The Evolution of the Tax Burden in Norway 1936-2015

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Abstract

Is it possible to examine the evolution of the tax burden in Norway over time? I address this question using data on direct and indirect tax revenue both for the state and municipalities from 1936 to 2015. Following the data collection I summarise the various taxes into larger aggregate categories. My main interest lies in examining the distribution of the tax burden between labour or human capital and capital. In order to determine incidence I draw on various studies of tax progressivity and combine assumptions from these to create 6 distinct assumption sets. These assumption sets then allow me to determine which group (capital or labour/human capital) actually pays the specific tax. I can then find the total share of tax revenue paid by each group for different time series and assumption sets. The results show that overall labour/human capital bears the largest tax burden and that over time the trend is more or less constant. However, the results greatly depend on the assumption set used as well as the distinction between labour and human capital.
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“...but in this world nothing can be said to be certain, except death and taxes.”

Benjamin Franklin
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1 Introduction

1.1 Research question

The purpose of this thesis is to examine how the tax burden in Norway has evolved over time. Going back to 1936 I attempt to reach some conclusions as to whether capital or labour has borne the largest share of the tax payments. The interest of this result lies partly in the political realm, and I will not spend much time discussing what constitutes a "good" or "bad" distribution, nor whether the distributions I find in this paper are "good" or "bad". However, from an economic point of view there may still be some indicators on what kind of distribution would be most beneficial. Firstly, several studies (OECD (2015) and Persson and Tabellini (1994)) have shown that higher income inequality is detrimental to economic growth. Additionally, more equal societies usually have a more cohesive social structure and less political disruption, this is also good for growth (Stiglitz, 2013). Therefore, a system which redistributes income should experience better conditions for economic growth. A "fairer" tax burden between capital and labour might prevent the development of a narrow economic elite thereby ensuring social cohesiveness. In a climate of increasing government expenditure it also seems reasonable that one group should not have to bear a disproportionately large share of the increase. Particularly as this might lead to increased attempts at tax evasion, tax avoidance, and a larger informal economy (Genschel, 2002; Scharpf, 2000). If nothing else, I hope that this thesis will contribute to a discussion on how the total tax burden may be examined.

Economists have usually divided taxpayers into groups in five different ways (Atkinson & Stiglitz, 2015):

i Consumers versus producers.

ii Specific factors; capital, land and labour.

iii Individuals or households.
iv Regional groups.

v Generational groups.

My definition falls between category i. and ii.. Capital and labour/human capital in my context do not define a group of people who are constantly and rigidly included in one category or the other. Rather individuals move between the groups depending on which tax they are paying. For example, an individual who receives an average salary could well be included in both groups if she owns several real estate properties (not uncommon in Norway). The hotel and commercial property owner Olav Thon primarily gets his income from sources I define as capital, but he is nonetheless a consumer when he goes into a shop to buy food and is therefore subject to indirect taxes whose incidence falls on the group I have called labour. I also define capital very broadly and include land and residential property in this category. When separating the taxes into the two categories I mostly consider whether the income which is being taxed arises from a “job” completed at the time of taxation (labour/human capital) or as a result of a “job” completed at a previous time (capital).

Some clarification is perhaps needed with regards to the use of the word “tax burden”. In the literature the term "tax burden" refers most often to incidence analysis. However, I use it mainly to refer to the tax contribution made by different groups. The final results rest on incidence assumptions however, and as such reference to the tax burden in later chapters will be more in line with the common usage. It may also be beneficial to briefly define what is meant by indirect and direct taxation. In the early tax literature direct taxes referred to taxes that were not usually shifted, so that the legislative subject of a tax was also its economic subject. Conversely, indirect taxes was a term used to refer to taxes that for practical reasons were levied at the production level, but whose rates would later be included in the final price (Statistics Norway, 1958). Today, the distinction is based more on the manner or source of taxation rather than directly being linked to tax shifting versus non tax shifting. For the purpose of this paper direct taxes refer to taxes on income and wealth, as well as social security contributions. While indirect taxes will refer to taxes on sales, production, and the means of production.
1.2 Motivation

My main motivation for choosing tax burden as a thesis topic was a paper by Kiær in 1911. In fact, the paper itself is a reprint of a talk Kiær held at a meeting of the state economic organization (Den statsøkonomiske forening) in 1884. In this talk he discussed whether the tax burden in Norway at the time was too large, i.e. whether the population was over-taxed? To this end, he compares the tax revenue with population size, but also stresses that the tax burden must be compared with tax ability. In comparison with other European countries he finds that Norway has one of the smallest tax burdens accounting for population size, but had one of the higher burdens when considering taxes as percentage of income. He concluded that the tax burden in Norway was averagely large compared with national income. He also found that the burden had grown at a slightly faster pace than national income over the preceding 30 years, although this was only true for municipal taxes. All in all he concluded that the tax burden in Norway could not be said to be particularly suffocating to economic activity (Kiær, 1911). Today we might consider Norway to be a high tax country, but in fact we do not have a very high tax burden (measured as a percentage of GDP) at least when comparing with other OECD countries. The tax burden has also declined during the past decades (Christensen & Sandmo, 2008).

Kiær was the first general director of the Norwegian Central Bureau of Statistics, today known as Statistics Norway. He was passionate about statistics and particularly concerned with creating statistical measures that were consistent across borders in order to allow for cross-country comparisons. This is made clear from his active participation in the various International Statistical Congresses that were organised throughout the 19th century (Bjerkholt & Skoglund, 2012). Kiær’s pioneering work was in national income measurement, although an international consensus in this area was not reached until after the Second World War. However, Kiær’s work allowed early on for a fairly extensive collection of income data and its distribution in Norway. Interestingly, Kiær did not agree with Classics such as Adam Smith that only productive factors created value in an economy. Instead he insisted that also services (including those that are unpaid) should be included in the national accounts. This is not the case for the international consensus on national accounting today, but it does provide an interesting link between Kiær and authors such as Stiglitz, Sen, and Fitoussi.
Kiær was a partisan of the individual method, meaning that he felt it was more correct to calculate income by summing citizens’ incomes rather than starting from the income for different sectors. He also argued that an equal distribution of income in society is beneficial not only because it expands the consumption base, but also because it limits non-profitable activities that arise from having an exorbitant amount of wealth (Bjerkholt & Skoglund, 2012).

It is Kiær’s dual focus on income distribution and redistribution (Kiær, 1913) as well as on taxes (Kiær, 1911) which has motivated my thesis on the evolution of the Norwegian tax burden. Departing from a hypothesis that labour income is largely spent on consumption and capital income largely on reinvestment and further enrichment I wanted to examine whether one could distinguish any trend in which group is facing the largest burden of taxes, and also if this distribution is constant or changing over time? If for example one could find convincing results that capital bore the lightest tax burden it could provide one explanation for the increasing top wealth shares observed by Piketty in “Capital in the 21st Century” (Piketty, 2014).

My thesis is split into seven chapters not including this introduction. In the first chapter I attempt to introduce the theme of taxation from three different perspectives. Firstly, I summarise the various developments of the tax system in Norway. Starting from 1814, and increasing with detail as I cover the 20th century. I then present an overview of the tax literature spanning back to the 17th century. In this overview I aim to show how the lines of thought on taxation have changed both with developments in economics, but also with the evolution of society. In the final part of the literature review I dig deeper into themes of Norwegian taxation research.

In the second chapter I go through the data and method that I have chosen to use for the thesis. The complete dataset I have compiled is available in the online appendix (see link at the end of printed appendix), and the original data sources are available through Statistics Norway’s online library of historical booklets and reports. I use excel for all output calculations. In the third chapter I examine the question of incidence more
1.2. Motivation

closely\(^1\), both by presenting a simple example of tax shifting (using supply and demand curves), and by presenting relevant literature which has focused on incidence analysis. This examination of the incidence literature is continued in the fourth chapter where I present the studies I have drawn on when creating the different assumption sets. In the fifth chapter I have compiled the results of my analysis. In total there are 24 figures that illustrate how the tax burden is shared between labour/human capital and capital over the time period 1936-2015. The abundance of figures is explained by the fact that I use several sets of assumptions, I analyse the relative shares both with and without tax revenue from petroleum and gas extraction, and because I have two series for each case. One series covers the entire period and looks at the split of the tax burden between human capital and capital, the other covers a period from 1956 to 2015 and looks at the split of the tax burden between labour and capital. In the interest of not overwhelming the reader with graphics, however, all figures that include petroleum tax revenue can be found in the appendix.

In the sixth chapter I discuss both the assumptions I have made and also evaluate the reliability of the results. I find that overall some caution should be taken in the interpretation of the results. This is due to the fact that the results depend a great deal on the assumptions made about incidence, and also about category (human capital/labour versus capital). As explained in the beginning of the chapter on results large differences are found between the partial and total series simply because I switch between analysing human capital and labour. Finally, I conclude the thesis.

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\(^1\)Incidence refers to the question of who bears a particular tax, the incidence can also be split between groups. The "who" in question can change depending on what one wants to study (see the list over different ways of splitting up taxpayers from Atkinson and Stiglitz (2015)).
2 Literature Review

2.1 The history of the Norwegian tax system

The history of the modern Norwegian tax system can be traced back to the creation of the 1814 constitution. Soon after 1814 the state introduced a land and city tax (land- og kjøpstadskatten) which can be considered as a wealth and income tax. This tax was financed by property in the districts and income and trade in the cities. The tax was a repartition tax meaning that the tax revenue was collected and then split between city and country without necessarily matching the contributions. This is not unlike the system today where total tax revenue at the state level is funnelled into projects and expenditures that are prioritised without regard for the origin of the revenue. The land and city tax in question became increasingly unpopular and was repealed in 1836 (Gerdrup, 1998). Direct central government taxation of income was re-introduced in 1892, and in 1893 direct central government taxes on capital/wealth were also introduced. In the intervening period i.e. between 1814 and 1892 most taxes were collected at the municipal level and largely financed through taxes on property (matrikkelskatten). Municipalities were during this period free to determine their own taxes and tax rates and most taxes were collected for a specific purpose. The administration of the tax system was in the hands of local politicians, the church and the courts (Gerdrup, 1998).

The switch from taxation of property to direct taxation of income reflected the changes from a natural economy to a money-based economy. A similar development can also be seen internationally (Gerdrup, 1998; Musgrave, 1985). To begin with the income tax was proportional, but from 1896 it became progressive, whereas the wealth tax has been progressive since 1914. The development since then has leaned steadily towards increasing total tax revenue, while the progressivity increased until the early 1970s (Gerdrup, 1998).
2.1. The history of the Norwegian tax system

Throughout the 19th century and even in the beginning of the 20th century customs and tariffs were important sources of tax revenue. Despite there being a fairly high level of international free trade prior to the First World War, protectionist measures such as tariffs were a popular tool for governments. The main purpose of tariffs was to protect domestic industry, particularly those industries which were deemed especially important to the economy. In addition of course custom duties and tariffs also provided a significant amount of revenue for governments. For example, around the beginning of the 20th century 60 percent of total tax revenue in Norway came from tariffs and custom duties (Statistics Norway, 1955) (only 10 percent came from direct taxes while 25 percent came from other indirect taxes). Tariffs in Norway were largely regressive, due to them mainly being levied on nutritional products such as sugar and coffee, leading to high costs for foodstuffs. The tariffs were raised at the end of the 19th century and their protectionist aspect tightened in 1905. Throughout the 1920s the tariff rates remained stable. However, due to inflation in the 1920s tariffs measured as a share of the value of goods decreased significantly during this period. With the creation of the General Agreement on Tarriff and Trade (GATT) following the Second World War the importance of tariffs and custom duties in government budgets has been greatly reduced. In 1950 for instance, they only accounted for approximately 4 percent of tax revenue (Statistics Norway, 1955).

Taxation of corporations was first regulated by the law of 13 July 1921. Since then there has been some sort of tax on corporations and corporate income although certain sectors have benefited from highly favourable systems. The shipping sector in particular is a good example of this. At first it was protected because of its integral value to the Norwegian economy, both as an employer and producer, but in particular because it provided much needed foreign currency (Gerdrup, 1998). Today however, the sector increasingly replaces labour with capital technology, employs foreign over domestic workers and threatens to leave Norway if the preferential regime they enjoy is curbed. As such it reflects the limits governments face on the subject of capital taxation in today’s globalised world (NOU 2006:4, 2006).

In 1921 a tax on higher incomes was introduced, and collected at the municipal level, but to begin with the municipality could decide whether to
collect the tax or not and at what rate. After the Second World War the tax on higher incomes was made compulsory and uniform rates were introduced across municipalities. Age compensation taxes appeared in 1936 and a war retirement tax in 1946. Both these taxes were later repealed when the old age security tax was re-organised in 1959, and today they are included in the social security contributions paid by employers and employees (Statistics Norway, 1958).

Perhaps the most important year to remember when reviewing the Norwegian tax system is the year 1911. Despite there being no real change to the tax system it is integral because it marks the birth of tax return forms that had to be filled in by all persons liable to taxation. This system still exists today, although we probably all appreciate the ease of simply checking whether the automatically uploaded electronic data on our income has been correctly reported, rather than doing the "heavy lifting" ourselves. In addition to the introduction of the tax return system the regulations on what was classified as income were tightened and clarified. This reform led to a higher than normal increase in tax subjects and tax income between 1911 and 1912 (Gerdrup, 1998; Christensen & Sandmo, 2008).

In 1936 the tax distribution fund was created to financially support poor municipalities. This fund existed until 1997 when it was integrated into the state budget. The seaman’s tax was introduced in 1947. The purpose was to give an equal treatment of all seamen where the same tax design was applied regardless of the level of taxation in their home municipalities (which was liable to variation). It was also introduced because it was an administratively simple way to collect the tax income from seamen. The seamen also faced favourable terms as their overall tax burden was lower than the rest of the population’s (Koren, 2017).

In 1955 the tax system started distinguishing between personal tax payers (forskuddspliktige) i.e. taxpayers whose pre-calculated tax was deducted directly from their pay check and corporations (etterskuddspliktige), who paid taxes after reviewing the tax returns and correcting for debts and other exemptions. As this was not fully put in place until 1957 there were variations on the amount of tax paid during these years, for example in 1956 personal taxpayers did not pay taxes as they were to be collected from that
year's income rather than the previous year which had already been paid for.

In 1962 a new uniform tax, called tax for development aid (særskatt til utviklingshjelp) was introduced for all taxpayers. The tax was contentious and particularly the far right with Anders Lange (creator of the forerunner of The Progress Party) was against this specific tax (Bjørklund, 2008). The tax was repealed in 1975.

In 1967 the social security scheme was created (Folketrygden). This scheme is financed by social security contributions from employers and employees as well as contributions from the state. It was designed as a Pay-As-you-Go system and covers various welfare benefits including sickness benefits, pregnancy and birth, unemployment, old age, disability, single parent, death, loss of economic provider and rehabilitation for re-entry into the labour market (NAV, 2018).

The reforms of the tax system in 1892/93 and 1911 have been succeeded by several large reforms in modern times. In 1987 and 1992 the highest marginal tax rates were significantly reduced along with the number of exemptions. The aim of the reform was to increase fairness in the tax system and improve efficiency. Despite high marginal tax rates in the previous tax system (highest around 70 percent), the degree of progressivity was weakened by the large number of exemptions and particularly loopholes with regards to debt, which enabled both high earning individuals and firms to minimise their tax burden simply by taking on more leverage (Store Norske Leksikon, 2017).

Discussions in OECD countries during the 1980s and 1990s were concerned with possible large losses in efficiency due to disincentives and distortions on worker behaviour caused by progressive taxation. The reform proposals motivated by such arguments led to flatter profiles of the marginal tax rates together with a reduction of the levels of the tax rates. The 1986 tax reform in the US under Reagan and the 1991 tax reform in Sweden were influenced by these arguments. A similar tax reform was implemented in Norway in 1992/93. The new dual system for income taxation, which was a combination of a low flat tax on capital income (28 percent) with higher
progressive taxes on labour income (up to 50 percent), implied a reduction in the interest rate exemptions to 28 percent (Store Norske Leksikon, 2017).

The main difficulty with this system however, was to avoid misuse of the different income categories, i.e. trying to pass off labour income as capital income. This was resolved by splitting the income definition into a definition for capital and a definition for labour (delingssystemet). With regards to residential property, the tax system remained highly favourable to property owners (Store Norske Leksikon, 2017).

The new system might have contributed to a period of growth in the economy from the mid-1990s. The new rules allowed for a freer flow of capital in the economy and a greater return on investments, it also led to an increased importance of financial markets and institutions. However, the split system or split model gradually fell apart making it easier and easier for agents to avoid taxation by disguising labour income as capital income. This would eventually lead to the tax reform of 2006 (Store Norske Leksikon, 2017).

The major changes brought about by the tax reform of 2006 was the introduction of a dividend tax as well as changing the taxation of corporate incomes. Those parts of the corporate income that exceeded a calculated risk-free return on the invested capital would now be taxed either according to the progressive tax rates as those for labour income or as regular income both when it is earned/created in the firm and when it is paid out to the shareholders. The risk-free return on invested capital is shielded, so in practise up to a certain threshold profits are not taxed if these are then used for reinvestment. For stock companies the profits are taxed as ordinary income at the firm level and additionally the dividends are taxed as ordinary income at the shareholder level. For the self-employed a personal income is calculated based on the profit of the firm with exemptions for interest rates on debt, and the tax calculated with a basis in this income (Thoresen, Bo, Fjærli, & Halvorsen, 2011).
2.2 The history of tax literature, from the Physiocrats to optimal taxation theory

It would be natural to assume that the study of taxes has an important place in economic literature. After all taxes are integral to the existence of the state, whose main reason for existing (according to Hobbes (2017); having a monopoly on violence) can only be financed through confiscation of a portion of private property (Besley & Persson, 2010). Indeed, the literature on taxes is fairly rich particularly in the period of the Classics and in the early 20th century. In the last half of the previous century the focus has been more targeted and most of the literature has either concerned itself with optimal taxation theory and/or incidence measurement. However, a broader study of taxation and especially more normative studies are experiencing a revival (see for example Piketty (2014), or some of the other papers cited at the end of the literature review).

If we trace the history of taxation backwards we find that in the beginning taxes were mainly used as a way of financing wars (Tilly, 1990). Indeed, Tilly (1990) proposes a theory that one of the reasons for Western Europe developing a more complex system of taxation and institutions early on were the continuous wars in the region that consequently created a demand for a larger tax base.

The legitimacy of the state depends on its ability to protect its population, and the protection is financed through taxation. Sanchez de la Sierra (2017) for example shows how bandits in Eastern Congo provide protection services in exchange for taxes and how the decision between plundering or setting up some sort of “permanent” settlement depends on the accessibility and size of the tax base.

In attempting to present an overview of the tax literature I rely heavily on Musgrave (1985) who provides a highly detailed history of fiscal doctrine beginning with Adam Smith (although Musgrave specifies that the study of

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1Sanchez de la Sierra specifically looks at coltan mines versus gold mines and finds that coltan which is only valuable in bulk can be taxed directly at the mines thereby providing an incentive for protection services there, but not in coltan villages. Whiles gold (valuable in small easily hidden quantities) is more easily taxed indirectly through consumption and trade in villages thereby providing incentives to protect the village, but not the mine.
Chapter 2. Literature Review

taxes predates Smith) up to the advent of empirical studies in the 1970s. The history of taxation literature reflects both the technical developments in economics such as the rise of incidence analysis, elasticities, marginal utility and cost theory etc., but also changes in social perspectives; from Locke’s rules of entitlement through Bentham’s utilitarianism and further along the line considerations of equity and fairness. We can trace the changing role of economics along its development, from a science rooted in moral philosophy and politics to a field which shies away from normative judgments leaving politics to the politicians. Finally, it reflects the evolution of institutions, the rise of democracy and the changing function of the State (from a limited provider of defence and protection to the safety net from cradle to grave)\(^2\). Following Musgrave (1985) I choose to split the analysis into three parts; firstly, I examine the literature on the reasons to tax, secondly the literature addressing what or who to tax, and finally, the literature on how to tax most efficiently\(^3\).

2.2.1 To tax or not to tax?

Departing from Adam Smith we can distinguish three roles for the government; to protect society from invasion and attack from abroad, to protect society against injustice or attack from within, and to provide certain institutions and public works (Smith, 1904). The second role has been addressed by multiple authors, among these Besley and Persson (2010) who emphasise two capacities for government; legal and fiscal. The legal provides protection of property rights allowing for economic growth and the fiscal enables both the development and financing of the legal capacity. One conclusion that can be drawn from their analysis is that taxes are necessary to ensure economic growth as without taxes there will be no protection of private property and thereby no or little incentive for investment.

Although Smith does not use the words market failure he alludes to it in the third role of the government. There are some services and activities which are essential to the functioning of the market system and to economic growth, but which are not profitable enough for a private agent to supply.

\(^2\)As studying Norway focus on the Norwegian state and Western fiscal doctrine.
\(^3\)I do not pretend to have covered the entirety of the available tax literature, and it may therefore be that important contributions have been omitted.
John Stuart Mill goes further in trying to evaluate which principles decide when it is acceptable to depart from the market system. He stresses the dissonance between an individual’s actions and their overall utility. For example, individuals may not be able to correctly evaluate the utility of certain products, such as national defence. They may lack sufficient foresight and therefore undertake irreversible contracts, and it may be necessary to have regulations in markets where interests differ, for example the stock market, (this is an indirect formulation of the agent-principle problem) (Mill, 1921). To a certain extent one can say that Mill’s principles are based on cases where the individual departs from the behavioural assumptions of the homo economicus, in this way there is a certain similarity between Mill and the far more recent line of research into behavioural economics⁴.

For both Smith and Mill the market was the rule and the state the exception when it came to economics. The continental or German school on the other hand viewed the economy as a dual split between the two, which influenced the American authors of the time (19th-20th century) who often completed their graduate degrees in Germany (Mehrotra, 2005; Musgrave, 1985).

### 2.2.2 Who should pay taxes?

There are two principles for deciding who should pay taxes:

i The benefit principle departs from the position that taxes should be paid in proportion to your benefit of the public services financed by these taxes.

ii The ability-to-pay principle states that taxes should be paid according to your ability or if you will, income, in other words taxes should be progressive.

Closely linked to the benefit principle of taxation is marginal utility theory. Simply put if we assume preference as given, then welfare is maximised when price equals marginal utility. This is quite simple in a market setting as quantity adjustments move the price towards the marginal utility (at least theoretically speaking). However, public goods are provided to everyone in equal measure as they are non-rivalling and non-exclusive.

⁴See authors such as Richard Thaler, Daniel Khaneman etc.
Marginal utility of a public good will however, vary between individuals. For example, one individual may not have a car and therefore rarely use the motor-way, but for another it is essential to their business and thereby livelihood. In this case prices should differ to reflect the differing marginal utility leading to the benefit principle; the higher utility you receive from a public good the more you should pay. Wicksell was one of the first authors to point out the difficulties associated with following the benefit principle (Musgrave & Peacock, 1958). Firstly, there is an issue regarding equity as those who benefit the most from public intervention or public financing are often those with the more limited private means. Perhaps more importantly Wicksell recognised that individuals would under the benefit principle have an incentive to hide their real preferences in the hopes that the preference of others would pull the provision of public goods up without any additional cost to themselves, in other words individuals would have an incentive to free-ride on other’s willingness or even necessity to pay (Musgrave & Peacock, 1958).

Another issue with the benefit principle is that it is not straightforward to determine who benefits the most. Therefore, many scholars favoured progressivity and payment according to ability. Progressivity was based on four arguments or assumptions, as listed in Musgrave (1985):

i Utility is comparable between individuals and is measurable.

ii There exists a known marginal income utility schedule.

iii This schedule shows that marginal utility declines with income, i.e. the higher your income the lower your utility from a small increase in income.

iv All the above assumptions are valid for all individuals.

These assumptions are of course questionable and many authors, particularly Pigou and Edgeworth were sceptical to them. However, it wasn’t until the rise of Paretian welfare economics in the 1930s that the assumptions completely fell out of use, especially the first assumption. According to Pareto efficiency economic welfare increases if the economic position of A is improved without the position of B deteriorating or less stringently if the position of A improves and part of this improvement is used to compensate B so that his net position has not deteriorated. The
result of this development as well as a general wish in economics to move closer to the hard sciences in method and valuation was that reflections on the distribution of the tax burden became a matter for politics rather than economics (Musgrave, 1985).

Before moving on to the literature on how best to design a tax system it is beneficial to first turn to the studies on what could and should be taxed. Today, at least in a country like Norway it seems obvious that you tax people’s income and to a certain degree their wealth in the form of property and financial taxes, as well as having consumption and excise taxes. However, the literature shows that things were not always so straightforward. The Physiocrats for example believed that the only truly productive factor in the economy was land and therefore the rent from land was the only thing that should be taxed. As society at that time (17th century) was largely agrarian these conclusions are perhaps unsurprising. The Classics took a broader view and defined both rent from land, profits, and income used on and stemming from luxury consumption as eligible sources of taxation. However, due to the risk of capital flight (Adam Smith) and obstruction to growth from taxing profits (David Ricardo), only land rent and income from luxury consumption were deemed viable sources (Musgrave, 1985).

Despite income as a measure of tax capacity pre-dating Smith, the concept of an income base emerged slowly. This may be due to the fact that income was hard to measure for most parts of the 19th century and to a certain degree into the 20th century. For example, in 1900 in Norway 70 percent of the fiscal income stemmed from customs and duties (Christensen & Sandmo, 2008) indicating that this was a more easily tapped income source for the government than personal/corporate income and wealth. Additionally, many economic transactions were still barters (Gerdrup, 1998). Even Kiær’s interest in how to measure national income suggests that it was not a straightforward task.

The modern idea of a global income tax emerged towards the end of the 19th century. It was the German author Schanz who first proposed the

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5 Definition by Merriam-Webster: A school of political economists founded in 18th century France who believed that government policy should not interfere with the workings of the market and that land is the source of all wealth.
concept of accretion\textsuperscript{6}. This was later adopted by Haig (1921) who introduced the concept to the American literature in the 1920s. He defines income as “money value of the net accretion to a person’s economic power between two points in time” Haig (1921, p. 27). Accretion was a useful concept because it could be used in defining capital gains independent of realisation, corporate income, depreciation, etc. The comprehensive income tax base also became a way of ensuring both horizontal and vertical equity, i.e. of combining or at least attempting to combine the benefits principle and the ability-to-pay principle (Atrostic & Nunns, 1991; Musgrave, 1985).

Although I have in accordance with the larger part of the literature focused on income taxation in this introduction; consumption taxes, excise taxes, custom duties, extraordinary taxes following wars, taxes on natural resources and increasingly environmental taxes are also (or have been) sources of tax income and sources of debate. Taxes also have other functions than simply providing revenue or redistributing income and increasingly they are used to influence the behaviour of agents. For example, in the case of environmental taxes or high excise taxes on products that could damage one’s health such as tobacco, alcohol and sugar\textsuperscript{7} (Christensen & Sandmo, 2008).

\textbf{2.2.3 How to design a tax system?}

Returning to Wicksell, how can you design a tax system founded on the benefit principle while still avoiding issues of free-riding and inequity? Wicksell proposed voting over different bundles of taxes and benefit provision, preferably with a unanimous vote, but in practise with majority voting. This is in fact largely how we do it today; political parties propose platforms with varying degrees of social security coverage and corresponding tax rates, and voters express their opinion through the ballots (Musgrave & Peacock, 1958).

One main feature of fiscal studies is how to tax in a way that least disrupts the natural functioning of the market as well as minimising administration

\textsuperscript{6}The process of growth or enlargement by a gradual build-up (Merriam-Webster dictionary)

\textsuperscript{7}Excise taxes on these goods are not at all new concepts and have existed in the Norwegian tax system for a long time, I simply mention them here as an example of goods that today are taxed not only for revenue purposes, but also for behavioural purposes.
2.2. The history of tax literature, from the Physiocrats to optimal taxation theory

costs. When analysing how efficient or inefficient a tax is (at least in theory) it can be helpful to use the concepts of consumer- and producer surplus, deadweight loss and Marshallian supply and demand curves. These are also useful tools when we wish to illustrate how economic tax incidence can depart from judicial tax incidence. Incidence analysis is not essentially a new topic. For example, Mun (1664) and Petty (1899) discussed how a tax burden can be shifted, particularly in the case of excise taxes. Mun believed that taxation of necessities would raise both prices and wages and therefore fall predominantly on the producers. Petty on the contrary argued that taxes on necessities fall on consumers (Musgrave, 1985). However, there was no formal framework in which incidence could be analysed until the 20th century.

Ramsey (1927) was the first to link tax-shifting directly with elasticities. His contributions are particularly useful when illustrating the effect of taxes in a partial equilibrium world. More recently the focus of incidence analysis has moved to general equilibrium models. As the Physiocrats and the Classics reflected within a general equilibrium framework, but lacked modern tools the analysis remained incomplete. With the development of marginal productivity analysis, it was recognised that taxes on any input factor may affect the returns from any other input factor (Musgrave, 1985). Shephard (1944) and Meade (1955) were the first to create mathematical models of general equilibrium incidence and Harberger (1962) paper on corporate income tax incidence cemented this area of research. As computer technology grew more advanced so the research opportunities became richer and today many studies have been completed. However, despite various studies measuring the progressivity of tax systems the incidence assumptions supporting the models are rarely tested (Fullerton & Metcalf, 2002).

Since the 1970s the main focus of taxation research has been on optimal taxation theory. Optimal taxation theory can first be attributed to Ramsey (1927) but was later revived by Mirrlees (1971). Mirrlees (1971) formalised how a social planner can overcome the heterogeneity among taxpayers by formalising the trade-off between equality and efficiency. In the Mirrlees framework the social planner wants to tax those of high ability in order to give transfers to those of low ability, but he needs to ensure that those of
high ability do not pretend to be of low ability (Mankiw, Weinzierl, & Yagan, 2009). The Mirrlees approach finds an optimal progressivity rate by making a trade-off between efficiency and equality. His simulations show that the optimal tax profile is similar to a linear tax of constant marginal tax on all income, combined with lump-sum transfers to all taxpayers, irrespective of income (Sandmo, 2016), which means that Mirrlees did not find very strong arguments for progressivity. Sandmo (2016) raises the question of whether we have the correct perspective when discussing wealth or income inequality with regards to taxation. He suggests that we have ignored the fundamentals of inequality. For most people taxing income achieved through hard work at high rates is perceived much more unfair than taxing income that originates in rent seeking or illegal activities. Sandmo (2016) also raises the more philosophical question of whether redistribution of income is a task for the government at all; of course to this question there will likely never be any clear consensus.

Many other economists have also examined the question of optimal taxation, Atkinson and Stiglitz (1976) discuss the trade-off between equality and efficiency when deciding whether to rely on direct or indirect taxation. Mankiw et al. (2009) provide an overview of the subject as well as comparing the lessons learnt from optimal taxation theory to OECD policy changes. They find that policy changes for taxation in income have largely followed the literature. However, for changes in capital taxation the evidence is more mixed. Slemrod (1990) criticizes optimal taxation theory as not being sufficiently applicable due among other things to the fact that it ignores the coercive nature of taxation and therefore the resulting efforts of circumvention. Slemrod proposes that the theory must change to a theory of optimal tax systems which considers which difficulties may be encountered and how to choose a tax system depending on what difficulties you face. Piketty, Saez, and Stantcheva (2011) follow Slemrod’s criticism and present a model of optimal labour income taxation using behavioural elasticities to evaluate how you can get a tax which does not distort labour supply, minimises tax avoidance and increases with compensation bargaining to limit disproportionate growth in CEO compensation. Aaberge and Colombino (2013) also criticise the traditional approach to optimal taxation analyses. They claim that both the assumptions needed to transfer theory to empirics and the discrepancy between the assumptions used to estimate the
empirical measures versus their theoretical counterparts lead to inconsistency and uncertain numerical significance. Rather than departing from theory, they depart from empirics, using a microeconometric model of labour supply to identify, by simulation, the tax rule maximising a social welfare function. Their results indicate that there should be increasing marginal rates (lower on low incomes and higher on high incomes) and a lower average rate.

Another interesting line of research is that of Chetty, Looney, and Kroft (2007). They examine how salience of an indirect tax, i.e. how visible it is to the consumer affects demand. Their findings indicate that when an excise tax is included in the price demand is less affected than if the tax is visible as an addition to the price of a good. Using this insight, they expand Harberger (1962) formulas to include tax salience in incidence calculations. This line of research could potentially be useful when designing taxes whose main goal is to influence behaviour. For example, by increasing the visibility of environmental taxes one should according to Chetty et al. (2007) research see a larger decrease in demand, than when the tax is hidden in the overall price.

I now turn to the final part of the introduction where I look more closely at tax research from a Norwegian perspective.

### 2.3 Research on taxation in Norway

Musgrave (1959) defines three branches of the public sector, which can be extended to three goals for fiscal policy:

i. Taxes should finance public activity in a way that to the furthest extent contributes to full employment and a stable price level.

ii. The distribution of the tax burden between individuals and families should coincide with the accepted norms for social justice and fairness.

iii. Taxes should be created in such a way that they correct for market failures and externalities, and so that the deadweight loss is minimized.

These goals are to a certain extent contradictory and must sometimes be traded off against each other. Additionally, politicians likely introduce taxes
for other reasons than the three stated above and use taxes to favour one group over another (for example having a high duty tax on certain products to protect domestic production or having beneficial tax laws for house owners favouring owners over renters).

In Norway, regional politics and development have often played an important role in the design of the tax system. This could be said to fall under point three if we define urbanisation to be a form of market failure. However, the way taxes affect the economy does not only depend on what you tax and by how much, but also what the tax revenue is used for. For example, using tax revenue to finance nurseries greatly contributed to women being able to participate in the labour market thereby providing higher growth and likely counterbalancing any disincentives to work from higher taxes (Christensen & Sandmo, 2008).

The main contributors to the theoretical tax literature in Norway have been Jæger (1930), Vogt (1935), and Johansen (1965). Jæger (1930) wrote a fairly extensive overview of the different themes of taxation, different taxes and the theory. However, he does not address how taxes can alter the incentives of agents. This is unsurprising as the modern tools of tax incidence analysis had not yet been widely spread. However, Vogt (1935) criticises this shortcoming as well as the fact that Jæger’s analysis of different taxes is disconnected from the overall structure of the economy. Vogt (1935) is not entirely successful in connecting these two either, but he did make several suggestions as to how the Norwegian tax system could be improved so as to create a more efficient as well as fairer system (Christensen & Sandmo, 2008). Johansen (1965) later combined an overview of the most important taxes as well as which tools one can use to analyse tax effects on economic agents’ behaviour and incentives.

The government and particularly the ministry of finance have long endorsed the funding of individual research projects on taxation. In 2010 however, the tax research program was reorganised. Originally only one tax research centre was intended, but in the end both the application of Oslo Fiscal Studies (OFS) and the Norwegian centre for Taxation (NoCeT) were approved. Although both centres focus on taxation research they have slightly different profiles allowing for both competition and cooperation,
2.3. Research on taxation in Norway

and ensuring a robustness that may not have been achieved had there only been one centre. OFS (Oslo Fiscal Studies, n.d.) targets research on how taxes and transfers affect individual and firm behaviour as well as tax morale and the legitimacy of a generous welfare state while NoCeT (Norwegian Centre for Taxation, n.d.) concentrates on capital taxation and the open economy, law and economics, and behavioural economics and compliance.

An extensive examination of the publications of these institutions could make up a master thesis in itself and I will therefore not enter into the details, although some of the publications are cited in other parts of the text (see Sandmo (2016)). However, it seems clear that all these areas of study should be of great importance to policy makers. Particularly studies on capital taxation are important for a small open economy like Norway, especially in the current climate of globalisation and the rise of "BigTech". I personally believe that with the forthcoming "Age Wave" and the development of the "Sharing Economy" transforming the tax system in order to ensure an income stream that sufficiently funds the existing welfare system will be the next challenge for the Norwegian tax system.

As shown in this literature review taxes are hardly a new subject in economics, but it remains a highly interesting one. It is simultaneously a fairly technical and theoretical subject while also being supremely important to the everyday functioning of the economy. Finally, it is a subject which should hold interest for us all, not in the least because it affects our daily lives, but also because it touches on philosophy, psychology, political science and last but not least economics.

In the following parts of the thesis I will present the data, method (including some further discussion of incidence analysis) and results before presenting the limits to the analysis and concluding.
3 Data and Method

3.1 Data

Data collection has made up a significant portion of the work with this thesis, not because of the data's inherent complexity, but rather due to its availability at least in a form which can easily be manipulated for analysis. All of the data on income from taxation is collected from Statistics Norway, but only the data from 1978 and onwards was readily available in a suitable format. Data from 1978 to 1989 is available both in the modern datasets and in the historical reports. The difference between the total revenue from direct and indirect taxes in national accounts versus my sums is minimised when using the historical booklet during this period of overlap, therefore I have chosen to use the historical publications for years from 1936 up to 1989 whereupon I switch to the modern data available in the “statistics bank”. For the data on municipal and state taxes on incomes and wealth I’ve primarily used the booklets on taxes categorised under public administration. The data for various indirect taxes as well as social security contributions are from the national accounts.

The online appendix provides full documentation for each year including which booklet the data originates from and which table. The data should be fairly reliable, but there is of course a possibility of human error both from when the data was originally collected, and also from my treatment of it. I have however, taken steps to minimise this possibility both by double checking the numbers, and by comparing my totals to those in the tables of the booklets. Another issue is the availability of data at the time of collection, particularly for the earliest years several of the values are estimations based on a sample and not until 1967 was it possible to get information about the population as a whole.

The national accounts which were often publications of revised numbers and therefore covered longer periods rather than a single year are likely the
most reliable and I have therefore as far as possible tried to use these values, although in the search for detail I resort to also using the yearly reports on direct taxation. This has created some discrepancy between the different totals\textsuperscript{1}.

For social security contributions from 1954-1974 no split between contributions from members and contributions from employers was given, I have therefore interpolated\textsuperscript{2} the values for these years using the numbers from 1953 and 1975. In the earlier years I cover there was an age compensation tax at the municipal level. This was collected from income and the compensation was also somewhat subsidised by the tax revenue from the state level. As far as I can tell from historical sources (Selsjord, 1961) the age compensation tax was additional to the social security premiums, I have therefore included it in the overall total. Due to the decreasing importance of customs and duties throughout the 20th century these are not as detailed as they might have been had the dataset also covered the 19th century, they are instead included under indirect taxation.

From 1979 and onwards I could no longer find any property tax in the historical booklets, however, for previous years the total sum of the municipal taxes almost perfectly matched that of the property tax so I have therefore defined indirect municipal taxes as property taxes from 1979 until the property tax reappears in the data in 1991. Finally, I have decided to exclude tax revenue from foreign seamen on Norwegian vessels, as my interest is in the Norwegian picture and in any case these posts are negligible. I have not excluded tax revenue from shareholders living abroad as I have no information about their nationality.

\textsuperscript{1}This entails a problem regarding the total sum of tax incomes for a specific year as my numbers often do not match the totals given in the national accounts, but the national accounts are not detailed enough to provide sufficient data on income and wealth taxes. On average my sums exceed the national accounts by approximately 2 billion kroner (with oil) and are lower by on average 160 thousand kroner (without oil). The standard deviation is about 6.3 billion kroner (with oil) and 600 thousand kroner (without oil). The small standard deviation and average for the latter is due to the historical national accounts not including a value for total without oil. The maximum absolute difference between my sums and the national accounts (with oil) (30 billion) occurs in 1984 and the maximum absolute difference (without oil) (2 million) in 1994 (this last value is negligible). For the series with oil this entails a bias of about 13 percent. Some deviations such as the one in 1956 can likely be explained by the Tax Statistics not including tax income from personal taxpayers and the national accounts maybe including this.

\textsuperscript{2}Method for constructing new data points within a set of known data points.
Overall, the data is imperfect and my collection of it is not foolproof, however, it is quite detailed and in my opinion reliable. 

3.2 Method

The method used in this thesis is relatively simple. From the historical publications I have manually taken the relevant tables and values and formatted these in excel. In order to achieve consistency, I have interpolated the different values of contributions to social security for those years where only the total was given. As the tax system changes over time the taxes for one year do not necessarily match those of the next. In order to get an aggregation from which it is possible to analyse the tax burden over time I have indexed all the different taxes according to whether or not they fall on personal taxpayers, corporations, income or wealth and also have categories for the various indirect taxes. Note that in this first aggregation incidence is not taken into account. For example, if the tax is called a capital tax on corporations it is indexed as a wealth tax on corporations regardless of whether or not it is shifted to consumers. 

In order to tackle the problem of incidence I rely on three sets of assumptions; these assumptions then allow me to take the aggregated categories and assign these to either capital, human capital or labour. Because the reports only start distinguishing between personal taxpayers and corporations from 1956 and onwards I’ve chosen to have four different series. Two which cover the entire period and where I look at the evolution of contributions from capital and human capital (i.e. a tax on wealth regardless of whether it’s from personal taxpayers or corporations is assumed to be a tax on capital, and all taxes on labour are considered to be a tax on human capital), one including tax revenue from gas and petroleum and one without. And two series which cover the period from 1956 to 2015 where I examine the contributions from labour and capital (where income taxes from personal taxpayers are considered contributions from labour), again one series including the tax revenue from gas and petroleum

The data for the period of the Second World War (1940-1945) is, not surprisingly, more limited than other years. Rather than trying to estimate the various values I leave it as is with the caveat that the information may not be as pertinent as for the rest of the dataset.
3.2. Method

extraction and one which does not include it. Before presenting the assumptions I have used for the analysis in more detail, I discuss the topic of incidence as well as presenting some of the relevant literature.
4 Incidence analysis in theory and in the literature

4.1 A simple model of tax incidence

Economic incidence differs from legislative incidence because taxes can be shifted. This means that the legal subject of a tax e.g. the firm is not necessarily the same as the economic subject of the tax. For example if a firm is a perfect monopolist any unit tax imposed upon its product can be fully shifted to the consumer. Because taxes affect the prices of goods thereby affecting quantities and prices of other goods the incidence of a tax is not necessarily easy to measure (Stiglitz, 2000).

Three rules of tax incidence can be distinguished (Gruber, 2010):

i The legal tax-paying entity is not necessarily the same as the economic entity.

ii The side of the market (supplier/demander) on which a tax is imposed is irrelevant to the distribution of the tax burdens.

iii Elasticities determine who ultimately pays a tax, the more inelastic the higher the burden.

Ramsey (1927) was one of the first scholars to discuss how taxes can be optimised in the economic sense of the term. He concluded that less elastic goods should be taxed more and at a higher rate and elastic goods less. However, in practise things are slightly more complicated. Firstly, there are both political and distributional implications to taxing inelastic goods, but also we don’t necessarily know the elasticity of one good compared to that of another. Finally, one main difficulty for the real economy is the level of interconnectedness, a tax may seem to be shifted to labour in the market in question, but what are the effects in other markets?
4.1. A simple model of tax incidence

In a basic theoretical set-up we can analyse tax incidence in partial equilibrium by using supply and demand curves. Given certain assumptions this can be extended to a general equilibrium situation, albeit with very little direct relevance to the real world. However, such a simple graphical presentation is often useful in order to understand the intuition behind tax-shifting as well as the role of elasticities.

Assume a closed economy with two goods which are imperfect substitutes for one another, call these A and B. Assume also that for the products supply is nearly perfectly elastic and demand relatively inelastic. A and B are considered equal in availability, quality and other characteristics and assume that consumers originally buy A instead of B (or vice versa) out of habit. A unit tax is imposed on A as illustrated in figure 4.1, this tax is legally imposed on the supply side of the market and the supply curve shifts upwards, however, we can see that the change in the price is higher than the change in demand and therefore can conclude for the partial equilibrium analysis that the tax is borne disproportionately by the consumer of A. Looking to the general equilibrium analysis if the price of A goes up and the price of B is unchanged and A and B are imperfect substitutes some of the demand for A will go into increased demand for B this will then shift up the demand curve for B as illustrated in figure 4.2. Assuming the same elasticities for B, the demand and price of B will increase, this is unequivocally positive for producers of B and can be either positive or negative for consumers. A consumer who originally consumed A will gain from this if the tax-increased price of A is larger than the demand-increased price of B, a consumer who originally (and still) consumes B will lose as the price has gone up (Gruber, 2010)\(^1\).

\(^1\)For a complete illustration it would be beneficial to measure the consumer and producer surplus, however, in the interest of graphical clarity I have omitted this.
If instead the demand for A and B had been elastic and the supply inelastic the following would occur. A unit tax is imposed on the supply of A shifting the supply curve upwards, see figure 4.3. Quantity sold goes down and the price of A goes up, however, the change in the price is smaller than the change in quantity so the tax is borne mostly by producers. Some consumers of A shift their demand from A to B although not as many as in the previous example as the price increase in A is not as severe, this induces a small price increase in B, see figure 4.4. It follows that if supply is inelastic producers of A must bear more of the tax than if supply is elastic.
It has often been a subject of interest for researchers to attempt to measure how redistributive a tax system is. Or, whether a tax system will become more or less redistributive after some change has occurred. We often use the terms regressivity and progressivity to describe whether a tax promotes more or less redistribution of income/wealth or other. A tax is deemed regressive if the total tax burden falls as income increases, and progressive if it increases with income (Metcalf, 1997; Stiglitz, 2000). There are many studies that attempt to measure the progressivity of a tax or a given tax system. For example, in 1965 Statistics Norway published a report that attempted to measure the progressiveness of the Norwegian tax system for 1960 (Statistics Norway, 1965). One of the strengths of this report is its thorough investigation into the various difficulties that can arise when attempting to measure progressivity. Mostly this is due to the difficulty of
assigning incidence. Its weakness lies in the use of fairly simple and likely inaccurate incidence assumptions (see chapter 5). Another example is Metcalf (1997) paper "Measuring the Incidence of a National Retail Sales Tax: Annual Versus Lifetime Incidence Measures". Metcalf (1997) examines how the distributional effect of a shift from an income tax to a national retail sales tax varies with the definition of income. If annual income is used to rank households, then a reform is highly regressive, if lifetime income is used in the ranking then the reform is less regressive. He also discusses what steps could be taken to make the national retail sales tax as progressive as an income tax (Metcalf, 1997). Theoretically the difference between lifetime and annual income is interesting, as exhibited in the paper because it changes the results. However, one should perhaps take into account that most people consider their income on an annual basis and do not make decisions according to a discounted lifetime income calculation. Therefore, designing policy around a concept that only exists in theory could perhaps give adverse behavioural implications.

4.2 Measuring incidence: The literature

Many authors have addressed both the topic of incidence and particularly how to measure it. Fullerton and Metcalf (2003) for example, run through forty years of tax incidence analysis starting from Harberger (1962). Harberger (1962) was perhaps the first author who truly attempted to create a formal model of tax incidence, he was preceded by both Shephard (1944) and Meade (1955), but it is his analysis of the incidence of the corporate income tax that can be said to have kick-started a more practical discussion on incidence. Harberger (1962) finds that capital bears more or less the full burden of the corporate income tax, i.e there is no shifting to the employee or the consumer. However, this result rests on some fairly strong assumptions; fixed physical capital stock, closed economy, no financing decisions, and no uncertainty. It is therefore unlikely that Harberger (1962) result is true for all corporate income taxation. Indeed few of the standard assumptions on incidence have been tested and confirmed (Fullerton & Metcalf, 2003).

Attempts to create statistical and mathematical frameworks for measuring incidence, horizontal and vertical equity as well as tax progressivity did not
end with Harberger. Other examples include Kienzle (1982), Lambert and Pfahler (1988), and Davidson and Duclos (1995). The studies I specifically base my incidence assumptions on will be presented in chapter 5 and further discussed in chapter 7.
5  Incidence assumptions

5.1  Assumptions in the literature

In order to say anything about the distribution of the tax burden it is first essential to determine incidence, in other words; who pays the tax in the end? In order to do this I rely on various assumptions made in the literature. Particularly Musgrave, Case, and Leonard (1974) and Okner and Pechman (1974) have been useful as these cover a full set of possible taxes and also vary the assumptions between different levels of progressivity. By combining the assumptions from the literature I am able to create six different sets of assumptions. This should lend some robustness to the results. In the following I first present the main ideas I have used from existing papers before presenting my own assumptions.

5.1.1  Musgrave et al. (1974)

In their 1974 study the authors attempt to estimate the distribution of tax burdens and benefits on US data. The paper updates previous studies to 1968 levels as well as introducing several new assumption variants. For my purposes the main interest of this paper lies in its highly expansive assumption set (which I have replicated in table 5.1, see next page). The table has tax type in the first column and different assumption cases in the following columns, a dash means that no information was provided on that tax for the specific case.
### 5.1. Assumptions in the literature


<table>
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<th>Case A</th>
<th>Case B</th>
<th>Case C</th>
<th>Case D</th>
<th>Case E</th>
<th>Case F</th>
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<td>Consumers in general and households with auto expenditures</td>
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<td>Consumers in general and households with auto expenditures</td>
<td>Consumers in general and households with auto expenditures</td>
<td>Consumers in general and households with auto expenditures</td>
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<td>Consumers of taxable items</td>
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<td>Dividend recipients</td>
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<td>Consumers in general</td>
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<td>Residential owner</td>
<td>Homeowners</td>
<td>Homeowners</td>
<td>All capital income earners</td>
<td>Homeowners</td>
<td>Homeowners</td>
<td>-</td>
</tr>
<tr>
<td>occupied property</td>
<td>Residential rented property</td>
<td>Residential rented property</td>
<td>Residential rented property</td>
<td>Residential rented property</td>
<td>Residential rented property</td>
<td>Residential rented property</td>
</tr>
<tr>
<td>Employer contribution</td>
<td>Consumers in general</td>
<td>Employee</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>to social insurance</td>
<td>Employee</td>
<td>Employee</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Employee contribution</td>
<td>Employee</td>
<td>Employee</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
5.1.2 Okner and Pechman (1974)

This paper is a summary of a book written by the same authors for the Brooking institute. They set up eight different incidence assumption sets. Variations between the different sets are mostly linked to incidence of property taxes, corporate income taxes and payroll taxes. For income taxation and taxation of consumption there is more or less consensus with regards to the incidence falling on the income recipient and the consumer. For the other taxes it depends to a larger degree on the elasticity, however, under perfect competition, price flexibility, perfect factor mobility, elastic labour supply, and inelastic capital supply these taxes will fall on the factor of production. As with Musgrave et al. (1974) I have summarised and replicated their assumptions below.
Table 5.2: Incidence assumptions from Okner and Pechman (1974)

<table>
<thead>
<tr>
<th>Tax</th>
<th>Variant 1</th>
<th>Variant 2</th>
<th>Variant 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual income tax</td>
<td>Taxpayer</td>
<td>Taxpayer</td>
<td>Taxpayer</td>
</tr>
<tr>
<td>Sales and excise tax</td>
<td>Consumer</td>
<td>Consumer</td>
<td>Consumer</td>
</tr>
<tr>
<td>Corporate income tax</td>
<td>Property income in general</td>
<td>Property income in general</td>
<td>½ to property income in general, ½ to dividend recipients</td>
</tr>
<tr>
<td>Corporate income tax</td>
<td>Dividend recipients</td>
<td>Dividend recipients</td>
<td>½ to employee compensation, ½ to consumers, ½ dividend recipients</td>
</tr>
<tr>
<td>Property tax on land</td>
<td>Landowners</td>
<td>Property income in general</td>
<td>Landowners</td>
</tr>
<tr>
<td>Property tax on improvements</td>
<td>Property income in general</td>
<td>Property income in general</td>
<td>Shelter and consumption</td>
</tr>
<tr>
<td>Social security/payroll taxes employers</td>
<td>Employee compensation</td>
<td>Employee compensation</td>
<td>½ to employee compensation, ½ to consumption</td>
</tr>
<tr>
<td>Social security/payroll taxes employees</td>
<td>Employee compensation</td>
<td>Employee compensation</td>
<td>½ to employee compensation, ½ to consumption</td>
</tr>
</tbody>
</table>
5.1.3 Melguizo and González-Páramo (2013)

The authors review 53 different studies on incidence of the income tax and payroll tax/social security contributions. In their own analysis they mainly focus on social security contributions. They do not find much consensus in the individual studies, however on average 66 percent of the incidence is found to fall on labour, albeit with a standard deviation of 51 percent. When estimating incidence themselves they find 66 percent with a standard deviation of 4 percent, this is mostly due to their large sample size as they use the data from all the other studies. They found that in the short run workers bear a lower burden (40 percent) versus 70 percent in the long run. In Nordic economies with highly centralised wage bargaining they find that workers bear 79-88 percent of the incidence. I have chosen to use their findings for Nordic countries as a basis for my own assumptions. However, in the appendix I have also examined what happens to the distribution when using the 60-40 split.

5.1.4 Statistics Norway (1965)

In the report "Progressivity in the Norwegian Tax System 1960", researchers at Statistics Norway attempted to study how the total tax burden (direct and indirect) for persons was distributed between different income groups, i.e. study the progressivity of taxation for households in Norway for the year 1960. Price subsidies and welfare benefits were included as negative taxes. They rely on fairly simple assumptions and assume that changes in taxes do not have indirect effects on prices and income, i.e. if the tax on a good increases then the only effect is the direct price effect, they do not consider any substitution effects.

5.1.5 Statistics Norway (1976)

In the report "Income and consumer taxation from a distributional point of view- a model for empirical analysis", Statistics Norway present a model specifically designed to be a tool for analysing the distributional effects of simultaneous changes in direct taxes, indirect taxes, welfare benefits (such as child allowance) and subsidies on consumption goods. Direct taxes and allowances affect the total amount of available income, whiles indirect taxes and subsidies affect the "efficacy" of income (i.e how much you can
5.1. Assumptions in the literature

actually purchase). The model assumes that both gross price and sales price is unaffected by the tax changes for all income groups analysed, therefore taxes will be borne by consumers both in the direct and indirect aspect. The report does state that these assumptions are extreme and likely not completely correct.

5.1.6 Fullerton and Metcalf (2003)

This paper provides an overview of the various tax incidence analyses that have been completed since Harberger (1962). The authors find three standard assumptions that prevail in the literature.

i The corporate income tax falls on capital.

ii Sales and excise taxes are fully shifted to the consumer.

iii The payroll tax or social security contribution is fully shifted to labour.

However, they lament the lack of empirical research on the advisability of these assumptions.

5.1.7 Garfinkel et al. (2006)

Garfinkel, Rainwater, and Smeeding (2006) re-examine the differences in inequality between industrialised countries. Previous studies find large differences, mostly due to differences in welfare state generosity. However, as pointed out by the authors these studies rarely include in-kind benefits, for example, health insurance and education. When including these benefits as well as including transfers financed by indirect taxes Garfinkel et al. (2006) find that the differences are substantially reduced, particularly at the bottom of the income distribution. In order to find these results they make several assumptions about tax incidence. Firstly all payroll taxes (social security contributions) are assumed to be devoted to benefits. Employer social security contribution tax incidence is assumed to be on labour, given that these are taken out of wages the employee would otherwise spend on the benefits in question\textsuperscript{1}. They also assume that the incidence of the corporate income tax and of taxes on goods and services fall on the

\textsuperscript{1}This assumption rests on the observation that in the United States health insurance is largely covered by the employer, whether it is an assumption that is directly transferable to countries with universal health coverage is not discussed.
consumer. Using data to determine the tax distribution by income class, they find amongst other things that value-added taxes are regressive both at the top and bottom of the income distribution.

### 5.1.8 Aaberge et al. (2010)

Although not a paper that directly adresses incidence analysis, Aaberge and co-authors look at poverty and distributional impacts of public services at different levels of income. Citing Gruber (2005) the empirical evidence suggests that income taxes are borne by the legal tax entity (i.e the people who pay them), payroll taxes are borne by workers, indirect taxes are shifted to prices which ultimately means the consumer, and corporate taxes are borne by the owners of capital, but also by consumers and workers (Gruber himself provides no details on how this is split).

### 5.1.9 Piketty et al. (2018)

This paper uses very simplified assumptions, that are nonetheless useful as they allow for the creation of a benchmark model. Piketty and co-authors assume that taxes do not affect the overall level of national income, or its distribution across labour and capital. In other words, taxes on capital are borne by capital alone, and taxes on labour are borne by labour alone. Payroll taxes are assumed to be entirely paid by the employees, regardless of the legal tax subject. In keeping with Harberger (1962) corporate taxes can be shifted to other forms of capital other than corporate entities (this does not affect my analysis as I do not split between different capital entities). In contrast to Harberger, real-estate property taxes are assumed to fall only on the owner as the residential real-estate market does not empirically appear to be perfectly integrated with financial markets (as in Harberger’s assumption). Finally, sale and excise taxes are assumed to be paid proportionally to factor income minus saving\(^2\).

### 5.2 Assumptions

In order to create assumptions of my own I combine the insights from the different papers presented to create three different sets of assumptions,

\(^2\)In order to avoid over complicating the analysis I ignore this last assumption and rather use the assumption from Fullerton and Metcalf (2003) see section 5.1.6.
5.2. Assumptions

where the final set includes four different variations. The first is a set of control assumptions where I assume that taxes fall entirely on their legal entity. For example if the tax is indirect, but it is on production it is assumed to fall on capital. This is also the case that most closely follows Harberger (1962), in the sense that it assumes corporate income taxes are entirely borne by producers. However, it may be prudent to point out that this result rests on some heady assumptions such as fixed capital stock, closed economy, no financing decisions and no uncertainty. Overall this first set of assumptions is likely the most unrealistic.

In the second assumption set, which I have called the benchmark assumptions, I use papers in section 5.1.4 through 5.1.9. As stated earlier I don’t necessarily use all the assumptions from one paper (as with the Piketty assumptions on indirect taxes). However, on the whole I think the assumptions in these papers are fairly similar, and it is therefore a good departure point despite their simplicity.

The control assumptions therefore, take the most simplistic view of tax incidence. Indeed, incidence is assumed to be completely straightforward and tax shifting to be non existent. I called this category control assumptions as I felt it was a starting point from which to base the analysis. If we believe that taxes can be shifted how will their distribution compare to the "control" version in which shifting does not occur? The benchmark assumptions on the other hand assume quite a lot of tax shifting, despite also being fairly simple. I called this category benchmark assumptions as they most closely represent the majority of the assumptions made in the literature and therefore, to some extent, represent the status quo.

For my final assumption set I have made good use of both the Musgrave et al. (1974) paper and the Okner and Pechman (1974) paper, as well as the work done by Melguizo and González-Páramo (2013). Combining those assumptions which were equal in both papers and ignoring assumptions that are not covered by the available data. I create four different categories of assumptions. The first two subsets of assumptions here are probably the

\footnote{Note that these papers do not agree entirely on all assumptions, for example, Garfinkel et al. (2006) assume the corporate income tax falls on consumers while I continue to follow Harberger for the benchmark assumptions. This choice is made to distinguish the combined assumption set (4) from the benchmark assumptions.}
most realistic as they allow for some sharing of incidence between labour and capital for the same tax.

There were some assumptions I had to make purely on my own as they were not covered in previous studies. Firstly, I have assumed for all assumptions sets (with the exception of the control assumptions) that indirect taxes on petroleum extraction are shifted to labour/human capital (L/HK) through the same mechanisms as other indirect taxes on goods, while direct taxes on petroleum extraction are paid by the owners (in the Norwegian case the state and some private firms) i.e. capital (K)\(^4\).

Both Musgrave et al. (1974) and Okner and Pechman (1974) split the property taxes into different subgroups, depending on whether it is on commercial, owned or rented property (Musgrave et al., 1974), or whether it's a tax on improvements or directly on land (Okner & Pechman, 1974). Unfortunately, due to data limitations I cannot do this\(^5\). Instead I assume that the largest part of income from property taxes comes from residential property where the owner resides herself, this assumption is based on the observation that 80 percent of people in Norway own their domicile (Statistics Norway, 2017). Additionally I use the assumption from Garfinkel et al. (2006) (that property taxes fall on housing consumption) to support this claim. Note, however, that property taxes are still considered taxes on capital, as I define property as a component of wealth.

Following the Second World War and the occupation of Norway various war related taxes were introduced, the intent of such taxes was to remove any "unfair" enrichment that occurred during the occupation (Kvisli, 1946). I have assumed that the burden of these taxes fell on capital income, but I have no information on who was most strongly affected, corporations or personal tax payers. As these types of taxes only existed for a short period I assume that corporations did not shift their burden onto labour (although this may not be true).

\(^4\)It would have been useful if it were possible to distinguish between public and private capital. However, due to difficulties that may arise in merging this data with the existing data used in the thesis as well as time constraints I do not attempt to make any such distinction.

\(^5\)For indirect taxes by sector there is a post in the national accounts that includes both corporate properties and private housing, but there is no information on the distribution between the two.
5.2. Assumptions

In summary the assumptions sets differ in the following ways. The control assumptions represent an overly simplified view of the world, where taxes fall on the tax subject. The assumption of no tax-shifting is implicitly an assumption of no price-effects in taxation. I believe that the control assumptions are the least reliable of the five assumptions sets. The benchmark assumptions represent an attempt to summarise the general consensus in the literature. Here there are price effects, but these are strongest with regards to indirect taxation. The benchmark assumptions are more believable than the control assumptions, but still leave a lot to be desired in the way of plausibility. Finally, the combined assumptions (at least the first two sets) look at price effects that occur for direct taxation as well. For example there is assumed some sharing of the corporate income tax. These are probably also the most realistic assumptions with regards to social security contributions. Below are tables that summarise the assumption sets, and show (depending on assumption set) to which category (labour/human capital or capital) the taxes are allocated.
Table 5.3: Control Assumptions

<table>
<thead>
<tr>
<th>Tax Type</th>
<th>L/HK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct taxes</td>
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</tr>
<tr>
<td>Capital tax</td>
<td>K</td>
</tr>
<tr>
<td>Corporations</td>
<td></td>
</tr>
<tr>
<td>Personal</td>
<td>L/HK</td>
</tr>
<tr>
<td>Income tax</td>
<td>L/HK</td>
</tr>
<tr>
<td>Corporations</td>
<td>L/HK</td>
</tr>
<tr>
<td>Personal</td>
<td>L/HK</td>
</tr>
<tr>
<td>Tax on higher incomes</td>
<td>L/HK</td>
</tr>
<tr>
<td>Corporations</td>
<td>L/HK</td>
</tr>
<tr>
<td>Personal</td>
<td>L/HK</td>
</tr>
<tr>
<td>'Seamen's tax'</td>
<td>L/HK</td>
</tr>
<tr>
<td>Social security total</td>
<td></td>
</tr>
<tr>
<td>Membership contribution to social security</td>
<td>L/HK</td>
</tr>
<tr>
<td>Employer contribution to social security</td>
<td>K</td>
</tr>
<tr>
<td>Motor vehicle tax</td>
<td>L/HK</td>
</tr>
<tr>
<td>Tax on lotteries and gambling</td>
<td>L/HK</td>
</tr>
<tr>
<td>Tax on inheritance and gifts</td>
<td>K</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Taxes on oil extraction</td>
<td>K</td>
</tr>
<tr>
<td>Indirect taxes</td>
<td></td>
</tr>
<tr>
<td>Property tax</td>
<td>K</td>
</tr>
<tr>
<td>Value added tax or general sales tax</td>
<td>K</td>
</tr>
<tr>
<td>Motor vehicle tax</td>
<td>K</td>
</tr>
<tr>
<td>Excise taxes</td>
<td>K</td>
</tr>
<tr>
<td>Municipal taxes</td>
<td></td>
</tr>
<tr>
<td>Environmental and energy taxes</td>
<td>K</td>
</tr>
<tr>
<td>Other</td>
<td>K</td>
</tr>
<tr>
<td>Taxes on oil extraction</td>
<td>K</td>
</tr>
<tr>
<td>War related taxes</td>
<td>K</td>
</tr>
<tr>
<td>Indirect taxes by sector</td>
<td></td>
</tr>
<tr>
<td>Farming, forestry, fishing, whaling</td>
<td>K</td>
</tr>
<tr>
<td>Mining</td>
<td>K</td>
</tr>
<tr>
<td>Petroleum</td>
<td>K</td>
</tr>
<tr>
<td>Industry (including food)</td>
<td>K</td>
</tr>
<tr>
<td>Construction</td>
<td>K</td>
</tr>
<tr>
<td>Hydroelectric power and other power</td>
<td>K</td>
</tr>
<tr>
<td>Merchandise</td>
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</tr>
<tr>
<td>Transport by sea</td>
<td>K</td>
</tr>
<tr>
<td>Other transport</td>
<td>K</td>
</tr>
<tr>
<td>Public administration and defense</td>
<td>K</td>
</tr>
<tr>
<td>Public and private services</td>
<td>K</td>
</tr>
<tr>
<td>Personal services</td>
<td>K</td>
</tr>
<tr>
<td>Corporate properties and housing</td>
<td>K</td>
</tr>
<tr>
<td>Financial institutions</td>
<td>K</td>
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### Table 5.4: Benchmark Assumptions

<table>
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<th>Tax Type</th>
<th>Category</th>
</tr>
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<tbody>
<tr>
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</tr>
<tr>
<td>Personal</td>
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</tr>
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<td>Income tax</td>
<td>HK</td>
</tr>
<tr>
<td>Corporations</td>
<td>K</td>
</tr>
<tr>
<td>Personal</td>
<td>L/HK</td>
</tr>
<tr>
<td>Tax on higher incomes</td>
<td>HK</td>
</tr>
<tr>
<td>Corporations</td>
<td>K</td>
</tr>
<tr>
<td>Seamen's tax</td>
<td>L/HK</td>
</tr>
<tr>
<td>Social security total</td>
<td>L/HK</td>
</tr>
<tr>
<td>Membership contribution to social security</td>
<td>L/HK</td>
</tr>
<tr>
<td>Employer contribution to social security</td>
<td>L/HK</td>
</tr>
<tr>
<td>Motor vehicle tax</td>
<td>L/HK</td>
</tr>
<tr>
<td>Tax on lotteries and gambling</td>
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</tr>
<tr>
<td>Tax on inheritance and gifts</td>
<td>K</td>
</tr>
<tr>
<td>Other</td>
<td>L/HK</td>
</tr>
<tr>
<td>Taxes on oil extraction</td>
<td>K</td>
</tr>
<tr>
<td>Indirect taxes</td>
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</tr>
<tr>
<td>Property tax</td>
<td>K</td>
</tr>
<tr>
<td>Value added tax or general sales tax</td>
<td>L/HK</td>
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<td>Environmental and energy taxes</td>
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<td>Taxes on oil extraction</td>
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<table>
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<td>K</td>
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</tr>
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<td>L/HK</td>
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<td>L/HK</td>
<td>L/HK</td>
</tr>
<tr>
<td>Tax on higher incomes</td>
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<td>0.5 K 0.5 L/HK</td>
<td>K</td>
<td>L/HK</td>
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<td>L/HK</td>
</tr>
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<td>L/HK</td>
<td>L/HK</td>
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<td>0.88 L/HK 0.12 K</td>
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<td>0.88 L/HK 0.12 K</td>
<td>0.88 L/HK 0.12 K</td>
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<td>L/HK</td>
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<td>L/HK</td>
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<tr>
<td>Tax on lotteries and gambling</td>
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<td>L/HK</td>
<td>L/HK</td>
</tr>
<tr>
<td>Tax on inheritance and gifts</td>
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<td>K</td>
</tr>
<tr>
<td>Other</td>
<td>L/HK</td>
<td>L/HK</td>
<td>L/HK</td>
<td>L/HK</td>
</tr>
<tr>
<td>Taxes on oil extraction</td>
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<td>K</td>
</tr>
<tr>
<td>Indirect taxes</td>
<td>K</td>
<td>K</td>
<td>K</td>
<td>K</td>
</tr>
<tr>
<td>Property tax</td>
<td>L/HK</td>
<td>L/HK</td>
<td>L/HK</td>
<td>L/HK</td>
</tr>
<tr>
<td>Value added tax or general sales tax</td>
<td>L/HK</td>
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</table>
6 Results

The results can be summarised in the following 12 figures. The remaining 12 figures which replicate the results below except that they also include revenue from taxation on gas and petroleum extraction can be found in the appendix. Unsurprisingly the results vary quite a bit depending on the assumption set used. As shown by the legend next to the figures the tax burden share of capital (K) is in black and the tax burden share of labour (L) (when looking at the partial series) or human capital (HK) (when looking at the total series) is in grey. The years are along the x-axis and percentage of total tax revenue along the y-axis. In order to get these results, I have simply summed revenue from all taxes pertaining to capital and all taxes pertaining to labour/human capital and found the share of this with regards to total tax revenue for each year.

The control assumptions and the combined assumptions (3) give the most even distributions between capital and labour, although because the control assumptions assume that many of the indirect taxes are paid by capital (which is not assumed for the combined assumptions (3)) the share of capital is significantly higher here. The large discrepancy between the total and partial series for combined assumptions (3) is due to the distinction between labour and human capital. As also explained below, when I look at human capital and income taxes for this assumption set the entirety is assumed to be shifted to capital. This is in direct contradiction with the generally accepted assumption that direct taxation on personal income is paid by the tax subject (i.e. the income earner), however, because I in other assumption sets assume that all income taxes are shifted to labour I choose to keep this misleading assumption. When, in the partial series I am able to examine personal income taxes and corporate income taxes separately I can correct the false assumption above so that personal income taxes are paid by labour and corporate income taxes are paid by capital, this then leads to the observed drop in the share of capital. This human capital/labour effect is also seen when comparing several of the other figures as well (see detailed
explanations below). The benchmark assumptions and the combined assumptions (4) also resemble one another, both allocate more or less all of the tax burden to labour/human capital. However, as the combined assumptions (4) assume that all corporate income taxes are shifted to labour the partial series here is more extreme than that of the benchmark assumptions (in the benchmark assumptions for the partial series I follow Harberger (1962) who states that the entirety of the corporate income taxes are borne by capital). For the total series all income taxation is assumed to fall on human capital in both assumption sets and therefore the only difference occurs due to the assumption on social security contributions. Combined assumptions (1) and (2) are also quite similar as the main difference here is a variation in how much of the corporate income tax is shifted to labour/human capital (66-34 (HK/L-K) for combined assumptions (1) and 50-50 (HK/L-K) for combined assumptions (2)).

6.1 Control Assumptions

For the results found under the control assumptions (Table 5.3), capital bears the largest tax burden in both series. As one can see from the assumptions corporate income bears the full burden of the corporate income tax. Additionally, because I have assumed that taxes are borne by their legal subject many of the indirect taxes (on production) are also assumed to be borne by capital. On average there is approximately an equal split of the tax burden for the entire period in the total series with oil, 53 percent (K) versus 47 percent (L) for the partial series with oil, 47 percent (K) versus 53 percent (HK) for the total series without oil, and an almost equal split between capital and labour for the partial series without oil. The evolution is fairly constant over time, this is in fact the case for all the results regardless of assumption set. To summarise one could say that under the control assumptions the share of the tax burden complies with horizontal equity, this is only true, however if I assume that the earnings are also equal (see further discussion of this in chapter seven). For the total series there is a sharp increase in the share paid by capital around 1956, this is due to a change in the tax system around this time. After 1956 the system was split into personal taxpayers who have their taxes deducted immediately and corporations who pay taxes ex-poste. In the transition period personal taxpayers were exempted from taxes between 1955 and 1956 so that they
would not be paying a double amount. There is also a discrepancy in the evolution of the share in the beginning of the 1990s for both figures, this is likely due to the financial crisis that followed a period of extended growth in the late 1980s. Both for tax revenue from capital and tax revenue from labour there is a reduction at the beginning of the crisis in 1989, but tax revenue from capital rebounded earlier than that of labour indicating that the recovery was swifter for those sectors/factors I have assumed to be capital for this assumption set.

**Figure 6.1:** Control assumptions, total series, without oil

![Image 1](image1.png)

**Figure 6.2:** Control assumptions, partial series, without oil

![Image 2](image2.png)

### 6.2 Benchmark Assumptions

The results here imply that almost the entirety of the tax burden falls on labour and human capital (see Table 5.4). Again, the development is fairly
Chapter 6. Results

constant, and there does not appear to be any trend, although there is an increase in the share of capital towards the end of the series when petroleum tax revenue is included (see Appendix). On average throughout the period 91 percent of the burden was borne by human capital and 9 percent by capital in the total series with oil, 15 percent (K) versus 85 percent (L) for the partial series with oil, 4 percent (K) versus 96 percent (HK) for the total series without oil, and 9 percent (K) versus 91 percent (L) for the partial series without oil. For all the series the relatively low share of capital is due to the fact that in the benchmark assumptions all indirect taxes are assumed to be shifted to labour/human capital and income taxes are assumed to be borne by the legal entity. However, because the total series distinguishes between capital and human capital rather than labour, the income tax (including that part which likely falls on capital) is paid by human capital. This simplification was necessary since for the total series it was not possible to distinguish between capital and labour directly, but it does lead to biased results. In the appendix one can also see that the capital share is higher when tax revenue from gas and petroleum is included (these taxes are significant contributors to the total revenue especially in later years and therefore it is unsurprising that their inclusion or exclusion should make a difference). There are some discrepancies in the data, the dip around the 1990s is due to the same crisis explained for the control assumptions. There is also a considerable rise in the share of capital from the mid-70s to the mid-80s for the total series only when oil is included, but for the partial series both when oil is included and when it is not (see Appendix). For the series with oil part of the anomaly is likely explained by the discovery of oil off the Norwegian coast and therefore the introduction of a new source of tax revenue. Additionally, there is a jump in revenue from direct taxation of oil, between 1977 and 1988. This is probably also the explanation for part of the spike for the partial series with oil as the spike here is larger than when measured without oil. The remainder of the spike and its absence in the total series is likely due to the difference in definitions, i.e. between labour and capital, and capital and human capital. Because the first split allows for more detail, part of the income in the total series that is counted as human capital is counted as capital in the partial series.
6.3 Combined Assumptions

6.3.1 Combined Assumptions (1)

In the first subset of assumptions 34 percent of the income tax burden is assumed to fall on labour/human capital and 66 percent on capital. For the total series with oil capital pays on average 33 percent of the share versus 67 percent for human capital, for the partial series with oil 16 percent of the share is capital and 84 percent labour, in the total series without oil the split is 30 percent (K) versus 70 percent (HK), and in the partial series without oil it is 10 percent (K) versus 90 percent (L) (again for figures including oil, see Appendix). The total series will be different from the partial series because of the difference between using human capital versus labour. Because the
total of income tax revenue is used for the total series this will make it seem like the capital share is larger. While for the partial series the split of 34-66 is only used for revenue from the corporate income tax while the personal income tax is assumed to be borne by labour. In Musgrave et al. (1974) and Okner and Pechman (1974) the split concerns corporate income, personal income taxes are assumed to be paid by the taxpayer. However, to avoid the bias of the benchmark assumptions I choose to use this split on income tax revenue in the case where no distinction between corporations and personal taxpayers is possible. Incidentally in the third subset it is assumed that all of the income tax falls on capital while in the fourth subset it falls entirely on labour/human capital. For the total series there is again a spike around 1956, this is due to the same change in the tax system as for the control assumptions except that in this case it leads to a reversal of the spike, the share of labour increases rather than the share of capital. The reversal of the spike occurs because of the assumptions. For the total series I use only human capital and have assumed that 64 percent of the burden from income taxation falls on capital, when the total amount of income tax revenue decreases this results in a stronger effect for the share of capital than for the share of human capital.

**Figure 6.5:** Combined assumptions (1), total series, without oil
6.3. Combined Assumptions

6.3.2 Combined Assumptions (2)

For these results the explanation is almost the same as above. However, because the split between capital and human capital for total income taxation in the total series and capital versus labour in the partial series is now 50-50 instead of 66-34 the total share of capital is slightly reduced. On average throughout the period the split in the total series with oil is 27 percent (K) versus 73 percent (HK), in the partial series with oil it is 15 percent (K) versus 85 percent (L), in the total series without oil it is 24 percent (K) versus 76 percent (HK), and in the partial series without oil it is 9 percent (K) versus 91 percent (L). For all the results (regardless of assumption set) the greater reduction in percentage points for the average of the partial series with and without oil compared to the total series is due to the time period covered. As the total series covers a longer period without revenue from oil and petroleum taxation the difference becomes smaller.
6.3.3 Combined Assumptions (3)

This subset of results is fairly similar to the control assumptions, apart from the social security contributions here falling largely on labour (88 percent) and the indirect taxes falling almost exclusively on labour. On average throughout the period the split in the total series with oil is 43 percent (K) versus 57 percent (HK), in the partial series with oil it is 18 percent (K) versus 82 percent (L), in the total series without oil it is 41 percent (K) versus 59 percent (HK), and in the partial series without oil it is 12 percent (K) versus 88 percent (L). The explanations for the variations as given in the control assumptions also apply here. Overall, one of the interesting results from this exercise has been to observe the importance the definition plays.
6.3. Combined Assumptions

Depending on whether using human capital or labour the results can become significantly different.

**FIGURE 6.9:** Combined assumptions (3), total series, without oil

**FIGURE 6.10:** Combined assumptions (3), partial series, without oil

6.3.4 Combined Assumptions (4)

This assumption subset is similar to the benchmark assumptions. However, it is even more extreme in the case of the partial series as the entirety of the tax burden from the corporate income tax is assumed to fall on labour. In other words, according to these assumptions corporations can fully shift their tax burden to the employee and consumers. The results are however, slightly moderated (compared to the benchmark assumptions) by the split in the burden for social security taxes. For this assumption set 88 percent is
shifted to labour and 12 percent to capital rather than the full shift to labour assumed in the benchmark assumptions. On average throughout the period the split in the total series with oil is 11 percent (K) versus 89 percent (HK), in the partial series with oil it is 12 percent (K) versus 88 percent (L), in the total series without oil it is 6 percent (K) versus 94 percent (HK), and in the partial series without oil it is 5 percent (K) versus 95 percent (L). For explanations regarding the variations I refer to the subsection on the results from the benchmark assumptions.

**Figure 6.11:** Combined assumptions (4), total series, without oil

**Figure 6.12:** Combined assumptions (4), partial series, without oil
7 Discussion

7.1 Regarding the results

My analysis suffers from the drawback that I do not take into account the relative earnings of the different groups I am studying. The results clearly indicate that for almost all assumption sets (with the exception of the control assumptions and the third set of combined assumptions) labour/human capital bears a larger share of the total tax burden than capital. However, if the group I have defined as labour/human capital also earns the largest share of income, then it is not surprising that it should also pay the largest amount of taxes. Without data on the contribution to GDP from the two (three) groups any conclusions drawn from the results will be speculative at best. A possible way of including income would be to reuse the historical series where assumed income for each group has been reported. Using the same categories as for the taxes one could replicate the analysis and get a full dataset on estimated incomes for each group for each year. This would then allow for a calculation of total yearly income for the two (three) different groups and one could compare this to the total share of GDP for that year as well as the share of total tax revenue. However, one limitation of this method is that the reports where these numbers can be easily found do not necessarily cover all income. For example, the total assumed income when looking at the tax revenue of municipalities differs from that of the state. It therefore appears that the assumed income and wealth only covers the specific groups in the relevant table, and not the total population. Additionally, from 1970 and onwards the income is no longer assumed gross income, but net income. As the data in these series is gathered from tax returns there may also be some income that does not show up due to tax evasion.

Another problematic aspect of this thesis is the complete reliance on assumptions for tax incidence. In this, I am in good company as more or less all of the literature on tax incidence as well as studies of progressivity of tax
systems relies on similar assumptions. However, this does not necessarily
mean that the assumptions are good or realistic. Indeed, economists do
have a track-record for blindly defending their assumptions even when
these are not supported by empirical results. Whalley (1984) for example,
looks at various incidence studies and shows how results vary (and even
contradict each other) all depending on the assumptions used. Fullerton
and Metcalf (2002) also briefly discuss standard assumptions when they
point out that little empirical testing has been done. Indeed, it is not clear
how one could test the assumptions in the first place, and I have not
succeeded in finding any papers that attempt to do so.

However, one defence of the results is that they pick up on certain economic
events. For example, almost all of the assumption sets give results that show
the economic crisis in 1989. This would indicate that they do at least have
some connection to the real developments observed in the economy. Additionally, my analysis shows to what extent measurement of the tax
burden depends on the assumptions made with regards to incidence. This is
clear from the large variation between the figures presented in the Results
section. I have also given what I consider to be a thorough examination of
the existing incidence assumptions that are found in the literature. For the
final part of the discussion I wish to expand on the criticism made by Prest
(1955) with regards to the assumptions made about direct and indirect
taxation.

7.2 Prest’s (1955) criticisms on the assumptions
used in tax incidence analysis

Prest (1955) points out numerous logical inconsistencies in the assumptions
made about tax incidence. In his critique he focuses primarily on income
taxes and excise taxes and is particularly concerned with the fact that the
overall demand effects of taxation are mostly ignored. In the papers
addressed by Prest (1955) the assumptions are that income taxes are not
shifted while indirect taxes (excise taxes) are fully shifted to the consumer.
The arguments for non-shifting of direct taxes are as enumerated by Prest
(1955):
7.2. **Prest’s (1955) criticisms on the assumptions used in tax incidence analysis**

i The distribution of pre-tax personal income is more or less stable over time.

ii The share of wages in national income does not vary with tax changes, indicating that labour supply is largely inelastic.

iii The gross long-term rate of interest is stable over long periods.

Prest (1955) is primarily concerned with the studies that attempt to estimate effects of taxes on the distribution of real income in the private sector. He points out that implicitly authors studying this are assuming that the supply of all factors is completely inelastic (among other things this means that we ignore the implications of international trade and limits to productivity). Starting with the subject of indirect taxes, Prest (1955) points out that the argument that incidence or redistributive effects are borne as intended is a fallacy in itself as it is not possible to aggregate the intentions of a Government. Additionally, tax systems are often an accumulation of choices made by multiple governments, making it even more unlikely that any aggregation of intentions would be successful. Prest (1955) also comments that tax incidence authors often wish to study the entire system of indirect taxes, but that their arguments rely on a context of a single product. If prices increase only by the amount of the tax, as often assumed, then supply must be perfectly elastic or demand must be completely inelastic. For this to be true in the case of any one commodity the time period considered must be longer than the general short run, but authors are not dealing with one good, but a whole range of taxed goods. Assuming there is a general excise tax covering all goods and services, if prices rise only by the amount of the tax this would imply perfectly elastic supply, but this then contradicts the assumption that the supply of all factors is completely inelastic. So in order for the assumption (that price rises with tax) to be true there must be some demand condition that is implicit in the assumption. Therefore, unless it is assumed that the general level of demand rises (general price level inclusive of taxes) there must be price effects. So if the price level is assumed unchanged it means that there must be price effects, but in this case one cannot consistently assume that the price of a taxed commodity only increases with the amount of the tax.

With regards to income taxation the main assumption at play is that factor supplies to any given industry is completely inelastic, however, this ignores
potential long-term effects. For example, a proportional income tax may give adverse employment effects in risky industries as the higher wage that is given to compensate for the unattractiveness of the job is taxed away. Inelasticity of factor supplies can also be thought to only be relevant in the short run (this short run would then likely vary between industries). Taking labour as an example it may be that it is inelastic up to a certain threshold. Firstly people are dependant on having some basic level of income (although of course one could argue that the minimum subsistence level could be achieved by the receiving of benefits). However, there are also psychological and sociological factors that entice us to work, so I do not think it is unreasonable to assume that most people wish to have a job, thereby making aggregate labour supply relatively inelastic even for high levels of taxation\footnote{Indeed, many countries with high marginal tax rates also have a high labour participation rate, the Scandinavian countries being one example.}.

However, assume an extreme scenario where personal income is taxed at 100 percent (but people receive a universal basic income that covers their subsistence needs), in this case labour supply would likely not be inelastic (implicitly assume that no one is forced to work), some people might still work simply for the value of work itself, but they would probably be a minority (see Aaberge and Colombino (2013) for empirical evidence on this). So in order for the assumption of inelastic factors of supply to be true one needs to assume a short-run perspective. This contradicts with the case for indirect taxes, because here the assumptions would only hold in a long-run perspective. Prest (1955) concludes from this that studying a tax versus no-tax system or a tax versus neutral tax-system has little value. However, one can study the relative distribution of incomes between years in order to say something about improving or deteriorating income equality. This would also entail several challenges, but avoids the logical fallacies discussed above.
8 Conclusion

In this thesis I have attempted to answer the question of whether labour or capital bears the largest tax burden in Norway, and how the distribution of the tax burden has varied over time. In order to examine this I firstly introduced the theme through a historical overview of the Norwegian tax system as well as a short presentation of the developments in the taxation literature both abroad and in Norway. In order to provide a theoretical backdrop for the assumptions used in the analysis I discussed the topic of incidence and tax shifting as well as providing some examples of literature addressing this topic. In the chapter on assumptions this literature review is further developed as I present the papers and assumptions I have used in my analysis. Following this I present my results, using data on tax revenues from 1936-2015 to examine the evolution of the tax burden between capital and labour over time. It seems that this evolution has been fairly constant although some variations occur, due mostly to major changes of the tax system or business cycle effects. Depending on the assumptions labour/human capital or capital bear the largest tax burden, although on average the assumptions ensure a higher burden on labour/human capital than on capital.

The validity of these results is not clear-cut; as discussed in chapter seven it is difficult to make any clear judgments on the distribution of the tax burden without also examining the relative incomes of the two (three) categories. Additionally, because the results are based on incidence assumptions that have rarely if ever been tested they should be approached with a dose of scepticism. Overall the empirical task of measuring the total tax burden in a country seems relatively unexplored in the literature, perhaps because of the inherent difficulties in measuring it. Ultimately the validity of the results depends on whether or not one finds the assumptions convincing. Clearly, some of the assumption sets are more extreme than the others, although there are large areas of consensus. For example it seems to be generally accepted that value added and other indirect taxes fall on the consumer.
Without any empirical testing of the assumptions it is difficult to reach any more concrete conclusions. Despite these challenges I do believe there is a value in the thesis. Firstly, and despite many caveats, I present several possible tax burden distributions for Norway. These seem to be fairly pertinent (given the assumption sets) as they pick up on various business cycles throughout the period of study. Secondly, the uncertainty that occurs due to the heavy reliance on assumptions is to some extent a result in itself as it exemplifies the challenges economists face in practising their craft. I also believe that I have managed to summarise and update the work of Musgrave (1985) in my literature review, as well as providing a fairly concise overview of the Norwegian tax system. Finally, the extensive dataset I have compiled could be useful for further studies on taxation in Norway.
A Appendix

Results from main analysis when tax revenue from gas and petroleum extraction is included

Below I show the results when tax revenue from petroleum and gas extraction is taken into account. I choose to do this here rather than in the main body of the thesis as the Result section would become rather extensive if these figures were included. Mainly the results are not greatly affected by the advent of the "oil age". However, overall tax revenue is of course higher and as I assume that most of the taxes on oil extraction fall on capital the share of capital is higher here than for the series presented in the Results chapter. For a more detailed analysis of the figures I refer to the Results section.

Figure A.1: Control assumptions, total series, with oil
FIGURE A.2: Control assumptions, partial series, with oil

FIGURE A.3: Benchmark assumptions, total series, with oil

FIGURE A.4: Benchmark assumptions, partial series, with oil
FIGURE A.5: Combined assumptions (1), total series, with oil

FIGURE A.6: Combined assumptions (1), partial series, with oil

FIGURE A.7: Combined assumptions (2), total series, with oil
FIGURE A.8: Combined assumptions (2), partial series, with oil

FIGURE A.9: Combined assumptions (3), total series, with oil

FIGURE A.10: Combined assumptions (3), partial series, with oil
Distribution of the tax burden when using alternative assumption from Melguizo and González-Páramo (2013)

For the combined assumptions in chapter 5 I used the most radical of Melguizo and González-Páramo (2013) findings on the incidence of social security contributions, i.e. that in the Nordic countries 88 percent of the incidence falls on the employee and 12 percent on the employer. In their combined analysis (when using all data from other available studies) they find that 60 percent of total incidence falls on the employee and 40 percent
on the employer\(^1\). Below I have displayed the results of the combined assumptions if we assume that 60 percent of the social security contributions are paid by/shifted to labour/human capital and the remaining 40 percent by capital. The results are more or less identical to the combined assumptions from chapter 6, except that the share of capital is now higher for all the figures.

\(\text{Figure A.13: Combined assumptions (1) (appendix), total series, with oil}\)

\(\text{Figure A.14: Combined assumptions (1) (appendix), partial series, with oil}\)

\(^1\)In fact, Melguizo and González-Páramo (2013) find that the amount of shifting varies from the short run to the long run, with workers bearing a larger part of the tax in the longer run. In the interest of simplicity I have not however, elaborated on this.
Figure A.15: Combined assumptions (1) (appendix), total series, without oil

Figure A.16: Combined assumptions (1) (appendix), partial series, without oil

Figure A.17: Combined assumptions (2) (appendix), total series, with oil
FIGURE A.18: Combined assumptions (2) (appendix), partial series, with oil

FIGURE A.19: Combined assumptions (2) (appendix), total series, without oil

FIGURE A.20: Combined assumptions (2) (appendix), partial series, without oil
FIGURE A.21: Combined assumptions (3) (appendix), total series, with oil

FIGURE A.22: Combined assumptions (3) (appendix), partial series, with oil

FIGURE A.23: Combined assumptions (3) (appendix), total series, without oil
**Figure A.24:** Combined assumptions (3) (appendix), partial series, without oil

**Figure A.25:** Combined assumptions (4) (appendix), total series, with oil

**Figure A.26:** Combined assumptions (4) (appendix), partial series, with oil
The table below presents the average shares for capital and labour/human capital over the different periods and with the different assumption subsets.
# Appendix A. Appendix

Table A.1: Average share of the tax burden with alternative Melguizo and González-Páramo (2013) assumptions

<table>
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<th>Assumption subset</th>
<th>Average share K (percent)</th>
<th>Average share L/HK (percent)</th>
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<td>Combined assumptions (2) (Partial) (No Oil)</td>
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For further details on the data, please examine the online appendix where I have compiled all the data used in this thesis.
Bibliography


