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Government Expenditure and Social Security System for elderly

Bachelor's thesis

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Declaration:

I declare that I wrote the bachelor’s thesis on my own, using only the listed bibliography.

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ANNOTATION

Title: Government Expenditure and Social Security System for elderly

The thesis aims to analyze the adequacy of pension in the Czech Republic in comparison to the chosen countries in Europe between the years 2013-2017. It is divided into two main parts, the theoretical and practical part. In the theoretical part, we provide a brief theoretical background, a historical and current overview of the pension system of each country, and an overview of social expenditure on pension. In the practical part, we use data from Eurostat to compare the different poverty rates of the chosen countries, and the regression analysis and European social model to calculate the efficiency and effectiveness of social spending. In addition to the practical part, we also provide a specific overview of government expenditure on the pension that includes the reduced poverty rate among the elderly after social transfer.

Key words Social security system, Pension in old-age, Pension adequacy, Senior, Poverty in old-age, Public expendiure, GDP

ANOTACE

Nazev: Vládní výdaje a systém sociálního zabezpečení pro seniory

Tato bakalářská práce analyzuje přiměřenost důchodu v České republice ve srovnání s vybranými zeměmi v Evropě v letech 2013–2017. Práce je rozdělena do dvou hlavních částí jako teoretické a praktické. V teoretické části uvádíme stručný teoretický základ, historický a současný přehled důchodového systému každé země a přehled sociálních výdajích na důchod. V praktické části využíváme údaje z Eurostatu ke srovnání rozdílné míry chudoby ve vybraných zemích a regresní analýzu a evropský sociální model pro výpočet efektivity a účinnosti sociálních výdajích. Kromě praktické části poskytujeme také konkrétní přehled vládních výdajích na důchod, který zahrnuje sníženou míru chudoby mezi seniory ve vazbě na sociální podporu.

Klíčová Slova Systém sociálního zabezpečení, Starobní důchod, Přiměřenost důchodů, Senior, Chudoba ve stáří, Veřejné výdaje, HDP

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TABLE OF CONTENT

I. INTRODUCTION 1

II. OBJECTIVES OF THE STUDY AND METHODS 3

III. THEORETICAL BACKGROUND 4

3.1. Definition of Key Terms 4

3.1.1. Social security system 4

3.1.2. Pension in Old-age 6

3.1.3. Pension Adequacy 7

3.1.4. Seniors 9

3.1.5. Poverty in Old-age 9

3.1.6. Public expenditure 10

3.1.7. GDP 12

3.2. Historical Overview of Social Security System of the Chosen Countries 13

3.2.1. The Czech Republic 13

3.2.2. Germany 14

3.2.3. Ireland 15

3.2.4. Spain 15

IV. THE ANALYSIS OF PENSION IN THE CHOSEN COUNTRIES IN EUROPE 17

4.1. Public Expenditure and Pension of the Chosen Countries 17

4.1.1. Public expenditure and Pension in the Czech Republic 17

4.1.1.1 Social Security System 17

4.1.1.2. Expenditure on Old-age 21

4.1.1.3. Poverty among Old-age people 22

4.1.2. Public expenditure and Pension in Germany 23

4.1.2.1. Social Security System ... 23
4.1.2.2. Expenditure on Old-age ... 25
4.1.2.3. Poverty among Old-age people ... 27
4.1.3. Public expenditure and Pension in Ireland ... 27
4.1.3.1. Social Security System ... 27
4.1.3.2. Expenditure on Old-age ... 31
4.1.3.3. Poverty among Old-age people ... 32
4.1.4. Public expenditure and Pension in Spain ... 33
4.1.4.1. Social Security System ... 33
4.1.4.2. Expenditure on Old-age ... 38
4.1.4.3. Poverty among Old-age people ... 39
4.2. The Relationship Between Social Transfers and Poverty ... 40
4.2.1. The Estimation of the Effectiveness and Efficiency of Social expenditure based on Regression analysis ... 42
4.2.2. The Estimation of the Effectiveness and Efficiency of Social expenditure based on European Social Model (ESM) ... 46
4.3. A Brief Comparison among Chosen Countries from Pension Adequacy Indicator ... 48
4.4. Summary and Recommendation ... 51
V. CONCLUSION ... 55
VI. BIBLOGRAPHY ... 56

I. INTRODUCTION

Public expenditure plays an important role in improving the welfare economics and the quality of life of citizens in the society, and it usually refers to the government expenditure on public services, such as pension spending, unemployment spending, incapacity spending, survivors, dependents spending, and others social services.

According to the object of expenditure, public expenditure classification could be divided into 2 types, such as development and non-development expenditure (Nageshwar, 2019). Development expenditure is the spending on the activities which are incurred directly on economic development sectors, such as health care, education, employment, and other social services (Nageshwar, 2019). Meanwhile, non-development expenditure refers to the general administration services that are indirectly contributed to economic growth, such as on defense, the cost of tax collection, pension spending (Nageshwar, 2019).

Public expenditure on pension is one of the fundamental factors that are needed to ensure the economics stabilities and economic growth of the country because it helps to maximize the social advantage, minimizing poverty and inequality of income distribution among the elderly (Kees, Olaf & Koen, 2012).

The population in the EU is getting older and aging due to the low fertility rates and increase life expectancy. According to the European Commission, the total population in the EU is forecast to increase by 9 million between the years 2016-2070; while the working-age population will be decreased by 41 million (European Commission, 2018). The population aging is likely to reduce the pension benefits in the future as there are more and more seniors and less working-age group. Women are at higher risk of poverty than men, especially among the elderly. In the EU-28, the median income for older women was 6 percentage points lower than men (SPC&EC, pp. 36, 2018). Thus, pension aims to reduce income inequality or poverty in old-age and hardship for the elderly (OECD, 2020). The Older population or seniors represent many challenges to productivity in the labor market and government spending. To avoid the fall in pension level, the pension reforms have made to stabilize the public pension as the share of GDP, such as increasing the retirement age and changes of pension index (European Commission, 2018).

People need a social security system to protect their benefits in an anticipated crisis and build their retired plan to insure their lifetime. Their social security rights depend on the terms and conditions of each country.

This paper aims to analyze the adequacy of pension in the Czech Republic in comparison to the chosen countries in Europe.

Specifically, the bachelor of a thesis is divided into two main parts, theoretical and practical part. In the theoretical part, we provide a brief theoretical background, a historical and current overview of the pension system of each country, and an overview of social expenditure on pension. In the practical part, we use data from Eurostat to compare the different poverty rates of the chosen countries, and the regression analysis and European social model to calculate the efficiency and effectiveness of social spending (Arno, pp.12, 2011). In addition to the practical part, we also provide a specific overview of government expenditure on the pension that includes the reduced poverty rate among the elderly after social transfer.

As a result, the thesis is instructed as follows. Section 2 presents the objective of the study and methods. Section 3 provides a brief review of the relevant theoretical background and provides a historical overview of the social security system of the chosen countries, such as the Czech Republic, Germany Spain, and Ireland. Section 4 delivers the methodology analysis among the chosen countries and provides a summarize of information and recommendation strategy. Section 5 conclusion.

II. OBJECTIVES OF THE STUDY AND METHODS

The objective of this thesis is to analyze the adequacy of pension in the Czech Republic in comparison to the chosen countries in Europe between the years 2013-2017. Adequacy is understood according to the Social protection committee and the European Commission; Adequacy is measured by the ability to prevent and mitigate the poverty risk among older-people (SPC&EC, pp.23, 2018).

To achieve this goal, the following steps will be taken:

- Overviewing the social security system of the elderly among the four countries. European countries that had different historical development of the social security systems are selected for this research. The countries of Northern Europe (Ireland), Southern Europe (Spain), Western Europe (Germany), and Central Europe (The Czech Republic) are selected.
- Identifying the efficiency and effectiveness of government expenditure on social transfer in relation to the poverty rate among the four countries within the EU-28. For additional information, we also provide a specific overview of government expenditure on the pension that includes the reduced poverty rate among the elderly after social transfer.

The research of this thesis mainly based on secondary data or desk research, such as Eurostat, Ministry of Labor and Social Affair, European Commission, OECD, information from national statistics, and various international databases.

For overviewing the social security system development among the four countries, it will be carried out by a theoretical framework of the social security system and review the historical development of social security. For measuring the effectiveness and efficiency of public expenditure, it will be carried out by regression analysis and European social model, which are constructed from Eurostat data. Specifically, we will use European calculation methods based on the European social model (ESM). Historically, ESM is one of the primary objectives of EU to create more equitable in society to end poverty and to guarantee the subsistence wage that allows a decent living for all individual in society (Timofei, pp.13, 2011). According to European Commission, ESM is defined as a set of common values to democracy and to adequate social security and solidarity toward individual in society (Jepsen & Serrano Pascual, pp.234, 2005).

III. THEORETICAL BACKGROUND

3.1. Definition of Key Terms

To have a better understanding of this thesis, it is necessary to give readers insight and clarify the key feature concepts and necessary terms that will be used further in the text. For example, what is the social security system? How many types of pension? Are pension adequate if they prevent poverty risk in old-age? How do we define a senior? What kinds of poverty classification is used in our analysis?

The following are a brief discussion on the definition of Social security system, Pension in old-age, Pension adequacy, Seniors, Poverty in old-age, Public expenditure, and GDP.

3.1.1. Social security system

Social security is known as social insurance or social welfare program. According to Wagner's law, social insurance created only when a state is rich enough to improve the welfare and luxury goods of its country (Cutler, D. M., & Johnson, R, p.93, 2004). Social insurance was firstly created in the 1880s in Germany, which consisted of old-age insurance and invalidity, accident insurance, and sickness insurance that aimed to prevent people from falling into poverty and provided an emergency help, especially for the elderly (Cutler, D. M., & Johnson, R, p.89, 2004).

Later, when capitalism has entered the world economies, social insurance has been using in all developed countries and becomes necessary for all working-class family. Thus, on August 14, 1935, the social security act was officially signed into law as the first national welfare law of the United States and other developed countries by President Franklin D. Roosevelt in order to protect individuals against financial devastated during the great depression (History, 2018). The basic principle of the social security act is to mainly help citizens overcome the economic crisis with social benefits, such as retirement benefits, survivor and death benefits, and disability benefits (Lawyer.com, 2018).

As a result, in 1995, Germany introduced the Social Long-term Care Insurance and got fully adopted in 1996 to relieve the financial burden on those who are in long-term disability and illness, retired, or need a nursing home facility and medical care because of the reduced functional capacity in daily life (Geraedts, Heller, & Harrington, p.375, 2000).

Long-term Care Insurance is an important component to support the social security system and it concludes the specific social care services, professional health, and the protection of care. For example, in the Czech Republic, social care services, social protection, and social counseling services are provided for the elderly (Tevasopo, 2019).

Firstly, social care services include personal assistance, care service, emergency care, and nursing home (Tevasopo, 2019).

1. Personal assistance is provided by the state to help seniors and disabled people whose situation needs the help of another person. Personal assistants support the clients to deal with their social and physical activities, such as routine self-care both at home and in the community, hygiene, running a household, and assist them in exercising of rights and legitimate interests (Odbor 22, 2017).
2. Care service is also known as nursing care that is provided with a specified time at homes of people who are in need. It is provided with particular fees to people with reduced self-sufficiency due to age, chronic illness, and disabilities, while it is free for families with three or more children who are born simultaneously and seniors who are over 70 years old (Odbor 22, 2017).
3. Emergency care is a field of social care service provided a distance voice and electronic communication, such as a mobile phone with a special button to contact the operator and it is provided with a specific fee (LADARA, 2011). Emergency care usually supports users with 24/7 through the years at a minimal cost. It is a special service for people who are facing a high risk of their life that is caused by the sudden deterioration of health or crisis situations; for example, a fall, nausea, panic, and anxiety (Odbor 22, 2017).
4. Nursing home includes Day and Weekly care center, retirement home, and special regime home.

Secondly, social protection services help people to overcome the unwanted situation in society and to protect society from the spread of unfavorable social problems. It refers to the methods and activities to stop social problems in the first place and aims to avoid the need for more intensive services (Penny Lane Centers, 2019). The early intervention stage is needed to assist the prevention services to strive for halting the development and to reduce the negative factors of social problems because the intervention will be less effective if it is not taken on time (Maria, 2005, p.3).

Thirdly, social counseling services give advice and necessary information for people to deal with their social problems and assist them in exercising their rights and legitimate interests (Odbor 22, 2017). It is not only gathering information based on individual needs but also supporting them in the decision-making process.

In addition, the social workers of professional health are needed, such as a doctor, nurse, healthcare social worker, paramedical worker and others, pedagogical worker, service personnel, executive, and office worker. They are responsible for helping individuals, families who are facing problems and could not overcome it in their own ways (Guide 2 social work, 2017). They help to improve the life quality of people and human well-being by organizing the communities, policy development, and crisis intervention (NASW, 2014).

3.1.2. Pension in Old-age

Pension is a part of a retirement plan that aims to protect older people from poverty; it refers to the payment that employees receive after retirement (OECD, 2020). Retirement plans could be provided by employers, insurance companies or the government. Pension policy is designed and implemented differently by each EU country. As people grow older, they cannot rely much on income from employment as the majority of population is usually excluded from the job at their older-age. Due to the fact that most older workers are less energy, facing a health problems, and less productive than younger employees. For this reason, pension becomes the fundamental income security for elderly (Social protection & Human rights, 2015).

Pension expenditure is calculated as a share of GDP. The total pension expenditure per older person depends on the number of older population and the economy of the country (SPC&EC, pp. 35, 2018). More than a quarter of total population in EU or approximately 130 million people in EU receive a pension (OECD, 2015). Since women are the majority pensioners, are most likely to live alone, and have a higher risk of poverty than men, they have lower pension than men (SPC&EC, pp.68, 2018). The number of pension beneficiaries will increase, as the number of working-age group decline.

During the working period, employees are required to pay for social security taxes or payroll taxes. Payroll tax can be imposed on both employee and employer. It is calculated in the different percentage of the base wages or salaries of the employee depends on the rule of law of each country (Julia, 2018). There are two main types of pension plan, such as defined-benefit plan and defined-

contribution plan. Firstly, defined-benefits plan (DB) specifies the money benefits at retirement. It is funded and guaranteed by employers based on the salary history and length of employment of employee with the accrual rate from the company (DOL, 2020). Secondly, defined-contribution plan (DC) is a retirement plan that employee and employer contribute at a fixed rate of their income (DOL, 2020).

Furthermore, there are many types of pension benefits such old-age pension, disability pension and survivor pension. Firstly, old-age insurance or old-age pension refers to a monthly paycheck budget to retired employees who are usually out of labor force. Secondly, Invalidity insurance or disability pension is a type of pension provided to people who are unable to perform their work permanently or temporary due to accidents or illness.

In this context, the old-age pension and disability pension are being discussed. Each European country has its regulation and different range of the budget provision on pension. For example, according to data from OECD, in 2017, the public expenditure on pension in Ireland, the Czech Republic, Germany, and Spain were at 3.6%, 8.1%, 10.1% and 11.1% of GDP respectively.

3.1.3. Pension Adequacy

Pension adequacy should not only define based on the reducing of poverty risk, but also the length of retirement and how pension income compare to the earning income before retirement, because the different in pension outcome depends on the years of contribution during the working life and income level. According to the Social protection committee and the European Commission, Pension adequacy is measured by three aspects, such as, Poverty protection, Income maintenance, and Pension duration (SPC&EC, pp.22, 2018).

Firstly, adequacy is measured by the ability to provide poverty protection for elderly. It aims to prevent and mitigate the poverty risk among the elderly aged 65 and over. People at risk of poverty (AROPE) refers to those who have low disposable income, which is below 60% of national median income (OECD, 2019). In 2015, on the average of EU, 14.1% of the elderly were at risk of poverty compared to 18.1% for the rest of population (European Commission, pp.2, 2013). As a number of people have fail either to secure the sufficient income or to meet the longer contribution requirement by the time they reach the standard pension age, it is important to establish some specific measure protecting them from poverty, such as minimum income provision for elderly (SPC&EC, pp.23, 2018). In addition, gender gap in employment lead to income inequality and

poverty risk among men and women. To close the gender gap, state need to ensure the availability of affordable childcare and balance use of parental leave between parent (ITUC, 2019).

Secondly, adequacy is measured by the capacity to maintain income of the elderly after the retirement by income replacement (SPC&EC, pp.47, 2018). Income replacement rate is defined as the ratio of pension income to working income and it refers to the percentage of income from employment before the retirement at age 50-59 that is replaced by the pension income at aged 65-75, taking into account the social security contributions and personal income tax paid by the workers and pensioners (OECD, 2020). It shows how effective pension system could replace earning income by capturing the difference between the late career and early year of retirement. It is computed for a single worker who have been in full time work with an average earning for 40 years until the standard pension age (SPC&EC, pp.49, 2018). The replacement rate is expected to range from 40.1% to 92.5% between 2013-2053 (European Commission, pp.3, 2013). According to the International Labor Organization, for old-age pension, it is recommended to have replacement rate at least 40% of the previous income (Anne, Krysztof & Tharcisse, 2020). In 2018, on the average of OECD countries, the replacement rate was 58.6% of income earning (OECD, 2020).

Thirdly, adequacy is measured by the pension duration that refers to the length of retirement to which pensioners are entitled. Almost all EU member state are in the process of increasing retirement age in accordance with the pension reform. Increasing in life expectation means that the government expenditures might need to increase to cover the additional years, even though the number of years contribution is remained the same. According to the Committee for a Responsible Federal Budget in 2013, increasing the retirement age would also promote working longer, increase the size of labor force, and increase retirement saving. As worker are living longer, they must also remain the labor market for a longer time. Even the barriers might exist for older people, age discrimination, state can support the older worker by providing training, lifelong learning, and taking action to stop age discrimination (ITUC, 2019).

As life expectation increase, decline working-age population, the required increased in public expenditure might not be sustainable. Thus, in aging society, in response to pension adequacy, it is required to maintain longer working life, to postpone retirement duration, to restrict early

retirement and to increase the complementary retirement saving (European Commission, pp.7-8, 2013).

3.1.4. Seniors

Seniors are also known as older adult, elderly or old-age people. Senior is defined based on the chronological age and refers to those who aged at 65 years or more (WHO, 2020). After retirement, a senior who collects pension benefits is called a pensioner. Seniors are most likely at risk to get chronical illness, and severity of infection since there mental health and physical health decrease with the ages.

Seniors and young generation under 14 year are considered as dependency as they are not counted in labor force or working age. In some countries, such as Spain, it allows retired people to work as part-time if they wish (European Commission, 2020). However, a higher dependency ratio indicates that a country face greater economy burden in compromising the aging population because it reduces the productivity growth, which leads to decrease in economic growth.

3.1.5. Poverty in Old-age

Poverty is a condition in which society lacks of scarcity resources and unable to provide people a minimum living standard (James, 2019). This entails that people are not able to acquire enough goods and services for normal life and meet the basics need, such as foods, education, and health care. Severs health problems, unemployment, low education, natural disaster are considering as the root causes of poverty. Specifically, people at risk of poverty (AROPE) refers to those who have low disposable income, which is below 60% of national median income (OECD, 2019).

In all member states of the EU, women above age 65 face a higher risk of poverty than men. In full-time jobs, women work less than men for 4.9 years on averages across the EU countries, less likely to be employed than men, and earn less than men (SPC&EC, pp.73, 2018). In addition, women face more career interruption and part-time work than men as they need to take care of the household and children (OECD, 2015). In the EU, older women tend to live alone more than men, as 40% of elderly women live in single households compare to 19% of the elderly men (OECD, 2015).

All these reasons translate into a different risk of poverty among men and women. According to the European Commission, to prevent the higher risk of poverty among the elderly people, it

requires a specifics measure within the pension system, such as minimum pension and survivor's benefits (OECD, 2015). Moreover, according to the European pillar of social rights, there are three key important factors to fight for poverty, such as fair working condition, social protection and inclusion and equal opportunities and access to the labour market (European Commission, 2020).

There are many different types of poverty based on social, economic, and political aspects; however, the two main classifications of poverty are absolute poverty and relative poverty (Habitatbrowar, 2019). Firstly, absolute poverty or extreme poverty measures only the necessary amount of household income to meet the necessary basic needs, such as foods, clean water, shelters, education, and health care (Gaurav, 2018). In this type of poverty, people are living below the aforementioned poverty threshold, and they are not affected by social benefits even if the country is growing economically. Secondly, relative poverty or relative deprivation measures the minimum amount of household income to meet the average level of living standard, such as clean clothes, wifi, internet, TV, mobile phone, better education, and decent house (Habitatbrowar, 2019). In this type of poverty, people have a certain amount of income, but they still could not afford the same living standard as others do. The level of households income is settled at a fixed percentage below 60% of median income (tutpr2u, 2018). In addition, relative poverty varies on the economic development of the country as people are granted social benefits or social transfer.

In this context, we collect data from relative poverty to use in our calculating methods as it indicates the social transfer contribution to poor people. So, we can compare how public expenditure on social security system of each country affects on the poverty rate.

3.1.6. Public expenditure

Public expenditure is also known as Government expenditure. An expansion of government expenditure helps the state to increase the supply of public goods, merit goods, and welfare payment benefits. It does not only reduce the unemployment rate and negative externality but also provides goods and services to individuals citizens, such as school, hospital, road, defense, and pension (Economics Online, 2019).

Thus, there are many discussions between the relations of public expenditure and economic growth, such as Wagner's law and Keynesian view on government expenditure. Wagner's law is the first well-known model of public expenditure which was hypothesized by a German economist Adolf Wagner (1835-1917) (Mukesh & Vinod, pp.53, 2015). He propounded the ideas of "Law of

increasing state activities,, which he believed that public expenditure is a result of economic growth that would be expanded during the growth of economic development (Mukesh & Vinod, pp.55, 2015). Based on the Wagner's law, industrialization and modernization, the growth of real income, and the nature of monopolies are the three important factors in improving economic growth and government role (Mukesh & Vinod, pp.56, 2015). In contrast, as stated by a British economist Jonh Maynard Keynes (1883-1946), he believed that increasing the public expenditures demand will boost up economic growth instead (Steven, pp.129, 2016). Based on the Keynesian theory, to restore economic growth, it supports the expansionary fiscal policy which refers to the tax cut or expansion of money supply rather than lower social security expenditures (Steven, pp.204, 2016).

However, government could not only expand the public expenditure without making revenue. According to the Tax Policy Center 2016, there are five fundamental sources for federal government revenue, such as individual income tax, corporate income tax, payroll tax, excise tax, and others. Firstly, individual income tax, which is known as personal income tax, is a type of direct tax that imposes on wages, salaries, dividends, and others income that individuals earn during the year (Urban, 2019). Secondly, corporate income tax is a special direct tax that levies on the legal entities, and foreign company which reside in a specific country (Grow Your Business, 2018). Thirdly, payroll tax or social security contribution tax is a direct tax which is levied on both employee and employer on their base earning for social security and hospital insurance reason (Bankrate, 2019). Fourthly, excise tax is an indirect tax on the value of goods and services, such as property tax, and on a specific harmful product, such as alcohol, gasoline, and cigarettes (Terin, 2019). Lastly, other taxes could be VAT, Road tax, Inheritance tax and gift tax.

Government expenditure by function describes of how much governments spend the budgets on the key areas, which is classified into ten important groups, such as social protection, education, recreation, culture and religious, health, housing and community amenities, environmental protection, economics affairs, public orders and safety, defense and general public services (OECD, 2020). Social expenditure represents the largest share of government expenditure. It is the provision of benefits by the government to 9 social areas, such as old-age, survivor, incapacity, health, family, unemployment, housing, active labor market policies and other social security areas.

Furthermore, pension expenditure represents the largest share of social expenditure. It mainly refers to the expenditure on old-age pension, disability pension, and survivor pension (Eurostat, 2016). It aims to help households or any individuals who are facing the risks because of their ages, disability or dependents. The expenditure on pension in the EU in 2016 was €1.89 trillion, among them expenditure on old-age pension accounted for 76.7%, while survivor pension accounted for 11.4% and disability pension accounted for 6.6% (Eurostat, 2019). Such a benefit can be delivered by cash transfer or transfer payment. On the average of the EU, the public expenditure is expected to increase to 11.7% of GDP between 2013-2040 (European Commission, pp.7, 2013).

Transfer payments is a redistribution of income by government to individual through social program, such as pension state payment, unemployment benefits, welfare and others social security benefits (Oxford, 2020). Government uses the revenue receiving from income taxation to make transfer payment.

In this context, we focus on the expenditure on old-age pension and disability pension among the chose countries.

3.1.7. GDP

GDP is an abbreviation of Gross Domestic Products, which is an important indicator to determine the growth of economic activities of a nation. According to OECD (2018), ‘‘GDP is the standard measure of the value-added created through the production of goods and services in a country during a certain period’’. It calculated by the sum of consumer spending, government expenditures, capital expenditures, and net export of goods and services (Jim, 2019).

Firstly, consumer spending or personal consumption expenditures index (PCE Index) is a part of national income which shows the amount of how much households spend their income on durable and non-durable goods and services in their daily life and reveals the elasticity of demand (Will, 2019). The higher of personal consumption expenditure, the higher GDP growth. Secondly, government expenditure refers to the spending on goods, and services of the government at all level, such as local, federal, and national and it includes the salaries of the government employees, public infrastructures, and military machine (CFI, 2019). Thirdly, capital expenditure or Business investment creates employments and increases productivity of the country. According to Bureau of Economic Analysis, the business investment consists of two main components, such as fixed

investment and changed in private inventory (Kimberly, 2019). Fixed investment could be *residential*, which includes the real estate investment, such as houses, condos the residential construction, and *non-residential* investment, which includes the business equipment, such as capital goods and manufacturing equipment (Kimberly, 2019). The changed in private inventory is also important in greater the GDP because of the larger amount of increasing inventory, the better for economics. Inventory can be in a form of final products, intermediate goods and services, and materials (BEA, 2018). Finally, net Exports is given by the formula NX=TE-TI, which is the value of total amount of export minus the total amount of the import of the country (Christina, 2019). The positive net exports show the trade surplus, while the negative exports show the trade deficits.

In this context, we use nominal GDP in our description of thesis. In 2016, social expenditure in the EU was 28% of GDP. Among that, the expenditure on pension was equivalent to 12.8% of GDP and the expenditure care for elderly was equivalent to 0.5% of GDP (Eurostat, 2020).

3.2.Historical Overview of Social Security System of the Chosen Countries

In the last decades, many countries have struggled with social security reform system in order to foster the retirement saving and disability funds to get the best quality of life for its citizens. In this part, we will highlight some historical reform among the four chosen countries, the Czech Republic, Germany, Ireland, and Spain.

3.2.1. The Czech Republic

Even during the socialist regime of Czechoslovakia, the social policy also existed to support old people, children, and people with a health disorder. In the past, the Czech Republic had three types of Pension reform system which was known as three-pillar systems, such as mandatory pension insurance, retirement saving and pension scheme with state contribution; however, the Second pillar system which was named as Retirement saving or Defined-contribution (DC) was shut down in 2016 after the establishment in 2013 because it created more benefits only for wealthy people, not common residents due to its limited aged between 18 and 35 (Zuzana, H & Josef, A & Iva, C, p.138, 2015). Thus, currently, the Czech Republic is based on the two-pillar systems.

On January 1, 2013, the first pillar or mandatory pension insurance was created and was known as Defined-benefits (DB), Pay-As-You-Go (PAYG) which is a retirement scheme that pension budget of the retiree are financed by their contribution from their past work and it is calculated

based on the basic amount and percentage amount (Julia, 2019). It could be also defined that the current contribution money today is used to pay for the current retirees. It has been represented by more than 90% of old-age pensioner's income and people could claim the pension benefits by 3 years earlier (Social protection committee & the European Commission, 2018).

Lastly, the third pillar which is also known as a Supplementary pension scheme with state contribution started in the beginning of 2013. It includes personal pension insurance with state contribution and other benefits from commercial insurance company or pension company. The government allows the citizen in this category to have tax incentives for their private saving and people could receive the pension benefits up to 5 years before the retirement age, which is good for those who has a high risk in losing their jobs (Social protection committee & the European Commission, 2018).

3.2.2. Germany

Germany was the first nation to establish the first social security system in the world, founded by Bismarck, from East Germany, in 1889 (SSA, 2020). It introduced disability and old-age pension law based on Pay-as-you-go system; it was initially fully funded for pensioners aged 70 or more and later it was lower to 65 in 1916 (Alexandre, 2020).

After the fall of the Berlin Wall in 1991, the pension system was transferred to the West German parliament and was enacted as the state pension system reform in 1992. As the aging population increase, the reform aimed to reduce future pension expenditure (Winfried, S, pp.81, 1992. It was compulsory for employees and employers to pay half of the social security contribution to the basis of earning (Winfried, S, pp.82, 1992).

The pension reform process reached the peaked in Germany was in 2001 and 2004. On May 11, 2001, a new pension reform act was enacted that aimed to stabilize contribution rate, and introduced a private supplementary pension scheme (Axel, B, Christina, B, pp.8, 2006). For example, the contribution rate should not exceed 22% until 2030; Employees who decided to save up to 4% of their income in private supplementary pension schemes are granted tax deduction (Harald, C &Tetsuo, F, pp 73-76, 2003). In 2004, another pension reform was enacted which implemented on the sustainability factors (Honekamp, I., Schwarze, J, 2010). It modified the relationship between the number of people who actually paid contributions to the state pension system and the number of pensioners.

3.2.3. Ireland

Irish pension system was first established as the Old Age Pension Act in 1908 during the colonial past in the UK, and the act was created to provide the non-contributory pension for people over the age of 70 (Murphy, M. P., & Dukelow, F, p.94, 2016).

Later in 1960, the first pillar was created and went through the structural changes to the introduction of contributory old-age pension. It is known as a social insurance flat-rate pension or national pension, which is funded on Pay-as-you-go (PAYG) basis. Irish national pensions are financed highly by employees and employers contributions. For example, in 2013, total income from social insurance contribution was €8.6 bn of which employers contributed 62%, employees and self-employed contributed 23%, and state contribution 15% (Murphy, M. P., & Dukelow, F, p.102, 2016).

In 1990, the Pension Act was established, and it introduced the second pillar. It is known as an occupational pension which is provided by a private sector. Furthermore, the Green Paper on Pension was published in 2007; later, it had developed the National Pension Framework in 2010. Till now, it remains as the Irish government's blueprint for pension policy (Murphy, M. P., & Dukelow, F, p.95, 2016).

3.2.4. Spain

Spain's pension system has been struggling with the challenges of reform in 2011 and 2013.

In 2010, the government proposed the parametric reform of its pension system to the European Commission and was successfully approved in 2011; It focused on three main goals, such as a gradual increase of the number of year's contribution to retirement pension, an extent of early retirement from 61 to 63, and increase for a normal retirement age from 65 to 67 till 2027 (DÍAZ-GIMÉNEZ, J., & DÍAZ-SAAVEDRA, J., p.1, 2016).

After the new law was implemented, in the following three years, in 2013, the Spanish government enacted another three additional mechanism changes to the pension system, such as an increase of early retirement age from 63 to 65 by adding one month for each following year from 2013, introduce a new Sustainable Factor which links the amount of retirement pension to the life expectancy and is applicable from 2019, and introduce a new bounded pension Revaluation Index

which links pensions to the CPI and it depends on the revenue and expenditure of social security system, number of pensions and substitution effects (Roberto, pp.13, 2014).

More recently, Spain seems to face the social pension problems, because of demographic crisis, since Spain is one of the highest life expectancy rates and is one of the lowest birth rates in the world (OECD, 2017). As of January 2018, Spanish people joined demonstration weekly to protest to the pension reform in several cities across Spain with a slogan,, Whoever is ruling, pensions must be defended'' and chanted with a phrase,, Old but not fool'' (teleSUR, 2018). They demanded a decent pension by at least 1,080 euros/month, not an increased by 0.25% as the inflation is already rising by 1.25%, which is nonsense (The local, 2018).

IV. THE ANALYSIS OF PENSION IN THE CHOSEN COUNTRIES IN EUROPE

The objective of the thesis was to overview the social security system of the elderly among the four chosen countries and to identify the effectiveness and efficiency of government expenditure on social transfer in relation to the poverty rate. Therefore, we aim to study the social security benefits, pension expenditure, the reduced poverty rate in old-age, and how effective and efficient of social expenditure in reducing the poverty rate among the four chosen countries, such as the Czech Republic, Germany, Ireland, and Spain.

In this context of the methodological part, we divide the analysis into three main parts, such as public expenditure and pension of the chosen countries, the relationship between the social transfer and poverty and a brief comparison among the chosen countries from the pension adequacy indicator.

4.1. Public Expenditure and Pension of the Chosen Countries

Public expenditures on pension has been increased in most OECD countries. The average pension expenditure is expected to increase to 9.5% of GDP by 2050 (OECD, p.146, 2017). Pension expenditure aims to help household or any individuals who are facing the risk of poverty because of their age, disability, or dependents.

In this part, we focus on the social security system, expenditure on old-age pension and poverty rate among the elderly of the chosen countries, such as the Czech Republic, Germany, Ireland and Spain.

4.1.1. Public expenditure and Pension in the Czech Republic

4.1.1.1 Social Security System

Old-Age Pension

As reported by the Czech social security administration in 2018, people who were born after 1971, the maximum retirement age is 65 years for both men and women and the retirement benefits could be divided into two types. Firstly, old-age pension which is a budget for a person who reaches the retirement age and meets the requirement of insured period, and the percentage amount will be calculated as 1.5% of the calculation base per month (Čssz, 2018). Secondly, early old-age pension which is established as of January 1, 2010, and it refers to the pension for those who want to retire

even though they do not reach the retirement age yet, but they complete the minimum insured period contribution (Čssz, 2018). The earlier the retirement, the greater of reduction of pension benefits. Nowadays, people could apply for early retirement up to 5 years (Čssz, 2018).

As of 1 July 2019, in the Czech Republic, employers need to pay 33,8% for income of which 24.8% of their gross salary to social insurance with the maximum base of 1,569,552 kč and 9% to health insurance without limitation of salary amount; At the same time, employees must pay 26% for income tax of which 6.5% of their gross salary to social insurance, 4.5% to health insurance, and 15% flat rate of their income (Kurzy, 2019). The longer lifetime of working, the higher benefits. The pension amount in the Czech Republic consists of two components, basis amount and percentage assessment.

In 2019, the basis amount is 3 270 kč and the percentage assessment is based on the type of retirement pension (Čssz, 2018). In the following table, it represents the pension benefits from 2019 based on the type of pension. For example, for old-age pension, the percentage amount is 1.5% of the calculation bases add to the basis amount. As for early old-age pension, the first 360 calendar days, the percentage amount is 0.9% of calculation base add to the basic amount (Čssz, 2018).

Table 1. The type of retirement pension in the Czech Republic from 2019

Type of pension	Pension benefits
Old-age pension	**3 270 kč + 1.5% of the calculation base**
Early old-age pension *(Reduced for every 90 days in the 360 calendar days)*	3 270 kč + 1. 0.9% of the calculation base for the first 360 calendar days 2. 1.2% of the calculation base from 361st-720th calendar days 3. 1.5% of the calculation base from 721st calendar days

Note. Adapted from ‘ Old-age pension,’ by Czech social security administration, 2018

The below table shows the number of insurance years for retirement age that has been developed in the last decade. For example, for those who were retired before 2010, they needed to have the insured period at least 25 years and later the insured period had increased gradually by an additional 1 year steadily based on the year of retirement. Until now, for those who are retired after 2018, they must have at least 35 years of the insured period. The insurance period will be counted too if the insured person works within EU, EEA or Switzerland (European Commission, 2018, p.44).

Table 2. The requirement of insurance period in the Czech Republic

Reaching retirement age	The minimum period of insurance
Before 2010	25 years
In 2010	26 years
…………………………………………………………………………………………	
In 2018	34 years
After 2018	35 years

Note. Adapted from ‘ Old-age pension,’ by Czech social security administration, 2018

Disability Pension

According to the Ministry of Labor and Social Affairs in the Czech Republic 2018, the disability pension has been divided into three degrees, such as 1st degree disability, 2nd degree disability, and 3rd degree disability.

First-degree disability pension refers to the budget for the employee who has decreased their ability to perform the job between 35% to 49% (Odbor 71, 2018). Second-degree disability pension is the payment for people whose ability has decreased between 50% to 69% (Odbor 71, 2018). Third-degree disability pension is a budget for those who have decreased the ability to work at least 70% (Odbor 71, 2018). The amount of disability is applied differently according to the ages of people and the number of years they have contributed to insurance. The disability pension in the Czech Republic consists of two components: the basic amount and percentage amount. Based on the

Czech Social Security Administration, the basic amount is the same for all types of pensions with an amount of 3 270 kč in 2019 and the percentage amount depends on the level of disability degree, and the past average of gross earning and insured period. For example, the first degree of disability pension, people will receive basic amount add with 0,5% of the calculation base.

The below table identifies the condition and disability pension based on each category in the Czech Republic.

Table1. The Disability Pension for each full year of insurance period in the Czech Republic

Degree of disability	Condition of disability	Disability pension
1st degree	35% - 49%	3 270 kč + 0.5% of the calculation base
2nd degree	50% - 69%	3 270 kč + 0.75% of the calculation base
3rd degree	At least 70%	3 270 kč + 1.5% of the calculation base

Note. Adapted from 'Disability Benefits,' by Odbor 71, 2018

Furthermore, to receive the disability pension, people need to fulfill the specifics requirements for insured period. For instance, from the age of 28, the insured person needs to have insurance 5 years prior in the last 10 or 20 years (European Commission, 2018).

The following table identifies the required condition based on the age of disabled people in 2018.

Table2. The Required Insurance Period for insured people in the Czech Republic 2018

Age	The period of insurance
Under 20 years	Less than 1 year
From 20 to 22 years	1 year
From 22 to 24 years	2 years
From 24 to 26 years	3 years

From 26 to 28 years	4 years
Over 28 years	5 years
Over 38 years	10 years

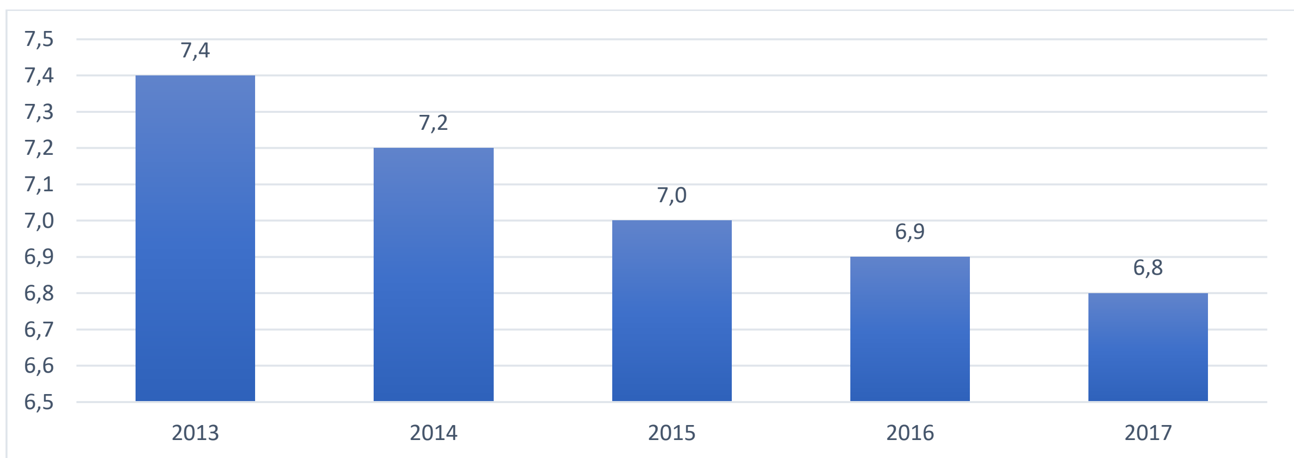
Note. Adapted from 'Invalidity Benefits,' by European Commission: Employment, Social Affairs & Inclusion, Your social security rights in the Czech Republic (p.31), 2020, Brussels. Copy right 2018 by European Union.

4.1.1.2. Expenditure on Old-age

According to the projection of public expenditure on pension, the Czech Republic is forecast to increase public pension spending from 9% in 2020 to 9.6% by 2050 (OECD, p.147, 2017).

In the below table, it shows the expenditure on old-age in the share of GDP from 2013-2017 in the Czech Republic. We see that during the period of 5 years, the pension expenditure on old-age had been slightly dropped by 0.6% from 7.4% in 2013 to 6.8% in 2017 (Eurostat, 2020). At the same time, between 2013-2017, the social protection expenditure in the Czech Republic had been decreased by 1.5% of GDP from 13.5% in 2013 to 12.0% in 2017 (Eurostat, 2020).

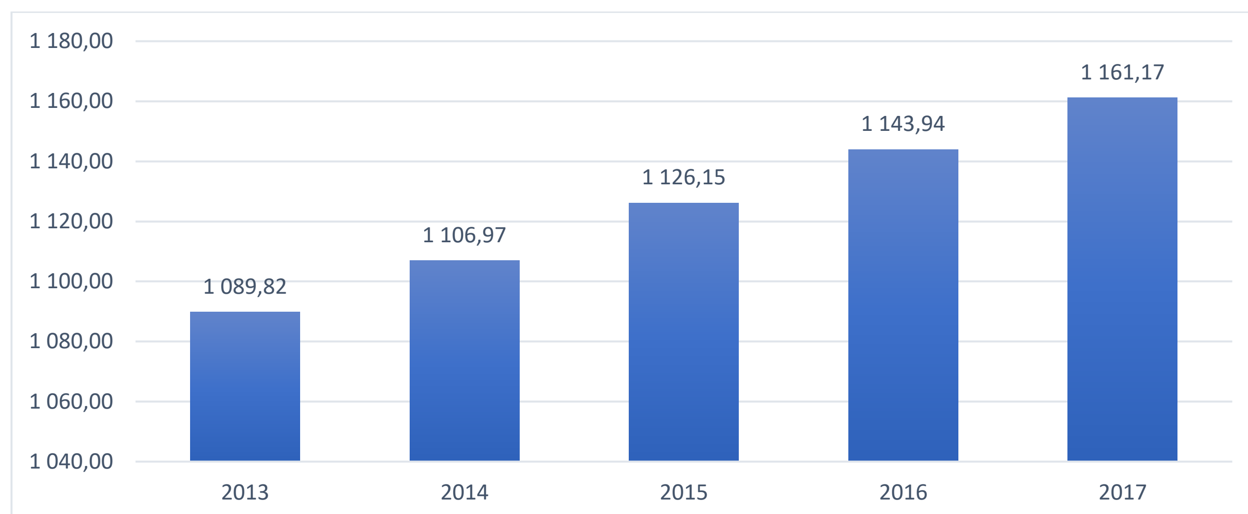
Figure1. Pension Expenditure on Old-age in % of GDP between years 2013-2017



Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010 Data source (spr_exp_pens)

In addition, table2 represents the pension expenditure on old-age in Euro per habitant between 2013-2017 in the Czech Republic. We see that, during the period of 5 years, old-age pension per habitant had been slightly raised by €71,35 from €1 089,82 to €1 161,17 (Eurostat, 2020).

Figure2. Pension Expenditure on Old-age in Euro per habitant between years 2013-2017



Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010 Data source (spr_exp_pens)

4.1.1.3. Poverty among Old-age people

In the Czech Republic, almost 15% of old-age people were threatened by poverty in 2016 and 8.1% of pensioners were facing poverty on the condition that the elderly is living alone and have less than 60% of monthly median income. Women is almost at double risk compare to men (ČTK, 2016).

The below table indicates the poverty before and after social transfer of elderly aged 65 and over in 2017. We see that the poverty among eldery before social transfer was 14.6% of the total population and was reduced by 3.9% after the social transfer, above EU-28 (3.3.%) (Eurostat, 2020).

Table1. Poverty before and after social transfer among Older-people age 65 and over in 2017

Country	Poverty before social transfer (% of total population)	Poverty after social transfer (% total population)	Reduced rate poverty (% of total population)

EU-28	18,3	15,0	3,3
Czechia	14,6	10,7	3,9

Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010. Data Source: Eurostat (ilc_li02, ilc_li10)

4.1.2. Public expenditure and Pension in Germany

4.1.2.1. Social Security System

Old-age Pension

Germany's pension system is designed under three pillars, such as mandatory state pension (1st pillar), voluntary occupational pension (2nd pillar), and private pensions (3rd pillar) (Wilmington, 2020). Specifically, Old-age pension, disability pension, and survivor pension are funded under the first pillar. Currently, the legal retirement age is 65 and will increase to 67 from 2012 to 2029, (Wilmington, 2020). Employees and employers share the tax contribution equally based on annual earning. As of January 2020, the overall tax contribution to the social security system is 38.65% of their gross salary, which means that both employee and employer must contribute 19.32% of their gross income from which 9.3% to pension insurance, 2.4% to unemployment insurance, 14.6% to health insurance and 3.05% to long-term care insurance (PWC, 2020).

According to European Commission 2019, In Germany, there are two types of retirement pension, such as old-age pension and early old-age pension.

Firstly, the old-age pension is a funded budget for those who have reached the official age of retirement and fulfilled a minimum insurance period. To receive an old-age pension, retired people must have at least 35 years at the age of 65 (IamExpat, 2020).

Secondly, the early-old age pension refers to a pension for people who would like to retire earlier than the official age. It allows people to retire at age 63, but the contribution periods must have at least 35 years. Each missing year must be reduced by 3.6%. However, if the people have made 45 years of contribution, they can retire at 63 without a reduced rate (European commission, pp.31, 2019).

There is no minimum and maximum amount of pension; It depends on the year contribution, average income level, and the retirement age (Expatica, 2020).

Table1. The type and condition of retirement pension in Germany 2020

Type of retirement	Requirement	Pension
Old-age pension	Retire at the age of 65 years *if they have contributed at least 35 year*	It is calculated based on the retirement age, average income and contributed years
Early old-age pension	Retire at the age of 63 years *if they have contributed at least 35 year*	

Disability Pension

As we already know, disability insurance is the sustantial part of the social security system that aims to protect disabled people who lose their ability to work from falling into poverty. According to the European Commission in 2019, the disability pension in Germany is divided into 2 types, such as Full disability pension and Partial disability (European Commission, 2019).

Firstly, full disability pension is the budget provided to those who cannot perform an activity under the labor market more than 3 hours per day, due to the serious illness or health problem. In order to receive a disability pension, an insured person must contribute the insurance period for at least 60 months and have paid 3 years prior in the last 5 years before the onset of invalidity (European Commission, pp.24, 2019).

Secondly, partial disability pension refers to the budget for those who are incapable to perform the job more than 6 hours per day because of the health problem that occurs during the current profession. To receive the pension, insured person must qualified the requirement from Full disability and were born before 2 January 1961 (European Commission, pp.24, 2019). The amount of disability pension depends on the the number of contributed insurance periods and the total amount of payment (European Commission, pp.25, 2019).

Table1. A briefly of Disability Benefits system in Germany 2020

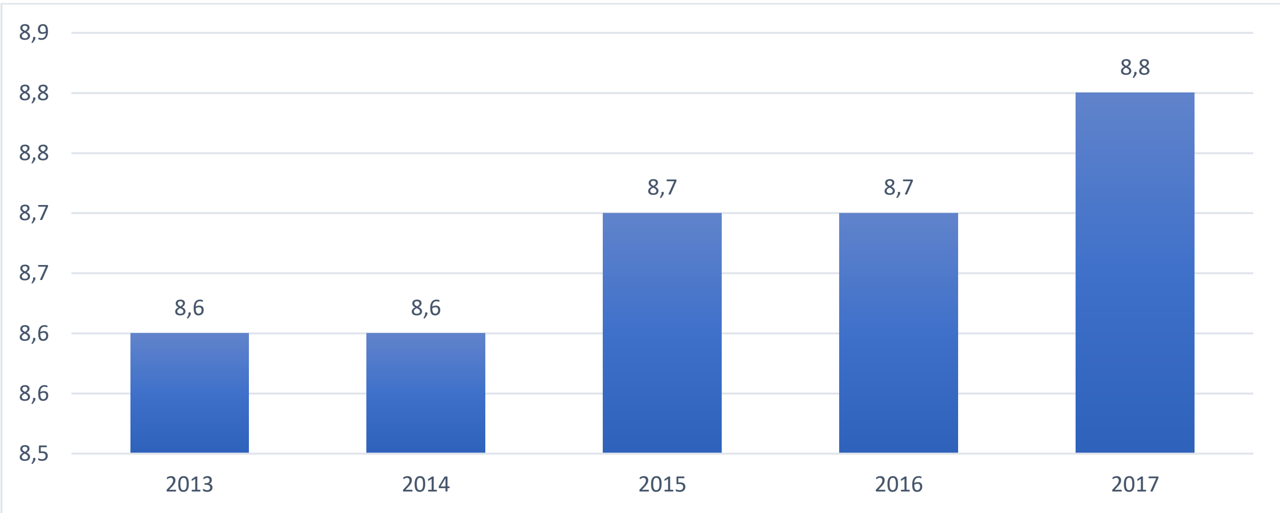
Type of disability	Requirement	Pension
Full disability pension *Unable to work more than 6h/day*	Must have contributed at least 5 years and have paid 3 years prior in the last 5 years before the draw of pension	It is calculated based on contributed years and the total amount of payment
Partial disability pension *Unable to work more than 3h/day*	The above condition+ were born before January 2, 1961	

4.1.2.2. Expenditure on Old-age

According to the projection of public expenditure on pension, Germany is expected to increase public pension spending from 10.3% in 2020 to 12.5% by 2050 (OECD, p.147, 2017).

In the below table, it shows the expenditure on old-age in the share of GDP from 2013-2017 in Germany. We see that during the period of 5 years, the pension expenditure on old-age had been slightly increased by 0.2% from 8.6% in 2013 to 8.8% in 2017. At the same time, between 2013-2017, the social protection expenditure in Germany had been increased by 0.6% of GDP from 19% in 2013 to 19.6% in 2017 (Eurostat, 2020).

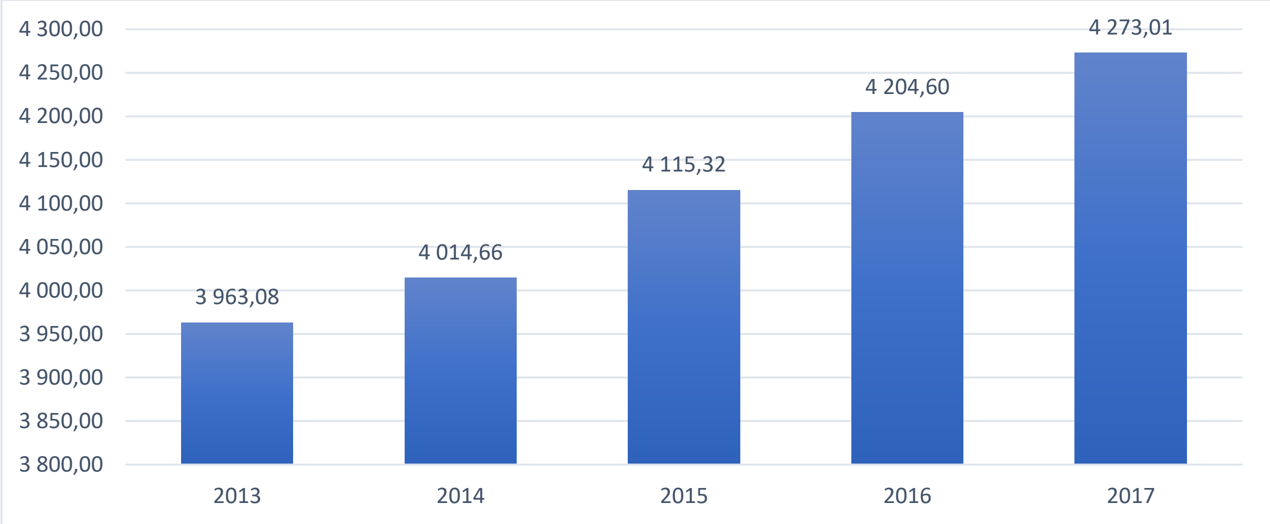
Figure1. Pension Expenditure on Old-age in % of GDP between years 2013-2017



Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010 Data source (spr_exp_pens)

In addition, table2 represents the pension expenditure on old-age in Euro per habitant between 2013-2017 in Germany. We see that, during the period of 5 years, old-age pension per habitant had been significantly increased by €309,93 from €3 963,08 to €4 273,01(Eurostat, 2020).

Figure2. Pension Expenditure on Old-age in Euro per habitant between years 2013-2017



Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010 Data source (spr_exp_pens)

4.1.2.3. Poverty among Old-age people

As more people are working for low wage jobs or part-time jobs and the growth of population aging, Germany is facing a high poverty rate among the elderly despite the highest employment rate (The local, 2020). In Germany, nearly 18.7% of pensioners were classified as being at risk from poverty in 2017 on condition that pensioner is living alone and the annual income is less than €13,628 (Deutsche, 2020).

The below table indicates the poverty before and after social transfer of elderly aged 65 and over in 2017. We see that the poverty among the eldery before social transfer was 18.1% of the total population and was reduced by 1.1% after the social transfer, below EU-28 (3.3.%) (Eurostat, 2020).

Table1. Poverty before and after social transfer among Older-people age 65 and over in 2017

Country	Poverty before social transfer (% of total population)	Poverty after social transfer (% total population)	Reduced rate poverty (% of total population)
EU-28	18,3	15,0	3,3
Germany	18,1	17,0	1,1

Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010. Data Source: Eurostat (ilc_li02, ilc_li10)

4.1.3. Public expenditure and Pension in Ireland

4.1.3.1. Social Security System

Old-age Pension

The contributory state pension is paid to elder people who reach a certain age of 66 and meet the requirement of Irish social insurance contribution. The pension age will continue to rise to 67 in 2021 and 68 in 2028 (Citizens Information, 2020). The employer is responsible for pension contributions and it will be deducted directly from employee's wages (Citizens Information, 2020). Since 2012, there are three main specifics criteria for Paying Related Social Insurance (Government of Ireland, 2019).

1. Age at entry or Paid PRSI contribution before a certain age, which means that to get the state pension, you must start to pay social insurance before the age of 56 if you are born on or after 1 October 1922. You must be aged at least 66 to get a retired pension.
2. Number of paid contributions which means that you need to have 520 full-rate contribution or 10 years contribution of social insurance if you retired on or after 6 April 2012. However, if you reach the pension age between 6 April 2002 and 5 April 2012, Voluntary contribution could have 260 out of 520 contributions which is equal to 5 years operation.
3. Total number of contributions, which could be explained in two ways:

   . Normal average rule: you need to have an average of 10 years of social insurance in order to get the minimum pension.

   . Alternative average rule: you need to have an average of 48 years of contribution to get the maximum rate pension. It applies only to those reach pension age on or after 6 April 1992.

Table 1 represents the tax charge as a percentage of your income in 2020. The tax liability is divided into two types, 20% and 40% according to your status (Citizens Information, 2020). The standard rate is 20% (Citizens Information, 2020). For example, if you are Single person and earn less than €35,300, you will be charged fro 20% of your income and if your annual income is more than this amount, you will be charged for 40%.

Table1. Standard rate cut-off point in 2019 and 2020 in Ireland

Status	Tax rate in 2019 and 2020	
	20%	40%
Single person	€35,300	Balance
Married couple, one income	€44,300	Balance
Married couple, two income	€70,600	Balance
One parent family	€39,300	Balance

Note: Adapted from' Tax rates and the standard rate cut-off point,' by Citizens Information Boards, 2020

Table2 classifies the yearly average of pension amount for those who retire before 1 September 2012 into 4 categories in response to a personal rate per week (Citizens Information, 2020). Firstly,

those who paid social insurance between 10-14 would receive a minimum personal pension rate weekly €124.20. Secondly, those who paid social insurance between 15-19 would receive a personal pension rate weekly €186.20. Thirdly, those who paid social insurance between 20-47 would receive a personal pension rate €124.20 weekly. Fourthly, those who paid social insurance from 48 would receive the maximum personal rate €248.30 per week.

Table 2. State Pension 2020 for qualified people before 1 September 2012

Yearly average of pension contributions	Personal rate per week
48 or over	€248.30
20-47	€243.40
15-19	€186.20
10-14	€124.20

Note: Adapted from' State Pension (contributory),' by Citizens Information Boards, 2020

The below table classifies the yearly average of pension amount for those who retire on or after 1 September 2012 into 6 categories in response to a personal rate per week (Citizensinformation, 2020). Firstly, those who paid social insurance between 10-14 would receive a minimum personal pension rate weekly €99.20. Secondly, those who paid social insurance between 15-19 would receive a personal pension rate weekly €161.80. Thirdly, those who paid social insurance between 20-29 would receive a personal pension rate €211.40 weekly. Fourthly, for those who paid social insurance between 30-39 would receive the maximum personal rate €223.20 per week. Fifthly, those who paid social insurance between 40-47 would receive a personal pension rate €243.40 weekly. Lastly, those who paid social insurance from 48 or over would receive the maximum personal rate €248.30 per week. According to the Citizen Information Board in 2019, the minimum state pension was €99.20 per week (Citizensinformation, 2020).

Table 3. State Pension 2020 for qualified people on or after 1 September 2012

Yearly average of pension contributions	Personal rate per week
48 or over	€248.30
40-47	€243.40

30-39	€223.20
20-29	€211.40
15-19	€161.80
10-14	€99.20

Note: Adapted from' State Pension (contributory),' by Citizens Information Boards, 2020

Disability Pension

The disability pension in Ireland is paid weekly to people who could not work because of sickness. Usually, the start of the date of permanent disability is after 12 months of incapable of work due to illness. There are two main conditions for invalidity pension (Government of Ireland, 2019).

Firstly, you must have at least 260 weeks of paid PRSI, or 5 years paid social contribution and you cannot use the voluntary contribution to compromise the yearly average of social insurance for invalidity pension. Secondly, before starting the date of your permanent incapacity for work, you must have paid 48 weeks of PRSI contribution in the last or second last completed year (Government of Ireland, 2019).

Table 1. Invalidity Pension Rate per week in 2020

<table>
<tr><th>Aged under 66</th><th>Adult dependent</th><th>Child dependant as of 9 January 2020</th></tr>
<tr><td rowspan="2">€208.50</td><td rowspan="2">€148.90</td><td>Child (under 12 years old)
. €36 (full rate)
. €18 (half rate)</td></tr>
<tr><td>Child (age 12 and over)
. €40 (full rate)
. €20 (half rate)</td></tr>
</table>

Note: Adapted from' Invalidity pension' by Government of Ireland, 2019

The above table describes the qualification and invalidity pension in Ireland 2020. The invalidity pension in Ireland has been divided into 3 categories.

Firstly, for those who are under 66 years old and have fulfill the required PRSI contribution will receive €208.50, a maximum personal rate per week (Government of Ireland, 2019).

Secondly, adult dependant or increase for qulified adult will receive pension of €148.90 per week. To get adult dependant, he/she cannot have the gross weekly earning more than €310. He/she will receive a full rate of Child dependent if she earns less than €100 per week, and He/she will receive a half rate of Child dependent if she earns between €100-€310 per week (Citizens Information, 2020).

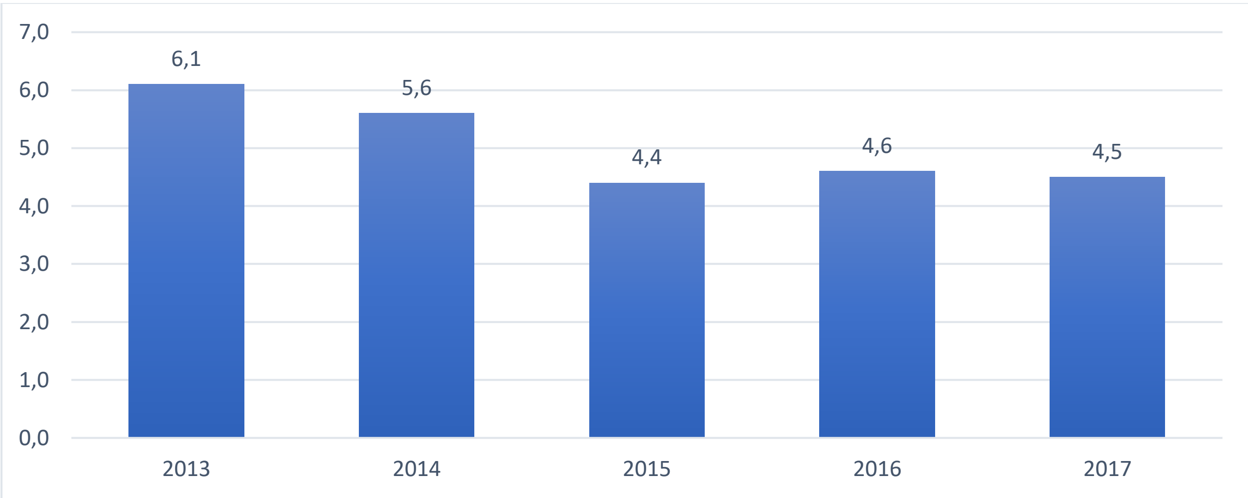
Thirdly, child dependant or increase for a qualified child is divided into two types. As of 9 January 2020, you will receive a full rate of increase for a qualified child if your spouse gets adult dependant or you are parenting alone; Meanwhile, you will receive a half rate of increase for a qualified child if your spouse has an income between €310-€400 per week (Citizens Information, 2020).

4.1.3.2. Expenditure on Old-age

According to the projection of public expenditure on pension, Ireland is projected to increase pension expenditure further from 8.0% in 2020 to 10% by 2050. (OECD, p.147, 2017).

In the below table, it shows the expenditure on old-age in the share of GDP from 2013-2017 in the Czech Republic. We see that during the period of 5 years, the pension expenditure on old-age had been slightly dropped by 1.6% from 6.1% in 2013 to 4.5% in 2017. At the same time, between 2013-2017, the social protection expenditure in Ireland had been decreased by 6% of GDP from 15.2% in 2013 to 9.5% in 2017 (Eurostat, 2020).

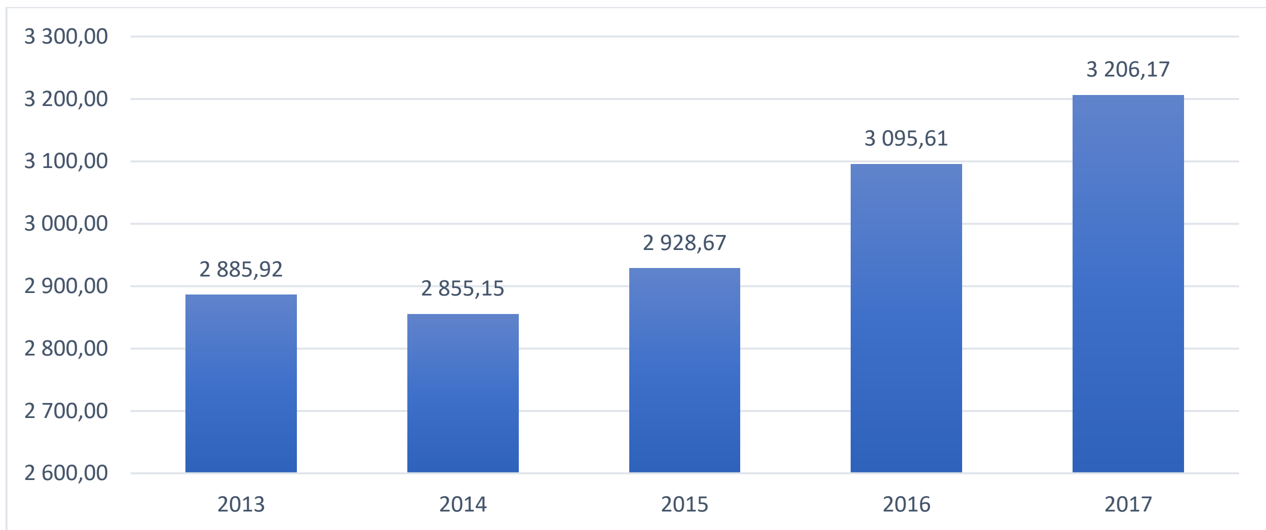
Figure1. Pension Expenditure on Old-age in % of GDP between years 2013-2017



Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010 Data source (spr_exp_pens)

In addition, table2 represents the pension expenditure on old-age in Euro per habitant between 2013-2017 in Ireland. We see that, during the period of 5 years, old-age pension per habitant had been considerably increased by €320,25 from €2 885,92 to €3 206,17 (Eurostat, 2020).

Figure2. Pension Expenditure on Old-age in Euro per habitant between years 2013-2017



Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010 Data source (spr_exp_pens)

4.1.3.3. Poverty among Old-age people

In Ireland, less than 7% of pensioners were living by income poverty in 2015 on the condition that pensioners have low income below half of national median income (Advisory, 2020). In addition, in 2017, it was 8.6% of the elderly who were facing income poverty (ESRI, 2019).

The below table indicates the poverty before and after social transfer of elderly aged 65 and over in 2017. We see that the poverty among the eldery before social transfer was 28.1% of the total population and was reduced by 13.3% after the social transfer, above EU-28 (3.3.%) (Eurostat, 2020).

Table1. Poverty before and after social transfer among Older-people age 65 and over in 2017

Country	Poverty before social transfer	Poverty after social transfer	Reduced rate poverty

	(% of total population)	(% total population)	(% of total population)
EU-28	18,3	15,0	3,3
Ireland	28,1	14,8	13,3

Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010. Data Source: Eurostat (ilc_li02, ilc_li10)

4.1.4. Public expenditure and Pension in Spain

4.1.4.1. Social Security System

Old-age Pension

In 2019, people could retire at the age of 65 years if they have contributed at least 36 years and 9 months (MITRAMISS, 2019). The tax contribution from employees and employers to the social security system in Spain has been changing most of the time; As a result, from 31 March 2018, to cover accident and illness, employers who work in Spain is obliged to pay 29.9% of their gross salary and the employees must pay 6.35% of their gross salary (KPMG, 2019). Based on the report from European Commission 2018, retirement pension in Spain has been divided into 3 main different type categories.

Firstly, the ordinary retirement pension is a budget for those who reache the age of retirement and have met the minimum contribution period to social security. The retirees of ordinary pension will receive the amount of pension from 50% to 100% of the total regulation base, which means that the retirees must have at least 15 years of contribution and the percentage will be increased until 100% according to the limitation of contribution period and will be paid 14 monthly payment after the day of leaving the job till the death (European Commission, 2018). For instance, a percentage 50% is applied for the first 180 months, 0,21% is applied from the following 163 months and 0,19% is applied from months 344 till the limitation of the contribution (BBVA, 2019).

Secondly, flexible retirement pensioner refers to those who want to work part-time after their retirement regardless of whether they retired as an ordinary or early retirement. The early retirement age is no more than 2 years prior to the legal age of retirement. In 2019, the early retirement age is 63 years or 63 years 8 months (BBVA, 2019).

From 17 March 2013, the retiree could work in the private sector from 50% to 75% of the hour worked by full-time worker and the calculation of the amount base is based on the ordinary pension and is reduced the proportional working days, which will be calculated by social security system workers (European Commission, 2019). It will be combined your original pension with the part-time work and retirees need to pay for their social security contribution during their part-time job too.

Thirdly, partial retirement is like flexible retirement, which retirees could choose to work as a part-time worker after their retirement. Generally, the retirees could apply for a partial retirement when after their early retirement age under the part-time employment contract or after their legal age of retirement without a part-time employment contract (BBVA, 2019). The calculation of amount pension will be recalculated by the workers of social security contribution.

The minimum pension benefits of the state pension in 2019 was €657.6 per month for a single pensioner and EUR 811.4 per month for pensioner with a dependent spouse (Gary, 2019).

In the following table, it illustrates the benefits and required condition based on each type of old-age pension in 2019.

Table1. The type and condition of retirement pension in Spain in 2019

Type of retirement	Requirement	Pension
Ordinary retirement	Retire at the age of 65 years *if they have contributed at least 36 years and 9*	Receive the amount of pension from 50% to 100% 1. a percentage 50% is applied for the first 180 months 2. 0,21% is applied from the following 163 month 3. 0,19% is applied from months 344 till the limitation of the contribution
Flexible retirement	Work part-time after their retirement (ordinary or early retirement)	Will be calculated by social security system workers

Partial retirement	Apply for a partial retirement (under or without the part-time employment contract)	Will be calculated by social security system workers

Spain has been changing the conditions for retirement benefits many times. Thus, after the second reform in 2013, as from 1st January 2013 to 2027, the claim of pension retirement is based on the ages of people and their contribution to social security during their working period (MITRAMISS, 2019). Logically, the period of insurance has been increasing by an additional 3 months every year; At the same time, the age of retirement has been increasing by an additional 1 month every year.

Table1. The Requirement age and period contribution in Spain from 2013-2027

Year	The minimum Period of insurance	Age of retirement
2013	35 years and 3 months or more	65 years
	Less than 35 years and 3 months	65 years and 1 month
2014	35 years and 6 months or more	65 years
	Less than 35 years and 6 months	65 years and 2 months
…………………………………………………………………………………………………		
2020	37 years or more	65 years
	Less than 37 years	65 years and 10 months
………………………………………………………………………………………………..		
From 2027	38 years and 6 months or more	65 years
	Less than 38 years and 6 months	67 years

Note. Adopted from ‘Ordinary retirement requirement,’ by Ministry of labor, migration and social security, 2019

Disability Pension

According to the National Social Security Institute in Spain in2019, disability benefits can result in four different types of categories.

Firstly, partial permanently disability refers to a 33% of disability that diminishes the ability to work and people will receive the lump-sum indemnity with 24 monthly payment based on their base salary (BBVA, 2019). Secondly, total permanently disability pension refers to a budget for people who could not perform their job and they will get a 12 to 14 monthly payment 55% of their base salary and up to 75% when they reach 55 years (BBVA, 2019). Thirdly, absolute permanently disability pension which is a budget for those who completely could not perform their work and other basic work, and they will receive a 12-14 monthly payment 100% of their base salary. Lastly, severs permanently disability pension refers to those who completely could not perform the work and require assistance from other people to carry out daily activities, and they could expect to receive total or absolute permanent disability and both supplement payment to their carer up to 50% of the social security minimum basis and additional 30% of their last month (BBVA, 2019).

The below table identifies the condition and disability pension based on each category in Spain in 2019.

Table1. A briefly of Disability Benefits system in Spain

Type of Disability	Condition of Disability	Disability Pensions
Partial permanently disability	33%	lump-sum indemnity with 24 monthly payment
Total permanently disability	100%	12-14 monthly payment per year between 55% - 75%
Absolute permanently disability	100% + no others work activity	100% of person's base salary from 12-14 monthly payment per year

Severs permanently disability	Suffer permanently + nurse	Absolute + 45% of social security payment for nurse + 30% of last month salary

Note. Adapted from 'Disability Pension,'by BBVA, 2019

Table2 shows the requirement of the permanently disability benefits depend on the various ages of disability and their registration in social security. Firstly, to apply for partial permanently disability pension, the disability needs to register in the social security system and have paid contribution 1 800 days in 10 years prior to the day that temporary disability becomes permanently disability (European Commission, p.21, 2020). Secondly, to apply for the total permanently disability pension, there is no require specific contribution if an individual is under 31, but if he/she is age 31 or over, they need to contribute 10 years prior to the date which contributions no longer required (MITRAMISS, 2019). Thirdly, both absolute permanently disability and severs permanently disability are similar to total permanently disability, but if the disability is caused by the non-related work, he/she needs to pay for a specific contribution period by 3 years in the last 10 years (MITRAMISS, 2019).

Table2. Requirement for permanently disability pension in Spain 2019

Type of disability	Requirement
Partial permanently disability	1 800 days in 10 years prior to the day
Total permanently disability	No require specific contribution if an individual is under 31, If he/she is age 31 or over, they need to contribute 10 years prior
Absolute permanently disability and Severs permanently disability	If the disability is caused by the non-related work, he/she needs to pay for a specific contribution period by 3 years in the last 10 years

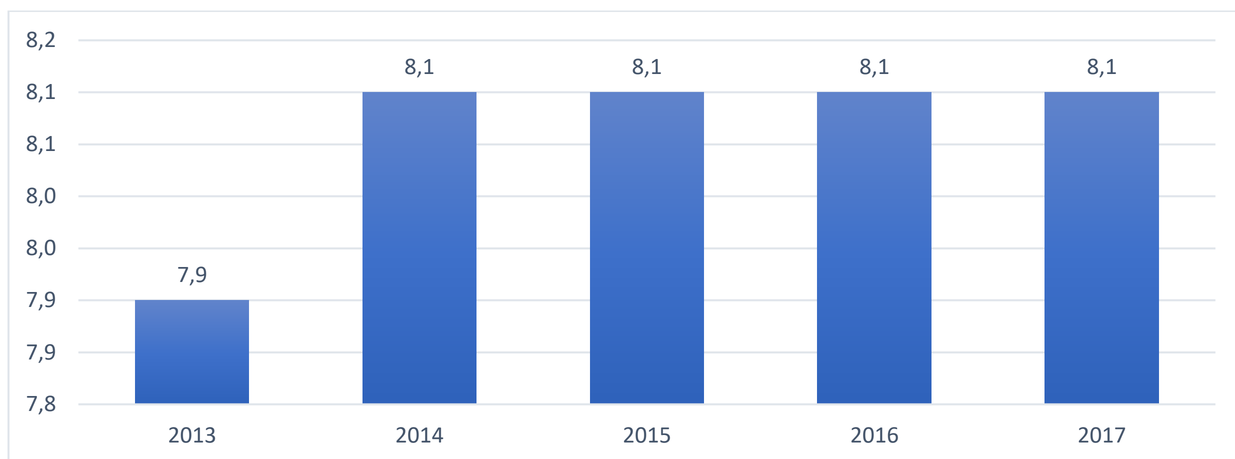
Note. Adopted from 'Permanent Disability Pension,' by Ministry of Labor, migration and social security, 2019

4.1.4.2. Expenditure on Old-age

According to the projection of public expenditure on pension, Spain is forecast to increase public pension expenditure from 11.8% in 2020 to 12.3% by 2050 (OECD, p.147, 2017).

In the below table, it shows the expenditure on old-age in the share of GDP from 2013-2017 in Spain. We see that during the period of 5 years, the pension expenditure on old-age had been slightly increased by 0.2% from 7.9% in 2013 to 8.1% in 2014 and continuedly stagnated at 8.1% till 2017. At the same time, between 2013-2017, the social protection expenditure in Spain had been decreased by 1.5% of GDP from 18.2% in 2013 to 16.7% in 2017 (Eurostat, 2020).

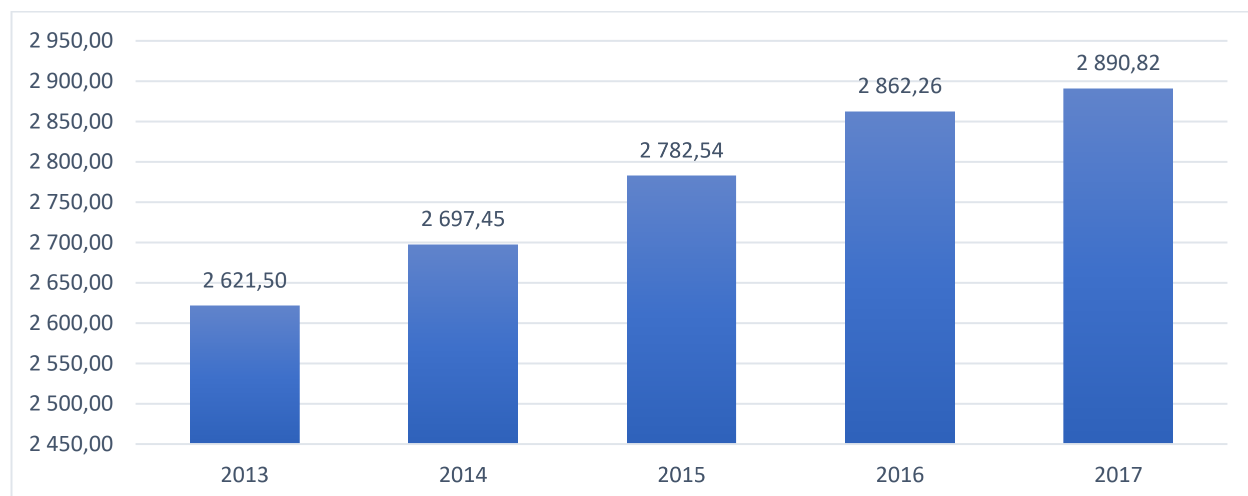
Firgure1. Pension Expenditure on Old-age in % of GDP between years 2013-2017



Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010 Data source (spr_exp_pens)

In addition, table2 represents the pension expenditure on old-age in Euro per habitant between 2013-2017 in Spain. We see that, during the period of 5 years, old-age pension per habitant had been slightly raised by €269,32 from €2 621,50 to €2 890,82 (Eurostat, 2020).

Figures2. Pension Expenditure on Old-age in Euro per habitant between years 2013-2017



Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010 Data source (spr_exp_pens)

4.1.4.3. Poverty among Old-age people

In Spain, about 32.6% of pensioners were falling below the poverty line in 2017, while 60.4% of pensioner poverty are women (teleSUR, 2018). The below table indicates the poverty before and after social transfer of elderly aged 65 and over in 2017. We see that the poverty among the elderly before the social transfer was 18.0% of the total population and was reduced by 3.2% after the social transfer, almost keep up with EU-28 (3.3.%) (Eurostat, 2020).

Table1. Poverty before and after social transfer among Older-people age 65 and over in 2017

Country	Poverty before social transfer (% of total population)	Poverty after social transfer (% total population)	Reduced rate poverty (% of total population)
EU-28	18,3	15,0	3,3
Spain	18,0	14,8	3,2

Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010. Data Source: Eurostat (ilc_li02, ilc_li10)

4.2.The Relationship Between Social Transfers and Poverty

State pension expenditure on old-age people, incapacitated people, and survivors has not been equaled in all countries, especially among the European countries, such as the Czech Republic, Germany, Ireland, and Spain. Fertility rate, income, age of retirement, health care, and life expectation are the fundamental factors that could impact on the pension system.

According to the European Consumer Health Care Index in 2016, the Czech Republic ranked highest among the central European countries in providing the best healthcare accessibility and information for patients (Expats.cz, 2017). In addition, Germany was the first nation to establish the first social security system in the world, founded by Bismarck, from East Germany, in 1889 (SSA, 2020). The health care system in Germany is known as the oldest health care system and one of the best in the world, creating in the 1880s (Germanyhis, 2020). In 2019, Ireland ranked as top2 out of 153 countries as Good Country Index (Sarah, B, 2019). It includes the score from global contribution to international peace, health and well-being, prosperity and equality, and cultural categories. Somehow, Spain was recorded as the world healthiest country at 92.75 health grade in 2018 based on Bloomberg research and had the highest life expectancy at an average of 83 years in the European Union in 2015 according to the data from Eurostat.

Managing and controlling public resource is the key for developing the economic efficiency of each country. The Output shows the results and how effective the government expenditure is. It is measured by many relevant indicators: health output by life expectation, mortality and ageing index, and social protection output by the reduction of poverty risk after the social transfer. However, measuring efficiency is getting more complicated because it will need a specific methodology and the correct way to calculate. Input and output are the two fundamental components. For example, Country A uses more input resource than country B does; However, both countries get the same level of output. This means that Country B generates the resource in a more efficiency way.

The different percentages of poverty reduction often lead to the biased results and show the different objective situation of each country. Thus, in this thesis, we will use two types of quantitative methods based on Eurostat data to identify how the efficiency and effectiveness of

social expenditure in reducing poverty risk is among the chosen countries the Czech Republic, Spain, Ireland, Germany, and EU-28.

In the first part, we will use our own empirical estimate of the efficiency and effectiveness of social expenditure based on Regression analysis, which indicates the relations between poverty before and after the social transfer, and the result of social improvement after the social transfer. Based on the regression analysis, the effectiveness is defined by the percentage of poverty better-than-expected after social transfer in accordance with the residual regression (Alno, Almas, Chemen & Peter, pp.4, 2008). Firstly, to calculate the percentage of poverty better-than-expected after social transfer, we multiply the regression residual by -1. Secondly, to calculate the residual regression to see how far the real value from the expected value, we subtract poverty after social transfer from the predicted value after social transfer. Thirdly, to calculate the predicted value of poverty after social transfer, we use the linear trend value Excel regression on poverty before and after social transfer (Arno, pp.32, 2011). Meanwhile, the efficiency based on regression analysis is defined by the residual of social spending in poverty reduction (Alno, Almas, Chemen & Peter, pp.22, 2008). Firstly, to calculate the residual of social spending in poverty, we subtract the percentage of poverty better-than-expected after social transfer from the predicted value of social expenditure based on poverty reduction. Secondly, to calculate the predicted value of social expenditure based on poverty reduction, we use the linear trend value Excel regression on social expenditure and the percentages poverty better-than-expected after social transfer (Arno, pp.32, 2011).

In the second part, we will use the European calculating methods based on the European Social Model (ESM), which is simplified in a mathematical way not only the reducing rate of poverty risk, but also the percentage of the poor population saved by social transfer from poverty, and the percentage of GDP spend to lift 1% of the population out of poverty (Arno, pp.12-14, 2011). Based on the European calculating methods, the effectiveness of social expenditure on poverty is defined by the % of the poor population saved by social transfer from poverty (Arno, pp.14, 2011). Firstly, to calculate the percentage of poor saved by social transfer from poverty, we use the result from the effect of social transfer divided by poverty before social transfer. Secondly, to calculate the reduced rate of poverty risk or effect of social transfer, we calculate the difference between the poverty before and after social transfer. Meanwhile, the efficiency based on European Commission methods is defined by the % of the GDP spend to lift 1% of the population out of poverty (Arno,

pp.13, 2011). To calculate the percentage of GDP spend to lift 1% of the population out of poverty, we divide the total social expenditure by the effect of social transfer.

4.2.1. The Estimation of the Effectiveness and Efficiency of Social expenditure based on Regression analysis

Regression analysis is a statistical method that attempts to determine the strength and the character of the relationship between the variety of independent variables and one dependent variable (Brian, 2020). There are two main types of regression analysis, such as simple linear regression and multiple linear regression (Brian, 2020). Specifically, simple linear regression applies one independent variable X to predict the outcome of the dependent variable Y; Meanwhile, multiple linear regression uses one or more independent variables to predict the outcome in a future (Brian, 2020). In this context, simple linear regression analysis is being used of which poverty before social transfer is independent variable Y and predicted poverty after social transfer is dependent variable X.

According to Eurostat data in 2017, Ireland had the highest initial level of poverty rates at 32,9% among the chosen countries and it became the most effective country in reducing the poverty rate after the social transfer, which gave the positive result of better-than-expected at 6.1% (Eurostat, 2020). In contrast, the Czech Republic had the lowest initial level of poverty at 15.8%, it gave the positive result of better-than-expected only at 1.2% (Eurostat, 2020).

As we could see from table 1, the poverty rates before social transfer among the chosen country ranged from 15.8 to 32.9 percent of the total population, where the initial poverty rate after social transfer ranged from 9.1 to 21.6 percent of the total population (Eurostat, 2020). The result in the table1 indicates that Ireland and the Czech Republic were the most effective countires in reducing the rates of poverty at 6.1% and 1.2% respectively. Meanwhile, Spain was the least effective country in reducing rates of poverty after the social transfer with the negative expected-result at -2.9%, below the average EU-28 (-0.1%). In addition, Germany had negative expected-result at -0.3%, lower than the average EU-28 (-0.1%) (Eurostat, 2020).

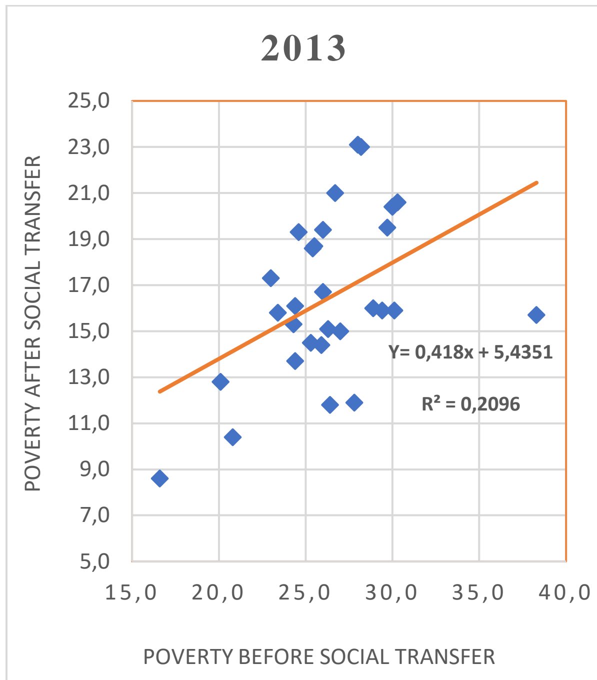
Table1. Poverty before and after social transfers: an analytical approach, based on regression residuals (Eurostat figures 2017)

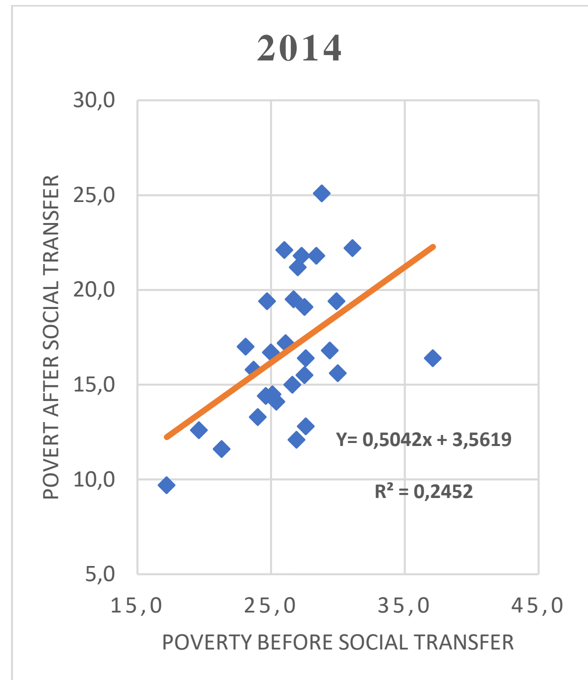
Country	At risk of poverty rate before social transfers (pensions excluded from social transfers	At risk of poverty rate (cut-off point: 60% of median equivalised income after social transfers)	Predicted value (regression analysis: poverty before social transfers predicting poverty after social transfers)	Residual (measure how far the real value is away from the predicted value)	Standard Eurostat data on poverty after social transfers are better than expected (in % points)
Czechia	15,8	9,1	10,3	-1,2	1,2
Germany	24,1	16,1	15,8	0,3	-0,3
Ireland	32,9	15,6	21,7	-6,1	6,1
Spain	28,4	21,6	18,7	2,9	-2,9
EU-28	25,6	16,9	16,8	0,1	-0,1

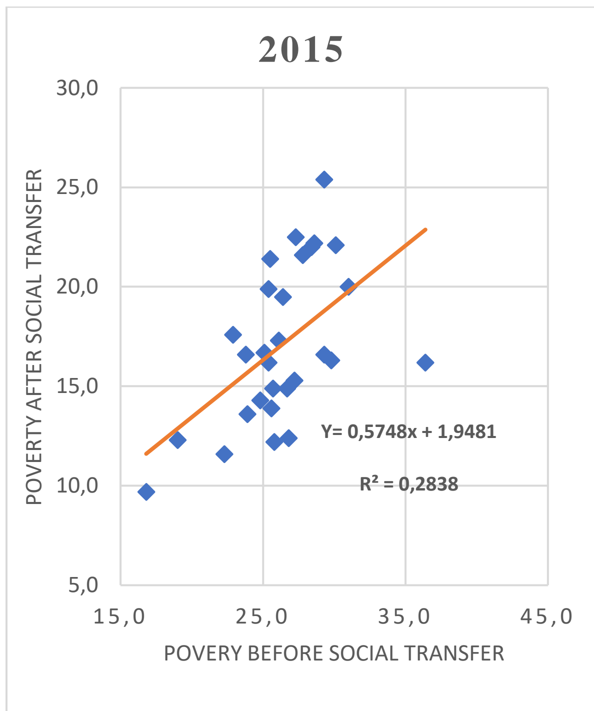
Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010. Data Source: Eurostat (ilc_li02, ilc_li10)

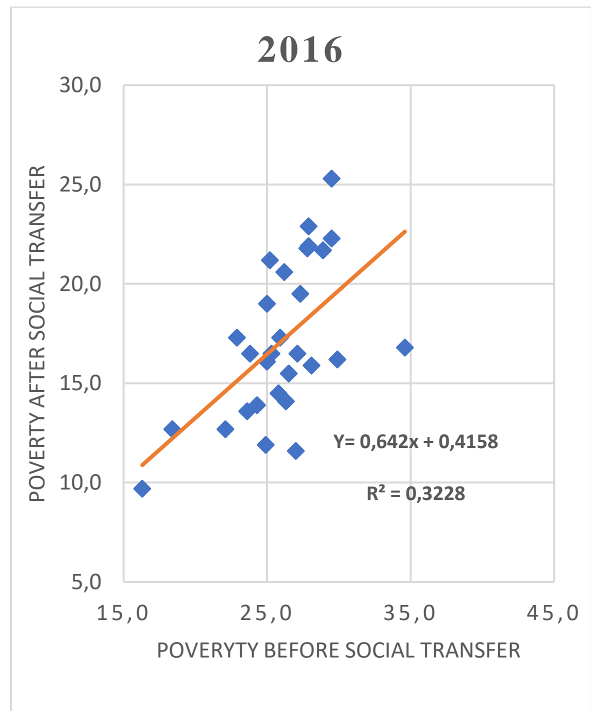
Figure1, shows the data of two variables, poverty before and after the social transfer, between the years 2013-2017. It could be seen that the two poverty had positively correlation and increased each year. For example, in 2013, the two poverty had a positive correlated at 0,42 that is derived from the linear **Y=0,418X+5,351** and poverty after social transfer explains 20% of the variation in poverty before social transfer. Meanwhile, in 2017, the two poverty had increased a positive correlation to 0,66 which is derived from the linear **Y= 0,66X -0,29.** It means that social transfer has a considerably strong positive association in reducing the poverty rate because each percentage of social transfer increases in social expenditure, the poverty rate is declined by 0,66 percent, and the poverty after social transfer explains 36% of the variation in poverty before social transfer.

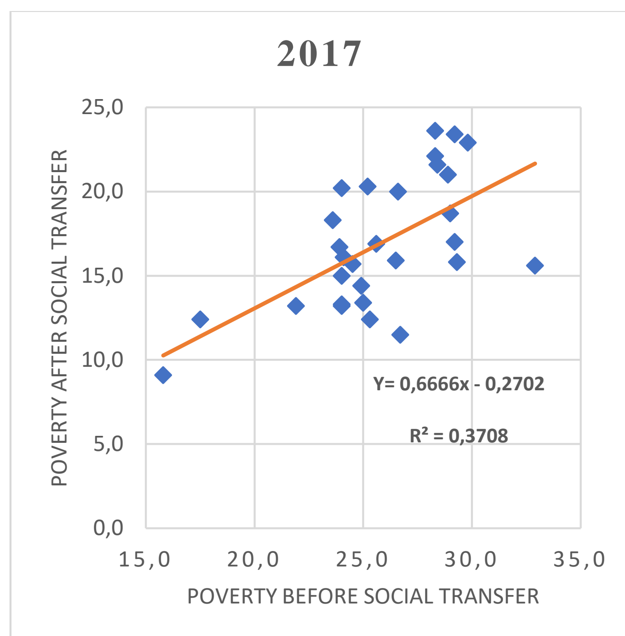
Figure1. Poverty Before and After Social Transfer between 2013-2017











Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010. Data Source: Eurostat (ilc_li10, ilc_li02)

Furthermore, according to the regression analysis in table2, it illustrates that the most efficient country among the chosen countries in 2017 was Ireland at the value of 7.69, followed by the Czech Republic (2.03); While, Spain was the least inefficient country at the negative value of

-3.02. In addition, Germany had relatively less efficiency result at a negative value of -1.65, lower than the average value of EU-28 (-1.09) (Eurostat, 2020).

Table2. The real residual efficiency of social expenditure within the EU-28 between years 2013-2017

Country	2013	2014	2015	2016	2017
Czechia	4,8	3,6	3,0	2,3	2,01
Germany	-1,7	-1,8	-1,7	-1,4	-1,7
Ireland	6,2	6,7	8,6	7,7	7,7

Spain	-2,8	-3,3	-3,1	-3,0	-3,0
EU-28	-1,5	-1,7	-1,5	-1,4	-1,1

Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010. Data Source: Eurostat (spr_exp_sum, ilc_li02, ilc_li10)

4.2.2. The Estimation of the Effectiveness and Efficiency of Social expenditure based on European Social Model (ESM)

According to the European Commission, ESM is defined as a set of common values to democracy and to adequate social security and solidarity toward individuals in society (Jepsen & Serrano Pascual, pp.234, 2005). In addition, in 2000, the European Council also defined the ESM as a set of social policy system that characterized by offering four key elements, such as a high level of social protection, social dialogue, social cohesion, and a set of common core value that includes non-discrimination, solidarity, and justices (Alber, pp.394, 2006).

From table3, it emphasizes European social policy had lift 33.98% of the poor population out of poverty. It can be seen clearly that Ireland's social protection expenditure was the lowest at 14.9% of GDP compared to the highest ratio of Germany at 29.7% (Eurostat, 2020). Bank bailout after the financial crisis in 2007 is a reason that Ireland still lags in social spending compare to other countries in the EU (David, C, 2020). On the other hand, Ireland and the Czech Republic were the most effective countries to lift the poor population out of poverty by 52.58% and 42.41% respectively. Meanwhile, Spain was the least effective country to lift the poor population out of poverty by 23.94%, below the EU-28 (33,98%). At the same time, Germany had lifted 33.20% of the poor population out of poverty, almost keep up with the average of EU-28 (33.98%) (Eurostat, 2020).

Table3. The effectiveness of social expenditure on poverty reduction within the EU-28 2017

Country	At risk of poverty rate before social transfers (pensions excluded from social transfers)	At risk of poverty rate (cut-off point: 60% of median equivalised income after social transfers)	Effect of social transfers – the difference between at-risk-of-poverty rate before and after social transfers (percentage points)	Total social expenditure in % of GDP	% of the Poor population saved by social transfers from poverty
Czechia	15,8	9,1	6,7	18,6	42,41
Germany	24,1	16,1	8,0	29,7	33,20
Ireland	32,9	15,6	17,3	14,9	52,58
Spain	28,4	21,6	6,8	23,4	23,94
EU-28	25,6	16,9	8,7	27,9	33,98

Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010. Data Source: Eurostat (spr_exp_sum, ilc_li02, ilc_li10)

In addition, table 4 represents the % of GDP spent to lift 1% of the population out of the poverty of each country between the years 2013-2017. We recognize that during the period of 5 years, Germany spent between 3.38%-3.71% of GDP to lift 1% of the population out of poverty. The Czech Republic and Spain spent between 2.33%-3.44% of GDP to lift just 1% of the population out of poverty. Ireland spent between 0,66%-0,86% of GDP to life 1% of the population out of poverty (Eurostat, 2020).

Generally, Ireland was the most efficient country by spending the lowest % of GDP to lift the poor population out of poverty. For example, in 2017, Ireland spent at 0.86% of GDP to lift 1% of the population out of poverty, followed by the Czech Republic (2.78%). Meanwhile, Spain and Germany were the least efficient country to spend up to 3.44% and 3.71% of GDP respectively, to

lift 1% of the population out of poverty, higher than the average of EU-28 (3.20% of GDP) (Eurostat, 2020).

Table4. The efficiency of European social protection between years 2013- 2017: % of the GDP spent to lift 1% of the population out of poverty

Country	2013	2014	2015	2016	2017
Czechia	2,33	2,48	2,62	2,82	2,78
Germany	3,58	3,58	3,54	3,38	3,71
Ireland	0,66	0,72	0,74	0,84	0,86
Spain	2,44	2,63	2,93	3,25	3,44
EU-28	2,96	3,12	3,16	3,23	3,20

Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010. Data Source: Eurostat (spr_exp_sum, ilc_li02, ilc_li10)

4.3.A Brief Comparison among Chosen Countries from Pension Adequacy Indicator

As we already know in the previous description of the social security system, each country has a different pension system. For example, to get old-age pension benefits in 2020, in the Czech Republic, those who were born after 1971 must have at least 35 years of insurance period at the standard retirement age 65 years; In Germany, people must have contributed at least 35 years at the retirement age 65 years; In Ireland, people must have at least 10 years of social insurance at the retirement age 66 years; In Spain, people must have contributed at least 37 years to retire at age 65 years.

In addition, from the previous analysis, we see that Ireland was the most effective and efficient country in using social expenditure to reduce the poverty rate. For example, Ireland had the highest positive result of better-than-expected at 6.1%, followed by the Czech Republic (1.2%), Germany (-0.3%), and Spain (-2.9%). Ireland spent the lowest GDP at 0.86% to lift 1% of the population

out of poverty, followed by the Czech Republic (2.78%), Germany (3.21%), and Spain (3.44%) respectively (Eurostat, 2020).

In this context, we aim to provide an additional brief comparison among the chosen countries from pension adequacy indicators, such as reduced poverty rate, replacement rate, and the length of retirement.

Reduced Poverty Rate

The below table represents the reduced poverty rate of the elderly among the Czech Republic, Germany, Ireland, and Spain between 2013-2017. We see that during the period of 5 years, Germany constantly reduced the poverty rate among the elderly from 1.0% to 1.2%. The Czech Republic and Spain reduced the poverty rate among the elderly between 2.7%-4.3%. Ireland greatly reduced the poverty rate among the elderly between 9.8%-13.3% (Eurostat, 2020).

Generally, Ireland was the most effective country in reducing the poverty rate among older people aged 65 and over. For example, in 2017, Ireland reduced the poverty rate among the elderly by 13.3% of the total population, followed by the Czech Republic (3.9%), Spain (3.2%), and Germany (1.1%) (Eurostat, 2020).

Table1. Reduced poverty rate of elderly in % of total population among the chosen countries between years 2013-2017

Country	**2013**	**2014**	**2015**	**2016**	**2017**
The Czech Republic	2,7%	3,0%	3,2%	3,1%	3.9%
Germany	1,1%	1,0%	1,0%	1,2%	1.1%
Ireland	10,6%	9,8%	13,9%	13,0%	13.3%
Spain	4,3%	3,9%	3,4%	3,5%	3.2%

Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010. Data Source: Eurostat (ilc_li02, ilc_li10)

Replacement rate

The below table represents the replacement rate of pensioners among the Czech Republic, Germany, Ireland, and Spain between the years 2013-2017. We see that during the period of 5 years Spain had the highest replacement rate for full-career workers between 60%- 69%, followed by the Czech Republic (50%-56%), Germany (45%-47%), and Ireland (33%-37%) respectively (eurostat, 2020).

Table2. Aggregate replacement ratio of pensioner among the chosen countries in between 2013-2017

Country	**2013**	**2014**	**2015**	**2016**	**2017**
The Czech Republic	0.56	0.55	0.51	0.50	0.51
Germany	0.47	0.45	0.46	0.46	0.46
Ireland	0.37	0.38	0.37	0.33	0.33
Spain	0.60	0.60	0.66	0.69	0.69

Source: Own construction from Eurostat data. Computer Software Microsoft Excel 2010. Data Source: Eurostat (ilc_pnp3)

Length of retirement

In the below table, it represents the life expectancy at age 65 in 2017 and the future retirement age among the chosen counties. In Spain, after reaching the retirement age in 2017, the retiree was expected to live up to 21,7 years, followed by Ireland (20,2 years), Germany (19,7 years), and the Czech Republic (18,1 years) respectively. As life expectations increase, almost all member states are in the process of further increasing the retirement age. For example. Ireland is expected to increase the retirement age by 68 in 2028, followed by Germany (67 in 2031), Spain (67 in 2027), and the Czech republic (65 in 2036) respectively (Eurostat, 2020).

Table3. Life expectancy at age 65, and Future retirement age of the chosen countries

Country	Life expectancy at age 65 in 2017	Future retirement age
The Czech Republic	18,1 years	65 years (2036)
Germany	19,7 years	67 years (2031)
Ireland	20,2 years	68 years (2028)
Spain	21,5 years	67 years (2027)

Note. Adopted from 'Retirement Ages,' by Finnish Centre for pensions, 2020 and 'Life expectancy at age 65, by sex,' by Eurostat, 2020

4.4.Summary and Recommendation

All chapters in this thesis aimed to determine the impact of social expenditure in reducing the poverty rate and evaluate the adequacy of pension among the chosen countries, such as the Czech Republic, Germany, Ireland, and Spain.

In section 4.1, we mainly focus on expenditure on old-age pension and poverty rates among the elderly of the chosen countries, such as the Czech Republic, Germany, Ireland, and Spain. As for expenditure on old-age pension, we see that during the period of 5 years between the years 2013-2017, each county had spent between 4.4%-8.8% of GDP. Generally, Germany had the highest pension expenditure on old-age, followed by Spain, the Czech Republic, and Ireland respectively. In addition, the poverty rate among the elderly of each country had fallen at least by 1.1% to 13.3% in 2017. Ireland had the highest fallen rate of poverty at 13.3%, followed by the Czech Republic, Spain and Germany.

In section 4.2, we use our own empirical estimation of the efficiency and effectiveness of social expenditure in reducing poverty rates based on regression analysis and the European social model.

As for regression analysis, although Ireland social protection expenditure was the lowest among EU-28 due to the bank bailout after the financial crisis in 2007, Ireland had the highest residual

value of efficiency and was the most effective country at the highest result of better-than-expected value, followed by the Czech Republic, Germany, Ireland, and Spain respectively.

As for the European social model, Ireland was also the most effective country to lift the poor population out of poverty and was the most efficient country in generating social expenditure to spend less percentage of GDP to lift 1% of the population out of poverty, followed by the Czech Republic. Interestingly, Germany was more effective than Spain in terms of lifting the poor population out of poverty; While Spain was more efficient than Germany in terms of spending less percentage of GDP to lift 1% of the population out of poverty.

As a result, we see that regression analysis performs better than the European social model. The European social model provides unbiased efficiency results among the chosen countries, but the result is a lack of effectiveness. Whereas, regression analysis shows the predicted value, better-than-expected value, and correlation between poverty before and after social transfer; Thus, regression analysis has no bias in effectiveness and efficiency and more reliable.

Although social transfer has an important role in reducing the poverty rate, an excess of social transfer could cause an inefficient allocation of resources. So, government intervention is needed. Government, a policymaker, has been featured as a key important factor to improve the efficiency and effectiveness in spending public expenditure on social security services. Thus, we recommend three functions of government based on the European standard. Firstly, according to the European Commission in 2013, the government should encourage people to work longer and more active in their senior life to cope with the aging population challenge by supporting the employability of older worker or providing training, lifelong learning, and taking action to stop age discrimination (European Commission, pp.7-8, 2013). Secondly, according to OECD policy briefs in 2006, the government should also promote financial education as early as possible to encourage individuals start saving for their family and pension plan (OECD, 2006). Thirdly, the government should optimize the allocation of resources and evaluate every project spend on the social sector to avoid overspending on the functional areas (Alno, Almas, Chemen, & Peter, pp.9, 2008).

Furthermore, each country has its own opportunity for addressing pension challenges. During the period of five years between the years 2013-2017, the GDP growth in Ireland increased by 6.79% from 1.35% in 2013 to 8.14% in 2017 (worldbank, 2020). Irish export has displayed a positive

improvement and business investment is recovering strongly in the construction sector (OECD, 2018). From 2016-2071, pension-related expenditure is projected to increase from 70%-80% of funds; Thus, to ensure that future pension benefits are sustainability and viability, the general scheme of the Social Welfare and Pensions Bill 2017 was enacted (SPC&EC, pp.72, 2018). The scheme proposes that employer will be required to provide a minimum notice to the pension authority where they decided to cease contribution to a defined-benefits schemes; In case the pension schemes is deficit, the pension authority will take necessary and timely action to restore a funding position (SPC&EC, pp.72, 2018).

Secondly, in the Czech Republic, the GDP growth increased by 4.83% from -0.48% in 2013 to 4.35% in 2017 (worldbank, 2020). Strong household consumption, expansion of export and low unemployment rates leads to accelerated growth (OECD, 2018). However, the Czech's economy suffers a strong hit from COVID-19 outbreak in 2020 and leads to a sharp contract in GDP growth by -6.2% (Praguemorning, 2020). On the other hand, several reforms of the pension system have been approved and has a negative impact on long-term fiscal sustainability system, such as postponing the retirement age and methods of pension indexation. As for postponing retirement age, it is important for government to regularly respond to the changes of the demographic situation at 5 years interval (SPC&EC, pp.33, 2018). As for pension index, it aims to improve the income of pensioners and maintain the replacement rate; However, due to the aging population, the expenditure is expected to exceed the revenue of the pension system, it requires to find financial resource to cover pension deficit (SPC&EC, pp.33-34, 2018).

Thirdly, in Spain, the GDP growth raised by 4.34% from -1.45% in 2013 to 2.89% in 2017 (worldbank, 2020). Spain has made a successful recovery and has increased employment and provided support to households (OECD, 2018). For addressing the pension-related challenges, the implementaion of the intergenerational equity factor in 2019 was introduced to ensure longer and full-time careers, to keep low unemployment rate (SPC&EC, pp.92, 2018).

Finally, in Germany, the GDP growth raised by 2.04% from 0.42% in 2013 to 2.46% in 2017 (worldbank, 2020). Germany has enjoyed the economics growth, building on the stong domestic demand, and expansion of export from a large manufacturing sector (OECD, 2018). Adequate provision for old-age pension remain the main goal for Welfare system in Germany. Many pension

reforms on old-age have aimed to address the challenges of demographic changes and to provide a stable higher level of old-age security (SPC&EC, pp.53, 2018). Thus, the legal framework is necessarily needed to regulate the permanent minimum insurance obligation (SPC&EC, pp.53, 2018).

More importantly, as we have described in the previous part, we see that in the Czech republic, Germany, and Spain, people need to have at least 35 years of contribution to the social security system to retire at age 65; While in Ireland, people need to obtain only the minimum 10 years to retire at age 66. At this point of view, pensioners in Ireland have better advantage to enjoy their time than that in the Czech Republic, Germany, and Spain as they do not need to stay longer in working life. In addition, the Czech Republic, Germany, and Spain should create a similar system to the general scheme of the Social Welfare and Pension Bill of Ireland that allow pension authority to have all information in advanced regarding to pension budget contribution from residents and allow the state to take necessary and timely action to restore a funding position if the pension scheme will be deficit.

V. CONCLUSION

The objective of this thesis was to analyze the adequacy of pension among the four chosen countries, such as the Czech Republic, Germany, Ireland, and Spain. This was done by studying on social security system among the elderly and analyzing whether the country utilizes public expenditure effectively and efficiently.

In section 4.1, we specifically focus on the social security benefits among the chosen countries. we already know that each country has a different way of calculating old-age pension benefits. Firstly, old-age pension benefits in the Czech Republic consists of a minimum basis amount and percentage amount. For example, the standard old-age pension benefit in 2019 is calculated as 3 270kč plus 1.5% of the calculation base. Secondly, old-age pension benefits in Germany is calculated based on the retirement age, average income, and contributed years. Thirdly, the standard old-age pension benefit is calculated as weekly based on the qualified year of retirement. For example, for those who have contributed between 10-14 years and retire on or after 1 September 2012 will get €99.20 per week. Lastly, the standard old-age pension benefit in Spain is calculated from 50% to 100% of calculation basis based on years of contributed insurance. The minimum guaranteed pension was €657.6 per month.

In section 4.2, Regression analysis and European social model were used to estimate the relationship between poverty before and after social transfer. The result shows that in between 2013-2017 Ireland was the most effective and efficient country in making a use of public expenditure even though Irish social expenditure was the lowest among the chosen counties. This illustrates that a high increase of social transfer does not mean the country could generate the budget effectively and efficiently. In accordance with our analysis of EU-28 in 2017, it illustrates that social transfer has a strong positive association in reducing the poverty rate as each percentage of social transfer increase in social expenditure, the poverty rate is declined by 0,67 percent.

In conclusion, economic growth, life expectation, retirement age, and pension contribution have an influence on pension amount. Pension is essential to ensure income security for the elderly that includes the rights to adequate social security pension. The Czech Republic should optimize the allocation of resources and evaluate every project of social budget to avoid overspending.

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