement gap due to differences in the mean values of the independent variables within the groups. The second part does not explain the planned retirement age by these differences in observed characteristics, but explains the planned retirement age gap due to differences in the effects of the independent variables.

**Table 9: Results of the multiple regression analyses to use for the Oaxaca decomposition**

| Variables | | | | |
|---|---|---|---|---|
| $\overline{Y}_{SELF-EMPLOYED}$ | 68.16 | | | |
| $\overline{Y}_{EMPLOYEES}$ | 64.52 | | | |
| $\hat{\alpha}_{SELF-EMPLOYED}$ | 56.664 | | | |
| $\hat{\alpha}_{EMPLOYEES}$ | 57.573 | | | |
| | $\hat{\beta}_S$ | $\hat{\beta}_E$ | $\overline{X}_S$ | $\overline{X}_E$ |
| 1. Physical load | 0.046 | -0.104 | 1.7762 | 1.7699 |
| 2. Mental load | 0.242 | 0.045 | 4.2338 | 4.1832 |
| 3. Emotional load | -0.146 | -0.294 | 2.3173 | 2.4031 |

| | | | | |
|---|---|---|---|---|
| 4. Social support | -0.183 | 0.126 | 2.5854 | 3.5213 |
| 5. Financial support | -0.680 | -0.105 | 2.25 | 2.48 |
| | $\hat{\gamma}_S$ | $\hat{\gamma}_E$ | $\overline{Z}_S$ | $\overline{Z}_E$ |
| 1. Age | 0.197 | 0.152 | 56.6690 | 54.6673 |
| 3. Health in general | -0.646 | -0.372 | 2.54 | 2.66 |
| 4. Education | 1.348 | 0.067 | 2.38 | 2.15 |

Filling in the formula gives:

$$\overline{Y}_S - \overline{Y}_E =$$

0.046*(1.7762 – 1.7699) + 0.242*(4.2338 – 4.1832) + -0.146*(2.3173 – 2.4031) + -0.183*(2.5854 – 3.5213) + -0.680*(2.25-2.48) + 0.197*(56.6690 – 54.6673) + -0.646*(2.54 – 2.66) + 1.348*(2.38 – 2.15) (*explained*)

(56.664 – 57.573) + (0.046 – -0.104)*1.7699+ (0.242 – 0.045)*4.1832 + (-0.146 – -0.294)* 2.4031 + (-0.183 – 0.126)*3.5213 + (-0.680 – -0.105)*2.48 + (0.197 – 0.152)*54.6673 + (-0.646 – -0.372)*2.66 + (1.348 – 0.067)*2.15 (*unexplained*)

1.1346264 + 2.507491 = 3.6421174 ≈ 3.64

$\overline{Y}_S - \overline{Y}_E = 68.16 - 64.52 = 3.64$. This means that 1.1346264 / 3.64 = 31% of the planned retirement gap is explained by the differences in working conditions and control variables (age, general health, and education) between self-employed and employees (i.e., the observed characteristics or decomposition). Thus, 2.507491 / 3.64 = 69% of the planned retirement age gap is unexplained. This is the corrected planned retirement gap that shows what the planned retirement age of a self-employed is higher with comparable values of working conditions and control variables of an employee (i.e., the conditional characteristics or effect).

*5.5 To sum up*

First, the empirical analysis is based on a sample of approximately 562 self-employed without employees and 7,754 employees. Therefore, the group of employees is much larger. The descriptive statistics showed that the average planned retirement age of self-employed without employees (68.16) and employees (64.52) differ. Most of the employees respondents plan to retire at an age around 65, most of the self-employed respondents plan to retire at an age around 70. Other important findings of the descriptive statistics are: employees slightly

experience on average more physical load than self-employed, employees slightly experience on average more social support than self-employed, and employees slightly experience on average more financial support than self-employed.

Second, the correlation analyses showed that it is important to control for age, health in general, and education. The partial correlation analysis showed that physical load, emotional load, social support of employees, and financial support significantly correlate with the planned retirement age. Therefore, it can be assumed that there is a relationship between the planned retirement age and the working conditions (except for mental load and social support of self-employed).

Third, the multiple regression analysis of employees showed that physical load is significant negatively associated with the planned retirement age ($\beta = -0.104$), emotional load is significant negatively associated with the planned retirement age ($\beta = -0.294$), social support is significant positively associated with the planned retirement age ($\beta = 0.126$), and financial support is significant negatively associated with the planned retirement age ($\beta = -0.105$). The multiple regression analysis of self-employed showed that only financial support is significant negatively associated with the planned retirement age ($\beta = -0.680$).

Fourth, the interaction terms are added to further explain the relationships between the variables. Only the interaction effects of financial support is statistically significant. In combination with the results of the multiple regression analyses, it can be assumed that there are accurate differences in the impact of a good salary on the planned retirement of self-employed and employees. Thus, the impact of a good salary on the planned retirement age of self-employed is greater than the impact of a good salary on the planned retirement age of employees. The better their salary, the earlier self-employed plan to retire.

Fifth, the Oaxaca decompositions explained the differences in the average planned retirement age of self-employed and employees by decomposing the gap into a part that is due to differences in the mean values of the independent variables within the groups, and a part that is due to differences in the effects of the independent variables. The results show that 31% of the planned retirement gap is explained by differences in the values of working conditions and control variables (age, general health, and education) between self-employed and employees, and 69% of the gap is explained by the differences in the effects of the working conditions and the control variables. The planned retirement age of self-employed is therefore higher when they experience the same working conditions and have the same values of control variables as employees.

## 6. Conclusion

The goal of this research was to contribute to the on-going debate of self-employment and to provide more clarity about the differences between self-employed and employees and their retirement decisions. The research question that was aimed to answer is: "To what extent do working conditions affect the planned retirement age of self-employed and employees?"

The large increase in the number of self-employed might have more impact on labour relations, taxation, and social security systems in the Netherlands than in other European countries. Also, high pension risks of self-employed are emphasized in the public debates, because self-employed accumulate less or no supplementary pension and self-employed often have a relatively low replacement rate. In order to capture the effects of the ageing population, it is important that more elderly people work longer, both self-employed and employees. This research adds important lessons regarding retirement decisions of self-employed and employees, and the adequacy of the retirement accumulation of self-employed.

Self-employed are a very heterogeneous labour market category. The recent growth of self-employed in the Netherlands is mainly due to the growth of 'new' self-employed (i.e., provides labour of services). Also, structural changes in the economy, the emergence of new services, and developments based on liberalization and flexibility contributed to the increase of self-employed. In the empirical part of this research only the self-employed without employees are analysed, because in the research group this appears to be the largest group and the increase in the number of self-employed is mostly due to the increase in the number of self-employed without employees.

The Dutch pension system is analysed, because the high participation in the system threatens to reduce when the group of self-employed is increasing. Analysing the pension system showed that there are differences between the pension provision for self-employed and employees and the consequences thereof. There is a trade-off between freedom of choice and protection. Self-employed permanently seem to postpone their desired retirement savings and this indicates market failure. The policy option to make retirement savings compulsory for self-employed is regularly on the political agenda, and the counterargument that often appears is that self-employed should be allowed to save freely. This argument may be less important now that the group of self-employed is growing, transitions occur between working as a self-employed and as an employee, and also the distinction between subgroups of self-employed is smaller.

The theoretical basis for understanding the retirement planning process of self-employed compared to employees is limited. However, the theoretical framework formed a basis to understand the relationship between working conditions and the planned retirement age. Self-employed face different institutional restrictions on retirement and also different incentives to retire. It is argued that self-employed nearing the statutory retirement age are less likely to leave the labour force, because of lower benefits and higher social insurance contributions. The factors influencing retirement behaviour are largely in line with the working conditions. It can be assumed that among self-employed and employees there are differences in working conditions. For example, theory states that self-employed are working more hours than employees, self-employed want to work more hours than employees, and self-employed in the construction sector face more physical stress than employees. Also, poor quality of work is an important determinant of early retirement and physically demanding or repetitive jobs result in early exits from the labour market. Following the elaborated theory, this research distinguishes four categories of working conditions: physical load, psychological load, social support, and financial support. The analyses have to indicate whether there are differences in the planned retirement age of self-employed and employees, whether there are differences in the working conditions of self-employed and employees, whether working conditions are associated with the planned retirement age, and whether there are differences in the effects of the working conditions between self-employed and employees.

The empirical part of the research offered analyses on data from the Study on Transitions in Employment, Ability and Motivation (STREAM) from Dutch Research Institute TNO. Data from 2015 is used to cope with the influences of the economic crisis and changes in employment of self-employed. The dependent variable is the planned retirement age. The independent variables are the working conditions: physical load, psychological load (mental load and emotional load), social support, and financial support. The control variables are age, general health, and education. The empirical analysis is based on a sample of approximately 562 self-employed without employees and 7,754 employees.

The descriptive statistics showed that the average planned retirement age of self-employed without employees (68.16) and employees (64.52) differ. Also, the averages working conditions slightly differ between self-employed and employees. The multiple regression analysis of employees showed that physical load is negatively associated with the planned retirement age, emotional load is negatively associated with the planned retirement age, social support is positively associated with the planned retirement age, and financial support is negatively associated with the planned retirement age. The multiple regression

analysis of self-employed showed that only financial support is negatively associated with the planned retirement age. The interaction terms logically confirmed this finding. The association of financial support and the planned retirement age significantly differs between self-employed and employees. The negative impact of a good salary on the planned retirement age of self-employed is greater than the negative impact of a good salary on the planned retirement age of employees. The better their salary, the earlier self-employed plan to retire. This is contrary to the findings of previous studies. For example, Parker and Rougier (2007: 697) argued that higher earnings decrease the probability of retirement. However, according to Montalto et al. (2001: 1), a better salary can also result in higher financial wealth, which increases the probability of retirement. Therefore, in combination with the findings of this research, it can be assumed that when self-employed and employees have a higher income, they can save more and afford to stop working earlier. The Oaxaca decomposition explained the differences in the average planned retirement age of self-employed and employees by decomposing the gap into a part that is due to differences in the mean values of the working conditions within the groups, and a part that is due to differences in the effects of the working conditions. The results of this decomposition show that 31% of the planned retirement gap is explained by differences in the values of the working conditions and control variables (age, general health, and education) between self-employed and employees, and 69% of the gap is explained by the differences in the effects of the working conditions and the control variables. The planned retirement age of self-employed is therefore higher when they experience the same working conditions and have the same values of control variables as employees.

Altogether, this research showed that working conditions are associated with the planned retirement age of self-employed and employees to a certain extent and in a different way. Especially financial support shows a significant difference in the effect on the planned retirement age of self-employed and employees. The working conditions (physical load, emotional load, financial support, and social support) are significantly associated the planned retirement age of employees. Only financial support is significantly associated with the planned retirement age of self-employed. Therefore, this research showed that there are actual differences in the effect of working conditions on the planned retirement age of self-employed and employees. However, the analyses do not give a conclusive answer to the research question. Though, this research is an important addition to previous studies and shows the importance of research on self-employment. The differences between the two groups are elaborated. The increasing self-employed part of the labour force in the Netherlands emphasizes the importance to pursue and expand this research. Even though compulsory

options for self-employed are in conflict with policies assuming own responsibility, the preferences for voluntary participation, and freedom of choice for self-employed, the increasing self-employed group cannot be ignored and policies need to be adapted in line with these developments. Thereby, the option for a flexible retirement age makes it possible to personally decide when to start receiving state pension. With the growing self-employed group and in order to capture the effects of the ageing population, this is a good option to maintain retirement income adequacy without endangering financial sustainability.

## 7. Discussion

This research outlined the relationship between working conditions and the planned retirement age of self-employed and employees. However, there are some comments that have to be made when using this research to address policy problems or support new policies in the future. The comprehensive unit may be questioned, because working conditions may entail more than the factors of physical load, physiological load, financial support, and social support used in this research. Also, other control variables can be added such as the household situation, the employment status of the partner, the planned retirement age of the partner, and/or the partner's opinion towards early retirement. Due to the time period of this research, this is not further elaborated. In addition, the group of self-employed was relatively small in comparison to the group of employees. Therefore, using a larger group of self-employed can improve this research.

Furthermore, in this research the reliability and/or homogeneity of the scales used in the questionnaire are not being elaborated. This is done by Research Institute TNO. The findings cannot be further generalized; the conclusion is only applicable to the research group of the STREAM data. The research group is not a precise representative sample of the Dutch working population, although it seems that the distribution of the groups based on age and employment status partly corresponds to the data of StatLine. However, the aim was to examine the influence of various determinants, and for this aim heterogeneity was more important than representation.

Although, this research may not be that comprehensive and conclusive, the findings in this research could be used as a step forward to extending research about retirement decisions. As described, the Dutch labour market is changing. The number of self-employed in growing. As a consequence, there are increasing numbers of working people for whom the supplementary pension is not self-evident. Policy should therefore make less distinction based on employment status, but more based on the needs of the working person. The working population has become more diverse and more individualistic. This increases the need for a pension structure that fits personal preferences and circumstances. Especially, it can be assumed that working conditions can be influenced in order to realise a later planned retirement age to cope with the consequences of the ageing population. Therefore, recommendations according to this research include a combination of more customization and options, so that pension schemes better match the characteristics and preferences of the working population: a future-proof pension system for self-employed and employees.

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# Appendix A

**Table 10: Working population in the Netherlands in 2015, age 45-75 years**

| Category | | N | Percentages |
|---|---|---|---|
| Employee | Total | 2,767,000 | 100% |
| | Men | 1,488,000 | 53.78% |
| | Women | 1,279,000 | 46.22% |
| Self-employed | Total | 594,000 | 100% |
| | Men | 373,000 | 62.80% |
| | Women | 221,000 | 37.20% |
| Total | Total | 3,361,000 | 100% |
| | Men | 1,861,000 | 55.37% |
| | Women | 1,500,000 | 44.63% |

Source: Statistics Netherlands, 2017

**Table 11: STREAM Data in 2015, age 45-70 years**

| Category | | N | Percentages |
|---|---|---|---|
| Employee | Total | 5,490 | 100 % |
| | Men | 3,151 | 57.40 % |
| | Women | 2,339 | 42.60 % |
| Self-employed | Total | 550 | 100 % |
| | Men | 363 | 66.0 % |
| | Women | 187 | 34.0 % |
| Total | Total | 6,040 | 100% |
| | Men | 3,514 | 58.18% |
| | Women | 2,526 | 41.82% |

Source: TNO, 2017

## Appendix B

**Table 12: Percentages of answers**

| Variables | Employees | | | | | Self-employed without employees | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Physical load* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| I. Using a lot of force (e.g. lifting, pushing, pulling) | 4.7 | 11.0 | 17.7 | 16.2 | 50.5 | 3.1 | 8.9 | 16.0 | 18.7 | 53.4 |
| II. Using tools etc. causing body vibration | 2.2 | 3.2 | 7.1 | 7.2 | 80.3 | 1.5 | 4.1 | 8.0 | 7.3 | 79.1 |
| III. Work in uncomfortable postures | 1.2 | 7.8 | 22.6 | 17.6 | 50.8 | 1.6 | 6.5 | 21.9 | 15.8 | 54.1 |
| IV. Stand for long periods of time | 10.0 | 14.4 | 13.7 | 10.7 | 51.2 | 5.8 | 13.7 | 18.1 | 11.3 | 51.1 |
| V. Kneel or squat for long periods of time | 0.5 | 4.1 | 13.7 | 14.5 | 67.2 | 0.4 | 4.4 | 12.6 | 14.4 | 68.2 |
| *Psychological load* | | | | | | | | | | |
| *Mental load* | | | | | | | | | | |
| I. Work requires you to think very hard | 25.5 | 42.0 | 25.8 | 4.7 | 2.0 | 28.3 | 37.5 | 27.2 | 5.0 | 2.0 |
| II. Work requires that you keep your mind on your job | 50.0 | 41.3 | 6.9 | 1.1 | 0.6 | 57.8 | 33.0 | 7.3 | 1.4 | 0.4 |
| III. Work requires a lot of your attention | 36.7 | 45.9 | 14.8 | 1.9 | 0.7 | 42.3 | 38.8 | 15.8 | 2.5 | 0.5 |
| *Emotional load* | | | | | | | | | | |
| I. Emotionally difficult situations | 0.8 | 6.9 | 38.1 | 32.3 | 21.9 | 0.5 | 3.4 | 33.9 | 34.6 | 27.6 |
| II. Emotionally demanding | 1.7 | 10.3 | 32.3 | 31.1 | 24.6 | 1.3 | 6.3 | 30.0 | 34.6 | 27.8 |
| III. Emotionally involved | 2.0 | 11.4 | 38.2 | 28.6 | 19.8 | 4.5 | 12.0 | 35.1 | 26.3 | 22.1 |
| *Social support* | | | | | | | | | | |
| *Social support employees* | | | | | | | | | | |
| I. Help and support from your colleagues | 11.6 | 39.8 | 36.4 | 8.0 | 4.2 | | | | | |
| II. Colleagues willing to listen to work-related problems | 20.8 | 46.9 | 23.8 | 4.9 | 3.6 | | | | | |
| III. Help and support from your immediate superior | 12.0 | 29.8 | 37.7 | 14.7 | 5.8 | | | | | |
| IV. Superior willing to listen to work-related problems | 22.6 | 36.2 | 27.3 | 9.5 | 4.5 | | | | | |
| *Social support self-employed* | | | | | | | | | | |
| I. Help and support from colleagues/other entrepreneurs | | | | | | 2.3 | 12.2 | 31.9 | 22.4 | 31.2 |
| II. Colleagues/other entrepreneurs willing to listen to work-related problems | | | | | | 8.3 | 21.7 | 30.6 | 12.0 | 27.5 |
| III. Help and support from your customers or clients | | | | | | 2.5 | 13.1 | 38.2 | 23.7 | 22.5 |
| IV. Customers or clients willing to listen to work-related problems | | | | | | 6.8 | 17.0 | 29.1 | 20.2 | 26.9 |
| *Financial support* | | | | | | | | | | |
| I. Good salary | 13.2 | 39.2 | 37.6 | 9.9 | | 22.7 | 41.1 | 26.6 | 9.5 | |

[a]: 1 = Always, 2 = Often, 3 = Sometimes, 4 = Rarely, 5 = (Almost) never

[b]: 1 = Not present at all, 2 = Somewhat present, 3 = Rather present, 4 = Highly present