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| **[tHE SPILLOVER EFFECTS OF PENSION REFORMS IN EUROPE]** |
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## Abstract

This thesis will discuss the international spillover effects of pension reforms made in Italy, Germany and Sweden and how they affect the Netherlands. It does so using an Overlapping Generations Model. Initially the pension schemes of the four respective countries are identified. The pension reforms made in Germany, Italy and Sweden are summarized and are subjected to a qualitative analysis, in which the effects of the reforms upon the country initiating the reform and the Netherlands are examined.

It is concluded that when a country using an unfunded pension scheme increases its retirement age, its citizens will experience a lower utility. The citizens of the country using a funded pension scheme will experience a drop in wage, but an increase in pension entitlements.

When a PAYG country reforms its pension scheme from a defined benefits scheme towards a defined contributions scheme, the effects depend upon the demographic composition of the population of the unfunded country; is it ageing or not? If an ageing country reforms from defined benefits towards defined contributions, this will increase the capital-labor ratio and will cause a gain of utility.

The third and final analysis analyses the effects of tax based reform in order to strengthen the third pillar (savings). It is found that this will again result in an increasing capital-labor ratio and will also cause an increase in experienced utility.

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## Introduction

A large part of the OECD countries have a pension system which is based upon the so called Pay As You Go (PAYG) scheme. Some of these countries rely on a fully unfunded scheme, whilst others, like the Netherlands, have combined funded and unfunded scheme (Adema et al. 2008). In a funded pension scheme people save for their pensions through a capital intensive system. Thus, the more a person saves in period *T*, the more extensive the pension benefits of this person are in period *T+1*. An unfunded scheme works on a so called Pay As You Go basis. In this system working individuals pay for the pensions of the older generations, and their pensions in turn will be funded by younger generations.

Many OECD countries cope with an ageing population. This yields to a situation in which “...either the costs of social programs will increase, and with them the contributions and taxes required to finance benefits or benefits levels will have to be reduced, or deficits will increase, or there will be a combination of these.” (Whiteford & Whitehouse 2006: 79).

Large efforts, like extensive pension reforms, are made to make the Pay As You Go (PAYG) scheme more sustainable. However, these efforts are not costless. Reforms in both the funded and the unfunded PAYG scheme have spillover effects. These effects are the positive or negative unintended side effects of the reforms to other countries. (Adema et al. 2008).

Many governments of countries with an (partially) unfunded pension scheme, among which the Dutch, have initiated an increase in the retirement age and / or implemented measures to decrease early retirement (like the VUT reforms in the Netherlands). Other reforms, which have more effect via the capital market are the transformation of a defined benefit system to a system of notional accounts in Sweden, the movement from the defined-contribution system towards a privatization of the voluntarily contribution, like the Riester reforms in Germany and the linking of life expectancy to pension benefits in Sweden and Italy. (Whiteford and Whitehouse, 2006).

Therefore, this bachelor thesis will address the question:

*How did the recent pension reforms in the Sweden, Italy and Germany affect the Netherlands through spillover effects working via the integrated capital market?*

This research will aim to contribute to the acknowledgement of the international spillover effects of pension reforms in the countries mentioned above from an international perspective*.*

Therefore this research aims to indentify the spillover effects of specific reforms concerning both a funded and unfunded pension scheme through the integrated capital market with respect to the international focus, providing more clarification on the matter.

The aim of this study is to provide an analysis, based on the spillover effects of both types of pension systems and the reforms within these schemes. This analysis will highlight the up- and downsides of the different types of pension schemes and will clarify the different (dis)advantages of the reforms for both schemes concerning an integrated capital market.

This research will focus on several specific pension reforms in the countries named in the research question and how it these reforms affect the Netherlands. This will be done using three steps. First, the pension scheme of the country that is analyzed will be identified. Once the type of pension scheme has been established, the recent initiated pension reforms will be discussed. This will be done for all four countries mentioned in the research question. Thirdly, the consequences of these recent initiated pension reforms are discussed, based upon a literature study.

In addition to this, an Overlapping Generations Model (OLG-model) will be explained. Using the OLG-model, there will be qualitative analyses of the effects the various pension reforms on the Netherlands.

Finally, the results of the analysis will be discussed and eventually conclusions will be drawn based on the analysis and the discussion.

## 2. Theoretical Framework

This chapter will provide an overview of the prevailing views on pension (reforms). It will do so by first addressing the basics concepts of pension systems and their objectives. In addition to this, the concept of spillover effects of these pension reforms will be addressed. In the final section of this review, pension systems of four countries (Germany, Italy, the Netherlands and Sweden) will be identified and analyzed including their recent reforms.

### 2.1 Types of pension schemes

Based upon the literature the different pension schemes can roughly be divided into two types: funded and unfunded. Figure 1 represents this and states the main characteristics of each type.

Figure 1. Pension schemes and their characteristics

Source: Lindbeck and Persson (2003)

A funded scheme is financed by the contributions made by the recipient. These contributions will be invested and will finally yield the benefits at the time of retirement. These benefits thus depend on the performance of the investments at the time of retirement.

An unfunded scheme, also known as a Pay As You Go (PAYG) scheme is financed by a lump sum or proportional tax, which is usually imposed on the working force. In such a scheme the working generation pays for the retirement of the retired generation. The benefits that the retiree will receive are determined using a ‘fixed formula’. (Lindbeck and Persson ,2003).

Another way of looking at pension schemes is dividing them according to actuarial fairness. In an actuarial fair pension scheme the contributions of an individual are equalized to the received retirement benefits of this individual over his/her lifetime. This means that in such a system there is no redistribution of wealth or income regarding retirement benefits.

Queisser and Whitehouse (2006) state that ‘ The Aaron-Samuelson condition shows that, in a PAYG system, the fiscally sustainable rate of return is the sum of productivity (or average-earnings) growth and the growth (or shrinkage) of the workforce.” Unless in a scenario where the ratio between productivity growth and workforce growth is 1:1, that in an unfunded pension scheme there has to be a trade-off between actuarial fairness and fiscal sustainability (regarding the issue of redistribution of wealth and income). A pension scheme is either actuarial fair (meaning there is no redistribution of income and wealth), but not fiscally sustainable (unless when the ratio of productivity growth and workforce growth is 1:1), or it is fiscally sustainable but not actuarially fair. In such a scenario a decrease in either one of the growth percentages has to be compensated by the other one. (Queisser and Whitehouse, 2006).

### 2.2 Risks

Fully funded pension schemes are more vulnerable for market conditions, whereas a PAYG pension scheme is less vulnerable for these market conditions. In addition to this, insuring these risks will be very costly. These risks do not only consist of bad cyclical market conditions, but also hedging strategies will be forming a new threat for the retirees’ pension benefits by tearing up pension funds. Opposing to all this is that funded pension schemes are far less vulnerable to demographic shocks, like for instance an ageing population. (Miles and Timmermann, 1999).

Unfunded pension schemes also have several drawbacks: Bovenberg and Nijman (2009) argue that regarding Pay As You Go and (corporate) Defined Benefits schemes, the ones facilitating the pension schemes (companies and the government) have less expertise than specialized institutions. Furthermore it is stated that Defined Contributions schemes (individually bound) are substituting these old schemes, which cannot be properly managed by individuals themselves. In addition to this, the DC schemes cope with high transaction costs. Bovenberg and Nijman (2009) argue that the solution for these problems can be found in the individual cooperative pension funds, similar to the stand-alone pensions in the Dutch pension scheme.

### 2.3 Pillars of a pension fund

Adema (2008) summarizes the three different types of pillars on which a pension scheme can be based and their purposes. The first of these pillars is financed through a Pay As You Go system and has the objective to prevent people from living in poverty. The second pillar consists of obligatory savings which are aimed at the prevention of a large drop in income once someone retires. This pillar is funded and bound to an individual or certain type of occupation. The last pillar is a voluntarily savings or insurance plan which can be individually or occupationally bound to a person. Table 1 presents how the retirement income of retirees was distributed amongst the three different pillars in the countries relevant for this research.

Table 1: Distribution retirement income across the three pillars

|  |  |  |  |
| --- | --- | --- | --- |
|  | First Pillar | Second Pillar | Third Pillar |
| *Italy* | 96% | 2% | 2% |
| *Germany* | 94% | 4% | 2% |
| *Sweden* | 75% | 20% | 5% |
| *Netherlands* | 56% | 37% | 7% |

Source: Adema (2008)

Whiteford and Whitehouse (2006) provide in an overview of the current state of the pension schemes in various OECD countries. This paper distinguishes two tiers. The aim of the first tier is to facilitate in social safety nets. This can be done in various ways, for example a flat rated basic scheme. Other schemes are more targeted towards a specific (demographic) group, the so called targeted schemes. These schemes are aimed at increasing the pension benefits for less advantaged retirees. Social assistance schemes are more or less along the same lines as the target schemes; they are aimed at the protection of the less advantaged retirees. Working with the same objective, but along other lines are the minimum schemes. These schemes are designed to guarantee every retiree with a minimum income and therefore a minimum living standard.

The second tier aims at providing a replacement rated income, meaning that these benefits are depend on the income the recipient earned in the past. Whereas the first tier has no regard for the recipients past, but only for the current financial state, the second tier depends on the previous activities of the retiree. These benefits are distributed depending upon the scheme which applies to the second tier in a specific country. There are four different types of schemes, which differ in the way that pension entitlements are financed. Defined benefits schemes are based upon the years of employment and the previously earned income and will ensure the retiree with pension benefits which are known in advance. Defined contribution schemes on the other hand work as a capital accumulating scheme in which the cumulated capital is eventually paid out as pension benefits to the retiree. Notional accounts are a PAYG scheme, but through crediting notional points to an individual contributor this scheme resembles a defined contributions scheme. Finally, public points are based upon the idea that workers earn points dependent on their contributions. At the time of retirement, the number of points is multiplied with the value of a point and thus yielding the pension benefits.

The first tier can be regarded as an unfunded scheme, since it is financed using a tax (lump sum or proportional). The second tier contains main characteristics of a funded scheme, but is not necessarily a funded scheme. Especially the last two forms (notional accounts and public points schemes) are frequently seen in an unfunded scheme.

Table 2 represents the state of affairs concerning the pension schemes for the countries relevant for this research.

Table 2: Overview of pension systems in various countries

|  |  |  |  |
| --- | --- | --- | --- |
|  | *First tier* | *Second tier* | *Retirement age (early retirement) in 2008* |
| *Germany* | Social assistance | Public points | 67 (65) |
| *Italy* | Social assistance | Public notional accounts | 66 (60) |
| *Netherlands* | Basic | Private defined benefits | 65 (60) |
| *Sweden* | Targeted | Public notional accounts, private defined benefits and contributions | 61 – 67 |

Source: Whiteford and Whitehouse (2006) & OECD (2011)

Table 1 shows that the three different pillars do not have an equal share in the financing of a pension scheme. Furthermore is the strict difference between the first and second pillar (that solely the first pillar enables redistribution of income or wealth) that has been indicated in the literature is not always as strict in practice as it is in theory.

Due to this difference between theory and practice, the qualification of pension schemes as ‘funded’ or ‘unfunded’ cannot solely rely on presence of a second or third pillar. Later in this research the degree of funding will be determined through the comparison of the public and private expenditures on pensions.

### 2.4 The Overlapping Generations Model

In an Overlapping Generations Model, or OLG-model, each individual has two different periods in which they live. In the first period the individual will be part of the labor force and in the second period these individuals will live as retirees. Further assumptions are that retirees do not work and both retirees and workers are non-altruistic and homogeneous.

Furthermore it is assumed that the world consists of only two countries which solely differ in the way their pension schemes are financed. Country *P* finances its pension schemes through PAYG and country *F* uses a funded pension scheme. (Adema et al., 2008).

The OLG-model can be applied to a specific situation using a standard Cobb-Douglas production function.

 (1)

Within this function *L* denotes the input of labor, the *K* denotes the input of capital and the *A* stands for the factor of productivity.

Furthermore the real wage (*w*) and the interest rate (*r*) are equal to (*δ* denotes the depreciation rate).

 (2)

 (3)

Assuming full capital mobility, we can conclude that *rP*=*rF*, *wP*=*wF* and *kP*=*kF*

Regarding the size of the population we can denote that the size of the first generation (younger people) is equal to:

 (4)

In the equation above, *L1* represents the younger, working, generation and *L0* denotes the older, retired generation. The rate at which the (old) population reproduces is represented by *n*. The higher this rate, the more children per person are born.

Determining the relative size of each country, regarding to population can be done by the equation below, *v* then represents the ratio between the population sizes of the two countries.

 (5)

The pension entitlements (*z*) in country *P* are financed through taxes imposed upon the young, working generation (*t*). In country *F* this is done by investing the contributions. This yields the following equation, where denotes the probability for longevity:

 (6)

 (7)

The expected utility of a certain individual at period *t* is given by the following utility function, where denotes the consumption of the elderly in period *t+1,* denotes the consumption of the younger generation at period *t* and *ρ* represents the time preference of an individual:

(8)

And additionally, the life time budget constraint:

(9)

The optimal savings in each respective country is given by:

(10)

(11)

The equilibrium in the capital market between country *P* and county *F* (where *s* denotes the savings) is shown below:

(12)

## Pension systems

### 3.1 General

Many of the pension crises in OECD countries can be directly linked to a lower fertility rate, a higher life expectancy rate and the appearance of early retirement. (Queissir & Whitehouse ,2006)

As mentioned, the degree of funding strongly differs between countries. Table 3 expresses the expenditures on pensions (both public and private) relatively to the Gross Domestic Product.

Table 3. Public/Private Spending on pensions (as % of GDP).

|  |  |  |
| --- | --- | --- |
|  | Public Expenditure | Private Expenditure |
|  | 2009 | 2009 | 2010 |
| Germany | 11,3% | 0,3% | 0,2% |
| Italy | 15,4% | 0,2% | 0,2% |
| Netherlands | 5,1% | 3,9% | 4,0% |
| Sweden | 8,2% | 1,3% | 1,4% |

Source: OECD Pension Global Pension Statistics 2013

Following Table 3, it can be stated that in the Netherlands private spending on pensions is significantly larger than in the other three countries (and especially larger than in Germany & Italy).

Table 4 below shows the total investments of pension funds as a percentage of a countries GDP. This table also indicates that the Dutch pension scheme is by far more capital intensive than the pension schemes of respectively Germany, Italy and Sweden.

Table 4. Total investments of pension funds (as % of GDP)

|  |  |
| --- | --- |
|  | Total investments of pension funds (% of GDP) |
|  | 2009 | 2010 |
| GermanyItaly | 5,2%4,1 % | 5,2 %4,6 % |
| Netherlands | 126,0 % | 134,9 % |
| Sweden | 8,4 % | 9,6 % |

Source: OECD Global Pension Statistics 2013

### 3.2 Germany

#### Identification

The German pension schemes consists of the traditional three pillars: the first pillar aims at social assistance, the second pillar is used to create additional entitlements for an individual (using public points) and the third pillars are the recently introduced Riester-saving plans. The difference between the Riester-saving plans and the creation of additional entitlements is that the third pillars consist of non-obligatory savings.

A pension point is yielded every year a worker contributes at the average earnings. The allocation of pension points is proportional to the ratio between the gross average earnings and a workers income. Therefore will someone who has an income which is higher than the gross average earnings gain more pension points in that year than someone who has a lower income.

The value of these pension points is upgraded on a yearly basis, linking it to the development of gross wages and two other factors. These factors are linked to the actuarial neutrality of the pension scheme. The first factor is the adaptation of the contribution rates to pension scheme (statutory) and the schemes within the second pillar. Since this is a negative relation, the indexation of public points will drop when the contribution rates increase. The second factor ensures that changes in the dependency ratio are taken into account regarding the value of pension points. It is estimated that in the long run, due to this indexation the pension benefits will be 14% below the increase of average earnings.

In order to receive pension benefits in Germany, one has to be minimally 65 years old and must have been a contributor for at least five years. There are possibilities for early retirement (at the age of 63), but in order to so, one must have been a contributor for 35 years. When an individual decides to retire before the age of 67, it will yield a reduction of 3,6% in pension benefits per year of early retirement. There are exceptionally rules for people who have been a contributor for more than 45 years. Also people who have taken care of children or disable people qualify for alternative rules.

The German pension scheme has an additional provision for parents. Every couple gets one pension point for childcare for children up to 10 years old. If parents decide to combine working with childcare, this will yield an additional 0.33 pension point.

The unemployment insurance covers loss in pension contributions in the first period of unemployment with 80% of gross earnings. The length of the first period varies from 6 up to 24 months, depending on a persons' age and years of contribution. (OECD, 2011)

#### Pension Reforms

In Germany there have been significant pension reforms in the past 20 years. The larger part of these reforms are the so-called the Riester reforms (after the German Secretary of Labor and Social Security). Börsch-Supan (2012) provides an oversight of the body and the establishment of these saving plans.

The objective of the reforms in Germany was to strengthen the third and second pension pillar (respectively private savings and occupational earnings) and thus strengthening the funded pillars of the pension scheme. These reforms can be defined as saving plans for the individual which are aimed at bridging the gap between public pensions benefits in the future (which are decreasing due to an aging population, amongst other things) and the current pension benefit standards. These plans are partially subsidized by the German state and to overcome ‘poverty traps’ for lower income groups or families, there have been implemented tax breaks for these specific groups. (Börsch-Supan, 2012)

The pension reforms in Germany between 1990 and 2012 consist of several elements. Fore mostly, these elements are a reduction in pension benefits before the pension eligible age, valorization,

shifting towards a Defined Contribution pension scheme (via using tax-based incentives) and the abolishment of tax-breaks for pension benefits. Valorization is the revaluation of in this ca**s**e the retirement benefits of a retiree. This revaluation usually is based upon the living standards.

(Whiteford and Whitehouse, 2006).

#### Consequences

Börsch-Supan (2012) describes the implementation of the so called Riester reforms in Germany and the factors which contribute in the actual take off of these subsidized saving plans. It is found that after substantive simplifications in the savings scheme the reform is more rapidly implemented and accepted. Moreover, the research shows that less educated people have a lower acceptance rate of the reforms. Therefore it is argued that information and knowledge about pensions and the specific reforms are at the essence of acceptance.

Honekamp and Schwarz (2010) argue that the savings in the third pillar require a person to make an estimation regarding their future pension entitlements. This study finds that part-time workers and low-educated or low-paid workers have the most difficulties making these decisions. Also women are found to have more insecurity regarding their pension entitlements.

Furthermore it has to be taken into account that these reforms took place less than two decades ago, which makes the drawing of conclusions harder and maybe even preliminary.

###  3.3 Italy

#### Identification

The Italian pension scheme is based on the principle of notional accounts. The contribution rate is 33% and is largely financed by employers (66,7%). The Italian pension scheme has a first pillar which is aimed at social assistance and a second pillar which is, like stated above, a notional accounts scheme. The third pillar is also represented within the Italian pension scheme, but the number of participants within these pillars is still low. The Italian governments aims to counteract this through new legislation by creating a stronger (financial) incentive to participate within the voluntarily savings scheme. Men are eligible for pension benefits as of age 65 and women as of age 60.

The total earnings indexation is based upon two factors, namely the lifelong contributions of an individual (which is corrected using the nominal GDP growth) and so called ‘transformation coefficient’. This coefficient links the pension entitlements to the retirement age (a negative relationship) through calculating probabilities of death, leaving a spouse behind and the extent to which widows and widowers will withdraw benefits. In addition to this, the coefficient is reviewed every three years. Using such scheme ensures that at the time of retirement the average life expectancy is taken into account and is related to the pension benefits.

Once pension benefits are distributed, a larger part of these payments are indexed in relation to the price inflation. If the pension payments are below five times the minimum pension the indexation is 100% regarding price inflation. If the pension payments are 5 to 8 times larger than the minimum, this percentage is only 75 percent. For pension payments larger than 8 times the minimum pension there is no indexation.

Early retirement used to be possible as of age 57, but has been increased in the past few years up to 61. Exceptions are made for persons who have been a contributor to the system for more than 40 years. In addition to this, in recent reforms the minimum pension has been abolished and transferred to a social assistance pension. Only people with income below a certain threshold are eligible for this.

The third pillar provides in an occupational system which contains both open and collective funds which is financed like a severance pay (at 6,91%). Like stated above, the enrollment of workers within such a fund is still at a low rate. Some of the recent reforms that were initiated in order to counteract this will be discussed below.

For women, the transformation coefficient will be more favorable if they enter parenthood. How more favorable depends on the number of children. In addition to this, unemployment will be covered for five years by the insurance schemes. (OECD, 2011)

#### Pension Reforms

The Italian pension scheme was largely reformed in the beginning of the 1990’s. It became apparent to the Italian government that the old pension scheme was not sustainable and the urge to cut public spending in such a situation was recognized. Italy moved further away from a PAYG pension scheme by linking the life expectancy to the pension benefits and abolishing defined benefits and moving towards notional annuity calculation. (Whiteford and Whitehouse, 2006).

First of all the retirement age was increased (from 60 to 65 for men and from 55 to 60 for women). In addition to this the number of years one had to be a contributor, has been increased from 15 to 20 years. Another reform, targeted at cutting public spending, was the alternative calculation method in which the years of least contributions were now no longer taken into account. In line with this was the flexibilization of the retirement age, allowing Italians to retire between the age of 57 and 65. (Aguda and Garcia, 2011).

Whiteford and Whitehouse (2006) summarize the pension reforms in Italy in five different categories. In addition to the reforms named above, there was an additional reform regarding the early retirement schemes. These schemes were tightened by increasing the number of years a person minimally had to be a contributor in order to qualify for early retirement.

In 2007 there were additional reforms regarding the voluntary occupational pension scheme. Since the enrollment of workers in these funds was at a very low rate, the government decided to create more incentives to enroll in these schemes. Among these were fiscal incentives and the transfer of severance pay in these accounts unless the contributor wished otherwise. (OECD, 2011)

#### Consequences

Agudo and Garcia (2011) claim that the success rate of these reforms varies. The reform regarding the alternative calculation of pension entitlements (and thus cutting out the years of the least contributions) was successful in cutting public spending. Other reforms lacked in sustainability since they did not take the demographic change of the next few decades into account. Another reform which was very successful in decreasing public spending was the flexibilization of the retirement age. (Agudo and Garcia, 2011).

### 3.4 Sweden

#### Identification

The first pillar within the Swedish pension scheme can be described as ‘targeted’. It provides in a guaranteed pension, which ensures that retirees whose pension benefits (originating from the second and third pillar) are below a certain threshold can still count on a minimum amount of pension benefits. The second pillar is financed through notional accounts and contributions depend upon a contributor’s income. In addition to this there is an additional defined contribution pension scheme, creating a so called ‘premium pension’. The contributions of the latter two schemes are a percentage of the contributors (pensionable) income.

Pension entitlements are indexed upon several factors in Sweden. For individuals holds that at the time of retirement, his/her retirement age and life expectancy are taken into account. The life expectancy is calculated using (unisex) mortality labels over the last five years. Another factor which has to be taken into account constantly is the balancing mechanism. This mechanism ensures that the pension system is actuarial neutral. It does so by calculating the ratio between assets and liabilities. Should this ratio fall below a certain threshold, the indexation of the pensions is revised and altered into a ‘sustainable’ replacement rate.

The contributions to the third pillar in the Swedish pension scheme (the premium pension) also depend upon ones income. Moreover, this premium pension is mandatory.

The eligibility for the Swedish pension scheme depends on being a resident in Sweden. Proportionally to the number of years (between 3 and 40 years) an individual has been a Swedish resident, he or she can claim Swedish pension entitlements.

Rather than having a fixed retirement age and possibilities for early retirement, the Swedish pension scheme enables a person to retire as of age 61. Calculation of the pension entitlements does depend on the age of retirement, meaning that the earlier a person retires, the larger his or hers actuarial reduction will be. Despite that there is no fixed retirement age; the guaranteed pension cannot be claimed until the future recipient has reached the age of 65 years. Retiring later and deferring your benefits is also possible within the Swedish pension scheme.

Depending on the number of years a person has children under the age of four (or lives with children under the age of four) there will be a crediting in the public scheme. These credits are awarded depend upon the workers income. In case of unemployment the unemployment benefits count as pensionable pay (as of which a percentage is taken to provide in pension contributions). The part of the pension contributions which is usually paid for by the employer, will be paid by the government. These benefits do decrease over time towards a minimum. Initially these benefits are determined based upon the previously earned income. (OECD, 2011).

#### Pension Reforms

In Sweden the pension scheme before the reform contained two pillars: a lump-sum retirement benefit and additional benefits which were dependent on ones income (Allmän tilläggspension (ATP)). For those which had to cope with a low ATP or even none at all there is a supplement which is provided by the Swedish government. In 1998 the pension scheme using defined benefits was abolished and replaced it with a defined contributions scheme based on notional accounts, “…that mimics a fully funded individual scheme while remaining a PAYG scheme. Tied to this is a second tier of fully funded individual benefits (the premium pension)”. (Selén and Stahlberg, 2007: 1178).

To protect the system from destabilizing factors, like the number of pension beneficial outgrowing the number of contributors to the system, there will be an automatic reduction of the index on which the pension benefits are based when the systems copes with a deficit. Furthermore a minimum pension is also guaranteed, should one fall short on pension benefits. These benefits are collectable as of age 61 in the system, unless the minimum pension guarantee is acquired; the eligible age for these benefits is 65. (Selén and Stahlberg, 2007).

#### Consequences

Selén and Stahlberg conclude that the pension reforms were a success, since ‘..most voters are winners in a notional defined contribution reform..’ and that ‘.. the contributions of the working generations (age < 53) are reduced by more than their expected pensions might..’.

However, these reforms have not been implemented long enough to draw any conclusions based on empirical data hard and any definitive conclusions at this stage would be preliminary.

### 3.5 Netherlands

#### Identification

The Dutch pension scheme has a clear distinction between the first and second tier. The distinction between the second and third pillar is not as clear as in for instance Germany. Furthermore there are many different forms of the pension schemes within the second tier.

The basic pension scheme, the so called ´Algemene Ouderdomswet´ (AOW) is based on the Pay As You Go principle. An individual qualifies for these pension entitlements by working or living within the Netherlands. Every year a person does, this will yield 2% of basic entitlements. The benefits of this basic scheme are flat rated, the financing however, is based upon a proportional tax.

The additional pension benefits are secured in a private pension system. In 2008 this system contained 656 different pension funds. Partially, this high number of pension funds is due to the fact that the funds are industry-specific. Despite the fact that these funds are industry-specific, the pension rights of a retiree are transferable in case of a career / job switch. There are possibilities for opting out of these pension funds, which has resulted in thousands of plans which are offered by mainly smaller companies. It is estimated that in 2008 90% of these pension funds used a defined benefit scheme. The remaining 10% used a defined contribution scheme. Nearly all the defined benefits schemes use the average lifetime earnings to determine the pension entitlements (this is the case for 97% of the participants in such a scheme). For a small percentage the measurement of earnings is based upon the retirees’ final salary. An equally small percentage uses a combination of the named earning measurements.

There are no legal requirements to valorize pay from earlier years, as well as there are no legal rules for the upgrading of pension benefits. Despite the lack of regulation on this topic, the social partners (see the description of the ‘poldermodel’ below) ensure that there are rules ensuring this process. For the upgrading of the pension benefits holds that this is done using the wage growth in the respective industry (in 60% of the cases this happened in 2008) or the indexed upon prices.

The early retirement possibilities used to exist before 2005, but were abolished to stimulate the participation rate. Before 2005 it was possible to retire between the age of 60 to 65 years.

Some occupational plans offer the possibility for later retirement, but the basic pension scheme does not. At age 65 these benefits can be generated, whether a person continues to work or decides to retire.

There are no exceptions for the pension scheme as described above regarding unemployment or taking care of children. However, it has to be taken into account that these effects are phased-out due to the flat rated pension benefits within the first tier. (OECD, 2011)

#### Pension Reforms

The pension reforms in the Netherlands concerning the early retirement scheme were initiated in the beginning of the 1990s. Before the 1990s the early retirement scheme was flat-rated. A main characteristic of these so-called VUT schemes was that early retirement benefits, or the replacement ratio of the income, were not related to the age upon one retired. (Euwals et al., 2006)

In the beginning of the 1990s an effort was made via the Dutch ‘poldermodel’ (labor unions and employers’ representatives working together on a national level) to make the early retirements schemes less attractive and more funded (actuarial fairness). The main characteristics of these reforms were the increase of eligibility age for early retirement and the reduction of the benefits. (Euwals et al., 2006)

A few years later the entire VUT schemes were abolished and instead of this the ‘pre-pension’ schemes were introduced. The main characteristics of the new early retirement scheme were the younger eligibility age for an early retirement scheme (from 60-61 to 55), creating more of an individual trade-off between leisure and labor (actuarial fairness made leisure more costly, whereas this was not the case in the old pension scheme) and in addition to this the financial resources which were available for the ‘purchase’ of leisure became more restricted. An early retiree needed 35-40 years of contributions to a pre-pension scheme before being able to collect the full benefits of this pension scheme. (Euwals et al., 2006).

Both pension schemes, the VUT and the pre-pension, differ between several industries. A government official will most likely have a different pension scheme than someone working within another industry. Therefore these reforms were implemented at different paces between 1997 until after 2000 (the telecom, agriculture and catering services industry waited until the end of 2000).

## Classification reforms

In order to make the pension reforms in the respective countries applicable for the OLG model, these reforms have to be simplified to some degree.

Table 5: Classification of the pension reforms per respective country

|  |  |  |  |
| --- | --- | --- | --- |
|  | Germany | Italy | Sweden |
| 1. *(Early) retirement (age)*
 | Reduction early retirement benefitsIncrease retirement age | Increase retirement age & tightening eligibility Flexible retirement age |  |
| 1. *Scheme*
 | Moving towards Defined Contributions | Moving towards Notional Accounts | Moving towards Defined ContributionsIntroduction Notional Accounts |
| 1. *Indexation of benefits*
 | Valorization | Life expectancy to benefitsIncreasing years of contributions to qualifyAlternative calculation benefits | Life expectancy to benefits |
| 1. *Tax based policy*
 | Abolishment tax breaks pension benefits | Tax incentives to increase use third pillar |  |

Table 5 shows the different type of reforms made in Germany, Italy and Sweden organized into four different categories. The first category includes all the reforms which resulted in a change of the retirement age or changes concerning early retirement. The second category provides in a summary of all the reforms which resulted into a change of the type of pension scheme. The category ‘Indexation of benefits’ addresses all the reforms which ensured that pension entitlements are determined according to a different indexation then before. Finally, the ‘Tax based policy’ category contains all the reforms which alter tax policy for pension benefits.Since category 2 represents a reform which focuses on an essential change within a country’s pension scheme and conveniently applies to every country which are incorporated into this analysis, this category will be used in the further analyses.

The second type of reform which extensively has been used by governments to transform their pension scheme and to decrease pressure of public spending is ensuring that people retire at an older age. Therefore the first category in Table 5 will also be used in the further analysis with an OLG model. In contrast to category 2, this category does need some simplification since the reforms differ amongst each other. Not solely in the fact that the different reforms propose different increases of the retirement age, but also different rules regarding eligibility for (early) retirement. Despite the fact that these reforms have different paths of achieving a goal, they all aim at the same goal: people should retire at an older age.

The third and last type of reform which shall be analyzed are the tax incentives which are introduced to stimulate the use of the third pillar within a pension scheme. Analyzing such a reform will give an insight into the effects of a PAYG pension scheme moving towards a funded pension scheme.

From category 1 there will be one reform analyzed through the OLG model, namely the increase of the retirement age. Concerning category 2 there will an analysis regarding the transformation of a Defined Benefits scheme towards a Defined Contributions pension based scheme. Finally, the encouragement of strengthening the third pillar using tax incentives will be analyzed

## Analysis

In this analysis the Netherlands is subjected to the same assumption as country F as is described in section 4. The OLG model will therefore determine the effect of the pension reforms made by Germany, Italy and Sweden upon the Netherlands.

### 5.1 Increase of the retirement age

Consider a situation in which the assumptions of the OLG model described in Section 2 hold. The government announces at *t=-1* that the retirement age in country *P* will be increased at *t=0*.

Due to the increase of the retirement age, the labor force will increase, which will cause the capital-labor ratio to fall in country *P*. This will ensure the fact that capital is now scarcer than it was before. Since the interest rate *r* is correlated to the scarcity of capital, this rate will increase and the real wage  will decrease. This latter is due to the fact that capital has now become scarcer relatively to labor.

The new situation will result in either a reduction of the pension contributions *τ* or an increase of the pension entitlements *z*. This will lead to a situation in which the consumption will increase. Depending upon whether taxes *τ* or pension entitlements *z* will be adjusted, or will increase.

If the taxes will be lowered, this will cause the savings to increase along with . If the pension entitlements are increased, this will cause the savings to decrease and the to increase.

Following Equation 8 in Section 2.4, the expected utility of the citizens in country *P* will be affected by two main effects, the first one being that the increase of either or will cause the expected utility to increase. This effect will be counteracted by the higher interest rate and lower wage, causing the consumption to decrease.

However, in the literature study is argued that countries using an unfunded pension scheme, alter their pension schemes in order to make the schemes financially more sustainable. When we assume that the government of country *P* raises the retirement age just enough to make the pension scheme sustainable again, there will be no reduction of taxes or increase of pension entitlements. In such a scenario, the capital-labor ratio would fall, causing the interest rate to increase and the wages to decrease. This will lead to a decrease concerning the consumption and therefore a lower utility than before the reform.

Due to the perfect capital mobility, there will be a capital flow from country *F* to *P*. This is due to the fact that initially the interest rate in country *P* will be higher and thus there will be an incentive to move capital from country *F* to *P*. This capital reduction in country *F* will cause the capital-labor ratio to decrease, which ensures an increase of the interest rate and a decrease of the wages.

 In the new market equilibrium the interest rate *r* will be higher, but the wage will be at a lower rate than before. Since the income at *t=0* has fallen, but the pension entitlements (income at *t+1*) will increase due the higher interest rate, the expected utility of citizens in country *F* will be dependent upon the individual time preference *ρ*. However, Adema et al. (2008) show that a higher capital-labor ratio combined with a higher level of longevity, will eventually lead to a higher level of utility for the population. Since the capital-labor ratio has fallen in both countries, this would mean that according to this research the citizens would be worse off after the reform.

The spillover effects which arise due to this reform are both positive and negative. The capital flow from country *F* to country *P* ensures that the capital-labor ratio in country *F* will decrease, causing a loss of utility for the citizens of country *F*. However, this capital flow also ensures that the capital-labor ratio in country *P* will not decrease as severe as it would do in the scenario of autarky. The utility loss in country *P* is therefore smaller due to the spillover effects, but at the cost of a decreasing utility of citizens in country *F.*

### 5.2 From Defined Benefits towards Defined Contributions

Consider a situation in which the assumptions of the OLG model described in Section 2 hold. The government of country *P* announces at *t=-1* that the pension scheme will be transformed at *t=*0 from Defined Benefits towards Defined Contributions.

How citizens of country P react on the reform described above depends on how the population of a country is expected to change with respect to age. This depends for a larger part upon the variables of the population growth rate *n* and the probability that a person reaches their retirement age *ε*.

If citizens in country P expect the ratio of to remain the same in the next period, there will not be any changes regarding the capital-labor ratio or any other significant parameters of the OLG model.

However, since all of the countries relevant for this research cope with an ageing population, it is assumed that the ratio will increase. This would mean that fewer contributors will provide in the pension entitlements of more beneficiaries. This results in a situation in which the pension entitlements *z* will have to be decreased (it is assumed that taxes *τ* will remain unchanged since in a DC pension scheme the contributions are defined). People will anticipate lower pension entitlements and will increase their savings to complement their pensions. Due to these higher savings, the capital-labor ratio will increase. This will result in a decrease of the interest rate *r* and an increase of the wages *w.* This is due the fact that capital has now become less scarce relatively to labor.

This lower interest rate *r* in country *P* will cause a capital flow from country *P* towards country *F*. Due to the fact that the country *F* will attract this capital, the capital-labor ratio in country *F* will increase. The interest rate and the wages will be affected in the same way as they were affected in country *P* due to the higher capital-labor ratio.

The consumption in both countries is affected by several factors; the increasing wages will cause consumption to increase at *t=0*, but the increasing savings will counteract this effect. The lower pension entitlements *z* will cause the consumption to decrease at *t=*1.

As can be seen in Equation 8 in Section 2.4 the expected utility depends on the consumption at both *t=0* and *t=1*. Adema et al. (2008) show that a higher capital-labor ratio combined with a higher level of longevity, this will eventually lead to a higher level of utility for the population.

The spillover effect of this reform are generated through the capital flow from country *P* to country *F*. Country *F* will have a higher capital-labor ratio due to the capital flow, which will eventually ensure a higher level of experienced of utility in country *F*. Like stated above, the capital-labor ratio in country *P* will also increase, but the capital flow will ensure that the increase is not as severe as it would do in the scenario of autarky. Both countries will experience a higher level of utility after this reform.

### 5.3 Strengthening the Third Pillar

Consider a situation in which the assumptions of the OLG model described in Section 2 hold. The government of country *P* announces at *t=-1* that the pension scheme will be expanded with tax-based incentives to strengthen the third pillar of the pension scheme at *t=*0. The effects of the reform mentioned above are quite similar to the effects of the transformation of a pension scheme from defined benefits towards defined contributions under an ageing population.

Due to the tax based incentive to increase savings, the capital-labor ratio in country *P* will increase, causing the interest rate *r* to decrease and the wages *w* to increase. However, in contrast to the scenario where a pension scheme is reformed from defined benefits to defined contributions under an ageing society, the taxes *τ* will be lowered and the pension entitlements *z* will remain unchanged.

This lower interest rate *r* in country *P* will cause a capital flow from country *P* towards country *F*. Due to the fact that the country *F* will attract this capital, the capital-labor ratio in country *F* will increase. The interest rate and the wages will be affected in the same way as they were affected in country *P* due to the higher capital-labor ratio.

The consumption in both countries is affected by several factors; the increasing wages will cause consumption to increase at *t=0*, but the increasing savings will counteract this effect. The consumption at *t=1* will face similar contradictions: the increasing savings will stimulate the consumption, but the decreasing interest rate will cause a decrease of consumption.

As can be seen in Equation 8in Section 2.4 the expected utility depends on the consumption at both *t=0* and *t=1*. Adema et al. (2008) show that a higher capital-labor ratio combined with a higher level of longevity, this will eventually lead to a higher level of utility for the population. The difference between reform 5.3 and 5.2 is that tax reduction and the fact that in the case of the reform described in this Section the pension entitlements will not be lowered. This will probably cause the utility to be higher in the scenario of reform 5.3 than in the scenario of the reform in 5.2.

The spillover effects of this reform are simultaneous to the spillover effects as described in Section 5.2. The capital flow will generate a higher level of utility in country *F* due to the increase of the capital-labor ratio, but this will be at the expense of the capital-labor ratio of country *P (*which will still be increased, only less severe)

## Conclusion

In this bachelor thesis the pension reforms of the last two decades are summarized for Netherlands, Germany, Italy and Sweden. These reforms were made for various reasons, but it can be stated that the financial health of the pension system was one of the motivations to reform. When the respective pension schemes are being compared to each other, it is found that the Netherlands has a far more funded pension scheme than Germany, Italy or Sweden. This latter was the reason for using the Netherlands as a benchmark in this research. In the analysis an Overlapping Generations Model was used, examining the effects of reforms in a country using a PAYG pension scheme upon a country using a funded pension scheme.

The first analysis made an inquiry into the effects of the increase of the retirement age in the PAYG country. It is assumed that taxes will not be lowered or that benefits will be increased in the PAYG country due the fact that reform was initiated to financially balance the pension scheme. If this assumption holds, citizens in the PAYG country will experience a decreasing utility comparing to the situation before the reform.

Due to the spillover effects which are generated through the capital market, the macro-economic parameters which are affected in the PAYG country due to the reform, the same parameters will also be affected in the funded country. In the OLG model, these macro-economic parameters are the interest rate and the wages. Due to perfect capital mobility, there will be a capital flow generated which will ensure that the rate of the macro-economic parameters in the funded country will be equal to the rate of those same parameters in the unfunded country.

 Citizens in country *F* will be worse off after the reform. The wages will be lower in the new market equilibrium after the reform, but the pension entitlements in the country using the funded pension scheme will also be higher. However, based on the research done by Adema et al. (2008), it can be derived that the lower capital-labor ratio will cause a loss of utility.

The second analysis examined the effects of a country using a PAYG pension scheme reforming its pension scheme from defined benefits towards a system of defined contributions. In such a situation the PAYG country can encounter three possible scenarios: an ageing population, a rejuvenation of the population or a situation in which the ratio will stay constant. Since the scenario of the ageing population is most realistic for the countries relevant to this research, only this scenario was further analyzed.

An ageing society is forced to lower the disposable income of its retirees by reducing the pension entitlements. However, due to the increased savings the wages will increase generating more disposable income for the young. This will result in a higher consumption on the one hand, due to the increase of the wages and a lower consumption on the other hand due the reduction of the pension entitlements. The statement that the utility will increase is supported by Adema et al. (2008), which states that an increase of the capital-labor ratio will ensure a gain of experienced utility.

The third analysis shows the effect of a tax based reform in order to strengthen the third pillar of a pension scheme. This will result in an increasing capital-labor ratio, but also in more disposable income at *t=0* since the wages will we higher and the taxes will be reduced. This effect will partially be counteracted by the fact that there is now a stronger incentive to increase savings. It can be stated, based on the assumption that a higher capital-labor ratio leads to a higher experienced utility, that the utility in both country *P* and *F* will increase. Additionally, the utility will increase more compared to the reform described in Section 5.2.

The spillover effects are mainly caused due to capital flows between country *P* and *F,* causing the capital-labor ratio to increase. Due to perfect capital mobility between the two countries, the macro-economic parameters which are affected in country *P* due to the reform, will in most cases be affected in a similar way in country *F.* Due to the market equilibrium, the effect of shocks which occur in one economy will be ‘distributed’ among both the economies.

## Discussion

This thesis has provided a combination of the existing literature on pension reforms and the international spillover effects of pension schemes. In addition to this, the pension schemes of the Netherlands, Italy, Germany and Sweden have been identified, along with the reforms of the last two decades. This information has been qualitative analyzed using an Overlapping Generations Model.

The OLG model has a number of limitations, like the assumption that the world consists of two countries and that people solely live for two periods.

The first recommendation is, in addition to these qualitative analyses, to conduct an empirical research, examining the effects of the pension reforms. Such an inquiry will enable researchers to compare the actual effects of the pension reforms to the forecast which were made based upon the OLG model.

A second recommendation is to further develop the OLG model in such a way that it could contain more countries and could contain more macro-economic variables, such as inflation and unemployment.

Other papers, like Cutler et al. (1990) argue that the saving rate in United States in particular (but also other parts of the world) for the last three decades of the 20th century has been too low and taking into account that emerging markets (like Eastern Europe at the time) have a growing need for capital. These market conditions are not taken into account due to the oversimplified OLG model.

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