Research Department

Employment dynamics within small, medium and large establishments in the Netherlands at the end of the 1990s: Where and to what extent did job creation and job destruction occur?

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EMPLOYMENT DYNAMICS WITHIN SMALL, MEDIUM AND LARGE ESTABLISHMENTS IN THE NETHERLANDS AT THE END OF THE 1990S:

Where and to what extent did job creation and job destruction occur?

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ABSTRACT

Employment dynamics within small, medium and large establishments in the Netherlands at the end of the 1990s: Where and to what extent did job creation and job destruction occur?
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This study analyses Dutch employment growth and dynamics during the booming end 1990s. In this period many new jobs were created as employment growth was strongly positive. Next to these net flows of employment the gross flows of employment –i.e. the numbers of jobs created and number of jobs destructed- are calculated per establishment in 1994, 1996 and 1998. From the analyses follows that relatively many jobs were destructed. Further, relatively more job creation and job destruction took place in small than in large establishments. Significant evidence for job creation as a consequence of government subsidized programs was not found. Neither did the development of real wages affect job creation or destruction during the end 1990s.

Key words: Labour demand, employment, jobs
JEL codes: J21, J23, J60

SAMENVATTING

Werkgelegenheidsdynamiek in kleine, middelgrote en grote vestigingen in Nederland gedurende eind jaren 1990: Waar en in welke mate vonden baancreatie en -vernietiging plaats ?
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Deze studie analyseert de Nederlandse werkgelegenheidsgroei en -dynamiek gedurende de economisch bloeiende eind jaren ‘90. In deze periode was de werkgelegenheidsgroei sterk positief. Naast deze netto baancreatie, wordt in deze studie de bruto baancreatie berekend per vestiging in 1994, 1996 en 1998. Dit betreft een berekening van het aantal banen dat is gecreëerd en het aantal banen dat is vernietigd. Uit de analyses volgt dat relatief veel banen zijn vernietigd. Verder blijkt dat relatief meer baancreatie en –vernietiging plaats hebben gevonden in kleine dan in grote vestigingen. Een significante toename in baancreatie als gevolg van door de overheid gesubsidieerde werkgelegenheidsprogramma’s wordt niet gevonden. Evenmin heeft de reële loonontwikkeling een effect op baancreatie of –vernietiging gehad gedurende de eind jaren 90.

Trefwoorden: Arbeidsvraag, werkgelegenheid, banen
JEL codes: J21, J23, J60

1 INTRODUCTION AND MOTIVATION

International studies show that since the early eighties small and medium firms started to contribute more and more to economic activity compared to large firms. Looking at employment, also a major part of total employment can be contributed to the small and medium-sized firms (SMEs, for short). In the Netherlands this is about 50%. Jobs created by the SMEs often gain special attention as they are considered to be essential for new economic growth, and may even trigger growth for a longer term.

Employment dynamics were a major subject of many studies in the past, but these studies primarily focused on macro employment developments. A common assumption is that employment growth lags economic growth, i.e. is post-cyclical, and that dynamics may be stronger. Employment growth rates are then measured as comparing the number of employees at the end with those at the beginning of a period. This *net* employment growth equals the difference between inflow and outflow of workers in a certain period. Any conclusions with respect to employment dynamics are therefore based on migration of workers whereas an interesting question of employment dynamics is concerned with *job* fluctuations.

Our employment dynamics analysis is based on job creation and destruction. The paper aims to estimate job creation and job destruction, so *gross* employment flows, in the Netherlands in order to study the developments at the end of the 1990s. For this purpose we use a model developed by Allaart, Kerkhofs and De Voogd-Hamelink (2000). They estimate job creation and destruction using net micro employment fluctuations for 1996. Our particular interest concerns the differences among small, medium and large firms or establishments. In addition to 1996, we further analyze 1994 and 1998 at the micro level. The results show, in both the macro as well as the micro analyses, that major differences exist in employment growth between small and large firms.

This thesis is outlined as follows. Chapter 2 considers employment growth and dynamics based on Dutch macro data during the period 1995-2000 for small, medium and large-sized firms. Chapter 3 analyses in a similar vein Dutch micro data for 1994, 1996 and 1998. In chapter 4 the econometric model to estimate job creation and destruction is outlined. Chapter 5 presents the estimation results based on the model presented in chapter 4 and the micro data presented in chapter 3. Chapter 6 concludes.

2 EMPLOYMENT DYNAMICS AT THE MACRO LEVEL

In the Netherlands 701,810 firms were active in 2001. Table 2.1 shows their subdivision by small, medium and large firms. Nearly half of all firms concern one-man businesses without employees. In accordance with the definition of Statistics Netherlands (CBS) they are considered to be a part of *small* firms, i.e. firms with less than 10 employees. Firms with 10 employees up to 100 employees are called *medium-sized.* As follows, the majority of Dutch firms belong to the small and medium-sized enterprises (SMEs, for short) that accounted for 2.9 million jobs. This is nearly half of all employment in the Netherlands (43%). *Large* firms, being firms with 100 employees or more, concern less than 1% of all firms but provide the other half of Dutch employment.

Table 2.1 Number of Dutch firms per size-class in 2001

Size-class	Number of employees	Number of firms	Percentage of firms
Small	0	338,330	48
	1-4	247,580	35
	5-9	52,925	8
Medium	10-19	28,300	4
	20-49	20,840	3
	50-99	7,030	1
Large	>100	6,765	1
Total		701,810	100

Source: Statline, Statistics Netherlands

Table 2.2 makes a further subdivision of the number of jobs by size-class and by sectors. The largest 'job engine' at sector level in all size-classes is the sector *Business services*, being all business services except for cleaning companies [1]. *Retail trade and repair* provide 15% of all employment in small firms and 8% in medium firms. *Wholesale trade* generates roughly 10% in both size classes. Across the large firms the second and third largest sectors are *Public administration* and *Subsidised education.*

[1] Officially this sector is called *Rest of business services*. *'Rest of*" is dropped here as this name seems a bit misleading due to the fact that only cleaning services are excluded.

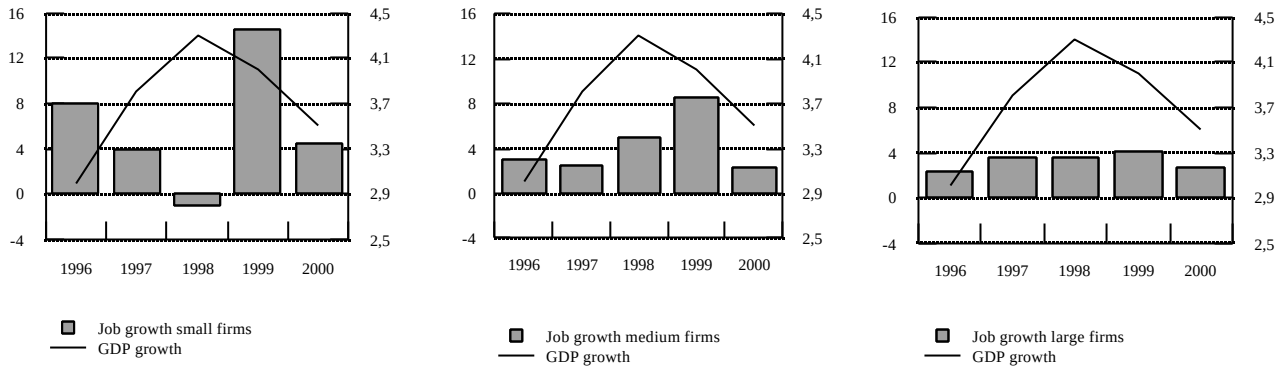
Table 2.2 Number of Dutch jobs by size-class and by sector in 2000

SMALL			MEDIUM			LARGE		
	No. a)	% b)		No. a)	% b)		No. a)	% b)
Business services	195	17	Business services	260	14	Business services	518	13
Retail trade and repair	174	15	Wholesale trade	198	11	Public administration	461	12
Hotels and restaurants	122	11	Construction	198	11	Subsidised education	322	8
Wholesale trade	117	10	Retail trade and repair	150	8	Retail trade and repair	302	8
Cultural and other activities	87	7	Manufacture of metal and electrical equipment	136	8	Nursery and old people's homes	263	7
Construction	87	7	Cultural and other activities	89	5	Hospitals	256	7
Rest of health care and service activities	65	6	Subsidised education	89	5	Rest of health care and service activities	203	5
Agriculture. forestry and fishing	53	5	Land transport	86	5	Rest of transport and communication	202	5
Trade and repair of motor vehicles	48	4	Hotels and restaurants	79	4	Manufacture of metal and electrical equipment	198	5
Financial and business activities	43	4	Rest of health care and service activities	70	4	Financial and business activities	193	5
Manufacture of metal and electrical equipment	34	3	Rest of the industry	65	4	Rest of the industry	163	4
Land transport	24	2	Trade and repair of motor vehicles	61	3	Wholesale trade	125	3
Rest of the industry	22	2	Nursery and old people's homes	52	3	Construction	120	3
Rest of transport and communication	21	2	Manufacture of food, beverages and tobacco	43	2	Cleaning	102	3
Manufacture of food, beverages and tobacco	20	2	Agriculture, forestry and fishing	40	2	Cultural and other activities	86	2
Publishing and printing	16	1	Rest of transport and communication	39	2	Manufacture of food, beverages and tobacco	83	2
Cleaning	15	1	Cleaning	33	2	Manufacture of chemical products	80	2
Subsidised education	14	1	Financial and business activities	33	2	Land transport	79	2
Manufacture of chemical products	4	0,4	Publishing and printing	32	2	Hotels and restaurants	53	1
Nursery and old people's homes	1	0,1	Manufacture of chemical products	28	2	Publishing and printing	38	1
Public administration	0.6	0,1	Public administration	23	1	Electricity, gas and water supply	33	1
Mining and quarrying	0.4	0,03	Mining and quarrying	2.1	0,1	Trade and repair of motor vehicles	22	1
Hospitals	0.2	0,02	Electricity, gas and water supply	1.6	0,1	Agriculture, forestry and fishing	10	0,3
Electricity, gas and water supply	0.1	0,01	Hospitals	0.6	0,03	Mining and quarrying	6	0,2
Total	1.162	100		1.808,8	100		3.918	100

a) number of jobs x 1000
b) number of jobs as percentage of total jobs in small, medium and large firms

Source: Statline, Statistics Netherlands

Graph 2.1a-2.1c Job growth rates Dutch firms by size-class and GDP-growth 1996-2000
(%)

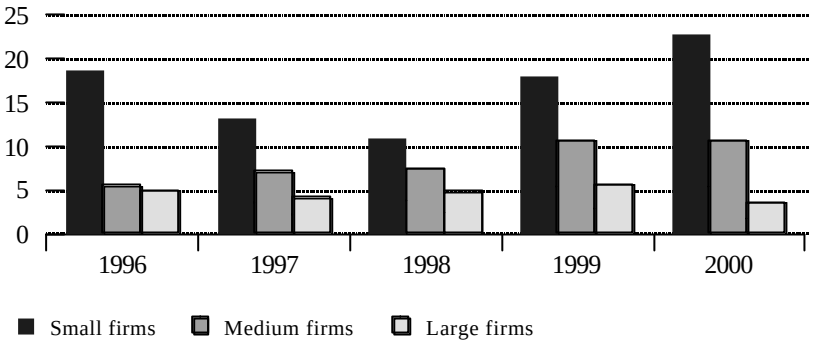


Source: Statline, Statistics Netherlands

Graph 2.1 considers the annual job growth rates per firm size-class and the GDP-growth. The bars show the annual job growth rates per size-class for each of the years 1996 to 2000 and the curve shows the real GDP-growth for the whole economy. From the graph it evidently follows that changes in economic growth affect employment in large firms less than in small or medium-sized firms. The annual job growth was about 4% in large firms (see graph 2.1c) whereas it varied from -1% to more than 10% in small firms (graph 2.1a) and 3% to 8% (graph 2.1b) in medium firms. Probably there are fewer possibilities within the SME to absorb (temporary) economic shocks. In case of slower economic growth, SMEs may be forced to fire employees in an earlier stage than large firms because hoarding labour is financially no option. The limited period that we have available here only shows the upper part of a business cycle where economic growth is positive, varying from 3% to more than 4%. However, this short period already reveals the strong fluctuations in job growth. Looking more closely, it follows that GDP-growth is most synchronous with job growth. It also holds that this is most simultaneous for the large firms. All size-classes further show a delayed reaction in job growth to economic growth, as follows from the peak in economic growth in 1998 and the peak in job growth in 1999 (in all three graphs). Also remarkable is the fall in job growth of small firms in 1998. Small firms may have become medium-sized firms by expansion of the labour force.

During the economically flourishing period 1996-2000 average annual job growth in small firms was almost twice the job growth in large firms, i.e. 6.0% compared to 3.2%. Growth rates across the different sectors, as shown in Table 2.2, provide more detailed information. Graph 2.2 considers the standard deviation of the growth rates across these 24 sectors by size-class and by year. From this graph it follows that the spread across sectors decreased with the increase in firm size. Job growth rates fluctuate most for small firms and least for large firms. So, differences across sectors are much larger for small than for medium-sized or large firms. This confirms, like in Graph 2.1, the stronger dynamics of small firms compared to medium firms and of medium firms compared to large firms.

Graph 2.2 Dispersion of Dutch job growth rates across sectors per year and per firmsize-class



Source: Statline, Statistics Netherlands

Table 2.3 reports the sectors where job creation was highest (left column) and lowest (right column) at the end of the 1990s. These percentages concern job growth rates between 1995 and 2000. It turns out that the sector '*Business services'* takes a high position in all three size-classes having an average growth of 61%. Of all small firms this sector is third best. The leading sector across the small firms is '*Financial and business activities*'. The strongest fall across all three size-classes occurred in the sector '*Nursing and old people's homes*' with approximately 25%. Possibly the expansion of the medium-sized *Nursery and old people's homes* over the period 1995-2000 gave rise to the large fall of the job growth rates of the medium-sized firms. Further, *'Mining and quarrying'* declined considerably across small and medium firms. In all fairness it should be added that these are quite small sectors (as follows from the number of jobs in Table 2.2).

Table 2.3 Three sectors of highest and three sectors of lowest Dutch job growth in 2000 in comparison to 1995 by size-class

Sector	Rise (in %)	Sector	Fall (in %)
SMALL		SMALL	
Financial and business activities	112	Mining and quarrying	-43
Cleaning	78	Nursery and old people's homes	-27
Business services	65	Public administration	-14
MEDIUM		MEDIUM	
Business services	68	Hospitals	-50
Hotels and restaurants	64	Mining and quarrying	-32
Financial and business activities	62	Nursery and old people's homes	-23
LARGE		LARGE	
Business services	51	Electricity, gas and water supply	-20
Trade and repair of motor vehicles	45	Manufacture of chemical products	-10
Nursery and old people's homes	30	Manufacture of food, beverages and tobacco	-3

3 EMPLOYMENT DYNAMICS AT THE MICRO LEVEL

The macro data presented in the previous section on *net* employment growth do not give any information about the number of jobs created or destructed. The positive net job growth during 1995-2000 does not necessarily imply mere job creation or a low job destruction rate. Numerous jobs may have been destructed. As job creation and destruction data are not available separately, micro data and an econometric model are used to fully grasp *gross* employment dynamics. But before discussing the model in the next section, information on the micro data is provided below.

3.1 **General data description**

The data consists of information from a survey, the Labour Demand Panel, conducted by the Research Institute for Labour Studies (OSA) in 1995, 1997 and 1999. It contains information on more than 2,000 establishments with at least 5 employees over all size-classes and sectors for respectively the years 1994, 1996 and 1998. By interviewing establishments instead of firms, the number of employees on establishment-level may in some cases be less than on firm-level as the number of employees in a firm includes all the employees working in its different establishments. So the firm size classes in the survey will differ in definition from the definition on macro level. Some large firms may have establishments with less than 100 employees, causing it to be treated in the survey as a small or medium 'firm'. So, we have to keep in mind that the number of large 'firms' may be underestimated, and the number of low and medium 'firms' overestimated. However, it will depend on the level of the establishment's independence with respect to human resource policy to what extent this affects the results. In case decisions of job creation or destruction are made at the establishment level, the establishment may be considered a firm for our purpose. However, in practice this is usually not the case. Therefore we need to treat conclusions for SMEs in this survey with some caution. Furthermore, lack of information on firms with less than 5 employees makes that job creation and destruction cannot be fully estimated for small sized establishments. In addition, a part of creation and destruction is also missing because no new or closed down establishments are included. These surveys also contain information about the firm's main activities, product and market aspects, competitive position, composition of workforce and balance-sheet information.

3.2 **Net job flows : averages and dispersion**

In order to get an overview of the representation of the establishments in the survey, Table 3.1 shows the breakdown by year and by size-class. It follows that the fraction of small establishments is smaller than the

Table 3.1 Number of Dutch firms per establishment size-class in 1994-1996-1998

Size-class	Number of employees	Number of establishments			Percentage of establishments		
		1994	1996	1998	1994	1996	1998
Small	5-9	395	415	369	16	16	15
Medium	10-99	1,232	1,084	1,110	49	43	46
Large	>100	910	1,038	998	35	41	39
Total number		2,537	2,537	2,477	100	100	100

Source: OSA Labour Demand Panel

fraction of small firms in the whole economy as Table 2.1 shows, namely about 15% instead of 91%. The large establishments are over-represented. In this survey about 40% of the firms are large, whereas at the macro level large firms account for less than 1% [2].

Table 3.2 provides information about the representativeness across sectors. The largest sector at the macro level, see Table 2.2, *Business services* has a number three respectively number two position in the category of the medium and large-sized establishments. It only has a number five position in small establishments. The largest sectors in the survey are the *Farming and Industry* and the *Care sector*. Like the *Government* and *Education* sector, the latter is under far-reaching governmental supervision. Nevertheless, this sector was not removed from the sample simply because of its magnitude.

Table 3.2 Average number of Dutch jobs by size-class and by sector during 1994-1998

Small			Medium			Large		
	No. a)	% b)		No. a)	% b)		No. a)	% b)
Farming and Industry	769	28	Care sector	8,287	21	Care sector	200,177	31
Trade	525	19	Farming and Industry	6,838	17	Business services	118,545	18
Construction	374	14	Business services	5,255	13	Farming and Industry	103,985	16
Other business services	345	12	Government	4,548	11	Government	76,038	12
Business services	256	9	Trade	4,412	11	Education	44,692	7
Transport	179	6	Construction	3,701	9	Trade	29,837	5
Education	173	6	Education	3,645	9	Other business services	27,209	4
Care sector	141	5	Transport	1,986	5	Transport	26,589	4
Government	13	1	Other business services	1,596	4	Construction	17,448	3
Total	2,775	100	Total	40,268	100	Total	644,521	100

a) number of jobs x 1000
b) number of jobs as percentage of total jobs in small, medium and large firms

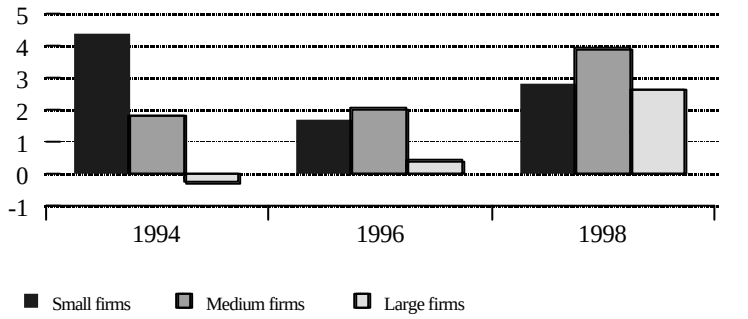
Source: OSA Labour Demand Panel

2 All large establishments are asked to participate in the survey whereas a sample was drawn among the SMEs.

One of the conclusions based on the macro data in the previous section was that job growth rates are highest for small firms. Below we check whether these findings still hold on the micro level.

Graphs 3.1a and 3.1b show per size-class and by year the mean and standard deviation of the ratio net job flows (=inflow-outflow) divided by the average size of the labour force across establishments. These figures reflect relative job growth at the firm level. From Graph 3.1 follows that the ratio net flow to firm size decreases sharply with firm size, indicating that job growth was highest in the small firms in 1994. However, in 1996 and 1998 the picture changes. The ratio isn't highest any more among the small firms but among the medium-sized firms. During the period 1994-1998 the ratio increases for large firms from below zero to 2.5%. In the second half of the 90s, job growth seems to have shifted from the small firms to the medium-sized and large firms. Note that among the fast growing medium sized firms in 1996 there might be a vast number of firms which were classified as a small firm in 1994. Graph 3.1b shows that the dispersion in the job growth ratio is highest for small firms. On average, the dispersion decreases also over the years. The rise in GDP-growth during these years may have entailed a less dispersive net flow rate across establishments.

Graph 3.1.a Average net job flow rates by firmsize-class and year



Graph 3.1.b Dispersion net flow rates by firmsize-class and year

3.3 **Job destruction**

The survey contains information about the last employee who left and the reason for leaving the job. There are six different reasons : (i) termination of a short-term contract (ii) termination of a long-term contract (iii) compulsory redundancy (iv) (early) retirement or death (v) voluntary redundancy and (vi) disability.

Table 3.3 presents the job destruction probabilities for six different outflow categories, subdivided by size class and year. The last columns show that the job destruction probabilities fell in 1998 in comparison with 1994 for all outflow categories, except for compulsory redundancy. This decline was highest for the outflow category *disability* that fell from from more than 0.3% in 1994 (and 1996) to 0.16% in 1998. These decreasing job destruction probabilities are in line with the economic boom which the Netherlands experienced at the end of the 1990s. The probability that jobs are destructed is highest in case of terminating long-term contracts in 1994 and 1996. In these years more than 50% of all cases when long-term contracts expired, the jobs were destructed. In 1998 the probability of job destruction was highest due to compulsory redundancy. Logically, not many jobs were destructed when employees left voluntarily. So this category of outflow has the lowest destruction probabilities in each year. Most remarkable is the strong fall in destruction rate of jobs when employees became disabled (in Dutch this is called the WAO).

The distribution of the estimated job destruction probabilities across the size-classes is not even. This follows from the last columns in Table 3.3. The highest probability of a job not being refilled is often in case of an employee made redundant compulsory. In particular for small establishments compulsory redundancies often are the forerunner of a close-down. Medium and large establishments were most likely to destroy a job when long-term contracts expired, thereafter in case of dismissals. In small firms this often happens in case a short-term contract expires. Probably, the termination of long-term contracts does not induce a high destruction probability in small establishments as more employees have short- than long-term contracts, independent of policy.

Table 3.3 Estimated probability of job destruction per outflow category per size-class in 1994-1998

	Small			Medium			Large			Total		
Outflow category	1994	1996	1998	1994	1996	1998	1994	1996	1998	1994	1996	1998
1 termination of short-term contract	0.50	0.14	0.39	0.41	0.37	0.39	0.54	0.51	0.42	0.48	0.43	0.40
2 termination of long-term contract	-	0.38	0.11	0.56	0.56	0.38	0.58	0.52	0.55	0.54	0.51	0.41
3 compulsory redundancy	0.48	0.53	0.42	0.44	0.47	0.43	0.34	0.45	0.42	0.42	0.47	0.43
4 (early) retirement or death	-	0.43	0.38	0.30	0.27	0.16	0.31	0.36	0.23	0.30	0.33	0.21
5 voluntary redundancy	0.24	0.13	0.16	0.13	0.17	0.08	0.13	0.14	0.10	0.14	0.15	0.09
6 disability	-	-	-	0.30	0.33	0.16	0.38	0.35	0.17	0.34	0.31	0.16

Note: In small establishments some categories have been dropped because the cells contained less than 6 employees.

4 JOB CREATION AND DESTRUCTION: AN ECONOMETRIC MODEL

This section presents the model developed by Allaart *et al.* (2000) used for estimating job creation and job destruction.

Information on in- and outflow of workers and on mobility within the establishments is needed for estimating the number of jobs created and the number of jobs destructed. In case an employee quits a job, the job can be refilled or destructed. Individual cases of outflow and internal mobility may provide information on the reason for leaving (see Table 3.3) and/or on refilling of vacancies. Information is though only available on the last one or two workers that left the firm or moved internally. So, previous jobs that were refilled or destructed are not taken into account.

In analyses often the common definition of employment growth was used, being the percentage change in the number of employees during a certain period. This definition has the disadvantage that employment is overestimated in case of an increase in the number of part-time employees. Therefore, we use 'job' as a definition of employment. A job is defined by a set of specific tasks done by one person. It implies that a job requires a worker to have the specific skills needed to meet the job requirements. If a job is considered to be unique within a firm, not refilling it in case of a vacancy means destroying it. A new job is created in case new specific tasks during a full-time working week are to be fulfilled.

4.1 **The flows within the firm**

The relation between inflow of employees (I), outflow of employees (O), the number of jobs created (C) and the number of jobs destructed (D) is assumed to be given by

$$\Delta E_i \equiv I_i - O_i = C_i - D_i \tag{1}$$

where the net (annual) change in employment in numbers of employees or jobs is denoted as $\Delta E_{i,t} = E_{i,t} - E_{i,t-1}$ and subscript i refers to the i-th firm and subscript t to time. So, in case the net employment change equals x, the net inflow ($I_i - O_i$) equals x persons but at the same time it is assumed that there are x net jobs created ($C_i - D_i$). The inflow of employees does not necessarily coincide with the number of jobs created, nor does the outflow of employees necessarily coincide with the number of jobs destructed. But in case there are more employees who enter than who leave firm i, i.e. inflow exceeds outflow ($I_i > O_i$), it is assumed that more jobs are created than destructed ($C_i > D_i$). Oppositely, more jobs

are destructed than created if more employees leave than enter the firm i.e. if $O_i > I_i$. The number of jobs created equals the number of destructed jobs plus either the number of 'newly' created jobs or destructed jobs. So, within a certain firm creation and destruction can occur at the same time. The net change in employment of firm i is here thus defined as the difference in the number of incoming and outgoing workers i.e. inflow minus outflow, that equals the difference in number of created and destructed jobs (see Davis and Haltiwanger, 1992 and 1996).

Jobs of employees leaving the firm can be destructed or refilled, i.e.

$$O_i = O_{i,D} + O_{i,X}\,, \tag{2}$$

where $O_{i,D}$ equals the number of jobs destructed and $O_{i,X}$ the number of jobs refilled. A job can be refilled by someone already working within the firm or by someone from outside the firm. If a vacancy is internally settled another job becomes vacant within the firm at the same time. Internal mobility thus influences creation and destruction similar to the outflow of employees. This implies that total internal mobility (M_i) is equal to the sum of the internally-mobile employees leaving destructed jobs ($M_{i,D}$) and leaving refilled jobs ($M_{i,X}$),

$$M_i = M_{i,D} + M_{i,X} \tag{3}$$

The total number of jobs destructed in firm i thus equals the number of jobs destructed resulting from outflow ($O_{i,D}$) and internal mobility ($M_{i,D}$),

$$D_i = O_{i,D} + M_{i,D} \tag{4}$$

The total number of employees who were internally mobile, that entered and left the firm (respectively M_i, I_i and O_i) are observed as they can be directly obtained from the survey. However, $O_{i,D}$ and $M_{i,D}$ need to be estimated. Once they are estimated the total number of jobs destructed follows from (4). The total number of jobs created follows then from equation (1) as $C_i = \Delta E_i + D_i = I_i - O_i + D_i$.

4.2 **The probability of job destruction**

The survey contains information on at least the last worker who left the organisation and on the last worker that was internally mobile. Furthermore, we know whether or not a vacant job was refilled again. If the job was not refilled, we consider it to be destructed. For every firm in the survey we define

$Y_i = 1$ if the last vacant job in firm i is destructed and

$Y_i = 0$ if the last vacant job in firm i is refilled.

In addition the survey contains information about the reason for leaving. As already explained in section 3.3, there are six outflow categories in the survey:

(i) termination of a short-term contract
(ii) termination of a long-term contract
(iii) compulsory redundancy
(iv) (early) retirement or death
(v) voluntary redundancy and
(vi) disability.

Six dummies are used, denoted $k_{i,1}$ to $k_{i,6}$, indicating the outflow category. The model estimates job destruction probabilities given the corresponding outflow category. We will include two additional explanatory variables in the model reflecting whether the firm's future financial prospects are improving or deteriorating (reference category is that the firm's prospects will not change very much). These eight components form the vector X_i. The probability of job destruction given the vector X_i is specified in logit form as

$$P_{X_i} \equiv P(Y_i = 1 \mid X_i) = \frac{\exp(X_i b)}{1 + \exp(X_i b)} \tag{5}$$

and depends therefore on the outflow category and on the firm's financial prospects. This estimation procedure yields a (*8x1*) parameter vector b.

In case an employee moves internally there is only one reason, so only one outflow category is distinguished. The probability of job destruction in case the employee moves internally is

$$P_{\bar{Z}_i} \equiv P(Y_i = 1 \mid \bar{Z}_i) = \frac{\exp(b_0 + \bar{Z}_i b_1)}{1 + \exp(b_0 + \bar{Z}_i b_1)} \tag{6}$$

where internal job movement is here explained by the future financial prospects of the firm, stored in vector $\bar{Z}_i$. The b 's in equations (5) and (6) are parameter(vector)s to be estimated.

The marginal effects of continuous independent variables on the probability under consideration in the logit model (5) can be evaluated as

$$\frac{\partial E(Y_i)}{\partial X_i} = \frac{\exp(X_i b)}{1 + \exp(X_i b)} \left(1 - \frac{\exp(X_i b)}{1 + \exp(X_i b)} \right) b \tag{7a}$$

Since the first two terms after the '=' sign are always positive the qualitative direction of the marginal effect is equal to the sign of the corresponding estimated parameter. For binary independent variables, like the outflow categories, the marginal effect of the variable on the probability of destruction can be derived as

$$P(Y_i = 1 \mid \bar{X}_i, k_{i,j} = 1) - P(Y_i = 1 \mid \bar{X}_i, k_{i,j} = 0) \tag{7b}$$

where $\bar{X}_i$ denotes the average values in the sample of the other independent variables excluding the outflow dummies. In practice the approximation given by equation (7a) offers often a very good approximation for the marginal effect of a binary variable on the probability under consideration (Greene, 1997, p. 878).

Notice that because of (7a) a positive (negative) value of an element of β indicates that the corresponding independent variable has a positive (negative) effect on the destruction probability of a job.

4.3 **Estimating the number of jobs destructed and jobs created within firm i**

Suppose that the observed outflow of firm i into outflow category k_j ($j = 1,2...6$) is denoted by O_{i,k_j}. The estimated number of destructed jobs caused by outflow then equals

$$O_{i,D} = P_{i,O} * O_i \quad \text{where} \quad P_{i,O} = \sum_{j=1}^{6} \frac{O_{i,k_j}}{O_i} * P_{i,k_j} \tag{8}$$

where $P_{i,O}$ equals the destruction probability of jobs due to outflow of firm i as can be calculated from (5), and $P_{i,kj}$ equals the firm specific probability of job destruction given that an employee has left the firm because of reason j. Note that these probabilities are only equal across firms if there are no firm specific variables included in X_i.

In a similar vein, the estimated number of destructed jobs caused by internal flow equal

$$M_{i,D} = P_{i,M} * M_i , \tag{9}$$

where $P_{i,M}$ equals the destruction probability of jobs of firm i due to internal mobility as in (6).

The total estimated number of destructed jobs in firm i then follows from adding (8) and (9) as in (4). The number of created jobs in firm i then result from (1) as $C_i = I_i - O_i + D_i$.

One problem remains. This estimation procedure can lead to estimated negative job creation if negative employment growth exceeds the (positive) number of jobs destructed. The number of jobs created should however be non-negative for each firm. For this reason we assume for these 'problem' cases that the number of jobs destructed equals $O_i - I_i$, so that the number of jobs created equals zero.

5 JOB CREATION AND DESTRUCTION: THE ESTIMATION RESULTS

This section presents the estimated job destruction and creation rates, based on the outflow and inflow data that are constructed as described in the previous section. Section 5.1 presents estimation results of the destruction probabilities. These are used to construct the destruction and, consequently, creation rates as described in the previous section. Section 5.2 provides further descriptive details about the numbers of jobs created and jobs constructed. In section 5.3 the Tobit model is described explained that is used for the explanation of the number of jobs created and jobs destructed. Finally, section 5.4 presents the obtained Tobit estimation results.

5.1 **Estimation results job destruction probability equations**

Table 5.1 presents the estimated parameters of the logit models explaining the probability of destruction due to outflow and due to internal mobility, i.e. equations (5) and (6). The logit model is estimated using the six outflow category dummies and the two dummies representing the firm's financial prospects for the coming years as explanatory variables.

Starting with the job destruction probability due to outflow: in all three years jobs are significantly less likely to be destroyed if the employee leaves the firm voluntarily, retires (or dies) or becomes disabled. Of these three possibilities leaving the firm voluntarily has the strongest effect. On the other hand, in case a long-term fixed contract is terminated the probability that the job is destructed is much higher (but this effect is not significant). These findings ares in accordance with the job destruction probabilities presented in table 3.3, that come straight from the survey.

As expected, jobs are significantly less (more) likely to be destroyed if the firm is quite optimistic (pessimistic) about its future sales. This also holds both external and internal job mobility. Negative financial prospects increased the probability of job destruction in case an employee changed jobs within a firm (variable is significant in two out three years), but having positive expectations about the future did not affect job destruction.

As explained in the previous section, these probabilities are used to calculate the number of jobs destructed per firm, and using equation (1), the number of jobs created per firm.

Table 5.1 Logit regression results of the probability of job destruction based on outflow and internal mobility in 1994, 1996 and 1998
(absolute t-values between parentheses)

	Job destruction via outflow (see equation (5))					
	1994		1996		1998	
Intercept						
Termination short term fixed contract	-0.108	(0.57)	-0.072	(0.44)	-0.241	(1.29)
Termination long term fixed contract	0.134	(0.41)	0.245	(0.85)	-0.266	(0.85)
Compulsory redundancy	-0.331*	(1.84)	0.092	(0.50)	-0.131	(0.55)
(Early) retirement/death	-0.828**	(5.46)	-0.594**	(3.82)	-1.218**	(6.47)
Voluntary redundancy	-1.804**	(13.94)	-1.563**	(13.00)	-2.136**	(15.48)
Disability	-0.719**	(2.28)	-0.752**	(2.30)	-1.507**	(3.55)
Positive prospects firm	-0.206	(1.32)	-0.430**	(3.43)	-0.305**	(2.05)
Negative prospects firm	0.647**	(3.06)	0.706**	(3.28)	0.438	(1.37)
Number of observations	1234		1537		1505	
Log likelihood	-651.097		-809.236		-622.564	
	Job destruction via internal flow (see equation (6))					
	1994		1996		1998	
Intercept	-1.125**	(9.77)	-1.112**	(8.24)	-1.711**	(10.79)
Positive prospects firm	0.121	(0.63)	-0.443**	(2.46)	-0.028	(0.14)
Negative prospects firm	0.565*	(1.87)	0.184	(0.58)	0.730*	(1.73)
Number of observations	683		837		795	
Log likelihood	-391.178		-423.798		-342.643	

*(**) denotes significance at the 10% (5% level)

5.2 **The number of jobs created and jobs destructed per firm**

Tables 5.2a and 5.2b report the averages and standard deviations of the estimated percentages of created and destructed jobs per firm size.

From table 5.2a it follows that on average the number of created jobs grew with about 50% of the firm size in small establishments whereas 12%-25% of the jobs were destructed. So, still quite a lot of jobs were destructed. This percentage declined during the observation period. The same pattern holds for all the other size-classes and years, although the percentages of created and destructed jobs decline rapidly with firm size. Furthermore, we see that internal mobility is with 1-5% quite moderate and occurs mostly in large firms, possibly due to the fact that reorganisations happen more often in large-scale establishments than in small establishments. Generally, inflow of new employees lies somewhat above 10% of total firm size

Table 5.2a Average number of Dutch job created, destructed, internal mobility, inflow and outflow relative to firm size, by year and by size class *(standard deviations between parentheses)*

	No. obs	Creation		Destruction		Internal mobility		Inflow		Outflow	
		C		*D*		*M*		*I*		*O*	
1994											
Small	247	52.3	(100.8)	25.7	(62.3)	1.2	(6.0)	10.6	(15.0)	9.0	(14.4)
Medium	893	18.6	(43.0)	10.1	(26.1)	1.8	(5.4)	9.3	(12.0)	8.4	(11.7)
Large	614	2.8	(5.2)	2.4	(2.5)	3.3	(6.0)	8.9	(9.1)	9.2	(8.0)
1996											
Small	268	56.1	(101.1)	17.5	(51.6)	1.2	(5.1)	9.6	(12.9)	7.0	(11.6)
Medium	850	26.6	(59.0)	13.2	(30.1)	2.1	(6.5)	11.1	(14.8)	9.5	(14.1)
Large	761	4.5	(5.5)	4.3	(3.8)	4.8	(8.0)	10.2	(10.2)	9.8	(8.4)
1998											
Small	241	50.0	(95.5)	12.2	(40.2)	1.0	(4.4)	10.3	(13.1)	7.8	(11.6)
Medium	830	29.9	(53.7)	10.2	(27.2)	2.0	(5.0)	13.4	(12.6)	10.1	(11.4)
Large	531	4.4	(4.9)	3.2	(2.4)	3.8	(5.8)	13.5	(10.5)	11.0	(7.9)

whereas outflow of employees lies somewhat below 10%, so firms are growing in the observed period. It is quite interesting to see that in 1994 inflow is highest in small firms, but that at the end of the observation period, inflow of new employees is highest in the large firms. This pattern is in line with that of job creation, supporting the idea that small firms function as an engine for job creation and large firms catching up later.

In table 5.2b job creation and job destruction rates are shown at the sector level. The figures show that there is a lot of differentiation in job creation/destruction across sectors. Creation and destruction rates are highest in the private sector, although it is hard to point out a particular sector with the highest creation and destruction rates, since that differs per year. Job creation and destruction are lowest in the public sector, excluding education and health care. Efforts of the government to increase employment in health care and in the educational sector have sorted out effect as can be seen in the figures of medium sized firms in 1996 and 1998.

Table 5.2b Average number of Dutch job created (C) and destructed (D) relative to firm size, by year, firm size-class and sector *(standard deviations between parentheses)*

	1994				1996				1998			
	Creation		Destruction		Creation		Destruction		Creation		Destruction	
Small firms												
Farming and Industry	59.8	(107.1)	23.6	(59.9)	62.9	(106.6)	20.1	(60.9)	53.4	(89.1)	20.7	(48.7)
Construction	51.4	(108.7)	53.3	(88.8)	90.0	(121.4)	10.9	(34.8)	19.1	(51.4)	13.8	(38.9)
Trade	47.7	(95.8)	24.0	(59.9)	27.5	(65.7)	18.1	(47.0)	46.5	(103.3)	12.6	(46.3)
Other business services	74.7	(110.2)	20.7	(55.1)	76.0	(121.4)	14.2	(45.7)	62.3	(110.8)	9.4	(39.0)
Business services	37.7	(79.7)	34.8	(72.0)	46.9	(94.5)	27.0	(62.3)	27.4	(75.0)	25.0	(64.2)
Transport	52.0	(123.7)	1.1	(2.7)	28.4	(65.5)	24.2	(69.4)	41.5	(110.9)	12.5	(44.2)
Education	-	-	-	-	34.1	(73.7)	8.5	(29.8)	35.9	(83.9)	1.3	(2.3)
Care sector	-	-	-	-	-	-	-	-	89.9	(115.5)	1.6	(2.0)
Government	-	-	-	-	-	-	-	-	-	-	-	-
Medium firms												
Farming and Industry	25.9	(56.2)	13.0	(29.7)	33.4	(72.1)	10.0	(24.7)	34.5	(57.5)	9.0	(21.0)
Construction	25.2	(56.0)	11.8	(32.7)	24.0	(52.7)	24.7	(48.9)	28.1	(50.8)	7.6	(18.6)
Trade	19.4	(37.3)	11.0	(30.5)	33.7	(69.5)	18.6	(32.8)	37.8	(55.3)	10.6	(27.4)
Other business services	26.9	(48.6)	8.5	(19.9)	30.3	(64.4)	14.3	(29.0)	51.2	(89.1)	16.0	(38.0)
Business services	13.8	(35.5)	10.7	(25.9)	35.1	(67.3)	12.9	(28.2)	27.4	(41.6)	16.4	(41.1)
Transport	25.2	(60.4)	12.0	(33.8)	20.2	(34.1)	18.7	(42.7)	23.7	(44.0)	10.9	(30.1)
Education	12.7	(24.8)	5.7	(15.3)	22.7	(45.6)	10.6	(25.9)	24.0	(35.1)	10.2	(27.9)
Care sector	13.4	(27.6)	8.6	(17.9)	11.2	(22.4)	6.9	(12.9)	29.0	(54.3)	10.1	(26.6)
Government	4.3	(6.4)	6.1	17.2)	3.9	(7.9)	4.0	(5.5)	4.5	(8.5)	2.0	(1.8)
Large firms												
Farming and Industry	2.1	(2.9)	2.8	(3.0)	3.9	(4.2)	4.2	(3.8)	4.0	(3.8)	3.1	(2.6)
Construction	3.2	(6.0)	1.9	(1.2)	4.6	(4.0)	3.7	(2.6)	2.9	(3.4)	3.3	(1.4)
Trade	3.8	(4.1)	2.8	(2.3)	5.9	(4.7)	6.7	(5.1)	7.7	(7.6)	3.8	(1.8)
Other business services	2.8	(3.2)	2.2	(1.4)	5.7	(7.1)	6.4	(8.0)	2.8	(2.8)	2.7	(2.2)
Business services	3.5	(3.5)	2.9	(2.4)	6.9	(10.6)	4.8	(3.8)	5.7	(4.4)	4.7	(3.5)
Transport	3.6	(5.7)	4.1	(2.5)	6.4	(8.4)	3.8	(3.3)	5.5	(4.1)	3.6	(1.8)
Education	2.5	(4.5)	1.9	(1.7)	2.3	(1.9)	2.8	(2.2)	3.5	(2.7)	2.4	(1.3)
Care sector	2.6	(3.0)	2.5	(2.6)	4.8	(3.4)	4.3	(2.8)	5.2	(6.5)	3.4	(2.4)
Government	3.0	(9.4)	1.9	(2.6)	2.7	(2.5)	3.0	(2.7)	2.4	(2.2)	2.1	(1.6)

- = less than 10 observations

5.3 **The Tobit model**

Since there are many firms in the micro data set where either no creation or destruction of jobs has taken place, we opt for the Tobit regression method to explain job creation and job destruction. The high number of zero values for job creation and destruction is an indication that the dependent variable is censored, i.e. values in a certain range are all transformed to a single value (see Greene, 1997). Conventional least squares methods (like OLS) can not deal adequately with censored dependent variables. They neglect the conceptual difference between a zero value and a (in the case of job creation or job destruction) positive value of the dependent value under consideration. In a way, the distribution of a censored dependent variable y_i^* is actually a mixture of a discrete distribution (zero values) and a continuous distribution (positive values). This is modelled as follows:

$$
\begin{aligned}
y_i^* &= X_i\beta + \varepsilon_i, \qquad \varepsilon_i \ \ i.i.d.\ N(0,\sigma^2) \\
y_i &= 0 \leftrightarrow y_i^* \le 0 \\
y_i &= y_i^* \leftrightarrow y_i^* > 0
\end{aligned}
\tag{10}
$$

where β is a parameter vector to be estimated and ε_i a disturbance term, that is normally distributed with zero mean and standard deviation σ.

The expected value of y_i^*, given that it is positive, equals

$$
E(y_i^* \,|\, y_i^* > 0) = X_i b + E(e_i \,|\, e_i > -X_i b) = X_i b + s\,\frac{f\left(s^{-1}X_i b\right)}{1-\Phi\left(s^{-1}X_i b\right)} \tag{11}
$$

where $\phi(.)$ and $\Phi(.)$ denote the standard normal density function and the standard normal distribution function, respectively. Equation (11) already shows that performing an OLS regression on the positive values of y_i leads to biased estimates of β, since the expected value of the error term ε_i may not be zero, but equals $\sigma\varphi(.)/(1-\Phi(.))$. This expression is also known as the Inverse Mill's ratio.

The log-likelihood function to be estimated consists of two parts. The first part is the contribution of the zero value observations to the log-likelihood and the second part reflects the contribution of the positive value observations to the log likelihood. Assume that a dummy variable δ_i is equal to 1 in case of censoring, and is equal to zero otherwise, then the log-likelihood reads as

$$
\begin{aligned}
\log L &= \sum_{i=1}^{n} d_i \Phi\left(y_i^* \le 0\right) + (1-d_i) f(y_i \,|\, y_i^* > 0) \\
&= \sum_{i=1}^{n} d_i\ \Phi\left(-X_i b\ /\ s\ \right) + (1-d_i)\left(\log\left(s^{-1} f(s^{-1}(y_i - X_i b))\right) - \log\left(1-\Phi\left(s^{-1}(-X_i b\ )\right)\right)\right)
\end{aligned}
\tag{12}
$$

where n denotes the total number of observations in the sample.

Because of the censoring, deriving the marginal effects of the explanatory variables on job creation or job destruction is not as clear-cut as when using OLS estimation in case of no censoring in the population. The issue is whether you are interested in the marginal effect of an explanatory variable on the unconditional dependent variable (allowing y_i to be zero) or on the censored dependent variable (y_i larger than zero). The marginal effects with respect to a variable x_i are subsequently given by

$$
\frac{E\left(y_i^* \,|\, x_i\right)}{\partial x_i} = b \tag{13a}
$$

$$
\frac{E\left(y_i^* \,|\, x_i\right)}{\partial x_i} = b\ \Phi\left(\frac{x_i b}{s}\right) \tag{13b}
$$

Equation (13a) shows the marginal effect of the explanatory variables on the dependent variable in the whole sample of firms (including the ones with no job creation/destructions) whereas equation (13b) reflects the marginal effects of the explanatory variables on the dependent variable in the sub-set of firms in which jobs have actually been created/destructed. They are smaller than according to equation (13a) since the standard normal distribution function $\Phi(.)$ lies between 0 and 1.

In section 5.4 the focus will be on the unconditional marginal effects of variables on job creation/destruction. The reason for this choice is that we are primarily interested in the effects of several firm characteristics on job creation/destruction in all firms in the Dutch economy and not just in the firms in which job creation/destruction takes place.

5.4 **Estimation results job creation and job destruction rates**

Table 5.4a and table 5.4b show the estimation results of the Tobit regressions performed to explain job creation respectively job destruction rates. We have estimated two specifications for the years 1994, 1996 and 1998. The names of the variables are self-explanatory. The difference between specification 1 and 2 [3] is that in the latter specification four economic policy related variables are included, i.e. real wage rise (average wage increase in a firm corrected for consumer price inflation), the percentage of workers earning a gross monthly wage below Dfl 2,400 (€ 1,100), the percentage of workers in subsidised jobs (special programs) and the percentage of workers whose wages/taxes are subsidised by the government. Including these variables enables us to analyse whether police measures which should stimulate employment sort out any effect. However, we realise the limitations of our analyses and we ask the reader to keep in mind that we only want to get a rough indication on the employment effects of government policy.

5.4.1 *Job creation rates*

Relative job creation, measured as the number of jobs created by a firm divided by the number of employees in the preceding year, is affected by several variables. The main results are discussed in this section. On the whole, the estimation results are in accordance with economic intuition and are quite robust across the two specifications as well as the three years under investigation.

[3] The estimation results in specification 2 are based on less observations than the estimation results in specification 1. The reason is that many companies weren't able to provide figures on the four economic policy related variables. In order to investigate whether the differences in estimation results between specification 1 and 2 stem from the addition of four explanatory variables or from differences in sample size we have also estimated specification 1 on the sample used in specification 2. Using the smaller sample hardly altered the estimation results.

The capital variable indicates how many percentage points higher/lower the utilisation rate of capital goods was in a particular year than the average utilisation rate of capital. Capital has a positive and statistically significant effect on relative job creation. The corresponding parameter equals about 0.02-0.035, indicating that a one unit percentage point higher capital utilisation rate increases the number of created jobs with 2%-3.5% of the total number of employees at the firm. This finding is in accordance with economic intuition; a high capital utilisation rate may increase the number of jobs created by the firm.

The definition of labour is similar to the variable capital. Its effect on relative job creation is negative and statistically significant. The reason for this negative effect is somewhat less clear-cut than in case of the capital utilisation rate. A possible explanation may be that job creation lags behind having a higher than normal labour utilisation rate. This does not seem to be unreasonable. If production increases then, at first, a firm might ask his employees to do some overwork and, only if the production level remains high, it starts creating additional jobs.

Firms with positive expectations on future sales or budget (public sector) also show higher job creation rates than firms that expect no change in sales/budget. The effect is quite high (0.25 to 0.57). However, firms with negative expectations do not differ significantly in their creation of new jobs than firms that don't expect any changes in sales/budget. Reorganisations as such only affect job creation significantly in 1996, but not in 1994 and 1998. Changes in outsourcing also only affect job creation significantly in 1996. Interesting but logically, a decrease in contracting out activities increases relative job creation.

The age of a firm significantly affects a firm's relative job creation. Old firms create far less jobs than young firms (set up after 1976). Among these young firms there are probably many firms which are still in the 'building up' phase and are busy developing new activities or products. This probably stimulates the creation of new jobs in young firms whereas it probably plays less in older firms whose definite shapes have more or less already been crystallised out for quite some time.

Firm size has the expected effect on job creation. Small firms create (relatively speaking) much more new jobs than large firms. The estimated parameter coefficient suggests that job creation at small firms is in 1994 respectively 1998 about 50-70%, respectively 30% of their firm size higher than job creation at large firms. In 1996 firm size did not affect relative job creation significantly, although the estimated coefficient is still positive. The fading away over the observation period of the firm size effect may be explained by the fast economic growth the Netherlands experienced in the second half of the 1990s. During the first years of the economic boom large firms may have been able to do the growing amount of work with the current

staff (over-work, outsourcing, reallocating employees within the firm), whereas small firms did not have the aforementioned possibilities and had to hire more people in order to handle the increased amount of work. When the large firms can't cope with the growing amount of work by working more efficiently or when the increased production does not seem to be just temporary they start hiring extra people. In fact, this is just the opposite of labour hoarding in large firms at the beginning of an economic recession.

After having controlled for several firm characteristics, sector does not seem to affect job creation very much. The only exception is the care sector in 1998. In this year, job creation in the care sector is much larger than in the reference sector public services (excluding care and education). This picture also emerges according to the CPB (see CEP, 2002, 'Werkgelegenheid in de zorg', p. 125). The CPB shows that in the late 1990s employment (measured in labour years) grew much faster in the care sector (1997: 4.2%, 1998:5.1%) than in the private sector (1997:3.7%, 1998: 3.6%) or in other parts of the public sector (1997: 0.3%, 1998: 1.9%). This was the result of government policy to increase employment in the care sector in order to reduce waiting lists for medical care.

The job creation effects of the economic policy relevant variables in specification 2 suggest that specific government programs to create jobs for people with a disadvantaged position at the labour market may not have had the expected effect. The corresponding parameter is very small and insignificant. Firms that employ people as part of a government project for the unemployed do not seem to create more additional jobs than other firms. However, tax subsidies on low wages turn out to have stimulated job creation. The effect of this variable is positive and statistically significant in 1996. Job creation also seems to be more prominent in firms with relatively many low wage workers than in firms with relatively few low wage workers.

5.4.2. *Job destruction rates*

Comparing Table 5.4b with Table 5.4a shows that on the whole, there are less factors affecting job destruction than job creation. Job destruction often occurs when a multi-unit firm merges with other firms and when a firm had a major reorganisation. The latter change results in a loss of jobs of about 16-20 percent of the original firm size. This effect is quite stable across the years and is found in both specifications. Firm size seems to affect job destruction mildly. In 1994, job destruction occurred statistically more often in small firms than in large firms. In 1996 the magnitude fades away and becomes insignificant.

Only one variable of the four economic policy variables significantly affects job destruction, namely the percentage of subsidised jobs. Wage costs did not seem to have any effect on job destruction during the

observed period 1994-1998. Maybe this was due to the favourable economic conditions in this period. In 1994, employing people within a government employment program increased job destruction. This result suggests that in this year regular jobs were substituted for subsidised jobs. Interestingly enough, this effect disappeared in 1996 and 1998. Probably, the replacement of regular jobs for subsidised jobs (which was not the intention of these employment programs) was just a starting up problem and did not occur anymore in later years.

Tatble 5.4a Tobit regression results job creation in 1994, 1996 and 1998 *(absolute t-values between parentheses)*

	Specification 1						Specification 2					
	1994		1996		1998		1994		1996		1998	
Constant	-0.997**	*(2.35)*	-0.308	*(0.89)*	-0.534**	*(2.10)*	-1.204**	*(2.80)*	-0.415	*(1.19)*	-0.598**	*(2.35)*
Capital	0.034**	*(3.27)*	0.021**	*(3.73)*			0.034**	*(3.20)*	0.021**	*(3.77)*		
Labour	-0.039**	*(3.84)*	-0.039**	*(4.96)*			-0.040**	*(3.91)*	-0.034**	*(5.00)*		
Positive expectations (sales, budget)	0.570**	*(3.11)*	0.263*	*(1.77)*	0.393**	*(3.65)*	0.533**	*(2.92)*	0.254*	*(1.70)*	0.364**	*(3.41)*
Negative expectations (sales, budget)	-0.433	*(1.38)*	-0.377	*(1.20)*	-0.048	*(0.17)*	-0.440	*(1.41)*	-0.377	*(1.20)*	0.018	*(0.07)*
State technology	0.099	*(1.12)*	-0.022	*(0.33)*	0.043	*(0.83)*	0.111	*(1.26)*	-0.011	*(0.16)*	0.041	*(0.78)*
Change position within multi-unit firm	-0.224	*(0.70)*	0.052	*(0.26)*	0.009	*(0.05)*	-0.167	*(0.52)*	0.083	*(0.42)*	0.043	*(0.26)*
From multi-unit to single unit firm	0.130	*(0.18)*	0.348	*(0.60)*	-1.339**	*(1.91)*	0.164	*(0.22)*	0.659	*(1.01)*	-1.388**	*(1.99)*
Reorganisation	-0.022	*(0.11)*	0.363**	*(2.29)*	0.053	*(0.45)*	-0.003	*(0.01)*	0.369**	*(2.33)*	0.070	*(0.60)*
Increase in contracting out	0.036	*(0.14)*	-0.184	*(1.14)*	-0.042	*(0.35)*	-0.099	*(0.44)*	-0.162	*(1.01)*	-0.045	*(0.38)*
Decrease in contracting out	-0.137	*(0.61)*	0.564**	*(2.83)*			0.044	*(0.17)*	0.576**	*(2.90)*		
Coll. labour agreement	0.482**	*(2.09)*	0.130	*(0.68)*	0.041	*(0.24)*	0.478**	*(2.08)*	0.117	*(0.62)*	0.038	*(0.23)*
Year of establishment 1800-1945	-0.604**	*(2.38)*	-0.448**	*(2.28)*	-0.110	*(0.69)*	-0.536**	*(2.11)*	-0.446**	*(2.26)*	-0.110	*(0.70)*
Year of establishment 1946-1960	-0.465	*(1.46)*	-0.389	*(1.63)*	-0.317	*(1.60)*	-0.405	*(1.27)*	-0.376	*(1.58)*	-0.290	*(1.47)*
Year of establishment 1961-1975	-0.548**	*(2.46)*	-0.322*	*(1.80)*	-0.241*	*(1.71)*	-0.497**	*(2.24)*	-0.314*	*(1.76)*	-0.233*	*(1.67)*
Size 5-9 employees	0.689**	*(2.61)*	0.173	*(0.81)*	0.320*	*(1.83)*	0.551**	*(2.06)*	0.166	*(0.76)*	0.228	*(1.30)*
Size 10-99 employees	-0.019	*(0.09)*	-0.087	*(0.53)*	0.130	*(1.13)*	-0.039	*(0.19)*	-0.104	*(0.63)*	0.038	*(0.32)*
Care sector	-0.031	*(0.07)*	-0.294	*(0.63)*	0.437**	*(3.07)*	0.096	*(0.21)*	-0.298	*(0.63)*	0.382**	*(2.64)*
Trade sector	0.020	*(0.08)*	0.059	*(0.27)*	0.186	*(0.95)*	-0.076	*(0.30)*	0.006	*(0.03)*	0.103	*(0.53)*
Agr. and ind. sectors	0.026	*(0.12)*	0.251	*(1.45)*	0.118	*(0.81)*	0.055	*(0.25)*	0.253	*(1.46)*	0.137	*(0.94)*
Educational sector	-0.877	*(0.65)*	-0.328	*(0.32)*	0.164	*(0.74)*	-0.777	*(0.58)*	-0.349	*(0.34)*	0.182	*(0.82)*
Private sector services	-0.006	*(0.02)*	-0.088	*(0.43)*	0.035	*(0.19)*	0.097	*(0.34)*	-0.090	*(0.44)*	0.062	*(0.33)*
Real wage rise									0.022	(1.64)	0.015	(1.58)
Subsidised work							-0.001	(0.05)	0.002	(0.20)	0.007	(1.63)
Lower tax									0.017**	(2.29)	0.001	(0.12)
Perc.low wage workers							0.011**	(2.92)	-0.000	(0.10)	0.010**	(3.53)
Ancillory parameter σ	2.568	s.e.=0.075	1.960	s.e.=0.054	1.620	ss.e.=0.039	2.55	s.e.=0.074	1.960	s.e.=0.054	1.607	s.e.=0.039
Number of observations (censored observations)	1,157 (508)		1,046 (334)		1,182 (297)		1,157 (508)		1,046 (334)		1,157 (289)	
Log likelihood	-1,839.83		-1,707.49		-1,892.16		-1,835.60		1,703.43		-1,849.16	

- (**) denotes significance at the 10% (5%) level of significance

Table 5.4b Tobit regression results job destruction in 1994, 1996 and 1998 *(absolute t-values between parentheses)*

	Specification 1						Specification 2					
	1994		1996		1998		1994		1996		1998	
Variable												
Constant	0.007	*(0.06)*	0.301**	*(2.24)*	-0.163	*(0.93)*	-0.010	*(0.09)*	0.291**	*(2.15)*	-0.177	*(1.00)*
Capital	-0.005*	*(1.80)*	-0.000	*(0.14)*			-0.005*	*(1.85)*	-0.000	*(0.13)*		
Labour	-0.001	*(0.44)*	0.007**	*(2.76)*			-0.001	*(0.47)*	0.007**	*(2.81)*		
Positive expectations (sales, budget)	-0.073	*(1.41)*	-0.014	*(0.24)*	-0.053	*(0.74)*	-0.066	*(1.28)*	-0.011	*(0.19)*	-0.058	*(0.78)*
Negative expectations (sales, budget)	0.040	*(0.48)*	-0.025	*(0.22)*	-0.075	*(0.40)*	0.048	*(0.58)*	-0.021	*(0.18)*	-0.075	*(0.40)*
State technology	-0.037	*(1.50)*	-0.021	*(0.82)*	0.009	*(0.25)*	-0.035	*(1.43)*	-0.023	*(0.88)*	0.009	*(0.24)*
Change position within multi-unit firm	0.094	*(1.07)*	0.023	*(0.31)*	0.003	*(0.02)*	0.097	*(1.11)*	0.024	*(0.33)*	0.014	*(0.12)*
From multi-unit to single unit firm	-0.013	*(0.06)*	-0.146	*(0.55)*	0.957**	*(2.41)*	-0.008	*(0.04)*	-0.171	*(0.65)*	0.936**	*(2.35)*
reorganisation	0.166**	*(3.08)*	0.044	*(0.72)*	0.167**	*(2.07)*	0.162**	*(3.00)*	0.042	*(0.68)*	0.172**	*(2.12)*
Increase in contracting out	0.079	*(1.28)*	0.080	*(1.29)*	0.123	*(1.49)*	0.083	*(1.35)*	0.083	*(1.33)*	0.126	*(1.52)*
Decrease in contracting out	0.020	*(0.27)*	-0.097	*(1.24)*			0.025	*(0.33)*	-0.090	*(1.14)*		
Coll. labour agreement	0.015	*(0.23)*	0.093	*(1.28)*	0.166	*(1.44)*	0.017	*(0.26)*	0.100	*(1.37)*	0.166	*(1.44)*
Year of establishment 1800-1945	0.132*	*(1.93)*	-0.104	*(1.39)*	0.203*	*(1.85)*	0.140**	*(2.03)*	-0.097	*(1.29)*	0.209*	*(1.90)*
Year of establishment 1946-1960	-0.036	*(0.40)*	-0.008	*(0.09)*	-0.037	*(0.27)*	-0.046	*(0.51)*	-0.003	*(0.03)*	-0.030	*(0.21)*
Year of establishment 1961-1975	0.061	*(1.00)*	-0.196**	*(2.79)*	-0.072	*(0.74)*	0.062	*(1.01)*	-0.194**	*(2.77)*	-0.068	*(0.71)*
Size 5-9 employees	0.245**	*(3.31)*	0.053	*(0.64)*	0.047	*(0.38)*	0.242**	*(3.21)*	0.031	*(0.36)*	0.028	*(0.23)*
Size 10-99 employees	-0.014	*(0.10)*	-0.025	*(0.41)*	-0.050	*(0.63)*	-0.027	*(0.46)*	-0.031	*(0.49)*	-0.065	*(0.79)*
Care sector	0.030	*(0.23)*	-0.206	*(1.12)*	0.048	*(0.49)*	0.009	*(0.07)*	-0.188	*(1.02)*	0.037	*(0.37)*
Trade sector	-0.113	*(1.58)*	-0.186**	*(2.18)*	-0.027	*(0.20)*	-0.110	*(1.49)*	-0.195**	*(2.26)*	-0.047	*(0.34)*
Agr. and ind. sectors	0.001	*(0.02)*	-0.163**	*(2.42)*	0.119	*(1.18)*	0.011	*(0.18)*	-0.159**	*(2.34)*	0.124	*(1.23)*
Educational sector	-0.287	*(0.83)*	-0.049	*(0.13)*	-0.177	*(1.13)*	-0.281	*(0.82)*	-0.037	*(0.10)*	-0.172	*(1.10)*
Private sector services	0.009	*(0.12)*	-0.111	*(1.42)*	0.087	*(0.68)*	0.016	*(0.21)*	-0.103	*(1.29)*	0.092	*(0.72)*
Real wage rise									-0.001	(0.24)	-0.001	(0.23)
Subsidised work							0.016**	(2.36)	-0.000	(0.15)	0.001	(0.44)
Lower tax									-0.001	(0.45)	0.002	(0.33)
Perc. low wage workers							0.000	(0.17)	0.002	(1.30)	0.002	(1.13)
Ancillory parameter σ	0.740	s.e.=0.020	0.783	s.e.=0.020	1.147	s.e.=0.026	0.740	s.e.=0.020	0.783	s.e.=0.020	1.146	s.e.=0.026
Number of observations (censored observations)	1,157 (395)		1,049 (242)		1,213 (241)		1,157 (395)		1,049 (242)		1,213 (241)	
Log likelihood	-1,122.23		-1,123.40		-1,672.51		-1,119. 46		-1,112.17		-1,671.59	

* (**) denotes significance at the 10% (5%) level of significance

6 SUMMARY AND CONCLUSIONS

At the end of the 1990s economic growth was high and employment growth was positive. However, employment growth fluctuated much more in small than in medium, and in medium than in large firms. This follows from macro data. It confirms the view that SMEs, but in particular small firms, have less possibilities of keeping a stable staff size. Hiring and firing decisions have a strong impact for the individual small firms as clearly follows from the growth figures. Remarkably, in 1998 when economic growth in the Netherlands reached a peak, employment fell in small firms. Probably many small firms became medium-sized in this year. Differences in job growth rates across sectors are also highest for the small firms. Employment dynamics in time, but also across sectors, are therefore evidently associated with the size of the firm.

A focus on job destruction is also present. The positive employment growth indicates that (many) jobs were created. By means of the econometric model developed by Allaart *et al.* (2000) also the number of jobs destructed was calculated for 1994, 1996 and 1998.

The estimation results lead us to the following conclusions. Job creation is influenced by several factors. It is stimulated by a higher utilisation rate than normal of both capital and labour, by favourable expectations with respect to sales/budget, a small firm size and a firm being recently established. No job creation effects seem to stem from government subsidised employment programs. Finally, firms with relatively many low wage workers create more jobs than other firms.

Job destruction is affected by only a few variables. Job destruction occurs during a reorganisation of a firm. On the whole, about 16-20% of the jobs at a firm are destructed during a reorganisation. Furthermore, job destruction occurs relatively often at small firms compared to large firms. Government subsidised employment programs have contributed to a higher job destruction in 1994, but this effect disappeared in later years. No other significant effects of wage costs related variables on job destruction were found in the analyses.

It should be stressed that the period studied was a long period of an economic boom. During periods of an economic downturn employment dynamics might possibly also be expected to be higher for small than large firms but this aspect is –due to the limited time period that data were available- beyond the scope of this paper.

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