Preliminary version
Do not quote

Ebbe K. Graversen
The Danish Institute for Studies in Research and research Policy

Inflow mobility rates over a decade

Danish evidence for the period 1988-1997 using register data
Preliminary results

The Danish Institute for Studies in Research and research Policy
Finlandsgade 4
DK – 8200 Aarhus N.
Denmark

May 2000

To be presented at the 2nd ordinary meeting in the Nordic Group for Mobility Studies in Reykjavik, 25-27th May 2000.

Acknowledgements: Financial support from the Nordic Industrial Fund as well as the Danish Institute for Studies in Research and Research Policy are gratefully acknowledged. Jane Christensen and Mette Lemming have both performed valuable research assistance in the project.

1. Introduction

The present paper gives Danish job mobility rates based on matched employer-employee data for the period 1988-97. The decade is characterised by a negative business cycle starting in 1987 and ending in 1993 and a positive business cycle from 1994 and onwards. This full business cycle allows a comparison with the mobility rates of employees on the labour market. According to Earlier Danish and Norwegian findings, a pro-cyclical pattern is to be expected in the worker flows, cf. Bingley et al (1999) and Ekeland (2000).

The present paper gives a comprehensive picture of the mobility flows on the Danish labour market over a decade. Bingley et al document that 40 percent of the overall worker flows is associated with a job flow, which means that the work place either create a new job or does not replace the existing job.[1] However, the remaining 60 percent is reallocation of jobs although the exact replacement cannot be identified. A firm can upgrade the work force by firing a low educated and hire a higher educated or it can change the firm by closing a position requiring low skills and open a new requiring higher skills. This is not possible to distinguish in the register data. Hence, the cause for a job shift may be forced or voluntary without differences in the observable register data.

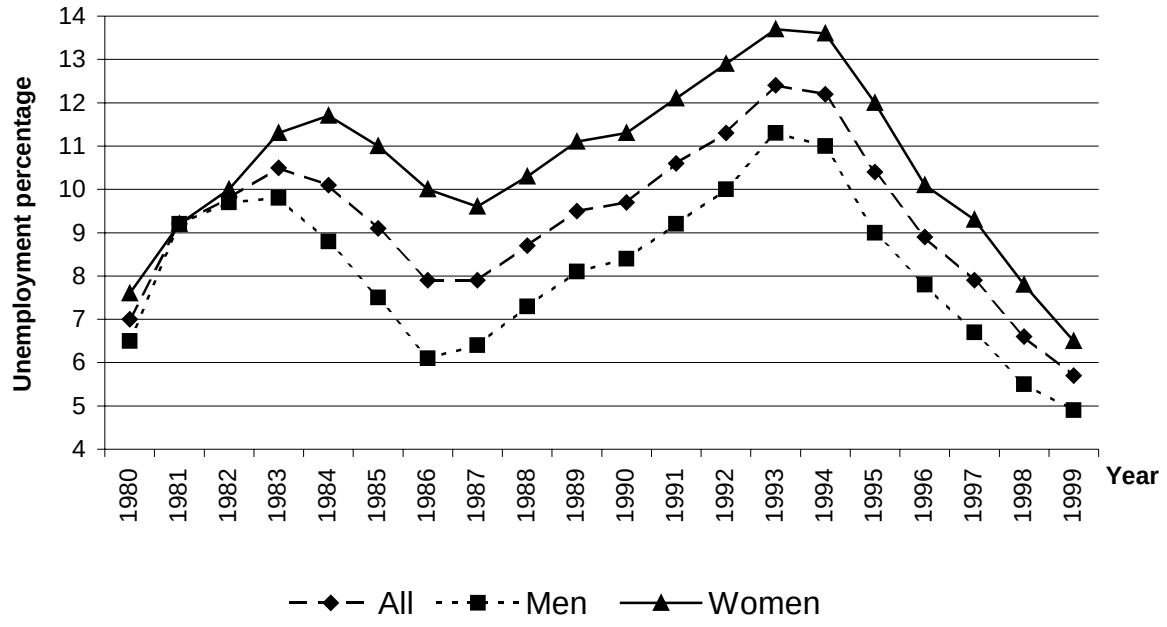
The distribution of mobility rates on branch, age, educational level, size of workplace etc. gives a more fully picture of the Danish case. Section 2 presents the business cycle for the period of interest together with the overall aggregated mobility rates. In Section 3, mobility rates for various subgroups are presented. The trends in the data are compared with the business cycle in Section 4 while Section 5 concludes.

2. The business cycle in the period 1988-1997

The business cycle in the period 1988-1997 can be measured by the unemployment rate in the labour market. Figure 1 shows the unemployment rate as the registered unemployed in percent of the labour force aged 16-66 years. The inverse unemployment rate is an effective indicator on the national business cycle.

[1] BIngley et al has access to register data on the entire population for the period 1980 to 1995. They define mobility to be job mobility when the total number of employees at the workplace changes. They cannot identify shifts in work positions or whether a hired employee replace another or take a new position.

Figure 1: The registered unemployed in percent of the labour force 1980-1999, total and by gender. Pct.



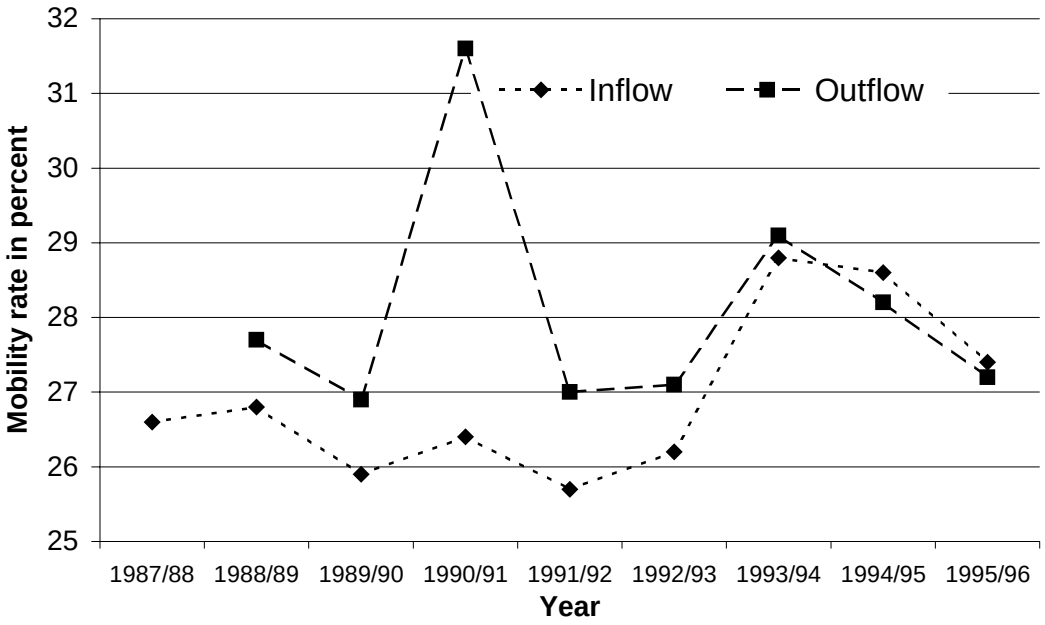
Source: STO (1988, 1997) and Konjunktur Statistik (2000)

Figure 1 indicates a close relationship between male and female unemployment rates. Although the levels differ, the trends are parallel. The overall mobility rates of workers into and out of work places are shown in Figure 2 for the period 1988-96.[2] There is a level shift between 1993 and 1994 indicating a pro-cyclical inflow mobility rate where the worker mobility rates increase with the business cycle. Similarly, there is an indication of a counter-cyclical outflow mobility rate. However, the Spearman rank correlation coefficient between the numbers in Figure 2 and the inverse of the corresponding numbers in Figure 1 is only 0.17 for the inflow mobility rate and –0.26 for the outflow mobility rate; both correlation coefficients are insignificant.

The signs of the correlation coefficients match the findings in Bingley et al (1999) where they use the employment stock to characterise the business cycle. Ekeland (2000) also finds a pro-cyclically inflow mobility pattern for workers who stay in the work force from year to year. The insignificant correlation fit with the opposite movements of counter-cyclical job search and pro-cyclical firm hiring for the inflows (hired) and the pro-cyclical quits and counter-cyclical lay-offs for the outflows (separations).

[2] The inflow mobility rate is the number of new workers in the establishments from year t-1 to year t divided with the total number of employees in year t. The outflow mobility rate is the number of workers employed in the establishments in year t but not in year t+1 divided with the total number of employees in year t.

Figure 2: The inflow worker mobility rates to workplaces in Denmark in 1988-96. Pct.



Source: Own data. The peak for the outflow mobility rate in 1990 is not found in Bingley et al (1999) and is probably caused by an error in the data regarding the mobility measure in 1990. It has not been possible to identify the exact error although it seems to be especially connected to the larger establishments.

3. Mobility rates over the decade

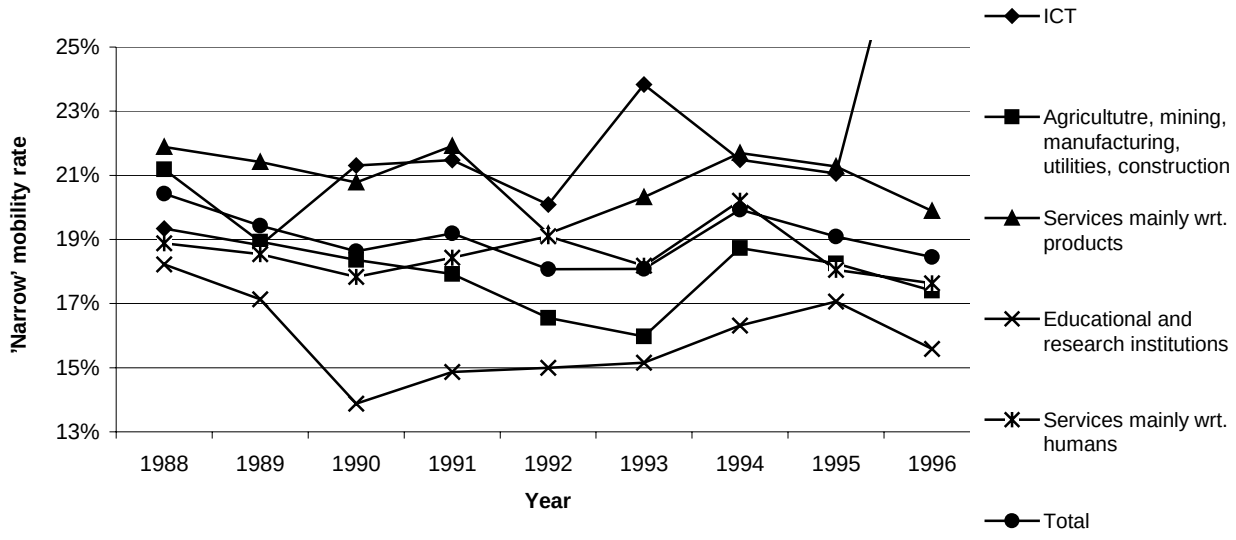
Mobility rates for various subgroups can be drawn similar to Figure 2. The first two, Figure 3 and Figure 4, gives the inflow mobility rates for five aggregated industrial sectors in the economy.[3] In Figure 3, only workers employed the previous year are included, while all newcomers are included in Figure 4. Hence, the mobility rates in Figure 3 are a subsample of the mobility rates in Figure 4. The number of employees in the five sectors differs considerably. The ICT-sector is smallest while the community service sector is largest. The ICT-sector represents the 'new' knowledge based economy.[4] The manufacturing sector represents the industrial economy, while the two service sectors represents this. Lastly there is a research representative.

Below average mobility is mainly found in the research sector and in the manufacturing sector. Hence, these sectors hire less often compared to the remaining economy. It may be caused by longer tenure, fewer open positions or shrinking industries. The 'service wrt. products'-sector presents mobility rates above average. A striking trend seems to be that the mobility rates for

[3] The five industrial classifications are suggested in Åkerblom (2000) together with a corresponding 20-sector classification.
[4] ICT stands for Information and Computer Technology.

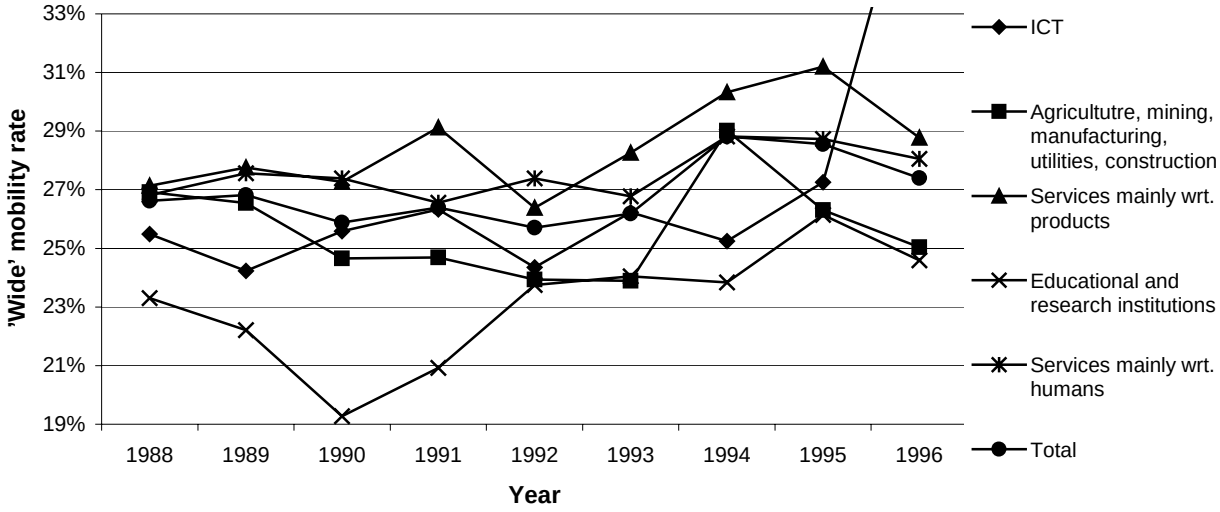
the ‘services wrt. humans’-sector is close to the average in the ‘narrow’ definition and above average in the ‘wide’ definition. This indicates a higher than average recruitment share of workers not previously employed. The opposite seems to be the case for the ICT-sector, which recruit new employees among already employed workers by a rate higher than average but not seems to deviate from the average in Figure 4. Since experience is important in this sector and since it is a growing industry, the result could be expected. Spearman rank correlation coefficients with the business cycle are presented in Section 4.

Figure 3: The inflow worker mobility rates to workplaces by sectors for employed workers in Denmark in 1988-96. Pct.



Note: The ‘narrow’ mobility rate covers inflow mobility of workers employed in year t-1 to a job at a new employer in year t.

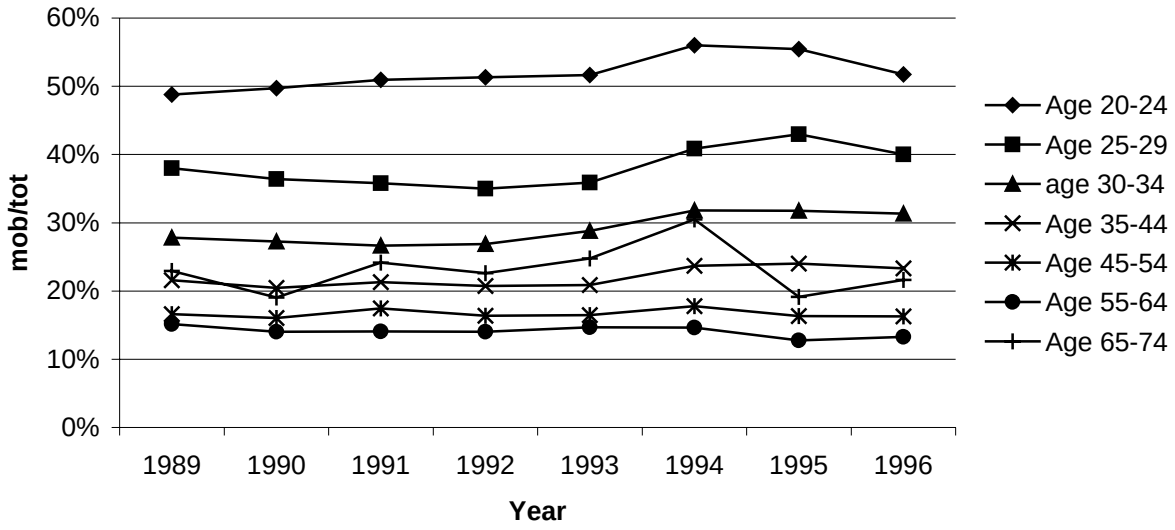
Figure 4: The inflow worker mobility rates to workplaces by sectors for the entire labour force in Denmark in 1988-96. Pct.



Note: The 'wide' mobility rate covers inflow mobility of workers employed in year t-1 to a job at a new employer in year t.

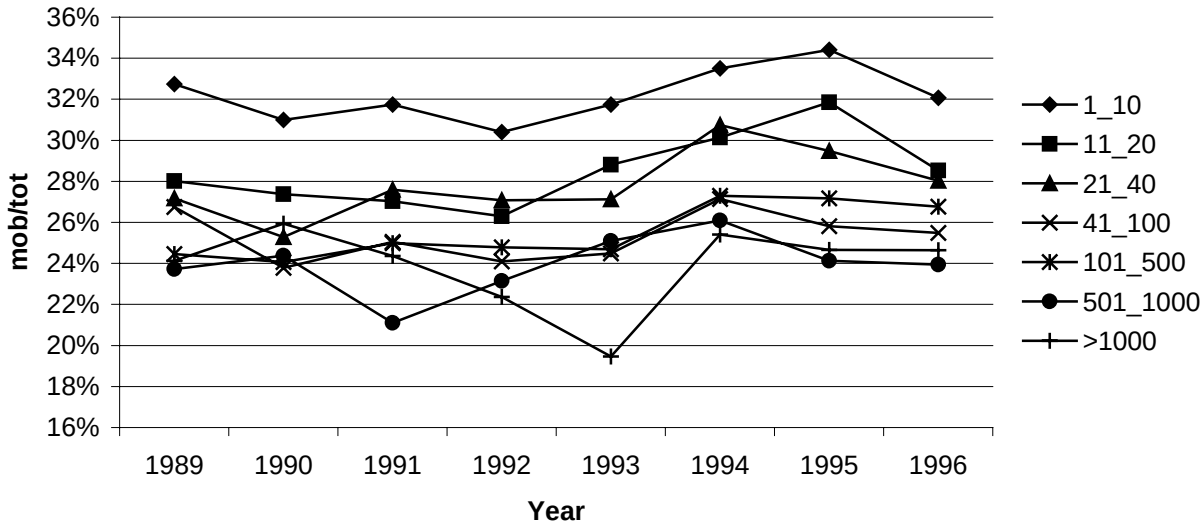
The mobility rate is expected to decrease by age, since both the employer and the employees search for the perfect match. Over time or age this match becomes more and more likely to happen. However, at the same time inflow mobility rates may be higher for experienced workers in negative parts of the business cycles. Figure 5 presents mobility rates for various age groups. A similar figure of outflow mobility rates shows the same pattern. The only rate, which does not fulfil the expected pattern, is the rates for the age group 65-74. However, this is caused by the retirement and job type among these individuals. Retirement reduces the stock of individuals in the age group and the jobs they take are often part time short-term jobs.

Figure 5: The inflow worker mobility rates to workplaces by age groups for the entire labour force in Denmark in 1988-96. Pct.



The following three figures present mobility rates by establishment size The establishment size is calculated as the number of employees in November in Figure 6, as the average number of employees in November year t-1 and year t in Figure 7, and as the average number of employees in all the years the establishment is present in the data in Figure 8.

Figure 6: The inflow worker mobility rates to workplaces by establishment size for the entire labour force in Denmark in 1988-96. Pct.



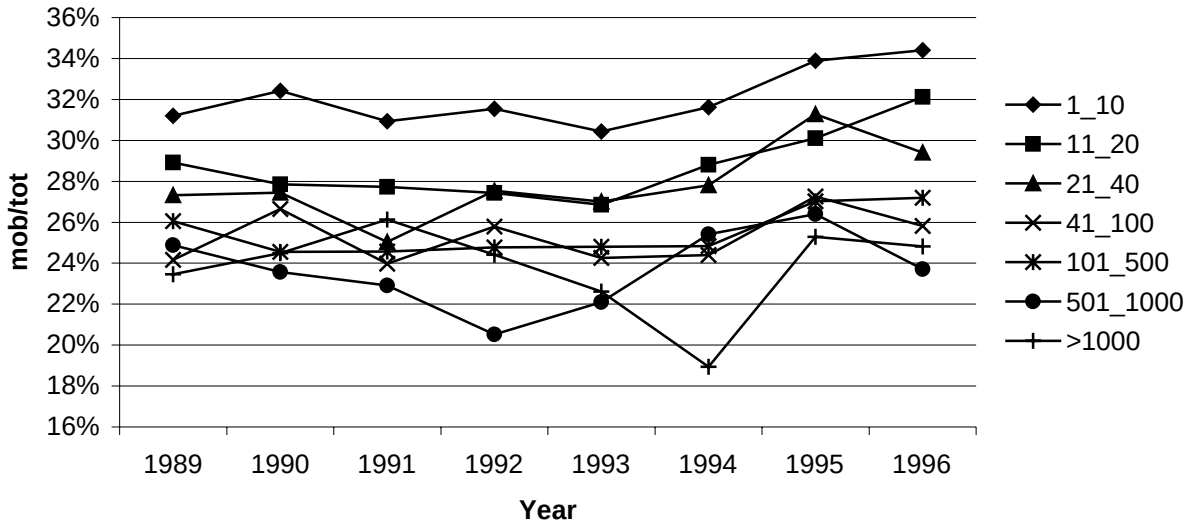
Note: The establishment size is calculated as the number of employees in November.

In Figure 6, there is a tendency of an inverse relationship between the inflow mobility rate and the establishment size. Especially the small establishments with less than 40 employees have

as higher mobility rate compared to the remaining establishments. This is in line with Bingley et al (1999) who finds e decreasing pattern up to an establishment size on 40 employees and a stable and smaller mobility rate for the larger establishments.

Using the average number of employees in two consecutive years does not change much as Figure 7 also shows. Although, this way of calculating the establishment size decrease the number of establishments that shifts size groups between two following years, the difference compared to the definition used in Figure 6 is only minor.

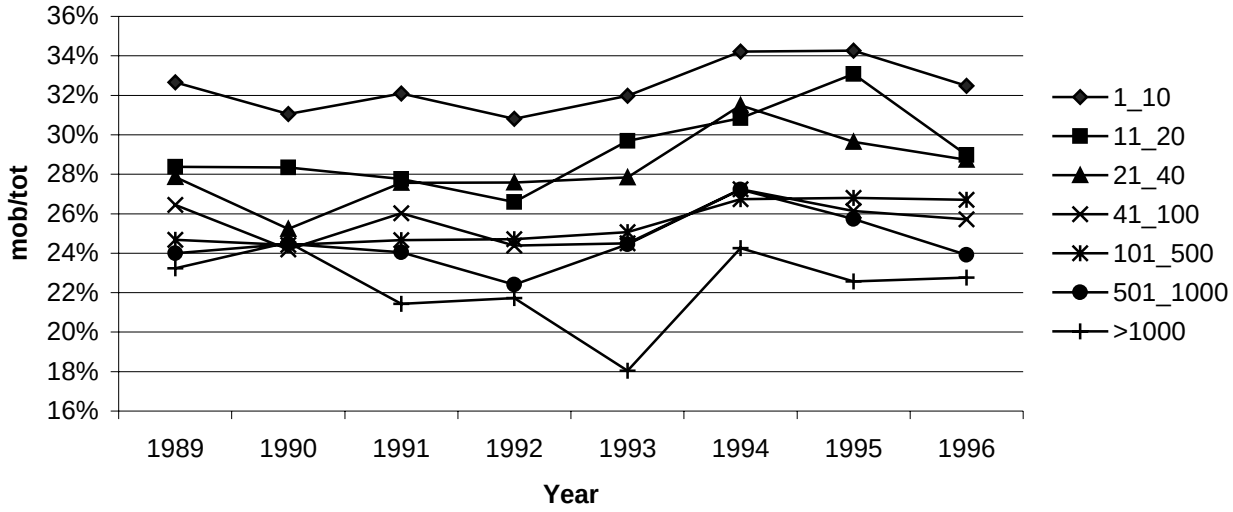
Figure 7: The inflow worker mobility rates to workplaces by establishment size for the entire labour force in Denmark in 1988-96. Pct.



Note: The establishment size is calculated as the average number of employees in November year t-1 and in year t.

In Figure 8 the establishment size is measured as the average number of employees in the entire period 1988-96. The mobility rates in Figure 8 shows the same trends and characteristics as in Figure 6 and 7.

Figure 8: The inflow worker mobility rates to workplaces by establishment size for the entire labour force in Denmark in 1988-96. Pct.



Note: The establishment size is calculated as the average number of employees in November in all the years where the establishment is present.

4. Pro-cyclical or counter-cyclical mobility rates

When the joint distribution of two variables differs considerably from a bivariate normal distribution and when no obvious transformation is clear, the nonparametric rank correlation can be used to make inference about the association of two variables. In the present paper, the Spearman rank correlation coefficient is used.

Table 1 shows the Spearman rank correlation coefficients between the inverse unemployment percentage and the mobility rates found in the period 1988-96 for Denmark. For comparison, the conclusion from a number of other studies is given in Table 2. The trends found in the other studies in Table 2 support the present findings in Table 1.

The worker outflow seems to be counter cyclical no matter which subgroups the mobility rates refer to. Hence, the separations increase in negative parts of the business cycle which means that the firing argument probably dominate the job search argument.

The correlation between the worker inflow and the business cycle seems to be more variable. As in Bingley et al (1999) and Albæk (1998), the inflow worker mobility rates are procyclical for the entire labour market and for the manufacturing sectors no matter whether the narrow or the wide definition is used. Bingley et al finds a procyclicality for the private sector and a counter

cyclicality for the public sector. Given that 'manufacturing etc.' and 'services mainly wrt. products' equals the private sector and 'services mainly wrt. humans' equals the public sector, then the present analysis finds similar results using the narrow definition. However, using the wide definition gives opposite results for the public sector and for the 'services mainly wrt. products' sector.

Table 1: Cyclicality of mobility rates in Denmark by various characteristics. Spearman rank correlation coefficients in parenthesis.

Group characteristics	Worker inflow (hires)	Worker outflow (separations)
All employees	procyclical (0.17)	counter cyclical (-0.26)
5 sectors		
- Narrow definition[1)]		
ICT	counter cyclical (-0.38)	
Manufacturing etc.	procyclical (0.57)	
Services mainly wrt. products	procyclical (0.17)	
Educational and research institutions	procyclical (0.43)	-
Services mainly wrt. humans	counter cyclical (-0.32)	
Total	procyclical (0.38)	
- Wide definition[1)]		
ICT	procyclical (0.10)	
Manufacturing etc.	procyclical (0.42)	
Services mainly wrt. products	counter cyclical (-0.27)	
Educational and research institutions	counter cyclical (-0.18)	-
Services mainly wrt. humans	procyclical (0.10)	
Total	procyclical (0.17)	
Age groups		
Age 20-24	counter cyclical (-0.36)	counter cyclical (-0.79)
Age 25-29	procyclical (0.31)	counter cyclical (-0.42)
Age 30-34	counter cyclical (-0.05)	counter cyclical (-0.54)
Age 35-44	counter cyclical (-0.52)	counter cyclical (-0.32)
Age 45-54	counter cyclical (-0.38)	counter cyclical (-0.07)
Age 55-64	counter cyclical (-0.67)	acyclical (0.00)
Age 65-74	counter cyclical (-0.12)	counter cyclical (-0.25)
Establishment size[2)]		
1-10 employees	procyclical (0.19)	counter cyclical (-0.07)
11-20 employees	counter cyclical (-0.12)	counter cyclical (-0.82)
21-40 employees	acyclical (0.00)	counter cyclical (-0.25)
41-100 employees	procyclical (0.10)	counter cyclical (-0.18)
101-500 employees	counter cyclical (-0.19)	counter cyclical (-0.21)
501-1000 employees	counter cyclical (-0.38)	counter cyclical (-0.13)
Over 1000 employees	procyclical (0.33)	counter cyclical (-0.04)

Note: The Spearman rank correlation coefficient is calculated between the mobility rate and the inverse of the unemployment rate. [1)]For the narrow and wide definition, see Figure 3 and 4. [2)]The establishment size is calculated as the number of employees in year t. Other definitions do not change the conclusions.

Looking at two sector which are of interest in the 'new' knowledge based economies, the ICT sector seems to be counter cyclical and the 'educational and research institutions' sector seems to be procyclical when the narrow mobility definition is used. Hence, the ICT sector hires less from employees already employed in other jobs in positive parts of the business cycle. The 'educational and research institutions' sector seems to hire more employees already employed. Looking at the wide mobility rates, the opposite results come out. This means that the ICT sector hires more in positive parts of the business cycle, meaning that more employees are hired from the 'not employed ' status compensating for the counter cyclicality in the narrow mobility rate. The 'educational and research institutions' sector hires counter cyclical when the wide mobility rate is used. This means that the sector hires especially few from 'not employed' in positive periods of the business cycle.

There seems to be a certain degree of counter cyclicality in the inflow worker mobility for the youngest and for the workers aged above 35. This supports a more selective hiring strategy in negative business cycle periods. Establishment size measured by employees does not seem to explain whether the inflow worker mobility is pro- or counter cyclical.

Table 2: Earlier finding on cyclicality of mobility rates in Denmark.

Study	Worker inflow (hires)	Worker outflow (separations)	Worker reallocation
Albæk (1998) Manufacturing sector	procyclical	counter cyclical	procyclical
Bingley et al (1999)			
All employees	procyclical	counter cyclical	counter cyclical
Private sector	procyclical	counter cyclical	counter cyclical
Manufacturing sector	procyclical	counter cyclical	counter cyclical
Public sector	counter cyclical	counter cyclical	counter cyclical

Note: Worker reallocation is the net flow from establishments.

5. Conclusion

The present paper gives trends and illustrates differences in mobility rates for the period 1988-96 for the Danish labour market. Mobility rates are given for various subgroups of the population of interest. The inflow mobility rate seems to be lower than the outflow mobility rates in the negative part of the business cycle and opposite in positive the part. This corresponds to the changes in the unemployment rates. However, calculating correlation coefficients shows that the inflow mobility rate is procyclical and the outflow mobility rate is counter cyclical. The

counter cyclicality of the outflow mobility rate seems to be persistent over various subgroups while the procyclicality of inflow mobility rate changes to counter cyclicality for some of the subgroups.

The inflow mobility rate for 5 selected sectors spanning the entire labour market shows a remarkably higher mobility rate for the ICT and product service sectors compared to the other sectors. The lowest mobility rates are found for the educational and research institutions.

As expectable the inflow mobility rates decreases with age from close to 50 percent for the youngest to less than 20 percent for the oldest on the labour market.

A closer look on the inflow mobility rates by establishment size measured by employees shows a decreasing rate by size up to 40-100 employees. Hereafter, the trend shows unclear but low rates. Another definition of the establishment size by employees over a longer time period, 2 years and 10 years averages, does not change the conclusion although it clarifies the findings.

References

Albæk and Sørensen. 1998. *Worker and Job Flows in Danish Manufacturing, 1980-1991.* The Economic Journal 108, 1750-1771.

Bingley, Eriksson, Wervatz and Westergård-Nielsen. 1999. *Beyond 'Manucentrism' – Some Fresh Facts About Job and Worker Flows.* CLS-WP 99-09

Ekeland. 2000. Norwegian m*obility rates over a decade.* Preliminary paper, presented at the OECD Focus Group on Human Mobility – seminar, Budapest.

Statistisk Tiårsoversigt. 1988. Danmarks Statistik

Statistisk Tiårsoversigt. 1997. Danmarks Statistik

Konjunktur Statistik. 2000. KS 2000:4. Danmarks Statistik.

Åkerblom. 2000. *The Nordic mobility project: Some ideas for basic classifications, definitions and preliminary tables.* Unpublished discussion paper.