

Sources and impact of rising inequality in Denmark

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Abstract

Rising inequality is a global and current concern. Investigating the sources and consequences of income inequality is a priority for both economists and policymakers. This paper examines the evolution of individual and household income inequality, between 1980 and 2010, using register data from Statistics Denmark. It investigates the main drivers and consequences of income inequality; from the effects of the tax and transfer system, to the evolution of the labor market participation and changes in education, to the effects of changing demographics, family formation and aging. The second part of the paper provides a concise overview of the social and political consequences of the rise in inequality, using the same time frame.

We find that income inequality in Denmark has increased in the past 30 years, mainly due to the abundance of students and young individuals taking on low paid jobs, but also due to the higher labor market participation of women in full-time jobs. Similarly, we find that increasing returns to education and increasing levels of education for both men and women have a positive effect on income inequality. Last but not least, we find that family formation in the modern society is by itself a driver of inequality. Moreover, we find that the changes in deprivation, crime rates, poverty risks, happiness, trust and other more qualitative variables do not unanimously reflect the increasing income inequality probably because the inequality has increased within almost all groups in the society. And that the recent increase is partly created by changes in the tax system.

Key words: inequality, sources of inequality, education, family formation, income inequality, social impacts

JEL codes: J31, D3, I3

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1. Introduction

This paper gives an account of economic inequality in Denmark as it has developed from 1980 until 2010. It is based on register data for the whole population which enables us to map the entire Danish income distribution year by year for all sorts of sub groups.

The Danish income distribution after tax and transfers has, for long, been comparatively equally distributed with a relatively small difference between the lowest and the highest incomes and with a relatively high earnings mobility. However, this changes slowly towards a more unequal income distribution over the investigated years, for both household and individual incomes. It is found that the tax and transfer system have a huge impact on the distribution of incomes, reducing inequality from 0.46 to 0.30, in 2010.

There are many mechanisms in the Danish society that contribute to this result and these are related to both the distribution of salaries and incomes and the redistribution via the tax and benefit system but also to the policies implemented during these years.

This paper shows an income and transfer system which is based on high redistribution with a resulting relatively low but increasing income inequality and a society with no or little noticeable social, political and cultural changes in the period investigated as a result of the inequality increase. It seems that the perceived inequality by the Danish population is very low and its increase is insignificant. One of the reasons is that the increasing inequality to some degree is linked to different stages of the life cycle that all will pass through and to the increasing work participation of women as will be demonstrated in the following. Another reason is the high intergenerational mobility in Denmark that allows individuals to escape the poverty trap¹.

The paper is organized as follows – the first chapter gives a brief description of the income distribution and its development since 1980 and investigates the sources of the increasing inequality by looking at contributions from men, women and marriages as well as generational sub groups. The second and the third chapters concentrate on the potential social and political consequences of increased inequality in Denmark., while the final chapter describes the policies undergone by Denmark in order to maintain inequality at its lowest.

¹ Bjørnskov et. al, 2012

2. The development of the income distribution

In this chapter we will focus on both equalized household income and individual income, using all types of income available from Statistics Denmark (gross income, net income, before and after redistribution and imputed rents) in order to present a clear and detailed picture of the evolution of income inequality in Denmark, since 1980.

2.1. Data

The data for this exercise comes from Danish Register data². These data contain earnings after tax incomes, together with information about transfers from the public sector. The information originates from the tax register and is generally considered to be highly valid. The income information exists in the registers for each individual. Due to a common ID-number this information can be merged with registers for education, housing and all other relevant registers. The registers in Denmark contain detailed information on individuals, work, and earnings, down to the apartment or house address of each person. This means that households are identified as married or unmarried couples if they are registered at the same address and apartment number. Even same sex households are covered in this way. Children are also registered. As a consequence, the size of household will be revealed and can subsequently be used to calculate the income equivalence according to the normal OECD procedure. We use the OECD square root equalization method for household income, where household income is divided by the square root of the number of members in the household to net out the different consumption needs of the household.

The income variable gives a challenge as there is a small number of people (less than 0.1%) with negative incomes. The main reason for this is that incomes are registered on an annual basis and there may be corrections made to the wage of the previous year. Furthermore, taxable incomes come from the tax register and because of various tax issues incomes can become negative in one year due to tax-deductible losses. All cases with negative incomes have been deleted from the sample.

² The results presented in this paper are based on own calculations, if not otherwise mentioned

2.2. Household income inequality

Overall, the disposable household income in Denmark belongs to the most equal incomes in the world. Thus, according to OECD the Gini coefficient was 0.23 in mid-2000s (OECD 2011). However, the distribution changes slightly over time due to changes in the primary distribution and in the structure of the tax and transfer system.

According to OECD, 2011, Denmark has had an overall growth in household disposable income from the mid-1980s to late 2000s of 1% p.a. with a growth in the bottom decile income of 0.7% and a growth of the top decile of 1.5%. That means that top incomes have grown much faster than the bottom incomes. The overall growth in disposable income is among the lower end of the OECD countries while the relative differential between top and bottom incomes is higher than average in OECD countries indicating that inequality has actually grown in the investigated period as it has in the majority of OECD countries. However, the change has been relatively modest compared to other countries.

The distribution of disposable income for households is the result of several processes. Incomes are mostly created at the labour market as earnings. On top of that comes capital income. Both are taxed by a progressive tax that tends to equalize after tax income. Furthermore, large groups receive pensions and other transfers from the public sector equalizing disposable incomes even more. Figure 1 presents the distribution of household income in Denmark, in 2006, which is chosen among other years. It shows, roughly, how unequal primary incomes are shaped by the redistribution system through taxes and transfers and transformed into disposable income. Part of the redistribution system is of course inter-generations.,

Figure 1. Household equalized income in 2006, transformation from primary to disposable income, frequencies

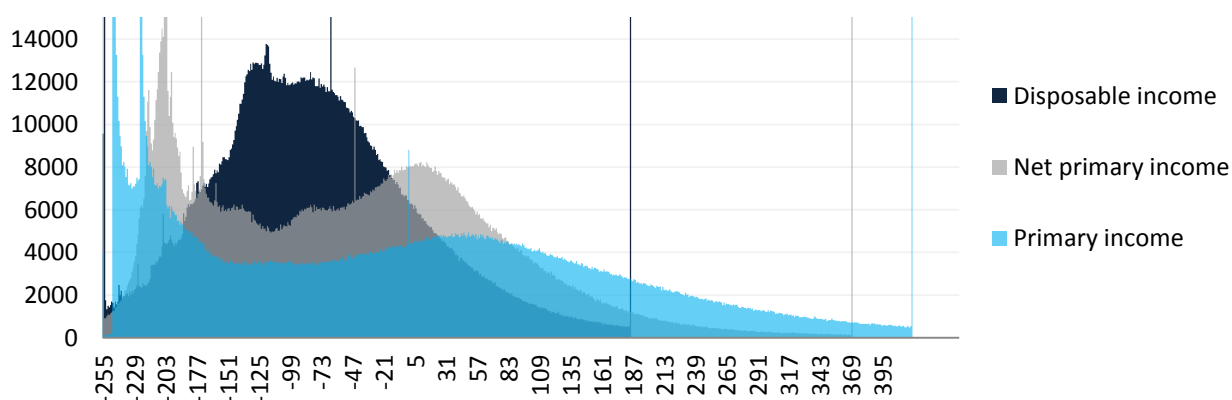
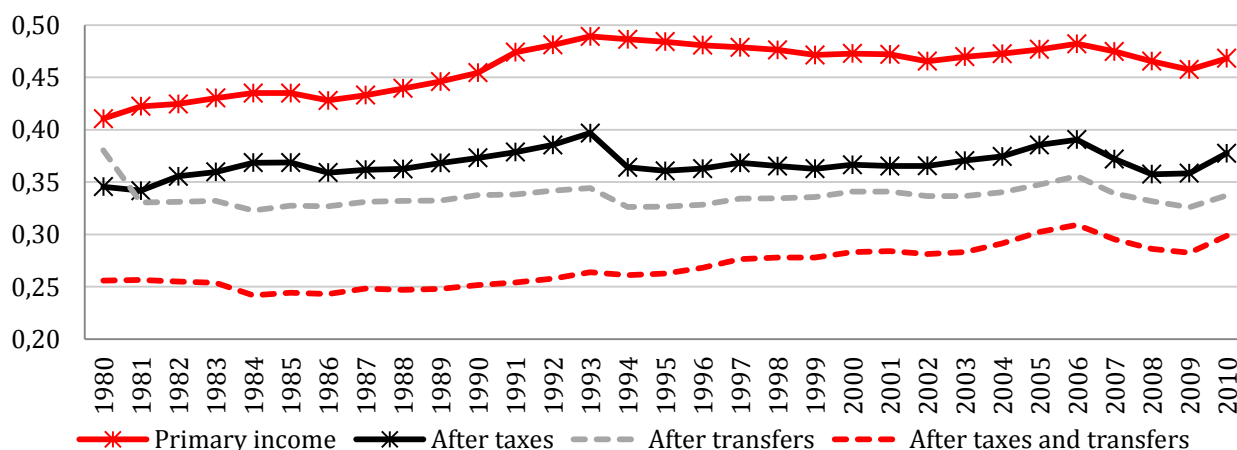


Figure 2 shows the evolution of the Gini coefficient of household income, by source of income and stresses the importance of redistribution and taxes in shaping inequality. The top line in the graph in Figure 2 shows the development of the Gini coefficient for primary income, i.e. earnings before taxes and redistribution and imputed rent. It is seen that the Gini coefficient reaches its highest value of 0.49 in 1993. It is remarkable that the distribution of primary income becomes more unequal in the years with low economic growth and high unemployment, 1987-1993, and become slightly more equal again from 1993 and until 2003 when growth starts again. After that, inequality in earnings has been rising slightly during the upswing 2004 to 2006. Finally, it should be mentioned that imputed rent from housing does not have an independent impact on the Gini coefficient before the 2000s where increasing house prices make the imputed rent to increase somewhat.

Figure 2: Evolution of household income inequality in Denmark (the Gini coefficient) - decomposition by source of income



Note: All incomes include imputed rents from 1984.

The next line in the graph describes the development of the Gini coefficient of incomes after tax has been paid. This line has the same overall shape as the Gini-coefficients of the income before tax and transfers, but has a shift in level in 1994 due to a reform after which all transfers became taxable. After tax, Gini coefficients are substantially lower than primary income and the slightly increasing gap between them indicates a sustained increase of the redistribution through the tax system, since 1980. Inequality of after tax incomes decrease after 2006 as a result of a tax reform and increases again in 2010 because of a second tax reform. These will be discussed in detail in the policy section. The third line in the graph is the Gini coefficient of the income after transfer payments and before tax. This shows that the

transfer system has an almost constant levelling impact until 2003, thus reducing the Gini coefficient to around 0.35. The fourth line shows the Gini coefficient of household income after both tax and transfers. It is almost constant and around 0.26 until the mid-1990s from where it starts climbing and reaches 0.29 in 2006. After that the Gini coefficient falls but regains in 2010, so that 2010 is just short of the level in 2006. Including imputed rent does only have an impact in more recent years where it increases the Gini-coefficient with about 0.02 units, in 2006 due to the boom in house prices.

Our results³ are recapitulated in Table 1 for each kink point in Figure 2. It is clear from the table that redistribution levels out the Gini coefficient of primary income through tax and benefits with 0.15 - 0.23 units every year with the result that the income after tax and redistribution has almost the same Gini-coefficient at least until 1993. Over time it has also worked as a significant levelling factor as it is found that the Gini coefficient of primary income has increased with 0.07 units from 1980 to 2006, while the income after redistribution has increased with only 0.04 units.

Table 1: Summary of Gini coefficients of equalized household income, for specific years

	1980	1986	1993	2000	2006	2009
Primary income	0.41	0.43	0.49	0.47	0.48	0.46
Income after redistribution	0.26	0.24	0.26	0.28	0.31	0.28
<i>Redistribution effect</i>	<i>0.15</i>	<i>0.18</i>	<i>0.23</i>	<i>0.19</i>	<i>0.17</i>	<i>0.18</i>

These findings show that the income distribution is fairly equal in Denmark. This is mainly accomplished through the benefit and tax system. These findings also point at a paradox. At one side we see that the primary income (before taxes and transfers) becomes slightly more equal after 1993. On the other side we see that the income after tax and transfers become more unequal since 1984.

In the following we will investigate each aspect separately in order to find the culprit. We will start with the equalized income and P-ratios, where we take account of household size. Then we will change to the individual level and investigate the role of the welfare society package to old age and retired above 65 and similarly for the younger. These groups will be divided

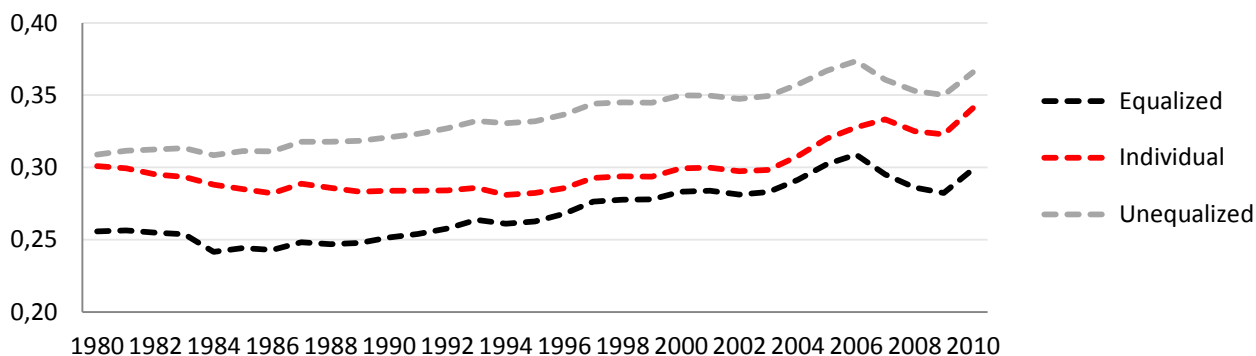
³ Are higher than the ones presented in OECD, 2011.

into those working and those not working. The working will be investigated further by estimating a human capital function checking whether return to Human Capital has increased over the period. Finally, we will investigate the formation of households again and see if the formation of households in it self creates more inequality.

2.2.1. Equalizing incomes and P ratios

We will briefly investigate the separate effect of equalizing with the size of the household. Figure 3 shows that equalization lowers the Gini coefficient with about 5 percentage points and that this percentage does not change over time. So, equalization of incomes is not the culprit.

Figure 3: Comparison between household and individual income-(Gini coefficient for disposable income, including imputed rents)



The differences in income can also be expressed by quantile ratios. Thus, the P90/P50 ratio shows that the richest 10% (90th quantile) earn at least 1.7 times more than the median household. This is up from around 1.5 in the mid 1980s. Furthermore, we find that the same measure on the primary income shows that the high-income earners moved away from the median until 1993, after which period the rich actually lose relative income shares. But after tax and transfers they actually earn more compared to the median. So the tax and transfer system is somehow leaving the highest incomes less taxed than the median household despite their lower earnings. At the bottom of the distribution we see that the lowest 10 percentile earn only about 5% of the median before taxes, but after transfers they earn 50% of the median income. In both ends of the income distribution we see that the efficient Danish tax and transfer system smoothens out incomes. This raises the question whether the slightly upward moving Gini coefficient is felt as a factor of inequality, which will be investigated at length in chapters 3 and 4.

2.3. Individual income inequality

The possible culprits (causes) for the increasing inequality are demographic differences, education, working youth, part time versus full time employment and changes in taxation and/or transfers. Finally, we will look at the household formation and investigate if the household formation in itself has had an impact on equality.

2.3.1. Demographic changes

We have chosen to split the demographic composition of the work force into active and mainly passive age groups. Consequently, we have split the population into those below 65 and those above 64 and divided both groups according to their economic status.

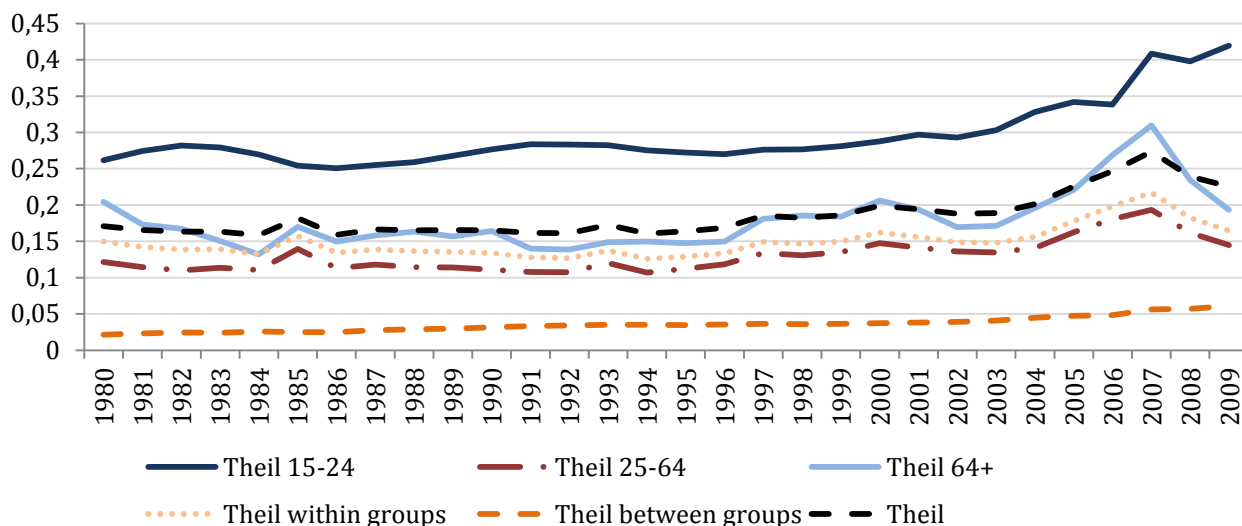
Table 2. The demographic composition of the population, 1980 to 2010.

	1980	1990	2000	2009
15-64	3,307,822	3,470,809	3,553,458	3,622,458
working	0.72	0.70	0.71	0.71
of which men	0.56	0.54	0.54	0.52
women	0.44	0.46	0.46	0.48
non-working	0.28	0.30	0.29	0.29
Of which students	0.31	0.32	0.30	0.39
out of labour force	0.35	0.21	0.28	0.27
retired	0.22	0.26	0.22	0.27
unemployed	0.15	0.22	0.10	0.10
65 - 74	448,343	448,343	448,343	448,343
of which working	0.00	0.10	0.09	0.14

The Theil coefficients for individuals between 15 and 74 years old reported in Figure 4, show that the age groups have almost the same pattern over time with an increasing Theil coefficient between and within groups, especially after 2003, though the older groups have a more equal distribution than the youngest group. It must also be mentioned that the share of between groups inequality has increased in total inequality, from a minimum share of 12% in 1980 to 22% in 2005 indicating that the increase in inequality could be attributed, to some extent to age differences. Nevertheless, we conclude that the main driver of inequality is the

inequality within each group, namely the elder and the very young adults with a little push of between groups inequality.

Figure 4. Theil decomposition for age groups below 75, 1980-2010.

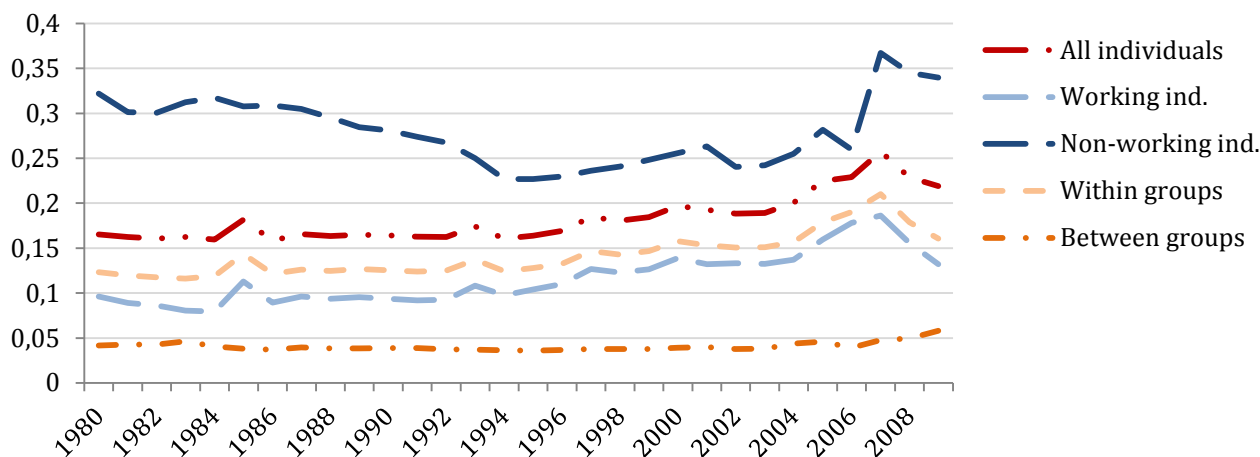


We will now subdivide both groups and look at those who have mainly earnings and those who have mainly transfers, namely working and non-working individuals.

First, for the 15 to 65 age group, we find that the Theil coefficient is higher for the non-working population than for the working (Figure 6). Furthermore, the share of between groups inequality in total inequality has been decreasing from 25% in 1980 to only 18% in 2007,⁴ but started rising again as a response to the economic and financial crisis. It is remarkable that the inequality between working and non-working population is so low and has been decreasing in Denmark, indicating an efficient transfer system.

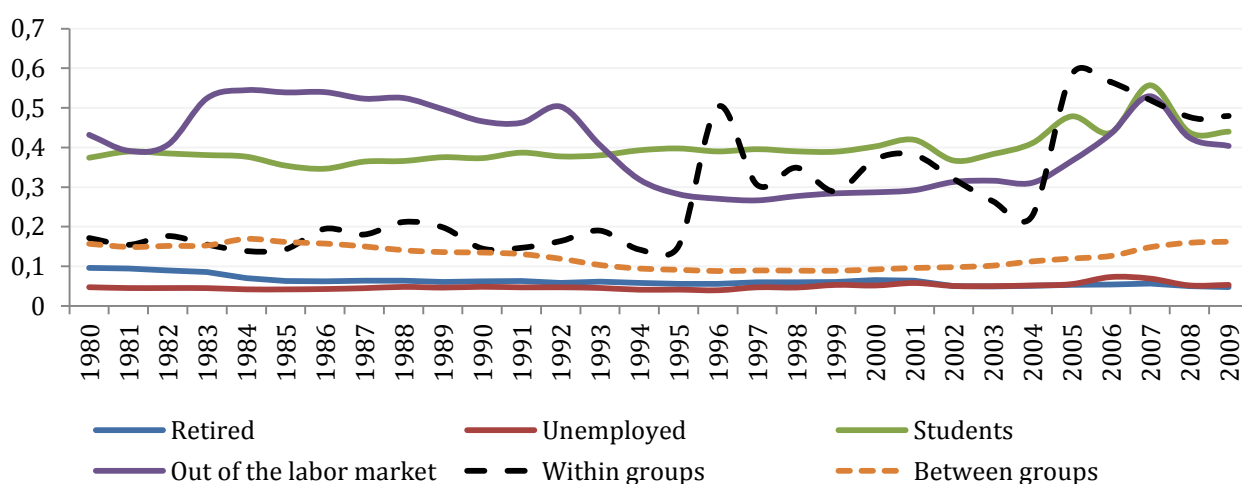
Figure 6. Theil-coefficients for working and non-working individuals, 15-64 years old

⁴ See Appendix, table A1



In the case of individuals over 65 years old, the picture is opposite⁵, with higher income dispersion within the working population and a low dispersion within the non-working population. Also, the share of between groups in total inequality actually increases from 12% in 1980 up to 20% in 2005, indicating that the increase in inequality can be explained by the increase between working and non-working population of over 65 years old individuals. In Figure 7, we have drawn the Theil-coefficient curves for each group of non-working individuals, age 15-64. It seems that the groups with the highest inequality are the out of the labor market and the students. Within group inequality has increased dramatically after 1994, drawn by an increase in all the groups under investigation.

Figure 7. Theil-coefficients for non-working 15-64 years old. Group-wise decomposition.



Note: Data methodology change in 1994, 2002, 2007.

⁵ See Appendix, figure A3

On the other hand, the inequality between these groups adds up to 53% of total inequality of the non-working population leading us to conclude that is not a particular group that influences the increase in inequality but a mixture between within and between group inequality of non-working population.

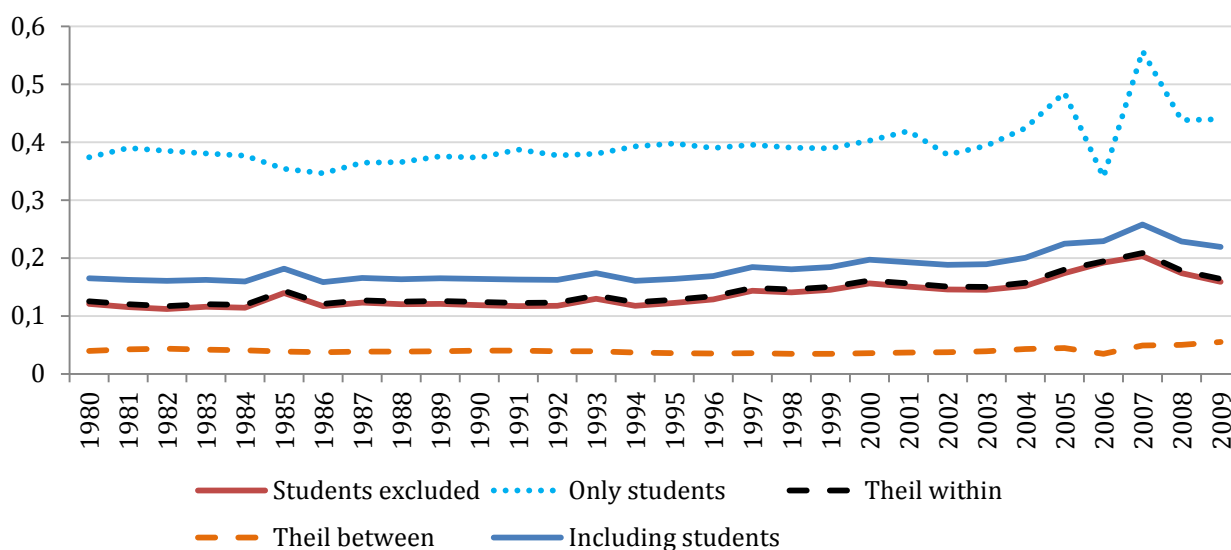
2.3.3. Students and youth

Students and youth constitute a special case in Denmark (as pointed out by Figures 5 and 7) because many students work in order to supplement the stipend that almost every registered student receives. Students are in our context considered to be non-working and recipients of transfers if they earn up to the allowed amount after which deductions are made in the stipend. Students earning more than this threshold are classified as working and not as students⁶.

Figure 8 shows the effect of students on total income inequality in Denmark. Clearly, excluding students reduces inequality on average, by 0.04 units and the inequality between the two groups seems to be almost constant, with a slight increase in later years (after 2007). Moreover, this figure shows that total inequality is mostly due to the within group inequality and to a low extend to the income differences between the two groups. Also, it is remarkable that students lower the level but do not take away the increase in the Theil coefficient. Furthermore, the inequality between groups has decreased since 1980 until 2000 and has been oscillating ever since.

Figure 8. Theil coefficients for students and the entire population, age 15-64

⁶ Statistical offices classify working students as part of the labour force.



Another similar group is youth who have graduated from high school and start working waiting for admission to further education. This has been common practice for long and was for a long time motivated by the admission system to further education, where applicants could earn extra points by working. These young people have been taking mainly jobs just above the minimum standards. The latter group is registered among the working. Table 2 shows that more than 50% of young adults in Denmark do not follow an education (Others).

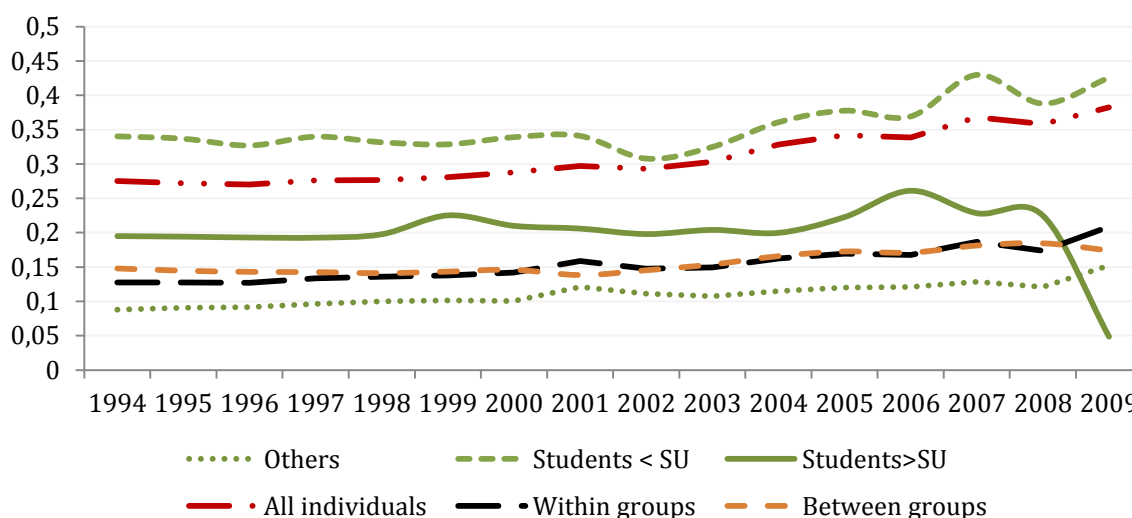
Table 2: Composition of students in the age group 15-24

	1994	2000	2005	2009
Students with SU	37%	39%	45%	49%
Students over SU	5%	4%	5%	1%
Others	58%	57%	51%	51%

Figure 9 shows the decomposition of this group, dividing it into students that receive more than SU (study support), students that receive this amount or less and young adults that have their own business, work or are on another form of government support (others). It can be seen that students earning less than the allowance are responsible for the largest within group income inequality and overall it is seen that the high inequality of this age group (15-24) comes both from within each group and also from the large income differences between groups⁷.

⁷ on average, 50% of total inequality is due to the between group inequality. See Appendix

Figure 9. Decomposition of disposable income(Theil coefficients) for young adults, age 15-24, by type of activity and income earned



The large impact of students appears because students in Denmark receive a stipend and most of them work on top of that and many work to something very close to low pay. In fact students have taken over a large and increasing proportion of all low wage jobs, Westergaard-Nielsen, 2008.

2.3.2. Education

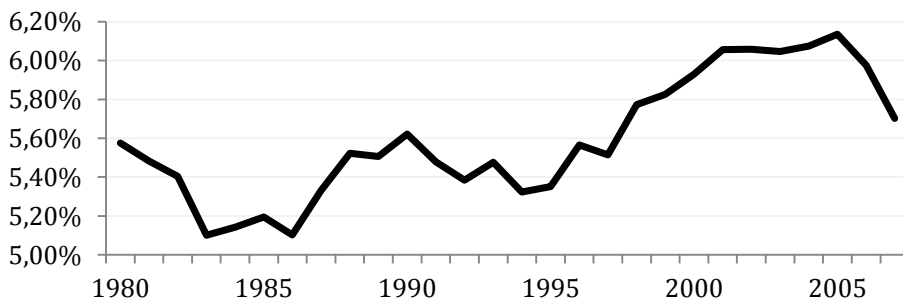
More and more Danes have acquired a further education in the investigated period, as described in Table 3. The increase in the numbers of upper and further educated individuals is stronger among women, being almost doubled in 2000, compared to 1980.

Table 3. Highest obtained education as proportion of the labour force 25-64 years old excluding students.

	Basic education	Apprentice education	Gymnasium	Short further education	Bachelor level	Master level	PhD and MD
Men							
1980	34.2%	38.4%	2.7%	3.3%	8.7%	4.1%	0.9%
1990	29.0%	43.3%	3.8%	4.8%	10.7%	5.5%	1.1%
2000	22.7%	43.6%	5.4%	6.6%	12.0%	6.9%	1.3%
2009	18.4%	41.8%	5.8%	7.7%	13.1%	9.0%	1.6%
Women							
1980	45.13%	29.15%	2.13%	2.94%	13.36%	1.48%	0.30%
1990	36.05%	34.52%	3.96%	3.74%	17.29%	2.63%	0.49%
2000	23.19%	37.88%	5.97%	4.71%	21.65%	4.82%	0.77%
2009	16.36%	36.16%	5.70%	5.44%	25.46%	8.07%	1.22%

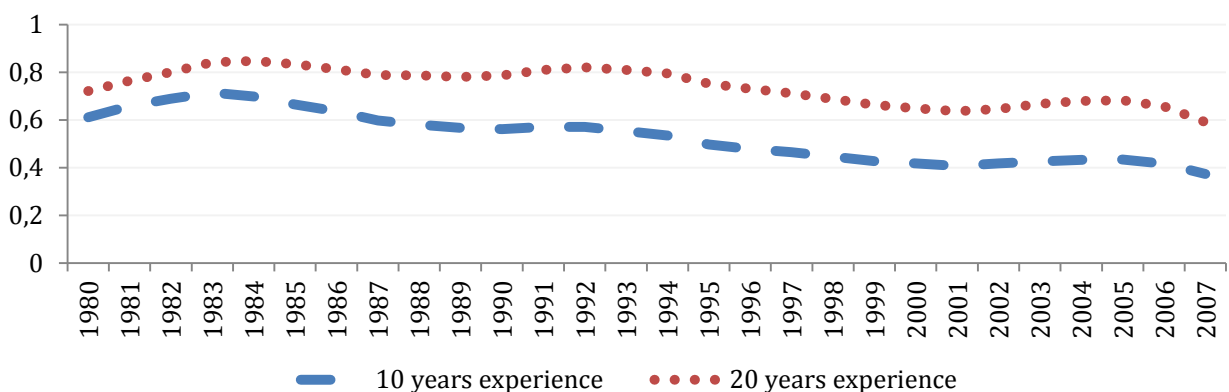
We also find that the return to education before tax and transfers has gone up from 5% to 6% for each year of extra education⁸ as seen in Figure 10.

Figure 10. Return to one more year of education. 1980 to 2007



At the same time we find that the return to experience on the job is actually reduced. Figure 11 shows that the return to on-the-job training has fallen since the upswing in the mid 1980's indicating that there has been put more weight on formal education and less on what is learned on-the-job.

Figure 11. Returns to experience evaluated at 10 years and 20 years of experience.

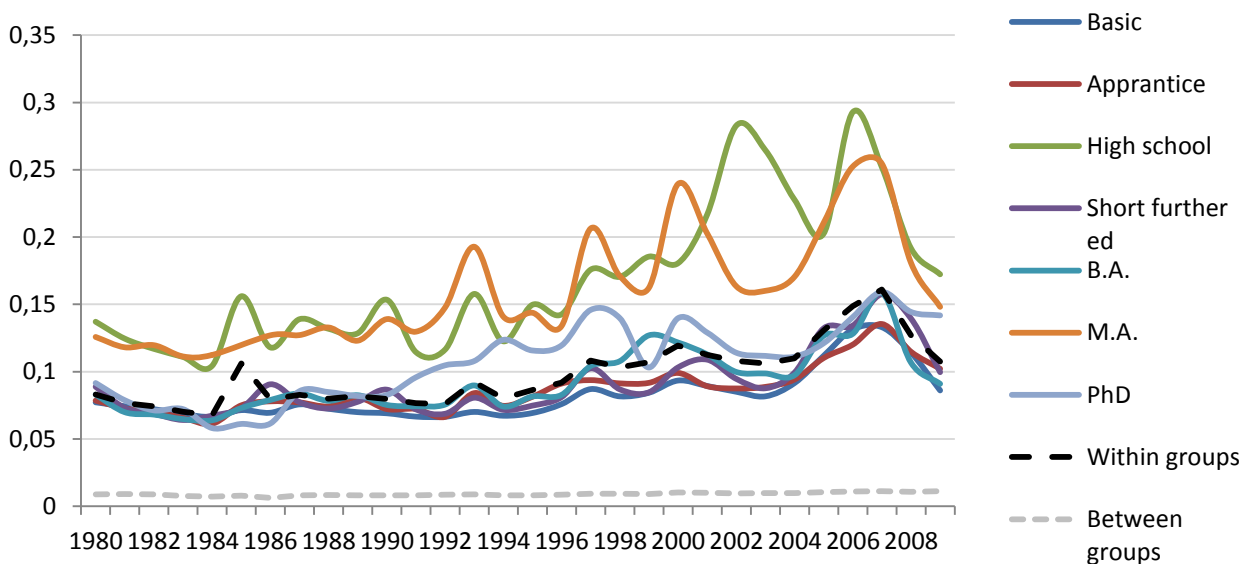


Evaluating the distributional effect of education on the income distribution is complicated. First, giving more people an education may move them from the lowest income to one that is closer to the median which will lower the Gini coefficient. Second, increasing the educational level upwards from BA level to MA level may create more high incomes and thus making the Gini coefficient to increase. Third, the higher return to education and the lower return to experience indicate that people are to a larger extent, remunerated according to their education and to a lower degree to their experience.

⁸ Return to education is calculated from a Mincer model based on primary earnings.

The last point is illustrated by Figure 12, where we have depicted graphs for the development in the Theil coefficient for educational groups. Generally, we find that the Theil coefficient is highest for graduates from High School graduates, MA's and PhD's, while it is low and almost identical for the other educational groups. This means that graduating more MA's and PhD's will increase the Theil coefficient, by increasing the within group inequality. If the expansion happens in short further education, BA or apprentice, the income distribution will not be affected much. The net effect of education will therefore to a large extent depend on where the expansion occurs. In our case, many more people take the low inequality-educations than the high inequality-educations so the effect from education will probably be modest. However, the fraction graduating in the high inequality-educations has been increasing more than the low-inequality-educations since 1980, so that alone will contribute to an increasing Theil-coefficient. Increasing the number with top educations in the future will probably lead to even a higher dispersion. Therefore, it is remarkable that income inequality is increasing within educational groups and only modestly between educational so we can (almost) rule out that some educational group is responsible for the increasing inequality.

Figure 12. Theil coefficients for disposable income for completed educational levels of working population.



Note: PhD cover also MD's because of their length of education.

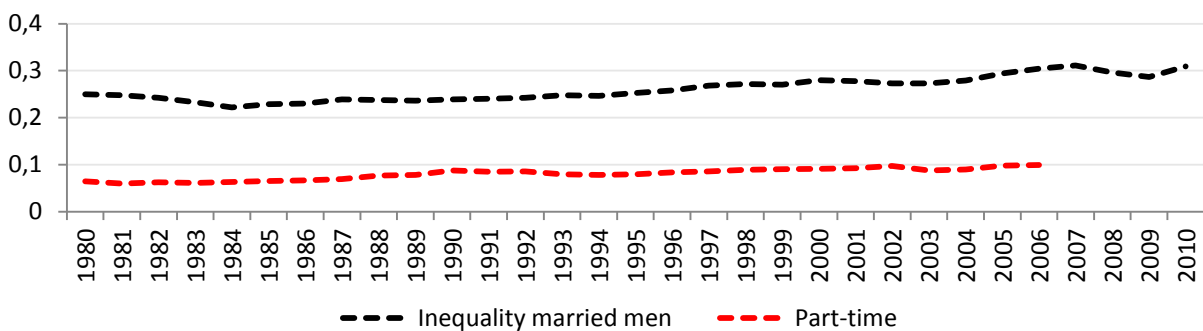
So far we have been able to identify two sources of the increasing inequality: students among transfer recipients, and more youth working to low wage among the working group. It is

obvious that both types of inequality are different from other types of inequality because it outgrows it self.

2.3.4. Family formation

Finally, we will look at the inequality that may occur when people form households either as married couples or cohabitating, in the following called married.

Figure 13. Gini coefficients of married men and their part time frequency⁹.

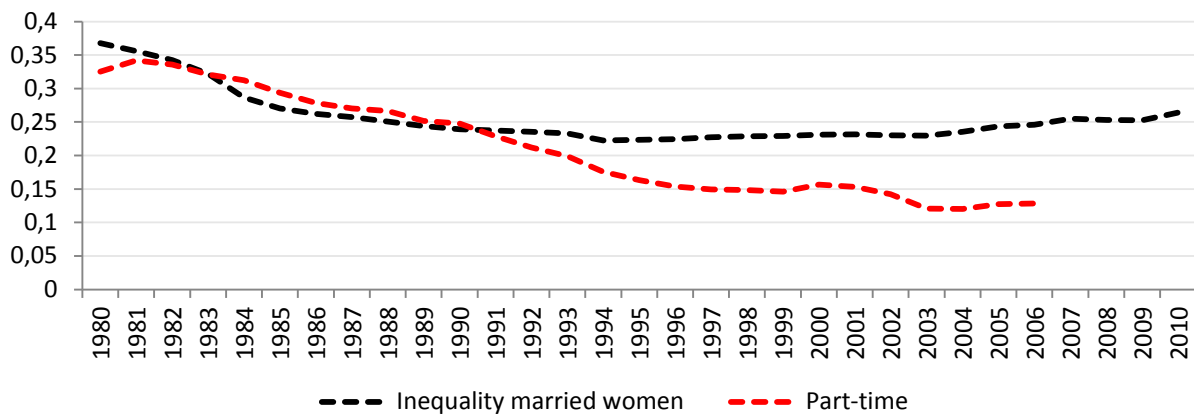


The Gini coefficient of married men increases from around 1984, while the similar curve for women start with a much larger Gini coefficient, which falls until around 1994 from where it rises again. The fall in the female curve reflects that women take up full time work more and more, while the correlation between part time jobs for men and their inequality is not as strong.

Figure 14 shows that the female income distribution of married women starts out rather unequal but becomes more equal with a falling part time participation. Thus, females in couples seem to contribute to a more equal distribution in the beginning of the period at least.

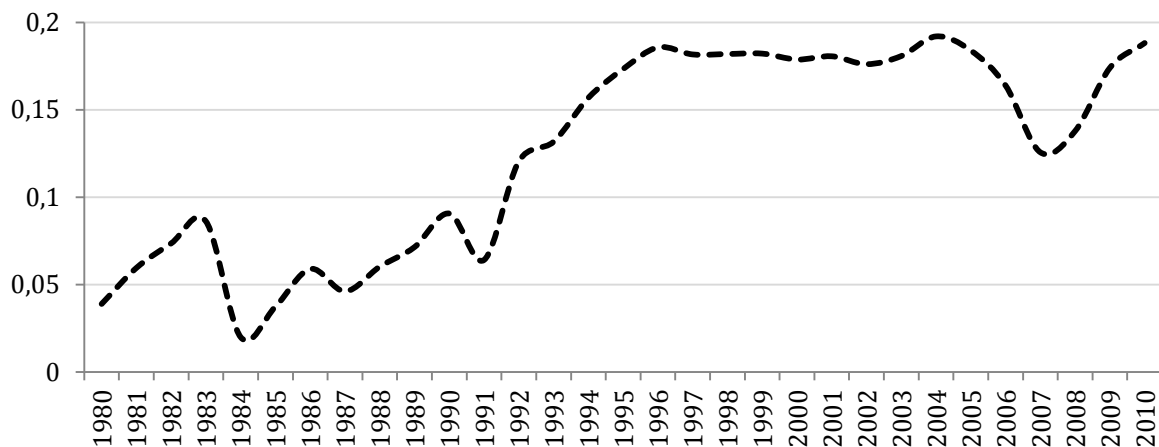
Figure 14. Gini curve for married women and their part time frequency¹⁰.

⁹ Individual income, not equalized.



Based on the belief that people do not form households at random, we have reported in Figure 15 the annual correlation coefficient between incomes of married men and women. This shows that there was a small positive correlation until 1991 reflecting that higher income men formed households with women earning less because of part time jobs. That changes gradually so after the mid 1990s high income men are more likely to form a couple with high income women, working full time. This is both a result of changed preferences for part time in households and a result of matching. As could be seen in Table 3, women get more and more education and as a result of that matching is probably more and more likely to happen at educational institutions. This has obvious consequences for the resulting household income distribution, where matching in the early period meant less income dispersion while later means more inequality.

Figure 15. Correlation between the income after tax and transfers for cohabiting or married couples, top and bottom 0.1% of incomes deleted



The resulting inequality curve for households appears consequently to increase more than it would have done if the correlations had remained at the low level, as shown in Figure 16.

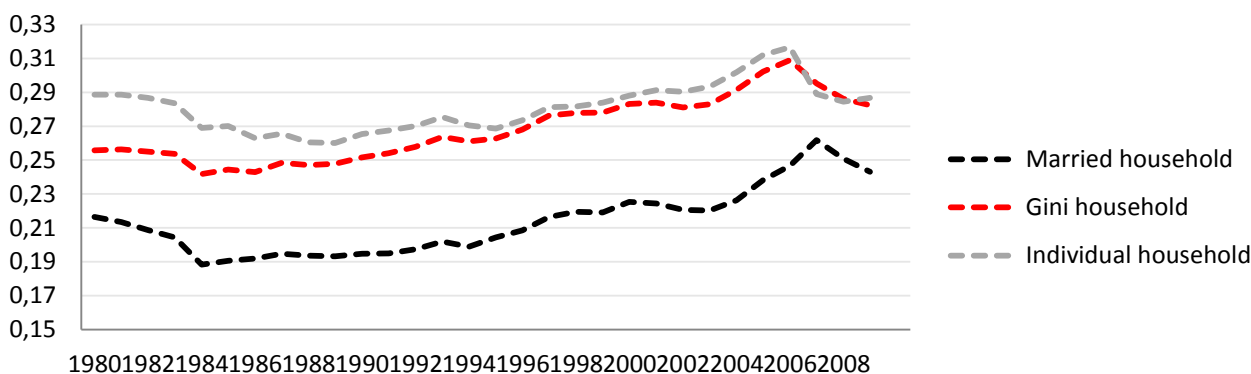
Another problem of modern society is the increased number of single households and an increase age at first marriage. Table 4 shows that the Danish composition of households also gets a higher proportion of single households.

Table 4. The composition of households

	1986	1990	2000	2010
Single households	41%	43%	45%	48%
Couples living together	59%	57%	55%	52%

The consequence is that an increasing proportion of singles will in itself increase income inequality as shown for the USA. (Gordon, XXXX) and indicated by the first line in figure 16.

Figure 16. Gini coefficients for married/cohabitating households and single households, equalized income



3. The social impacts of inequality

3.1. Introduction

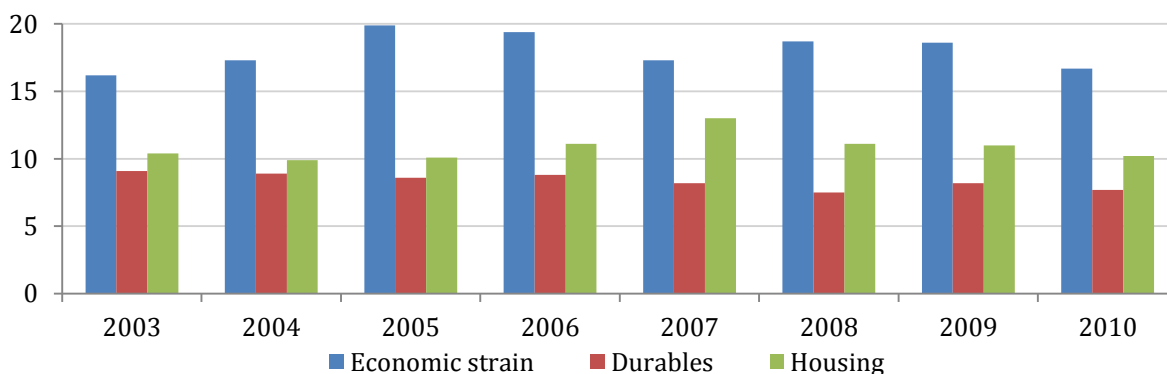
Increasing income inequality is generally expected to surface in measures of material deprivation of some sort, increasing social isolation, increasing health inequality and reductions of life satisfaction. The rationale is that increasing income inequality distribution at some point will lead to an increasing proportion of the population being deprived from material goods, live under so bad conditions that they become socially isolated or start having health problems.

It is worth remarking that data on these issues all comes from surveys, while income data came from register data. Surveys will, to some degree, also reflect the emotions of the responder while this is not case with register data. This point has to be kept in mind when comparing results from both sources.

3.2. Material deprivation and poverty

Material deprivation is measured as the inability of households to afford those consumption goods or activities that are typical in a society at a given point of time. For Denmark, more than 90% of the population responds that they are not deprived by any of the mentioned goods and it does not look like it is changing over time. Figure 17 depicts the proportion of the population who indicates being under economic stain, deprived from 1 durable and housing deprivation. It is remarkable that the lack of durables is fairly constant over time with no trend.

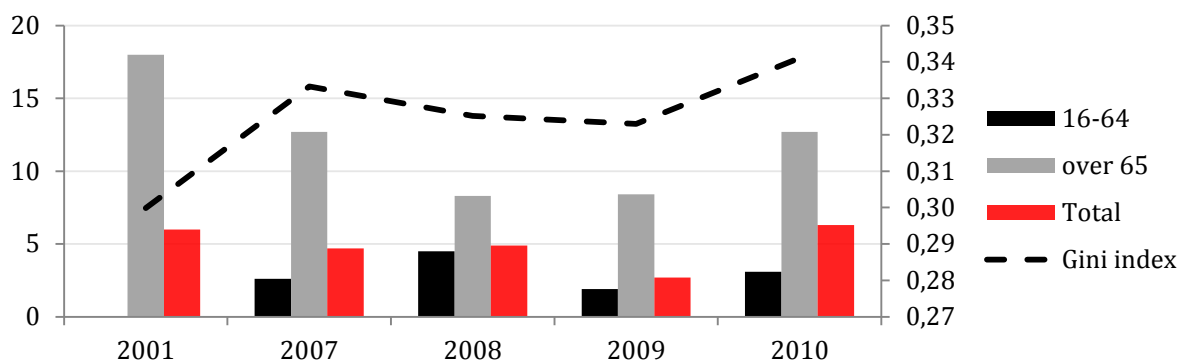
Figure 17. Material deprivation, 1 item in different dimensions. Source: Eurostat.



Economic stain is varying over time with no clear trend and so is housing. Most importantly, there is no upward trend and there is no immediate response to the Great Recession.

A comparison between income inequality and at risk of poverty or social exclusion and severe material deprivation shows no clear correlation between the two indicators, while the comparison between a persistent risk of poverty and inequality have a closer connection, as shown in Figure 18. The persistent risk of poverty is driven by the older population (over 65 years old), but the other age groups move in the same direction. At persistent risk of poverty refers to the population that is at-risk-of poverty (below 60% of median income) for 3 out of 4 years.

Figure 18: At persistent risk of poverty, for age groups and comparison with the Gini coefficient



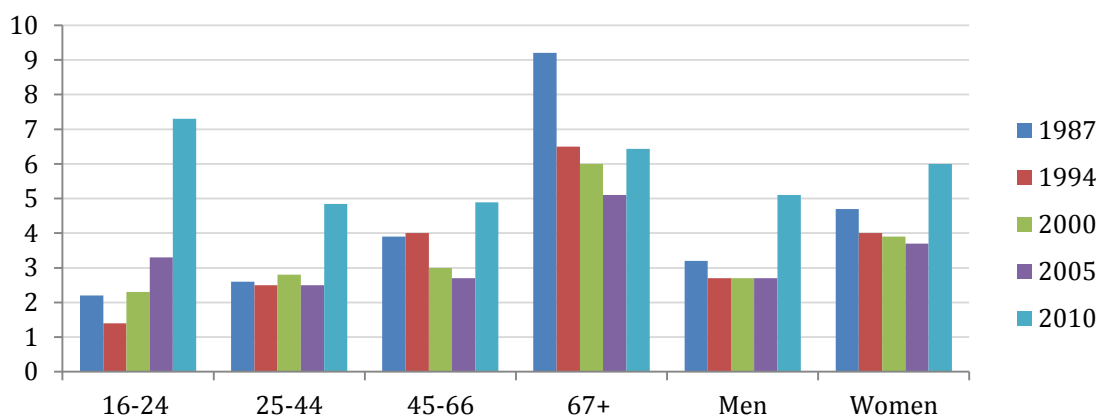
Source: Eurostat

3.3. Social isolation

Social isolation can have multiple causes such as poverty, sickness, old age, depression etc. A recent Danish Survey conducted by the Danish National Institute of Public Health showed that social contact with family and friends decreases slightly over time for men and women. In 1987, this percentage was quite high, but it decreased over time by 4 percentage points, for families and 3 percentage points, for friends. As expected, men are more socially isolated than women and individuals prefer meeting friends than family. A subdivision by group shows the same trend, although social isolation from family and friends increases by age.

And when adding a question on feeling alone there is a remarkable rise in the percentage saying that they are feeling alone, among younger age groups in 2010.

Figure 19. The proportion of people feeling alone



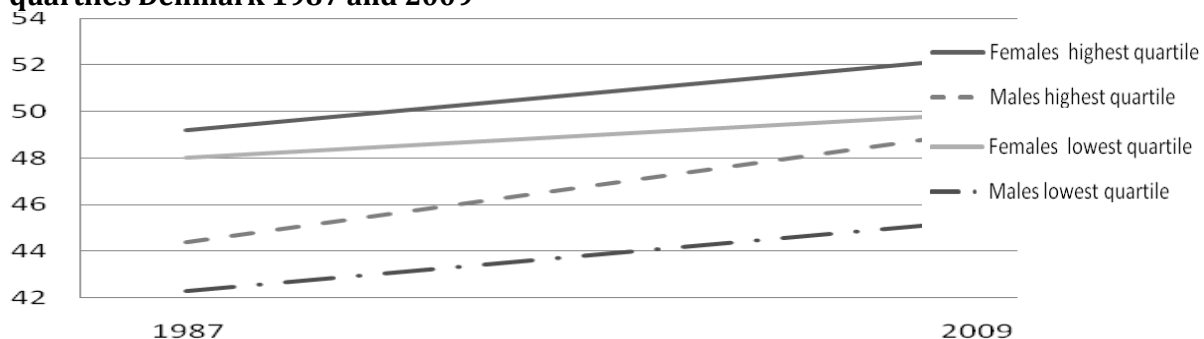
Source: Danish Health and Morbidity Survey

The same tendency is not reflected in higher divorce rates but the number of marriages is reduced about 15% in connection with the Recession. The birth rate is however not affected yet. In Denmark, birth rates have been constantly increasing, from a minimum of 1.3 children per woman, on average, to 1.73 in 2010

3.4. Health and life expectancy

Health has been also improving in Denmark over the entire investigated period. This shows up in improving self-reported health and in increasing life expectancy, which still remains lower than in other European countries. However, life expectancy appears to grow more for people in the highest income quartiles than in the lower quartiles. This could be an effect of the fact that smoking has been reduced most among the higher educated. Similarly, it is found that obesity in general is increasing, particularly for the lower educated. Excess alcohol consumption, on the other hand, is increasing more among the higher educated. The overall result is, however, that the lower educated and those in the lower quartile of the income distribution have a lower growth in life expectancy as depicted in Figure 20.

Figure 20. Remaining life expectancy for 30-year olds in the highest and lowest educational quartiles Denmark 1987 and 2009



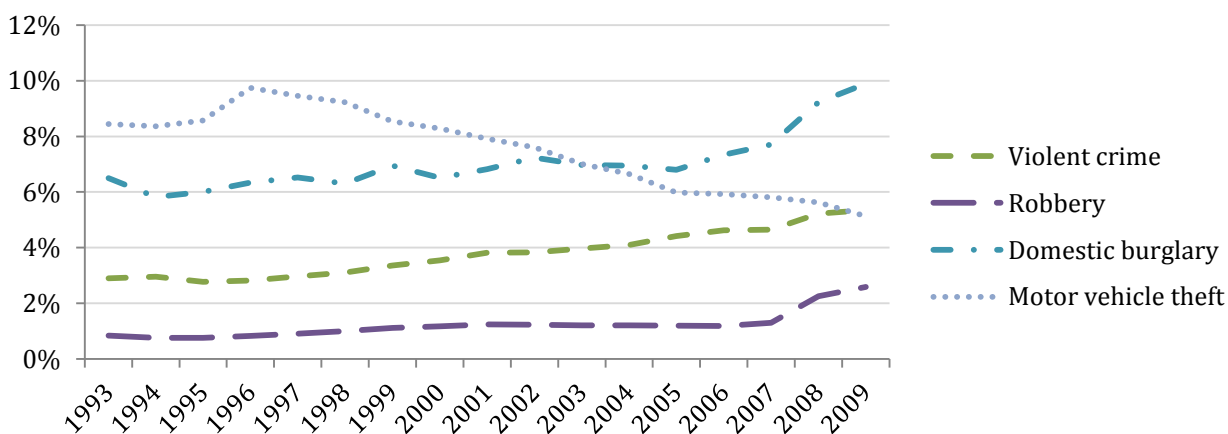
Source: Diderichsen et al, 2011

As in most European countries, statistics in Denmark show an increase in the number of cancer patients for both men and women and a dramatic decrease in health problems related to heart and circulatory system. Other studies show that mortality rates, among all age groups, have decreased but they are correlated with the level of education of individuals, so that the highest educated have the lowest rates. This indicates better self-preservation and more awareness but also less dangerous jobs of the highly skilled workers.

3.5. Crime statistics and life satisfaction

The crime statistics shows that burglary, robbery and violent crime has actually increased over the investigated period (Figure 21). These take a surge in the years of the Great Recession. The only exception is car theft, which has gone down over the whole period since 1996. As a consequence, the proportion of the population who are incarcerated has gone up with a small factor though the number is still relatively small.

Figure 21: Trends in crimes recorded by the police, comparison with the income inequality (% of total crime registered and the Gini coefficient)



To complete the picture life satisfaction of the Danes actually goes up in the investigated period, according to surveys from Euro Barometer and the World Dataset of Happiness, Denmark being among the happiest countries in the world, in recent years.

To sum up, the social impacts of a more unequal income distribution is not very clear at all. Only a small increase in domestic burglary and the evolution of at persistent rate of poverty seem to show that there might be an effect of increased income inequality, but life expectancy, health and life satisfaction show no effects on the population.

4. The political and cultural impacts of inequality

4.1. Introduction

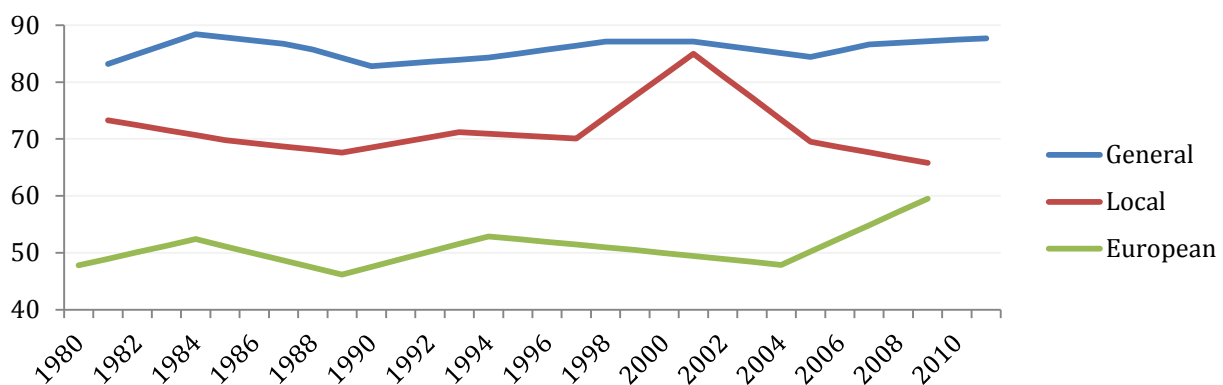
A long literature associates income inequality with social attitudes and behaviour. The key claim is that increased inequality in general has adverse social impacts. In this chapter, we therefore provide a closer look at trends in Danish attitudes and social beliefs, political values and participation in civil society. We will use turnout in elections, unionization rates and

strike activity as indicators of political and civic participation. We will also use trust in others and formal institutions as indicators. Finally, we will look at the political values and the perceived legitimacy and support of EU institutions and membership.

4.2. Political behaviour and union formation

Turnout in general elections has been quite stable from 1980 to 2011 whereas the turnout in the EP elections has increased over time and turnout in local elections has decreased slightly. In addition, it is worth noting the large increase in the turnout of the local election in 2001. While turnout was the same in the general and the local election, this is due to the fact that these elections were held at the same time. As such, there is no clear change in Danish turnout and the only reason for the high local turnout in 2001 is that a national election drew additional voters to the voting booth.

Figure22. The electorate turnout in Denmark



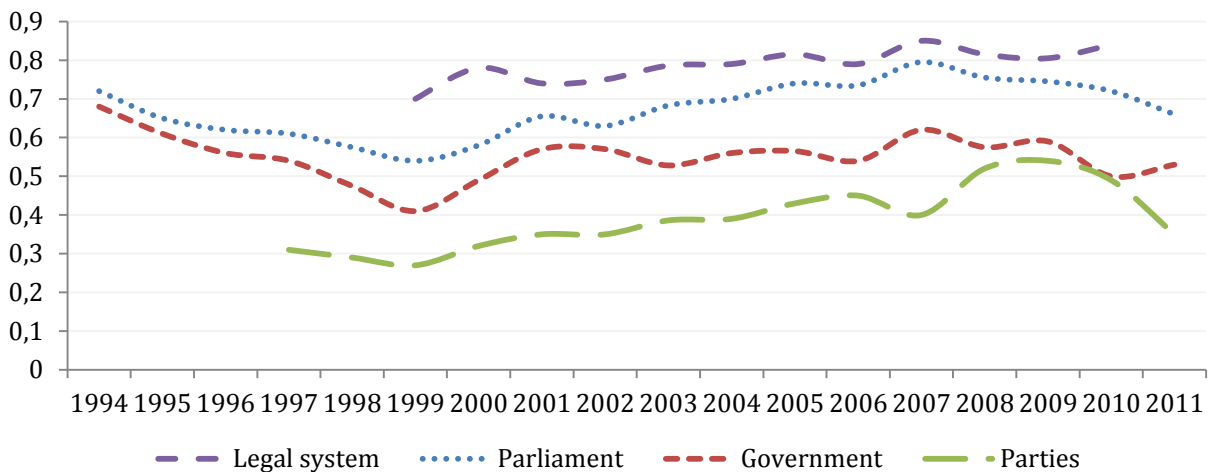
Thus, there seems to be a positive development in participation. When it comes to unionization, participation has been falling since its highest point in 1983, where the membership was 81% of the labour force. In 2011 it had fallen to 68%. The reason is both a general decline in manual work and a lower membership especially among the youth. Basically, it takes more years before people become members of Unions and of the unemployment insurance system.

Strike activity was low until around 1993 where a Social Democratic lead government came to power. Then it 6-doubled. It has been falling in subsequent years with the exceptions of some years where new wage contracts have been negotiated. In 2009 it was back to the level of the 1980s.

4.3. Trust in Denmark

A number of studies find that Danish indicators of trust are among the highest in the world (e.g. Uslaner, 2002). This is the case for trust in Parliament, Government, the political parties and the legal system. All these measures show high levels, except trust in Government and the political parties. Although all show an ascendant trend, they start declining after 2007 and during the Great Recession. It must be noted that these results are consistent with the development of Danish economic situation over the period investigated. In other words, trust in legal institutions is clearly pro-cyclical. Therefore, it is possible that the high level of trust reflect to a high degree the positive evolution of the economy.(Bjørnskov et al, 2012)

Figure 23: Trust in different institutions in Denmark



Source: Synthesis of Chapter 4, from Bjørnskov et al, 2012

Another strong result about trust is that trust in other people has increased and is now at its highest level around 77%. At the same time, Danish voters seem to have moved slightly towards the two extremes at the same time as voters in the traditional parties have been moving towards the median position. The result is ambiguous with respect to indicating what has happened to the Danish political spectrum. The relation to immigrants is a topic that has divided the population in the last 20 years. Where the Danes in the beginning of the 1990's could agree that employers should prefer Danish employees this picture has changed completely in 2008, where more than 65% say that Danes should not be preferred over immigrants.(European Values Survey).

4.4. Conclusion

Overall, a set of Danish measures of political and cultural attitudes and beliefs have changed to the better since the earlier 1980s. However, not all measures of institutional trust or values have changed in ways that are clearly or consistently associated to any common trend.

None of these trends are easy to associate with the development of income inequality in Denmark. Contrary to the claims in many studies (e.g. Rothstein and Uslaner, 2005), increasing inequality has not caused social or institutional trust to decrease in Denmark. Part of the explanation may be that most Danes have not perceived inequality to be on the increase, as that of women has decreased significantly during the period and has only started to increase slightly in the most recent years. Likewise, causality could arguably also run the other way such that higher trust levels increase support for redistribution and reduce rent-seeking, which subsequently affects income inequality (Nannestad, 2008).

The present exploration must therefore be interpreted with care, as it is necessarily preliminary. We nevertheless note that the increase in the correlation between inequality levels of partners and cohabitants logically seems to imply that inequality measured at the family and household level may be increasing in the years to come. Given that inequality does affect the quality of basic institutions, political participation and social attitudes and beliefs, future increases in inequality could arguably undermine some of the social cohesion of future generations in Denmark.

5. Policies directed towards income equality

5.1. Introduction

This section aims at explaining some of the major sources for the income distribution in Denmark. It begins with the formation of the market income and continues with the policies governing taxes and transfers.

5.2. Labour market income

The Danish way of organizing the labour market has on face value little in common with the Central European organization of the labour market and has more in common with the North American labour markets, because of the lack of direct Government intervention in rules and functioning. Furthermore, the Government pays a relatively high benefit, when people are out

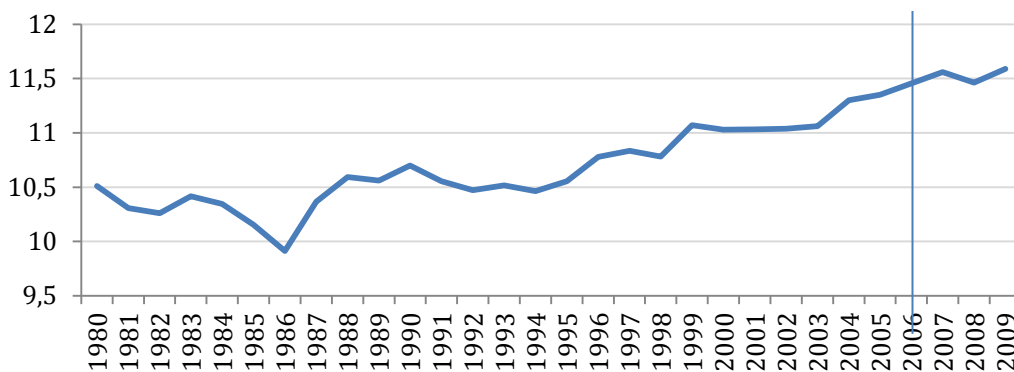
of work and supplies training if needed. This way of organizing the labour market is often dubbed “The Danish Model”. The key ingredient in the Danish model is that trade unions and the employer’s federation (the social partners) bargain most of the regulatory issues, and the role of the government is “to pay the bill”. The social partners are responsible for wage bargaining and wage setting. They also make agreements concerning normal working hours, and set rules for labour protection with respect to overtime and work environment.

The role of the Danish government is to provide unemployment benefits and to re-train workers who have lost their jobs due to low productivity. The government also provides health-care and disability pension. In other words, the government provides the safety net. This is also the case with respect to those who are not covered by unemployment insurance. In general these workers are eligible for social assistance, which is equal to the UI benefit at lowest level but with the main difference that all payments are means-tested.

Another aspect of the Danish Model is that the agreements on the labour market assures a certain element of flexibility that in principle should assure that workers can easily shift from one employer to another, while the Government role is to provide the income security. This is often dubbed “flexicurity”.

Trade Unions and the Equality of wages have established a special “low wage” policy in the 1980’s in order to reduce the female-male wage gap. That policy culminated, when a law was passed by Parliament on equal pay for equal work. Similarly, Trade Unions have fought for reducing the wage gap between non-skilled and skilled workers but with less success. Although Denmark does not have a minimum wage legislation as said, there is an agreement between the Trade Unions and the Employers Federation which states that an employee covered by any type of contract cannot be paid less than a specific guaranteed hourly wage, which is 97 DKK (13€ in 2012), and must receive extra 15% as vacation pay. The result is a de facto minimum wage of 111 DKK (15€) per hour. On top of that comes 7-10% pension contribution paid by the employer. Also the pension system has been introduced independently of lawmakers as an agreement between the parties on the labour market.

Figure 24: Minimum hourly wage in constant 2000 EUR.



Source: Statistics Denmark (1980-2005), Eurostat (2007-2009)

After the extension of EU to the East European countries, Danish Trade Unions were able to prevent most under-bidding of the current wage system by demanding that Eastern workers follow Danish “conditions” even if there is no direct contract with actual employers. The main reason why this worked in Denmark and not in Germany or other countries without a minimum wage legislation is an old rule allowing Trade Unions to demand a contract or start conflicting if the employers are not willing to make a contract.

5.3. Taxation

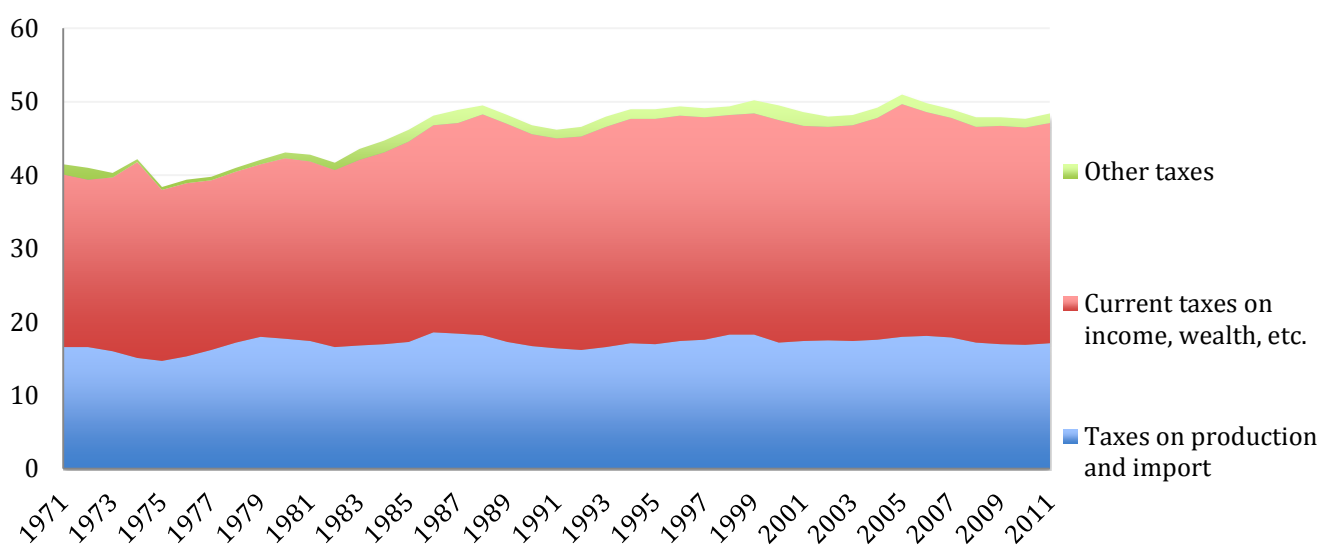
Denmark is one of the countries with the highest total tax payment in OECD, with 48% in 2010. The Danish tax system relies heavily on income tax and less on consumption tax as can be seen in Figure 25. The income tax is based on all types of income including almost all transfer income from the public sector. The tax system has a gross tax on all earnings called social security contributions of 8% of all gross earnings. This is deductible against the income tax. The income tax scale starts with a personal deduction of about 4000 € and all income above that is taxed by 37% and high incomes above 52000€ are taxed with another 15%. The top marginal tax including the Gross tax is 55.4% and that is currently paid by around ¼ of the labour force. Finally, a reduction is granted of 4.25% of income if employed, but that is capped by a maximum of almost 2,000€, so that helps increasing the after tax income for the low wage earners.

Over the years the income tax has been reformed a couple of times with the purpose of lowering the marginal tax rate. Such changes are the main reason for the development in the income after tax in Figure 25 in more recent years. From 2005, the tax bracket for the middle tax was gradually moved upward, so that fewer were paying middle tax and the employment allowance was introduced for the low wage earners. At the same time the bracket for top tax

was also moved upward. The result was that all incomes became less taxed, but marginal tax was not lowered. This is probably why inequality goes down in 2007-2009. In 2010 the middle tax is abandoned with the result that the marginal tax of top incomes became less taxed and consequently, after tax income inequality increased. Changes at the top have partly been balanced by higher employment allowances at the bottom.

The resulting tax wedge, i.e. the marginal tax rate that includes all sorts of taxes irrespective of who pays them is around 70% in Denmark and places Denmark between Italy and Netherlands on an international scale, Andersen, 2012.

Figure 25. Taxes as a percentage of GDP.



Source: Statistics Denmark

5.4. Social expenditures and the welfare system

There is a long tradition for welfare policy in Denmark. Today Denmark provides a social safety net that means that almost all citizens who do not work for one reason or another are covered by a transfer income. This is the case for public pensions covering all, sickness pay, maternity leave, disability pension, unemployment benefit¹¹, and welfare pay covering more or less all others. The total costs of the in-cash transfer programs was in 2012 18.8% of GDP and all social costs including in-kind transfers is 32.5% of GDP. On top of that comes student support. 31% of the entire population is on a full time basis on a transfer program. Of those 60% are old age related. That leaves 40% among age groups who could have been in the work

¹¹ UI benefit is in principle paid by the unemployment fund, which is formally independent of the State and Unions, though the Government covers any deficit.

force. Or put in another way the welfare programs gives full income support to about 11% of the population or 603.000 persons compared to a labour force of 2.8 million, or 21% of the labour force. These expensive transfer programs are financed by a comprehensive tax system dominated by the income tax.

Since 1957 a universal pension system has been in effect and everyone above the age of 67 has the right to a minimum pension irrespective of own income before or along with the pension. The minimum pension can be supplemented with means tested extra benefits. Some of those are related to objective needs with respect to health, housing and heating. The major change to the pension system has been the introduction of a mild requirement of labour market experience in Denmark. Sickness insurance for the poor and mandatory work accident insurance was introduced before the turn of the century. In 1907 a law on the creation of unemployment insurance funds was passed in the Parliament. This included a state subsidy and a substantial trade union influence on the management of the UI-funds. Unemployment insurance has more or less remained the same over the years. The main change has been that sickness insurance has been taken over by the State and that the daily pay was increased to a maximum of 90% of the previous salary but with a relatively low upper absolute ceiling in the late 1960s. These amounts have since then been regulated discretionary according to either a wage index or consumer price index. Now, all payments according to these systems are subject to taxation. The whole system means that low waged workers get a relatively high replacement ratio¹² in the event of unemployment or sickness. However, that also means that the incentive to seek work and get out of unemployment is relatively low for this group. At the same time, it is an important feature of the Danish system that the transfer income for the normal labour market participants who are members of the unemployment insurance system are not means tested. This is contrary to the benefits for people who are aged between 18 and 65 and who are not insured and who may not be part in the labour force. All their income transfers are means tested. However, even their benefits will be around the level of unemployment benefits in the short run and will be around old age pension plus supplements according to need in the longer run. The result is that the lowest level of benefits sets a minimum standard for normal pay.

¹² Calculated as the UI benefit per hour divided with the previous wage per hour.

Means tested housing subsidies were introduced in 1966 and provide benefit to all living in rented housing according to the size of the accommodation compared to an objective need based on the size of the household and income.

For those not having a work income, nor sickness payment, nor UI-payment nor pension of some type there is the possibilities of receiving a means tested welfare benefit. The social authorities determine the amount according to rules that are based on needs.

Table 4: Full time equivalent persons receiving transfer income, % of the labour force.

Percent	2007	2008	2009	2010	2011
Registered unemployed persons, total	2.6	1.8	3.4	4.0	3.8
Persons receiving holiday benefits	0.2	0.2	0.1	0.2	0.2
Guidance and activities upgrading skills, total	1.5	1.5	1.8	2.2	1.9
Subsidized employment, total	2.6	2.8	3.0	3.4	3.7
Maternity benefits, etc. total	2.1	2.1	2.1	2.1	2.0
Retirement, total, only below 61	5.8	5.8	5.9	6.0	6.0
Other social benefits, total	5.5	5.2	5.4	5.5	5.7
Total full year equivalent persons	20.3	19.4	21.8	23.3	23.3
Number of people in labour force	2901911	2917425	2875015	2874000	2866000

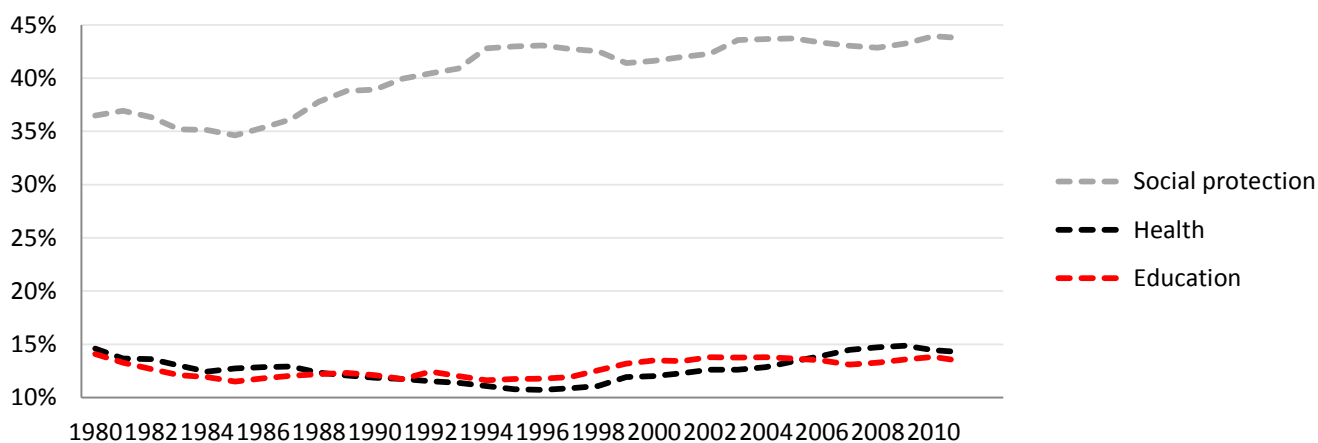
Source: Statistics Denmark

After 1994 all payments according to these systems are subject to taxation.

The overall result of these systems is that most people who are not in the labour force receive an income from the society. This means that clearly a more equal income distribution than otherwise.

Figure 26 shows the percentage of total governmental expenditure on education, health and social protection in the past 30 years.

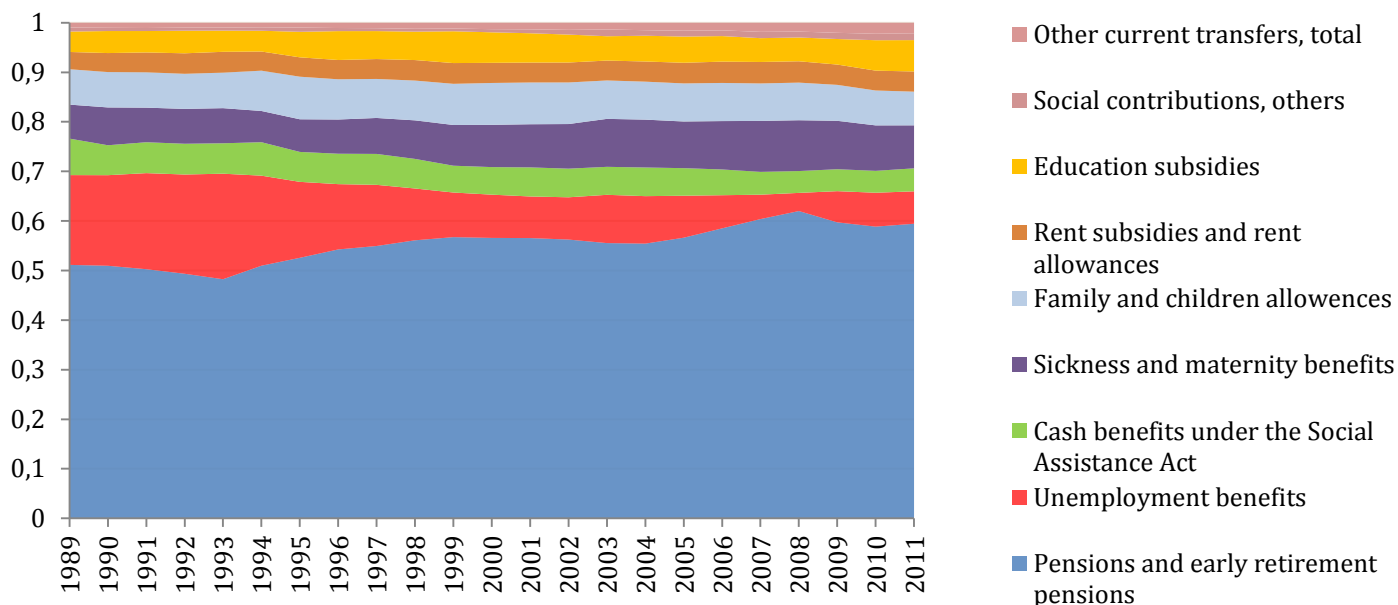
Figure 26: Expenditure on social protection, education and health (% of total governmental expenditure)



Source: Statistics Denmark

Education is clearly another way that the Government influences the long run income distribution, especially since almost all educations are provided free of charge and with substantial stipends for students. First, the level of education has increased constantly over the past 30 years, as well as public spending on education (as percentage of total public expenditure) and as percentage of GDP .A breakdown by level of education shows that the expenditures per GDP per capita for primary and tertiary level have decreased, especially after 1988, while the expenditure for secondary education has increased constantly.

Figure 27: Decomposition of governmental income transfers, by functionality



Source: Statistics Denmark

6. Conclusion

In this paper we have shown that the tax and transfer system do a tremendous job in redistributing income so that a primary relatively unequal income distribution is transformed into something rather equal.

This paper shows that the overall income distribution is internationally relatively equal but inequality has been increasing since the early 1990s.

This paper has attempted to isolate income elements and groups which are responsible for the increasing Gini coefficient in order to see if there are explanations why the popular perception of the income dispersion is not in line with the measured Gini coefficient. We have

found that the tax and benefit system has had a large redistributive influence on incomes in all years. Furthermore, we have shown that changes in the tax structure in more recent years may explain why inequality after tax and transfers has increased in more recent years. However, there are other reasons why inequality has increased in the latter years.

First, we have found that the Gini-coefficient is partly increasing because a growing number of students and youth take low wage jobs before or during their studies.

Second, the growing number of people with further education could have been another source of more inequality, but the general move to more education is found not to have large effects on the distribution of disposable income. Only the highest levels of education contribute to more inequality, while the others do not.

Finally, we have found that there is an unforeseen consequence of the increasing integration of working wives on the labour market, namely an increase in household inequality.

Overall, we have found that even when we take account of the four factors named above we still observe an increasing Gini coefficient in Denmark. It is, however, remarkable that we find this increasing element in all sub groups we have investigated except for the ones age make you grow out of. This probably means that the increasing inequality is generally accepted in the population, and is probably also why the qualitative measures of the income distribution do not contain signals of an increasing income dispersion. Contrary to the claims in many studies (e.g. Rothstein and Uslaner, 2005), increasing inequality has not caused social or institutional trust to decrease in Denmark. Part of the explanation may be that most Danes have not perceived inequality to be on the increase, as that of women has decreased significantly during the period and has only started to increase slightly in the most recent years. Likewise, causality could arguably also run the other way such that higher trust levels increase support for redistribution and reduce rent-seeking, which subsequently affects income inequality (Nannestad, 2008).

The present exploration must therefore be interpreted with care, as it is necessarily preliminary. We nevertheless note that the increase in the correlation between income levels of partners and cohabitants logically seems to imply that inequality measured at the family and household level may be increasing in the years to come. Given that inequality does affect the quality of basic institutions, political participation and social attitudes and beliefs, future increases in inequality could arguably undermine some of the social cohesion of future generations in Denmark.

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Appendix

Figure A1: Decomposition of first decile by socio-economic status, for the cohort of 1994 Age group 15-64; 1994-1999

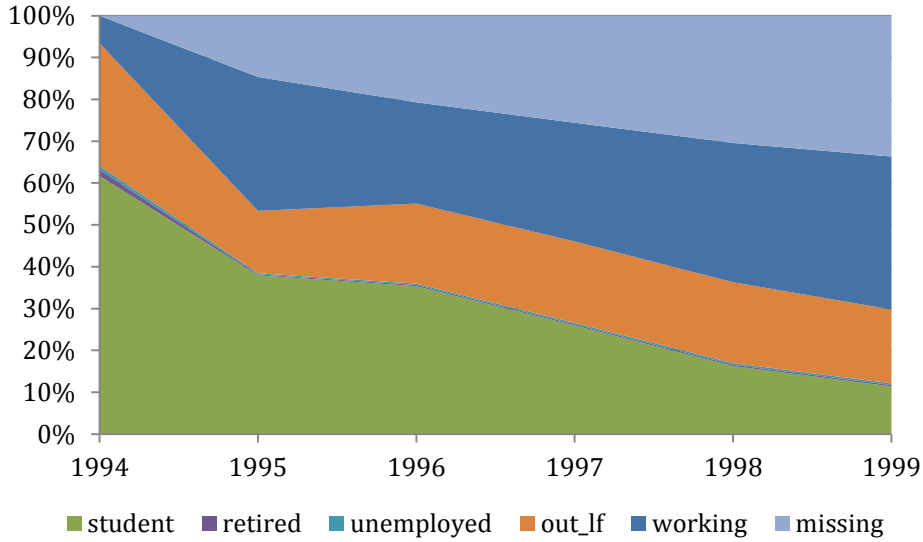


Figure A2: Decomposition of first decile by socio-economic status, for the cohort of 2002 Age group 15-64; 2002-2007

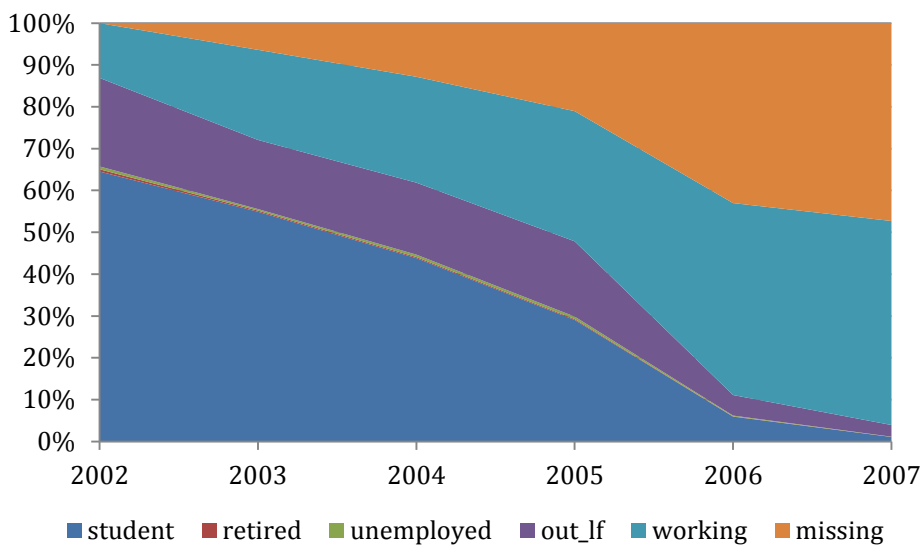


Figure A3: Theil decomposition of 65+ individuals, into working and non-working

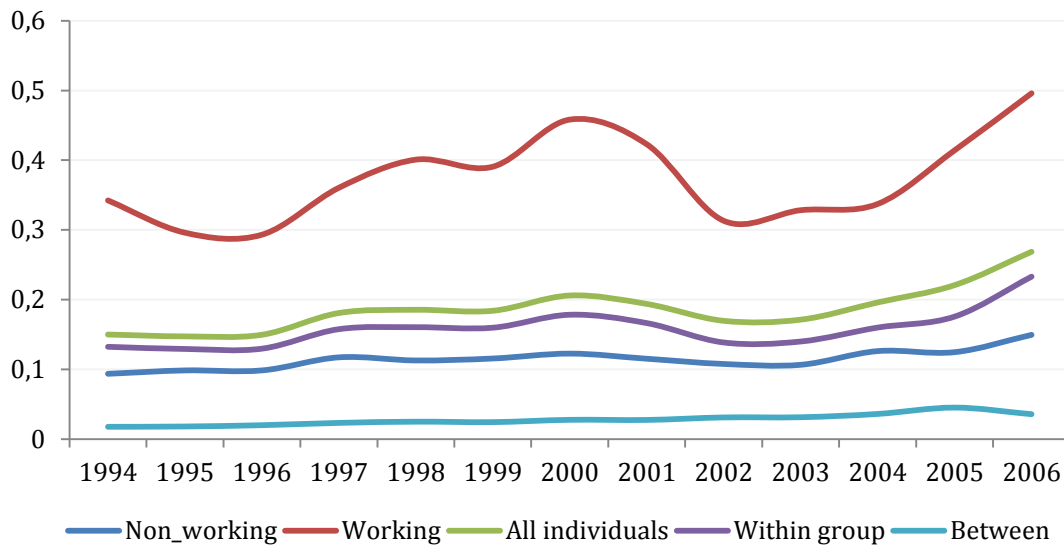


Table A1: Share of between groups inequality in total inequality (Theil_between/Theil_all) for all sub-divisions presented in the paper

Year	Age groups	Students and non-students	15-64		Non-working groups	15-24	65+
			Working/Non-working	Education groups		Students SU/Other	Working/Non-working
1980	0.13	0.24	0.25	0.10	0.49	n.a.	n.a.
1981	0.14	0.26	0.26	0.11	0.49	n.a.	n.a.
1982	0.15	0.27	0.27	0.11	0.50	n.a.	n.a.
1983	0.15	0.26	0.28	0.10	0.49	n.a.	n.a.
1984	0.16	0.25	0.25	0.10	0.53	n.a.	n.a.
1985	0.14	0.21	0.21	0.07	0.52	n.a.	n.a.
1986	0.16	0.24	0.23	0.07	0.51	n.a.	n.a.
1987	0.17	0.23	0.24	0.09	0.49	n.a.	n.a.
1988	0.17	0.24	0.24	0.09	0.48	n.a.	n.a.
1989	0.18	0.24	0.23	0.09	0.48	n.a.	n.a.
1990	0.19	0.25	0.24	0.09	0.48	n.a.	n.a.
1991	0.21	0.25	0.24	0.10	0.48	n.a.	n.a.
1992	0.21	0.24	0.23	0.10	0.44	n.a.	n.a.
1993	0.20	0.22	0.21	0.09	0.41	n.a.	n.a.
1994	0.22	0.23	0.23	0.09	0.42	0.54	0.12
1995	0.21	0.22	0.22	0.09	0.40	0.53	0.12
1996	0.21	0.21	0.22	0.09	0.38	0.53	0.13
1997	0.20	0.19	0.20	0.08	0.38	0.52	0.13
1998	0.20	0.19	0.21	0.08	0.37	0.51	0.13
1999	0.20	0.19	0.20	0.08	0.36	0.51	0.13
2000	0.19	0.18	0.20	0.08	0.36	0.51	0.13
2001	0.20	0.19	0.21	0.08	0.36	0.47	0.14
2002	0.21	0.20	0.20	0.08	0.41	0.50	0.18

2003	0.22	0.21	0.20	0.08	0.42	0.51	0.18
2004	0.22	0.21	0.22	0.08	0.44	0.51	0.18
2005	0.21	0.20	0.20	0.08	0.42	0.50	0.20
2006	0.20	0.15	0.17	0.07	0.42	0.51	0.13
2007	0.21	0.19	0.18	0.07	0.40	0.49	n.a.
2008	0.24	0.22	0.22	0.08	0.46	0.52	n.a.
2009	0.27	0.25	0.27	0.10	0.48	0.46	n.a.

Firm Insurance and Sickness Absence of Employees

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Abstract

We investigate the effect of firms' participation in an insurance scheme on the long-term sickness absence of their employees, using administrative records. In Denmark and several other European countries, firms are obliged to cover the first two weeks of sickness. The insurance scheme is provided by government authority and is designed to help small firms with the financial burden related to sickness absence of their workers. We use an exogenously-set threshold for the eligibility as a policy experiment. Using instrumental variable approach, we show that sickness absence in insured firms is much more prevalent than in uninsured firms. Sickness spells in insured firms are shorter and the conditional probability to return back to work from sickness is much higher in insured firms. These results suggest that employees in insured firms are less monitored during the first two weeks and that their sickness is less serious. We demonstrate in the paper that the minimum cost of the present insurance scheme is similar to about 1100 man-years. On top of that comes a substantial cost to more short time sickness.

JEL: I12, J28

Keywords: Sickness absence, Moral hazard, insurance for employers

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1. Introduction

Sickness absence brings high costs to the society and to the entire economy through the loss of working hours and production. Vast empirical evidence in the economic literature suggests that higher income replacement in sickness spells increases the absence rate. This is also in line with basic economic theory within the standard work-leisure framework (Brown and Session, 1996).

In this paper, we look at the problem of incentives and sickness absence from a different perspective than the traditional literature, which studies incentives and moral hazard mainly on the side of employees, but providing only little evidence about the potential moral hazard on the side of firms. This is surprising given the fact that many policies are actually targeted towards firms rather than workers. Denmark provides an example of such policies, where companies are generally obliged to compensate the loss in income of their workers during the first two weeks of sickness absence.

Literature provides convincing evidence that changes in economic incentives at individual level bring substantial changes in individual sickness absence. The most extensive and up-to-date empirical analysis of absenteeism is provided in Markussen et al. (2011). They show that even after controlling for all possible personal observables, financial incentives still matter. Previous literature is summarized in Ziebarth (2009).

Surprisingly, there is only little evidence about effects of firms' incentives on sickness absence of employees. One particular paper is directly related to our topic. Böheim and Leoni (2011) are looking at the reform in Austria, where the subsidization scheme for small firms was changed and they found significant effects on sickness absence of workers. We provide additional evidence on this topic from a different institutional setting and using precise administrative spell data combined with socio-economic data. We also include duration analysis and identify the presence of moral hazard using a Cox proportional hazard model.

In particular, we examine the effect of the sickness insurance scheme in Denmark, which is provided by public authority as a financial support for small companies. This insurance scheme works the following way. Small employers may insure themselves against the risk of paying wage

compensation of absence due to sickness by paying a premium to the insurance scheme run by the public authority. The premium is not experience related and is by law 0.69% of the total yearly wage bill. If the firm is insured, part of the wage costs related to the first two weeks of sickness is reimbursed by the authority.

The main goal of this paper is to test the presence of moral hazard in insured firms. Insured firms have lower incentives to monitor their employees, as they do not cover the total wage costs related to the sickness absence of their employees. At the same time, participation in the sickness insurance scheme is profitable only for firms with a higher prevalence of sickness. We disentangle the adverse selection and moral hazard and show that they both play an important role in explaining the sickness gap between insured and uninsured firms.

To identify the moral hazard, we use a fuzzy discontinuity design created by the eligibility threshold, in order to identify the true causal effect of sickness insurance on sickness absence of workers. We use the eligibility criterion as an instrument for the participation in the insurance scheme. We perform local linear regressions with bandwidth around the eligibility threshold and confirm the presence of moral hazard in insured firms.

Important evidence supporting the moral hazard hypothesis is the opposite relationship between incidence of sickness absence and length of spells. Although insured firms have a much higher incidence of long-term sickness absence, these long-term sickness spells are much shorter than in uninsured firms. This suggests that the composition of sick workers suffering from long-term sickness is different and that sick workers in insured firms suffer from much less serious sickness.

We also provide evidence that firms with specific characteristics sort themselves into the insurance scheme. For example, construction and manufacturing are dominant industries among insured firms. This is consistent with a hypothesis that firms with higher risk of sickness are more likely to enter the insurance scheme. However, even after controlling for this sorting, the differences in sickness absence persist.

2. Insurance Scheme in Denmark and Data Description

Denmark has a comprehensive system of health insurance and sickness benefits where the health insurance is basically free and includes all treatments at GPs and hospitals. All employed and unemployed citizens are also eligible to receive a daily compensation for each day they are not working due to sickness.

In the period 1999-2002, an employer had to pay full wage during the first 2 weeks of sickness. However, small employers may partly insure themselves against this risk by paying a premium. They get reimbursed for the wage expenses related to the first two weeks of sickness up to the maximum unemployment benefit.

The condition for participation in this insurance program is that the wage sum of the employer is below 1750 times the maximum weekly benefit. This is similar to the wage sum of about 30 full time low-wage workers or about 20 employees with mixed salaries. An employer will be expelled from the insurance if his wage sum increases above 2160 times the maximum weekly benefit or if his wage sum for 3 consecutive years is above the eligibility level. The premium is not experience related and is by law defined to 0.69% of the total wage bill.

The sickness absence system also distinguishes between different types of sickness absence and different types of employees. For example, if an employee has worked less than 8 weeks for the current employer or has worked less than 74 hours, the employer does not have to pay the worker from the first day of sickness. Instead, the sick person receives sickness benefits from the municipality from the first day of the spell of sickness. Furthermore, workers with a chronic disease can make an arrangement with the municipality about receiving sickness benefits from the municipality from day one. Similarly, sickness benefits are paid in a number of other cases identified in the data: pregnancy, leave for parents after childbirth, father's leave, work accidents, long-term sickness of children etc. Spells related to short-term employment, chronic diseases, pregnancy, parental leave, work accident and children sickness are excluded from our current analysis.

Our data are from administrative records including spells, which are covered by the public insurance scheme. Thus we observe complete spells for insured firms and spells longer than 2 weeks for uninsured firms. We restrict our data to spells longer than 2 weeks, so that we observe comparable spells for both groups. We merge the sickness spells with the socio-economic data using common identifiers for each individual. For the purpose of this draft of the paper, we use sickness records from the years 1999-2002 and for individuals who did not change employer during one calendar year. In total we use 6.2 million person-year observations. Each year it corresponds to about 1.3 millions of private sector workers, and 0.5 millions of sickness spells with an average length of approximately 130 days.

We provide a more detailed description of selected variables in section 5, in which we compare insured and uninsured firms.

3. Selection into the Insurance Scheme and Identifying the Moral Hazard

The formal rule requires that a firm may insure against the sickness of workers if their total wage bill is below an exogenously defined threshold. If a firm is eligible the decision to insure should depend on two key factors – the amount of expected sickness absence and, indirectly, the average wage in a firm. Using formulas for reimbursement and the size of the insurance premium, we find that the participation in the insurance scheme is profitable only, if the total amount of sickness hours (up to 2 weeks after which the authority takes over the main part of the bill) is at least 0.76% of all working days of a firm¹. After the second week of sickness absence, a firm need not be insured as it is reimbursed automatically from the municipality. The role of wage expenses is less straightforward. The relationship between the average wage and incentives to insure is driven by the rule that the maximum refunded wage is capped by the maximum unemployment benefit. Therefore, the higher the wages, the lower the proportion of the paid wage during sickness is reimbursed. Consequently, the potential refund in high wage firms from the insurance is relatively smaller compared to the total

¹ Cost-benefit analysis is provided in the Annex

expenditure related to sickness. In our analysis we thus control for the individual wages, although we are aware of potential endogeneity. Including wages into the regression, however, does not change our results.

The cost-benefit analysis predicts that firms with workers with a higher risk of sickness are supposed to be more motivated to participate in the scheme. On the other hand, firms should not make the decision to participate based on the expected incidence of long-term sickness or injuries, because work absence longer than 14 days is funded for all firms regardless of the insurance status. The selection mechanism on the workers' side should be also negative. More workers should prefer employment in insured firms with lower costs related to sickness absence.

In order to reveal the causal impact of the insurance scheme in sickness absence, we need to employ a proper identification strategy which separates moral hazard behavior from adverse selection of firms and workers into insurance schemes.

In principal, we address this problem using an instrumental variable approach with eligibility criteria as an instrument. Comparing insured firms and non-insured eligible firms can result in biased estimates. We thus include into the estimation the non-eligible firms that are just marginally bigger (according to their wage bill) than eligible firms. The similarity should result from various random shocks which potentially affect the total wage bill. The second source of exogeneity is the changes in the eligibility threshold set by central authority every year. Eligibility due to these reasons is to be orthogonal to sickness absence in firm, but, at the same time, should predict insurance. We discuss the validity of this exclusion restriction later. In figure 2 we document the sharp drop in probability to be insured around the eligibility threshold. We observe few firms that are insured even with a substantially bigger total wage bill than the eligibility threshold. We explain this fact by certain administrative delays and errors in the data, so we do not include these firms in our estimation.

Similarly to Lee and Lemieux (2009), we estimate our model with the following two stage model.

$$Y = \alpha + \beta D + \gamma X + \varepsilon$$

$$D = \delta + \tau T + \lambda X + \mu$$

where Y is a propensity of sickness absence, D is a treatment dummy – being employed in an insured firm, T is identifying eligible firms for insurance, X is a vector of all individual and firm level characteristics. The individual characteristics are age, gender, wage, occupation, children, spouse, and educational attainment. The firm level characteristics are regions and industry. Descriptive statistics are provided in the next section.

The treatment effect is consistently estimated if dummy variable T is properly excluded from the first stage equation. In other words, the assignment of firms around the eligibility threshold should be conditional on X orthogonal to the main outcome variable – sickness absence. In practice, this assumption means that firms with a potentially high sickness rate are not supposed to manipulate their total wage bill, so that they are just marginally eligible for the insurance scheme. Furthermore, sick workers do not sort intentionally into firms just marginally eligible for the insurance scheme.

We support these assumptions in several ways. First, we show that there is no clustering in the distribution of firms just below the eligibility threshold. This is shown in figure 1, where we plot the distribution of firms across the total wage bill. Second, we also present a test of validity of our estimator using the method presented in Battistin and Rettore (2008). They propose that the selection bias, which is present in the raw comparison of outcomes of participants and eligible non-participants, can be diminished by employing non-participants who are not eligible and are just above the eligibility threshold. In particular, we test the equality of the sickness absence for ineligible and eligible non-participants conditional on our control variables, and we cannot reject null hypotheses using the local linear regression model. This means that we can identify the mean impact on participants in the bandwidth around the eligibility threshold.

Second, we support our assumption that potentially sick workers do not sort into insured firms in our duration analysis. Here, we test whether workers in insured and uninsured firms return from sickness with different conditional probability. Using the Cox proportional hazard model, we show that the hazard ratio of returning back to work for sick workers employed in insured firms is

25% higher compared to sick workers in uninsured firms. This goes against the adverse selection hypothesis suggesting that workers with a high sickness rate would select themselves into insured firms. Johansson and Palme (2004) suggest that if there is any sorting effect due to a lower replacement ratio (in our case it is a more favorable condition for sickness) during sickness, one should observe together with a lower prevalence of sickness also shorter sickness spells. And this is clearly not the case in our situation, where workers in insured firms tend to return back to work with a much higher conditional probability.

In the next section we summarize the main differences across insured and uninsured firms.

4. Insured versus Uninsured Firms: Main Differences

Given that a firm must be first eligible to become insured, we divide our data into three groups according to the eligibility criteria which is the total wage bill. Workers are employed either in eligible or non-eligible firms. Within eligible firms we distinguish between insured and uninsured firms. By comparing eligible vs. non-eligible groups, we mainly see differences driven by the total wage bill. On average, non-eligible firms are more than 100 times bigger than eligible firms. Size also drives other differences that we describe in this section. For instance, bigger firms tend to pay more and employ more educated workers. In total, insured firms constitute approximately 30% of total firms and 13.6% of the total employment.

Our outcome variables differ substantially across different groups. On average, incidence of sickness is five times higher in insured firms compared to uninsured eligible firms (2 versus 10 percent). The sickness absence in non-eligible firms is about 6 percent. Duration of sickness is substantially higher among insured firms than uninsured, which indicates the presence of moral hazard. In the next section we decompose these differences into selection and causal part.

To shed more light on the selection process, we compare a sample of insured and uninsured firms within group of eligible firms. It shows that the main difference between these two groups is in their industrial composition. In particular, the construction industry is overrepresented among

insured firms. They constitute about 23% of insured eligible firms, compared to 7% among uninsured eligible firms.

Overrepresentation of insured firms in construction can be explained by various factors, including higher health risks, which is in line with our model suggesting that insurance is more profitable for firms with a higher risk of sickness. On the other hand, we found relatively small differences in occupational structure between insured and uninsured, but eligible firms.

In terms of demographic characteristics, we observe some statistically significant differences, but the size is not always economically important. For example, workers in insured firms are only one year older than workers in uninsured workers. However, there are some important differences in average educational attainment. First, there are twice as many workers with higher education in uninsured firms. Second, less educated workers are rather sorted into insured firms. Interestingly, we observe counter intuitive differences in the average wage. Workers in insured firms earn 6.5% more, and this difference is significant. We test for the presence of a pay gap in the regression analysis, and we find that all the differences are explained by a different industrial composition between these groups.

In general, the comparison of insured and uninsured firms shows negative sorting of firms, namely from specific industries that tend to have a higher risk of injuries. Differences due to workers selection due to different educational structure plays a lesser role.. Firm sorting is in line with our cost-benefit analysis, which predicts that firms with a higher risk of sickness are more likely to participate in the insurance scheme.

In our estimation, we use a fuzzy regression discontinuity design. For that purpose we only use firms that are around the eligibility threshold. We thus provide a comparison of insured, uninsured eligible and uninsured non-eligible in table 4. It is clear that we do not observe any significant differences between non-eligible and uninsured eligible firms. This is also confirmed in the regression analysis, which validates our identification strategy.

Further, in figure 2 we show how selected demographic characteristics change for firms around the eligibility margin. We present the share of females and the share of employees with children in comparison with the share of insured firms in different wage bill groups. It is clear that these two controls do not change discontinuously around the eligibility threshold, and it stays in contrast with the share of insured firms, which drops substantially around the eligibility threshold.

5. Results

We test the presence of moral hazard in the behavior of insured firms using standard probit and instrumental variable probit models. The results are presented in table 1. Column 1 presents results from different specifications estimated using the full sample from 1999 - 2002. Coefficients in table 1 are recalculated to marginal effects and standard errors are estimated using the delta method. Full results are provided in the annex of this paper.

Each specification (a, b and c) contains a different set of controls as it is specified in the table. It turns out that after controlling for all observable characteristics, the incidence of sickness absence is still substantially higher in insured firms, by 3 percentage points. We further focus only on firms that are around a certain bandwidth around the eligibility threshold. Here, we present only results from a 1 million DKK bandwidth. All coefficients are consistent with the moral hazard hypothesis.

Our first estimates presented in row column (1) in table 1 are from an estimation on a full sample, whereas the results in column 2 use only data around the eligibility margin. Column 3 and 4 are taking into consideration the potential endogeneity using IV estimation.

Our IV estimates are similar to the estimates shown in columns 1 and 2. The IV estimates in column 4 are substantially higher than in column 3. The only difference in the specification is the adding of the difference between the wage bill and the eligibility threshold ($f(W-c)$) as a control into the specification. According to Lee and Lemieux (2009), this control should capture a potential underlying relationship between the total wage bill in a firm and the propensity to be absent due to sickness. The increase in the estimated coefficient and the time standard errors suggest that our

instrument in combination with this control introduce noise into the estimations. However, it is also possible that our instrument is not properly excluded from the second stage regression. Nevertheless our most conservative estimate is that being employed in an insured firm increases the probability to be sick by 2.8 percentage points.

Table 1: The effect of insurance on incidence of long-term sickness (+14 days), 1999-2002

	Controls	(1)-full sample	(2) marginal	(3)-IV marginal
a)	Trend	0.034*** (0.000)	0.036*** (0.001)	0.057*** (0.005)
b)	Age, education, gender, wage, occupation, spouse	0.036*** (0.000)	0.031*** (0.001)	0.028*** (0.008)
c)	b) + Firm size, industry, regions	0.047*** (0.000)	0.029*** (0.001)	0.028*** (0.005)
	N	6148701	274939	274939

Note: All specifications were estimated using probit-model; the coefficients are recalculated on marginal effects

- (1) Full sample
- (2) Sample based on bandwidth 1million DKK around normalized eligibility threshold.
- (3) IV estimates, using eligibility as a instrument for insurance, on sample with bandwidth 1 mil DKK around normalized eligibility threshold, st. errors computed using delta method
- (4) IV estimates, using eligibility as a instrument for insurance, on sample with bandwidth 1 million DKK around normalized eligibility threshold, st. errors computed using delta method, controlling for f(w-c)

In our empirical analysis we also find that on average, the long-term sickness spells in insured firms is much shorter than in uninsured firms. Fig. 4 shows survival estimates for sickness spells in insured and uninsured firms. It is clear that sick workers in insured firms return to their work much faster than their uninsured counterparts. Table 2 is summarizing the results from a Cox proportional hazard model which is estimating the contribution of each characteristic described in annex in table 3 to the hazard of exiting sickness into work. We present only the contribution of being employed in an insured firm to this hazard.

Table 2: The effect of insurance on the hazard of exiting sickness (+14 days)

	Controls	(1) full sample	(2) marginal
a)	No controls	0.241*** (0.003)	0.273*** (0.015)
b)	Age, education , gender, wage, occupation	0.212*** (0.004)	0.239*** (0.015)
c)	b) + Firm size, industry, wagesum	0.259*** (0.005)	0.229*** (0.017)
d)	c) + Regions	0.258*** (0.005)	0.229*** (0.017)
	N	493558	20429

Note: Both specifications are estimated using a Cox proportional hazard model

Our results suggest that long-term sickness in insured firms has a much less serious nature, which contradicts the adverse selection hypothesis and suggests that the higher incentives of uninsured firms to monitor their sick employees might be very important for the subsequent absence reaching into the 15+ period. Our results are in line with the fact that the composition of sick workers on the 15th day of sickness is different between insured and uninsured firms. In particular, workers in insured firms are much less seriously sick due to the lack of monitoring during first two weeks of sickness.

The interpretation of our results leads to the following findings. While workers in insured firms have a higher sickness incidence, they have, on the other hand, a higher conditional probability to return to work, which correspond to a higher hazard ratio and shorter sickness spell. In particular, the total amount of sick workers would drop by 2.8 percentage points, which corresponds to about 5200 workers who are sick more than 2 weeks. However, our duration analysis also shows that these workers are sick about 22% longer while being employed in uninsured firms. This corresponds to

about 24 days more per sick worker. Our calculation shows that by moving workers from insured to uninsured firms, the Danish economy would save about 250 000 sickness days per year (i.e.1136 man years) , which corresponds to about 12 percent of the total long-term sickness in insured firms. This can be considered as a minimum saving, given that we observe only spells at least 2 weeks long, and one can expect that the main differences are in the short-term sickness.

6. Conclusion

In our analysis, we show a strong and robust presence of moral hazard in firms that are participating in the insurance scheme subsidizing the expenditures related to absence due to sickness of employees. We use a fuzzy regression discontinuity design that is justified by an eligibility threshold exogenously set by the public authority.

Our results have the following implications. First, while designing the insurance scheme, policymakers need to take into account that the majority of players behave rationally and exploit the insurance scheme, which could result in high public expenditures. Second, we show that mainly firms that tend to have a higher risk of sickness absence for lower-skilled workers choose the insurance scheme. Third, insured firms have lower incentives to control their workers while being off sick. This moral hazard increases the sickness absence even further and means that the design of the insurance scheme has adverse effects on economic efficiency. Our estimates show that the design of the current insurance scheme costs at least about 1100 full time jobs per year, without counting the loss due to more short time sickness (<2 weeks).

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Annex:

Cost-Benefit Analysis of Sickness Insurance

The insurance scheme is designed in such a way that firms have to pay a premium to be in the system. This, of course, means that participation is not profitable for all firms. A simple cost-benefit firm-level analysis of sickness insurance proves this. The employer is indifferent about entering an insurance scheme if the cost of sickness is the same with and without insurance. From institutional reasons and for the sake of simplicity, we consider two situations. Firms either employ low-wage workers or high-wage workers. Low-wage workers are defined as earning below 1.1 times the maximum unemployment benefit (which is equal to the sickness benefit), and high-wage workers earn above. The equations 1 and 2 represent equality between costs under insurance (left hand side) and costs of sickness without insurance (right hand side).

- 1) $0,0069*W + s*W*0,1 = s*W$ if $W < 1.1U$
- 2) $0,0069*W + s*(W - U) = s*W$ if $W > 1.1U$

Where W is the yearly wage bill in a firm, U is the yearly sum of all potential unemployment benefits for a given number of employees, and s is the share of lost working hours due to sickness in a given firm in a given year.

We also find the indifference point for a certain level of the total wage bill. If the annual average wage is lower than 1.1 times the unemployment benefits, the threshold does not depend on wages in the firm. For this level of wage bill, one can find the exact level of total sickness when the firm is indifferent about being insured or not as

- 1) $s = 0,0076$

It means that it is profitable to insure if total sickness is more than 0,76% of the total number of working hours. This means that at least 50% of workers should be absent at least 4 days per year to make the insurance scheme profitable.

The second case involves high-wage firms. In this case, the indifference point depends on the total wage bill.

- 2) $s = 0,0069*(W/U)$

The intuition is that the higher the wages the more workers have to be sick in order to cover the cost of insurance.

Fig. 1: Distribution of firms around the eligibility threshold

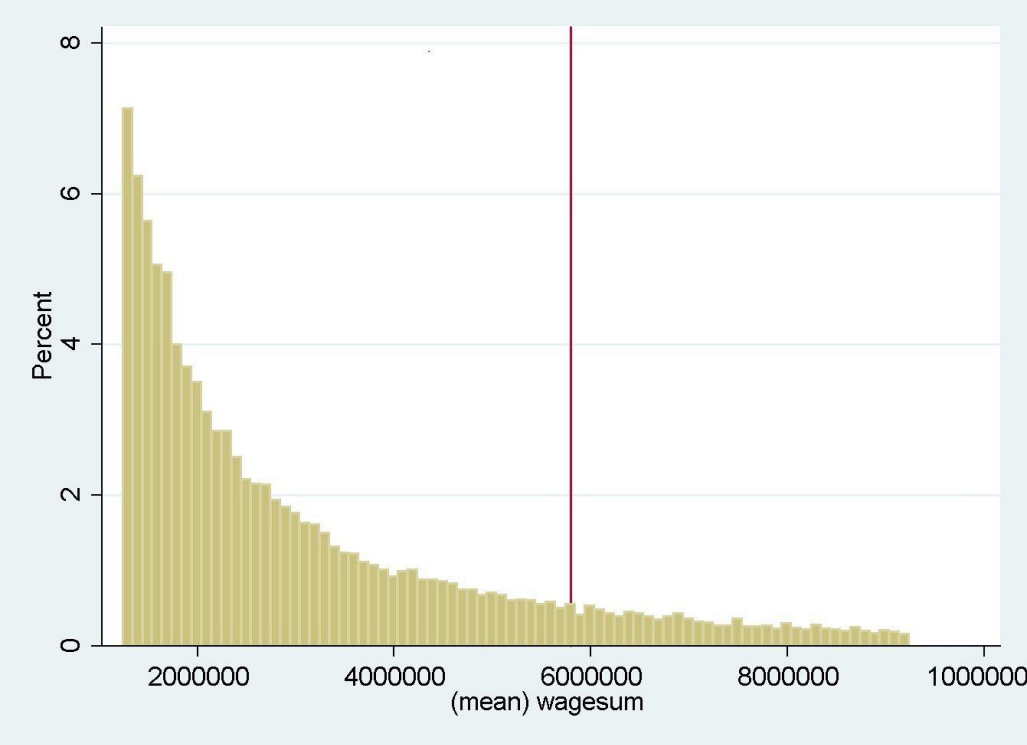


Fig. 2: Share of insured firms, females, and workers with children by wage groups

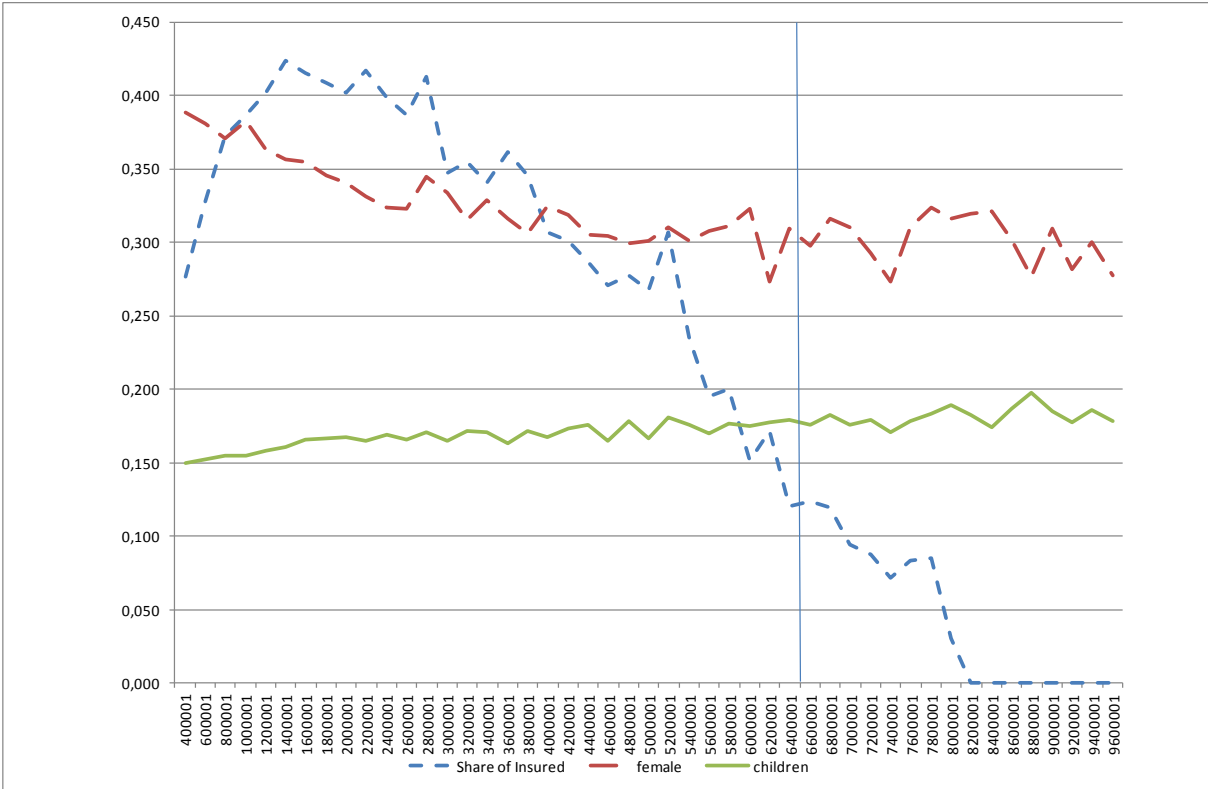
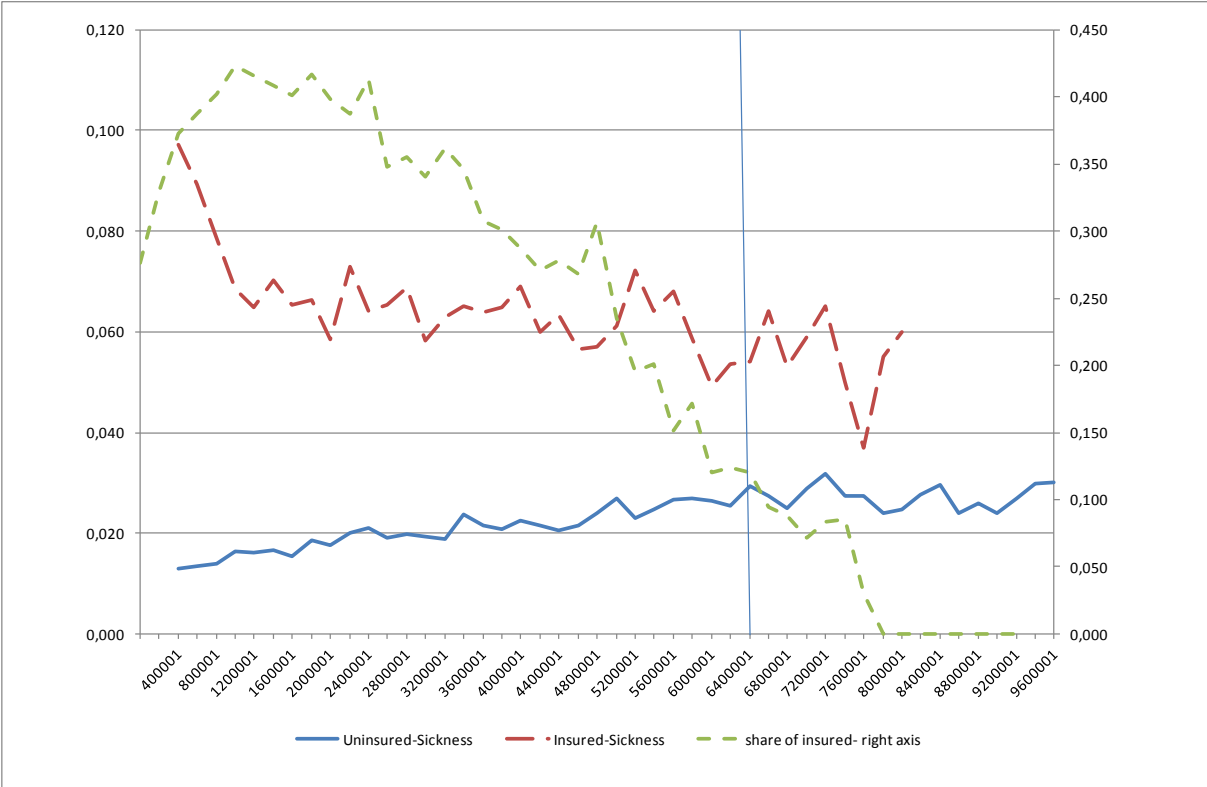


Fig. 3: Incidence of sickness absence vs. share of insured firms in the sample



Note: Sickness incidence is on the left axis, share of insured firms on the right axis.

Table 3: Descriptive statistics, 1999-2002, outcome variables are in bold

	Insured - eligible		Uninsured - eligible		Non-eligible	
	mean	(sd)	mean	(sd)	mean	(sd)
Sickness (>14 days)	0.10	(0.30)	0.03	(0.18)	0.06	(0.24)
Duration (>14 days)	113.63	(159.91)	167.72	(170.43)	136.78	(157.74)
Age	36.24	(14.49)	37.48	(15.55)	38.65	(13.27)
Wage	158295	(120115)	148242	(150597)	237973	(180323)
Children – age 1	0.04	(0.27)	0.04	(0.27)	0.05	(0.26)
Children – age 3	0.09	(0.54)	0.08	(0.56)	0.09	(0.48)
Spouse	0.76	(0.43)	0.75	(0.43)	0.76	(0.43)
Female	0.39	(0.49)	0.44	(0.50)	0.38	(0.49)
Primary school	0.37	(0.48)	0.33	(0.47)	0.28	(0.45)
Vocational school	0.42	(0.49)	0.33	(0.47)	0.37	(0.48)
Secondary school	0.10	(0.30)	0.13	(0.34)	0.14	(0.35)
Higher education	0.05	(0.21)	0.11	(0.32)	0.14	(0.34)
Employees	13.18	(10.97)	11.99	(14.91)	3278.96	(6515)
Wage sum	2138902	(1499686)	1990155	(1787129)	7.96e+8	(1.47e+09)
Full-time	0.75	(0.43)	0.67	(0.47)	0.83	(0.38)
Salaried_employee	0.71	(0.46)	0.84	(0.36)	0.71	(0.45)
Not specified Earner	0.21	(0.40)	0.23	(0.42)	0.07	(0.25)
CEO	0.02	(0.12)	0.02	(0.12)	0.03	(0.16)
Top earner	0.02	(0.13)	0.04	(0.19)	0.09	(0.28)
Intermediate earner	0.03	(0.18)	0.06	(0.24)	0.14	(0.35)
Low earner	0.41	(0.49)	0.26	(0.44)	0.41	(0.49)
Other	0.09	(0.28)	0.06	(0.24)	0.08	(0.28)
Secondary employ.	0.18	(0.39)	0.27	(0.44)	0.16	(0.37)
Non-specified	0.04	(0.20)	0.06	(0.24)	0.02	(0.16)
Agriculture, fishery	0.07	(0.25)	0.08	(0.27)	0.01	(0.11)
Manufacturing	0.18	(0.39)	0.11	(0.31)	0.34	(0.48)
Energy, water dist.	0.00	(0.02)	0.01	(0.08)	0.01	(0.08)
Construction	0.23	(0.42)	0.07	(0.25)	0.06	(0.23)
Retail, hotels, rest.	0.30	(0.46)	0.36	(0.48)	0.21	(0.41)
Transport, telecom.	0.05	(0.22)	0.06	(0.24)	0.12	(0.32)
Financial companies	0.10	(0.30)	0.19	(0.39)	0.19	(0.39)
Culture	0.07	(0.26)	0.13	(0.34)	0.06	(0.25)
Unknown industry	0.00	(0.01)	0.00	(0.03)	0.00	(0.00)
Copenhagen	0.25	(0.43)	0.24	(0.43)	0.22	(0.42)
Zealand	0.24	(0.42)	0.28	(0.45)	0.33	(0.47)
Southern Denmark	0.12	(0.33)	0.11	(0.32)	0.10	(0.30)
Central Jutland	0.25	(0.43)	0.22	(0.41)	0.21	(0.41)
Northern Jutland	0.15	(0.35)	0.15	(0.36)	0.14	(0.35)
year_1	0.26	(0.44)	0.26	(0.44)	0.24	(0.43)
year_2	0.25	(0.44)	0.24	(0.43)	0.25	(0.43)
year_3	0.25	(0.43)	0.24	(0.43)	0.25	(0.43)
year_4	0.24	(0.43)	0.25	(0.43)	0.26	(0.44)
N	745022		1471620		3983934	

Table 4: Descriptive statistics around for firms in bandwidth 1 million DKK around eligibility threshold

	Insured - eligible		Uninsured - eligible		Non- eligible	
	mean	(sd)	mean	(sd)	mean(sd)	
sickness14	0.09	(0.28)	0.05	(0.21)	0.04	(0.21)
Duration14	117.75	(163.10)	152.18	(165.29)	148.71	(160.23)
Age	36.21	(13.46)	38.34	(14.11)	36.42	(14.74)
Wage	191534	(134661)	209823	(169676)	195294	(168387)
children_1	0.05	(0.27)	0.04	(0.27)	0.04	(0.25)
children_3	0.09	(0.49)	0.09	(0.53)	0.09	(0.50)
Spouse	0.76	(0.43)	0.76	(0.43)	0.76	(0.43)
Female	0.32	(0.47)	0.36	(0.48)	0.35	(0.48)
Primary	0.35	(0.48)	0.29	(0.45)	0.28	(0.45)
Vocational	0.44	(0.50)	0.39	(0.49)	0.37	(0.48)
Secondary	0.10	(0.30)	0.13	(0.34)	0.12	(0.33)
Higher	0.05	(0.22)	0.12	(0.32)	0.10	(0.30)
Employees	31.39	(13.68)	28.59	(20.89)	35.11	(23.17)
Wage sum	5685345	(289269)	5730567	(294272)	6722619	(283129)
Full-time	0.81	(0.40)	0.79	(0.40)	0.74	(0.44)
Salaried_employee	0.63	(0.48)	0.75	(0.43)	0.76	(0.43)
Not specified Earner	0.11	(0.32)	0.11	(0.31)	0.12	(0.32)
CEO	0.03	(0.18)	0.04	(0.19)	0.03	(0.18)
Top earner	0.02	(0.13)	0.06	(0.23)	0.05	(0.21)
Intermediate earner	0.06	(0.23)	0.11	(0.32)	0.10	(0.30)
Low earner	0.49	(0.50)	0.38	(0.49)	0.37	(0.48)
Other	0.11	(0.32)	0.09	(0.28)	0.09	(0.28)
Secondary employ.	0.15	(0.35)	0.18	(0.38)	0.22	(0.41)
Non-specified	0.03	(0.17)	0.04	(0.19)	0.03	(0.18)
Agriculture, fishery	0.05	(0.21)	0.02	(0.15)	0.03	(0.17)
Manufacturing	0.30	(0.46)	0.19	(0.40)	0.21	(0.41)
Energy, water dist.	0.00	(0.00)	0.00	(0.06)	0.00	(0.05)
Construction	0.23	(0.42)	0.11	(0.31)	0.10	(0.30)
Retail, hotels, rest.	0.24	(0.43)	0.31	(0.46)	0.30	(0.46)
Transport, telecom.	0.05	(0.22)	0.08	(0.28)	0.12	(0.32)
Financial companies	0.11	(0.31)	0.17	(0.38)	0.18	(0.38)
Culture	0.02	(0.15)	0.10	(0.30)	0.07	(0.25)
Unknown industry	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Copenhagen	0.24	(0.43)	0.24	(0.43)	0.24	(0.42)
Zealand	0.25	(0.43)	0.30	(0.46)	0.29	(0.45)
Southern Denmark	0.13	(0.33)	0.10	(0.30)	0.10	(0.30)
Central Jutland	0.25	(0.43)	0.21	(0.41)	0.22	(0.41)
Northern Jutland	0.14	(0.34)	0.15	(0.36)	0.15	(0.36)
year_1	0.25	(0.43)	0.26	(0.44)	0.23	(0.42)
year_2	0.27	(0.44)	0.24	(0.42)	0.24	(0.43)
year_3	0.25	(0.43)	0.24	(0.43)	0.25	(0.43)
year_4	0.24	(0.42)	0.27	(0.44)	0.28	(0.45)
<i>N</i>	34413		110526		117078	

Fig. 4: Survival estimates of sickness spells in insured vs. uninsured firms (15-100 days)

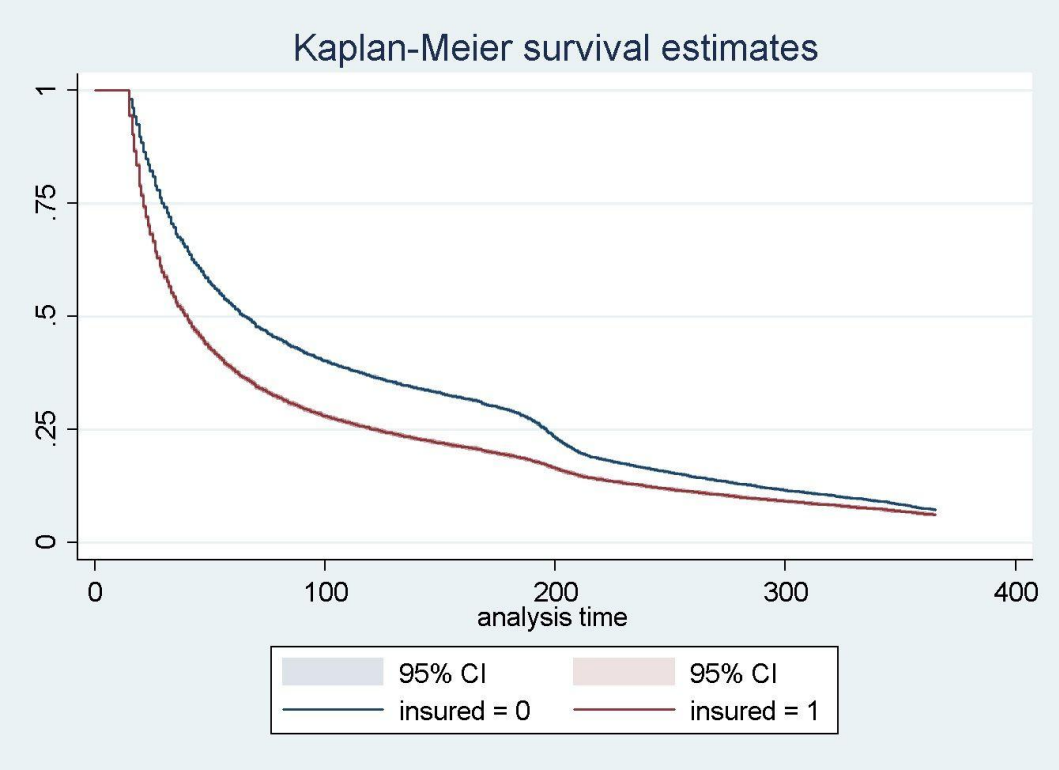


Table 5: Effects of characteristics on propensity to be sick more than 2 weeks, coefficients estimated using a probit model, full specification, including first stage

	(1) Full sample	(2) Marginal firms	(3) Marginal- IV	(4) Marginal - IV
Insured	0.426^{***} (0.003)	0.297^{***} (0.011)	0.278^{***} (0.075)	1.392^{***} (0.370)
Eligible	-0.166 ^{***} (0.003)	-0.002 (0.009)		
Age	0.004 ^{***} (0.000)	0.005 ^{***} (0.000)	0.005 ^{***} (0.000)	0.004 ^{***} (0.000)
Wage	-0.000 ^{***} (0.000)	-0.000 ^{***} (0.000)	-0.000 ^{***} (0.000)	-0.000 ^{***} (0.000)
children_1	0.979 ^{***} (0.004)	0.912 ^{***} (0.017)	0.912 ^{***} (0.017)	0.824 ^{***} (0.063)
children_3	-0.331 ^{***} (0.004)	-0.315 ^{***} (0.016)	-0.315 ^{***} (0.016)	-0.289 ^{***} (0.025)
Primary	0.171 ^{***} (0.003)	0.179 ^{***} (0.015)	0.179 ^{***} (0.015)	0.118 ^{***} (0.030)
Vocational	0.155 ^{***} (0.003)	0.168 ^{***} (0.015)	0.168 ^{***} (0.015)	0.114 ^{***} (0.028)
Higher	0.074 ^{***} (0.004)	0.090 ^{***} (0.021)	0.091 ^{***} (0.022)	0.041 (0.028)
Employees	-0.000 ^{***} (0.000)	-0.001 ^{***} (0.000)	-0.001 ^{***} (0.000)	-0.002 ^{***} (0.000)
Wage sum	0.000 ^{***} (0.000)			
Full-time	0.457 ^{***} (0.004)	0.502 ^{***} (0.018)	0.502 ^{***} (0.018)	0.428 ^{***} (0.046)
Salaried_employee	-0.236 ^{***} (0.002)	-0.192 ^{***} (0.011)	-0.192 ^{***} (0.011)	-0.149 ^{***} (0.024)
Spouse	-0.005 [*] (0.002)	-0.018 (0.011)	-0.018 (0.011)	-0.002 (0.012)
Female	0.376 ^{***} (0.002)	0.367 ^{***} (0.011)	0.367 ^{***} (0.011)	0.332 ^{***} (0.027)
industry_2	0.069 ^{***} (0.006)	0.063 [*] (0.028)	0.064 [*] (0.029)	-0.004 (0.036)
industry_3	-0.025 (0.015)	-0.056 (0.101)	-0.056 (0.101)	-0.025 (0.093)
industry_4	0.060 ^{***} (0.007)	0.093 ^{**} (0.030)	0.095 ^{**} (0.031)	-0.037 (0.055)
industry_5	-0.021 ^{***} (0.006)	0.024 (0.028)	0.023 (0.029)	0.096 ^{**} (0.036)
industry_6	0.107 ^{***} (0.007)	0.065 [*] (0.031)	0.063 [*] (0.032)	0.160 ^{***} (0.043)
industry_7	-0.009 (0.007)	0.007 (0.030)	0.005 (0.031)	0.090 [*] (0.041)
industry_8	0.031 ^{***}	0.054	0.052	0.158 ^{***}

	(0.007)	(0.033)	(0.034)	(0.047)
industry_9	-0.305** (0.116)			
year_2	0.040*** (0.002)	0.017 (0.012)	0.017 (0.012)	-0.000 (0.013)
year_3	0.056*** (0.002)	0.047*** (0.012)	0.048*** (0.012)	0.033* (0.013)
year_4	0.094*** (0.002)	0.086*** (0.012)	0.086*** (0.012)	0.090*** (0.011)
stil_2	-0.135*** (0.008)	-0.172*** (0.035)	-0.172*** (0.035)	-0.137*** (0.036)
stil_3	-0.083*** (0.005)	0.015 (0.028)	0.014 (0.028)	0.051 (0.029)
stil_4	-0.022*** (0.004)	0.010 (0.021)	0.009 (0.021)	0.059* (0.026)
stil_5	0.046*** (0.003)	0.055*** (0.016)	0.055*** (0.016)	0.070*** (0.016)
stil_6	0.088*** (0.004)	0.111*** (0.020)	0.111*** (0.020)	0.098*** (0.020)
stil_7	-0.229*** (0.004)	-0.218*** (0.020)	-0.219*** (0.021)	-0.138*** (0.040)
stil_8	-0.621*** (0.008)	-0.635*** (0.038)	-0.635*** (0.038)	-0.548*** (0.062)
region_2	0.013*** (0.003)	-0.053*** (0.013)	-0.052*** (0.013)	-0.063*** (0.012)
region_3	0.004 (0.003)	-0.005 (0.016)	-0.004 (0.016)	-0.031 (0.017)
region_4	0.003 (0.003)	-0.030* (0.013)	-0.030* (0.013)	-0.055*** (0.014)
region_5	0.001 (0.003)	-0.021 (0.014)	-0.021 (0.014)	-0.014 (0.014)
Oldprop	-0.049*** (0.008)	-0.061 (0.040)	-0.070 (0.054)	0.487* (0.196)
Higheeducpr	-0.232*** (0.009)	-0.189*** (0.047)	-0.193*** (0.050)	0.045 (0.099)
Femaleprop	-0.074*** (0.005)	-0.006 (0.024)	-0.005 (0.024)	-0.051 (0.028)
o.industry_9		0.000 (.)	0.000 (.)	0.000 (.)
Diffwage				0.000*** (0.000)
Diffwageeligible				0.000 (0.000)
_cons	-2.193*** (0.008)	-2.278*** (0.042)	-2.274*** (0.049)	-2.388*** (0.058)
Insured				
Age			0.000 (0.000)	0.000 (0.000)
Wage			-0.000***	-0.000***

	(0.000)	(0.000)
children_1	0.006	0.006*
	(0.003)	(0.003)
children_3	0.002	0.002
	(0.002)	(0.002)
Primary	0.039***	0.040***
	(0.003)	(0.003)
Vocational	0.034***	0.034***
	(0.003)	(0.003)
Higher	0.037***	0.037***
	(0.003)	(0.003)
Employees	0.000***	0.001***
	(0.000)	(0.000)
Full-time	0.024***	0.025***
	(0.003)	(0.003)
Salaried_employee	-0.023***	-0.023***
	(0.003)	(0.003)
Spouse	-0.012***	-0.012***
	(0.002)	(0.002)
Female	0.002	0.002
	(0.002)	(0.002)
industry_2	0.051***	0.054***
	(0.007)	(0.007)
industry_3	-0.024**	-0.021**
	(0.007)	(0.008)
industry_4	0.106***	0.107***
	(0.007)	(0.007)
industry_5	-0.069***	-0.067***
	(0.006)	(0.006)
industry_6	-0.088***	-0.090***
	(0.007)	(0.007)
industry_7	-0.077***	-0.076***
	(0.006)	(0.006)
industry_8	-0.095***	-0.098***
	(0.007)	(0.007)
o.industry_9	0.000	0.000
	(.)	(.)
year_2	0.014***	0.014***
	(0.002)	(0.002)
year_3	0.008***	0.009***
	(0.002)	(0.002)
year_4	-0.011***	-0.010***
	(0.002)	(0.002)
stil_2	-0.016**	-0.016**
	(0.006)	(0.006)
stil_3	-0.034***	-0.033***
	(0.004)	(0.004)
stil_4	-0.046***	-0.045***
	(0.004)	(0.004)

stil_5			-0.018 ^{***}	-0.017 ^{***}
			(0.003)	(0.003)
stil_6			0.002	0.003
			(0.004)	(0.004)
stil_7			-0.053 ^{***}	-0.054 ^{***}
			(0.003)	(0.003)
stil_8			-0.026 ^{***}	-0.026 ^{***}
			(0.005)	(0.005)
region_2			0.015 ^{***}	0.014 ^{***}
			(0.003)	(0.003)
region_3			0.025 ^{***}	0.024 ^{***}
			(0.004)	(0.004)
region_4			0.024 ^{***}	0.024 ^{***}
			(0.003)	(0.003)
region_5			-0.005	-0.006
			(0.003)	(0.003)
Oldprop			-0.489 ^{***}	-0.486 ^{***}
			(0.007)	(0.007)
Higheducpr			-0.200 ^{***}	-0.196 ^{***}
			(0.007)	(0.007)
Femaleprop			0.043 ^{***}	0.042 ^{***}
			(0.005)	(0.005)
Eligible			0.116 ^{***}	0.034 ^{***}
			(0.002)	(0.003)
Diffwage				-0.000 ^{***}
				(0.000)
Diffwageeligible				-0.000 ^{***}
				(0.000)
_cons			0.236 ^{***}	0.254 ^{***}
			(0.008)	(0.009)
Athrho				
_cons			0.007	-0.437 [*]
			(0.028)	(0.172)
Lnsigma				
_cons			-0.998 ^{***}	-1.001 ^{***}
			(0.002)	(0.002)
<i>N</i>	6148701	274939	274939	274939

Standard errors in parentheses, clustered on individual level

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Effects of characteristics on propensity to be sick more than 2 weeks, coefficients estimated using probit model, only individual specific characteristics

	(1) Full sample	(2) Marginal firms	(3) Marginal- IV	(4) Marginal - IV
Insured	0.331^{***} (0.002)	0.312^{***} (0.010)	0.280^{***} (0.075)	1.448^{***} (0.373)
Age	0.004 ^{***} (0.000)	0.004 ^{***} (0.000)	0.004 ^{***} (0.000)	0.006 ^{***} (0.000)
Wage	-0.000 ^{***} (0.000)	-0.000 ^{***} (0.000)	-0.000 ^{***} (0.000)	-0.000 ^{***} (0.000)
children_1	0.975 ^{***} (0.003)	0.908 ^{***} (0.013)	0.908 ^{***} (0.013)	0.809 ^{***} (0.070)
children_3	-0.329 ^{***} (0.002)	-0.315 ^{***} (0.009)	-0.315 ^{***} (0.009)	-0.285 ^{***} (0.024)
Primary	0.174 ^{***} (0.003)	0.188 ^{***} (0.014)	0.189 ^{***} (0.015)	0.112 ^{**} (0.036)
Vocational	0.145 ^{***} (0.003)	0.174 ^{***} (0.014)	0.175 ^{***} (0.014)	0.105 ^{**} (0.033)
Higher	0.025 ^{***} (0.004)	0.061 ^{**} (0.021)	0.061 ^{**} (0.021)	0.057 ^{**} (0.019)
Employees	0.000 ^{***} (0.000)	-0.001 ^{***} (0.000)	-0.001 ^{**} (0.000)	-0.002 ^{***} (0.000)
Full-time	0.459 ^{***} (0.003)	0.502 ^{***} (0.016)	0.502 ^{***} (0.016)	0.420 ^{***} (0.049)
Salaried empl.	-0.284 ^{***} (0.002)	-0.212 ^{***} (0.010)	-0.214 ^{***} (0.011)	-0.117 ^{**} (0.041)
Spouse	-0.006 ^{**} (0.002)	-0.012 (0.010)	-0.012 (0.010)	0.000 (0.010)
Female	0.349 ^{***} (0.002)	0.347 ^{***} (0.009)	0.347 ^{***} (0.009)	0.327 ^{***} (0.022)
year_2	0.041 ^{***} (0.002)	0.016 (0.012)	0.017 (0.012)	-0.002 (0.013)
year_3	0.062 ^{***} (0.002)	0.048 ^{***} (0.012)	0.048 ^{***} (0.012)	0.029 [*] (0.014)
year_4	0.100 ^{***} (0.002)	0.086 ^{***} (0.012)	0.085 ^{***} (0.012)	0.086 ^{***} (0.011)
stil_2	-0.120 ^{***} (0.008)	-0.158 ^{***} (0.033)	-0.157 ^{***} (0.033)	-0.151 ^{***} (0.031)
stil_3	-0.065 ^{***} (0.005)	-0.008 (0.028)	-0.010 (0.029)	0.076 [*] (0.039)
stil_4	0.017 ^{***} (0.004)	0.005 (0.020)	0.003 (0.021)	0.076 [*] (0.030)
stil_5	0.088 ^{***} (0.003)	0.069 ^{***} (0.016)	0.069 ^{***} (0.016)	0.061 ^{***} (0.015)
stil_6	0.118 ^{***} (0.004)	0.113 ^{***} (0.019)	0.113 ^{***} (0.019)	0.112 ^{***} (0.018)
stil_7	-0.201 ^{***} (0.004)	-0.219 ^{***} (0.019)	-0.221 ^{***} (0.020)	-0.128 ^{**} (0.043)

stil_8	-0.611 ^{***} (0.007)	-0.640 ^{***} (0.035)	-0.641 ^{***} (0.035)	-0.526 ^{***} (0.071)
diffwage				0.000 ^{***} (0.000)
Diffwage*elig				-0.000 (0.000)
_cons	-2.268 ^{***} (0.006)	-2.279 ^{***} (0.031)	-2.270 ^{***} (0.038)	-2.327 ^{***} (0.081)
<i>N</i>	6148701	274939	274939	274939

Standard errors in parentheses, clustered on individual level

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Effects of characteristics on propensity to be sick more than 2 weeks, coefficients estimated using a probit model, controlled for time trend

	(1) Full sample	(2) Marginal firms	(3) Marginal- IV	(4) Marginal - IV
Insured	0.288*** (0.002)	0.333*** (0.009)	0.518*** (0.072)	0.323*** (0.055)
year_2	0.033*** (0.002)	0.003 (0.011)	0.001 (0.011)	-0.002 (0.001)
year_3	0.040*** (0.002)	0.022 (0.011)	0.021 (0.011)	0.001 (0.001)
year_4	0.064*** (0.002)	0.043*** (0.011)	0.047*** (0.011)	0.010*** (0.002)
Diffwage				0.000*** (0.000)
Diffwageeligible				0.000 (0.000)
_cons	-1.629*** (0.002)	-1.709*** (0.008)	-1.740*** (0.013)	-1.782*** (0.010)
<i>N</i>	6268008	279325	279325	279325

Standard errors in parentheses, clustered on individual level

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8: Test of equality of sickness absence for eligible and ineligible non-participants for different bandwidth around the eligibility threshold

	(+-1000000) sickness14	(+-700000) sickness14	(+-1200000) sickness14
Eligible	-0.001	0.001	-0.001
	(0.001)	(0.001)	(0.001)
Age	0.000 ^{***}	0.000 ^{**}	0.000 ^{***}
	(0.000)	(0.000)	(0.000)
children_1	0.180 ^{***}	0.181 ^{***}	0.183 ^{***}
	(0.005)	(0.006)	(0.005)
children_3	-0.044 ^{***}	-0.043 ^{***}	-0.044 ^{***}
	(0.002)	(0.002)	(0.002)
Primary	0.010 ^{***}	0.010 ^{***}	0.010 ^{***}
	(0.001)	(0.001)	(0.001)
vocational	0.008 ^{***}	0.008 ^{***}	0.008 ^{***}
	(0.001)	(0.002)	(0.001)
Higher	0.004 [*]	0.003	0.004 [*]
	(0.002)	(0.002)	(0.002)
employees	-0.000	-0.000 ^{**}	-0.000 ^{**}
	(0.000)	(0.000)	(0.000)
Fulltime	0.028 ^{***}	0.028 ^{***}	0.028 ^{***}
	(0.001)	(0.001)	(0.001)
Salaried_employee	-0.022 ^{***}	-0.024 ^{***}	-0.023 ^{***}
	(0.001)	(0.002)	(0.001)
Spouse	0.001	0.002	0.001
	(0.001)	(0.001)	(0.001)
female	0.042 ^{***}	0.041 ^{***}	0.042 ^{***}
	(0.001)	(0.001)	(0.001)
industry_2	0.005	0.003	0.003
	(0.003)	(0.004)	(0.003)
industry_3	-0.006	-0.009	-0.001
	(0.008)	(0.009)	(0.008)
industry_4	0.006	0.003	0.006
	(0.003)	(0.004)	(0.003)
industry_5	-0.000	-0.000	-0.001
	(0.003)	(0.004)	(0.003)
industry_6	0.005	0.004	0.004
	(0.003)	(0.004)	(0.003)
industry_7	-0.003	-0.003	-0.003
	(0.003)	(0.004)	(0.003)
industry_8	0.002	0.001	0.001
	(0.004)	(0.004)	(0.003)
o.industry_9	0.000	0.000	0.000
	(.)	(.)	(.)
year_2	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)

year_3	0.003 [*] (0.001)	0.002 (0.001)	0.003 [*] (0.001)
year_4	0.006 ^{***} (0.001)	0.005 ^{***} (0.001)	0.006 ^{***} (0.001)
stil_2	-0.020 ^{***} (0.002)	-0.017 ^{***} (0.002)	-0.020 ^{***} (0.002)
stil_3	-0.001 (0.002)	0.002 (0.003)	-0.002 (0.002)
stil_4	-0.002 (0.002)	-0.002 (0.002)	-0.003 (0.002)
stil_5	0.005 ^{***} (0.002)	0.008 ^{***} (0.002)	0.005 ^{***} (0.001)
stil_6	0.014 ^{***} (0.002)	0.015 ^{***} (0.003)	0.013 ^{***} (0.002)
stil_7	-0.009 ^{***} (0.001)	-0.007 ^{***} (0.002)	-0.010 ^{***} (0.001)
stil_8	-0.033 ^{***} (0.002)	-0.030 ^{***} (0.002)	-0.033 ^{***} (0.002)
region_2	-0.007 ^{***} (0.001)	-0.007 ^{***} (0.001)	-0.006 ^{***} (0.001)
region_3	0.001 (0.002)	0.002 (0.002)	0.001 (0.002)
region_4	-0.003 [*] (0.001)	-0.005 ^{**} (0.002)	-0.002 (0.001)
region_5	-0.003 [*] (0.002)	-0.003 (0.002)	-0.003 [*] (0.001)
oldprop	-0.003 (0.004)	-0.002 (0.005)	-0.004 (0.003)
higheducpr	-0.018 ^{***} (0.004)	-0.021 ^{***} (0.005)	-0.018 ^{***} (0.004)
femaleprop	0.011 ^{***} (0.003)	0.016 ^{***} (0.003)	0.010 ^{***} (0.002)
_cons	0.009 [*] (0.004)	0.009 (0.005)	0.012 ^{**} (0.004)
<i>N</i>	223795	158404	266543

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

How are firms affected by the crisis and how do they react?*

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Abstract:

The recession started in 2008 constituted a massive shock to consumers and most firms all over the Western World. Firms were hit on their sales and finances. However, little is known on how badly they were hit and how they coped with the difficulties. This paper gives a rare and fairly early glimpse on how private Danish firms were hit and how they adjusted in order to survive the crisis. The first phase of the recession led to the largest loss of jobs since the oil crisis in Denmark. Four years into the recession we see that larger firms are gradually creating jobs again, although the overall job growth is still negative (Statistics Denmark, 2012). Consequently we present an assessment of factors that have been important in explaining why some firms have been able to recreate jobs and others have not. Especially, we point at the critical role of access to credit in creating and destroying jobs. The paper is based on a survey run on all Danish firms with more than 20 employees in November and December 2011.

Keywords: Crisis, impact on firms, credit constraints, job growth and destruction, survey

JEL codes: J62, D22, E32, J33

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How are firms affected by the crisis and how do they react?*

Introduction

The recession started in 2008 constitutes a massive shock to consumers and most firms. Firms were hit on their sales and finances. However, little is known on how badly they were hit and how they coped with the difficulties. This paper gives a rare and fairly early glimpse at how private Danish firms were hit and how they adjusted in order to survive the crisis. In Denmark, the first phase of the recession led to the largest loss of jobs since the oil crisis. Four years into the recession we see that larger firms are gradually creating jobs again, although the overall job growth is still negative (Statistics Denmark, 2012). Consequently, we present an assessment of factors that have been important in explaining why some firms have been able to recreate jobs and others have not. We especially point to the role of the financial sector in creating and destroying jobs.

This paper builds on a survey run on a random sample¹ of Danish firms in late 2011. Parts of the survey's questions are intentionally almost identical to those found in a survey run by ECB in 2009, although the sample in Denmark is larger and also has extra questions on job creation and destruction, for example. Because of the close relationship with the ECB survey which covered a number of European countries except Denmark, we are able to benchmark some of the Danish results.

Firms receive different macro economic and micro economic shocks all the time. The macro economic shocks come from general changes in demand, while the micro economic shocks come from other firms in the supply chain, local labour market or the production process. Each time a shock is received, the firm has to find a way to react to the different impulses. Its reactions will be constrained by overall rules, institutions and its own flexibility with respect to contracts, employees, customers and suppliers as well as financial possibilities.

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¹Given that we are surveying the firms 3 years after the crisis started, a number of firms have already closed down which means that we are getting a bias because we are only surveying firms that were able to survive the initial shock of the crisis.

Micro economic theory predicts different responses depending on the market situation of the firm: if a firm has a decreasing demand curve for its products and is experiencing a drop in sales, theory suggests that it will firstly cut production and secondly cut costs. The first action may involve closing down production lines, laying off production workers and/or reducing staff. Depending on the possibilities of renegotiating wage contracts, the second action may involve cutbacks in wages. In Denmark it is reasonably easy to lay off employees because of relatively weak job protection (OECD, 2004). Among employees, it is relatively easy to lay off blue-collar workers, while it is more costly to lay off salaried employees because of tenure related notice periods. Therefore, one would expect that firms react to a negative demand shock by laying off workers first and later laying off salaried employees. Another possibility is to renegotiate wages. There are two options in this case. One option is to renegotiate wages that are determined by contracts with the Trade Unions, which are mostly spread among blue-collar workers. The other option is to renegotiate the wage allowances consisting of bonuses and options. In many cases, these will adjust on their own as a consequence of the lower sales. While renegotiating a contract is extremely rare, adjusting bonuses is probably more frequent. The chosen strategy will depend on the possibilities rendered by the type of contracts signed with the employees. Nevertheless, it is an empirical question that needs an empirical answer.

Yet another response to a drop in sales is, of course, to lower prices and accept a smaller margin in the short run, to compensate for the reduction of demand. This requires that the firm has enough economic strength to make this adjustment.

Firms under full competition will have a more difficult situation. They will experience an immediate price drop on the market which means that they will not be able to cover all their fixed costs. This will motivate those with the highest costs to leave business relatively quickly, and allow others to survive. Cost savings will then be their only way to survive.

Considering this, we investigate, in the first part of our paper, the responses of Danish firms to the crisis and analyse the determinants of the crisis. In the second part of the paper we investigate the effects of the financial and demand problems on the growth of the firm, looking at job creation and destruction.

Literature

The Wage Dynamics Network (WDN) organized by the European Central Bank (ECB) ran a survey in 2009 in a number of E.U. countries². The purpose of that survey was to get an idea of how firms in member countries were affected and how they reacted to the challenges of the crisis.

The ECB survey has been used in a number of papers investigating different aspects of the crisis; whether to analyse the mechanisms of cost reduction adjustments to the crisis (e.g. Fabiani et al., 2011) or the price and wage adjustment mechanisms to shocks (Bertola et al. 2010; Druant et al., 2010).

Fabiani et al., 2011 report the intensity and nature of the initial shocks experienced by the firms and their reactions, given the different constraints of the firm and the national labour market regulations. Using country employment weighted means, it is demonstrated that there is a relationship between the GDP decline and the negative demand and credit shock. This provides a reassuring connection between the experience at the firm level and the national levels.

Similarly, Bertola et al., 2010, focus, in particular, on the impact of competition conditioned on the way firms are hit by the shock and on how they adjust to the crisis. Generally, they find that a significant but small proportion of the variation across countries and firms in adjustment strategies may be explained by structural and institutional features.

In the following sections, we will try to benchmark some of the Danish findings with the results of the above mentioned papers.

²Austria, Belgium, Czech Republic, Estonia, France, Italy, Luxemburg, Netherlands, Poland, Spain.

The survey data

The questions in our survey have been designed to mimic as closely as possible the questions in the 2009 ECB survey. Since this is the third ECB survey run since 2007, it has a set of background variables in common with the previous ones, and since we do not have prior and similar information for Denmark, the comparison will have its short-comings. Part of these will be overcome in the future by adding financial background data from Danish register data as soon as these will be available.

Questions regarding the types and intensity of the crisis shocks and the types of adjustments made by the firms were added to a larger survey on wages, bonuses and other HR related issues. Therefore, it was addressed to the person responsible for personnel according to a register created by Statistics Denmark.

The sample for the survey includes:

1. All firms with more than 20 employees from the Manufacturing industries.
2. Other private firms are sampled including
 - a. All firms with 100 and more employees
 - b. Around 60% of the firms with 50 to 99 employees .
 - c. Less than 20% of firms with less than 50 employees, where the sampling percentage of firms included is decreasing with the number of employees.

This type of sampling is in line with the sampling frame used by Statistics Denmark for business statistics³.

Statistics Denmark administered the survey and sent it to 3941 firms in November 2011. We received responses from 1961 firms. The response rates for different size groups and industries are reported in the Appendix.

The overall response rate is 49.8%. 28.4% of the selected firms were not found or did not respond, while 18.5% rejected to answer the questions.

Overall, we have a population of responses of 23.6% of all firms larger than 20 employees. Due to the sampling frame, we have more responses from the Manufacturing industry, where the coverage is 49.3% for firms with more than 20

³ See Appendix for details on the sampling frame and the response rates.

employees. Our survey covers about 50% of all larger companies with more than 50 employees and a smaller proportion of the smaller firms.

Affected and by how much?

The first important question in the survey is whether or not the surveyed firm has been affected by the crisis and whether it was negatively or positively affected.

75.9% of the surveyed firms answered affirmatively to the first question. 71.5% of them have been negatively affected and only 4.4% of them state that they have been positively affected by the crisis. These percentages do not vary grossly between industries, although there are some smaller differences.

Table 1 and 2 show how firms have been affected, divided by industry and size.

Table 1: Percentage of firms affected by the crisis, by industry

Affected by the crisis (%)	Manufacturing	Construction	Trade	Transport	Services	Total
Affected	75.4	78.7	83.3	74.5	70.7	75.9
Negatively	72.1	76.2	78.7	66.0	64.9	71.5
Positively	3.4	2.5	4.6	8.5	5.7	4.4
Not affected	23.6	19.7	16.4	24.8	26.1	22.8
Did not answer	0.9	1.6	0.3	0.7	3.2	1.3
Total	100	100	100	100	100	100
<i>Number of firms</i>	956	122	329	153	402	1962

Trade seems to be affected the most. This is followed by Construction and Manufacturing. Services and Transport are the least affected industries.

The negative wave of the crisis was felt by all size groups, but slightly more by companies with 30 to 39 employees. Very few (4.9%) have enjoyed positive effects of the crisis.

Table 2: Percentage of firms affected by the crisis, by firm size

Affected by the crisis (%)	Firm size (group of employees)					Total
	20-29	30-39	40-49	50-99	100+	
Affected	74.2	78.7	75.3	76.3	75.6	75.9
Negatively	70.2	75.1	72.9	71.3	70.7	71.5
Positively	4.0	3.6	2.4	4.9	4.9	4.4
Not affected	25.2	21.3	23.5	22.6	22.0	22.8
Did not answer	0.6	0.0	1.2	1.2	2.4	1.3
Total	100	100	100	100	100	100
<i>Number of firms</i>	329	225	166	607	635	1962

These results raise the question of which firm characteristics are more likely to expose the firm to the crisis. Consequently, we run a logit function of being affected. The explanatory variables are firm size and industry, the competitive situation (where we distinguish between many and few competitors), if there is a contract with flexibility of hours⁴, and the general wage contract conditions of the firm. The latter is measured by the existence of a collective contract with salaried employees and blue-collar workers, respectively. Finally, this has been interacted with the indicator of flexibility, which takes the value one if there is a collective contract between firm and union and if there is, at the same time, an agreement of flexible hours over the year.

The results in Table 3 show that small firms (30-39 employees) are significantly more negatively affected by the crisis than other size groups. Trade appears to be more frequently hit compared to Manufacturing and Construction, while Services and Transport are least frequently hit by the crisis. The competition matters as expected: firms with few competitors⁵ are the least hit. This means that the more monopolistic the market is, the less likely it is for the firm to be hit by the crisis. Hours flexibility (most likely introduced before the crisis) has a positive impact for salaried employees, but it has no impact for blue-collar workers. This is surprising since hours flexibility has been built into the majority of blue collar contracts by now. Yet, the hypothesis is that this flexibility option has not been used at all. Surprisingly, the combined effect shows that companies with hours flexibility and

⁴ An increasing number of firms have an agreement with workers allowing for more or less hours than the normal 37 hours as long as the average over a period of 1 year or more is 37 hours. The proportion of firms covered by such an agreement was 77% in 2008, DA, 2011.

⁵ Few competitors – dummy variable; equals 1 for firms with less than 5 competitors.

collective contracts for salaried employees are more likely to be affected by the crisis.

Table 3: Probability of being negatively affected by the crisis, based on specific firm characteristics (marginal effect)

	(1)		(2)	
	Probability of being affected	Robust Standard error	Probability of being affected	Robust Standard error
Firm size (ref 20-29 employees)				
<i>30-39 employees</i>	0.09	0.05	0.10	0.05
<i>40-49 employees</i>	0.04	0.05	0.06	0.06
<i>50-99 employees</i>	0.05	0.04	0.04	0.05
<i>100+ employees</i>	0.04	0.05	-0.03	0.06
Industry (ref Transport)				
<i>Manufacturing</i>	0.12	0.05	0.14	0.09
<i>Construction</i>	0.12	0.07	0.18	0.11
<i>Trade</i>	0.22	0.06	0.21	0.10
<i>Services</i>	0.04	0.06	0.10	0.10
Few competitors	-0.07	0.03	-0.10	0.06
Bonuses for managers	0.00	0.03	0.05	0.06
Bonuses for salaried employees and workers	-0.05	0.03	-0.14	0.07
Danish Company	0.00	0.03	-0.06	0.06
Hours flexibility	-0.04	0.06	-0.13	0.09
Collective contract for Salaried workers	-0.07	0.04	-0.15	0.06
Collective contract for workers	0.07	0.05	0.10	0.07
Hours flexibility and collective contracts for salaried workers	0.13	0.06	0.10	0.11
Hours flexibility and collective contracts for workers	-0.04	0.07	-0.04	0.12

Notes: bold indicates significant at 10% level. Specification (2) shows weighted results, using employment weights

Another issue is how strong the different companies are affected. Table 4 shows the answers given by the companies to this question. Such questions are always difficult to evaluate because of the subjective element and because different respondents may ascribe different meanings to the concepts. But it seems safe to say that few firms feel only marginally affected, while the majority of firms affected feel moderately to strongly affected. Furthermore, a small number of firms say that they are positively affected by the crisis.

Table 4: Intensity of the crisis, as experienced by the affected firms

Intensity of the crisis for the firms affected (%)	Negative	Positive	Total
Marginally	13.4	17.4	13.6
Moderately	48.8	50.0	48.9
Strongly	27.8	20.9	27.4
Very strongly	9.2	9.3	9.2
Did not answer	0.9	2.3	0.9
Total	100	100	100
<i>Number of firms</i>	<i>1403</i>	<i>86</i>	<i>1490</i>

A further question is on which of the measured parameters they feel most strongly affected. Table 5 summarizes the results and shows that most of the affected firms have felt the reduction of demand as the largest obstacle. This does not mean that firms did not have any other problems (because the obstacles encountered are not mutually exclusive), but those were not as important as the demand reduction. For example, severe financial difficulties were experienced by less than 12% of all firms.

Table 5: Primary effects of the crisis, by type of shock experienced

Effect of the crisis	Reduction in demand	Financial difficulties	Diff. in getting customers to pay	Difficulties in supply
Not affected	70	86	87.1	94
Affected	29	11.3	11	4.1
Did not answer	1.1	2.7	1.9	1.9
Total	100	100	100	100
<i>Number of firms</i>	<i>1489</i>	<i>1489</i>	<i>1489</i>	<i>1489</i>

It is useful to see how different industries experienced these shocks. The results are reported in Table 6. It seems that Manufacturing was affected the strongest by the reduction in demand and supply, while Transport had the biggest financial difficulties among all industries.

Table 6: Primary effects of the crisis by type of shock experienced and by industry. Percentages of firms affected

(%)	Manufacturing	Construction	Trade	Transport	Service	Total
Reduction in demand	31.5	22.9	27.0	27.2	27.5	29.0
Financial difficulties	13.0	11.5	7.3	15.8	8.8	11.3
Difficulties with customers	9.8	11.5	11.3	15.8	11.3	10.9
Difficulties in supply	6.7	0.0	2.9	0.0	1.8	4.1
<i>Number of firms affected</i>	721	96	274	114	284	1489

A similar table (Table 7) shows that big and small firms are affected in almost the same way. However, it is remarkable that bigger firms are less affected by financial difficulties than smaller ones, probably because they have better access to bank loans.

Table 7: Effects of the crisis by type of shock experienced and firm size

(%)	20-29 employees	30-39 employees	40-49 employees	50-99 employees	100+ employees	Total
Reduction in demand	30.3	32.2	35.2	27.2	27.3	29.0
Financial difficulties	16.0	14.7	11.2	11.2	7.7	11.3
Difficulties with customers	11.1	12.4	10.4	11.4	10.0	10.9
Difficulties in supply	4.9	6.2	5.6	3.0	3.5	4.1
<i>Number of firms affected</i>	244	177	125	463	480	1489

The analysis also shows that one shock does not come alone. It appears that many firms experience both demand and credit shocks at the same time. Table 8 compares the Danish experience with the results in the ECB survey. However, there is a common general concern that these numbers depend on the past volatility of the underlying variable, and this may differ across the sampled countries. This problem is stronger for the Danish survey because data was collected at a later point of time in the development of the crisis than the data in the ECB survey. Therefore, some firms in the Danish sample may have been able to counteract the shocks, while others may have gone out of the sample of firms with more than 20 employees due to job destruction or bankruptcy. Another issue is that the Danish survey only covers firms down to 20 employees, where the ECB-survey covers firms with more than 10

employees. It should also be mentioned that the sample size of the Danish survey is bigger than that of the ECB survey.

With these precautions in mind, we believe it is safe to say that the demand shock in Denmark belongs to the lowest among the countries in Table 8. The same is the case for credit shocks. Another 3.96% have been affected both by demand and credit shocks. Denmark seems to experience an incidence close to the one in Austria. When we compare Manufacturing and Trade, we find that Denmark has experienced a far better situation compared to the average European country both with respect to demand and credit shocks. However, with respect to Market services, Denmark has been hit almost at the average European level.

Table 8: Incidence of strong demand and credit shocks. Weighted by size of firm.

Country	Demand	Credit	Demand + Credit
Denmark	26.25	7.51	3.96
Austria	29.5	14.5	5.4
Belgium	43.6	18.3	13.8
Czech Republic	53.4	26.9	18.8
Estonia	80.6	39.8	34.4
Spain	40.5	27.5	19.4
France	35.6	10.3	5.6
Italy	43.9	21.1	12.6
Netherlands	38.3	20.7	10.9
Poland	22.1	15.3	7.9
Total	38.4	19.5	11.9
Euro area	32.7	19.3	11.7
Non-euro area	40.1	19.5	11.9
Manufacturing	50.4	24	16.1
Denmark Manufacturing	28.3	8.6	4.3
Trade	30.7	19.2	10.5
Denmark Trade	30.19	4.88	3.73
Market services	26.9	13.4	7
Denmark Services	23.56	10.43	3.96

Source: Fabiani et al., 2010, and own results, weighted by size

Responses to the crisis

The second part of the survey investigates how firms have reacted to the shocks.

The reduction in demand

Among the companies moderately or strongly affected by a reduction in demand, we asked what they have done in order to cope with the situation. The respondents could give more than one answer. The majority of firms say that they have reduced their costs compared to reducing prices, production and gross margins (profit), which were the other options. First of all, this shows that many firms are doing several things at the same time, but their efforts almost always involve lowering costs.

Table 9: Firms responses to the reduction in demand.

Responses of firms (%)	Reduction in prices	Reduction in production	Reduction in gross margin	Reduction in costs
Yes	43.3	49.9	48.0	81.0
No	55.9	48.9	50.0	18.6
Did not answer	0.8	1.2	2.1	0.5
Total	100.0	100.0	100.0	100.0
<i>Number of firms affected</i>	<i>1061</i>	<i>1061</i>	<i>1061</i>	<i>1061</i>

The next question addresses how firms reduced costs. Table 10 shows that the majority of firms reduced employment. It is surprising that there are only small differences across industries. Very few companies say that they reduced wages or different types of bonus payments. It is somewhat surprising that the reduction of costs is so focused on reductions in employment and that there is so little use of the other flexibilities in wages, bonus payments and hours. It is especially surprising because the on-going decentralisation of wage bargaining in Denmark has opened up for much more flexibility with respect to these factors. However, this is not a specific Danish reaction because it has also been found for the other European countries (Fabiani et al., 2010).

Table 10: Types of cost reduction strategies, by industry.

Cost reduction by reducing (%)	Manufacturing	Construction	Trade	Transport	Service	Total
The basic wage	2.0	1.6	0.0	4.0	0.5	1.5
Bonuses	1.4	7.8	0.5	4.0	1.6	1.9
Employees	58.3	51.6	59.2	52.0	63.5	58.5
Hours worked	2.6	0.0	1.5	9.3	1.1	2.4
Other reductions	35.3	37.5	38.3	30.7	33.3	35.3
Did not answer	0.4	1.6	0.5	0.0	0.0	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
<i>Number of firms affected</i>	<i>501</i>	<i>64</i>	<i>196</i>	<i>75</i>	<i>189</i>	<i>1025</i>

However, wages are not completely unaffected. Almost 40% of all firms in the survey indicate that they imposed a wage freeze, and another 10% say that they will do it. The differences across industries clearly reflect the degree of foreign competition as fewer Service and Transport firms say that they have frozen wages or intend to do so.

The percentage of employees affected by the wage freeze is quite big, 75.5%, on average.

Table 11: Percentage of firms that have or will freeze wages as response to the crisis, by industry and the share of employees affected by this action.

Freeze salary (%)	Manufacturing	Construction	Trade	Transport	Service	Total
No	43.9	44.3	44.9	53.9	57.0	47.5
Yes, we have	41.9	42.6	41.1	37.0	34.0	39.8
Yes, we will	11.8	9.8	11.4	9.1	6.6	10.2
Did not answer	2.7	3.3	2.3	0.0	2.4	2.4
Total	100	100	100	100	100	100
<i>Number of firms</i>	<i>956</i>	<i>122</i>	<i>329</i>	<i>153</i>	<i>402</i>	<i>1962</i>
Employees affected by salary freezing (%)	78.68	78.55	80.22	60.40	66.12	75.5

In order to investigate which factors (firm characteristics) might influence the decision of freezing the salaries of the employees, we have estimated a logit function. Results are shown in Table 12, and it seems that the smallest firms have higher chances of freezing wages, compared to the bigger firms, while the type of industry does not have a determining role. What seems to matter is the effect of the crisis on the company and whether the company has been affected by it or not. Thus, the probability of freezing wages is significantly higher for companies that have been

affected by the crisis, compared to those that declared themselves unaffected. Furthermore, it can be seen that negatively affected firms have higher probability of freezing wages than the ones positively affected by the crisis, which of course is not surprising. Work flexibility or type of contract does not seem to influence the wage freeze probability at all. Similarly, it is found that market competition has a negative impact. Specifically, the probability of freezing wages decreases in monopolistic markets.

Table 12: Logit results of firm characteristics on the probability of freezing wages. (marginal effects)

	Probability of freezing wages	Robust Std. Err.
Firm size (reference:20-29 employees)		
<i>30-39 employees</i>	-0.13	0.06
<i>40-49 employees</i>	-0.04	0.06
<i>50-99 employees</i>	-0.04	0.05
<i>100+ employees</i>	-0.15	0.06
Industry (reference Transport)		
<i>Manufacturing</i>	0.04	0.09
<i>Construction</i>	0.01	0.11
<i>Trade</i>	-0.01	0.10
<i>Services</i>	-0.02	0.10
Revenue	0.00	0.03
Negatively affected	0.25	0.07
Positively affected	-0.09	0.16
Few competitors	-0.12	0.05
Danish company	-0.05	0.05
Net job creation	0.00	0.00
Work flexibility	0.05	0.10
Collective contract for salaried employees	0.07	0.07
Collective contract for workers	-0.06	0.08
Work flexibility and collective contract for salaried workers	-0.07	0.11
Work flexibility and collective contract for workers	0.02	0.12
Number of observations	899	
Pseudo R2	0.09	

Notes: bold indicates significant at 10%; weighted results, using employment weights

The role of banks and credit

Given that this crisis started out as a bank crisis, it is important to see to what extent credit constraints have dragged down firms. It appears that the shortage of funds is not one of the worst threats to the firms (only 21% of them have been affected) – again, we have to remind ourselves that firms mostly affected by the shortage of finance probably have closed down at this point in the crisis.

In our sample, the number of firms saying that they have experienced a credit constraint is relatively small, as described in Table 13. It is impossible to say if this is a small or large increase in credit constraints, since we did not observe the firms before the crisis.

Table 13: The prevalence of credit constraints among the firms experiencing financial difficulties.

Firms experiencing financial difficulties (%)	20-29 employees	30-39 employees	40-49 employees	50-99 employees	100+ employees	Total
Limited access to credit	43.0	33.3	41.7	36.4	33.9	37.0
Problems financing new projects	62.8	73.3	58.3	58.5	41.1	56.4
Large borrowing costs	36.0	31.7	27.8	30.5	25.0	30.0
<i>Number of firms affected</i>	86	60	36	118	124	424

The most important result is that a number of firms do not start new projects due to funding problems. In the next section, we will examine the overall impact of these constraints on job creation and destruction in order to investigate the costs to the economy.

Recent job market development

For the analysis of the possible job loss we use the number of jobs created and destroyed by each firm in 2011, which is information obtained from a different part of the survey, that dealt specifically with the number of jobs created and/or destroyed in 2011. The jobs are divided within four personnel categories - top management, mid-level managers, salaried employees (white collar workers) and workers (blue collar workers).

We use these data to distinguish between expanding (positive net job creation) and contracting firms (negative net job creation).

Job creation versus job destruction

A firm is considered to be expanding if the number of jobs created is higher than the number of jobs destroyed.⁶

$$Firm\ expanding = \begin{cases} 1, & \text{if net job creation} > 0 \\ 0, & \text{otherwise} \end{cases}$$

Following the same logic, a firm is considered to be contracting if the number of jobs destroyed exceeds the number of jobs created.

$$Firm\ contraction = \begin{cases} 1, & \text{if net job creation} < 0 \\ 0, & \text{otherwise} \end{cases}$$

Also, we consider a firm as having *zero growth* if net job creation is zero.

This definition does not account for the evolution of the different personnel categories within a company⁷, but the distinction between expanding and contracting is important because it allows us a better understanding of the “health” of the companies and a better overview of the direction of Danish economy. The expansion of a company indicates a positive evolution of the firm, a blossoming of the production generated either by an increase in the demand or by entering on a new market. The contraction of the firm indicates a restructuring of the company generated either by a reduction in demand or by the firm’s decision to leave a certain

⁶This is in line with the typology of Lazear and Spletzer, 2011. A difference is that we look at job flows, and they look at worker flows with respect to hires and separations.

⁷ A company may be destroying some types of jobs at the same time that it is categorized as expanding. Thus, the number of blue collar jobs may go down but the firm is characterized as expanding if the reduction is outnumbered by the increase in salaried employees.

market. Financial difficulties generated by the crisis can also lead to contraction. We will further investigate these issues empirically in the second part of this section.

First, we analyse job growth for firms that are either expanding, have zero job growth or are contracting. Table 14 shows that the number of jobs created by the surveyed firms is higher than the number of jobs destroyed. However, this should not be taken as evidence that Denmark is now moving out of the crisis but as an indication that the surveyed firms are moving in the right direction and are on their way out of the crisis. However, Table 14 shows that some firms are still destroying jobs. Overall, our sample seems to have passed the trough of the crisis since job creation has been dominating destruction in 2011. Still, for the Manufacturing sector, the numbers of jobs created/destroyed reported by Statistics Denmark⁸ show a different picture in which job destruction dominates over job creation.

The differences between official statistics and our sample may be generated by a selection bias, because our sample consists of firms with more than 20 employees, and 50% of these firms are in Manufacturing. Furthermore, our sample may be biased towards the better firms because personnel managers in better companies may be more likely to respond to the survey than others, but this is probably not the main cause for the different outcomes. It is more likely that the difference is related to size of firms. The most likely scenario is that firms with less than 20 employees are responsible for the decline in jobs. This corresponds with our finding that the smallest firms in our sample are more seriously hit by the crisis⁹. Therefore, we can assess that the sampled firms are generally in a better shape than the average and smaller firm.

⁸ See the Appendix for a better description.

⁹ Since the published data from Statistics Denmark is not divided in size groups, we cannot confirm this hypothesis.

Table 14: Job Creation and Destruction in 2011 in expanding and contracting firms in sample. (number of jobs)

Industry	Job creation		Zero growth	Job destruction		Net job creation
	Expanding	Contracting		Expanding	Contracting	
Manufacturing	7052	571	79	545	3375	3782
Construction	1179	76	12	135	328	804
Trade	2557	403	30	230	2573	187
Transport	1951	37	11	191	828	980
Services	3302	371	371	433	1854	1757
Total	16041	1458	503	1534	8958	7510

Contracting or expanding?

As shown in the previous chapter, the financial and economic crisis has caused firms to reduce costs and most of them responded by firing employees. We will now use the same information to investigate if credit constraints or other factors are correlated with the job destruction or expansion in 2011. Using a logit function, we have estimated the probability of a company restricting or expanding its activity and correspondingly, adjusting the number of employees.

In Table 15 we have controlled for firm size, industry, competition conditions and specific firm characteristics such as existence of a bonus system, collective contracts and flexible wages. The Large firm dummy variable equals one for firms with more than 50 employees, Bonus for employees is a dummy variable accounting for any type of bonus offered to the salaried workers and workers, and Low competition is a dummy variable equal to one for firms with less than 5 competitors. Furthermore, we have added variables for experienced difficulties with respect to demand and financial constraints.

We analyse two different scenarios; one where we compare contracting firms with expanding and zero growth firms, and one where we compare expanding firms with contracting and zero growth firms. We have also tried a multinomial logit specification with three separate outcomes. The results are not qualitatively different, but the first ones are easier to interpret.

Table 15: The effects of the crisis on the decision of expanding or contraction. (marginal effect)

	Contraction	Std. Err.	Expansion	Std. Err.
Large firms	0.03	0.03	0.07	0.04
Manufacturing	-0.03	0.05	-0.01	0.06
Construction	-0.10	0.07	0.08	0.08
Trade	0.09	0.06	-0.13	0.07
Services	-0.07	0.06	-0.10	0.07
Bonuses for Top and Mid Management	-0.03	0.03	0.10	0.03
Bonuses for employees	0.02	0.03	0.03	0.03
Low competition	-0.04	0.03	0.03	0.03
Flexible wages	-0.06	0.07	0.06	0.07
Collective contract for salaried workers	0.01	0.04	-0.01	0.04
Collective contract for workers	0.06	0.05	-0.14	0.06
Work flexibility and C.C for S	0.00	0.06	0.01	0.06
Work flexibility and C.C for W	0.11	0.08	-0.06	0.08
Financial difficulties	0.09	0.04	-0.06	0.04
Financial difficulties for large firms	-0.06	0.08	0.01	0.09
Demand problems	0.16	0.03	-0.13	0.04
No of observations	1115		1115	
Pseudo R2	0.05		0.06	

Notes: bold indicates significance at 10%-level.

Table 15 shows that problems with reduced demand in the beginning of the crisis will increase the likelihood that a firm contracts by 16%, even in 2011, while financial difficulties increase this chance by 9%. In the case of expanding firms, the coefficient to financial difficulties is negative but not significant, while the problems with demand will reduce the probability that a company expands by 13%.

Moreover, large firms have higher chances of expanding than smaller firms. Firms in the Trade sector seem to have the lowest chances of expanding. Furthermore, it is also found that incentives for top management will increase the likelihood of an expansion.

It may be argued that financial constraints are a consequence of the demand problem as banks are more likely to reject financing in companies with demand problems. To limit this possible bias from demand problems in our results, we

analysed the effects of financial difficulties on firms with different degrees of demand problems.

Furthermore, we divided financial difficulties into the underlying three questions: difficulties in getting finance for new projects, borrowing costs are too high, and limitations in existing credit and we ran separate regressions for each combination of levels of demand problems and types of financial difficulties, using the same explanatory variables as in Table 15. The results are summarized in Table 16. The first column consists of those firms that had no demand problems at all, the second column of those who had moderate demand problems together with those with no demand problems, and finally for all firms irrespective of their level of demand problems. This is done for expanding and contracting firms separately, as in Table 15.

Table 16. Marginal effects of regressing job expansion and contraction on various measures of financial constraints on samples with different degrees of demand problems.

Demand problems	Contraction			Expansion		
	None	Moderate or None	Strong, Moderate or None	None	Moderate or None	Strong, Moderate or None
Overall financial difficulties	0.22	0.10	0.12	-0.05	-0.08	-0.10
<i>Std dev.</i>	0.07	0.04	0.03	0.14	0.05	0.04
Financing new projects	0.17	0.08	0.11	0.02	-0.05	-0.08
<i>Std dev.</i>	0.09	0.04	0.04	0.15	0.05	0.04
Borrowing costs are too large	0.21	0.16	0.27	-0.09	-0.18	-0.21
<i>Std dev.</i>	0.04	0.05	0.10	0.19	0.08	0.06
<i>Number of observations</i>	339	868	1115	448	868	1115

Note: Bolded coefficients are significant at 10%

The first column of Table 16 shows that even firms having experienced no demand constraints have an increased probability of contraction due to financial difficulties. The next columns show that the marginal probability of contraction is also lower if they have been experiencing even moderate or strong demand problems together with financial difficulties. The type of financial difficulty seems to play almost no separate role, since the results are almost identical for difficulties financing new projects as for difficulties with borrowing costs.

In the case of expanding firms, the probability of expansion is reduced by the existence of financial difficulties together with problems of demand. However, our results indicate a negative but not significant effect on the probability of expansion for the most restricted group of firms without demand problems. It is worth remarking that expansion is positively related to size, according to Table 15, and from Table 13 we know that banking problem are less prevalent for large companies so it may be that size is a joint confounder that lowers the significance of the financial indicators on job creation.

Nevertheless, there is still the possibility that the negative correlation between job contraction and financial problems is due to a generally bad economic situation of the firm which will make the bank reject the credit application. It is, of course, hard to know which factors the bank will use for this decision. The most obvious candidates would be: total revenue, total profit (in levels or growth rates), equity or solvency of the previous year or a combination of these. In the next section we analyse the effects of the credit constraints on firms with a positive growth in revenue, in 2011, according to their own statement in the questionnaire. We use this proxy for a good/stable economic situation of the company under the hypothesis that a firm with growing revenue is less likely to be rejected by the bank.

Table 17: Marginal effects of regressing job expansion and contraction on various measures of financial constraints on samples with different degrees of demand problems under the condition that revenue is increasing in 2011.

Demand problems	Contraction			Expansion		
	None	Moderate or None	Strong, Moderate or None	None	Moderate or Non	Strong, Moderate or None
Overall financial difficulties	0.29	0.11	0.10	-0.13	-0.08	-0.08
<i>Std dev.</i>	0.08	0.04	0.03	0.17	0.06	0.05
Financing new projects	0.32	0.11	0.11	-0.10	-0.06	-0.06
<i>Std dev.</i>	0.10	0.04	0.04	0.17	0.06	0.05
Borrowing costs are too large	0.30	0.09	0.15	-0.15	-0.17	-0.15
<i>Std dev.</i>	0.10	0.07	0.05	0.22	0.09	0.07
<i>Number of observations</i>	259	529	609	396	609	774

Table 17 shows that although this extra limitation lowers the number of observations, it does not change the coefficients very much compared to Table 16, where we just conditioned on various levels of demand constraints. All this points to the existence of a credit crunch in Denmark which affects even “healthy companies”. Theoretically, the question remains whether it is a causal relation from credit to growth or it is the opposite relationship. However, since our results show that the relationship is maintained for the least likely situation, we believe that we have brought some evidence for a causal interpretation.

Furthermore, it is worth remarking that this result is obtained on firms that are generally doing much better with respect to job creation than the average Danish firm, suggesting even more severe financial difficulties for the average Danish company.

Summary and conclusions

This study contains analyses of a recent survey designed to investigate the evolution, experiences and reactions of Danish firms during the largest recession since the oil crisis in the 1970’s. The first part of this study looked at the effects of the crisis on Danish firms, while the second part consisted of an analysis of the development of job creation and destruction in private sector firms.

The survey shows that almost all firms have been negatively affected by the crisis, although a small number of firms have benefitted from the crisis. The main way that firms have been affected has been by a decreasing demand for goods and services. The second most important way has been through a credit crunch. A large number of firms say that the lack of financial support for new projects has constrained their growth. These results may underestimate the real effects of credit constraints and demand reductions, especially for small firms, due to the possible bias in our survey. Comparing the survey with a similar survey conducted by the European Central Bank reveals that Danish firms have been hit by the economic crisis at a similar level as Austria, which is among the least affected countries in Europe in the ECB analysis. This result may, however, be biased by the fact that we have been surveying Danish firms 2 years later into the crisis compared to the European survey. This means that

a number of firms have already been closed or have reduced their number of employees to 20 or less, making them non-participants in our survey.

In the second part of our study we look at the job creation and destruction behaviour of the surveyed firms in 2011. Our survey shows a more optimistic picture with a positive net creation of jobs in Danish firms, whereas Statistics Denmark still shows a negative development in 2011. This difference may be caused by the possible sampling bias in our survey.

Also, we show that smaller firms have a higher probability of becoming affected by the crisis while firms in a market with less competition have lower risk of being affected. Moreover, we show that financial and demand constraints trigger cost reduction that leads to a reduction of the number of employees and restructuring of the firms.

Finally, we find that firms in our sample are more likely to destroy jobs if they have credit problems. This coefficient remains significantly different from zero even when we only base our estimations on firms which did not have demand problems related to the crisis or when we restrict our estimates to companies with no demand problems and positive revenue growth in 2011. This indicates that firms, which have had no problems on the demand side and have no economic problems, are also constrained by the credit system.

A similar negative correlation of job creation and credit problems is only found for firms that also have demand problems so it is not possible to say that a credit constraint plays an independent role for job creation. Thus, for expanding firms it cannot be ruled out that banks do not constrain activities. However, it is found that expansion is higher for large firms and large firms do have less financial problems so it is hard to rule out a relationship between less expansion and finance problems.

Given the fact that we are investigating the large and probably better-fit firms, our results indicate an even larger and more serious credit problem for the smaller and less fortunate firms.

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Appendix

A. Sample description

Table A1: Sampling Frame of survey; Percentage of firms sampled, by industry and number of employees.

Industry	20-29 employees	30-39 employees	40-49 employees	50-99 employees	100+ employees	Total
Manufacturing	99.1	99.1	100.0	99.6	99	99.3
Construction	5.6	13.8	19.3	63.2	100	25.0
Trade	7.6	9.4	18.4	61.9	98.9	30.0
Transport	3.9	11.8	10.6	62.0	98.7	32.4
Services	6.1	8.4	14.8	60.4	98.1	36.3
<i>Total</i>	23.0	30.8	35.2	72.2	98.7	47.5

Table A2: Coverage rate of the survey, by industry and size group.

Industry	20-29 employees	30-39 employees	40-49 employees	50-99 employees	100+ employees	Total
Manufacturing	45.16	51.81	53.54	50.89	49.03	49.30
Construction	3.09	4.43	11.01	29.61	45.98	11.68
Trade	3.79	4.22	10.25	30.46	47.48	14.67
Transport	2.12	7.89	6.38	35.44	48.32	17.33
Services	3.33	4.35	7.42	35.11	43.90	18.27
<i>Total</i>	10.84	15.68	18.99	37.90	46.82	23.63

Table A3: Number of responses and non-responses, by industry.

Industry	Answered	Not found	Did not answer	Bankruptcy	Other reasons	Total
Manufacturing	956	485	432	24	28	1925
Construction	121	75	50	6	7	259
Trade	329	214	102	15	12	672
Transport	153	83	41	2	7	286
Services	402	261	106	18	12	799
<i>Total</i>	1961	1118	731	65	66	3941

Table A4: Number of responses and non-responses, by firm size.

Firm size	Answered	Not found	Did not answer	Bankruptcy	Other reasons	Total
20-29 employees	329	161	184	13	11	698
30-39 employees	225	115	88	10	4	442
40-49 employees	166	73	61	3	5	308
50-99 employees	607	295	216	19	19	1156
100+ employees	634	474	182	20	27	1337
<i>Total</i>	1961	1118	731	65	66	3941

TableA5: Number of firms and rate of coverage for industries.

Industry	All firms > 20 employees	Answered	% answered
Manufacturing	1939	956	49.3
Construction	1036	121	11.7
Trade	2242	329	14.7
Transport	883	153	17.3
Services	2200	402	18.3
<i>Total</i>	8300	1961	23.6

Table A6: Number of firms and rate of coverage for size groups.

Firm size	All firms > 20 employees	Answered	% answered
20-29 employees	3035	329	10.8
30-39 employees	1435	225	15.7
40-49 employees	874	166	19.0
50-99 employees	1602	607	52.5
100+ employees	1354	634	46.8
<i>Total</i>	8300	1961	23.6

B. Job destruction in Denmark during the crisis

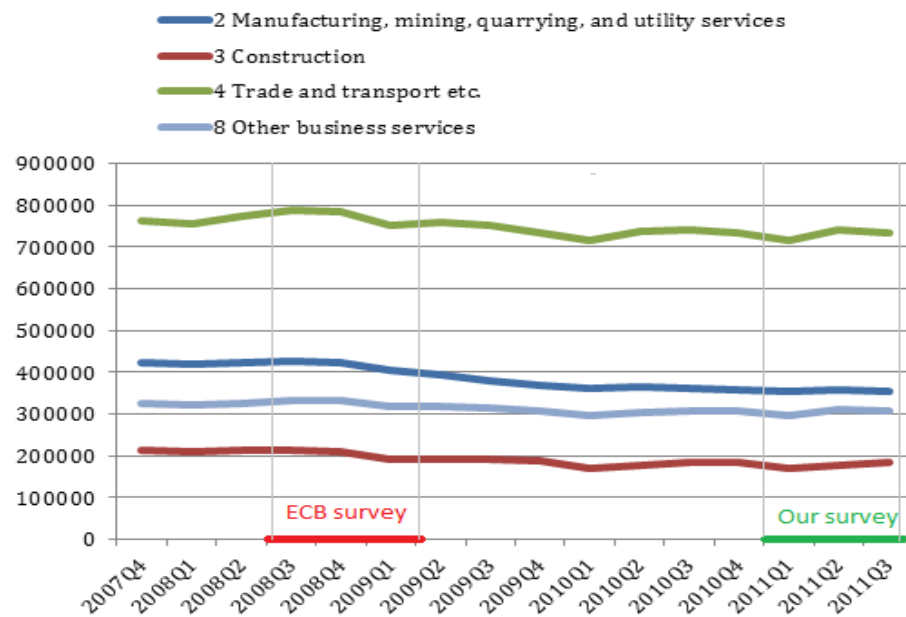
Table B1 shows that Denmark has lost almost 9% of all private sector jobs since the 3rd quarter of 2008. The largest loss was in the Manufacturing industry with 15% of all jobs. Manufacturing was most vulnerable because of a wage growth higher than in countries competing with Danish products, especially Germany, (DA, 2012). Since the ECB survey was conducted in the summer of 2009 and the Danish survey was run in Nov-Dec 2011, it is obvious that Denmark was surveyed later in the development of the crisis and this will have an impact on the answers. First of all, it means that many adjustments have been executed in the early phase of the crisis, therefore making comparisons with the ECB survey difficult. Secondly, a number of the Danish firms might have left the sample of firms surveyed because they have lost many jobs already or might have gone bankrupt at the time of our survey. Table B1 shows that $\frac{3}{4}$ of the job destruction happened in the first phase of the crisis, from the 3rd quarter of 2008 to the second quarter of 2009, when the ECB survey was conducted. Conversely, $\frac{1}{4}$ of the total destruction happened between the time of the ECB-survey and our survey. Thus, it is most likely that the firms are more influenced by the second phase of the crisis than by the first phase, when responding to the survey.

Table B1: Total job destruction in the Private sector from 2008.

Job loss in	Q ₃ ²⁰⁰⁸	Overall (Q ₂ ²⁰⁰⁸ - Q ₃ ²⁰¹¹)	The first phase (Q ₂ ²⁰⁰⁸ - Q ₃ ²⁰⁰⁹)	The second phase (Q ₃ ²⁰⁰⁹ - Q ₃ ²⁰¹¹)	Impact in the First phase (%)	Impact in the Second phase (%)	Overall change (%) (Q ₃ ²⁰⁰⁸ - Q ₃ ²⁰¹¹)
Manufacturing, mining and quar.	427651	-67358	-47446	-25052	70	30	-15.8
Construction	212560	-26762	-20155	-7807	75	25	-12.6
Trade and transport etc.	787168	-48659	-36269	-15946	75	25	-6.2
Information and communication	115620	-6515	-3709	-2128	57	43	-5.6
Financial and insurance	96028	-7433	-5484	-2707	74	26	-7.7
Real estate	64140	-1023	-4418	1566	432	-332	-1.6
Other business services	332871	-23829	-18248	-6795	77	23	-7.2
Total	2036038	-181579	-135729	-58869	75	25	-8.9

Figure B1 shows the evolution of jobs in Denmark in the past 5 years and the differences between the effects captured by our survey and the ECB survey.

Figure A1. Evolution of jobs in main private industries, 2007-2011.



C. The Questionnaire

Questions on the reaction to the current economic downturn

1 - To what extent is your firm's activity (in terms of turnover) affected by the current economic and financial crisis?

Please choose a single option

- Negatively affected (please specify)
 not at all
 marginally
 moderately
 strongly
 exceptionally strongly
 Positively affected
 Not at all

2 - To what extent is the current economic and financial crisis affecting your firm with respect to each of the following aspects? *Please choose an option for each line*

	<i>not at all</i>	<i>marginally</i>	<i>moderately</i>	<i>strongly</i>	<i>exceptionally strongly</i>
Fall in the demand for your firm's products/services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty in financing your firm's activity through the usual financial channels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty in being paid by customers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty in obtaining intermediate products from your firm's usual suppliers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3 - If the current economic and financial crisis is causing a fall in the demand for your firm's products/services, to which degree has your company adopted each of these strategies to face such a fall?

Please choose an option for each line

	<i>To a high degree</i>	<i>To some degree</i>	<i>To a low degree</i>	<i>Not at all</i>
Reduce prices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduce margins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduce output	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduce costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4 - If the reduction of costs is of any relevance in your answer to question 3, please indicate the main channel through which this goal is achieved in your firm.

Please choose a single option, the most important factor

- Reduce base wages
Reduce flexible wage components (for example bonuses, benefits, etc.)
Reduce the number of permanent employees
Adjust the number of hours worked per employee
Reduce other costs

5 - In the current economic and financial crisis, has your firm (or is it going to) frozen the base wage of some employees?

Freeze in base wage: base wage in nominal terms is unchanged from one pay negotiation to the next
The last two options are not mutually exclusive

- No
Yes we froze the nominal base wage
 For what percentage of employees _____%
Yes we are going to freeze the nominal base wage

6 - In the current economic and financial crisis, has your firm (or is it going to) cut the base wage of some employees?

*Cut in base wage: base wage in nominal terms is decreased from one pay negotiation to the next
The last two options are not mutually exclusive*

- No
- Yes we froze the nominal base wage
- For what percentage of employees _____%
- Yes we are going to freeze the nominal base wage

7 - If the current economic situation is causing financial difficulties for your firm, please indicate the reason for this.

The options are not mutually exclusive

- The bank has limited an existing credit
- The bank is unwilling to expand current credit line
- Borrowing costs have become too high

Questions on other economic factors

8 - Does your firm have any of the following bonus systems for each of the following employees groups?

	<i>Individual bonuses</i>	<i>Team bonuses</i>	<i>Stocks or warrants</i>	<i>Equities Employee shares</i>	<i>Profit shares</i>	<i>Qualification based wages</i>
Top-management personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mid-level management personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Salaried employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9 - Does your firm have any of the following characteristics:

- Is covered by a collective agreement for monthly paid (salaried) employees Yes/No
- Is covered by a collective agreement for hourly paid employees (workers) Yes/No
- Has a collective contract that makes it possible to work flexible hours without overtime pay Yes/No
- For salaried employees Yes/No
- For workers Yes/No
- The firm is a subsidiary of a firm abroad Yes/No
- The firm is a parent company for one or more companies abroad Yes/No
- The firm has created jobs in 2011 Yes/No
- The firm has destroyed jobs in 2011 Yes/No

10 - How many competitors does your firm have in the market of your core business? (0...1000)

11 - How big is the increase in turnover in 2011 compared to 2010? (percentages)

Om jobskabelse og -nedlæggelse og den finansielle situation i virksomhederne, 2012

Notat baseret på Center for Corporate Performance dec 2012 survey om løn- og ansættelsesforhold i danske virksomheder

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Baggrund: Center for Corporate Performance lavede i 1999 den første survey over løn- og ansættelsesforhold i større danske virksomheder med over 20 ansatte. Den blev gentaget i 2009, 2011 og 2012. I de to sidste er der tilføjet spørgsmål, der tager temperaturen på danske virksomheder. Spørgsmål er udsendt til de personaleansvarlige i godt 4000 virksomheder. Der kom svar fra godt 2000. Fremstillingsvirksomhed er overrepræsenteret, fordi det er her, der er nedlagt flest job under krisen, og det er her jobskabelse må siges at være mest kritisk. Disse tal er naturligvis ikke helt af samme kvalitet, som registerdata, men muliggør til gengæld mere kvalitative oplysninger, som ikke kan indsamles via registrene. Et andet fortrin er, at vi kan få data, som er tæt på begivenhederne og meget nærmere, end hvis vi havde skullet vente på registerdata.

I dette notat har vi samlet nogle af de oplysninger, som har betydning for en aktuel konjunkturbedømmelse. Vi har følt, at resultaterne er så væsentlige til en bedømmelse af konjunktursituationen, at de skal ud til en bredere offentlighed hurtigst muligt.

En foreløbig analyse af vore data viser, at der blandt virksomhederne i stikprøven netto er nedlagt 396 job og, at det er gået værst ud over Transport og Service. Tabel 1 viser, at der blev skabt 15350 job i virksomheder, der i øvrigt ekspanderer, og at der samme sted nedlægges 1244 job. I virksomheder, der trækker sig sammen, skabes der 1889 job, mens der nedlægges 16391 job. Det sidste afspejler, at virksomheder godt kan nedlægge en type job og oprette en anden type job inden for det samme år. Disse tal illustrerer glimrende, at der som led i den normale udvikling på samme tid oprettes og nedlægges mange job. Men nettotallet siger naturligvis, at det ikke går, som det skal, når arbejdsløsheden samtidig er betydelig.

Inden for industrien oprettes der således hele 5565 job hos de ekspanderende virksomheder, mens de samtidig nedlægger 695, mens de kontraherende virksomheder nedlægger 5457, mens de samtidig opretter 500 job. Netto er der tale om, at industrien opretter 303 nye job.

Tabel 1. Jobskabelse og nedlæggelse i virksomheder, som enten ekspanderer eller bliver mindre. 2012

Industry	Jobskabelse			Jobnedlæggelse		Netto jobskabelse
	Udvidende	Indskrænke	Nulvækst	Udvidende	Indskrænke	
Industri	5565	695	72	500	5457	303
Byggeri	1429	217	49	36	707	903
Handel	2683	251	38	209	2488	237
Transport	1607	124	2	193	2213	-675
Service	4066	602	56	306	5526	-1164
Total	15350	1889	217	1244	16391	-396

Da vi har oplysninger om oprettelse og nedlæggelser af forskellige stillingskategorier inden for den enkelte virksomhed kan vi også vise, at der foregår en simultan oprettelse og nedlæggelse af forskellige jobtyper, men sådan, at der sker et skift af stillingssammensætningen. I tabel 2 kan man således se, at der nedlægges 629 job blandt timelønnede, men at der samtidig oprettes 212 job for funktionærer. På ledelsesplan skubbes der også "opad".

Tabel 2. Jobskabelse og nedlæggelse fordelt på stillingstyper og på om virksomheden netto ekspanderer eller trækker sig sammen. 2012.

Level	Jobskabelse			Jobnedlæggelse			Netto jobskabelse
	Udvidende	Indskrænke	Nulvækst	Udvidende	Indskrænke	Nulvækst	
Topledelse	155	39	1	19	102	2	72
Anden ledelse	1235	242	13	137	1394	10	-51
Månedslønnede	6415	967	93	526	6659	78	212
Timelønnede	7545	641	110	562	8236	127	-629
Total	15350	1889	217	1244	16391	217	-396

Sammenlignes med vore resultater for 2011, er nettojobnedlæggelserne noget dårligere end i 2011, hvor der netto blev oprettet 3067 job blandt de undersøgte større virksomheder. I 2011 viste Danmarks Statistik senere hen, at der netto blev nedlagt job i 2011, så man kunne deraf slutte, at de navnlig blev nedlagt blandt de mindre virksomheder. (DST's statistik muliggør ikke en opdeling på virksomhedsstørrelse, før der foreligger registerdata flere år efter). Hvor meget dårligere får man et indtryk af ved at sammenligne de virksomheder, der var med i både 2011 og 2012.

Tabel 3 viser, at de samme virksomheder i 2011 skabte godt 3000 job netto, mens de i 2012 har nedlagt 894 job. Desuden kan man se, at jobskabelsen er gået ned i industrien, mens serviceindustrien har måttet stå på mål for den største vending og nedgang. Dette er bemærkelsesværdigt, fordi det i tidligere kriser har været Serviceektoren, der har ført an med jobskabelse efter, at krisens værste jobnedlæggelser er gennemført, se Ibsen og W-N,

2011. Det er altså gået de samme virksomheder inden for alle brancher dårligere mht jobskabelse i 2012 end i 2011.

Tabel 3. Nettojobskabelse i virksomheder, der var med i undersøgelsen i både 2011 og 2012, fordelt på industri.

	Netto jobskabelse	
	2011	2012
Industri	1973	1065
Byggeri	442	298
Handel	-449	-351
Transport	97	-499
Service	1004	-1407
Total	3067	-894

Tabel 4 beskriver det samme fordelt på stillingstyper, og deraf kan man se, at det gået ud over ledere, funktionærer og timelønnede, hvor de sidste har måttet tage den største nedgang i 2012, hvor det gik dem noget bedre i 2011.

Tabel 4. Nettojobskabelse i virksomheder, der var med i undersøgelsen i både 2011 og 2012, fordelt på stillingstyper.

Level	Netto jobskabelse	
	2011	2012
Topleddelse	57	31
Anden ledelse	403	-31
Månedslønnede	1521	-186
Timelønnede	1086	-708
Total	3067	-894

Disse tal tyder således på, at 2012 er gået væsentligt dårligere for de større private virksomheder end 2011 med hensyn til jobskabelse. Helt så pessimistisk er det dog ikke, når man ser på, hvordan det er gået den enkelte virksomhed i 2012 i forhold til, hvordan det gik dem i 2011. Det viser sig nemlig her, at hele 61% af dem, der ekspanderede i 2011 også gjorde det i 2012. Kun 22% af de ekspanderende virksomheder ændrer sig til at indskrænke i 2012. Og hyppigheden for at være indskrænkende i begge år er kun omkring 29%.

Tabel 5. Sammenhængen mellem jobskabelse i 2011 og 2012.

Industry	Udvidende 2011 & Udvidende 2012	Indskrænk. 2011 & Indskrænk. 2012	Udvidende 2011 & Indskrænk. 2012	Indskrænk. 2011 & Udvidende 2012
Industri	61%	26%	23%	33%
Byggeri	69%	17%	18%	42%
Handel	52%	42%	26%	16%
Transport	74%	22%	16%	33%
Service	63%	34%	23%	25%
Total	61%	29%	22%	29%

Ved at sammenligne svarene i 2011 med svarene fra identiske virksomheder i 2012 kan vi se, hvor konsistent væksten er over de to år. Vi finder, at der er en betydelig "træghed", således at 61% af de virksomheder, der ekspanderede i 2011 også gjorde det i 2012. Men alligevel er det bemærkelsesværdigt, at der er 39% af de i 2011 ekspanderende virksomheder, som ikke ekspanderer i 2012. Desværre har vi ikke et umiddelbart benchmark at sammenligne med.

På samme vis finder vi, at 29% af de virksomheder, der i 2011 nedlagde job, også gør det i 2012. Endelig ser vi, at der er nogenlunde den samme andel, der går fra jobnedlæggelse i 2011 til ekspansion i 2012 og en lidt mindre andel går fra joboprettelse i 2011 til nedlæggelse i 2012. Måske er det sidste udtryk for en vis positiv udvikling.

Sammenlignes brancher, kan man se, at handel er ret hårdt ramt, og at der er en ret negativ udvikling. Modsætningsvis finder vi, at byggeriet har en positiv udvikling fra 2011 til 2012.

Selv om udviklingen fra 2011 til 2012 ser ud til at være en forringelse er det dog ikke sikkert, at der er tale om en forringelse, fordi vi fra andre papirer (Ibsen og Westergård-Nielsen, 2011) ved, at de ældre og dermed større firmaer, som dominerer de adspurgte virksomheder faktisk netto nedlægger job og har gjort det i mange år. Mere herom senere.

Kredit og finansieringsforhold

I spørgeskemaet var der i 2011 en række spørgsmål vedrørende kreditforhold. Disse er gentaget i 2012 men suppleret med spørgsmål om virksomhedens egenkapital og om virksomheden har udbetalt udbytte etc., hvor vi med forskellige spørgsmål har forsøgt at afdække hvor finansielt stærke virksomhederne er.

Tabel 6 viser, at 44.5% af alle virksomheder har haft vanskeligheder med at finansiere sine normale aktiviteter gennem de normale finansielle kanaler, men samtidig skal siges, at kun knap 15% har haft alvorlige problemer med det.

Tabel 6. Vanskeligheder med finansiering

Vanskeligheder med at finansiere dit firmas aktiviteter gennem de normale finansielle kanaler	% af firmaer
Ingen	55.5
Marginal	15.5
Moderat	14.8
Stærkt	9.8
Meget stærkt	4.4
	1403

Tabel 7 viser, at for 535 virksomheder har banken givet afslag på en ansøgning om kredit til et bestemt formål. 22% af dem har drejet sig om allerede eksisterende aktiviteter, mens næsten lige så mange drejer sig om nye aktiviteter.

Tabel 7. Har banken givet direkte afslag på ansøgning om yderligere kredit/lån til følgende formål

	% af firmaer
--	--------------

En kredit der skulle bruges til allerede eksisterende aktiviteter	22.2
En kredit der skulle bruges til nye aktiviteter	20.0
Andet	57.8
Antal besvarelser	535

En trediedel af virksomhederne siger (tabel 8), at banken har begrænset en bestående kredit.

Tabel 8. Banken har begrænset en eksisterende kredit.

	% af firmaer
Ja	31.3
Nej	68.7
Antal besvarelser	601

Til trods for denne negativitet, får vi (tabel 9), at den manglende finansiering kun i godt 5% af alle observationer har haft den betydning, at man har skullet sige nej til en ordre.

Tabel 9. Har virksomheden inden for de sidste 2 år oplevet at skulle sige nej til en ordre på grund af manglende finansiering?

	% af firmaer
Ja	5.5
Nej	94.5
Antal besvarelser	2002

Man får et indblik i, at virksomhedernes finansielle situation er ret dårlig ved at konstatere, at 60% af selskaberne ikke har udloddet inden for de seneste 2 år, jvf øverste panel i Tabel 10. Kun knap 20% har fået yderligere kredit hos et pengeinstitut. Hvis de har fået yderligere kredit, så har knap halvdelen brugt kreditten til nye aktiviteter og lidt færre har brugt den til allerede eksisterende aktiviteter.

Tabel 10. Spørgsmål om finansiell situation, 2012.

Har selskabet udloddet til ejerne i mindst et af de sidste to år?	% af firmaer
Ja	40.2
Nej	59.8
Antal besvarelser	1894
Har dit firma inden for de sidste 2 år fået yderligere kredit hos jeres bank eller realkredit	% af firmaer
Ja	19.3
Nej	80.7
Antal besvarelser	1868
Blev kreditten anvendt til	% af firmaer
Allerede eksisterende aktiviteter	40.2

Nye aktiviteter	45.8
Til at indfri andre kreditter/lån	7.0
Andet	7.0
Antal besvarelser	343

Besvarelsen af disse spørgsmål om relationer til pengeinstitutter efterlader et indtryk af stærkt pressede virksomheder. Det skal dog anføres, at vi savner viden om deres situation under mere normale forhold med henblik på at vurdere, hvor dårligt det står til i øjeblikket. Lidt kan vi dog udlede af vores undersøgelse i de spørgsmål, vi har dækket både i 2011 og 2012.

Tabel 11 viser, at 75% af de virksomheder, der i 2011 sagde, at de havde finansielle problemer fortsat har det. Men desværre er der 24% der ikke havde finansielle problemer i 2011, som har fået det i 2012. Samtidig er det bemærkelsesværdigt, at det er 24% ud af et meget større tal. Dette tyder på en kraftig forværring. Hvis der har været en kreditbegrænsning i 2011 har hele 70% også oplevet en sådan i 2012. På samme måde er der en betydelig konsistens i problemer med at finansiere nye projekter. Kun på et område synes der at være tale om en forbedring, idet der kun er 23%, der i begge år siger at låneomkostningerne er for høje, mens der var 77%, der angav, at de ikke mere er for høje.

Tabel 11. Finansielle problemer i 2011 i forhold til de samme virksomheders svar på identiske spørgsmål i 2012.

Finansielle problemer i % af	2011	
	Nej	Ja
2012		
Nej	76%	25%
Ja	24%	75%
Antal besvarelser	984	166

Begrænset en eksisterende kredit	2011		
	Ja	Nej	I alt
2012			
Ja	69.57%	34.88%	78
Nej	28.99%	59.30%	71
Antal besvarelser	69	86	156

Problemer med at finansiere nye	2011		
	Ja	Nej	I alt
2012			
Ja	48%	13%	70
Nej	52%	87%	139
Antal besvarelser	122	87	209

Låneomkostninger for høje	2011		
	Nej	Ja	I alt
2012			
Nej	86%	77%	182
Ja	14%	23%	37
Antal besvarelser	154	65	219

Alt i alt giver besvarelsene indtryk af, at finansieringsforholdene er blevet forværret mellem 2011 og 2012.

Egenkapital og finansieringsforhold

I analysen af 2011-resultaterne undersøgte vi, om der var forhold, der kunne forklare, hvorfor den enkelte virksomhed oprettede eller nedlagde job. Disse er offentliggjort i Neamtu and Westergaard-Nielsen, 2012. Analyserne viste klart, at der var en sammenhæng mellem virksomhedens eventuelle finansielle problemer og dens jobskabelse. Hvis den havde finansielle problemer, var jobskabelsen mindre, og blandt de virksomheder, der nedlagde job, var jobnedlæggelserne større. Denne sammenhæng holdt også blandt virksomheder med omsætningsfremgang, så den påviste sammenhæng kunne næppe skyldes, at virksomhederne kom med lutter "dårlige projekter" til banken. Vi blev dog dengang kritiseret for ikke at have viden om virksomhedens egenkapitalforhold. Ringe egenkapital kunne således betyde, at banken ikke "spillede med", fordi virksomheden var for dårligt kapitaliseret.

Vi stillede derfor i 2012 et supplerende spørgsmål om virksomhedens egenkapital, så vi kunne se, hvordan egenkapitalens størrelse influerede på spørgsmålene omkring finansieringsproblemer.

Vi har i en række analyser undersøgt, om der er nogen sammenhæng, mellem om virksomheden siger, at den har forskellige finansielle problemer og dens egenkapital, dens størrelse, og om den havde tilsvarende problemer i 2011. Vi har undersøgt sammenhængen ved at estimere en sandsynlighedsmodel for at virksomheden skulle have finansielle vanskeligheder. Den grundliggende sandsynlighed for, at en referencevirksomhed har finansielle vanskeligheder, har vi estimeret til 40%. I tabel 12 angiver vi, hvordan forskellige egenskaber ved virksomheden enten øger eller formindsker denne sandsynlighed. (kun effekter i fed skrift er signifikant forskellige fra 0). Fortolkningen er således, at sandsynligheden for at have finansielle vanskeligheder er 5%points lavere for hver milliard højere egenkapital.. Tilsvarende er sandsynligheden 8% lavere, hvis virksomheden har 30-39 ansatte sammenlignet med basen, som er 20-29 ansatte.

Tabel 12. Sandsynligheden for finansielle vanskeligheder. Marginale effekter.

Sandsynligheden for finansielle vanskeligheder	dy/dx	Std. Err.
Egenkapital, mia	-0.05	0.02
Antal ansatte		
30-39 ansatte	-0.08	0.04
40-49 ansatte	-0.04	0.05
50-99 ansatte	-0.10	0.03
100 + ansatte	-0.10	0.04
(base 20-29 ansatte)		
Industri	-0.01	0.04
Byggeri	-0.05	0.05
Handel	-0.08	0.05
Service	-0.11	0.04

(base Transport)		
Dansk firma	-0.03	0.02
Lav konkurrence	-0.08	0.02

Vi finder således, at sandsynligheden for at virksomheden har finansielle problemer er mindre for virksomheder med en større egenkapital, sådan som man må forvente. Men effekten er forbavsende lille, idet en mia højere egenkapital kun betyder, at sandsynligheden for at have finansielle problemer falder med 5 procentpoints. Men samtidig ses der at være en størrelsesdimension, således at sandsynligheden falder lidt for større virksomheder. Kun handel og service har signifikant mindre vanskeligheder. Endelig finder vi, at lav konkurrenceudsathed betyder mindre risiko for finansielle vanskeligheder, fordi virksomhederne kan operere med større overskudsgrad. Da de marginal effekter kan sammenlignes må vi konstatere, at de små virksomheder (20-29 ansatte) med lav egenkapital inden for industrien og transport, som samtidig er konkurrenceudsatte, har den største sandsynlighed for at have haft finansielle vanskeligheder.

For de virksomheder, som besvarede surveyen både i 2011 og 2012, har vi undersøgt, om kreditforholdene er forbedret, eller om de dårlige kreditforhold hænger ved den enkelte virksomhed. Vi undersøger dette ved at estimere sandsynligheden for, at virksomheden har problemer som funktion af de samme variable som ovenfor for hvert af de nævnte finansielle problemer, men nu tilføjes en variabel, der angiver, om der var tilsvarende problemer sidste år.

Resultatet er, at alle tre slags problemer hænger ved med sandsynligheder på 9-20% selv når vi tager hensyn til egenkapital og de øvrige variable i Tabel 12. (Vi har ikke rapporteret resultaterne vedrørende de øvrige variable i Tabel 13). Forklaringen ligger derfor i noget andet, der har med virksomheden eller bankforbindelsen at gøre, det være sig ledelse, type af virksomhed, medarbejderne, generelle finansieringsforhold. Desværre har vi ikke oplysninger om, hvorvidt virksomheden har den samme bankforbindelse i de to år, så vi kan ikke udelukke, at en del af vedholdenheden skyldes bankforbindelsen

Tabel 13. Finansielle vanskeligheder i 2012 som funktion af, om der var tilsvarende vanskeligheder i 2011. (resultatet af 3 uafhængige estimationer)

	dy/dx	Std. Err.
Begrænsning af bestående kredit		
Egenkapital, Mia	-0.06	0.02
Begrænsning af bestående kredit i 2011	0.20	0.02
Bank afslår ny kredit		
Egenkapital, Mia	-0.07	0.02
Bank afslår ny kredit, 2011	0.21	0.02
Låneomkostninger for høje		
Egenkapital, Mia	-0.06	0.02
Låneomkostninger for høje 2011	0.10	0.02

Note: de samme variable som i Tabel 12 er også anvendt, men ikke rapporteret.

Jobskabelse og -nedlæggelse og finansieringsproblemer

I Neamtu and Westergård-Nielsen, 2012, viste vi, at der var en sammenhæng mellem jobskabelse og finansieringsproblemer, således at eksistensen af finansieringsproblemer betød, at der blev skabt færre nye job blandt de virksomheder, der voksede og der blev nedlagt flere job blandt de virksomheder, der indskrænkede. Denne sammenhæng var også signifikant blandt de virksomheder, der sagde, at de havde omsætningsfremgang til trods for krisen.

Vi har i 2012 undersøgelsen kørt de samme regressioner, men tilføjet to nye. Dels har vi tilføjet en variabel for omfanget af egenkapital og dels estimeret for jobskabelse og destruktion i Danmark og for aktiviteter uden for Danmark¹.

Vi har anvendt en meget simpel model, hvor sandsynligheden for, at en virksomhed ekspanderer eller beholder sin størrelse estimeres som en funktion af en række variable.

Beskrivelse af resultater

I nedenstående tabel 14 har vi gengivet alle de anvendte variable, men kun angivet koefficienter på dem, der er signifikant forskellige fra nul. For de angivne signifikante variable er standardafvigelsen endvidere anført. Resultater med signifikans på 10% eller bedre er angivet med fed skrift. Den grundlæggende sandsynlighed for at skabe jobvækst blandt virksomheder med vækst eller nulvækst er 65%. De angivne procenter i tabel 14 angiver således hvor mange procentpoint en given variabel afstedkommer. På samme måde er sandsynligheden for kontraktion også omkring de 65% for virksomheder, der indskrænker eller har nulvækst.

Ser vi først på **jobskabelsen i Danmark**, finder vi, at sandsynligheden for jobvækst er 6% større for større firmaer. Fremstillingssektor, handel og service nedlægger job med henholdsvis 14%, 20% og 18% højere sandsynlighed end transportsektoren. Og samtidig opretter handel og service med 20% 13% lavere sandsynlighed end transportfirmaer flere job. Kollektive aftaler for timelønnede betyder alt andet lige større sandsynlighed for jobnedlæggelse, og betyder samtidig en mindre sandsynlighed for jobvækst. Har virksomheden en kollektiv overenskomst for de timelønnede falder sandsynligheden yderligere. Men hvis virksomheden både har fleksible lønninger og en kollektiv overenskomst giver dette et positivt bidrag til sandsynligheden for jobvækst. Hvis virksomheden har en af de specificerede finansielle vanskeligheder, viser tabel 14, at den med 7% større sandsynlighed nedlægger job. Bonus og lav konkurrenceudsathed har ikke signifikant betydning for om virksomheden vokser eller indskrænker.

Generelt er der færre signifikante effekter for jobvækst og jobnedlæggelse uden for Danmark. Basissandsynligheden for vækst er 12% og sandsynligheden for indskrænkninger er 4%. Egenkapitalen er her negativt relateret til jobnedlæggelse men har ikke signifikant betydning for jobvækst. Større virksomheder har en større sandsynlighed for at vokse. Dansk ejede firmaer har en mindre chance for jobvækst. Men også en mindre sandsynlighed for at indskrænke. Finansielle vanskeligheder betyder ikke noget for jobskabelse, men betyder, at virksomheden er mere tilbøjelig til at nedlægge job i udlandet.

¹ I 2011-undersøgelsen var vi ikke eksplicite i vores spørgsmål til virksomhederne mht område, så svarene kan have været en blanding.

Diskussion af resultater

Overordnet er det bemærkelsesværdigt, at det er næsten de samme faktorer, men med modsat fortegn, der har betydning for, om der skabes job eller der nedlægges job. Dette er formentlig et tegn på, at vi har identificeret de væsentligste variable for processen. Desuden skal det bemærkes, at den begrænsede datamængde betyder, at få variable bliver statistisk signifikant forskellige fra nul. Overordnet betyder det, at der er meget få instrumenter, man kan gøre noget ved for at øge jobvækst eller nedbringe antallet af jobnedlæggelser. Hovedparten af forklaringen ligger givetvis i meget virksomhedsspecifikke faktorer, som vi ovenfor viste havde stor indflydelse på, om virksomheden havde kreditproblemer. Fremtidige analyser, hvor vi vil kunne trække på flere års besvarelser og hvor vi kan bringe registerdata i spil vil nok kunne forbedre analysen på dette punkt.

Alt i alt viser resultaterne, at nogle sektorer (fremstilling, handel og service) er mere tilbøjelige til at nedlægge job end transport og byggeri. Det kan hænge sammen med, at fremstillingssektoren er konkurrenceudsat og rammes af den manglende konkurrenceevne og det lave forbrug rammer handel og service. Det er samtidig meget karakteristisk, at jobvæksten bliver lavere og nedlæggelserne flere, hvis lønnen og andre ansættelsesforhold er mere regulerede, som det er tilfældet med en kollektiv overenskomst.

Det er bemærkelsesværdigt, at de finansielle vanskeligheder betyder mere jobdestruktion men i lighed med 2011 undersøgelsen ikke har signifikant betydning for jobvækst.

Jobvæksten uden for Danmark er betydelig og domineres givetvis af de større virksomheder, hvad der også kan ses af tabel 14. Jobvæksten her er endvidere positivt korreleret med egenkapitalens størrelse, men alligevel ses der at være en effekt på jobnedlæggelser af finansielle problemer.

Skal man trække situationen meget tydeligt op, og sætte tingene på spidsen, så har man valget mellem de få policy variable i tabel 14, som man kan skrue på, for at øge jobvækst og mindske nedlæggelserne blandt de undersøgte virksomheder: Enten skal man afskaffe kollektive overenskomster eller også skal man satse på at mindske de finansielle problemer for virksomhederne eller også følge en politik, der afbøder de negative effekter af begge dele

Tabel 14. Sandsynligheden for jobskabelse og jobdestruktion indenfor landet og uden for landet. Kun for de, der har svaret på spørgsmålet om finansielle vanskeligheder.

Antal of obs: 1148	I alt, Danmark				uden for Danmark			
	Jobnedlæggelse		Jobvækst		Jobnedlæggelse		Jobvækst	
	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.	dy/dx	Std. Err.
Egenkapital					0.02	0.01		
Stor virksomhed >100 ansatte			0.06	0.03			0.05	0.02
Fremstilling	0.14	0.05						
Byggeri								
Handel	0.20	0.06	-0.20	0.06				
Serviceindustri (base Transport)	0.18	0.07	-0.13	0.07				
Fleksible lønninger			-0.14	0.07				
Dansk virksomhed og marked								
Kollektiv aftale for månedsløn								
Kollektiv aftale for timelønnede	0.11	0.05	-0.17	0.05				
Fleksibel løn og kollektiv aftale for månedslønnede								
Fleksibel løn og kollektiv aftale for timelønnede			0.14	.08				
Finansielle vanskeligheder	0.07	0.03			0.04	0.01		
Bonus for medarbejdere								
Lav konkurrence								

Resultaterne om jobskabelse kan desværre kun anvendes direkte på den virksomhedsstørrelse, som data er indsamlet vedrørende. Dette er naturligvis en mangel, når vi ved, at der er flest virksomheder med under 20 ansatte, ligesom vi fra tidligere forskning (Ibsen og Westergaard-Nielsen, 2011) ved, at de store og ældre virksomheder netto nedlægger job. Samtidig er det fundet, at det største nettobidrag til jobvæksten kommer fra nystartede virksomheder. Dette er også tilfældet i USA, jf Haltiwanger et al 2011. Skal disse resultater anvendes på dette studie vedrørende større virksomheder, skal vi således ikke forvente, at de større virksomheder i en normal situation netto bidrager til jobvæksten. Men situationen nu er formodentlig ekstraordinær, fordi også mange af de større og ældre virksomheder har indskrænket antal af job væsentligt under krisen. Man kunne derfor måske forvente, at der var et potentiale for at disse kunne genvinde noget af det tabte i et opsving.

Anvender vi vore resultater fra dette studie til at sige noget om de mindre virksomheder, som altså ikke er dækket af survey, kan vi konstatere, at de mindre virksomheder i survey har mere hyppige finansieringsproblemer, ligesom de også skaber færre job, hvis de har disse problemer. Tallene for antallet af nystartede virksomheder synes kun at bekræfte, at netop disse har det særdeles vanskeligt under krisen. Man kan således formentlig godt tillade sig at sige, at de effekter, vi har fundet for de større virksomheder også er til stede for de mindre, og at de formentlig har en noget større effekt på dem.

Konklusioner

Vi har i dette notat vist, at kreditforholdene i Danmark stadig har betydning for jobskabelsen blandt virksomheder med over 20 ansatte. Vi har således vist, at virksomheder, der har finansieringsproblemer, er mere tilbøjelige til at nedlægge job end virksomheder, der ikke har finansieringsproblemer. Dette viser sig at være tilfældet uanset egenkapitalens højde, så årsagen er næppe, at disse virksomheder ikke er kreditværdige. Vi har også fundet, at der er en betydelig sammenhæng mellem, om virksomheder har problemer med finansieringsforhold i 2011 og 2012 uanset deres egenkapitalforhold. Dette kunne tyde på, at virksomhedsspecifikke forhold eller forhold vedrørende bankforbindelsen spiller ind.

Ligesom i analysen i 2011 finder vi, at der er større problemer blandt de mindste af denne gruppe virksomheder, og det indikerer, at virksomheder med mindre end 20 ansatte er påvirket endnu mere. Denne indikation understøttes klart af historier i dagspressen og ved at tale med banker og virksomheder.

Vi har desuden vist, at det tilsyneladende er ret få faktorer, der på signifikant vis påvirker jobskabelse og -nedlæggelse. Kun få af dem kan man påvirke fra politisk side. Sat på spidsen, så kan man dårligt afskærme virksomhederne fra udlandet af hensyn til EU-lovgivning, man kan dårligt fjerne betydningen af kollektive overenskomster, men man kan ved at omlægge styringen af banksektoren lette virksomhedernes finansielle problemer.

Noget andet er så, om dette er den mest effektive måde at skabe flere arbejdspladser. Vi ved nemlig, at det mest systematiske bidrag til jobskabelsen kommer fra de nystartede virksomheder. Tabsraten blandt de nystartede virksomheder er imidlertid høj, og der er få af de nystartede virksomheder, der vokser sig store. Men dels udgør det samlede antal nyskabte job i denne proces det største systematiske bidrag til jobvæksten, og dels er det formentlig også gennem nystart af virksomheder, at gode ideer bliver omsat og bliver til job og produktion. Så nystartede virksomheder er væsentlige for økonomien. Man må regne med, at netop de er meget følsomme overfor problemer med finansieringsforholdene og endnu mere følsomme end de her undersøgte virksomheder. Medicinen til de større virksomheder vil således også have effekt på de nye virksomheder.

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