

Working paper
1/2009

**An Informal Care Leave
Arrangement – An
Economic Evaluation**

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Abstract:

The objective of this study is to investigate whether an informal care leave arrangement (ICLA) is socially profitable or not. A methodology for doing such an analysis is Cost-Benefit Analysis (CBA) where all social benefits and costs are estimated, so they can be subtracted to arrive at the net social value. In this study, due to severe data limitations, only some benefits and costs are included in our analysis, making it a restricted cost-benefit analysis. In addition, several assumptions are made to arrive at estimates for costs and benefits.

The two main scenarios (the optimistic scenario and the pessimistic scenario) of our analysis differ with respect to which particular assumptions are made concerning (i) the average utilization of the ICLA, (ii) the degree to which informal care postpones the need for formal institutional care, and (iii) how the employment participation rate is affected by the ICLA.

The annual net social value for an individual participating in the ICLA for the two scenarios in our restricted cost-benefit analysis are: 4000 Norwegian kroner (optimistic scenario) and - 9000 Norwegian kroner (pessimistic scenario). It follows that depending on the assumptions made, the ICLA can be both socially profitable or/and socially unprofitable.

Keywords:

Contact: www.frisch.uio.no

Working paper from the project “The public long term care and its effect on labour market participation for elderly workers”, funded by the Norwegian Research Council.

ISBN 978-82-7988-091-2
ISSN 1501-9241

Acknowledgements

I would like to thank my supervisor Sverre Grepperud, Professor (health economics) at The Institute of Health Management and Health Economics, University of Oslo for his constructive comments. Thank you for your enthusiasm and responsive approach to be reached even when you are not in the office.

Snorre, Knut and Elisabeth thank you very much for the great opportunity you allow me to work on your project on student assistant position at the Frisch Centre. I appreciate the friendly working atmosphere and for their generosity during my stay at the Frisch Centre. Elisabeth, it was a good learning processes working with you. Thank you for your enthusiasm.

My heartfelt thanks go to my family for their support all the way through my study. Thanks to you Atse for your encouragement, understanding and taking care for our son, Biyya during my study.

I would like to thank all my friends for their encouragement and moral support through this study.

My thanks go to Donata for proofreading the draft of this thesis.

Support for this project was provided by a grant from the Frisch Centre, project 1135 on the public long term care and its effect on labour market participation for elderly workers.

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Abbreviations and Acronyms

BHIPS	British Household Panel Study
B/C	Cost -benefit ratio
CBA	Cost-benefit analysis
ICLA	Informal care leave arrangement
(MMMM)	Middle alternatives for population projection (“mellomnivået”)
NOK	Norwegian kroner, 1 US dollar is equivalent to 7 Norwegian kroner
NOU	Norges offentlige utredninger (“Norwegian Official Report”)
NPV	Net present value
PSR	Potential support ratio
PSR	Parent support ratio
SHARE	Survey of Health, Ageing and Retirement in Europe
SSB	Statistisk sentralbyrå (“Statistics Norway”)

1. INTRODUCTION

Unprecedented demographic transformation (an increasing proportion of elderly people) poses multiple future challenges to many societies. For example, challenges may develop with respect to the pension funds (the payment of retirement wages). The transition will also significantly increase the demand for future care and health care services and a lower share of the population will be responsible for raising governmental tax revenues through workforce participation. In addition, in a few decades, society will be confronted with a possible decline in the supply of informal care¹ for the elderly while at the same time the number of elderly people increases rapidly. A possible future effect will be that each individual in the workforce will experience a dual pressure – to provide more informal care for their elderly family members and to work for a longer time in their regular positions.

The Norwegian government has already acknowledged that in the future the society will face very demanding challenges related to nursing services, care services, and health care services. The Ministry of Health and Care Services has stated that the care responsibility of the future should not be left to the public sector alone. Rather one has to encourage a voluntary engagement from families, local communities, organizations and enterprises (St.meld.nr. 25, 2005-2006). Accordingly, a close coordination of family members, voluntarily institutions, and public services may become essential.

Countries have responded differently to the challenges posed by demographic changes. Norway has responded by devolving elderly care services from institution-based care to community care and home-based care. In addition, the Norwegian pension reform is to encourage older workers to postpone their retirement. The principle of home-based care is based on the assumption that there will be a sufficient number of care givers available to support elderly and disabled people in their own homes. On the other hand, devolution of nursing and care services from institutions to home-based care may imply that care receivers

¹ Informal care in this context is unpaid care giving services for the elderly or disabled. Informal care for the elderly and disabled is mostly performed in their own home, and care givers are persons who are family members, relatives, or friends of care receivers.

are to rely on family and relatives as well as formal care services. Consequently, a home-based system may put pressure on informal care givers² who are unpaid family members.

The Norwegian pension reform introduces a flexible retirement age with relatively lower benefits for early retirees and relatively larger benefits for delayed retirees. One important objective is to increase the future labour market participation rate. However, recent studies find that seniors (people above 60 years old), who are expected to postpone their retirement age, are exposed to an increasing dual pressure³ – the pressure to work more and the pressure to provide more informal care (Gautun and Hernes, 2006; Gautun, 2007). Despite the fact that seniors are urged to postpone their retirement to keep more people in the workforce, Gautun (2007) states, little attention are given to the effects of such reforms on seniors who also provide informal care for their elderly parents.

Family members often have a significant role in meeting the demands for caregiving. Studies confirm that such informal care services have significant impacts on labour market participation. In order to sustain both a high level of labour market participation and a high supply of informal care, mechanisms that improve the situation for family members may be important. There is an ongoing political dialogue on how the complementary care services for elderly and disabled people can reduce the dual pressure (Innst. S.nr. 14, 2007-2008). For family care givers, training, advice, and follow-up of professionals, cost coverage, care leave arrangement, and economic compensation for loss of income are mentioned as possible mechanisms that need to be assessed (St.meld.nr. 25, 2005-2006; Innst. S.nr. 14, 2007-2008). In relation to the care of close relatives, particularly for elderly family members, in Norway, Working Environment Act 2005, number 62, section 12-10 allows employees who take care of close relatives in the home in the terminal stages of life to be entitled to 20 days [unpaid] leave of absence to take care of the individual patient (Arbeidslivets lover “Working Environment Act”, 2005).

² In this study the concept of informal care givers refers to family members-particularly children who are giving unpaid care to their elderly parents. I tried to limit myself to use the word informal care giver(s). However, in some cases informal care givers, informal care providers, and informal care suppliers are interchangeably used to reflect the same concept.

³ In this analysis, the concept dual pressure refers to the potential conflict between informal care and labour market participation.

In Norway, the discussion on the role of employed informal care givers⁴ is highly dominated by equality concerns. Some political parties, trade unions and organizations representing seniors are emphasizing the importance of both formal and informal care services (welfare state responsibility and voluntary responsibility). They ask for policy measures that reduce the dual pressure so that a high workforce participation rate can be combined with informal care. Gautun and Hagen (2007, p. 6) state that “... a proposal has been put before the parliament (by the Conservatives) to introduce a quota of days that employees can use to take care of their older parents”. In this paper, this policy proposal will be investigated by doing a cost-benefit analysis, in order to study whether or not an informal care leave arrangement such as this is profitable for the society or not.

In this study I undertake a cost-benefit analysis of a suggested policy reform that gives labour force participants with close relatives (children and grandchildren) in need of care, the right to up to 10 days of paid leave annually, to provide them with informal care. This right will be of significance for everyone with close family members aged above 80 years old. The total quota is attached to the individual in need of care; this means that if several persons provide informal care, they must share the quota between them. This reform will in the following be denoted as the Informal Care Leave Arrangement (ICLA).

In Section 2, some literature related to informal care is presented. I first present what demographic challenges Norway will be confronted with in the future. Then, I refer to studies that investigate how common informal care is in Norway and the evidence on the potential conflict between the supply of informal care and labour market participation (“the dual pressure”). Finally, I present some of the policy reforms suggested to reduce “the dual pressure”. In Section 3, I explain what cost-benefits analysis is and present earlier cost and benefit studies done on leave arrangement. In Section 4, the cost-benefit analysis of the ICLA is presented. This section is divided into five subsections. First, I define the scope and objectives of the ICLA. Then, I present all possible costs and benefits that may arise in connection with implementing the ICLA (identification), and identify who may receive the possible benefits and pay the possible costs. In addition, I make clear which particular costs and benefits will be included in my analysis. Thereafter, the chosen benefits and costs are

⁴ Employed informal care givers in this work refer to informal care givers in the workforce (employment). In some cases working informal care givers or working care givers are used to address the same concept as employed informal caregivers.

estimated. In doing this, several assumptions need to be introduced. The fourth part of this section combines the estimates and costs estimated in order to derive the cost-benefit ratio. Finally, sensitivity analyses are undertaken and presented. Section 5 contains conclusions.

2. BACKGROUND OF THE STUDY

This section of the study will present results from the literature mainly on informal care from Norway and other countries. It has four subsections. In the first part, I present demographic challenges that Norway will be confronted with in the future. The second part reveals studies that investigate how common informal care is in Norway and whether it is increasing or decreasing. Then, I refer to studies that show evidence on dual pressure (the potential conflict between the supply of informal care and labour market participation). Finally, I present some of the policy reforms that have been suggested to reduce “the dual pressure”-policies that will improve the incentives for not reducing labour-market participation and also the incentives for participating in informal care supply.

2.1 Demographic Changes

The combination of the transition from a high to lower fertility rate and the reduction of adult mortality rate has been contributing to unprecedented demographic changes; i.e. a higher ageing population in developed countries (World population prospects, 2006). Norway is not an exception to these unprecedented demographic changes. According to the Statistics Norway 2008 (MMMM) projection, the number of children below age 16 is expected to decline from 20.5 percent of the population in 2008 to 18 percent by 2040. The number of persons above 67 years will double by 2040, from 614 000 (12.9 % of the population) in 2008 to 1.2 million (nearly 20 % of the population) by 2040. This is one of the challenges that demographic changes poses to the society. The challenge is not only the number of older people who will retire, but also the decline in the number of potential workforce participants who will finance the welfare system. The number of potential workers aged 16 to 66 will decline from 66.5 percent of the population today to 61 percent of the population by 2050. The potential support ratio (PSR)⁵ is 5 potential workers per older persons aged 67 and above in 2008 and is projected to decline to 2.9 potential worker per older persons by 2050 (Statistics Norway, 2008).

⁵ The potential support ratio (PSR) is the number of persons aged 16 to 66 per each person aged 67 and above that indicates available potential workers per older person.

Elderly people (80 years and above) accounted for 4 percent of the population in 2000, and this figure is expected to double (8 percent) by 2050. With an increase in the number of elderly people, senior workers may become important care givers to their elderly parents. Since the baby-boom years, the average family size has been decreasing which will result in fewer children on whom the elderly can depend for care services. Today the parent support ratio⁶ of persons aged 80 and above for every 100 persons aged 45 to 66 is slightly over 17 persons per 100 persons aged 45 to 66 and is expected to reach at least 31 persons per 100 by 2050 (Statistics Norway, 2008).

2.2 Informal Elderly Care in Norway: Prevalence and Trends

Informal care for the elderly and disabled plays a crucial role in nursing and care services in the world in general and serves as a supplement to public care services in welfare states in particular. In a welfare state like Norway, legally the duty and responsibility to care for the elderly population is assigned to the public service, i.e. municipality. According to the Municipal Health Service Act (1982), all municipalities have the responsibility to provide necessary health services for all persons resident or temporarily resident in the municipalities. Accordingly, people in Norway are not legally obliged to provide care for their parents and the elderly care service is supposed to rely only on the generous Norwegian welfare system. However, studies show that the role of family members in elderly care has been enormous (Kitterød, 1996; Gautun and Hernes, 2006; Gautun, 2007; Gautun and Hagen, 2007; Lingston, 1997; Daatland and Lowenstein, 2005). Even though in Norway nursing and care services to the elderly are not a family-based care model (like in the southern European countries where the family bond is considered to be strong), informal family care is found to be high in Norway (Daatland and Herlofson, 2003).

Even though public services substitute traditional family care giving responsibilities, Lingston (1997) argues that the size of family care giving remains stable in Norway. Family care for the elderly is independent of public elderly care provision. Analysis from Statistics Norway indicates that time spent on informal care for the elderly and disabled in Norway is

⁶ The parent support ratio is population aged 80 and above per persons aged 45 to 66 that indicate the level of support that adult children may be able to provide care to their elderly parents.

estimated to equal the load of public care provided in and outside the institutions (Vigran, 2000). The result of the analysis shows an increase in the number of care givers and at the same time a decrease in the given amount of time of care per person (Vigran, 2000). In a welfare state like Norway, the prevalence of high informal care is associated with ancestral family obligation and affection for their parents.

According to the Level of Living Survey 1995, 16 percent of the middle aged Norwegian population, around 400 000 persons, served as unpaid care givers outside their household to elderly, disabled, or ill people (Kitterød, 1996). Based on the Health-and Level of Living Condition Survey, Svalund (2005b) estimated that 36 percent of middle aged persons (50-66) in Norway provided unpaid informal elderly care to their parents and outside their households in the year 2002. He also estimated that 29 percent of middle-aged children provide regular assistance to their elderly parents.

Using a survey of 2000 representative sample of the Norwegian population in the age group 45-65 having one or both parents alive in the spring 2007, Gautun and Hagen (2007) found that 7 out of ten respondents provided informal care during the last 12 months (in 2006) while participating in paid employment. Of economically active respondents, 57 percent were reported to feel pressure from labour market participation and care responsibilities.

2.3 Intricacy of Combining Informal Care and Paid Work

Studies from Norway and other countries reveal that a high proportion of seniors combine both paid work participation and parent care responsibilities. Many informal care givers find it difficult to combine the role of care giving and paid employment (Gautun and Hagen, 2007; Gautun, 2008; Bolin et al., 2007; Arksey, 2002; Jegermalm, 2006; Turvey and Thomson, 1996; Bittman et al., 2007; Evandrou and Glasser, 2003; 2004).

A study conducted in the US on balancing elderly care responsibilities and work (Lee et al., 2001) reveals the effect of balancing elder care and work on emotional health. They found that female care givers reported more depression symptoms than male care givers. They suggested that employers may need to develop intervention mechanisms to help employees with higher care giving responsibilities. Most of the studies on informal care are gender-based. Studies show that women are performing most of the informal care giving work.

Caring for sick parents has a significant effect on the labour supply by reducing the number of hours work. Léger (2000) illustrates that women experience negative impacts on their hours worked when they live with sick elderly parents. However, a study from the UK demonstrates that the combination of care giving with other family and work roles appears to have few negative health consequences (Evandrou and Glasser, 2004; Glaser et al., 2005) and has an impact on pension credits (Evandrou and Glasser, 2003).

A care policy change from institutional care services to community care and an increase in the ageing population in Australia have been found to increase the demand for informal care. As a result, a number of care givers combine paid employment with their caring responsibilities (Turvey and Thomson, 1996; Bittman et al., 2007). Using the longitudinal Household, Income and Labour Dynamics in Australia Survey, Bittman et al. (2007) reveal that care givers are more likely to reduce their hours of work or exit from the labour force and earn low levels of income. They recommend that policy needs to address how to reduce the negative effects of informal caring and costs of caring that care givers face if it is intended to sustain the supply of informal care in the future. Reduced working hours, the unavailability of flexible jobs for care givers, and the inflexibility of working hours cause care givers to earn less (Gray et al., 2008).

A study based on data from the European Community Household Panel Surveys of 1994 and 1996 indicate that informal care giving has an impact on labour market participation. The findings reveal that starting or increasing care giving is accompanied by a decline of weekly work hours in northern Europe (except Ireland) (Spiess and Schneider, 2003). They also find that *“among midlife women, reductions in work hours or exit from labour force are not likely to be recovered after caregiving responsibilities stop”* (Spiess and Schneider, 2003, p.62).

On the other hand a study carried out in the Netherlands (Dautzenberg et al., 2000) on a population-based probability sample of middle aged women between 44 and 56 found that parental care and employment are not conflicting in time as the amount of care provided to parents was not affected by out-of-home employment. Parental care has only a small impact on work decisions, and employed care givers do not experience more care giver role strain.

They found that employed care givers used vacation days⁷ to assist their elderly parents; that helped employed care givers to combine care giving and paid work responsibilities.

Using data from SHARE (Survey of Health, Ageing and Retirement in Europe) a study carried out among employed informal care givers aged 50 and above in Europe (Bolin et al., 2007) found that informal care reduced the probability of employment among women and men; and informal care reduced the number of hours worked when analyzing women and men together. Their results show that informal care giving reduced the number of hours worked more for men in northern Europe than in southern Europe (Bolin et al., 2007). The adverse effects of informal care on labour market outcomes were found to be severe in countries with weak family ties (northern European countries).

Based on Norwegian administrative register data (from 1993-2005), Fevang et al. (2008) find that having a lone parent in the terminal phase of life causes a decline in labour market activity (strongest for daughters) and a rise in social security dependency⁸ (strongest for sons). They conclude that the employment rate continues to decline after the demise of the lone parent, while social security persists at higher levels for many years after the parent's demise.

Gautun and Hagen (2007) illustrate that absenteeism, irregular attendance (coming late and having to leave) at the workplace, and lacks of concentration on the job are dominant impacts of informal care giving on labour market participation. Gender variation was observed; men were likely to end work for longer and women experience problems with concentration while still working (Gautun and Hagen, 2007). To reduce the difficulty in combining paid work and elderly care responsibilities, informal care givers are exploiting vacation and holidays (Gautun and Hagen, 2007). They find that there is a positive effect of public welfare state services towards the very old on the employment output of the young elderly. For offspring who have elderly parents in institution, the care of burden is eased.

⁷ In the Netherlands employees are entitled to 25 to 40 holidays (work days) per year when they work full time.

⁸ The probability of being a long term social security claimant, defined as claiming benefits or social assistance for at least three months during a year due to sickness absence, rehabilitation, unemployment, or disability, rises on average by 2-4 percentage points during the final years of a lone parent's life.

They conclude that absence from work can be reduced if parents are taken care of by the welfare state.

The available evidences on the relationship between formal and informal elderly care is mixed. For instance, Kuhn and Nuscheler (2007) in their study of the optimal public provision of nursing homes state that there may be a productivity difference between nursing homes and family care. They argue that there is a situation where the elderly receive low quality of care in nursing homes. Bonsang (2008) illustrates that informal care is an effective substitute for formal care if the needs of the elderly are low and require an unskilled type of care. Bonsang concludes that “...*informal care is a weak complement to nursing care, independently of the level of disability*” (Bonsang 2008:1). According to Bolin et al., (2007) informal care provided by children to their elderly parents and formal care are substitutes, while informal care is a complement to doctor and hospital visits.

Studies show that women are under considerable stress to provide a large volume of care with little support from formal caregivers (Waliser et al., 2002). Marenzi & Pangani (2003) conducted a study in Italy on the impact of providing elderly care for parents on labour market participation of Italian women based on data from the Bank of Italy’s 2000 Survey of Household Income and Wealth (SHIW). They found that informal care for the elderly decreases labour market participation. Care giving may create a loss in working hours and earnings. These effects are likely to contribute to elderly women’s risk of living in poverty (Wakabayashi and Donato, 2005). It seems that women are disadvantaged by providing informal care.

A study from the US shows that informal care giving shapes the timing of retirement but the association depends on the relationship between informal care giver and care receivers (Dentinger and Clarkberg 2002). They conclude that wives caring for their husbands have retirement odds 5 times greater than women who are not care givers and substantially lower for husbands caring for their wives. Based on British Family and Working Lives Survey 1994-1995 for 9,139 British men and women, Henz (2006) reveals that family roles were relevant for men and women taking up caring. An important predictor of female informal care givers leaving the labour market was being in a lower social class.

As in other developed parts of the world, women have been providing major family care to the elderly in Norway. However, in recent years the role of men in informal care has become significant. In a recent study, Gautun and Hagen (2007) demonstrate that 73 percent of men and 67 percent of women provide services to their elderly parents. They conclude that the proportions reporting a dual pressure between work and care obligations “...are quite similar for men as for women. The impact of ones behaviour at work, however, seems to differ: men are more likely to terminate work for longer and smaller spells, whereas women report problems of concentration while still working” (Gautun and Hagen, 2007, p.11). On the other hand, a study conducted by Fevang et al. (2008) illustrates that women are more likely than men to reduce employment. They found that having a lone parent in the terminal phase of life reduces employment by 1 percentage point for sons and 2 percentage points for daughters. It seems that there is an insignificant difference between men and women. In this study, therefore, gender difference is not considered as a separate subject of study to analyse costs and benefits of the ICLA. Rather, analysis of the ICLA is carried out in such a way that it encompasses both male and female informal care givers.

2.4 How to reduce Dual Pressure?

Experience from other countries shows that increasing home based care increases the burden on informal care givers; and some counties have responded by enhancing improved care giver support programs, increasing tax relief for care givers, and expanding direct payment programs (MacAdam, 2004). Dautzenberg et al. (2000) suggests that:

Policy measures should be directed at supporting employed caregivers so that painful choices such as reducing work hours or elder care can be avoided. The combination of employment and elder care certainly is less problematic when a variety of community services are available and employees have sufficient vacation days and opportunities for family illness leave, as in the case in the Netherlands. Some of the most important measures are flexible work schedules, community services for the elderly, and family support personnel policies (p, 184).

In the US, a study based on national survey data (Silverstein and Parrott, 2001) shows that the majority of respondents are in favour of a policy that enables tax credits and time off to the care givers. Pavalko and Henderson (2006) found that workers in jobs that provide access to flexible hours, unpaid family leave, and paid sick or vacation days are more likely to remain in the labour force or maintain or increase their hours of employment.

In order to reduce dual pressure, the policy needs to address 'internal' factors, (such as the needs of the care recipient and the associated costs, household circumstances and the availability of family support), that influence care giver's ability to remain in paid employment (Turvey and Thomson, 1996). They also suggest that consideration of both internal and external factors are important in the development of policies relating to informal care giving and paid employment participation.

From a UK study based on the British Household Panel Study (BHIPS), Heitmueller and Inglis (2007) suggest that to increase the size of labour market participation, expansion of formal care is essential to substitute for informal care. Extending their suggestion, Heitmueller and Inglis stated that if the policy is intended to enable more people to combine care and work, more flexible work arrangements are necessary. Providing support to informal care givers raises the level and quality of care to care receivers and at the same time may reduce strain and improve quality of life for informal care givers from whom assistance for the elderly is expected (Motel-Klingebiel et al., 2005).

Combining care responsibilities with participation in paid employment requires a policy with a holistic approach that integrates formal and informal care and makes them inseparable parts of the whole approach. In order to reconcile labour market participation and care responsibilities, care policy needs to address a high quality of formal care accompanied by availability and affordability for all and backing for informal care givers (reducing financial, emotional and health costs) (Kröger, 2007).

Studies related to informal elderly care in Europe (Viitanen, 2007) analyzed how government expenditure on formal elderly care affects the likelihood of informal elderly care. Viitanen (2007) found that an increase in government formal care expenditure on

formal residential and home help services for elderly decreases the probability⁹ of informal care giving and in turn increases the labour force participation rates of 45-59 years old women across Europe. She concludes that an increase in government formal care expenditure is a cost-effective tool to increase labour force participation rates. On the other hand, a study from the US (Lidya, 2005) illustrates that the amount of informal care initially declined when publicly paid home care was received and that after a while it stabilized. Informal care givers do not relinquish care giving when publicly paid home care is available. Lidya (2005) considers expanding community long-term care as a means of developing partnerships between formal and informal care givers.

Even though Norway's elderly care services are different from other nations, the prevalence of informal care appears to be a common feature. Since the elderly care service follows different models, it is difficult to compare the figures from different countries. In their study, Gautun and Hagen (2007) illustrate that absence from work is reduced if parents are taken care of by the welfare state. The extent to which formal elderly care services substitute for informal care services has an effect on labour market participation. Children, whose parents are living in an institution for elderly nursing and care service, report fewer problems in combining paid work and elderly care responsibilities. Based on the experience of other countries, Gautun (2007) has discussed three major mechanisms that can help informal care givers who are under pressure to combine elderly care and labour market participation. Providing services to informal care givers, economic assistance, and assistance from the workplace (facilitating flexible working conditions) to employees with care giving responsibilities are mentioned. She also suggests that there is no single solution that works for all informal care givers. Rather, she suggests that several solutions may be required to meet the need of different informal care givers with different demands. Providing support to employees with care obligations will benefit most employees at the workplace (Arksey, 2002).

⁹ Based on the European Community Household Panel data, the results of the study show that a 1000 Euro increase in government expenditure on formal residential care and home-help services for the elderly decreases the probability of informal care giving outside of the caregiver's household by the carer's own household, but does not substitute the intergenerational household formation.

Conclusion

The ongoing demographic transition is likely to increase a demand for formal and informal care in the future. Based on the parent support ratio, it can be said that the supply of informal care (family care provision) will decline in the future. The increase in the oldest of the old population aged 80 and above seems to place more pressure on health and care service providers. This demographic transition not only causes a challenge to social security benefits and demands for elderly care services, but also raises the demand for an active workforce that can finance the welfare system. Decline in both the potential support ratio and the parental support ratio will pose a dual pressure to the future employee; i.e. to work more to finance the welfare system and to provide more care for the elderly.

Studies show an increase in the number of caregivers and at the same time a decrease in the given amount of time of care per person. The elderly people who receive informal care are increasing. There is an increase in the number of older people aged 80 and above and a decline in the number of people in the potential working group (aged between 16 and 66). Elderly care may not be solved either by formal or informal care. Demand for both formal and informal care is likely to increase. As more women enter the labour market, increasing internal mobility (migration) and lowering the number of children per family, the supply of informal care is likely to fall in the future. An incentive to care givers is important to sustain actual care givers and to motivate potential care givers. Empirical studies indicate that providing informal care reduces employment probability and increases absenteeism. There are informal care givers who have difficulties in combining labour market and elderly care responsibilities. To reduce dual pressure, incentive-based policies that make it easier for employees to combine paid work and elderly care responsibilities are essential. The informal care leave arrangement may be one of the solutions that can help employed informal care givers to combine paid work with elderly care responsibilities. This study analyses the benefits and costs of the informal care leave arrangement from the societal perspective.

The rationale behind considering the informal care leave arrangement in this analysis is due to the following factors. First, Working Environment Act 2005, number 62, section 12-10 states that employees who take care of close relatives in the home in the terminal stages of illness shall be entitled to 20 days [unpaid] leave of absence to take care of the patient. Second, equality concerns have motivated trade unions and some political parties to demand welfare state services of the kind offered to families with small children. There are some

organizations that have implemented 10 days paid care leave arrangement to employees who wish to take care of their elderly parents. The last factor is that the unpaid leave arrangement may reduce informal care giver's earnings and consumption that may affect social welfare. Loss of earnings may also become an incentive to informal care givers to claim social security benefits or may reduce their commitment to elderly care responsibilities.

3. CBA AS A DECISION-MAKING AID

In this section, I explain what a cost-benefits analysis is. CBA as a methodological tool and decision-making aid is presented. The weaknesses of CBA are illustrated. In the second subsection, I present former cost and benefit studies done on leave arrangement.

3.1 Principles of CBA

CBA is a tool used to assist in making judgments and appraising available options to determine the worth of a project, programme, or policy (Rosen, 2005; Brent, 2006). CBA is a quantitative analytical method for organising information in a systematic manner to aid decisions in the efficient allocation of resources (NOU, 1998:16). It is a methodology for assessing the net benefits accruing to society as a whole because of a project, programme, or policy. In CBA, both costs and benefits are measured in the same unit, monetary terms that allow one to judge whether a program is desirable from a societal point of view (Drummond et al., 2005; Birch and Donaldson, 1987; Brent, 2006).

The main reason for undertaking a CBA is to determine whether a project, programme, or policy will make the wider community better or worse. In other words, it indicates whether the net impact of the project is positive or negative. Net social benefits should exceed social costs (Cohn, 2003). In public services, CBA is used as a method of economic, program, intervention or policy evaluation from the societal perspective (Drummond et al., 2005; Brent, 2006).

CBA attempts to measure the value of all costs and benefits that are expected to result from the activity. The standard criterion for deciding whether a public program can be justified on economic principles is net present value (NPV) - the discounted monetised value of expected net benefits (i.e., benefits minus costs). Net present value is computed by assigning monetary values to benefits and costs, discounting future benefits and costs using an appropriate discount rate, and subtracting the sum of discounted benefits from the sum of discounted costs.

Undertaking a CBA provides the decision maker with quantitative comparisons of options and also provides supporting information for any costs and benefits that could not be quantified. CBA serve to aid decision-making. However, a CBA does not replace the need for sound judgment based on a wide range of considerations. Nyborg (1998) states that most politicians in Norway use cost-benefit ratio as a screening tool to approve projects rather than for ranking projects. Even though they recognize the usefulness of the cost-benefit ratio, attitudes towards cost-benefit analysis have been found to vary across political parties. Constraints in using the cost-benefit analysis approach are the feasibility and appropriateness of assigning money values to the costs and benefits generated by the program or policy. Cohn states “[m]easurement of costs and benefits is no easy task.... Omission of benefits and costs may alter the social value of projects and distort social choice” (2003, p.546). One of the limitations of using cost-benefit analysis related to all stakeholders or agents is the problem of aggregation in the social welfare function. Brekke et al. (1996) argue that even though explicit assumptions and ethical consideration are made, it is hard to formulate a social welfare function that accommodates the views of all agents.

Despite its weakness, the fundamental principle underling CBA is to assess social welfare change as a result of a policy or project. In other words, CBA looks at how social welfare is affected by a policy or project that depends on how the welfare of individuals is affected by the policy or the project (Kopp et al., 1997). In order to implement a public policy or intervention, Official Norwegian Reports (NOU, 1998) recommends economic evaluation or analysis of the societal profitability of the intervention. This study conducts a CBA of the ICLA from the societal perspective. Accordingly, the following five major components of the CBA of an intervention, program or policy are covered to assess social welfare change as a result of the ICLA under the study.

- Defining the scope and objectives of ICLA.
- Identifying all potential costs and benefits of ICLA (both quantitative and qualitative)
- Estimating Costs and benefits of the ICLA (quantification and valuation)
- Calculating the decision criteria.
- Performing sensitivity analysis and addressing issues of uncertainty

3.2 Existing Studies Related to Costs and Benefits of Leave Arrangement

Although the prevalence of informal care givers is well documented, there are only a few studies related to the benefits and costs of policy analysis. Existing studies are more general and particularly related to childcare (maternal and parental leave). Maternal and parental leave benefits have been found to have positive effects on the labour market participation of women (Datta Gubta et al., 2006; Spiess and Wrohlich, 2006; Ruhm, 1998; Waldfogel et al., 1999; Del Boca et al., 2007). Studies illustrate that maternal and parental care policy allows Nordic countries to facilitate balancing family responsibilities with labour market participation (Datta Gubta et al., 2006). Even though there is a variation within Nordic countries, it seems that the policy has by far achieved its aim in regard to the female labour supply and gender equality issues. Other countries, such as Germany, have recently shown a move towards the Scandinavian model of parental leave to increase workforce participation of mothers with young children and to address lower fertility rate problems (Spiess and Wrohlich, 2006). The study (Spiess and Wrohlich, 2006) suggests that the parental leave benefit reform in Germany, which followed the Scandinavian model, will achieve the aim of increasing the labour market participation of mothers with young children. In Norway, the existing family leave act (included in the Working Environment Act, 2005, Number 62, chapter 12, including maternal leave, parental leave, pregnancy leave, and childcare) allows families to combine occupational participation and childcare responsibilities. Leave arrangement not only raised the number of women in paid work participation but also gave an opportunity to Norwegian women to have a high fertility rate compared to some West European countries (Rønsen, 2004).

Except for policy discussions, I am not aware of studies that conduct cost-benefit analysis or cost effectiveness analysis of leave arrangement or flexible working arrangements to combine elderly care responsibilities and labour market participation. More relevant studies conducted in the US (Dube and Kaplan, 2002; Darby and Fuhar, 2007) were on the Family and Medical Leave Act that includes all types of work leave¹⁰. In California, a paid family and medical leave insurance system that allows employees 50-60 percent wage replacement

¹⁰ Analysis includes all work leave types, such as the maternity or parental leave, personal illness, and illness of a family member.

when they take up to 12 weeks of leave to care for a newborn or newly adopted child or for a seriously ill family member (including elderly parents) was found to be cost-effective (Dube and Kaplan, 2002). In the US, however, Darby and Fuhar (2007) reveal that costs of the Family and Medical Leave Act 1993¹¹ that permits eligible employees to take as much as 12 weeks [unpaid leave] each year to attend family matters exceeds the benefits. Available studies done on the care leave arrangement are very general and are mostly not directly related to informal elderly care. However, experiences from maternal and parental leave illustrate the positive effects of the leave arrangement on labour market participation.

¹¹ The main provisions of the Family and Medical Leave Act permit eligible employees to take as much as 12 weeks unpaid leave each year to attend family matters related to maternity, adoption or newborn care; to care for an elderly parent, sick child or spouse; or for reasons related to the employee's own serious medical conditions. The act directs the employees to restore workers to previous job status on returning from covered leave.

4. CBA OF THE ICLA

This section is divided into five subsections. First, I define the scope and objectives of the ICLA. In the second subsection, I present all possible costs and benefits that may arise in connection with implementing the ICLA and identify who may receive the possible benefits and pay the possible costs. In addition, I clarify which particular costs and benefits will be included in my analysis. Thereafter, the chosen benefits and costs are estimated. In doing this, several assumptions need to be introduced. The fourth part of this subsection combines the estimated benefits and costs in order to derive the cost-benefit ratio. Finally, sensitivity analysis is conducted and presented.

4.1 The Scope and Objective of the ICLA

In this subsection, I will define the scope of the ICLA. Then, I present the current situation (without the intervention) of the informal care and labour market in Norway. Finally, I state the objective of the ICLA.

Based on the Working Environment Act 2005, number 62, section 12-9 first paragraph, I assume that by implementing the ICLA, the elderly will receive rights equivalent to the rights available for child sickness leave. Accordingly, I assume that employees who have elderly parent(s) in their care are entitled to a maximum of 10 days of paid ICLA per year to attend to a sick parent(s) or to accompany the parent to medical examinations or other follow-up in connection with sickness (for example, provide care to outpatient services, inpatient recovery, etc). Suppose that the ICLA is allowed for elderly people above 80 years of age and who reside outside institutions¹². Let us assume that one informal care giver provides care to one informal care receiver. In other words, if a care receiver has more than one close family member assume that the care givers divide the informal care leave arrangement to provide care to the care receiver. In this analysis I will not cover the long leave arrangement related employee who may take care of close relatives in the home in the

¹² Institutions such as rehabilitation centres, nursing homes, and etc. where elderly people receive institutional-based care services.

terminal stages of illness or provide intensive long-term informal care in the elderly person's own home.

Some empirical studies indicate that providing informal care reduces employment probability and increases the probability of the caregiving becoming a social security claimant. Current employed informal care givers have difficulties combining labour market and elderly care responsibilities. Some of them use different forms of absenteeism either due to sick parents or due to "bad health" conditions from burden and stress. They are also reducing their working hours (employment) from full-time to part-time or they reduce the proportion of part-time employment or decide to leave the labour market entirely due to elderly care responsibilities. Studies show an increase in the number of care givers and at the same time a decrease in the given amount of time of care per person. The number of elderly people who receive informal care is increasing. There are elderly people who are in need of informal care. It is estimated that up to 20 percent of elderly people aged 67 years and above are receiving unpaid informal care. There are many elderly people above 80 years age outside of institution-based care who receive informal care. At the same time, there are also potential informal care givers who are not providing informal care.

The objective of this study is, therefore, to evaluate the effects that may occur if the ICLA is implemented. This is to assess benefits and costs of the ICLA from the societal perspective. Accordingly, it is to illustrate whether implementing the ICLA is profitable for the society or not.

4.2 Identification of Possible Costs and Benefits of the ICLA

In this subsection, I will identify potential costs and benefits of the ICLA. Cost and benefit identification is a component of CBA in which potential costs incurred throughout an intervention and potential effects of the intervention are to be identified. Identified potential costs and benefits component are presented in Table 1. Before proceeding to the concept of quantification and valuation of the selected costs and benefits, I discuss all potential costs and benefits components separately.

4.2.1 Costs of the ICLA

In this subsection I present and discuss all potential costs of the ICLA. These potential costs include direct intervention costs or production costs (PC), administration costs (AC), leisure time costs (LTC) costs on working colleagues (CWC), and low quality of life for care receivers (LQLCR).

Table 1. Identified potential costs and benefits of the informal care leave arrangement.

Benefits	Costs	Quantifiable	Non-quantifiable	Included in the analysis
	Production costs (PC)	Yes		Yes
	Administration costs (AC)	??	??	No
	Leisure time costs (LTC)	??	??	No
	Costs on work colleagues (CWC)	??	??	No
	Low quality of life for care receivers (LQLCR).		??	No
Health benefits for care givers (HBCG)			??	No

Continued...

Benefits	Costs	Quantifiable	Non-quantifiable	Included in the analysis
Positive utility from more happiness for care givers (PUMHCG)			??	No
Positive life quality effects for care receivers (PLQECR)			??	No
Positive health effects for care receivers (PHECR)			??	No
Labour market benefit (LMB)		Yes		Yes
Reduction in health care costs (RHCC)		Yes		Yes

4.2.1.1 Production Costs (PC)

In this context, production costs refer to the costs of the loss of production during the ICLAdays. The ICLAdays with payment or costs of leave days reflects the absence of working care givers from the workplace. The ICLAdays makes it possible for employed care givers employee to be away from work by making use of the provisions of the arrangement. During an absence of an employee, employers may use different mechanisms to maintain production. In this analysis, production losses during the leave and production gain due to the ICLAdays are not treated differently for different workplaces. Rather, production loss and production gain due to the ICLAdays are estimated using labour costs as a price proxy based on CBA guidelines (NOU, 1998:16). The direct cost of the ICLAdays or production loss due to the ICLAdays is a cost to the government or firms.

4.2.1.2 Administration Costs (AC)

The intervention of the informal care leave arrangement is likely to incur costs of administration. Despite the difficulty in quantifying and valuing the implementation costs, implementing the ICLAdays is likely to increase the workload for employers and implementing bodies such as the Norwegian Labour and Welfare Administration or (NAV). Administration and implementation costs of the ICLAdays may vary based on who will finance the ICLAdays. It is unclear who will finance the ICLAdays. From child sickness absence experiences, the employers may finance the ICLAdays. On the other hand, if it will be financed by the public or taxes, there will be additional implementation costs of 20 Norwegian øre per 1 NOK to run the ICLAdays (NOU, 1998). Due to the uncertainty of the financing system and a lack of information to quantify and value this cost component, it is not included in the analysis.

4.2.1.3 Costs on Working Colleagues (CWC)

The unexpected effect of pressure or stress on colleagues of absent informal care givers from the workplace is non-quantified effects of informal care or the ICLA. Elderly care may demand an emergency response that may interrupt working hours. Unscheduled absence to care for a sick elderly parent may put pressure on colleagues to cover work for the informal care giver. In this situation, the colleagues may be burdened with extra work or stress to fill in for unscheduled leave takers. There are considerable costs to employees that must work overtime and face stress. Stress at work and extra work may contribute to absenteeism. The employers/firms may face extra costs to cover unscheduled ICLA takers. There is no information to quantify and value the costs that the ICLA may incur on colleagues of informal care givers at the workplace. Accordingly, this cost component is not included in the analysis.

4.2.1.4 Leisure Time Costs (LTC)

Let us assume that employees who are potential informal care givers are willing to supply informal care to their elderly parents due to the ICLA. They may use the opportunity of the ICLA to start providing informal care. Without providing informal care, the available time (T) to this group of employees may be described as working time (W) and leisure time (L). When they start to provide informal care, the available time will be distributed into three categories: working time (W), leisure time (L), and care giving (C). It is likely that employees who start to provide informal care will trade off leisure time and care responsibilities. If they use the ICLA days from working time to provide informal care, they may reduce certain days per year or certain hours per day from leisure time as well. Loss of leisure time is a cost to informal care givers. Since there is a lack of information to quantify and value the costs of leisure time they may lose due to the ICLA, this cost component is not included in the analysis.

4.2.1.4 Lower Quality of Life for Informal Care Receivers (LQLICR)

Informal care receivers may experience negative effects of informal care emotionally and physically. Studies from other countries show that elderly people who receive informal care feel a loss of personal control in their lives and experience stress (Fast et al., 1999). The elderly also experience tension between expressing their need for assistance and their desire to not be a burden on their family members. Fast et al. (1999) state “...as the amount of care provided by informal caregivers increases, the psychological morale of elders who receive the care declines” (p. 307). The study conducted by Hellström and Hallberg (2001) among Swedish elderly people aged 75 years and older illustrates that low quality of life is related to receiving informal help from others. Since the municipality or public service has a duty to provide elderly care, the elderly may feel embarrassment or experience psychological stress from receiving personal care from their children. A study from Canada illustrates that “... they [the elderly] preferred to receive needed help from formal (i.e. either public or private sector) caregivers than from family members because relying on family members cost them their independence and burdened their family members” (Fast et al., 1999, p.307). If implementing the ICLA increases the supply of informal care, its dynamic effect could be that the number of informal care receivers may increase. Receiving personal care from a family member may cost care recipients sense of independence. This factor is not included in the analysis due to difficulty in quantifying and valuing the effect.

4.2.2 Benefits of the ICLA

In this subsection I specify and discuss all potential benefits of ICLA. The potential benefits of implementing the ICLA are assumed to be health benefits for care givers (HBCG), positive utility from more happiness for care givers (PUMHCG), positive life quality effects for care receivers (PLQECR), positive health effects for care receivers (PHECR), increased employment or labour market participation (LMB), and reduction in health care costs (RHCC). The identified potential benefits are presented separately in the subsections that follow.

4.2.2.1 Health Benefits for Care Givers (HBCG)

One of the non-quantified effects of the ICLA is health (psychological and physical) effects on informal care givers. I am not aware of a study or analysis that addressed the effects of informal care giving on informal carers' health in Norway. Experience from other countries shows that physically and psychologically distressed informal care givers are likely to become a greater burden on the public health system (Fast et al., 1999). Studies support the impact of care giving on mental health increases with the time committed to informal care giving (Hirst 2005, Cannusinco et al. 2002). Studies conducted among Swedish informal care givers aged 50-89 found that higher participation in informal care giving was associated with lower life satisfaction (Borg and Hallberg 2006). Experience from other countries illustrates that home-based care services have an effect on the health of informal care givers (Grunfled et al., 1997). A study from Australia also supports that a shift from institution-based care to community-based care has increased the burden on informal care givers (Gray et al., 2008). Studies from the US indicate that stress and strain associated with care giving increases the use of health care services and the medical expenditure of care givers and informal care receivers (Basu and Rosenman, 2009).

The ICLA may reduce the negative effects of informal care (stress and burden of elderly care responsibilities). If the ICLA reduces physical strain and psychological stress, it is likely to reduce long-term disability associated with informal care. If the ICLA improves the health condition of informal care givers, it is likely to reduce future health care costs associated with the effects of informal care. If the ICLA contributes to keeping the senior healthier, it is likely to contribute to productive aging and reduce the demand for care services in the long-term. Most informal care givers are likely to have family obligations in addition to their care giving responsibilities. Women are more likely to be stressed from multiple responsibilities. The ICLA may help informal care givers to meet family responsibilities while combining elderly care responsibilities and labour market participation. This benefit component is not included in the quantitative analysis due to difficulty in quantifying and assigning a monetary value to health effects for care givers.

4.2.2.2 Positive Utility from More Happiness for Care Givers (PUMHCG)

The motivation to provide informal care may differ from community to community, family to family, and individual to individual. Some studies indicate that the motivations for informal care from a child (son/daughter) are altruism (Fevang et al., 2008; Brouwer et al., 2005), the promise or expectation of a larger inheritance or transfer of cash (Van Houtven and Norton, 2008), duty, social norms, and similar reasons. The concept of altruism here is that the decision to supply informal care is dominated by empathetic motives. The primary goal is to benefit the informal care receivers. The informal care giver takes the health and wellbeing of care receivers into account when deciding to provide informal care.

By providing informal care, a care giver gains satisfaction or utility from caring for their beloved parent(s), which is a benefit that is hard to quantify. A study from the Netherlands using Dutch informal care givers' data (Brouwer et al., 2005) suggests that informal care givers derive positive utility from informal care. In other words, they argue that informal care givers acquire pleasure or happiness from providing care to their elderly parents. However, it is unclear whether the ICLA will add more benefits to the utility or satisfaction that a care giver extracts from informal care. Even though it is hard to generalize, it is likely that the ICLA may give an opportunity for socialisation between informal care givers and informal care receivers that may contribute to the wellbeing and health of care receivers. Studies from the US indicate that a positive relationship or socialisation between informal care givers and care receivers contributes to strong affection between both and has the dynamic effect of delaying the institutionalisation of care receivers (Basu and Rosenman, 2009). This effect is not included in the quantifiable benefits of the ICLA.

4.2.2.3 Positive Life Quality Effects for Care Receivers (PLQECR)

The quality of care may be dependent on the types of care that informal care givers provide. There may be certain areas in which family care givers provide “better care” than formal care. Most importantly, the psychological and emotional support that the elderly extract from family may give more satisfaction and pleasure than formal care. For instance, by providing practical assistance like preparing foods, cleaning, gardening, shopping, repairing things, assisting with paperwork, accompanying them to doctor visits, recreation activities, socialization, etc., family care givers may be more favoured than formal assistance; this may

contribute to the wellbeing of informal care receivers. This effect is not included in the quantifiable benefits of the ICLA.

4.2.2.4 Positive Health Effects for Care Receivers (PHECR)

One of the effects of the ICLA may be that care recipients receive the care they need. The ICLA may increase the opportunity for informal care receivers to visit their doctors at an early stage of their illness. Early visits to doctors are likely to reduce treatment complications. The dynamic effect of the ICLA could be that it may contribute to informal care receivers' health. The ICLA may provide an opportunity for more socialisation between informal care givers and informal care receivers. Informal care receivers may get more happiness from socialisation and a relief in pressure by being cared for or assisted by their immediate relatives in their own home. The dynamic effect of staying and receiving care in their own homes as a result of the ICLA would be that the care receivers may be happier being cared for in their own homes. The ICLA then contributes to the wellbeing, happiness, and health of informal care receivers.

4.2.2.5 The Reduction in Health Care Costs (RHCC)

Suppose an elderly mother with a broken hip needs to stay at a rehabilitation center or nursing home to recover after hospitalisation. There may be no immediate available places at a rehabilitation centre or nursing home outside a hospital. If a patient remains for more days than he/she is allowed, a municipality pays extra costs to a hospital. In addition, if a patient stays longer in a hospital, the society pays the costs of longer waiting lists. Incentives to informal care givers may increase the opportunity to provide care and assistance in their own home. The ICLA is likely to substitute formal practical care or assistance if it reduces formal care utilisation (reduces demand for a rehabilitation centre or nursing home). A study from the US shows that informal care reduces home care use (Van Houtven and Norton, 2004) and delays admission to nursing homes (Van Houtven and Norton, 2004; Charles and Sevak, 2005). The informal care leave arrangement has a dynamic effect of not only contributing to the reduction of inpatient stays in hospitals or rehabilitation centers, but is also likely to delay entry into nursing homes.

An investment in the ICLA that may increase the opportunity for informal care givers to combine elderly care and labour market participation may allow informal care receivers to stay and receive formal care in their own homes. The effect of the ICLA could be that it may delay elderly admission to institution-based care. The longer the elderly stay and are cared for in their own homes, the shorter the time they may receive care at institutions (eg. nursing homes). Accordingly, the ICLA may contribute to delaying the time at which the elderly may be admitted to institutions. Since costs of institution-based elderly care are very high, if care is provided at their (elderly persons) own homes, it may reduce costs. Thus informal care substitution that reduces the use of formal care and that delays entry to nursing homes is likely to reduce health care costs. A study conducted in the US (Van Houtven and Norton, 2008) illustrates that informal care by children reduces Medicare expenditure on long-term care and on inpatient care. If the ICLA reduces the utilisation of formal care services, the government or public save on health care costs.

4.2.2.6 Labour Market Benefits (LMB)

An implementation of the ICLA may make it easier for employed informal care givers to combine labour market and care responsibilities. The ICLA may have immediate effects to reduce dual pressure for informal care givers to combine labour market and care responsibility. If the ICLA reduces the stress and burden of caring, this may reduce the rate sickness absences. The long-term effects of having the ICLA may help informal care givers have strong ties to their workplace. Having strong ties to their workplace may increase the probability that employed informal care givers will stay in the labour market. The dynamic effects of the ICLA could then be that employed informal care givers who may decide to reduce or leave employment either due to “bad health” condition from stress or to provide non-intensive care to sick parent may increase their employment or may remain in labour market. As a result, actual informal care givers who reduce working hours (employment) from full-time to part-time or who reduce the proportion of part-time employment due to elderly care responsibility are likely to increase their employment. An experience with parental leave from Europe (Ruhm, 1998) illustrates that short periods (three months) of paid parental leave increase the employment-to-population ratios of women by 3 to 4 percent while having little effect on wages. Since maternal leave is different from care for an elderly parent, it is not appropriate to use this figure for the analysis. However, strong attachment to

the workplace and reduced stress and burden may assist informal care givers in increasing their employment or labour market participation. If implementing the ICLA increases employment, the tax revenue increases for the government, and consumption increases for informal care givers.

4.2.3. Description of Costs and Benefits of the ICLA Included in the Analysis

Socio-economic profitability takes into account the aggregate of all benefits and costs. Thus, it is not only monetary benefits and costs that are counted but all possible positive as well as negative effects. In this analysis, since there is a lack of information and we have limited knowledge on the future effects of the ICLA, it is hard to include all potential costs and benefits of the ICLA. From the identified potential costs of the ICLA, administration costs (AC), costs to working colleagues (CWC), and leisure time costs (LTC) are not selected for analysis due to lack of information to quantify and value these cost components. Lower quality of life for care receivers (LQLCR) is not included in the ICLA analysis due to difficulty in quantifying and valuing this effect. Production costs (PC) is the only cost component selected for this analysis.

From the potential benefits of the ICLA, health benefits for care givers (HBCG) and positive life quality effects for care receivers (PLQECR) variables are not selected for the ICLA analysis due to difficulty in quantifying and valuing these benefit components. Positive utility from more happiness for care givers (PUMHCG) and positive health effects for care receivers (PHECR) are not included in the analytical model of the ICLA. Caregivers and care receivers have an equal utility from increased happiness. Thus I assume that a perfect linear relationship exists between these two variables. Due to perfect collinearity, these variables cannot predict the ICLA benefits in the model. The selected benefits of the ICLA for the analysis are reduction in health care costs (RHCC) and labour market benefits (LMB).

4.3 Estimating Costs and Benefits

In this subsection, selected potential costs and benefits are quantified and valued to estimate costs and benefits of ICLA. The selected costs and benefits of the ICLA are estimated by combining available data with various assumptions. Production costs (PC) is the only cost component included in this analysis. The selected benefits are reduction in health care costs (RHCC) and labour market benefits (LMB). Since there is much uncertainty attached to the utilisation of the ICLA day (PC) and the value of the benefits that arise from the ICLA (RHCC, LMB), different assumptions on their size is assumed. Since there is very limited information that describes the existing state or probability of future outcomes and effects of the ICLA, it is necessary to conduct a scenario analysis using multiple assumptions. I present two scenarios: an optimistic and a pessimistic scenario.

Optimistic scenario:

Assume that informal care givers who have access to the ICLA use on average 2 days of the ICLA per year. Use of two days of the ICLA increases employment by 1 percent per year and delays informal care receivers' admission to institution-based care by 20 days in six years of informal care provision.

Pessimistic Scenario:

Let us assume that informal care givers who have access to the ICLA use on average 7 days of the ICLA per year. Use of seven days of the ICLA increases employment by 0.5 percent per year and delays informal care receivers' admission to institution-based care by 10 days in six years of informal care provision.

In the following three subsections, I will estimate the costs and benefits of the ICLA in the two different scenarios. I present both costs and benefits of ICLA for two extreme scenarios, the optimistic and the pessimistic.

4.3.1 Production Costs (PC)

There is no universally accepted method of estimating production losses due to absence from work. There is an ongoing debate among scholars on how to measure and which elements should be included. There are two major approaches for estimating productivity losses,

namely the human capital cost approach and the friction cost approach. Since this study is not focusing on a particular group, it becomes difficult to define friction periods; thus the human capital approach is considered to be the best choice. In this approach, productivity gains or losses are measured as opportunity costs (Koopmanschap et al., 2008; van den Berg et al., 2006; Drummond et al., 2005), meaning that the total wage expenses of firms and organizations will reflect the social value lost from less work days.

The total wage expenses¹³ are the gross wage rate (for example estimated by average annual gross wage rate plus direct costs¹⁴ and indirect costs¹⁵) (NOU, 1998). The average monthly wage for all full-time employees (working 37.5 hours a week) was 32 300 NOK in 2007 (Statistics Norway, 2008)¹⁶. However, information from Statistics Norway shows that 26.7 percent (653 000) of the 2 443 000 employees were part-time employees (Statistics Norway)¹⁷. Average working hours per week for both full-time and part-time employees is 34.3 hours, representing 91% of a full week (37.5 hours per week). The average monthly gross wage for all salaried employees is then 29 400 NOK (0.91*32 300 NOK). The average annual income for all salaried employees will then be equal to 352 700 NOK in 2007.

National average wage costs are challenging to estimate particularly since taxes on labour (“arbeidsgiveravgift”) differ across regions. Information from the tax office shows that this ranges from 14.1 % in Oslo to zero in the northern parts of the country¹⁸. In the Statistics Norway database (Statbank under labour market and wages), an average labour cost per full-time equivalent employee for year 2004 is presented (Statistics Norway, 2006)¹⁹. I used

¹³ Labour costs are defined as the total cost of having an employee and includes direct costs and indirect costs. Direct costs make up more than 80 per cent of the total costs (Statistics Norway, January 2005). <http://www.ssb.no/en/aki/arkiv/art-2005-01-26-01-en.html>

¹⁴ Direct labour costs include wages and salaries, remuneration and other cash payments like paid annual leave, sickness pay, and representation allowances. http://www.ssb.no/english/subjects/06/05/aki_en/about.html

¹⁵ Indirect labour costs include salaries in kind, costs for health and safety, social contributions, training costs and taxes on labour. http://www.ssb.no/english/subjects/06/05/aki_en/about.html

¹⁶ <http://www.ssb.no/lonnansatt/>

¹⁷ <http://www.ssb.no/aku/arkiv/tab-2008-10-29-06.html>

¹⁸ <http://www.skatteetaten.no/Templates/SKDMelding.aspx?id=57231&epslanguage=NO>

¹⁹ Full-time equivalents: Earnings for a part-time employee are recalculated to the earnings a full-time employee would receive. This is done by using the ratio of the working hours for each part-time employee and the average working hours for full-time employees in the industry as the factor of recalculation. Monthly

these figures to calculate direct labour costs and indirect labour costs for the same year. In 2004, the total average labour costs (wage costs) are estimated to be 476 758 NOK, and the direct and indirect labour costs are estimated to be 372 166 NOK and 104 593 NOK, respectively. It follows that the indirect labour costs account for 22 percent of the average labour costs while the direct labour costs accounts for 78% of the average labour costs. The average labour costs for year 2004 are calculated for average full-time equivalent employee by assuming that all employees work full-time jobs. In reality there are employees who are working part-time. Thus, it does not reflect the true average income of employees. However, the average labour costs for 2007 are calculated for both full-time and part-time employees. This results in a lower figure for year 2007 than for year 2004.

As described above, the average annual gross income of all salaried employees is equal to 352 700 NOK for 2007. Since indirect labour costs account for 22% of the total labour costs, with total labour costs of 352700 NOK, direct labour costs are estimated to be 440 900 NOK in 2007 value. Thus, the average labour costs of Norwegian employees is estimated to be 440 900 NOK (352 700 direct costs and 88 200 NOK indirect labour costs). For this analysis 440 900 NOK (in 2007 price) is considered the average yearly labour costs of Norwegian employees, including direct and indirect labour costs. An average labour cost per day is estimated to be 1900 NOK and an average labour cost per hour²⁰ is estimated to be 253 NOK.

Even though informal care givers are entitled to a maximum of 10 working days of leave absence per year, it is assumed that 100 percent of leave may not be used by employed informal care givers. There is a lack of information about how many days of leave informal care givers may use per year on average. Let us assume that working care givers use a minimum of 2 days and a maximum of 7 days of the ICLA to provide care to their elderly parents.

earnings per full-time equivalent for part-time employees may then be put together with monthly earnings for full-time employees and thus it is made possible to calculate average monthly earnings for all employees. Monthly earnings include basic salaries, variable additional allowances, bonuses, excluding payment for overtime work. <http://statbank.ssb.no/statistikkbanken/?PLanguage=1>

²⁰ Costs per hour are calculated from 7.5 hours a day, 5 days a week, 230 days per labour year.

Now, the social costs from work leave due to the ICLA can be calculated. This is done by combining the figure for average wage costs (total labour costs) by the expected number of days used for informal care (the increase in days of work leave due to the ICLA). The expression for total production costs (PC) for one individual being part of the ICLA becomes as follows:

PC = (the increase in the number of days absent from work due to the ICLA * total annual labour costs per day).

The average cost of one day away from work is equal to 1 900 NOK according to the calculations presented above (2007). Combining this yields the following two expressions for the two set of assumptions I have introduced;

Optimistic scenario, PC (O) = 2*1900= 3 800 NOK (1).

Pessimistic scenario, PC (P) = 7*1900=13 300 NOK (2).

It follows, based on my assumptions, that the annual social costs in terms of productivity losses for each individual participating in the ICLA varies between 3 800 and 13 300 NOK (2007 Kroner), depending on the belief of the number of days that they stay away from work due to the ICLA.

4.3.2 Labour Market Benefits (LMB)

The labour market benefits (LMB) are those benefits that accrue because the ICLA is expected to increase labour market participation rates for those with an informal care responsibility. The probability for each individual staying longer in the work force will increase. In order to calculate such benefits, we need to know the change in the employment propensity from the ICLA. I will in the following assume that the ICLA will increase the employment propensity by 0.5% and by 1%. By combining the assumed figures for the change in the employment propensity with our former estimate on annual average labour costs (440 900 NOK), the following figures follow:

Optimistic scenario, LMB (O) = 440 900*1%= 4409 NOK (3).

Pessimistic scenario, LMB (P) = 440 900*0.5%= 2205 NOK (4).

It follows that the annual average expected benefit from higher labour market participation (LMB) varies between 2 205 and 4 409 NOK depending on the size of the percentage change in the employment propensity.

4.3.3 The Reduction in Health Care Costs (RHCC)

Data from Statbank (KOSTRA)²¹ shows that the average annual adjusted gross operating expenditure per institutional bed in Norway is more than 700 000 NOK (2007; Statistics Norway, 2008). User payments, as a percentage of adjusted gross operating expenditure, was 15.7 %, meaning that the public expenditure per institutional bed amounts to 590 100 NOK (84.3%*700 000 NOK). Adjusted gross operating expenditures per user of home-based services is estimated to be 157 700 NOK (Statbank, KOSTRA²²). A user payment for home-based services is 1.4 % of adjusted gross operating expenditures per user of home-based services. This means that the public expenditure per home-based user becomes equal to 155 492 NOK (98.6%*157 700 NOK). Since the costs to the society includes private and public, I use 700 000 NOK as social costs per bed and 157 700 NOK as social costs per home-based care.

The provision of more informal care due to the ICLA is expected to reduce the demand for the services of rehabilitation centres and delay admission to nursing homes. Informal care givers are mostly non-professional and may not have the necessary skills in nursing care to provide care that demands nursing services²³. Formal care givers with professional training need to provide care services that demand nursing services. In addition, informal care givers participate in the labour market, have their own family responsibility, and provide informal care to their elderly parents. Let us in the following assume that by receiving formal home-based care (nursing care) and informal care, the elderly may stay longer in their own homes before admission to institutions. Suppose that in response to the ICLA, the average admission time to institutions is being reduced by 20 days (maximum estimate) or by 10

²¹ <http://statbank.ssb.no/statistikkbanken/>

²² <http://statbank.ssb.no/statistikkbanken/>

²³ Nursing care or services in this case refers to care services that demand health personnel such as nurses to meet the demand of care receivers.

(minimum estimate). Furthermore, it is supposed that the informal care recipients also use home-based formal care services in addition to the informal care services. The reduction in care costs and health care costs due to delaying the average admission to institutions can now be calculated by taking the difference between institution-based costs and home-based care costs. The health care benefits per day/night will now equal $1\,486$ NOK per day/night $(700\,000\text{ NOK}-157\,700\text{ NOK})/365\text{ days}=1486\text{ NOK per day/night}$.

According to the Romøren (2001) study, which was conducted among elderly people above 80 years old in the Larvik Municipality, the average period of family care is 8.8 years for elderly women and 5.3 years for men. The average period of family assistance or care to elderly parents before admission to an institution for elderly care is 5 years for women and 3.4 years for men. How long an informal care giver may use the informal care leave arrangement depends on how long care receiver may live with “bad health” outside institutions. Based on this study, the informal care provision may last for 3.4 to 8.8 years. Accordingly, let us assume that working care givers provide informal care on average for 6 years. If the ICLA is implemented instead of being admitted to formal care institution in 6 years, informal care receivers stay longer in their home for some days. This delay in admission to institutional formal care is a benefit –reduced health care costs due to the ICLA. This benefit comes after 6 years of the ICLA and needs to be discounted to present values. A discount rate equal to 5% is assumed, which gives the following numbers for each of the two scenarios:

Optimistic scenario, $RHCC(O) = 20 \cdot 1486 = 29\,720$ NOK, which must be discounted in the following way; $29\,720 / (1.05)^6 = 22\,178$ NOK, being the present value of the ICLA lasting for 6 years in average. To find the average annual value these benefits need to be divided over all 6 years, which means $22\,178/6 = 3696$ NOK. (5).

By following the same procedure, for the pessimistic scenario, we find:

Pessimistic scenario, $RHCC(P) = 10 \cdot 1486 = 14\,860$ NOK, and $14\,860 / (1.05)^6 = 11\,089$ NOK, and finally, $11\,089/6 = 1848$ NOK. (6).

The above numbers (3 696 NOK and 1 848 NOK) reflect what the discounted future benefits are when shared equally across the expected future time period for being admitted to formal institutionalized care for the two scenarios.

4.3.4 A summary of the Two Scenarios (Assumptions and Estimates)

In this subsection I present the summary of estimated benefits and costs of the optimistic and pessimistic scenarios. The optimistic scenario is the model in which benefits are believed to be high while costs are assumed to be low. The pessimistic scenario is the model in which benefits are believed to be low and costs are high. In Table 2, the summary of these two scenarios is presented to demonstrate the different possibilities that may result due to the informal care leave arrangement.

Table 2. Summary of estimated costs and benefits of the informal care leave arrangement.

<i>Costs and Benefits Component</i>	<i>Optimistic Estimate</i>	<i>Pessimistic Estimate</i>
Use of ICLA leave days	2	7
PC (per year)	3 800	13 300
Delayed admission to formal institutionalized care (days)	20	10
RHCC(per year, discounted value)	3 696	1 848
The increase in the employment participation rate	1	0.5
LMB (per year)	4 409	2 205

4.4 Costs-Benefit Analysis Decision Rule

In this subsection, I will calculate and present the net benefits of the ICLA. In order to drive the cost-benefit ratio, I will combine estimated costs and estimated benefits of the ICLA. It is calculated and presented for two extreme scenarios, the optimistic and the pessimistic. Decision criteria in cost-benefit analysis states that the net present value (NPV)²⁴ and cost-benefit ratio (B/C)²⁵ rule need to be examined. The net present value (NPV) rule states that

²⁴ NPV is the sum of the present value of project or policy benefits minus the sum of the present values of its costs after discounting.

²⁵ B/C ratio is the ratio of present value of benefits to the present value of costs.

all projects or policies for which $NPV > 0$ should be favoured. The cost-benefit ratio (B/C) rule states that projects or policies that have $B/C > 1$ may be pursued (Zerbe and Bellas, 2006; Drummond et al., 2005; Birch and Donaldson, 1987; Brent, 2006). Net present value is computed by assigning monetary values to benefits and costs, discounting future benefits and costs using an appropriate discount rate, and subtracting the sum of discounted benefits from the sum of discounted costs. In this model of analysis, health care benefits as cumulative effects after 6 years are discounted by 5 %. The effects of other variables (production costs and labour market benefits) are estimated annually and are not discounted.

Table 3. Estimated cost-benefits of the informal care leave arrangement under the two scenarios. In '000 Norwegian Kroner (NOK).

Scenarios	Benefits	Costs	B/C Ratio	Net Benefits
Optimistic	8	4	2.0	4
Pessimistic	4	13	0.3	-9

Table 3 presents estimated net benefits of the informal care leave arrangement under the two scenarios, the optimistic and pessimistic. The annual net benefits of the informal care leave arrangement under the optimistic scenario are estimated to be 4000 NOK per informal care giver participating in the ICLA. Under the pessimistic scenario, the annual net costs of the informal care leave arrangement are estimated to be 9000 NOK per informal care giver participating in the ICLA.

The cost-benefit ratio shows how much net benefit can be achieved from a 1 NOK investment in implementing the informal care leave arrangement. In the optimistic scenario, the cost-benefit ratio is 2.1, which is larger than one. In the pessimistic scenario, the cost-benefit ratio is 0.3, which is less than one.

4.5 Uncertainty and Sensitivity Analysis

In this subsection, I will conduct a sensitivity analysis to deal with the uncertainty of the costs and benefits of the ICLA. A major uncertainty in this study result is due to the lack of information related to the probability that informal care givers will make use of leave days

and also due to uncertainty about the effects of the ICLA. There is uncertainty about how many days of the ICLA informal care givers may use every year on average. It is highly uncertain to what extent the ICLA may increase employment and delay informal care receivers' admission to institution-based care. One-way sensitivity analysis is performed to examine whether a variable really makes a difference in the results by varying its assumption or value while keeping other variables at their base values (base cases). Sensitivity analysis is conducted by optimistic and pessimistic scenarios for all three variables included in the analytical model.

Optimistic Scenario: Keeping other variables at base value,

- Let us assume that the ICLA delays informal care receivers' admission to institution-based care by 30 days/nights in the best-case scenario and by 10 days/nights in the worst-case scenario. The annual net benefits of the ICLA are then estimated to be 6153 and 2457 NOK respectively per informal care giver participating in the ICLA.
- Let us assume that the ICLA increases the employment rate by 1.5 percent in the best-case scenario and by 0.5 percent in the worst-case scenario. Then, the annual net benefits of the ICLA are estimated to be 6510 and 2100 NOK respectively per informal care giver participating in the ICLA.
- Let us assume that utilisation of the ICLA in the worst-case scenario is 3 days and in the best-case scenario is 1 day per year per an informal care giver that has access to the ICLA. The net benefits of the ICLA are estimated to be 2405 and 6205 NOK respectively per informal care giver participating in the ICLA.

Pessimistic Scenario: Keeping other variables at base value,

- Let us assume that the ICLA delays informal care receivers' admission to institution-based care by 15 days/nights in the best-case scenario and by 5 days/nights in the worst-case scenario. Then the annual net costs of the ICLA are estimated to be 8323 and 10171 NOK respectively per informal care giver participating in the ICLA.
- Let us assume that the ICLA increases the employment rate by 0.75 percent in the best-case scenario and by 0.25 percent in the worst-case scenario. Then the annual

net costs of the ICLA are estimated to be 8145 and 10350 NOK respectively per informal care giver participating in the ICLA.

- Assume that the utilisation of the ICLA in the worst-case scenario is 10 days and in the best-case scenario is 4 days per year per an informal care giver that has access to the ICLA. The annual net costs of the ICLA are estimated to be 3547 and 14947 NOK respectively per informal care giver participating in the ICLA.

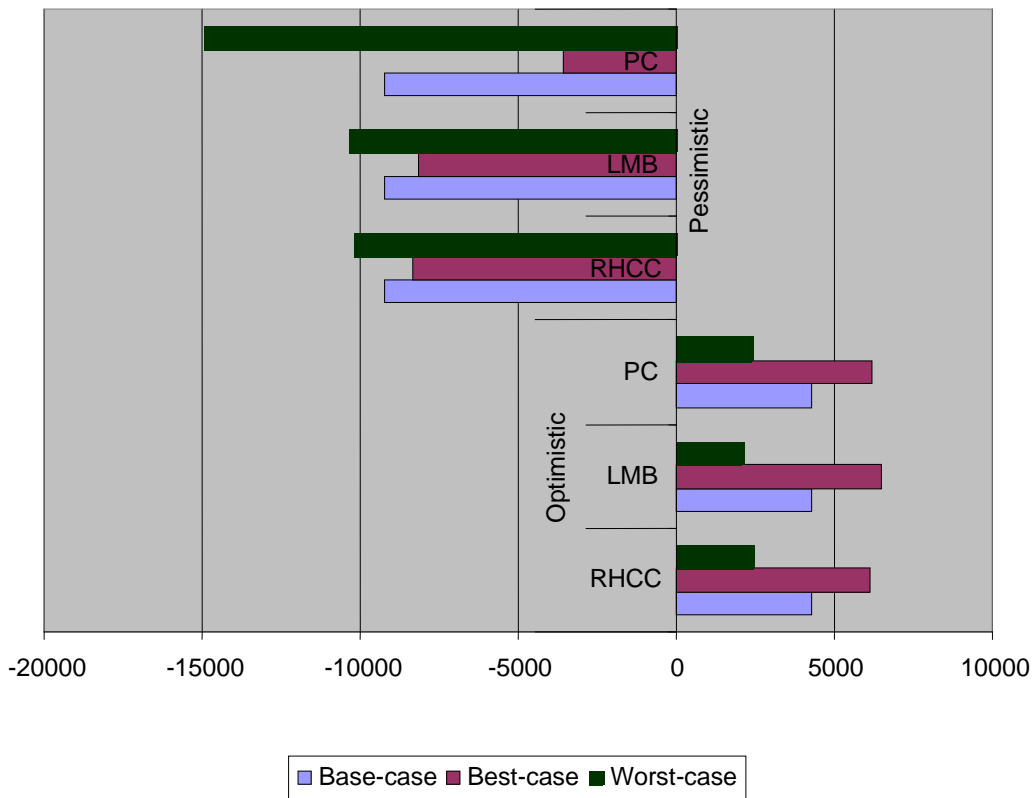
The results of one-way sensitivity in Table 4 demonstrate how net costs and net benefits vary when the values (assumptions) of single variable changes when other variables are kept at base value (base case). RHCC stands for the reduction in the health care costs, LMB is for labour market benefits and PC is for production costs.

Table 4. Variation of results due to changes in assumptions for each variable included in the model. In '000 NOK.

Scenarios	Variables	Base-case	Best-case	Worst-case	Changes
Optimistic	RHCC	4	6	2	2
	LMB	4	7	2	2
	PC	4	6	2	2
Pessimistic	RHCC	-9	-8	-10	1
	LMB	-9	-8	-10	1
	PC	-9	-4	-15	6

Figure 1 illustrates how changes in the assumptions for each variable can alter the study results in the diagram. Dramatic shifts in the result are not observed due to changes in assumptions for all three variables. However, increasing or decreasing the utilisation of the ICLA days in the pessimistic scenario has a significant effect on the annual net costs of the ICLA, which changes by 6000 NOK. The annual net cost of the ICLA has changed by 61.6 percent, when the assumption for utilisation of the ICLA days changes by 42.8 percent.

Figure 1. One-way sensitivity analysis, changes in the results of the analysis in 2007 NOK.



4.6 Discussion

The objective of this analysis is to conduct cost-benefit analysis of the ICLA from the societal perspective. Socio-economic profitability takes into account the aggregate of all benefits and costs. The rationale behind analysing socio-economic profitability in socioeconomic evaluation is to look at whether the positive effects of the program exceed the negative ones. In keeping with the principle of socio-economic profitability, all possible positive and negative effects of the ICLA need to be counted.

One of the limitations of this study is the lack of data. This study has provided an overview of the possible costs and benefits that may arise in connection with implementing the ICLA. Many of the potential costs and benefits are not easily estimated given the current data limitations. Due to lack of data, it is hard to include all relevant costs and benefits that would

have been used for this analysis. In this model of analysis, all identified potential costs and benefits of ICLA are not included to calculate the socio-economic profitability of the ICLA. This limits the analytical perspective of the cost-benefits analysis of the ICLA.

Production costs (PC) is the only cost component of the ICLA included in the analysis. From potential benefits of the ICLA, labour market benefits (LMB) and reduction in health care costs (RHCC) are included in the analysis. There is high uncertainty in the quantification and valuation of the selected cost and benefit components.. There is uncertainty about how many ICLA days on average informal care givers may use every year. There is also uncertainty related to what extent the leave arrangement may delay informal care receivers' admission to institutional care and increase employment. Limitation of the data has restricted the analysis to cost-benefit analysis under uncertainty. To deal with data limitation and uncertainty, two extreme scenarios are introduced. The two scenarios are optimistic and pessimistic scenarios. Under each scenario assumptions are made based on (1) the extent to which an informal caregiver who has access to the ICLA may use the arrangement, (2) to what extent the ICLA may delay consumption of institution-based care, and (3) to which level implementing the ICLA may increase the employment rate.

Using the limited available data and the assumptions made, in the optimistic scenario the annual net benefits of the ICLA are estimated to be 4000 NOK whereas, in the pessimistic scenario the annual net costs of the ICLA is estimated to be 9000 NOK. Findings of this work should be interpreted as estimates under the specified assumptions that illustrate what may happen if the ICLA is implemented as an incentive to increase the opportunity for informal caregivers to combine labour market and elderly care responsibilities. Since most of the data are based on multiple hypothetical assumptions, all figures are uncertain and likely to change. From the societal perspective, however, under the current data limitations, it is difficult to justify quantitatively whether implementing the ICLA is profitable for the society or not. Future research is needed.

The advantage of this analytical model is that the analysis takes into account health care sector and labour market variables to convey a comprehensive picture related to the provision of informal care. Possible costs and benefits of the ICLA are identified. The model seems to reflect a multidimensional purpose to see the challenges imposed by demographical changes. Scenario analyses included in the model provide the opportunity to look for

different alternatives that may arise due to the implementation of the ICLA. Sensitivity analysis is conducted to deal with uncertainty.

5. CONCLUSION AND POLICY IMPLICATIONS

This study is intended to carry out a CBA of the ICLA in Norway. The intention behind conducting a CBA of the ICLA is to look at whether such an arrangement is profitable for the society or not. This study has provided an overview of the possible costs and benefits that may arise in connection with implementing the ICLA. Many of the potential costs and benefits, however, are not easily assessed given the current data limitations. Under the current data limitations, it is hard to include all relevant costs and benefits that would have been used for this analysis.

There is much uncertainty related to the selected variables, for example on utilisation of the ICLA day (PC) and the value of the benefits that arise from the ICLA (RHCC and LMB). Since there is very limited information that describes the existing state or probability of future outcomes and effects of the ICLA, scenario analysis is conducted using multiple assumptions. In order to deal with uncertainty and lack of data, the costs and benefits of the ICLA are estimated for two extremes scenarios, the optimistic and the pessimistic, to illustrate the different possibilities that may arise from the ICLA. Under each scenario, hypothetical assumptions are made based on: use of the ICLA, the extent to which the ICLA may delay use of institutional care, and the probability that employment may increase due to the ICLA.

The annual net benefit of the ICLA under the optimistic scenario is estimated to be 4000 Norwegian kroner per informal caregiver participating in the ICLA. Under the pessimistic scenario, the annual net cost of the ICLA is estimated to be 9000 Norwegian kroner per informal caregiver participating in the ICLA. Because of a lack of information, from the societal perspective, the profitability of the ICLA for the society cannot be claimed or averted.

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