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Worker turnover in the Netherlands

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In this article, we present information on the dynamics of Dutch worker flows over the 2001–2005 period. This information provides important indications of the degree of labour market flexibility. It is for the first time that continuous-time worker flows, broken down by industry and sex, become available for the Netherlands. The ongoing movements and reallocations are measured by worker turnover: all hires and separations of workers during a year. We also consider the importance of the underlying job definition for our numerical findings. More specifically, we compare worker flows including all jobs with those including only jobs lasting at least three months.

Introduction

Labour market statistics like the number of jobs, the number of workers and the number of employed and unemployed persons are published in the National accounts every year. Yearly changes in these stocks reflect developments in labour demand and supply. These statistics, however, give no insight into the underlying dynamics. For example, the decrease of average unemployment with 69 thousand persons in 2007 may mean that outflow from unemployment was on average 69 thousand, but as well that inflow was 300 thousand and outflow 369 thousand. Insight into the magnitude of labour market flows is essential for a correct picture of the labour market.
The magnitude of flows also is an important indicator of the degree of flexibility on the labour market. In line with the Lisbon-strategy, improvement of the dynamics on the labour market is one of the main goals of government policy, as recently was expressed by Buijink (2008), the Secretary-General of the Ministry of Economic Affairs. More flexibility enhances an efficient (re)allocation of labour and may lead to productivity gains and higher labour market participation. Ministries, but also scientific institutions, have expressed much interest in incorporation of reliable and linked statistical information on labour market dynamics in the regular work programme of Statistics Netherlands. Statistics Netherlands is now developing such information. The yearly mutations in the (mean) labour market stocks are enriched with the underlying dynamics, which means with inflow and outflow. The central goal is to develop a consistent macroeconomic system of accounts with the main flows on the labour market. Experimental data on labour market dynamics were recently published in the National accounts of the Netherlands (CBS 2007).
This article reports about the magnitude of the flows in the Netherlands during the period 2001–2005 by calculating worker turnover: all hires plus all separations of workers that occur during a year.

Methodology

Figure 1 outlines the labour market in terms of the essential states and the corresponding flows.
The states in this simple flow model are: employment, unemployment and out of the labour force. In quantifying the transitions between these states, we follow the flow approach to the labour market (see, for example, Davis *et al*. 2006) as it has been

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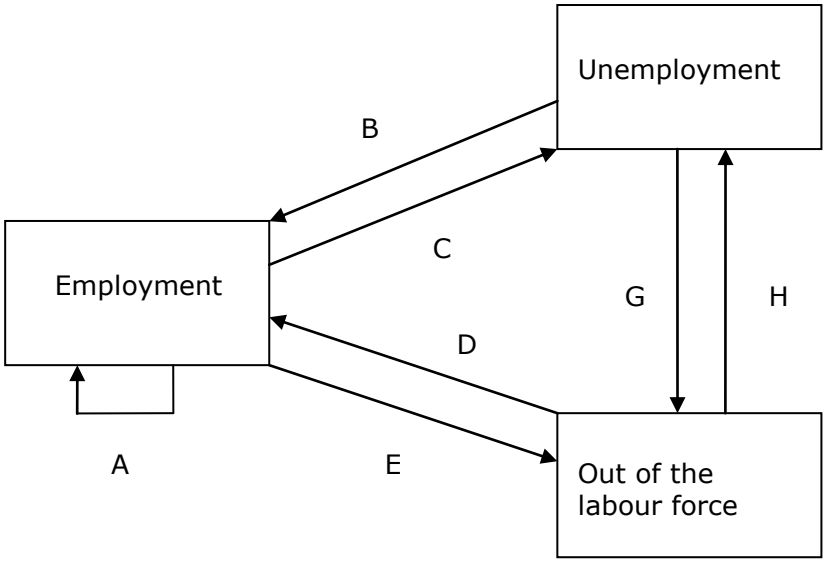

Figure 1. Labour market scheme of states and flows.

worked out by Broersma and Den Butter (1994) and Broersma *et al*. (2000) for the Netherlands. Figure 1 also shows the number of worker transitions from one employer to another (A). Internal mobility within firms is disregarded.

The first step in deriving the flows in figure 1 is the measurement of worker turnover: all hires and separations of workers during a year. For this purpose, only the precise definition of employment is relevant. Employment includes all persons with at least one employee job in the Netherlands. Conform the European System of Accounts (ESA) an employee job is defined as an explicit or implicit contract between a person and a firm, institution or private household in the Netherlands to do paid work during a specific period or until further notice. This definition encompasses all jobs of employees, regardless off job duration, working hours, main or secondary job. All persons who have these jobs in the Netherlands are included, irrespective of their age and the country where they live.

Yearly worker turnover is tabulated from data on beginning and ending dates of employee jobs (Milot and Kee 2005). The duration of jobs is determined on the basis of the period during which employees receive a salary for the job. Jobs are classified into four types: jobs without beginning or ending date during the year (continuing jobs), jobs with only a beginning date, jobs with only an ending date and jobs with both a beginning and an ending date (double flow jobs). Employees with only continuing jobs are of course not included in worker turnover, while those with double flow jobs are counted twice. Inflow in terms of figure 1 equals A + B + D. Inflow may relate to a newly created job, but to an already existing job as well. Direct information on this issue is not available within Statistics Netherlands. Outflow equals A + C + E. These are the main flows which determine worker turnover.

Worker turnover encompasses several flows which are not shown in figure 1. For example, some persons move directly from abroad to work in the Netherlands and vice versa. These persons may be migrants, but also persons who live abroad and are working in the Netherlands. There is also outflow due to mortality. Finally, worker turnover includes transitions which relate to additional jobs, because persons may have more than one job at the same time.

Worker turnover is constructed by counting all hires and separations that occur during a year. Worker turnover is taking place continually and hence continuous-time flows are calculated. These gross worker flows during an interval of time differ greatly from flows calculated from changes in stocks between two discrete points in time.

Classification of the total number of jobs into types relates to the number of jobs which exists during (part of) the year. The number of jobs which is published in the National accounts every year, however, is a weighted mean with each job counting only for its duration within the year. This yearly mean can be obtained by multiplying the number of jobs with the average job duration within the year (in days and as a percentage of the total number of days in the year). The connection between the average number of jobs and the number of jobs can be used to relate the flows, which are derived from the number of jobs per type, to the average number of jobs. We describe this relationship in detail in the appendix; see also Polder (2006).
We present the following aggregate indicators for the degree of labour market dynamics.

$H = \sum_i H_i$	hires, the sum of inflow per firm *i*;
$X = \sum_i X_i$	separations, the sum of outflow per firm *i*;
$WT = H + X$	worker turnover;
$\frac{WT}{2J^*} \times 100\%$	worker turnover rate = worker turnover as a percentage of twice the number of jobs (J^*);
	$\frac{WT}{2J^*}$ = 0 percent: no inflow or outflow, perfectly non-dynamic year;
	$\frac{WT}{2J^*}$ = 100 percent: all jobs are double flow jobs, perfectly dynamic year.

Data

We use the Social Statistical Database (SSB) to measure worker flows. Statistics Netherlands constructs this longitudinal database by combining mainly registers. These linked administrative data combined with one or more survey data sets are used to compose various separate files with information on for example persons living or working in the Netherlands, jobs and social security payments. Arts en Hoogteijling (2002) provide a detailed description of the multiple sources underlying the SSB. For an outline of the recent enrichment of the database with additional information, see Bakker (2006). For the purpose of computing worker flows, we matched data on employee jobs with data on individual workers. The resulting data set covers all employee jobs in the Netherlands and contains information on various characteristics of individual workers, their jobs and their employers. The magnitude of the derived flows for the entire economy are subsequently adjusted to meet the requirement of consistency with the information on changes in related stocks, which has been published already in the National accounts. For the applied method of adjustment, see Ahluwalia and Polder (2007).

Results

An overview of the magnitude of labour market dynamics over the 2001–2005 period is given in table 1. During this period the worker turnover rate amounted to 34 percent, on average. This means that the sum of inflow and outflow averaged 34 percent of twice the number of jobs per year. The magnitude of the flows was considerable. Inflow was 3.39 million and outflow 3.36 million in 2005. This meant a turnaround in the downward trend in worker turnover during the previous years. Worker turnover was 8.0 million (36.7 percent) in 2001, against 6.6 million (32.6 percent) in 2004 en 6.8 million (33.0 percent) in 2005. The decline of worker turnover over the 2001–2004 period is closely linked to the drop in economic growth after 2000 (CBS 2008; Ahluwalia and Kee 2007).

Table 1. Labour market dynamics, 2001-2005.

Year	Inflow	Outflow	Worker turnover	Total number of jobs	Worker turnover rate	Average job duration within year	Average number of jobs
	× 1000				*%*	*days*	*× 1000*
2001	4069	3884	7953	10834	36.7	255	7559
2002	3745	3753	7499	10695	35.1	260	7607
2003	3409	3468	6877	10351	33.2	267	7560
2004	3298	3333	6632	10181	32.6	269	7472
2005[1]	3392	3356	6750	10240	33.0	266	7468

[1]Provisional data.

The economic slowdown affected the labour market. For example, it became harder for entrants on the labour market to find a job and possibilities for job switching decreased. Worker turnover was at its lowest level in 2004. In this year, we saw the longest average job duration within the year and the biggest employment loss measured by the average number of jobs. From 2004 on, economic growth recovered. The average number of jobs decreased still slightly in 2005, but the number of jobs already increased. This contrary movement in the total and average number of jobs was caused by a decline in average job duration within the year. Average job duration within the year rose steadily before 2005.

Table 2 provides the results broken down by industry for 2004. Workers employed via employment agencies were responsible for almost 30 percent of both inflow and outflow. Also, by far the highest turnover rate (79 percent) was measured in this sector. This comes as no surprise, given the nature of this branch. Excluding these workers lowers the Dutch worker turnover rate by 6 percentage points to 27 percent. With a worker turnover rate of more than 50 percent, the sectors agriculture and hotels and restaurants can also be characterized as dynamic. Probably this has to do with the frequent use of seasonal workers in these sectors.

The worker turnover rate was significantly lower in the sectors trade and repair and business activities (exclusive of activities of employment agencies). With a share of each 13 percent in both inflow and outflow, both sectors did have, however, a substantial absolute turnover. The general government (exclusive of subsidized education) was the least dynamic sector: a turnover rate of 12 percent. Mobility was also low in manufacturing, financial activities, education and construction.

In interpreting these results by industry, recall that changes of department or function within firms are not counted. Internal mobility is much more common at larger employers than at smaller ones. Larger firms generally offer more opportunities for promotion which leads to smaller outflows. The results are also influenced by the fact that employees of employment agencies are not counted in the sectors where they work. The use of this kind of workers differs across industries.

Labour market dynamics for men and women separately are shown in table 3. Women are more dynamic than men. The aggregate turnover rate was 2 percentage points higher among women. Though more and more women combine work and care for children, the temporary career interruption in the case of the birth of children probably has a role to play. Because the participation rate is relatively high among the younger and better educated generation of women, labour supply of women also increases.

Table 2. Labour market dynamics by industry, 2004.

Industry	Inflow	Outflow	Worker turnover	Total number of jobs	Worker turnover rate
	× 1000				*%*
Agriculture, forestry and fishing	149	153	303	254	60
Manufacturing	168	191	359	1065	17
Construction	89	102	192	465	21
Trade and repair	441	453	894	1620	28
Hotels and restaurants	244	242	486	468	52
Transport, storage and communication	143	155	298	581	26
Financial activities[1]	56	58	114	319	18
Business activities[2]	423	421	844	1246	34
Activities of employment agencies	936	898	1833	1161	79
General government[3]	66	80	146	588	12
Subsidized education	101	100	202	515	20
Health and social work activities	304	301	604	1383	22
Other service activities	173	174	347	471	37
Total[4]	3299	3334	6632	10181	33

[1]Banking, insurance and pension funding, and activities auxiliary to financial intermediation.
[2]Excluding activities of employment agencies.
[3]Excluding subsidized education.
[4]Including mining and quarrying, and electricity, gas and water supply.

In most industries turnover rates for women exceeded those for men. The biggest gap showed up in agriculture, manufacturing and business activities. Though the aggregate turnover rate among women was higher, total inflow and outflow were, with a share of 53 percent, still dominated by men. This was generally not true for industries employing mostly women. Mainly in the health and social work activities, but also in education and hotels and restaurants, there has been a relatively large inflow and outflow of women. Movements of men were instead relatively large in construction, manufacturing and transport, industries with typical male occupations.

Sensitivity analysis

The measured magnitude of labour market dynamics depends on the applied definition of a job. Conform ESA, a job is defined as a labour contract. Particularly relevant is that contracts to do work for a short period are also counted. This implies, for example, that our exercise also relates to flows into and out of holiday work and other ephemeral jobs. For the years 2001–2004 we present in table 4 a comparison of our results with outcomes on dynamics based on jobs with a duration of at least three months (92 days or more). See Van den Berg (2007) for a more comprehensive analysis of the relation between job definition and measured magnitudes of flows. The share of these short duration jobs in the total number of jobs decreased from 15.4 percent in 2001 to 14.1 percent in 2004. The impact of ephemeral jobs is considerable. Not counting these jobs results in aggregate worker turnover being more than 40 percent lower each calendar year. The worker turnover rate lies 11 percentage points lower.

Table 3. Labour market dynamics by industry and sex, 2004.

Industry	Inflow	Outflow	Worker turnover	Total number of jobs	Worker turnover rate
	× 1000				*%*
Agriculture, forestry and fishing					
Men	88	90	178	162	55
Women	61	63	124	92	67
Manufacturing					
Men	118	135	252	817	15
Women	50	56	107	248	21
Construction					
Men	81	94	174	424	21
Women	9	9	17	41	21
Trade and repair					
Men	219	226	445	862	26
Women	223	228	451	760	30
Hotels and restaurants					
Men	119	118	237	225	53
Women	125	124	249	243	51
Transport, storage and communication					
Men	100	109	208	423	25
Women	44	47	90	159	28
Financial activities[1]					
Men	30	31	61	176	17
Women	25	26	51	144	18
Business activities[2]					
Men	220	220	440	701	31
Women	201	201	402	545	37
Activities of employment agencies					
Men	557	534	1090	687	79
Women	379	364	743	474	78
General government[3]					
Men	38	49	87	376	12
Women	28	31	59	211	14
Subsidized education					
Men	36	39	75	211	18
Women	66	62	127	303	21
Health and social work activities					
Men	56	57	113	243	23
Women	248	244	492	1140	22
Other service activities					
Men	86	88	174	232	37
Women	87	86	173	239	36
Total[4]					
Men	1751	1792	3542	5574	32
Women	1548	1542	3089	4607	34

[1]Banking, insurance and pension funding, and activities auxiliary to financial intermediation.
[2]Excluding activities of employment agencies.
[3]Excluding subsidized education.
[4]Including mining and quarrying, and electricity, gas and water supply.

Table 4. Labour market dynamics, all jobs and jobs ≥ 3 months, 2001-2004.

Year	Inflow	Outflow	Worker turnover	Total number of jobs	Worker turnover rate
	× 1000				*%*
2001					
all jobs	4069	3884	7953	10834	36.7
jobs ≥ 3 months	2438	2252	4690	9168	25.6
2002					
all jobs	3745	3753	7499	10695	35.1
jobs ≥ 3 months	2197	2196	4392	9113	24.1
2003					
all jobs	3409	3468	6877	10351	33.2
jobs ≥ 3 months	1934	1991	3925	8851	22.2
2004					
all jobs	3298	3333	6632	10181	32.6
jobs ≥ 3 months	1881	1919	3800	8742	21.7

Conclusions

This article addresses labour market dynamics for the entire Dutch economy by computing worker turnover: the sum of all hires and separations during a year. The data show a huge size of flows of workers each year: an absolute worker turnover of 7.1 million, on average, during the 2001–2005 period. Related to (twice) the total number of jobs, worker turnover averaged 34 percent during these years. A considerable amount of worker turnover was due to workers employed via employment agencies. The agricultural and hotels and restaurants industries also showed substantial turnover of workers. Mobility was lower in the other industries, especially in general government. The labour market behaviour of women was relatively dynamic. Except in some sectors, particularly in agriculture, the magnitude of differences between men and women, however, was small.

A sensitivity analysis applied to our underlying job definition reveals its importance. It shows that computed Dutch labour market dynamics would be 11 percentage points lower during the 2001-2004 period if the calculation excludes jobs with a duration of less than one quarter.

Worker turnover in various countries is calculated in several international studies. See for example Abowd *et al*. (1996) for France, Frederiksen and Westergaard-Nielsen (2007) for Denmark and Golan *et al*. (2007) for the US. Unfortunately, the reported outcomes are difficult to compare. They generally do not relate to continuous-time flows. Furthermore, the underlying job definition is usually not exactly clear. A common result, however, always is the considerable amount of labour market flows, in particular in relation to the yearly mutations in stocks. The information on the magnitude of dynamics in the form of a time series is particularly policy relevant, because insight is gained into the development of the flexibility on the labour market.

Appendix

The relation between gross flows and average number of jobs

The number of jobs in a year is published in the National accounts. The magnitude of this stock is calculated as a weighted mean by counting each job only for its duration in days within the year. The average number of jobs is given by

$$\tilde{J}_t = \sum_j \frac{d_{jt}}{D_t}$$

where $\tilde{J}_t$ the average number of jobs during period *t*;
d_{jt} the number of days job *j* exists during period *t*;
D_t the total number of days in period *t* (e.g. year = 365 or 366).

To connect the average number of jobs with flows, we first define the average duration of a job within period *t*

$$\bar{L}_t = \sum_j d_{jt} / J_t^*$$

where J_t^* is the number of jobs which exists during (part of) period *t*. The average duration within period *t* as a percentage of the total length of period *t* then can be written as

$$\tilde{L}_t = \frac{\bar{L}_t}{D} = \frac{1}{D}\sum_j d_{jt} / J_t^* = \frac{\tilde{J}_t}{J_t^*}$$

where we suppose for convenience that $D_t = D$. The average duration within period *t* in percentage terms thus can be written as the average number of jobs divided by the number of jobs. Jobs are classified into four types *s*. Hence, the average duration per type within period *t* in percentage terms is

$$\tilde{L}_{st} = \frac{1}{D}\sum_j d_{jst} / J_{st}^* = \frac{\tilde{J}_{st}}{J_{st}^*}$$

where *s* = {*WF, SI, SO, DF*}, with *WF* = without flow, *SI* = single inflow, *SO* = single outflow, *DF* = double flow. Thus the average duration of jobs of type *s* within period *t* in percentage terms equals the average number of jobs of type *s* divided by the number of jobs of type *s*.
Next, we split the average number of jobs into the four types

$$\tilde{J}_t = \tilde{J}_{WF,t} + \tilde{J}_{SI,t} + \tilde{J}_{SO,t} + \tilde{J}_{DF,t}\,.$$

$\tilde{L}_{WF,t} \equiv 1$, because *WF*-jobs exist the whole period. Hence

$$\begin{aligned}\tilde{J}_t &= \tilde{J}_{WF,t} + \tilde{J}_{SI,t} + \tilde{J}_{SO,t} + \tilde{J}_{DF,t} \\ &= J^*_{WF,t} + \tilde{L}_{SI,t} J^*_{SI,t} + \tilde{L}_{SO,t} J^*_{SO,t} + \tilde{L}_{DF,t} J^*_{DF,t}.\end{aligned}$$

The average number of jobs thus can be connected to the flows by calculating a weighted mean of the number of jobs per type. This follows from the derivation of flows directly from the number of jobs per type. The weights equal the average durations per type within period *t* in percentage terms.
Besides the average number of jobs, the mutation in this average can be related to the number of jobs per type, and hence to the flows. The mutation in the average number of jobs can be written as

$$
\begin{aligned}
\Delta\tilde{J}_t &= \tilde{J}_t - \tilde{J}_{t-1} = \\
&= (\tilde{J}_{WF,t} + \tilde{J}_{SI,t} + \tilde{J}_{SO,t} + \tilde{J}_{DF,t}) \\
&\quad - (\tilde{J}_{WF,t-1} + \tilde{J}_{SI,t-1} + \tilde{J}_{SO,t-1} + \tilde{J}_{DF,t-1}) \\
&= J^*_{WF,t} + \tilde{L}_{SI,t} J^*_{SI,t} + \tilde{L}_{SO,t} J^*_{SO,t} + \tilde{L}_{DF,t} J^*_{DF,t} \\
&\quad - (J^*_{WF,t-1} + \tilde{L}_{SI,t-1} J^*_{SI,t-1} + \tilde{L}_{SO,t-1} J^*_{SO,t-1} + \tilde{L}_{DF,t-1} J^*_{DF,t-1}) \\
&= \Delta J^*_{WF,t} + \Delta(\tilde{L}_{SI,t} J^*_{SI,t}) + \Delta(\tilde{L}_{SO,t} J^*_{SO,t}) + \Delta(\tilde{L}_{DF,t} J^*_{DF,t}) \\
&= \sum\nolimits_s \Delta(\tilde{L}_{st} J^*_{st})
\end{aligned}
$$

with $\tilde{L}_{WF,t} \equiv 1$.

The mutation in the average number of jobs is thus related to the number of jobs as follows. It is the change in the weighted sum of the number of jobs per type (J_{st}^*), with weights equal to the average durations per type within period *t* in percentage terms ($\tilde{L}_{st}$).

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