ISBN 87-7882-040-5 (print)
ISBN 87-7882-041-3 (online)

WORKING PAPER 05-4

Rikke Ibsen and Niels Westergaard-Nielsen

Job Creation and Destruction over the Business Cycles and the Impact on Individual Job Flows in Denmark 1980-2001

Department of Economics
Aarhus School of Business

Job Creation and Destruction over the Business Cycles and the Impact on Individual Job Flows in Denmark 1980-2001†

Rikke Ibsen*

and

Niels Westergaard-Nielsen**

Abstract:
Job creation and destruction should be considered as key success or failure criteria of the economic policy. Job creation and destruction are both effects of economic policy, the degree of out- and in-sourcing, and the ability to create new ideas that can be transformed into jobs. Job creation and destruction are results of businesses attempting to maximize their economic outcome. One of the costs of this process is that employees have to move from destroyed jobs to created jobs. The development of this process probably depends on labor protection laws, habits, the educational system, and the whole UI-system. A flexible labor market ensures that scarce labor resources are used where they are most in demand. Thus, labor turnover is an essential factor in a well-functioning economy.
This paper uses employer-employee data from the Danish registers of persons and workplaces to show where jobs have been destroyed and where they have been created over the last couple of business cycles. Jobs are in general destroyed and created simultaneously within each industry, but at the same time a major restructuring has taken place, so that jobs have been lost in Textile and Clothing, Manufacturing and the other "old industries", while jobs have been created in Trade and Service industries. Out-sourcing has been one of the causes. This restructuring has caused a tremendous pressure on workers and their ability to find employment in expanding sectors. The paper shows how this has been accomplished. Especially, the paper shows what has happened to employees involved. Have they become unemployed, employed in the welfare sector or where?

JEL Code: M51, O51, L1, J63

Keywords: job creation and job destruction, turnover of personnel, duration of unemployment, and impact of business cycles.

* Center for Corporate Performance, Aarhus School of Business, Prismet, Silkeborgvej 2, DK-8000 Aarhus C, Denmark. Email: ribs@asb.dk

** Center for Corporate Performance, Aarhus School of Business, Prismet, Silkeborgvej 2, DK-8000 Aarhus C, Denmark. Email: nwn@asb.dk

† First draft of this paper was presented at Deutsche Statistische Woche, Frankfurt, September 2004. Thanks to two referees for instructive comments. Financial support from The Danish Social Science Research Council through CCP is acknowledged.

Introduction and Motivation

The investigation of the relationship between job and employment restructuring and the impact on individual workers is interesting for several reasons. First, there is a current debate of the ability of the economy to create sufficiently new workplaces to compensate for the outsourcing of work to other workplaces and to other countries. Second, the flexibility of the labor force is important when restructuring is implemented.

In recent years, more and more interest has been directed to the rate of which the economy is able to generate or to destroy jobs. This is clearly the case in the US, where job creation statistics at one point looked like it could have changed the outcome of the 2004 Presidential election. It is less distinct in Europe, at least so far. Instead, Europe has been much more concerned about total employment, which has been reflected in job protection legislation and more or less direct subsidies to firms in financial distress. This of course does not promote job creation and policies towards a dynamic economy, which could be the best answer to the perceived threat from the newly industrialized countries. Lack of good data on job creation and destruction is another reason but it is hardly a cause rather than an effect. In the political discussion, the employment view is mixed with discussions of mass destruction of manual jobs in the developed world by outsourcing large parts of the jobs within the traditional Manufacturing sector.

Furthermore, the composition of jobs destroyed and created has for long been the object of a discussion of the possible skill bias of technical change. The most recent consensus (Acemoglu, 2002) is that technical changes favor skilled workers and together with capital skilled workers replace tasks previously performed by the unskilled. This has increased inequality because the demand for skilled workers has been stronger. At the same time, unskilled workers in the developed world have been in sharp competition with cheap labor and low production costs in many newly industrialized countries. However, this does not necessarily create large groups of unskilled workers without jobs because at the same time an increasing number of the next generation of workers has become skilled in the industrialized world. Acemoglu (2002) draws the consensus among scholars that the increasing skill level in the 20^{th} century has created a demand for skill-biased technology, because the relative abundance of skilled workers has created a demand for

developing new technologies that could be used by these workers. In shorter periods, the relative return to schooling has been going down (1960s and 1970s) in the USA due to this relative abundance, but it has mostly been going up. The picture in Europe is less clear as there does not seem to be a common trend in the return to human capital (Harmon et al., 2001). The problem is, however, that the time span of longitudinal data to be used for estimating returns to human capital has been relatively short in Europe. In Sweden, which is one of the few countries where long data series exist, the 1960s also showed diminishing returns to education. Denmark has actually shown constant returns to education in the period 1980-1990 and increasing returns to education ever since. Though there is free mobility, there does not seem to be any signs that the substantial differences in returns between the countries tend to be competed away in a systematic way.

It is most probable that the demand for highly skilled workers has been balanced by the growth in demand for skills for most periods, but there has been a certain variability in demand and supply that has created ups and downs in the relative return to skills. In recent years, outsourcing of production to low-wage areas has accelerated the decline in relative demand for unskilled workers. Outsourcing to other countries is, however, difficult to quantify and there are only few cases where we can say that outsourcing has been going on. In (Ibsen et al., 2004), it is found that the Danish Textile and Clothing industry has been reduced by about 80% over the last 30 years, and in this particular case there is no doubt that outsourcing to low-pay countries was the main reason for the decline. Other factors have of course been the general increase in the Danish minimum wage and the gradual deregulations of international trade with textile and clothing. The surprise was that this major restructuring has happened without creating mass unemployment and without massive public support to re-training of workers. One of the mechanisms was that the industry stopped employing young workers with the result that the older workers have lived out with the industry. In most other cases, we do not know whether outsourcing or normal workplace activity is the cause of job destruction.

However, the ability to deal with these demands for restructuring is highly dependent on the level of labor market regulations. In the discussion of labor market flexibility, it has been demonstrated that average job tenure is low and similarly the likelihood of staying

for long in a job is low in the Anglo-Saxon countries and in Denmark (OECD, 1997) compared to other European countries. The reason is that some countries have highly restrictive rules concerning worker protection. Some countries enforce these rules vigorously; other countries have strict labor protection rules but are not enforcing them, while others again do not have restrictive rulings at all.

In this paper, we investigate the relation between job creation and destruction and the labor turnover and we try to answer the question whether the notorious high flexibility is a burden for workers. The conditions and atmosphere of regulations may have an impact on how employees perceive higher flexibility, so that they do not see high mobility as a problem if they are used to it. In (Kristensen and Westergaard-Nielsen, 2004), it has been demonstrated using ECHP-data that Danes are less concerned about job security than the British. The major concern in Denmark is "job content", and it seems likely that employees move job because of "job content" but also because of low job satisfaction and higher wages in other jobs (Bingley and Westergaard-Nielsen, 2004). HRM policy at the workplace is another and probably related factor that can get workers to stay longer or shorter in the job (Batt, 2002). One more reason is undoubtedly that a relatively high unemployment benefit provides a safety net for the risky transition between two jobs. However, accept of high mobility cannot be independent of the traditions and the whole functioning of the labor market.

In this paper, we chase mobility from the restructuring of companies through job creation and destruction to the mobility of individuals in order to investigate to what extent workers suffer from the restructuring of their companies. Unfortunately, we do not have access to data from other countries that could be used for a comparison. Consequently, the analysis is performed on one single country.

It is obvious that a mass destruction of jobs creates worker turnover because the majority of workers in destroyed jobs have to go out and find a new job. Similar for job creations: each time a job is being created a worker has to be hired. The simple relationship is that every time a workplace destroys (or creates) a job, it is registered as a situation where one

person separates his job (is hired). The fact is, however, that there are about 2 times as many separations and hires than job destructions and creations.

Furthermore, a number of employees will be laid off for one reason or other. Usually, researchers are not able to distinguish between situations where workers quit and where they are laid off. Furthermore, in a model of efficient turnover, it is meaningless to distinguish, because employers and employees will always bargain about the wage, and in some cases the employees will say that they do not accept a wage and in others employers will not accept a wage offer (McLaughlin, 1991). Alternatively, he argues, it makes sense to distinguish between who took the initiative. Another part of the explanation for a high worker turnover is that workers try to find a good match with employers and therefore have to try out several before they settle with one employer for a longer time. Therefore, we find that workers tend to be most mobile in the first year they are having a job. This is shown on US data by (Hall, 1982) and on Danish data by (Aagaard et al., Forthcoming). Both papers show that young employees move more than older. (Bingley and Westergaard-Nielsen, 2004) show that the reason is that on average young employees tend to get a higher economic return to mobility. Thus, there is plenty of evidence that individual effects can influence the propensity to move. It remains unclear, however, to what degree this is dependent on the job creation and destruction process. Finally, some worker turnover is related to retirement, sickness, death and accidents, and other “life events”.

The bottom line is that a job destruction is related to a process where the person is separated from the workplace. The person will then look for another job, retire, start education etc. Similar, in the case of a job creation: the establishment looks for a candidate for the job. He or she may come from unemployment or another non-working status. Alternatively, he/she may have a job in another company and decides to make a move. Since employees who have only been in a job for a short period are more likely to move, they may actually not stay for long and soon another hire has to be made (Hall, 1982); (Aagaard, Eriksson and Westergaard-Nielsen, Forthcoming). Therefore, any net job creation is actually likely to create more personnel turnover than is related to the mere job creation. On top of that come effects of organizational changes related to job growth.

Examples are effects on existing workers of employing new supervisors. Job growth can also increase tenure because it creates new career opportunities.

The smoothness of the process of filling the vacant slots and of finding new employment clearly depends on labor market functions and rules regulating the changes of workplaces. If workers are protected in their current jobs because they have had them for more than a certain amount of months, they may be reluctant to make a move because they will loose their protecting shield for a number of months where they are particularly vulnerable because they and the employer both have to test the match.

In this paper, we investigate the impact of initial job destruction and creation on worker turnover. There are several issues in this process deserving attention.

First, declining industries will be less attractive in the sense that workers leaving a job in a declining industry might have difficulty in getting a job because they have to give up part of their industry-specific human capital in the case they find a job in a different industry. This is probably why workers leaving the Danish Textile and Clothing industry to a high extent succeeded in getting jobs within the industry despite its decline (Ibsen, Olsen and Westergaard-Nielsen, 2004).

Second, it may matter whether the person comes from a volatile industry, from an industry where a high turnover is common or from an industry with a more stable employment. Coming from an industry with a higher job turnover may make it easier to find new employment in the sense that employees are used to finding new jobs and employers are not afraid of employing employees from this industry.

Third, it may also matter whether the person comes from a declining workplace, a closing workplace or an expanding workplace. The reason is that the potential new employer may use the circumstances of the last separation as a signal of productivity as described by (Gibbons and Katz, 1991) and for an application to Danish data, (Frederiksen and Westergaard-Nielsen, 2002).

Data

The data source is the CCP version of the IDA database maintained by Statistics Denmark.[1] IDA is a longitudinal database that contains information about all individuals aged 15 to 74 (demographic characteristics, education, labor market experience, tenure and earnings) and employees in all workplaces in Denmark during the period 1980-2001. This information has been collected by merging information from several registers in Statistics Denmark with the help of unique identification numbers for individuals and workplaces. Persons and workplaces are matched at the end of November each year. Consequently, only changes between ends-of-Novembers are accounted for (not intermittent changes). We have only included employees who have their main occupation with an employer. This means that we have excluded students who earn more than is allowed when receiving study support in 2001.[2] The background data for IDA consist of various registers supplemented with data from the latest census in 1970. Thus, data on education come from the census in 1970 and after that from reports from all educational institutions on their current population of students and their degree completion. This means that the educational register contains status in 1970 and all upgrades after that.

For the analysis of job separations, we have applied a different data set, where we are able to identify all spells within the year. This data set is constructed at CCP and is using extra information from other registers to date all spells within the year. Therefore, with this data we can get around the November limitation on the dynamics. The data set is used to estimate a function for the probability that a person gets immediate employment after a separation.

Job destruction is defined as a situation where an establishment looses one job, measured as the number of employees from one year to another. In this context, we use the definitions of Statistics Denmark and the annual link between workplaces and individuals in November. Similarly for a job creation. These definitions exclude temporary changes in job compositions that occur between two consecutive Novembers. A separation is

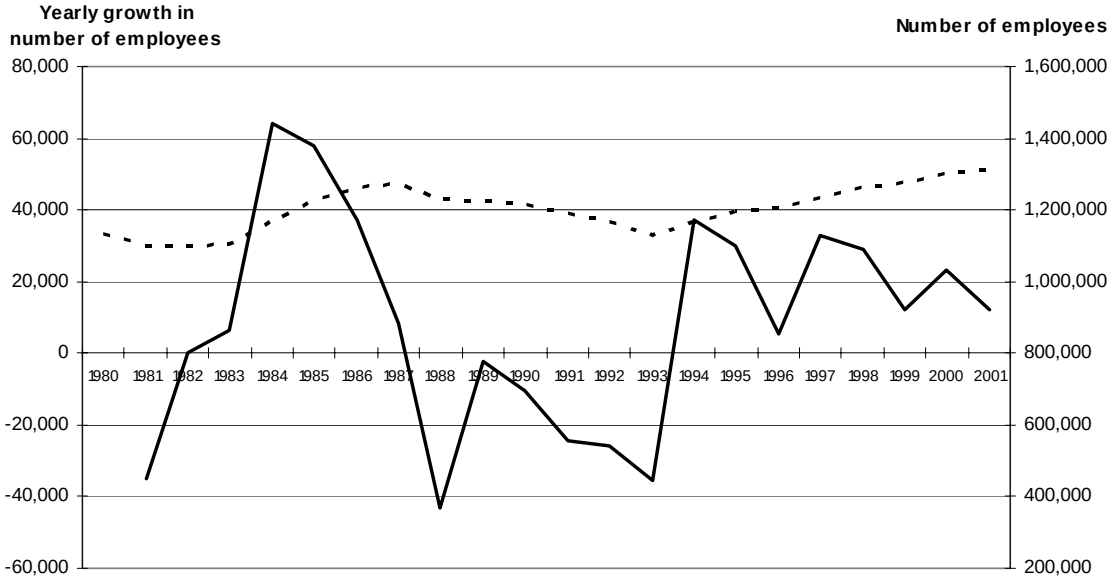
[1] Data may be approached at CCP with the permission by Statistics Denmark.
[2] This is unlike the official policy of Statistics Denmark and other statistical agencies, where most students count as ordinary employees. We have excluded working students because we find that their transition from one job to another and job creation and destruction involving students would exaggerate mobility.

defined as a situation, where the person was employed last year in November but is not employed this year in November. Similarly, a hiring is defined as a situation where a person was not employed last year, but is employed this year in November. The main problem with these definitions is that jobs are only related to what is observed on a particular day in November. Thus, we are discarding jobs in seasonal industries and are excluding other types of job dynamics. Obviously, there is a problem in defining jobs in a dynamic context. In the analysis of worker turnover, we have used data, where we have constructed dynamics drawing on other registers. However, we find at the present state that these newly constructed data cannot be used for constructing continuous job data.

Job Destructions and Creations

Over the time span from 1980 to 2001, the total private employment went up with almost 175,000.[3] The first half of the 1980s was a growth period, while the period from 1987 to 1993 was a period dominated by job destructions. Growth resumes after 1993.

Figure 1. Change and Level of Privately Employed in Denmark, 1980-2001. Solid Line is Left-hand Scale.



[3] 200,000 including students.

The net job growth can be divided into high, medium, and low growth industries. We have chosen the levels so that high growth industries have growth rates higher than the average growth rate for all industries, and low growth industries have growth rates lower than minus this growth rate. The average growth rate for all industries is 18%, so industries with growth rates higher than 18% are high growth industries, industries with growth lower than -18% are low growth industries and all in between are medium growth industries. Table 1 shows the change from 1980 to 2001. Textile has lost 21,000 jobs in that period, while computer consulting is the big winner with more than 29,000 jobs created.

Furthermore, Table 1 has ranked the observed rate of job re-allocations defined as the sum of job creations and destructions divided by the size of the workplace in the beginning of the period for each industry.[4] [5] Again, we have divided into high, medium and low levels of job re-allocation. We have chosen levels by taking the average job-reallocation and adding or subtracting one third of the average to get high, medium and low levels. Defined this way, the job re-allocation rate gives an impression of the joint activity in creating and destroying jobs. The primary sector has the highest job re-allocation rate and a very modest growth rate, but 5 out of 8 industries with high job re-allocation rates also have high growth rates. We find the lowest job re-allocation rate in chemistry, an industry with high growth.

[4] We only include upsizing, downsizing, new and closing workplaces in the job re-allocation rate.
[5] Worker re-allocation is defined as in Davis, Steve; Haltiwanger, John C. and Schuh, Scott. *Job Creation and Destruction*. The MIT Press, 1998. with the difference that the nominator is limited to one period.

Table 1. Growth and Job Turnover.

Growth				**Job Re-allocation Rate**		
Industry	**Growth 1980-2001**	**Value**	**State**	**Industry**	**Value**	**State**
Research	6887.2%	2,686	High	Primary	0.343	High
Computer Consulting	558.4%	29,208	High	Hotels & Restaurants	0.312	High
Private Social Services	287.1%	3,216	High	Cleaning	0.310	High
Rental	284.8%	4,557	High	Entertainment & Sport	0.301	High
Entertainment & Sport	235.0%	10,226	High	Teaching	0.287	High
Refuse Collection & Sewers	198.0%	2,580	High	Research	0.259	High
Advertising	140.9%	6,529	High	Private Social Services	0.257	High
Teaching	121.0%	1,757	High	Construction	0.247	High
Lawyers, Accounting & Consultancy	87.5%	31,775	High	Rental	0.233	Medium
Medical Equipment	60.1%	6,163	High	Laundry, Dry Cleaning + Hair Dressers	0.232	Medium
Hotels & Restaurants	54.9%	22,109	High	Advertising	0.227	Medium
Chemistry	49.7%	9,409	High	Other	0.212	Medium
Health & Doctors	47.3%	7,501	High	Health & Doctors	0.200	Medium
Transport	47.2%	29,905	High	Computer Consulting	0.200	Medium
Plastic	45.1%	6,708	High	Postage	0.192	Medium
Electronics	44.2%	7,486	High	Commerce	0.183	Medium
Recycling	37.0%	88	High	Transport	0.179	Medium
Wood	32.4%	3,521	High	Textile & Clothing	0.176	Medium
Postage	28.0%	5,608	High	Lawyers, Accounting & Consultancy	0.169	Medium
Furniture	16.6%	4,147	Medium	Iron & Metal	0.168	Medium
Iron & Metal	12.2%	4,627	Medium	Furniture	0.158	Medium
Commerce	10.8%	33,322	Medium	Electronics	0.156	Medium
Mechanical Engineering	10.4%	6,190	Medium	Wood	0.156	Medium
Construction	9.9%	13,273	Medium	Refuse Collection & Sewers	0.150	Medium
Financial	7.9%	4,927	Medium	Financial	0.150	Medium
Other	0.2%	52	Medium	Stone, Glass & Concrete	0.139	Medium
Cleaning	-4.5%	-825	Medium	Food	0.132	Medium
Radio & TV Manufactoring	-7.8%	-919	Medium	Plastic	0.130	Medium
Primary	-8.3%	-4,111	Medium	Recycling	0.129	Medium
Electricity, Gas, Heating & Water	-13.1%	-1,030	Medium	Medical Equipment	0.125	Medium
Food	-14.8%	-13,532	Medium	Radio & TV Manufactoring	0.120	Low
Laundry, Dry Cleaning + Hair Dressers	-15.1%	-1,835	Medium	Paper & Publishing	0.118	Low
Paper & Publishing	-19.6%	-566	Low	Transport Manufactoring	0.117	Low
Steelmills	-24.0%	-2,675	Low	Mechanical Engineering	0.108	Low
Stone, Glass & Concrete	-30.2%	-7,554	Low	Steelmills	0.108	Low
Transport Manufactoring	-37.9%	-9,531	Low	Electricity, Gas, Heating & Water	0.085	Low
Textile & Clothing	-61.8%	-20,924	Low	Chemistry	0.083	Low
Growth for all industries	17.6%	194,068		**Average**	0.185	
Growth>18%			**High**	**Average + 1/3**	0.247	**High**
Growth<-18%			**Low**	**Average - 1/3**	0.123	**Low**

Table 2 shows the relationship between worker re-allocation and stability of the industry. It clearly shows that the two measures show different aspects of the dynamic process.

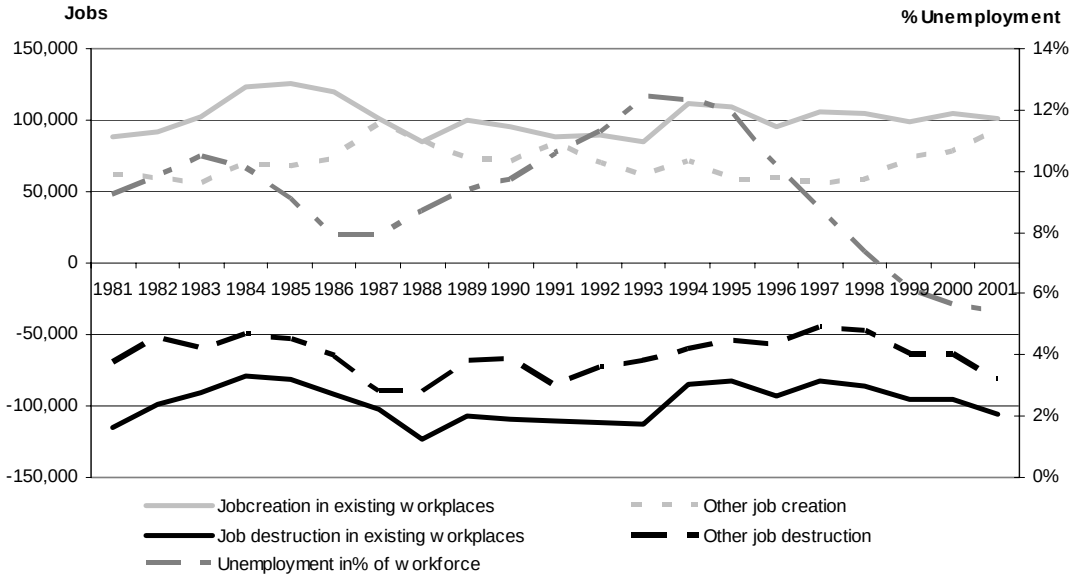
Job re-allocation has several causes. The main fraction of jobs created and destroyed relates to existing workplaces. A somewhat smaller part relates to closure of workplaces, creation of new workplaces and to changes in workplace size due to mergers and acquisitions.

Table 2. Summary of Stability and Job Re-allocation

	Decline	Stable	Growth	Total
Low re-allocation	2.82%	10.84%	2.20%	15.85%
Medium re-allocation	4.16%	44.50%	16.55%	65.21%
High re-allocation	0.00%	15.49%	3.44%	18.93%
Total	6.98%	70.83%	22.19%	100.00%

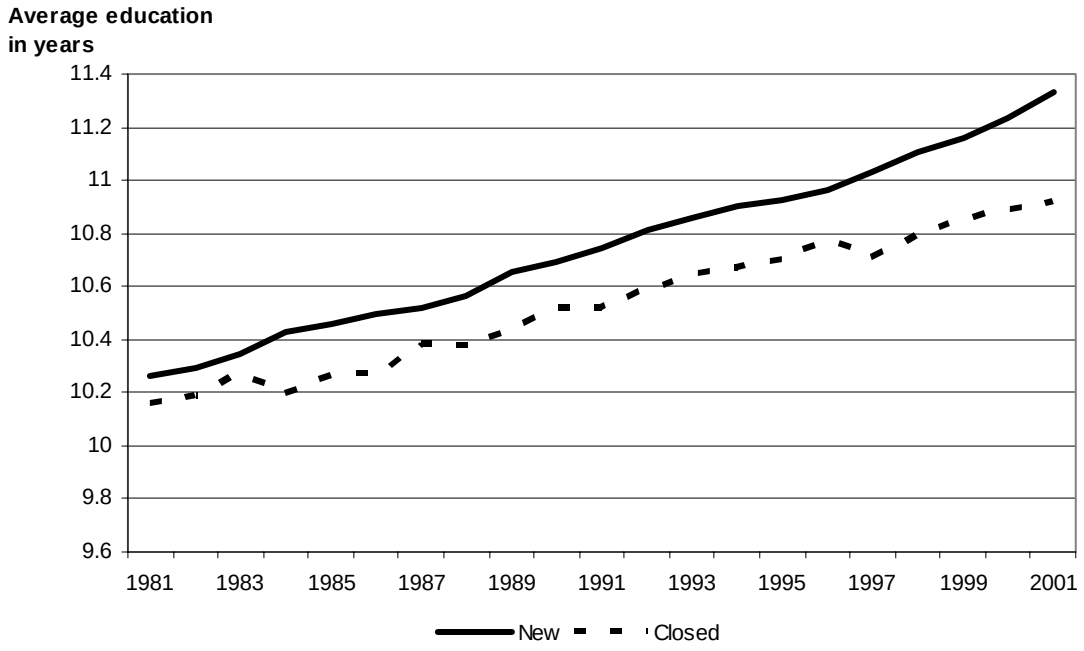
Figure 2 shows small variations in job creation and destruction over the business cycle. Comparing the development in unemployment, a closer inspection shows that the lower job creation from 1987 to 1993 and the higher job destruction in the same period in existing workplaces are the main responsible factors for the increase in unemployment. It is also noteworthy that job destruction due to other causes has a long-term development with local maxima in 1987, 1991 and 2001 and with minima in 1982 and 1997. It is obvious that other job destruction is not determined by the same factors as destruction of jobs in existing workplaces. The same applies to the creation due to new workplaces and spin-offs. These other factors could be due to changes in the conditions for creating new businesses and for closures of business. Tax laws are an obvious candidate together with the access to finance.

Figure 2. Job Creation and Job Destruction and Aggregate Unemployment.



Note: The composition of the group "other" is reported in Appendix Table A1.

Figure 3. The Composition of the Average Number of Years of Schooling in Newly Created Workplaces (up 2 years of age) and in Closed Workplaces.



The next question is whether the jobs created are of the same type as the jobs destroyed. However, it is difficult to characterize the job contents with the type of data available. One feasible and relevant aspect would be if the education required in the destroyed job is different from the education required for a newly created job. Getting a clear picture of the educational requirements of all the jobs destroyed and created would be complicated, because that would require that we were able to relate one particular person to each job. But in the case of newly created and closed workplaces, it is meaningful to compare the average educational level in the two types of workplaces. Figure 3 shows the composition of the average number of years of schooling in newly created workplaces (defined as up to 2 years old) and in closed workplaces. The graphs show that new workplaces have a higher content of education than the closed workplaces and that the difference increases over time so that it is 0.4 years in 2001. A small part of the change is related to an increasing level of education among younger cohorts, who tend to dominate hires and

new jobs, but in recent years the overall upgrade of education has not been so strong in Denmark that this can explain more than a small portion of the difference.

Table 3 shows that the average number of jobs created and destroyed in the case of up- or downsizing, new or closed workplaces is about 2.6 while it is much bigger in the cases of spin-offs or merges probably because workplaces involved in merges and spin-offs in general are bigger. Table 3 also shows that the "normal" "up- and downsize" and workplace closures and workplace creations are accountable for more jobs than the more complicated groups involving spin-offs, merges, and take-overs, so we can relatively safely limit much of our analysis to the "normal" cases.

Table 3. Average Change in Number of Jobs in Workplaces 1980-2001

	Number of **Created jobs**	**Workplaces**	**Average**	**Std. Dev.**
Upsize, identical workplace	2,127,624	805,150	2.64	7.83
New workplace	497,020	190,538	2.61	13.39
Spin-off	579,173	58,252	9.94	39.73
Upsize, workplace merge or spin-off	396,842	26,030	15.25	51.37
	Number of **Destroyed jobs**	**Workplaces**	**Average**	**Std.Dev.**
Downsize, identical workplace	-2,059,040	794,523	-2.59	7.66
Closed workplace	-409,120	153,831	-2.66	10.78
Take-over	-359,374	31,902	-11.26	44.86
Downsize, workplace merge or spin-off	-600,206	35,824	-16.75	59.61

Job creation and destruction are driven by an economic calculus of the firm, where the expected marginal profit of expanding employment is compared to the marginal costs of expanding employment. These variables are, however, very difficult to identify empirically. Even if we could observe profit, productivity and labor costs for an extended period, we would have severe problems identifying marginal investment costs related to the job expansion. Thus, our ambition is limited to describe how the level of education, experience, age of company, and of workers may influence the propensity to create or

destroy jobs together with variables that describe the growth and volatility of the industry.

Table 4. Ordered Probit for Job Creation and Job Destruction in Identical Workplaces with 10 or More Employees.

	Coefficient	Std.err.
Workplace tenure less than 2 years	**0.4917532**	*0.0100254*
Size	**0.0000938**	*2.87E-05*
Size Squared	**-2.59E-08**	*9.69E-09*
Average education in workplace	**-0.1045763**	*0.025354*
Average education Squared	**0.0124045**	*0.001055*
Average age in workplace	**0.0909482**	*0.0039272*
Average age squared	**-0.000796**	*0.0000384*
Average education*average age	**-0.0038673**	*0.00032*
Workplace outside Capital	**0.0256321**	*0.0039441*
Low job re-allocation industry	**0.0774669**	*0.0056131*
Medium job re-allocation industry	-	-
High job re-allocation industry	**-0.0616352**	*0.004246*
Declining industry	**-0.0154994**	*0.0076341*
Medium growth industry	-	-
Growing industry	**0.0365566**	*0.0039468*
N	437886	
Pseudo R-squared	0.0074	

Note: Reference characteristics: Workplace is more than 2 years old, identical workplace the year after, situated in the capital, medium re-allocation industry, and stable industry. % sizechange is calculated as sizechange(t,t+1)/1/2*(size(t)+size(t+1))

In Table 4, we report an ordered probit of the number of jobs created and destroyed in identical workplaces[6] on a number of observed characteristics to try to give a picture of the type of job creation and job destruction going on. The observation unit is the workplace, so the left-hand side is the change in number of jobs from t to t+1 in workplace j split into 5 groups. The first is job destruction larger than 10% of jobs in the

[6] New, closed, spin-offs, take-overs and merges and acquisitions are eliminated in the probit.

workplace, the second up to 10% jobs destroyed, the third is no creation/destruction, the fourth is up to 10% jobs created and the fifth is more than 10% jobs created. We only include workplaces with 10 or more employees, since small workplaces will always have more than 10% increase in size, if they increase or decrease the number of jobs with one. Time dummies are not reported.

The estimation results show that young workplaces create more new jobs than older workplaces. Bigger workplaces tend to create more new jobs, though the creation is decreasing with workplace size. Workplaces with average education are more likely to upsize. Higher average age of employees in a workplace is a growth factor but declining in intensity to the average age of 50 years from whereof it is negative. Workplaces outside the Capital are generally responsible for more growth and are less likely to downsize. The marginal effects show that the effect seems to be stronger for large upsize. The final variables show that job growth is actually smaller in a low job re-allocation industry and highest in a growing industry.

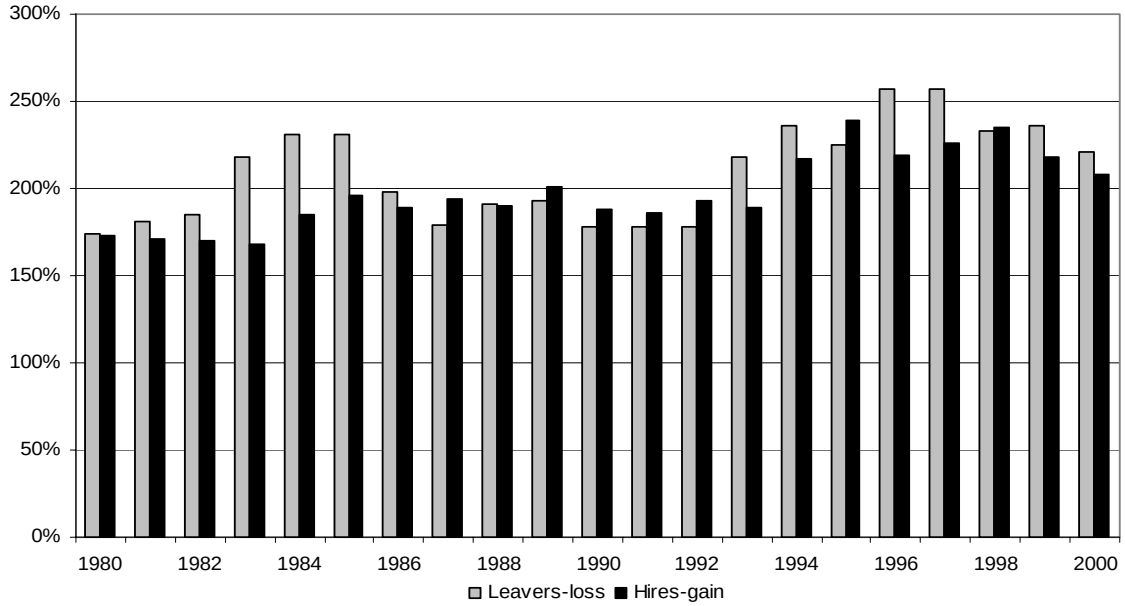
So far, we have shown that job creation and destruction are systematically related to size of workplace, average education, region and whether the workplace belongs to an industry with growth or not. There are of course other explanatory factors, where especially financial data are important, but we do not presently have sufficient data for a sufficiently long period. Furthermore, we have not been concerned about how the jobs have been filled and for how long. In the following section, we look at workers and how they are affected by the job creation and destruction process.

Worker Turnover

We assume that workers are able to move between destroyed and created jobs and between the existing jobs. Furthermore, we assume that workers are able to move out of the labor force for education, sickness, maternity leave etc. Figure 4 describes the gross flows from 1980 to 2000. In general, the gross flow is about 2 times the net job flow. Thus, on average for each job lost 2 persons will leave their job, and for each time a job is created there will be hired a little short of 2 persons. Furthermore, in the years where

the business cycle is clearly improving there are relatively more leavers for each job destroyed.

Figure 4. Hires and Leavers as Percentages of Job Loss and Job Gains.



These percentages reflect that there are many other reasons for workers to leave their workplace compared to what can be justified by the number of job destructions. This has been described as churning by (Davis, Haltiwanger and Schuh, 1998).[7] However, not all workplaces hire more than they actually need to fill the new positions. Likewise, some workplaces experience that more employees leave them than accounted for by a possible decline in the number of jobs. In Table 5, we have summarized the amount of excess hirings and separations, i.e. hirings or separations in excess of the job growth or destructions.

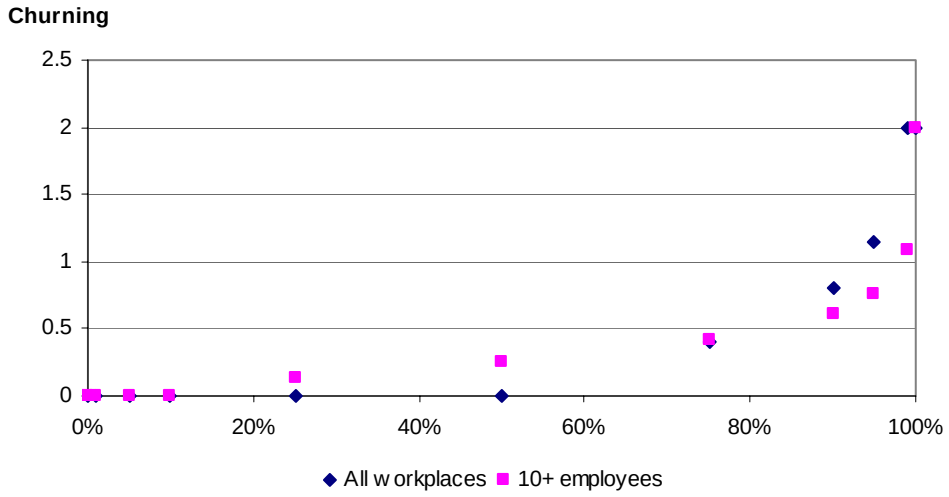
[7] Positive churning is defined as hirings minus job growth and negative churning is defined as separations-job destruction. In this way, churning becomes a sort of excess turnover. Churning only includes upsize and downsize in identical workplaces, no merges, spin-offs, takeovers are included.

Table 5. Churning and Size of Workplace.

	Churning	**No Churning**	**Average Churning Rate** *when Churning is present*	*all*
Size (number of employees)				
1	11.85%	88.15%	1.74	0.21
2-4	30.34%	69.66%	0.84	0.26
5-9	57.27%	42.73%	0.51	0.29
10-14	76.04%	23.96%	0.39	0.30
15-19	85.34%	14.66%	0.36	0.30
20-49	93.40%	6.60%	0.33	0.30
50-99	98.60%	1.40%	0.31	0.31
100-199	99.40%	0.60%	0.30	0.30
200-499	99.78%	0.22%	0.27	0.27
500+	99.93%	0.07%	0.23	0.23
Upsize	51.64%	48.36%	0.52	0.27
Downsize	44.01%	55.99%	0.52	0.23
Unchanged	29.05%	70.95%	0.90	0.26
Declining industry	55.91%	44.09%	0.43	0.24
Stable industry	39.40%	60.60%	0.63	0.25
Growing industry	41.76%	58.24%	0.66	0.28

Table 5 shows the summary statistics for churning. The two first columns show that most of the small workplaces have no or little churning and that churning clearly increases with size. This cannot be surprising since it is less likely that a workplace with 4 employees changes one of the employees without changing size than a big workplace with 200 employees. The table also shows that there is more churning in growing workplaces than in downsizing or unchanged workplaces. The reason might be that newly hired tend to stay shorter, which means that more persons have to be hired before an acceptable match has been found. Similarly, if it is a declining industry. The third column shows that the average churning rate decreases with size, but does not change much with workplace size above 10 persons and less than 200.

Figure 5. The Distribution of Churning for Workplaces with 10 and more Employees and for All Workplaces.



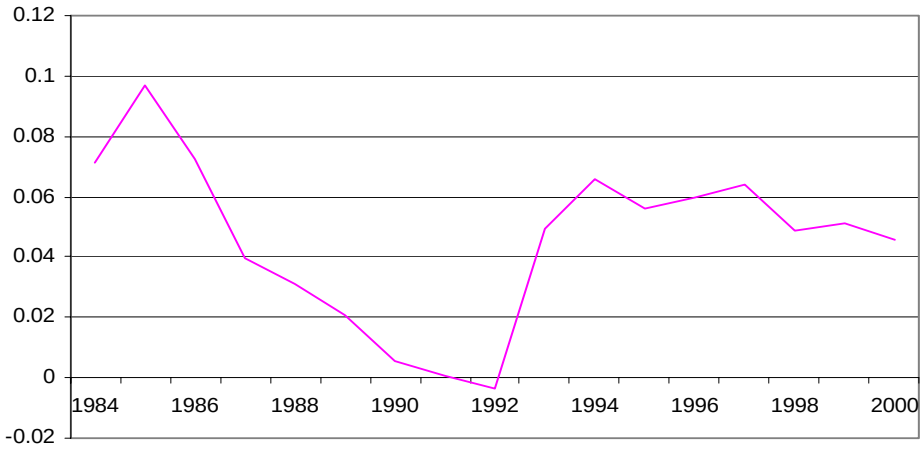
In Figure 5, we show the distribution of churning for all workplaces and more meaningful for those with more than 10 employees. Concentrating on the latter, we find that in about 15% of all cases there is no churning, meaning that the personnel turnover is solely happening because the number of jobs changes. For all others, there is a combination of turnover and churning.

In order to analyze the pattern of churning, we have run a tobit estimation of the factors influencing the churning. The Tobit is chosen because the variable has either the value 0 or a positive value. Results are reported in Table 6, which shows that churning is bell-shaped with a maximum of 1,719 employees, churning is decreasing with education at a decelerating rate, it is lower for upsizing and downsizing workplaces compared to stable workplaces, but is higher for up to 2-year-old workplaces. Finally, the estimation results show that downsizing industries have lower churning, while growing industries have higher churning. This is undoubtedly related to the abovementioned fact that it takes more than one hiring to find the right match when workplace and industry is growing. Thus, it is more costly to expand in a growing industry than in a contracting industry because other firms are also looking for the same type of employees. The time dummies are described in Figure 6.

Table 6. Tobit Estimation of Churning. Time Dummies are Reported in Figure 6.

	Coefficient	Std. Error
Constant	**0.6098955**	*0.0143124*
Size	**0.0001423**	*0.0000137*
Size squared	**-4.14E-08**	*3.74E-09*
Average education	**-0.0352996**	*0.0023419*
Average education squared	**0.0006505**	*0.0001001*
Up-size	**-0.0377531**	*0.0010857*
Down-size	**-0.0813355**	*0.0010755*
2 years old or less	**0.1294218**	*0.0026518*
Declining industry	**-0.0092491**	*0.0030858*
Growing industry	**0.0417293**	*0.001671*
N	425857	
Uncensored obs	367411	
Left-censored obs	58446	
sigma_u	**0.1863459**	*0.0006883*
sigma_e	**0.2046531**	*0.0002637*
rho	**0.4532809**	*0.0019583*

Figure 6. The Calendar Time Dimension of Churning. The estimated dummy coefficients from Table 6.



The time dummies in Figure 6 show that churning is low - other things being equal - in years with low economic activity (1988 to 1992) and is higher and relatively stable in years with economic growth.

Table 7. Decomposition of Separations on Destination States in the Private Sector, 1980-2001.

	% of all employment	**% of all separations**
Total	**28.33%**	100.00%
Job to job	**19.48%**	**68.77%**
New job in public sector	2.40%	8.49%
New job in same industry	6.27%	22.12%
New job in other industry	9.73%	34.34%
No psysical workplace	1.08%	3.83%
Job to no job	**8.85%**	**31.23%**
Unemployment	4.92%	17.38%
Education	1.03%	3.64%
Post employment wage	0.69%	2.44%
Pension	0.36%	1.27%
Out of labor force	1.52%	5.37%
New Labor Programme	0.32%	1.12%

Note: The new labor market program (NLP) was introduced in 1994 and accounts for 4.98% of the separations in 1994 and 3.95% in 1995; in later years that number is reduced. The NLP separations enter the decomposition in the same way as the other variables but are highly underrepresented since they occur for only two years.

Another issue is what happens to those individuals who leave a job for one reason or another. In (Frederiksen and Westergaard-Nielsen, 2002), there is a thorough investigation showing where employees go after having left a job. We have repeated part of their analysis adding 2001 to the span of observations. Another difference is that we have excluded employees whose main activity is being a student as we have through out this paper. Table 7 describes the results. On average, 28.33% of all employed in the private sector leave their job each year. Of those, a little less than 20% find a new job within less than a year. The majority of those, 9.73%, find a job in another workplace in a

different industry, 6.47% find a new job in the same industry, while 2.4% find a job in the public sector, and about 1% becomes self-employed.

Of the remaining 8.85%, more than half are observed as unemployed or on some labor market program the following year, around 1% starts an education and around 1% retires.

In this paper, we want to investigate how the condition of a job loss has influenced the destination of each individual who has left a job. For simplicity, we have aggregated the non-employment destinations into "to no employment", so that we distinguish between situations where the person is found in employment or not the following year in November.

Table 8. Proportion of Job Shifters Who Find New Employment or No Employment Depending on which Industry or Workplace They Come from.

% of all employment	Declining	Stable	Growing
Total	**26.97%**	**28.05%**	**30.11%**
Job to job	**16.28%**	**19.48%**	**20.76%**
Job to no job	**10.69%**	**8.57%**	**9.35%**
Unemployment	6.81%	4.83%	4.87%
Education	0.58%	0.98%	1.28%
Post employment wage	1.16%	0.69%	0.62%
Pension	0.37%	0.35%	0.39%
Out of labor force	1.46%	1.44%	1.81%
New Labor Programme	0.32%	0.29%	0.38%

The question we want to investigate is: Does the condition of the industry of your former job influence your possibilities of getting a new job?

Table 8 shows that industry characteristics seem to matter for the re-employment probability as workers from declining industries have more difficulty in getting a new job than workers from stable or growing industries. The reason could be that the specific human capital in a declining industry is not as useful in other industries compared to the

specific capital in other industries unless these workers are also different with respect to age and other characteristics. Growing workplaces appear to create a slightly higher flow into education and out of the labor force than stable or declining workplaces. Both may be related to youth, who seek more education and become pregnant more frequently.

The question is now how the initial condition of the separation process has influenced the probability that a person gets a new job. The hypothesis is that employees who have been involved in job destructions are more likely to have difficulties in getting new jobs. For this purpose, we have applied a different data set, where we are able to identify all spells within the year. This data set is constructed at CCP and is using extra information to date all spells within the year. So, with this data we can get around the November limitation on the dynamics. We can now estimate a function for the probability that a person gets immediate employment after a separation. As explanatory variables, we use person-specific information together with the job and workplace characteristics used above. In order to control for these variables, we have first run a logit on the probability of getting immediate re-employment versus no employment. Second, we have estimated the hazard rate getting back into employment for those who did not get a job right after the job from which they separated. In order to take account of that there are at least two different exit possibilities from unemployment: employment or "out of the labor force", we have estimated the hazard as a competing risk model, where the competing risks are to leave to a job or to a non-employment status.

Table 9 shows that higher education gives a higher but declining probability of getting immediate re-employment. In general, females and older workers have more difficulty in getting immediate re-employment. The conditions of the last employment are found to matter, and having been employed at a closing workplace or a workplace having been taken over is actually an advantage compared to a downsizing or unchanged workplace. "Declining industry" is here also found to be a disadvantage. These results are similar to the findings in Frederiksen and Westergaard-Nielsen (2002).

Table 9. Logit Estimation of the Probability of Getting Immediate Re-employment.

	Coefficient	Standard error
Intercept	0.032	*0.1064*
Years of education	**0.1464**	*0.0188*
Years of education squared	**-0.00387**	*0.000795*
Sex (male=0)	**-0.3642**	*0.00656*
Age less then 30 years	**0.0484**	*0.00658*
Age between 30 and 50 years	**-**	-
Age over 50 years	**-0.846**	*0.00864*
Workplace outside capital	**-0.0551**	*0.0064*
Upsize	**0.0901**	*0.00785*
Downsize	**-0.0652**	*0.00709*
Closed workplace	**0.1538**	*0.0132*
Take over	**1.5091**	*0.0257*
Upsize, merge og spin-off workplace	**0.2054**	*0.0136*
Downsize, merge or spin-off workplace	**0.4276**	*0.0108*
Unchanged	**-**	-
Declining industry	**-0.1807**	*0.0129*
Stable industry	**-**	-
Growing industry	**0.0172**	*0.00624*
Low job re-allocation industry	**-0.1563**	*0.00956*
Medium job re-allocation industry	**-**	-
High job re-allocation industry	**-0.151**	*0.00661*
No unemployment insurance	**0.6007**	*0.00864*
Construction UI	**0.1355**	*0.0123*
Iron industry UI	**0.1429**	*0.0132*
Womens unions UI	**-0.0965**	*0.0164*
Technicians UI	**0.4822**	*0.0134*
Trade UI	**0.1387**	*0.0113*
Salaried workers UI	**0.6982**	*0.0146*
Academics UI	**0.3938**	*0.0202*
Other UI	**0.2447**	*0.0114*
Selfemployed UI	**1.0576**	*0.023*
Manufacturing UI	-	-

R-square		0.0594
Max-rescaled R-square		0.0881
N	*all*	755586
	going to employment	567339
	leaving employment	188247

1=employment

Both low and high job re-allocation rates of the last workplace are found to have a negative effect, so that medium job re-allocation activity is an advantage. The final group of variables covers UI membership. UI membership is here specified as membership of a specific UI fund, named or un-named, and non-member with membership of "workmen's UI fund" as the reference group. The dummy variables for union membership cover a replacement ratio, the wage bargaining, traditions of how to find work, educational differences, and all other trade union specific factors because the UI membership is highly correlated with membership of specific trade unions and this again is correlated with the wage level and thus with the UI replacement ratio. The findings show that the higher the wage level for different trade unions is, the higher is the probability of getting a job immediately without any intervening unemployment. The reason is that worker groups with a high wage also have a low replacement ratio, and therefore they have a high incentive to find a job immediately. This is the case for "Academics" (the UI for University educated workers), "Salaried Workers", and "Technicians". The opposite pattern is found for unions with a relative low wage and therefore relatively high replacement ratio. Women's Union (KAD) (unskilled women) is the union with the highest replacement ratio (and low wage), and they are found to have a negative probability. SID is second in rank order. In order to test whether the replacement effect is the only driving force for each union, we have also run the logit specified with a UI replacement variable calculated as (eligible UI)/wage. The results show that there are also other UI-union-related factors which matter. Our conclusion so far is therefore that there is person- as well as industry- and workplace-specific effects in the function determining who get a new job without intervening unemployment.

Finally, we have estimated a competing hazard model for those who have a spell of unemployment after they have left the last job. The destination in the competing hazard model is either that the person gets a new job or that the person drops out of the labor force. Table 10 reports the coefficients. The hazard rate of getting re-employed is low for the first 8 weeks, then slightly higher for the next 8 weeks and from then it falls period for period. The hazard out of labor force is found to be increasing with the length of

unemployment. The young have higher hazards for getting re-employment and for dropping out of the labor force. The older workers have less probability of getting reemployed but higher probability of leaving the labor force, which is as expected. Years of education gives a higher probability for low skilled than for highly skilled when it comes to the re-employment hazard, and there is no effect for leaving the labor force. Given that the person has had a period of unemployment, higher education actually means lower hazard finding a job.

The workplace variables in Table 10 show that coming from a closed workplace is still an advantage (as in Table 9) even when the person has been unemployed for a while. This is clear support to the idea that workplace closures are not limited to selected workers who have been fired, "lemons" (Gibbons and Katz, 1991), but include good and bad workers. One may have expected that the positive effect on re-employment from having been through a workplace closure (compared to employees who have left an unchanged workplace) was limited to those who get job immediately, but this is not the case. Coming from a workplace which has been taken over has an even stronger impact on re-employment probability. This effect is probably closely related to the workplace closure effect and signals good ability, since it is judged that it is not the fault of the person that he or she is looking for a new job. Another interesting finding is that it is even better to come from a workplace that has changed the number of jobs with more than 10% up or down, all compared to leaving a workplace with unchanged size (+/- 10%). Furthermore, it is a remarkable finding that the market coefficients are of a lower magnitude than the person-related coefficients in the logit as well as in the hazard estimation. Of course, the relatively low goodness of fit indicates that there are other variables affecting the re-employment probability, so we cannot rule out that there are important omitted variables.

Table 10. Hazard Function for the Hazard Becoming Employed Estimated on Persons with Some Unemployment.

Parameters	Coefficient	Std. err.	Coefficient	Std. err.
Hazard	**to employment**		**to 'out of laborforce'**	
Baseline				
GE1 (0-8)	**-4.1140**	*0.0257*		
GE2 (8-16)	**-4.0782**	*0.0258*	**-5.4016**	0.0345
GE3 (16-26)	**-4.2542**	*0.0259*	**-5.2688**	0.0349
GE4 (26-52)	**-4.5100**	*0.0258*	**-5.2097**	0.0349
GE5 (52-130)	**-4.9784**	*0.0261*	**-5.0803**	0.0386
GE6 (130-)	**-4.9822**	*0.0289*	**-4.8127**	0.0540
Age (omitted: age 30-50)				
Age under 30 years	**0.2300**	*0.0047*	**0.2107**	0.0100
Age over 50 years	**-0.4965**	*0.0073*	**0.2736**	0.0126
Education in years				
Years of education	**0.6358**	*0.0473*	-0.0796	0.0636
Years of education squared	**-0.1579**	*0.0219*	-0.0041	0.0315
Working outside the Capital	**0.0722**	*0.0044*	**0.0148**	0.0088
Unemployment insurance (omitted: SID, Manufacturing)				
No inemployment insurance	**-0.1994**	*0.0069*	**0.4503**	0.0120
Construction UI	**0.3453**	*0.0071*	**0.0825**	0.0196
Iron industry UI	**0.0079**	*0.0079*	**0.1021**	0.0172
Technicians UI	**-0.2883**	*0.0104*	**-0.0919**	0.0198
Trade UI	**-0.3006**	*0.0117*	-0.0416	0.0231
Salaried workers UI	**-0.4039**	*0.0153*	**-0.1021**	0.0287
Academics UI	**-0.3491**	*0.0144*	**0.0939**	0.0272
Other UI	**-0.1864**	*0.0084*	-0.0236	0.0169
Selfemployed UI	**-0.5462**	*0.0199*	**-0.8754**	0.0418
Change in workplace (omitted: unchanged +/- 10%)				
Closed workplace	**0.1302**	*0.0111*	**-0.1300**	0.0253
Upsize	**0.0420**	*0.0057*	-0.0066	0.0115
Downsize	**0.0370**	*0.0056*	**-0.0474**	0.0113
Take over	**0.2630**	*0.0244*	-0.1234	0.0651
Upsize, merge og spin-off workplace	**-0.0452**	*0.0111*	0.0123	0.0209
Downsize, merge or spin-off workplace	**-0.0143**	*0.0093*	0.0037	0.0184
Industry change (omitted: Stable industry)				
Declining industry	**-0.1173**	*0.0087*	**0.0830**	0.0155
Growing industry	**-0.0105**	*0.0078*	**-0.0487**	0.0149
Volatility of industry (omitted: Medium Volatility)				
Low Volatility	0.0039	*0.0075*	**0.0437**	0.0141
High Volatility	**0.2265**	*0.0054*	**-0.0266**	0.0117

N=332901

The estimates of the industry variables in the employment hazard show that it is a disadvantage to come from a declining industry. This is, however, more than offset by a positive effect of coming from a high volatility industry.

The competing risk of leaving the labor force is generally age-specific, and to a smaller extent it depends on the type and level of UI. Most of the workplace variables are insignificant, though coming from a closed or downsized workplace makes it less likely that the person leaves the labor force.

Discussion and Conclusion

This paper has attempted to follow the chain of worker turnover from the destruction and creation of jobs to the turnover of individual workers.

Job creation and destruction are key variables in how well an economy functions. It is a common observation that most jobs and workplaces do not last forever. Technological chances, managerial skills, international outsourcing, and similar are commonly named as causes.

In accordance with the consensus of the literature on technological bias in the production process (Acemoglu, 2002), we do find that the newly created jobs employ employees with a higher average level of education than the destroyed jobs. Therefore, there is a bias. Whether this creates unemployment is another question and depends on the growth of supply of workers with an education. Job creation and destruction are the most likely factors to create worker turnover at least for the small workplaces. Nevertheless, average worker turnover is about twice as high as the job destruction and creation (job re-allocation) would predict. The excess turnover or churning is caused by employees and employers hunting better matches with respect to wages (Bartel, 1982, Bingley and Westergaard-Nielsen, 2004) or other job characteristics (Kristensen and Westergaard-Nielsen, 2004). Finally, employers may also lay off workers who do not fit into the organization for some reason. Excess turnover is most common for workplaces with more than 10 employees and matters less for the small workplaces. Excess turnover is found to be most common for large workplaces and for workplaces employing highly educated, relatively new workplaces, which are within the growth industries. There is less churning

if the workplace is either upsizing or downsizing. Furthermore, it is found that churning – other things being equal - goes down in years with a low economic activity and up in years with a high economic activity. Thus, churning is highly related to the process of finding better jobs and less related to situations where employers lay off workers because of wrongdoing or other mismatches. In down turns of the economy most lay offs happen in connection with adjustments of the labor force.

More than two thirds of all workers who leave an employer each year will have found a new job before next year and less than one third ends up in no employment the next year. A little more than half of these become unemployed while the rest are either retiring, in education or out of the labor force due to sickness or another reason. The question now is how the initial condition of the separation process has influenced the probability that a person gets a new job. The hypothesis is that employees who have been involved in job destructions are more likely to have difficulties in getting a new job. First, we have found that having been through a downsize, upsize or even workplace closure increases the probability of getting a job immediately without intervening unemployment, all compared to a situation with no growth. Coming from a declining industry or growing industry reduces the probability. A similar reduction in the probability is the effect of coming from a low job re-allocation industry or with a smaller effect from a high job re-allocation industry. The important point is, however, that these effects related to the previous workplace and industry are small compared to the person-related effects. Thus, being female decreases the effect much more than coming from a declining industry. Similarly, we find that the higher the average wage for the group in question is, the higher is the probability of getting immediate employment. Similarly, we have estimated the competing hazard functions for those who have had some spell of unemployment. The baseline hazard shows that the probability of getting employment decreases over time. The workplace variables show that the factors decreasing the probability of getting a job immediately are now lowering the hazard slightly. One exception is that coming from an industry with high job re-allocation actually increases the probability of getting a job. The main result is again, that the personal, individual effects are much bigger than the workplace effects.

The overall conclusion is that the initial job destruction or job creation has effects for the turnover of individuals. It seems, however, that these effects are relatively small compared to effects that can be attributed to individual incentives. The main reason is that there are other and individual reasons for worker turnover than job re-allocation. A likely interpretation is that the high job re-allocation rate in Denmark together with the high worker turnover makes it much easier for all employees to find a new job when they loose their job. This positive conclusion is of course not the same as saying that worker turnover is costless. There are without any doubt many costs related to worker separations in the form of loss of human and social capital together with losses of life satisfaction etc. However, these costs have to be compared to the possible loss of productivity of retaining employees in jobs due to worker protection laws. The stagnation in countries with high protection and the relative growth in countries with low protection in recent years may indicate that the balance has been tipped in favor of more turnover.

Literature

Acemoglu, Daron. "Technical Change, Inequality and the Labor Market." *Journal of Economic Literature*, 2002, *XL*(March), pp. 7-72.
Bartel, Ann P. "Wages, Nonwage Job Characteristics, and Labor Mobility." *Industrial and Labor Relations Review*, 1982, *35*(4), pp. 578-89.
Batt, R. "Managing Customer Services: Human Resource Practices, Quit Rates, and Sales Growth." *Academy of Management Journal*, 2002, *45*(3), pp. 587-97.
Bingley, Paul and Westergaard-Nielsen, Niels. "Careermaking and Job Mobility," Aarhus: CCP, 2004.
Davis, Steve; Haltiwanger, John C. and Schuh, Scott. *Job Creation and Destruction*. The MIT Press, 1998.
Frederiksen, Anders and Westergaard-Nielsen, Niels. "Where Did They Go?," Bonn: IZA, 2002.
Gibbons, Robert and Katz, Lawrence. "Layoffs and Lemons." *Journal of Labor Economics*, 1991, *9*, pp. 351-80.
Hall, Robert E. "The Importance of Lifetime Jobs in the U.S. Economy." *The American Economic Review*, 1982, *72*(4), pp. 716-24.
Harmon, Colm; Walker, Ian and Westergaard-Nielsen, Niels eds**.** *Education and Earnings in Europe*. Elgar, 2001.
Ibsen, R.; Olsen, K. Bjerring and Westergaard-Nielsen, N. "The Decline of the Textile and Clothing Industry," Aarhus: CCP, Aarhus School of Business, 2004.
Kristensen, Nicolai and Westergaard-Nielsen, Niels. "Does Low Job Satisfaction Lead to Job Mobility?," Bonn: IZA, 2004.
McLaughlin, Kenneth J. "A Theory of Quits and Layoffs with Efficient Turnover." *Journal of Political Economy*, 1991, *99*(1), pp. 1-29.
OECD. "Employment Outlook," Paris: Oecd, 1997.
Aagaard, Anders; Eriksson, Tor and Westergaard-Nielsen, Niels. "Wage and Labor Mobility in Denmark, 1980-2000," E. Lazear and K. Shaw, Cambridge: NBER, Forthcoming,

Appendix A

Table 1A. Distribution including 'Other' for Job Creation and Job Destruction

Distribution of Job Creation

	Upsize	New	Spin-off	Merge-spin Upsize
1981	58.87%	15.84%	16.21%	9.08%
1982	60.99%	15.56%	13.27%	10.18%
1983	64.68%	14.68%	12.29%	8.35%
1984	63.70%	15.59%	10.98%	9.74%
1985	65.28%	13.30%	12.57%	8.85%
1986	61.84%	15.20%	13.58%	9.37%
1987	50.84%	14.82%	25.26%	9.08%
1988	50.30%	15.18%	15.45%	19.07%
1989	57.91%	15.04%	18.24%	8.81%
1990	57.33%	12.99%	18.92%	10.75%
1991	51.45%	15.45%	18.56%	14.54%
1992	56.35%	11.87%	19.66%	12.12%
1993	58.09%	11.82%	17.96%	12.13%
1994	61.14%	11.79%	14.79%	12.28%
1995	65.57%	11.71%	12.55%	10.17%
1996	61.52%	12.49%	14.81%	11.18%
1997	65.42%	12.03%	12.67%	9.89%
1998	64.37%	12.46%	13.80%	9.37%
1999	57.60%	14.05%	16.36%	11.99%
2000	57.17%	13.81%	18.16%	10.87%
2001	52.06%	13.58%	20.24%	14.12%

Distribution of Job Destruction

	Downsize	Closed	Take over	Merge-spin Downsize
1981	62.13%	13.95%	8.06%	15.86%
1982	65.68%	12.47%	7.60%	14.25%
1983	60.04%	16.70%	6.18%	17.08%
1984	61.00%	13.92%	7.72%	17.37%
1985	60.22%	14.45%	8.18%	17.15%
1986	58.48%	13.90%	10.52%	17.10%
1987	53.25%	13.64%	8.58%	24.53%
1988	58.04%	10.81%	16.31%	14.84%
1989	60.86%	10.97%	8.53%	19.64%
1990	62.07%	10.83%	9.64%	17.46%
1991	56.15%	11.00%	15.34%	17.51%
1992	60.36%	10.05%	10.55%	19.04%
1993	62.03%	10.45%	9.69%	17.83%
1994	58.51%	11.38%	12.74%	17.38%
1995	60.17%	12.58%	12.25%	15.00%
1996	62.20%	9.36%	13.13%	15.31%
1997	64.46%	11.25%	8.94%	15.34%
1998	64.37%	10.46%	8.66%	16.51%
1999	59.83%	12.28%	10.92%	16.96%
2000	59.86%	11.07%	11.63%	17.45%
2001	56.43%	10.57%	11.61%	21.39%

Appendix 2.

Excluding students with minor work income.

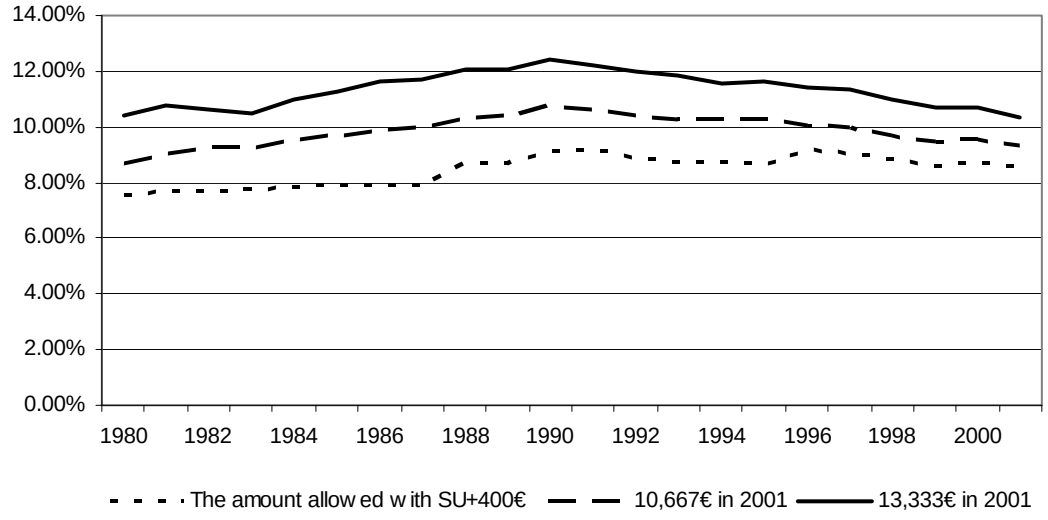
This note is on the exclusion of students from the data on job creation and destruction.

The official policy of Statistics Denmark and other statistical agencies is that most students count as ordinary employees even for a small number of hours. We have excluded working students from this study if their wage income is small, because we find that including all transitions from workplaces and jobs would exaggerate mobility.

Instead, we have applied a rule saying that the student is excluded if he or she is registered as attending an education and as having a wage income less than the earnings ceiling for students still maintaining their education support from the state (SU). This was in 2001 € 8762. On top of that, we add an additional € 400 to create a buffer.

To illustrate the number of employees excluded from the sample because they are defined as students, the percentage of employees removed from the data set is illustrated in Figure A1 along with the percentage of students that would have been removed if the income level had been set to € 10,667 or € 13,333 in 2001 and deflated in the preceding years.

Figure A1. Percentage of All Employees Excluded because of Student Status and Wage Level.



Using our favorite criteria excluding all students with wage income up to SU level + € 400 will exclude 8.45% of the employees, while an income level of € 10,667 would have excluded 9.85% and an income level of € 13,333 would have excluded 11.33% on average.

Looking at the group excluded in this paper, it turns out, that the number of excluded employees differs significantly across industries reflecting different use of students as temporary workers.

Table A1. Average Share of Student Employees in Industry and Share of Students, defined as those earning up to the allowances of Student Support (SU) plus extra 400 € (2001-level).

	% of Industry Average 1980-2001		% of Students Average 1980-2001
Hotels & Restaurants	26.90%	**Retail**	36.25%
Entertainment & Sport	20.16%	**Hotels & Restaurants**	12.30%
Cleaning	16.24%	**Food**	6.98%
Primary	15.13%	**Primary**	6.55%
Paper & Publishing	13.17%	**Paper & Publishing**	5.85%
Retail	12.90%	**Construction**	4.61%
Rental	12.28%	**Lawyers, Accounting & Consultancy**	2.71%
Health & Doctors	10.90%	**Cleaning**	2.24%
Laundry, Dry Cleaning + Hair Dressers	10.16%	**Transport**	2.13%
Advertising	9.83%	**Financial**	1.90%
Food	8.90%	**Health & Doctors**	1.82%
Postage	8.83%	**Iron & Metal**	1.59%
Teaching	8.68%	**Postage**	1.46%
Other	7.03%	**Other**	1.43%
Private Social Services	6.70%	**Mechanical Engineering**	1.40%
Lawyers, Accounting & Consultancy	6.21%	**Furniture**	1.39%
Furniture	5.18%	**Entertainment & Sport**	1.32%
Textile & Clothing	5.09%	**Textile & Clothing**	1.21%
Plastic	4.60%	**Laundry, Dry Cleaning + Hair Dressers**	0.96%
Wood	4.58%	**Plastic**	0.78%
Research	4.22%	**Advertising**	0.62%
Iron & Metal	4.17%	**Electronics**	0.60%
Construction	3.86%	**Wood**	0.54%
Electronics	3.49%	**Rental**	0.44%
Medical Equipment	3.29%	**Transport Manufactoring**	0.44%
Financial	3.16%	**Medical Equipment**	0.40%
Transport	3.08%	**Stone, Glass & Concrete**	0.39%
Computer Consulting	3.01%	**Computer Consulting**	0.39%
Refuse Collection & Sewers	2.41%	**Chemistry**	0.34%
Mechanical Engineering	2.38%	**Radio & TV Manufactoring**	0.25%
Radio & TV Manufactoring	2.35%	**Steelmills**	0.17%
Transport Manufactoring	2.20%	**Electricity, Gas, Heating & Water**	0.11%
Stone, Glass & Concrete	2.06%	**Teaching**	0.10%
Steelmills	2.02%	**Private Social Services**	0.07%
Recycling	1.87%	**Refuse Collection & Sewers**	0.05%
Chemistry	1.58%	**Research**	0.01%
Electricity, Gas, Heating & Water	1.44%	**Recycling**	0.00%

In Table A1, the average share of student employees in the industries is reported in the first column and the second column shows where the students are employed, as a share of all students. Both columns are sorted in descending order.

Looking at the first column, the share of students in the Hotels & Restaurants (27%) is by far the largest. The lowest share is in Electricity, Gas, Heating and Water (1.44%). Since most of these students (with low work income) have short-lived jobs, excluding or including them will have a big impact on job creation and destruction and on turnover.

In the second column, it is clear that most students work in Retail, where the share is 36%, while the share for Hotels & Restaurants is 12%. The difference from the first column stems from the fact, that the Retail industry is much larger than the Hotel & Restaurant industry.

Finally, we have taken a look at the development over time for Hotels & Restaurants and Retail, since they have the largest share of student employees. Figure 2A shows that the 2 industries have an increasing share of student employees. From 1980 to 2001 the share rose from 22% to 29% in Hotels & Restaurants and from 11% to 15% in Retail.

Figure 2A. Development in Share of Student Employees

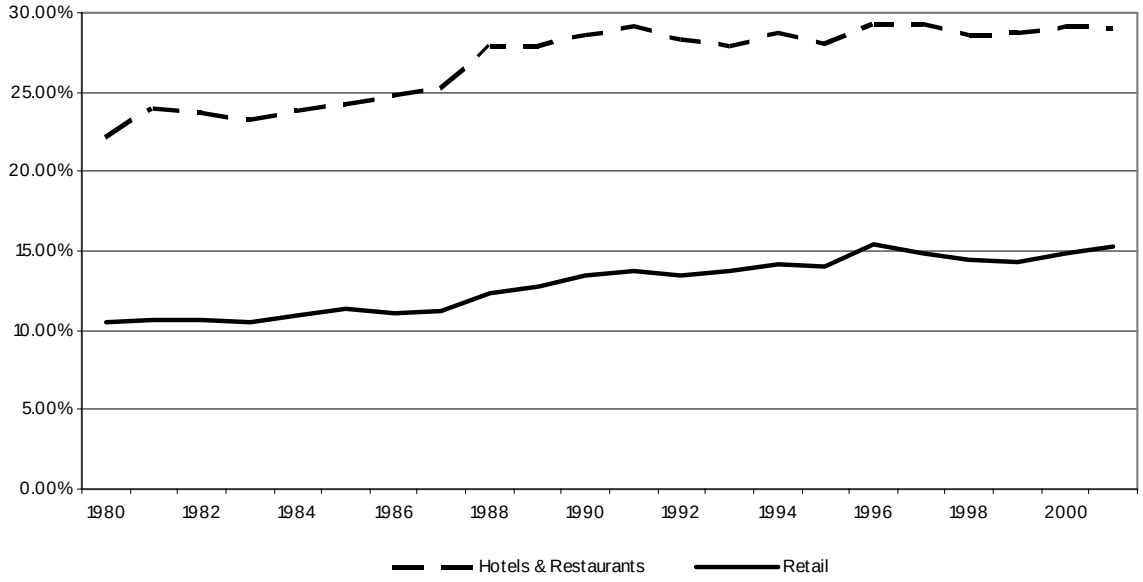


Figure 3A. Development in Distribution of Students on Industries

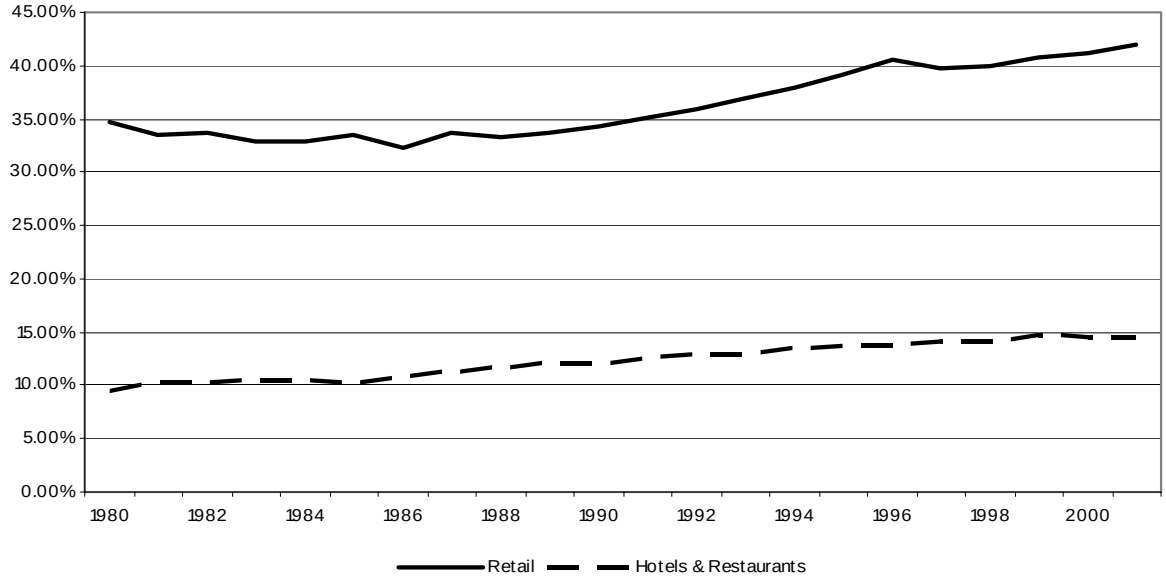
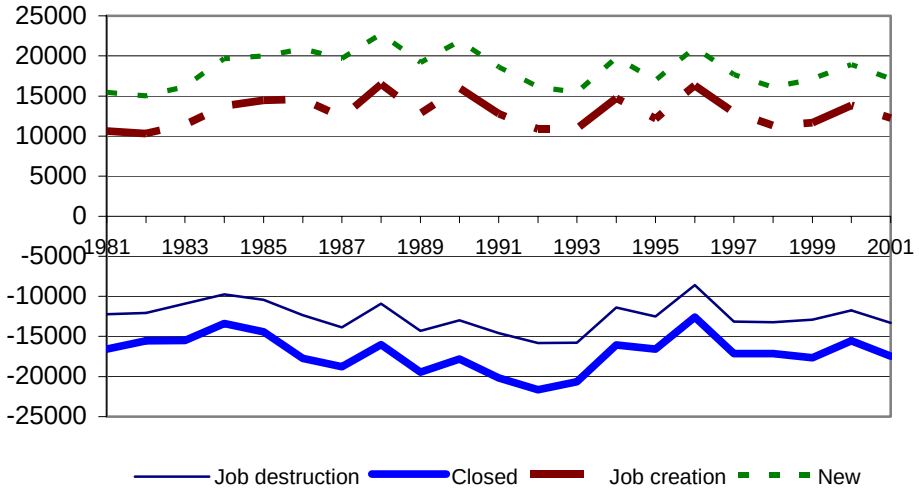


Figure 3A shows that an increasing share of the students works in these 2 industries. Thus, the share rises from 34% to 42% in Retail and from 9% to 15% in Hotels & Restaurants. This means that 57% of the students excluded from the sample work in these 2 industries.

Finally, we have looked at the impact on job creation and destruction if the students are excluded or not. The main groups are job creation and destruction of jobs at existing employers and closure and opening of new workplaces. Results are shown in Figure 4A. It appears that student jobs are responsible for about 20,000 new jobs per year in the late 1980s and a little less in the 1990s. This corresponds to about 15% of all job creations and destructions. In Retail and Hotels & Restaurants, these percentages will be much bigger because of the high number of students.

Figure 4A. Job Creation and Destruction for Students Earning Less than what is Allowed together with Student Grant + € 400.



Finally, Figure 5A shows that though excluding the students makes a substantial difference in the gross job turnover, it does not make much of a difference in the consolidated net job creation and destruction.

Figure 5A. The Net Job Creation and Destruction before and after Excluding Students.

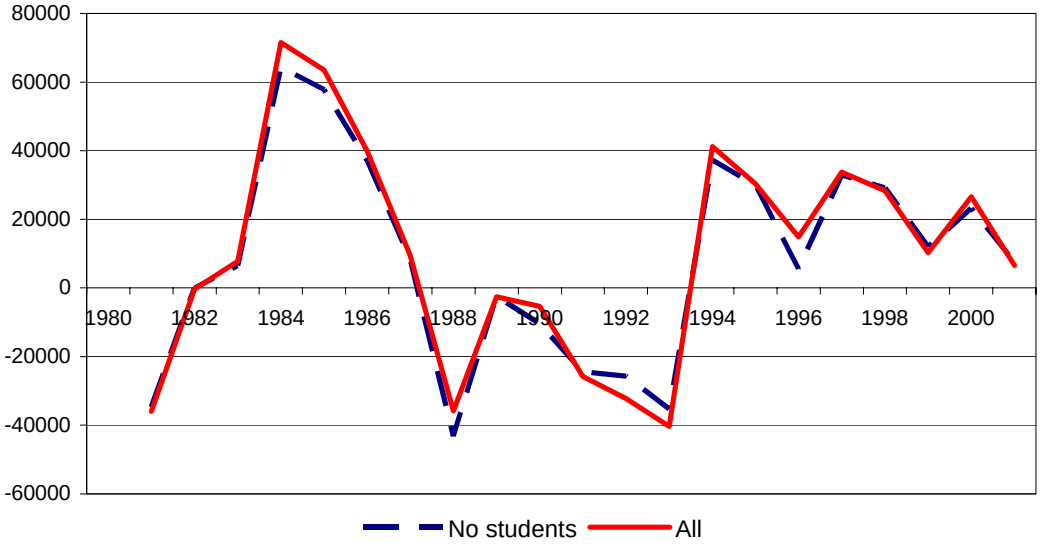


Figure 5A shows that there are only a few periods where including or excluding students makes a difference in the net-creation data, simply because creation and destruction are on balance. This actually underlines the wisdom in excluding students from the analysis.

This note has shown that excluding a relatively limited group of students of about 8% of the labor force can actually reduce the job creation and destruction with 16% simply because they are highly mobile, mostly because they only have a marginal position on the labor market with a main occupation as students. The distribution across industries shows that these problems are more eminent in Retail and Hotels & Restaurants than in any other industry. This clearly shows that there is a problem using the entire labor force as counted by the official statistics as the basis for calculating the job creation data. This may be a problem particularly in Denmark because in Denmark it is probably more widespread to work when studying and students in Denmark take a relatively long time to finish their studies compared to many other countries. These findings justify that we have excluded some of the students in the analysis.

Department of Economics:

Skriftserie/Working Paper:

2002:

WP 02-1 Peter Jensen, Michael Rosholm and Mette Verner: A Comparison of Different Estimators for Panel Data Sample Selection Models. ISSN 1397-4831.

WP 02-2 Erik Strøjer Madsen, Camilla Jensen and Jørgen Drud Hansen: Scale in Technology and Learning-by-doing in the Windmill Industry. ISSN 1397-4831.

WP 02-3 Peter Markussen, Gert Tinggaard Svendsen and Morten Vesterdal: The political economy of a tradable GHG permit market in the European Union. ISSN 1397-4831.

WP 02-4 Anders Frederiksen og Jan V. Hansen: Skattereformer: Dynamiske effekter og fordelingskonsekvenser. ISSN 1397-4831.

WP 02-5 Anders Poulsen: On the Evolutionary Stability of Bargaining Inefficiency. ISSN 1397-4831.

WP 02-6 Jan Bentzen and Valdemar Smith: What does California have in common with Finland, Norway and Sweden? ISSN 1397-4831.

WP 02-7 Odile Poulsen: Optimal Patent Policies: A Survey. ISSN 1397-4831.

WP 02-8 Jan Bentzen and Valdemar Smith: An empirical analysis of the interrelations among the export of red wine from France, Italy and Spain. ISSN 1397-4831.

WP 02-9 A. Goenka and O. Poulsen: Indeterminacy and Labor Augmenting Externalities. ISSN 1397-4831.

WP 02-10 Charlotte Christiansen and Helena Skyt Nielsen: The Educational Asset Market: A Finance Perspective on Human Capital Investment. ISSN 1397-4831.

WP 02-11 Gert Tinggaard Svendsen and Morten Vesterdal: CO2 trade and market power in the EU electricity sector. ISSN 1397-4831.

WP 02-12 Tibor Neugebauer, Anders Poulsen and Arthur Schram: Fairness and Reciprocity in the Hawk-Dove game. ISSN 1397-4831.

WP 02-13 Yoshifumi Ueda and Gert Tinggaard Svendsen: How to Solve the Tragedy of the Commons? Social Entrepreneurs and Global Public Goods. ISSN 1397-4831.

WP 02-14 Jan Bentzen and Valdemar Smith: An empirical analysis of the effect of labour market characteristics on marital dissolution rates. ISSN 1397-4831.

WP 02-15 Christian Bjørnskov and Gert Tinggaard Svendsen: Why Does the Northern Light Shine So Brightly? Decentralisation, social capital and the economy. ISSN 1397-4831.

WP 02-16 Gert Tinggaard Svendsen: Lobbyism and CO_2 trade in the EU. ISSN 1397-4831.

WP 02-17 Søren Harck: Reallønsaspirationer, fejlkorrektion og reallønskurver. ISSN 1397-4831.

WP 02-18 Anders Poulsen and Odile Poulsen: Materialism, Reciprocity and Altruism in the Prisoner's Dilemma – An Evolutionary Analysis. ISSN 1397-4831.

WP 02-19 Helena Skyt Nielsen, Marianne Simonsen and Mette Verner: Does the Gap in Family-friendly Policies Drive the Family Gap? ISSN 1397-4831.

2003:

WP 03-1 Søren Harck: Er der nu en strukturelt bestemt langsigts-ledighed I SMEC?: Phillipskurven i SMEC 99 vis-à-vis SMEC 94. ISSN 1397-4831.

WP 03-2 Beatrice Schindler Rangvid: Evaluating Private School Quality in Denmark. ISSN 1397-4831.

WP 03-3 Tor Eriksson: Managerial Pay and Executive Turnover in the Czech and Slovak Republics. ISSN 1397-4831.

WP 03-4 Michael Svarer and Mette Verner: Do Children Stabilize Marriages? ISSN 1397-4831.

WP 03-5 Christian Bjørnskov and Gert Tinggaard Svendsen: Measuring social capital – Is there a single underlying explanation? ISSN 1397-4831.

WP 03-6 Vibeke Jakobsen and Nina Smith: The educational attainment of the children of the Danish 'guest worker' immigrants. ISSN 1397-4831.

WP 03-7 Anders Poulsen: The Survival and Welfare Implications of Altruism When Preferences are Endogenous. ISSN 1397-4831.

WP 03-8 Helena Skyt Nielsen and Mette Verner: Why are Well-educated Women not Full-timers? ISSN 1397-4831.

WP 03-9 Anders Poulsen: On Efficiency, Tie-Breaking Rules and Role Assignment Procedures in Evolutionary Bargaining. ISSN 1397-4831.

WP 03-10 Anders Poulsen and Gert Tinggaard Svendsen: Rise and Decline of Social Capital – Excess Co-operation in the One-Shot Prisoner's Dilemma Game. ISSN 1397-4831.

WP 03-11 Nabanita Datta Gupta and Amaresh Dubey: Poverty and Fertility: An Instrumental Variables Analysis on Indian Micro Data. ISSN 1397-4831.

WP 03-12 Tor Eriksson: The Managerial Power Impact on Compensation – Some Further Evidence. ISSN 1397-4831.

WP 03-13 Christian Bjørnskov: Corruption and Social Capital. ISSN 1397-4831.

WP 03-14 Debashish Bhattacherjee: The Effects of Group Incentives in an Indian Firm – Evidence from Payroll Data. ISSN 1397-4831.

WP 03-15 Tor Eriksson och Peter Jensen: Tidsbegränsade anställninger – danska erfarenheter. ISSN 1397-4831.

WP 03-16 Tom Coupé, Valérie Smeets and Frédéric Warzynski: Incentives, Sorting and Productivity along the Career: Evidence from a Sample of Top Economists. ISSN 1397-4831.

WP 03-17 Jozef Koning, Patrick Van Cayseele and Frédéric Warzynski: The Effects of Privatization and Competitive Pressure on Firms' Price-Cost Margins: Micro Evidence from Emerging Economies. ISSN 1397-4831.

WP 03-18 Urs Steiner Brandt and Gert Tinggaard Svendsen: The coalition of industrialists and environmentalists in the climate change issue. ISSN 1397-4831.

WP 03-19 Jan Bentzen: An empirical analysis of gasoline price convergence for 20 OECD countries. ISSN 1397-4831.

WP 03-20 Jan Bentzen and Valdemar Smith: Regional income convergence in the Scandinavian countries. ISSN 1397-4831.

WP 03-21 Gert Tinggaard Svendsen: Social Capital, Corruption and Economic Growth: Eastern and Western Europe. ISSN 1397-4831.

WP 03-22 Jan Bentzen and Valdemar Smith: A Comparative Study of Wine Auction Prices: Mouton Rothschild Premier Cru Classé. ISSN 1397-4831.

WP 03-23 Peter Guldager: Folkepensionisternes incitamenter til at arbejde. ISSN 1397-4831.

WP 03-24 Valérie Smeets and Frédéric Warzynski: Job Creation, Job Destruction and Voting Behavior in Poland. ISSN 1397-4831.

WP 03-25 Tom Coupé, Valérie Smeets and Frédéric Warzynski: Incentives in Economic Departments: Testing Tournaments? ISSN 1397-4831.

WP 03-26 Erik Strøjer Madsen, Valdemar Smith and Mogens Dilling-Hansen: Industrial clusters, firm location and productivity – Some empirical evidence for Danish firms. ISSN 1397-4831.

WP 03-27 Aycan Çelikaksoy, Helena Skyt Nielsen and Mette Verner: Marriage Migration: Just another case of positive assortative matching? ISSN 1397-4831.

2004:

WP 04-1 Elina Pylkkänen and Nina Smith: Career Interruptions due to Parental Leave – A Comparative Study of Denmark and Sweden. ISSN 1397-4831.

WP 04-2 Urs Steiner Brandt and Gert Tinggaard Svendsen: Switch Point and First-Mover Advantage: The Case of the Wind Turbine Industry. ISSN 1397-4831.

WP 04-3 Tor Eriksson and Jaime Ortega: The Adoption of Job Rotation: Testing the Theories. ISSN 1397-4831.

WP 04-4 Valérie Smeets: Are There Fast Tracks in Economic Departments? Evidence from a Sample of Top Economists. ISSN 1397-4831.

WP 04-5 Karsten Bjerring Olsen, Rikke Ibsen and Niels Westergaard-Nielsen: Does Outsourcing Create Unemployment? The Case of the Danish Textile and Clothing Industry. ISSN 1397-4831.

WP 04-6 Tor Eriksson and Johan Moritz Kuhn: Firm Spin-offs in Denmark 1981-2000 – Patterns of Entry and Exit. ISSN 1397-4831.

WP 04-7 Mona Larsen and Nabanita Datta Gupta: The Impact of Health on Individual Retirement Plans: a Panel Analysis comparing Self-reported versus Diagnostic Measures. ISSN 1397-4831.

WP 04-8 Christian Bjørnskov: Inequality, Tolerance, and Growth. ISSN 1397-4831.

WP 04-9 Christian Bjørnskov: Legal Quality, Inequality, and Tolerance. ISSN 1397-4831.

WP 04-10 Karsten Bjerring Olsen: Economic Cooperation and Social Identity: Towards a Model of Economic Cross-Cultural Integration. ISSN 1397-4831.

WP 04-11 Iben Bolvig: Within- and between-firm mobility in the low-wage labour market. ISSN 1397-4831.

WP 04-12 Odile Poulsen and Gert Tinggaard Svendsen: Social Capital and Market Centralisation: A Two-Sector Model. ISSN 1397-4831.

WP 04-13 Aditya Goenka and Odile Poulsen: Factor Intensity Reversal and Ergodic Chaos. ISSN 1397-4831.

WP 04-14 Jan Bentzen and Valdemar Smith: Short-run and long-run relationships in the consumption of alcohol in the Scandinavian countries.
ISBN 87-7882-010-3 (print); ISBN 87-7882-011-1 (online).

WP 04-15 Jan Bentzen, Erik Strøjer Madsen, Valdemar Smith and Mogens Dilling-Hansen: Persistence in Corporate Performance? Empirical Evidence from Panel Unit Root Tests.
ISBN 87-7882-012-X (print); ISBN 87-7882-013-8 (online).

WP 04-16 Anders U. Poulsen and Jonathan H.W. Tan: Can Information Backfire? Experimental Evidence from the Ultimatum Game.
ISBN 87-7882-014-6 (print); ISBN 87-7882-015-4 (online).

WP 04-17 Werner Roeger and Frédéric Warzynski: A Joint Estimation of Price-Cost Margins and Sunk Capital: Theory and Evidence from the European Electricity Industry.
ISBN 87-7882-016-2 (print); ISBN 87-7882-017-0 (online).

WP 04-18 Nabanita Datta Gupta and Tor Eriksson: New workplace practices and the gender wage gap.
ISBN 87-7882-018-9 (print); ISBN 87-7882-019-7 (online).

WP 04-19 Tor Eriksson and Axel Werwatz: The Prevalence of Internal Labour Markets – New Evidence from Panel Data.
ISBN 87-7882-020-0 (print); ISBN 87-7882-021-9 (online).

WP 04-20 Anna Piil Damm and Michael Rosholm: Employment Effects of Dispersal Policies on Refugee Immigrants: Empirical Evidence.
ISBN 87-7882-022-7 (print); ISBN 87-7882-023-5 (online).

2005:

WP 05-1 Anna Piil Damm and Michael Rosholm: Employment Effects of Dispersal Policies on Refugee Immigrants: Theory.
ISBN 87-7882-024-3 (print); ISBN 87-7882-025-1 (online).

WP 05-2 Anna Piil Damm: Immigrants' Location Preferences: Exploiting a Natural Experiment.
ISBN 87-7882-036-7 (print); ISBN 87-7882-037-5 (online).

WP 05-3 Anna Piil Damm: The Danish Dispersal Policy on Refugee Immigrants 1986-1998: A Natural Experiment?
ISBN 87-7882-038-3 (print); ISBN 87-7882-039-1 (online).

WP 05-4 Rikke Ibsen and Niels Westergaard-Nielsen: Job Creation and Destruction over the Business Cycles and the Impact on Individual Job Flows in Denmark 1980-2001.
ISBN 87-7882-040-5 (print); ISBN 87-7882-041-3 (online).