Labour flows in Belgium

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Abstract

The paper describes job flows in Belgium using micro data at the firm level collected through the annual social balance sheets that companies have to file with the National Bank of Belgium. The coverage of the study is very broad: all industries and commercial services are included. We contribute to the previous literature by studying a long period from 1998 to 2006, covering both upturns and downturns in the Belgian economy. Furthermore, data from the social balance sheets make it possible to take into account the heterogeneity of the workforce, on top of the heterogeneity of firms themselves: job flows are broken down by socio-professional status and type of employment contract.

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The views expressed in this paper are those of the authors and do not necessarily reflect the views of the National Bank of Belgium.

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1   INTRODUCTION

With the introduction of the social balance sheet in 1996, researchers now have access to micro data at the firm level in Belgium containing detailed information about the workforce and no longer have to rely solely on survey data or social security-based aggregate data to investigate the changing nature of the Belgian labour market.

One of the contributions of this paper is the creation of a longitudinal dataset for the whole population of firms that have to file a social balance sheet with the Central Balance Sheet Office of the National Bank of Belgium. This longitudinal dataset is used to observe variations in behaviour among firms and to determine how they affect total employment. In particular, measures of job creation and destruction along the lines of research by Davis, Haltiwanger, and Schuh (1996) are presented for the period 1998-2006, for the private sector as a whole and for branches of particular interest.

Given the wider access to detailed microeconomic data in most countries, there has been a multiplication of papers on job and worker flows in recent years[1]. All studies have shown that job creation and destruction, as well as hiring and firing of workers, occur simultaneously at far higher rates than the evolution of net employment growth in the economy.

We contribute to the previous literature by studying the period 1998 to 2006, covering both upturns and downturns, and by taking more closely into account the heterogeneity of the workforce, on top of the well-documented heterogeneity of firms. The dynamics of firms is matched with job flows and heterogeneous labour. Workers are categorised according to their socio-professional status (blue-collar workers and white-collar workers) and type of work contract. The costs for adjustment of the workforce differ markedly between these categories, which may imply different cyclical patterns. The focus of the paper is net employment changes at the firm level[2] (job flows) and not the much more numerous hires, lay-offs and quits (worker flows). The empirical relationship between both is nontrivial (Burgess *et al.*, 2000).

The remainder of the paper is organised as follows. In Section 2, we present the longitudinal dataset used to compute job creation and destruction indicators. The cleaning of the database and the treatment of missing values is explained in detail. Section 3 begins with a short presentation on the methodological principles commonly used to measure job creations and job destructions. The main results on the job creation and destruction process in Belgium over the period 1998-2006 are then presented and compared with results from earlier studies and for other countries. Among other things, the cyclical properties of job creation and destruction over time are investigated, as well as the importance of reallocation within branches of activity versus reallocation between branches. Section 4 concludes.

2   DATA AND MEASUREMENT ISSUES

2.1   DATA

The analysis is based on data included in the social balance sheet of firms operating in Belgium. Firms producing a social balance sheet are those who file standard-format accounts collected by

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[1]   See, in particular, Konings (1995) for the United Kingdom, Van der Linden (1999) for Belgium, Abowd, Corbel and Kramarz (1999) and Duhautois (2002) for France or Stiglbauer *et al.* (2003) for Austria.

[2]   Social balance sheet data are available only at the firm - rather than the establishment - level.

the Central Balance Sheet Office of the National Bank of Belgium (i.e. non-financial corporations, and, since 2006, large non-profit-making organisations) as well as some other types of enterprises, in particular banks, insurance companies, hospitals and non-profit-making organisations with more than 20 workers. Employers not having the status of a legal entity (natural persons) do not have to file a social balance sheet.

The social balance sheet contains a large set of information concerning various aspects of employment in enterprises, notably the number of workers, the working hours and labour costs, the composition (by gender, by type of contract and by socio-professional status) of the workforce at the end of the financial year, the number of entries and exits of workers during the year, and the training policy of the firm. Social balance sheets exist in abbreviated or full-format version. All information in the abbreviated social balance sheet is included in the full-format version[3], which contains additional information, for example, about the use (and cost) of temporary workers, or about the characteristics of new and exiting workers.

The legislation governing the social balance sheet applies to the financial years beginning after 31 December 1995. The data concerning the first financial year of deposit (1996) are nevertheless incomplete and, in many cases, of bad quality. This is why our analysis covers the period 1998[4]-2006.

Since this article aims to analyse the creation and destruction of jobs, only companies with recorded workers were taken into account. Whatever their legal date of creation, the term "new firms" consequently covers firms having employed at least one person.

In addition, the population used for the analysis was limited to companies whose main activity is recorded in the categories C to K of the EC nomenclature of economic activities, i.e. the secondary sector and commercial services[5]. Several considerations explain this choice. Although the majority of international studies focused only on the manufacturing sector, it appeared interesting to widen the field of application as far as possible, more especially as the social balance sheets apply to a wide scope of activity, including, *inter alia*, banking and insurance services, and hospitals. It was decided to include services as far as possible. Nevertheless, with regard to non-commercial services, the quality of the data left much to be desired, in particular in the case of hospitals. Moreover, non-profit-making associations with between 20 and 100 workers were temporarily exempted from filing a social balance sheet before 31 December 1998, which causes a break in the population of analysis. It was consequently decided to limit the scope of activity to commercial services. Temporary work agencies were also excluded from the population of analysis given their typical high staff turnover and the ensuing difficulties with filing a social balance sheet.

To ensure comparability of the data, only the social balance sheets covering one twelve-month period were taken into account for each year. At the time of their creation, or their disappearance, or because of a change in their reporting period, companies can deviate from the principle of a

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[3] According to Belgian accounting legislation, a company had to file a full-format version for 2007, either when the yearly average of its workforce is at least 100 or when at least two of the following thresholds are exceeded: (1) yearly average of workforce is 50, (2) turnover (excluding VAT) amounts to at least EUR 7,300,000, (3) total assets exceed EUR 3,650,000. In general, the latter two thresholds are adjusted every four years in order to take account of inflation.

[4] As most of our analysis relies on year-to-year variations of employment, data from 1997 up to 2006 are necessary to study the 1998-2006 period.

[5] Secondary sector: C: Mining and quarrying industries; D: Manufacturing industry; E: Energy and water; F: Construction.
Commercial services: G: Trade and repair; H: Hotels and restaurants; I: Transport and communication; J: Financial and insurance services; K: Real estate and business services.

twelve-month financial year. As abnormally short or long reporting periods influence the job creation and destruction flows, such social balance sheets have been excluded from the analysis. Note that the closing date was not used as a criterion for eliminating companies from the dataset. For the same reporting year, one can thus find social balance sheets closed in January, as in June or December, which means that the one-year period covered by these balance sheets can differ. However, 85 p.c. of the companies close their financial year on 31 December.

An analysis of job creation and job destruction flows implies that we examine employment changes in each company during the whole period under review. The variations of employment between two consecutive financial years can nevertheless not be calculated when data are missing for one of these years.

This is indeed the case for continuing firms, when data are missing at the beginning or at the end of the period of observation. In this case, no employment change is taken into account. On the other hand, data are also missing for new companies, before their date of legal creation and for disappearing firms, after their legal shut-down (because of a bankruptcy, demerger, takeover, and so on). In these cases, the entire change in employment (to or from zero) is taken into account.

But social balance sheets of existing companies may also be missing for a certain number of reasons: where the duration of the financial year is not twelve months, bad quality of the data, filing after the legal deadline or not at all. As it is essential to have continuous series in order to be able to measure the annual variations in employment, missing values were replaced by estimated values wherever possible, according to the methodology described in the appendix.

2.2   DESCRIPTIVE STATISTICS

As a whole, the population of analysis includes 175,445 different companies. Some of them are continuing firms (they already existed in 1997 and were still active in 2006), while others appeared or disappeared during the period under review. Consequently, the number of active companies differs each year[6].

During the period under review, the number of active companies varied from a minimum of 87,269 units in 1998 to a maximum of 113,232 units in 2004. In 2006, 109,400 units were observed. The number of gainfully occupied workers was estimated at 1,591,000 in 1998. It reached a maximum of 1,892,000 units in 2001 and then declined to 1,856,000 in 2006[7].

As the scope of the social balance sheet is relatively broad, the cleaning of the database relatively limited and because the imputation procedure to treat missing data increased the number of firms and workers taken into account[8], the number of workers recorded in the whole population of firms accounts for, depending on the years, between 82 and 91 p.c. of total paid employment, as recorded in the national accounts for the same branches of activity (C to K)[9].

The population of firms was further broken down into several categories, according to their branch of activity and their size.

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[6]   Moreover, companies could not be considered as active when missing data were recorded at the beginning and/or at the end of the period under review, as explained in the appendix.

[7]   This is because 2006 was the last year of observation, so missing values could not be imputed.

[8]   From 2.1 to 3.9 p.c. of the workforce depending on the financial year examined.

[9]   Note that national accounts data include temporary agency workers (estimated at 113,000 persons on average in 2005), unlike our own data.

The code of activity was given according to the activity indicated in the latest available annual accounts or social balance sheet filed by the firm with the Central Balance Sheet Office. It consequently remains the same over the whole period.

Table 1   Distribution of firms and workers according to branch of activity in 2005

		Firms		Workers	
		Units	Percentages of the total	Units	Percentages of the total
Secondary sector					
C	Mining and quarrying industry	126	0.1	3,283	0.2
D	Manufacturing industry	14,755	13.0	546,077	29.2
E	Energy and water	59	0.1	23,154	1.2
F	Construction	16,851	14.9	172,665	9.2
Commercial services					
G	Trade and repair	38,719	34.2	424,405	22.7
H	Hotels and restaurants	9,523	8.4	88,512	4.7
I	Transport and communication	6,763	6.0	244,922	13.1
J	Financial and insurance services	4,882	4.3	122,374	6.5
K	Real estate and business services	21,402	18.9	247,717	13.2
Total of the private sector		**113,080**	**100.0**	**1,873,109**	**100.0**

Source: NBB.

Manufacturing industry is the main employer (29.2 p.c. of the total work force), before the trade and repair branch (22.7 p.c.). The transport and communication branch and the real estate and business services branch each employ about 13 p.c. of all recorded workers, and construction another 9.2 p.c. of the total. Other branches are relatively less important.

Size class is also constructed to be time-invariant: the size of a firm represents the average number of workers recorded for each available financial year, missing years not being taken into account.

Table 2   Distribution of firms and workers according to size class in 2005

	Firms		Workers	
	Units	Percentages of the total	Units	Percentages of the total
Small firms				
Ten workers or less	88,440	78.2	295,108	15.8
More than 10 to 20	12,005	10.6	176,810	9.4
More than 20 to 50	8,383	7.4	269,746	14.4
Medium sized firms				
More than 50 to 100	2,187	1.9	159,330	8.5
More than 100 to 250	1,304	1.2	208,742	11.1
Large firms				
More than 250 to 500	426	0.4	156,144	8.3
More than 500 to 1,000	204	0.2	141,270	7.5
More than 1,000	131	0.1	465,959	24.9
Total of the private sector	**113,080**	**100.0**	**1,873,109**	**100.0**

Source: NBB.

Firms with 50 workers or less (small enterprises) account for more than 96 p.c. of the full number of firms in our population. Firms with 10 workers or less even account for as much as 80 p.c. of them. In terms of employment, however, the relative importance of these small firms is definitely smaller: companies with 50 workers or less barely account for 40 p.c. of the total. Medium-sized companies (from 50 to 250 workers) occupy a fifth of the total number of workers, while large companies (more than 250 workers) employ the remaining 40 p.c. Very large companies, of more than 1,000 workers, employ a quarter of the total number of recorded workers.

3   MEASURING JOB FLOWS

3.1   METHODOLOGY

We use the standard definitions of job flow measures as constructed in Davis, Haltiwanger and Schuh (1996): (gross) job creation in period t equals the sum of employment gains over all expanding or entering firms between $t - 1$ and t. Similarly, (gross) job destruction in period t equals the sum of employment losses over all contracting or exiting firms between $t - 1$ and t. It follows that net employment change is the difference between job creation and destruction. (Gross) job reallocation equals the sum of job creation and destruction.

More specifically, we consider the net change of employment in establishment e (i.e. the firm) in the subset of establishments s (which could be, for example, a branch of activity, a size class, etc.) between t and $t-1$.

Job creation (C_{st}) is the sum of employment (X_{st}) changes of all establishments (expansions and new entries) with the employment gains (represented by S^+):

$$C_{st} = \sum_{e \in S^+} \Delta X_{est}$$

Similarly, job destruction (D_{st}) is the sum of employment changes within those establishments exhibiting job losses (contractions and exits, represented by S^-):

$$D_{st} = \sum_{e \in S^-} \Delta |X_{est}|$$

The employment growth rate (g_{est}) at an establishment e of type s in time t is the change in employment between t and $t-1$ periods divided by the average employment in the two time periods (denoted by Z_{est}). This growth rate is symmetric and bounded between -2 and 2.

$$Z_{est} = 0.5(X_{est} + X_{est-1})$$

$$g_{est} = \Delta X_{est} / Z_{est}$$

All measures are expressed as rates and constructed on an employment share basis (where the employment share is Z_{est} / Z_{st}). Thus, the job creation (c_{st}) and job destruction (d_{st}) rates for firm type s in time t are defined in the following manner:

$$c_{st} = \frac{C_{st}}{Z_{st}} = \sum_{e \in S^+} \left(\frac{Z_{est}}{Z_{st}}\right) g_{est}$$

$$d_{st} = \frac{D_{st}}{Z_{st}} = \sum_{e \in S^-} \left(\frac{Z_{est}}{Z_{st}}\right) |g_{est}|$$

One can assess the degree of "turbulence" in a sector by total job reallocation (R_{st}), which is the sum of job creation and destruction, while the net employment growth rate (net_{st}) is the difference between the two corresponding rates. Excess job reallocation (ER_{st}) is defined as job reallocation minus the absolute value of net employment change, representing that part of job reallocation over and above the amount required to accommodate net employment change. It thus provides a measure of excess turbulence in a sector, ignoring net employment growth *per se*.

$$r_{st} = c_{st} + d_{st}$$

$$net_{st} = c_{st} - d_{st} = \Delta X_{st} / Z_{st}$$

$$ER_{st} = R_{st} - |NET_{st}|$$

3.2 <u>RESULTS</u>

3.2.1 <u>JOB FLOWS, BUSINESS CYCLE AND FIRMS' DEMOGRAPHY</u>

Job creation and destruction rates are calculated for the period 1998-2006. Positive or negative employment changes are calculated individually for each enterprise for every two consecutive financial years (except in the case of missing data).

The job creation rate was on average 8.8 p.c. between 1998 and 2006, while at the same time, the job destruction rate reached 7.2 p.c. These rates are consequently 5 to 6 times higher than the net employment growth rate observed over the same period, which was on average 1.6 p.c.

The rate of job reallocation, which measures the cumulative number of hirings (new employment contract) and quits or lay-offs (end of employment contract, regardless of the cause) during a given period, is obtained by adding the two rates together. During the period under observation, it amounted to 16.1 p.c. The excess job reallocation, i.e. employment movements over and above the number necessary to obtain the net employment growth rate observed, was consequently on average 14.5 p.c. (i.e. 16.1 p.c. less 1.6 p.c.).

Table 3   Job creation and destruction rates in the private sector
(percentages)

	Job creation rate	Job destruction rate	Job reallocation rate	Net employment growth rate
1998	9.8	8.3	18.0	1.5
1999	10.4	8.1	18.4	2.3
2000	10.7	6.7	17.4	4.0
2001	8.6	7.6	16.1	1.0
2002	7.8	8.5	16.3	-0.6
2003	7.3	7.7	15.0	-0.3
2004	8.3	7.0	15.3	1.3
2005	7.9	5.9	13.8	2.0
2006	8.9	5.6	14.6	3.3
Average	**8.8**	**7.2**	**16.1**	**1.6**
Standard error	1.2	1.0		
Correlation with GDP at constant prices	0.69	-0.42	0.24	0.82

Source: NBB.

These results are highly comparable with those obtained by Van der Linden (1999) for the whole Belgian economy using data from the individual retirement accounts (CIMIRe). The 1978-1985 period covered by Van der Linden was on the whole a period of economic stagnation, when the average net employment growth rate was -1.4 p.c. (with a job creation rate of 7.3 p.c. and a job destruction rate of 8.7 p.c.) against the 1.6 p.c. growth observed for the period under review. The job reallocation rates in both periods are virtually the same, at 16 p.c.

The issue of whether or not job flows are counter-cyclical has been discussed in many previous studies (see Boeri (1996) or Duhautois (2002) for example). If a counter-cyclical pattern has been found, it has often been explained by recessions being periods of intense restructuring activity in

the economy. A number of models have been developed to incorporate the cyclical pattern of job flows. Mortensen and Pissarides (1994) present a matching model of unemployment with endogenous job creation and destruction processes. During upturns, it takes time to fill vacancies, while during downturns, job destruction occurs immediately. Job reallocation is thus counter-cyclical. Garibaldi (1998) extends the Mortensen and Pissarides model by allowing for employment protection legislation in the form of fixed firing costs. When firing is costly and time-consuming, the asymmetry in the cyclical pattern of job creation and job destruction disappears and job destruction becomes less responsive. Higher firing costs can result in an acyclical or even pro-cyclical job reallocation pattern.

In Belgium, the job creation rate is strongly correlated with change in economic activity. The correlation calculated between this variable and the GDP growth rate amounted to 0.7 for the period under review. On the other hand, the correlation between the job destruction rate and GDP growth rate was somewhat lower, at -0.4. The lower correlation between job destruction and economic activity is not surprising. While employment adjustment to the economic situation comes from job destruction in very flexible labour markets (as in the United States), it depends mainly on job creation in more rigid labour markets (as in continental Europe). In Belgium, employment protection legislation and labour shortages could prevent lay-offs in times of slowdown of economic activity, especially if it is considered as being temporary.

Figure 1 Job creation and destruction rates: influence of the business cycle
(percentages)
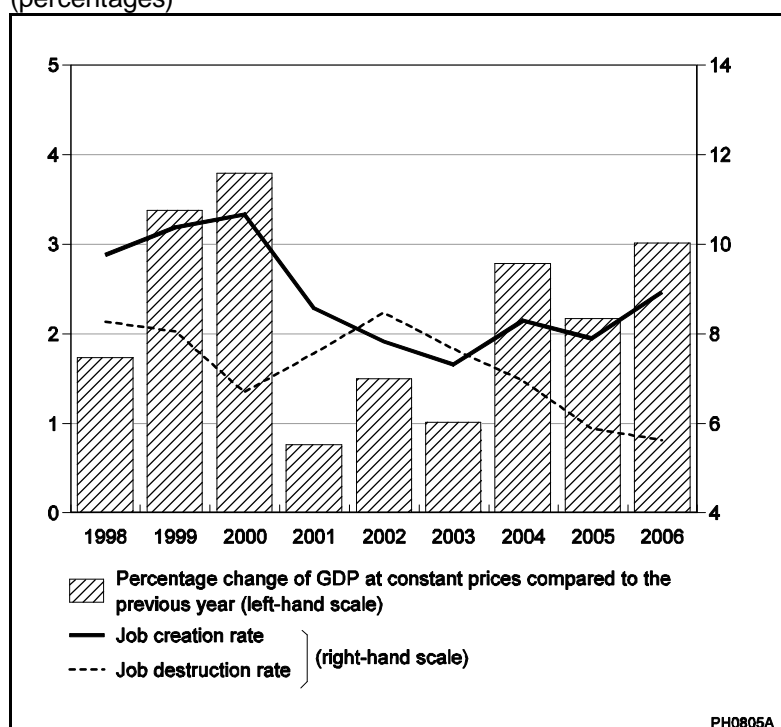
Sources: NAI, NBB.

Belgium's job creation rate reached a peak in 2000, a year during which GDP increased by 4 p.c., the highest value observed over the period 1998-2006. The net employment growth rate reached a peak (4 p.c.) in the same year. During the phase of economic slowdown which followed, job creation decreased gradually, while, conversely, the job destruction rate increased. In 2002 and 2003, the net employment growth rate became negative, the job destruction rate having become higher than the job creation rate. During the three following years, the economic recovery reversed the tendencies: the job creation rate increased again, but without reaching the very high level

observed in 2000, while the rate of destruction markedly contracted and in 2006 reached its lowest level of the period.

The focus of the present paper is net employment change, in other words, job flows. However, job flows constitute a lower bound of total labour reallocation. Total worker flows, defined as the sum of entries and exits of workers during the year, are much more numerous than job flows[10]. For the continuing firms in our population, which are on average older and larger firms, we calculate that worker flows can be 6 to 8 times higher than the corresponding job flows. As shown by Burgess *et al.* (2000), the empirical relationship between job and worker flows at the employer level is not only a question of magnitude. According to their results, the rotation of workers has a large employer-specific component, regardless of industry affiliation.

We would like to point up the role of firms' demography in job flows. To this end, we now distinguish four sets of firms each year. The set of firms increasing the number of their employees between *t-1* and *t* is divided into two subgroups: the first includes the entering firms, which are newly-created firms, reporting positive employment for the first time in year *t*, while the remaining subset consists of expanding continuing firms. Similarly, the set of contracting firms is divided into disappearing firms, which reported a positive employment in *t-1* and zero employment in *t*, and the subgroup of contracting continuing firms.

Table 4 Job creation and destruction rates and firms' demography
(percentages, annual averages computed on the 1998-2006 period)

	Job creation rate[1]			Job destruction rate[1]		
	Total	Contributions		Total	Contributions	
		of new firms	of continuing firms		of exiting firms	of continuing firms
Private sector	**8.8**	**2.4**	**6.4**	**7.2**	**2.2**	**5.1**
of which:						
Manufacturing industry	6.0	1.5	4.4	6.3	1.6	4.7
Commercial services	10.3	2.9	7.4	7.7	2.5	5.2

Source: NBB.
[1] Job creation and destruction rates are calculated here with respect to the same figure as denominator, i.e. total employment in the corresponding sector.

For the private sector as a whole, 27 p.c. of job creation is due to the creation of new firms, while the remaining 73 p.c. of job creation takes place in continuing firms. The exit of firms explains on average 30 p.c. of job losses during the observation period, while the remaining 70 p.c. of job destructions take place in contracting continuing firms.

Comparable results[11] exist for Austria, Germany and Italy where entering firms accounted for respectively 32, 27 and 32 p.c. of job creations on average and business closures were responsible for respectively 34, 23 and 33 p.c. of job losses.

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[10] Furthermore, job flows measured at the firm level understate the actual magnitude of total gross flows between establishments. Most European studies on job flows are, however, based on firm-level data because there is important heterogeneity in the definition of establishments across datasets and countries (Messina and Vallanti, 2008).

[11] The periods of study were respectively 1978-1998 for Austria, 1977-1989 for Germany and 1984-1993 for Italy (see Stiglbauer *et al*, 2003). Sectoral coverage is roughly comparable to our dataset.

The figures presented here are based on the usual method of calculating the contribution of entries and exits of firms to employment changes. This method has the advantage of allowing comparisons with other studies. All these comparisons should, however, be made with care given that data collection methods, periods of observation, sectoral and geographical coverage inevitably differ across studies.

The methodology used to calculate these contributions also has some degree of arbitrariness. To illustrate this point, imagine a mature firm facing severe financial distress. In general, the firm will first reduce expenses, use the intensive margin, before gradually laying off people. If the firm does effectively go bankrupt at the end of an often multi-year process, only the last movements in the personnel register will be attributed to the firm's exit. In that sense, the method underestimates the true effect of firm exits on the evolution of employment.

The calculations are also affected by the issue of mergers and acquisitions. Even if in some countries, the business registers have been keeping track of such organisational changes within and between firms in recent years, this information is very rarely used in published studies[12]. In particular, this data problem should be taken into account when one wants to study more narrowly-defined sectors like financial intermediation or retail trade, because mergers and acquisitions were a major phenomenon in these two branches in Belgium during the observation period. Spurious creations and exits of firms lead to an overestimation of the effect of firms' demography on job flows.

Persistence of job creation and destruction

The study of persistence of job creations and destructions aims at roughly estimating whether or not employment fluctuations are permanent.

The method of calculating the persistence rate involves comparing the level of employment recorded in *t+j* in firms which have respectively created and destroyed jobs between *t-1* and *t*. If the level of employment remains the same, the creation/destruction is considered persistent.

This method of calculation therefore only takes account of the overall level of employment in firms creating/destroying jobs, disregarding the fact that the employment structure may have changed between *t* and *t+j*, and that the job created/destroyed between *t-1* and *t* is perhaps not the same as that recorded in *t+j*. In other words, it is assumed that labour and job positions are homogenous. The interval between *t* and *t+1* is a year here because social balance sheet data are yearly. Very short employment spells within a year are therefore not taken into account. A better way to estimate job duration would require all individual job spells being followed through time. This is not possible with the data at hand. For an example of estimated persistence on individual data, see Böheim *et al.* (2008)

It should be noted that the persistence rate calculated from the social balance sheet database adjusted for missing data probably has a slight upward bias owing to the method of imputing the missing data, as employment is assumed to remain the same as the last recorded level. For firms whose data have undergone such adjustment, the whole of the change between two recorded figures is therefore imputed to the latest year of observation of the firm. The results obtained are broadly comparable with the figures calculated by Van der Linden (1999) for the years 1979, 1981

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[12] One exception on Belgian data is Geurts et al. (2009), where spurious creations and exits of firms are detected by identifying abnormally large worker flows across employers. See Picart (2008) for an overview of French data.

and 1983, with data from the individual retirement accounts or by Gómez-Salvador et al. (2004) on a smaller sample of large Belgian firms.

On average, almost 80 p.c. of the jobs created between 1998 and 2005 still exist a year later. However, that proportion varies considerably from one year to another. The highest job persistence after one year (around 80 p.c.) applies to jobs created in 1998 and 1999, while the lowest rate is found for jobs created in 2000 and 2001, at the time of the turnaround in the cycle (76 p.c.).

The persistence rate declines considerably over time. After one year, 79 p.c. of the jobs created during the period 1998-2001 are still there. This figure drops to 67 p.c. after two years, to 60 p.c. after three years and to only 52 p.c. after five years.

Figure 2 Fraction of jobs created/destroyed persisting for several years
(percentages of job creation/destruction remaining after x years, averages computed over the 1998-2001 period)
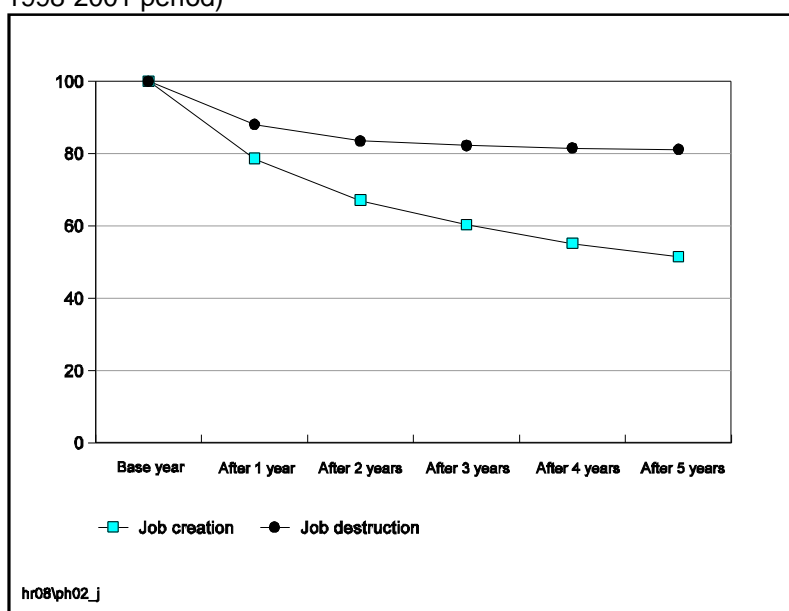
Source: NBB.

The persistence rate is higher for job destruction than for job creation over the period 1998-2001. On average, 88 p.c. of jobs destroyed had still not been re-created one year after that observation. The rate of persistence averages 84 p.c. after two years and remains stable at just over 80 p.c. thereafter.

The relatively high level of the persistence indicators allows for the conclusion that, within a firm, job fluctuations are relatively small, particularly for contracting firms. There are very few differences, on average, between the persistence rates calculated for manufacturing industry and those for services.

Table 5   Job flow persistence rates

(percentages)

Job created (destroyed) in :▼	Job creation persistence						Job destruction persistence				
	After 1 year	After 2 years	After 3 years	After 4 years	After 5 years		After 1 year	After 2 years	After 3 years	After 4 years	After 5 years
1998	79.9	70.6	64.8	57.6	54.0		89.3	84.1	83.1	81.3	81.2
1999	80.8	70.7	62.1	56.8	53.0		86.9	82.5	81.5	81.0	80.9
2000	77.9	63.5	57.6	53.8	50.9		86.5	82.3	81.2	80.6	80.1
2001	75.9	63.4	57.1	52.8	48.6		89.3	85.1	83.6	83.0	82.6
2002	78.4	67.2	61.3	51.4			88.9	83.7	82.1	80.8	
2003	78.5	66.4	58.8				86.8	81.5	79.7		
2004	79.1	67.0					85.5	79.4			
2005	77.3						83.4				

Source: NBB.

Contribution of the various cohorts of new firms to changes in employment

Newly-created firms are divided into cohorts according to the year of their legal establishment. For each cohort, we examine the change in the number of workers employed j years after the firm's creation, with j ranging from 1 to 9. The macroeconomic conditions applicable to these new companies are, of course, different for each cohort.

As mentioned above, an average of two years elapses between the date of establishment of a firm and the recruitment of its first paid employee. This is why, in new firms, employment increases considerably during the two years following their legal establishment.

In a very buoyant context, two years after their establishment, the firms set up between 1997 and 1999 (between 7,600 and 7,800 units per annum) were employing over 40,000 people. Firms created at the start of the next decade, in a significantly less favourable business context, had more difficulty expanding. They were also fewer in number than firms established before 2000, at just over 6,000 units in 2002 and under 5,000 in 2004[13]. After these new companies had been running for two years, the number of jobs recorded averaged 31,000 units, with the lowest levels recorded in the case of firms established in 2001 and 2003.

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[13] At the end of the period, the number of newly-created firms is distorted due to the elapsed time between the date of the legal establishment and the date on which they file a social balance sheet for the first time. In 2005, there were only around 1,800 new firms filing a social balance sheet, and 400 in 2006.

Figure 3   Employment recorded in the various cohorts of firms established between 1997 and 2006[1]

(persons)
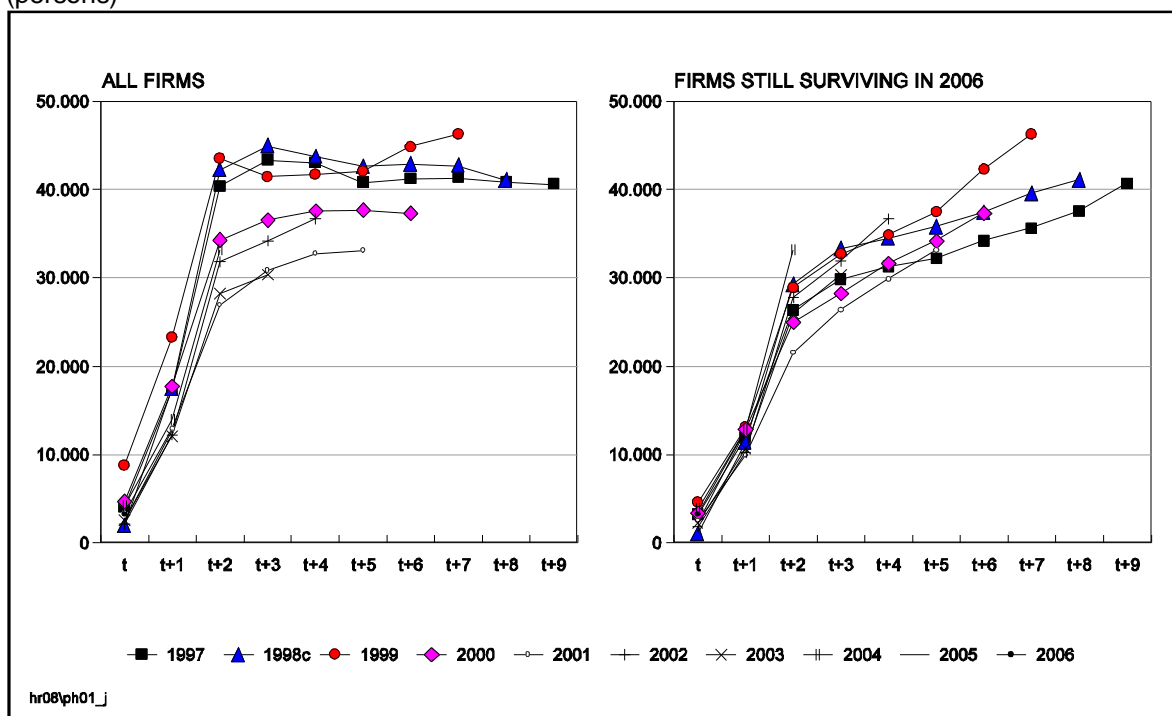
Some of the new firms expanded before collapsing and disappearing. In the firms surviving in 2006, employment increased monotonically over time, albeit at varying rates for the different cohorts. On average, in firms still existing in 2006, a total of 27,000 jobs had been created after two years of operation in the case of the 1997-2004 cohorts, and 33,000 after four years of operation in the case of the 1997-2002 cohorts.

3.2.2   JOB FLOWS AND FIRMS' CHARACTERISTICS

3.2.2.1   Employment change in the main economic sectors

In this section, the population of firms is broken down into main activity sectors. The most important sector in terms of employment is the manufacturing industry, which employed 29.2 p.c. of the workforce in 2005, but we will see that employment adjustments are quite small in this sector. They are, on the other hand, substantial in real estate and business services, in construction and in horeca, three much smaller sectors in terms of number of workers.

Table 6 Job creation and job destruction rates by branch of activity
(percentages, annual average computed on the 1998-2006 period)

	Job creation rate	Job destruction rate	Job reallocation rate	Net employment growth rate	Contribution (in p.c. of the total) to		
					Job creation	Job des- truction	Total employ- ment
Secondary sector	**6.9**	**6.7**	**13.5**	**0.2**	**32.8**	**39.3**	**39.8**
C Mining and quarrying industry	4.7	5.7	10.4	-1.0	0.1	0.2	0.2
D Manufacturing industry	6.0	6.3	12.3	-0.4	21.3	28.0	29.2
E Energy and water	5.3	5.8	11.2	-0.5	0.7	1.0	1.2
F Construction	10.2	8.0	18.2	2.2	10.7	10.2	9.2
Commercial services	**10.3**	**7.7**	**18.0**	**2.6**	**67.2**	**60.7**	**60.2**
G Trade and repair	9.4	7.2	16.6	2.3	23.4	21.4	22.7
H Horeca	17.3	12.6	29.9	4.7	8.7	7.7	4.7
I Transport and communication	6.4	5.4	11.7	1.0	8.9	9.4	13.1
J Financial and insurance services	8.7	7.6	16.3	1.1	6.3	6.6	6.5
K Real estate and business services	14.4	9.2	23.6	5.1	19.9	15.6	13.2
Private sector	**8.8**	**7.2**	**16.1**	**1.6**	**100.0**	**100.0**	**100.0**

Source: NBB.

The secondary sector proved to be clearly less dynamic in terms of job creation and destruction than services during the period 1998-2006. The job creation rate was much higher in the commercial services sector as a whole (10.3 p.c.) than in the secondary sector (6.9 p.c.). The discrepancy is weaker with regard to the job destruction rate, which attained 6.7 p.c. in the secondary sector, against 7.7 p.c. in the commercial services sector. As employment expansions were on average of the same extent than destructions in the secondary sector, the net employment growth rate remained barely positive (0.2 p.c.), while it reached 2.6 p.c. on average in services.

Although the rules of recruiting and dismissal are the same for these two sectors, the possibilities of adjustment of the volume of work by adapting temporary unemployment and temporary agency work are undoubtedly more widely used in the secondary sector, which could partly account for the weakness of job creation and destruction rates. These lower levels could also be explained by the structure of employment in the secondary sector, where firms are on average larger and older than in commercial services, and by higher sunk costs for industrial companies than for firms operating in the service sector.

In manufacturing industry, the lack of job creation caused the decline of the workforce. Indeed, over the period 1998-2006, the share of manufacturing industry in job expansion movements (21.3 p.c.) remained far lower than its relative share in total employment (29.2 p.c. in 2005), while its share in job destruction (28.0 p.c.) was quite similar. The average job creation rate (6 p.c.) remained lower than the job destruction rate (6.3 p.c.), so that the workforce decreased by 0.4 p.c. A decline was also recorded in the mining and quarrying industry and in the energy and water branch. On the other hand, the construction sector - where working conditions are generally hard and employment shortages significant - was very dynamic, with job creation and destruction rates higher than those

generally observed in commercial services, and a positive and quite high net employment growth rate (2.2 p.c.).

In commercial services, the most dynamic branches of activity in terms of job reallocation are horeca (29.9 p.c.) and the real estate and business services branch (23.6 p.c.), where the annual net employment growth rate was about 5 p.c. on average between 1998 and 2006. In the trade and repair branch (with a job reallocation rate of 16.6 p.c.), job creations were also considerably higher than job destructions, so that the net employment growth rate reached more than 2 p.c. per year. Despite a relatively high job reallocation rate (16.3 p.c.), the net employment growth rate has remained very low, at only 1.1 p.c., in financial and insurance services, because job destructions were quite high compared to job creations during the period under review. The workforce grew at the same pace in transport and communication although employment adjustment remained very small (with a job reallocation rate of only 11.7 p.c.).

The strong job mobility in the horeca branch and in real estate and business services is partly related to the small size of the firms operating there: a firm employs on average 10 workers in these branches of activity. The average firm size is also quite small in the construction sector and in the trade and repair branch. On the other hand, there were fewer employment movements in branches where larger firms are active, like in the transport and communication sector (with very large companies in rail transport and postal services), energy and water (energy distribution remaining relatively monopolistic) and manufacturing industry.

Figure 4   Job creation and job destruction rates in the specific sectors of activity
(percentages, annual average computed on the 1998-2006 period)

SECONDARY SECTOR

NB10   Mining of coal and lignite; extraction of peat
NB16   Manufacture of tabacco products
NB18   Manufacture of wearing apparel;
        dressing and dyeing of fur
NB19   Tanning and dressing of leather; manufacture of
        luggage, handbags and footwear
NB23   Manufacture of coke, refined petroleum products
        and nuclear fuel
NB30   Manufacture of office machinery and computers
NB32   Manufacture of radio,
        television and communication equipement
NB41   Collection, purification and distribution of water

COMMERCIAL SERVICES

NB55   Hotel and restaurant services
NB60   Land transport and transport via pipeline services
NB62   Air transport services
NB64   Post and telecommunication services
NB66   Insurance and pension funding services
NB73   Research and development services

PH0805B

Source: NBB.

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Looking at average job creation and job destruction rates for the period 1998-2006 in the branches of activity of the Nace-Bel A60 subdivision, one can conclude that job destructions were usually equal to or higher than job creations in the secondary sector: most of the sub-sectors are located on the upper side of the diagonal of the left-hand part of figure 4. For the business service sector, job creations were usually equal to or higher than job destructions, except for air transport services (where the net employment growth rate reached on average -7.7 p.c.), insurance and pension funding services (-2.0 p.c.) and post and telecommunication services (-1.3 p.c.).

Figure 5 Job creation and destruction rates in the private sector and the mainsectors of activity

(percentages)
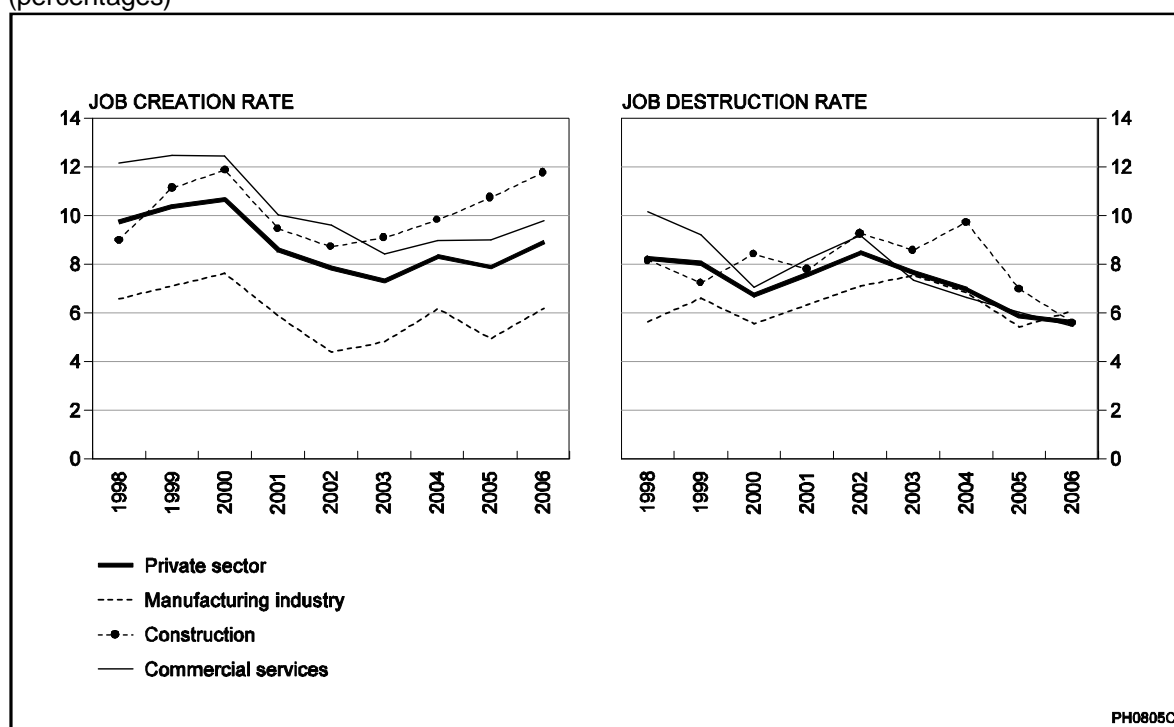
Source: NBB.

The profiles of job creation rates in services and in the manufacturing industry are very similar and largely pro-cyclical. The differences between the two nevertheless widened in 2002, when the job creation rate in industry declined more markedly than that observed in services. In addition, during the last period of economic recovery, the job creation rate rose more vigorously in services than in the manufacturing industry.

Whereas the job destruction rate in commercial services was much higher than in manufacturing industry at the beginning of the period of observation, these two rates converged thereafter (contrary to the movement observed for the job creation rate): the job destruction rates became roughly similar in the two sectors in 2003 and then followed the same downward trend.

Quantifying the role of between-sector employment shifts

Excess job reallocation, i.e. variations in employment exceeding the minimum required to take account of the net change in employment, can be defined for a branch of activity s by $R_{st}-|NET_{st}|$, where R_{st} is the reallocation of jobs (in persons) and NET_{st} is the net job creation (in persons) in branch s during period t.

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We have calculated this indicator for the private sector as a whole and for the different branches individually. The fact that total excess job reallocation is not equal to the sum of excess job reallocation within each branch points to the existence of inter-branch shifts of employment. Excess job reallocation can indeed be decomposed into two components, one representing the contribution of reshuffling employment opportunities among branches and another representing the contribution of reshuffling employment opportunities within branches. More formally (Davis and Haltiwanger, 1992):

$$R_t - \left| NET_t \right| = \sum_s \left\langle \left| R_{st} \right| - \left| NET_{st} \right| \right\rangle + \left\langle \sum_s \left| NET_{st} \right| - \left| NET_t \right| \right\rangle$$

The first term on the right-hand side is the intrasectoral excess job reallocation and the second measures the intersectoral change in employment. This second term is zero if employment in all the branches changes in the same direction.

Intersectoral shifts represent a fairly small proportion of the total excess job reallocation, averaging around 10 p.c. between 1998 and 2006, and actually ranging between 4 and 14 p.c. depending on the year. This is comparable to the result reported by Van der Linden (1999), who found a rate of 13.5 p.c. for 1984. These results always depend on the level of sectoral aggregation. The more detailed the breakdown, the more one expects to see an increase in the relative importance of intersectoral shifts. The level of 10 p.c. for the contribution to excess job reallocation due to between-sector shifts was obtained by working with two-digit branches of activity, namely 46 sub-sectors. If we use a more detailed breakdown of 3-digit branches of activity, we identify 194 sub-sectors and the contribution due to between-sector shifts increases to 16 p.c. The results obtained by Davis and Haltiwanger (1992) for the United States, with an extremely detailed sectoral breakdown (cross-classified by two-digit industry, region, size class, plant age class, and ownership type) yielding 14,400 groups of firms, showed that intergroup shifts account for only 39 p.c. of the total excess job reallocation. The results for other countries are comparable: Nocke (1994, cited by Duhautois, 2002) obtained a contribution of intersectoral shifts of 17 p.c. with French data. In conclusion, whichever sectoral classification scheme is used, the degree of intersectoral reallocation is relatively low.

Like the comparable studies for other countries, the Belgian findings therefore suggest that the excess job reallocation is not initially due to sectoral shocks or macroeconomic shocks which have a varying sectoral impact, but rather to shocks specific to firms.

If we distinguish movements within the manufacturing industry as opposed to movements within the business service sector, Belgian data show more intersectoral shifts within the manufacturing industry (from around 12 to 23 p.c., depending on the level of detail) than between sub-branches of the services (namely 7 to 11 p.c., depending on the level of detail). In contrast, for France, Duhautois (2002) finds a higher excess inter-group reallocation within the service sector (around 19 p.c.) than the contribution of inter-branch shifts within the manufacturing industry (around 15 p.c.).

3.2.2.2   Job flows by size class

Our analysis by size class is based on the concept of average firm size, which equals the mean number of employees computed on all the available observations for the firm, missing years not being taken into account.

Using average firm size instead of current size has the advantage of making size class time-invariant over the period of observation. Another reason for using the average size is to make results immune to the criticism that the often observed higher relative job-creating ability of small

firms depends in reality on a statistical artefact. Indeed, according to Davis, Haltiwanger and Schuh (1996), many claims about the job-creating prowess of small businesses appear to be based on changes over time in the size distribution of firms. Under the standard practice for measuring firm size using base-year employment (i.e. current size), firms can migrate between size classes from one year to the next. It can be shown that, due to these moves, aggregate figures on employment creation tend to paint an overly favourable picture of the relative job growth performance of small employers. As the potential job creation and destruction rates become smaller with employer size (firing or hiring one worker in a firm with 10 workers is proportionally ten times bigger than in a firm with 100 workers), the fact that a firm changes size class when it grows reinforces the difference in job creation and destruction rates between size categories.

Gross job creation rates decline monotonically with employer size. The job creation rate averages 16.2 p.c. per year for firms with fewer than 10 employees, 8.2 p.c. for firms with 100-250 employees and 4.4 p.c. for firms with more than 1,000 workers. Thus, smaller employers create new jobs at a much higher rate than large employers. But measuring gross job creation is only part of the story: gross job destruction rates also decline sharply with firm size. The differences as regards job destruction rates by size are nevertheless less marked. The job destruction rate averages 11.8 p.c. per year for firms with fewer than 10 employees, 6.8 p.c. for firms with 100-250 employees and 4.6 p.c. for firms with 1,000 or more employees. Thus, smaller employers also destroy jobs at a much higher rate than large employers.

Such observations are not surprising, since size is an indicator of development of the companies. Large companies are more firmly established on the market and their employment is more stable. On the other hand, the group of small firms contains more new companies, which are likely to see a rapid growth of their workforce in the event of success, or a significant decrease of manpower in the event of failure.

The same descending pattern is observed in each main branch of activity, both for job creations and job destructions. The differences between small and large firms can be very high. For example, the job creation rate is four times higher in small firms than in large ones in transport and communication (12.7 p.c. against 2.7 p.c.) and more than three times in energy and water (15.8 p.c. against 4.8 p.c.). These two branches are dominated by a small number of large-sized companies having preserved a monopoly in their field of activity for a long time.

Figure 6   Job creation and destruction rates by firm size class
(percentages, annual average computed on the 1998-2006 period)
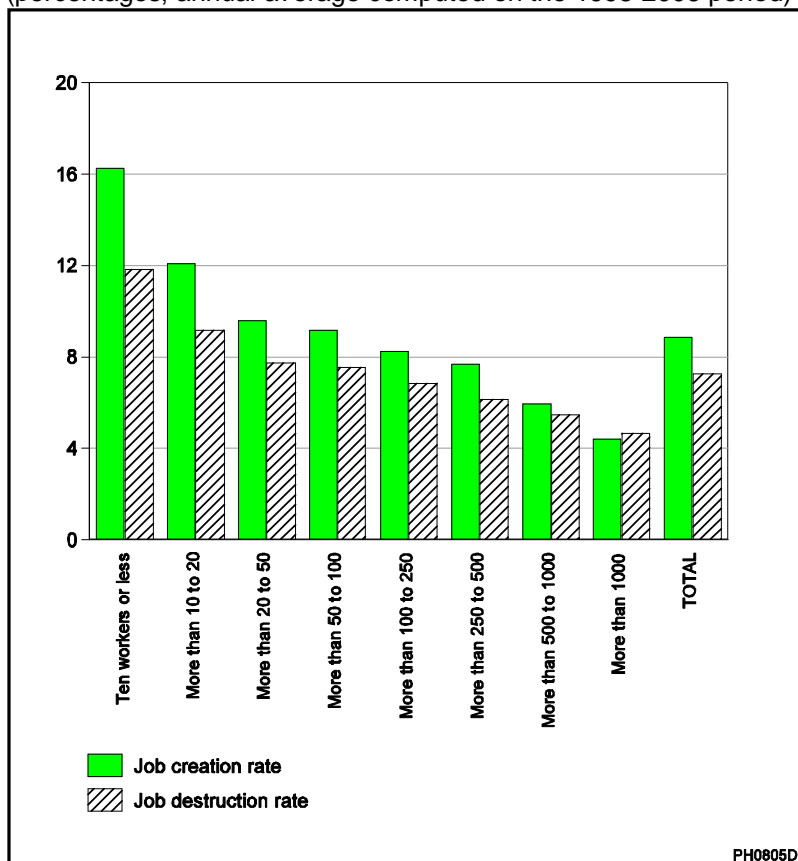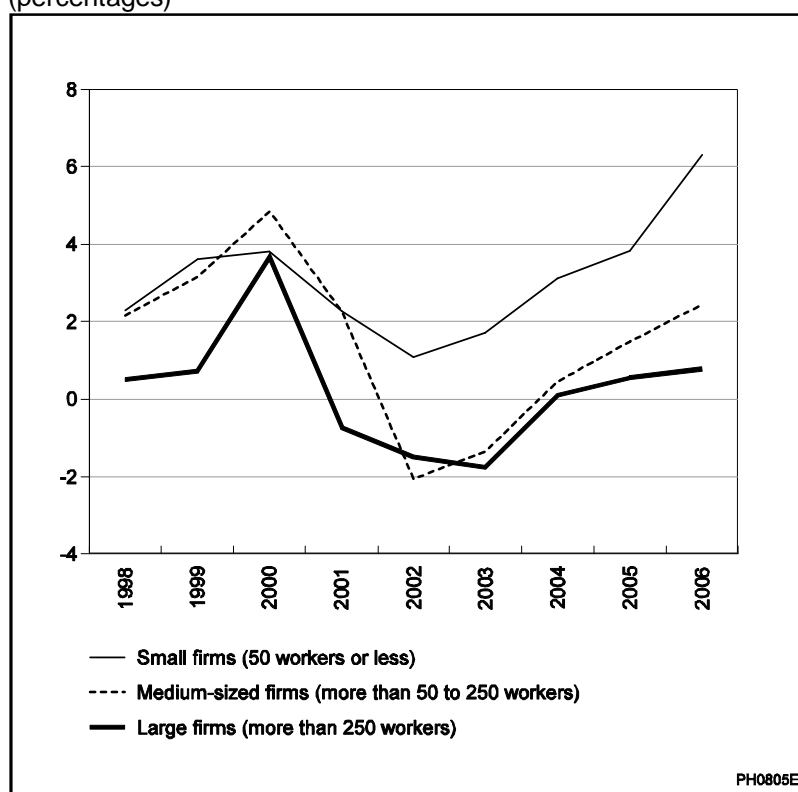

Source: NBB.

Each year, movements in the workforce (both entries and exits) involved on average 28 p.c. of the workers in the companies with 10 workers or less during the period under review. This reallocation rate falls quickly with size. In the companies with 10 to 20 workers, 21 p.c. of the workforce joined or left the company each year, while this percentage fell to 17 p.c. in the firms with 20 to 50 workers. In the medium-sized firms examined (50 to 250 workers), this rate is close to 16 p.c., but reaches only 10 p.c. in companies with more than 250 workers.

The job reallocation rate also differs considerably according to the economic activity of the firm. In small firms, it varies from 17.7 p.c. in the manufacturing industry to some 25 p.c. in the energy and water branch and in the real estate and business services branch, and to 36 p.c. in horeca. In medium-sized firms, the scope varies between 13 p.c. and 27 p.c. In large companies, the job reallocation rate is the lowest (6 p.c.) in transport and communication, where very large firms dominate, and the highest in real estate and business services branch (19 p.c.). The latter groups very diversified economic activities, where working conditions can be very different.

Overall, all size categories of firms recorded a positive net employment growth rate, except those with more than 1,000 workers. In this size class, this rate reached -0.2 p.c. on average between 1998 and 2006. Nevertheless, the rate remains positive for large firms as a whole (0.3 p.c.). Marked differences in employment change are recorded depending on the economic activity of large companies. The net employment growth rate was positive and relatively high in horeca (3.7 p.c.) and in real estate and business services (4.1 p.c.). On the other hand, in manufacturing services, transport and communication and energy and water, it remained negative. In the small and medium-sized enterprises reviewed, it reached on average 3.1 and 1.5 p.c.

Whatever the size of the companies, the profile of evolution of net employment growth rate is quite similar. It increased at the beginning of the period to reach 3.8 to 4.9 p.c. in 2000, depending on the main size category of the companies. It then contracted, and became negative after 2001 in large firms and 2002 in medium-sized ones. In the small companies, on the other hand, it remained positive over the whole period. From 2004 onwards, a new expansion in the net employment growth rate took shape in all size categories. Growth was particularly sustained in 2006 in small firms (6.3 p.c.), a year during which the job creation rate was slightly smaller than its peak level observed in 2000, while the job destruction rate reached its lowest point for the period under review.

Figure 7   Net employment growth rate by main size class
(percentages)

Source: NBB.

For the same number of jobs created or destroyed, the small companies record proportionally higher job creation and destruction rates. This is why it is interesting to examine the respective share of the various groups of firms in the volume of jobs created and destroyed.

The small firms are responsible for 56 p.c. of all job creations and 51 p.c. of job destructions. The smallest of them (10 workers or less) are even responsible for 27 p.c. of job creations and 24 p.c. of job destructions, although their share in total employment is significantly smaller (16 p.c.). On the other hand, the firms with more than 1,000 workers, which employ close to a fifth of the total workforce covered in the analysis, only account for 12 p.c. of total job creations, while they are responsible for 16 p.c. of all job losses. The weight of the manufacturing industry (where employment fell sharply during the period under review) in the large companies partly explains this observation.

3.2.2.3 Job flows in the regions

Belgium is a country that reconciles regional and cultural identities in a single federal structure. An important level in this construction are territorial entities called regions. Belgium is made up of three regions: the Flemish Region, the Brussels-Capital Region and the Walloon Region.

In order to allocate the firms filing a social balance sheet to a specific region, it was decided to consider firms located in a single region (single-region firms) separately from those with various establishments located in more than one region (multi-region firms, which were kept as one group). The regional code is attributed for the whole period and is based on the most recent business address of the firm according to the register compiled by the NAI[14].

As many as 174,108 of the 175,445 firms in our population are located in a single region. Of those, 24,077 are in Brussels, 106,974 in Flanders and 43,057 in Wallonia.

The 1,337 multi-region firms were not allocated, in full or in part, to any specific region. In fact, they are often firms operating nationwide, such as public transport operators or telecommunications companies, the mail service, retailers or credit institutions. There is therefore no justification for allocating them entirely to a particular region, and it is even more difficult to find an appropriate formula for allocating their workforce to each region, because the social balance sheets do not contain any information at plant or establishment level.

Multi-region firms have a very different structure from single-region firms. For one thing, they are mainly large enterprises: almost 90 p.c. of them have over 250 employees. Among the single-region firms, enterprises with under 50 employees account for half of the jobs, while the remainder are divided evenly between medium-sized and large companies. The structure of activity also differs considerably. The number of workers in multi-region firms is proportionately greater in the transport and communication branch and in financial and insurance services, and smaller in manufacturing industry and construction.

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14   NAI : National Accounts Institute.

Table 7   Structure of employment in single-region and multi-region firms
(percentages of the total, annual averages computed on the 1998-2006 period, unless otherwise stated)

		Single-region firms				Multi-region firms
		Brussels	Flanders	Wallonia	Total	
By branch of activity						
C	Mining and quarrying	0.0	0.1	0.8	0.2	0.1
D	Manufacturing industry	15.5	39.4	36.6	35.4	20.7
E	Energy and water	0.1	0.3	0.9	0.4	3.6
F	Construction	6.3	11.8	15.7	11.9	1.5
G	Trade and repair	21.8	20.9	22.9	21.5	22.7
H	Hotels and restaurants	9.9	4.9	4.2	5.4	1.6
I	Transport and communication	8.3	9.4	7.9	8.9	23.4
J	Financial and insurance services	13.4	1.5	1.7	3.2	16.0
K	Real estate and business services	24.6	11.8	9.3	13.0	10.5
By size						
	Small firms	43.1	51.1	56.1	51.0	2.4
	Medium-sized firms	23.0	24.8	22.2	24.0	8.7
	Large firms	33.9	24.1	21.7	25.0	88.9
p.m. (units)						
	Number of firms in the population	24,077	106,974	43,057	174,108	1,337
	Average number of workers per enterprise in 2005	12.7	12.5	10.9	12.1	404.2

Source: NBB.

Job flows are proportionately fewer in number in multi-region firms than in single-region firms. While the former represented on average 26 p.c. of employment over the period 1998-2006, their contribution to job creation was only 15 p.c. and even smaller in the case of job destruction (12 p.c.).

The job creation rate averaged 5.4 p.c. between 1998 and 2006 in multi-region firms, but declined throughout that period, falling from 9.3 p.c. in 1998 to around 3 p.c. in 2006. Conversely, in single-region firms, the job creation rate averaged 10.1 p.c. In 2006, it stood at almost the same level as in 2000, at just over 11 p.c., compared to 10 p.c. at the start of the period. In the case of job destruction, the differences are equally noticeable. In multi-region firms, the destruction rate averaged 3.2 p.c., compared to 8.7 p.c. in single-region firms. The latter therefore exhibit job creation and destruction rates which are both very high. The net employment growth rate averaged 1.4 p.c. Conversely, in the multi-region firms, although the job flows are significantly smaller, net job creation was proportionately greater, with employment increasing by an average of 2.2 p.c. per annum.

Among the single-region firms, those located in Brussels record higher job creation and destruction rates than their counterparts in Flanders and Wallonia. That is partly due to the fairly different structure of activity in the Belgian capital, as Brussels-based single-region firms have proportionately twice as many workers in the horeca branch and the real estate and business services branch, where job flows are higher than elsewhere. Also, among large firms with over

250 workers located in Brussels, accounting for one-third of the region's employment, the destruction rate was close to 15 p.c. on average over the period, three times as high as the rates recorded in Wallonia and Flanders. In all, employment thus declined by an average of 1 p.c. per annum in Brussels, whereas it increased by 1.7 p.c. in Flanders and 2.2 p.c. in Wallonia.

Table 8   Job creation and destruction rates: regional breakdown
(percentages, annual average computed on the 1998-2006 period)

	Single-region firms				Multi-region firms	Total
	Brussels	Flanders	Wallonia	Total		
Job creation rate						
Small firms	14.1	12.3	13.3	12.7	12.2	12.7
Medium-sized firms	11.2	8.2	7.7	8.5	9.5	8.6
Large firms	8.9	5.7	5.3	6.2	4.8	5.4
Total	11.7	9.7	10.3	10.1	5.4	8.8
Job destruction rate						
Small firms	11.8	9.4	9.4	9.7	5.6	9.6
Medium-sized firms	10.3	7.1	7.3	7.6	3.6	7.1
Large firms	14.9	5.7	5.4	7.5	3.1	5.1
Total	12.7	7.9	8.1	8.7	3.2	7.2
Net employment growth rate						
Small firms	2.3	2.9	3.9	3.1	6.5	3.1
Medium-sized firms	0.9	1.1	0.5	0.9	5.9	1.5
Large firms	-6.0	-0.1	-0.1	-1.3	1.7	0.3
Total	-1.0	1.7	2.2	1.4	2.2	1.6

Source: NBB.

Single-region firms in Flanders and Wallonia have a relatively similar business structure and their activities are concentrated mainly in manufacturing industry, trade and construction. The breakdown of employment among small, medium-sized and large firms is also fairly similar, although Wallonia counts proportionately slightly more small firms than Flanders. This similarity of structure is reflected in the job creation and destruction pattern. Generally speaking, the rates observed are very similar. However, over the period as a whole, the job creation rate in Wallonia was systematically higher than in Flanders, except in 1998. The overall difference came to 0.6 percentage point. As the destruction rate in both regions is comparable, the net employment growth rate in Wallonia is consequently slightly higher than that recorded in Flanders. This more favourable employment growth in single-region firms in Wallonia was evident every year during the period under review except in 2000 and 2006.

Figure 8   Job flows in single-region firms

(percentages)
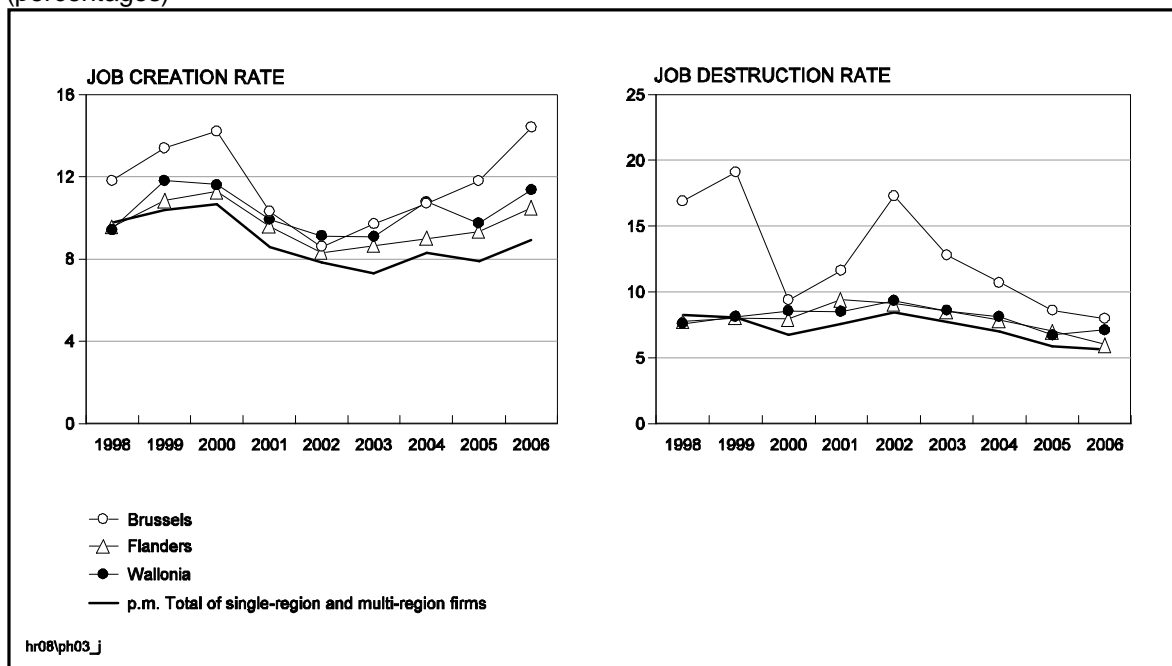
Source: NBB.

3.2.3   JOB FLOWS AND WORKERS' CHARACTERISTICS

As not all necessary information was available to estimate missing values for employment broken down by type of contract or by socio-professional status, the calculations in this section were made from the database before adjustment for missing values. Moreover, job creation and destruction rates are calculated here independently for each category of workers. For example, when calculating the job creation rate for workers with a permanent employment contract, the numerator is the sum of the positive changes in employment under permanent contract recorded in all firms in the population, the denominator being the total number of workers with a permanent contract.

3.2.3.1   Job flows by socio-professional status

Belgian labour law distinguishes between two main socio-professional statuses: blue-collar workers and white-collar workers. Different regulations apply to them in certain areas of labour and social security law, like annual paid leave, deficiency period for health insurance, importance of seniority for setting wages, etc.

Rules governing trial periods and lay-offs also differ according to socio-professional status: they are much more stringent for white-collar workers than for blue-collar workers. Indeed, for a blue-collar worker with less than 6 months' seniority, 7 days' notice is enough, while for a white-collar worker with the same seniority, the period of notice is 3 months. This difference is reflected in the difference in severance payments.

In principle, blue-collar and white-collar workers have different types of activities within a firm. The difference in tasks to be accomplished (manual work versus intellectual job) forms the basis of the legal definition of these two categories. However, structural changes in the economy (such as the development of the service sector and the higher technological content of domestic production) tend to make the legal distinction less effective than before.

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According to the figures reported in the social balance sheets, a slight majority of employees in Belgium are now white-collar workers. Over the period under review, this percentage has increased in the private sector as a whole while the percentage of blue-collar workers has been decreasing monotonically, from 50 p.c. in 1997 to 46.7 p.c. in 2006. The remaining categories (managerial, other) represent less than 3 p.c. of the total workforce.

The distribution of the socio-professional status differs markedly between sectors. While more than 80 p.c. of workers in the building industry are blue-collar workers, this percentage is around 67 p.c. in the manufacturing industry. In the service sector, horeca has the largest share of blue-collar workers, more than 80 p.c. on average over the period under review, while financial and insurance services employ the smallest share of this type of workers (nearly 2 p.c.). The share of blue-collar workers varies between 30 and 45 p.c. in the other branches.

When comparing job creation and job destruction rates in the manufacturing sector, it becomes clear that not only were fewer jobs created for blue-collar workers, but more jobs were destroyed too. On average, for every job destroyed for the blue-collar workers, only 0.8 jobs were created; while for the white-collar workers, this ratio (i.e. job creation rate divided by job destruction rate) averages 1.2. As socio-professional status is a good instrument for the educational level in this sector, these figures reflect the relative employment shift in favour of more highly educated workers, driven by a higher demand for educated workers. Comparable results are found in Sweden (Gartell and Persson, 2007).

Statistically, the cyclical behaviour of the rates is not significantly different between the two groups. In both cases, for the manufacturing industry, the job destruction rate is less volatile than the job creation rate. This result implies that job creation is an important factor, and more so than job destruction, in employment adjustments to activity in Belgian firms. Similar results have been found for France (Abowd, Corbel and Kramarz, 1999) and Austria (Stiglbauer *et al.*, 2003) and have been interpreted as symptomatic of a regulated labour market, compared to the US where most studies have found large cyclical changes in job destruction and acyclic job creation.

Figure 9   Job creation and job destruction rates by socio-professional status in manufacturing industry

(percentages)
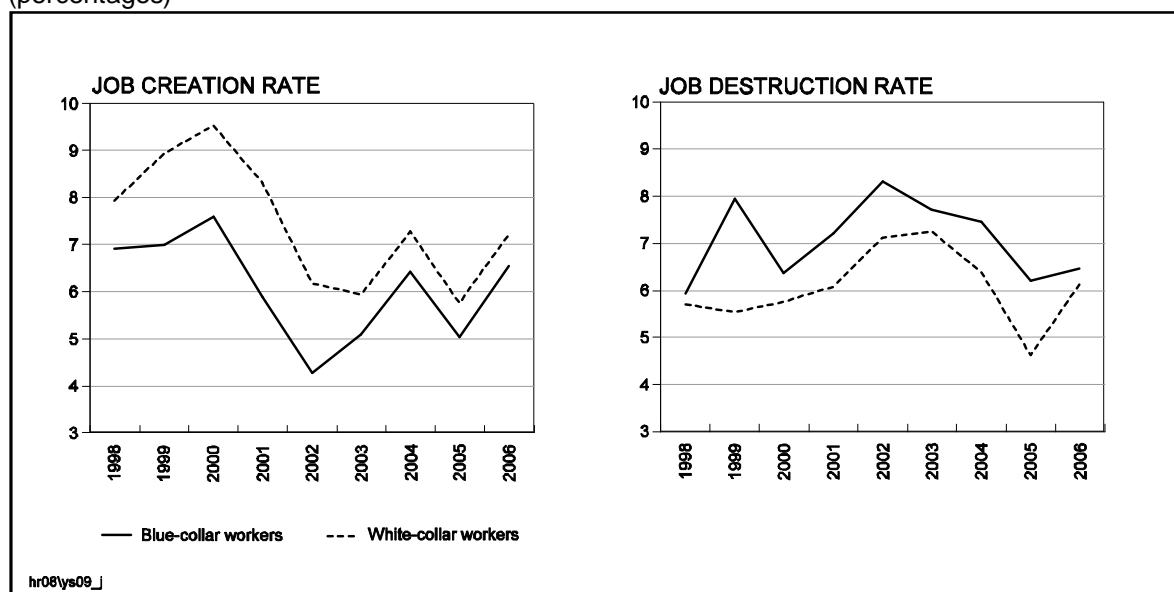
Source: NBB.

The fact that the cyclical behaviour is not significantly different between the two groups can be explained because job movements do not take into account some methods of adjusting the volume of work, like temporary lay-offs and the use of temporary agency workers, both concerning mainly blue-collar workers.

3.2.3.2   Permanent and fixed-term employment contracts.

Apart from a specific contract for agency workers, workers in Belgium may be hired on permanent contracts or on temporary contracts (which include fixed-term contracts, substitution contracts and contracts concluded for a specific project). In the social balance sheet, workers recorded in the workforce register are broken down according to these four categories of employment contract.

The permanent contract is the default employment contract. Hence, in principle, a temporary contract can be signed only for a well-defined duration or project. High firing costs for permanent contracts may nevertheless constitute an incentive for employers to use temporary contracts in sequence rather than converting them to regular contracts. This explains why Belgian legislation only allows the conclusion of four successive fixed-term contracts, provided that the total duration of these contracts does not exceed two years[15].

According to the social balance sheet figures, during the period under review, an average of 94.7 p.c. of employees were on a permanent contract, 4.6 p.c. had a fixed-term contract, while the two other types of temporary contracts were of marginal importance. This is why the analysis is restricted here to workers having a permanent or a fixed-term contract.

The percentage share of fixed-term contracts in total employment tends to rise with the economic cycle, while the opposite holds true for permanent contracts. Temporary contracts effectively make it possible to quickly and cheaply adapt the available workforce to demand shocks, this workforce playing the role of a buffer in the event of a temporary or unexpected slowdown or acceleration in activity[16]. These contracts also provide a relatively less expensive means for the employer to get to know a new worker and to assess his or her potential on the spot than if he had to resort to a permanent contract, generally associated with higher redundancy costs.

The proportion of fixed-term contracts increased at the end of the 1990s, until it accounted for as much as 5 p.c. of total employment by 1999. Following the cyclical downturn, it lost around 0.6 of a percentage point between 2000 and 2001, and stabilised at this level until 2004. It then started rising again and, by 2006, was back to the 1999 level.

The use of fixed-term contracts varies considerably between different branches of activity, and the development of this type of contract between the end of the 1990s and the year 2006 has also been quite divergent. Fixed-term contracts are particularly widespread in the horeca branch, where an average of 11.1 p.c. of all workers were employed under this type of contract between 1997 and 2006, and in the energy and water branch (7.2 p.c.). This proportion is also above the average in the mining and quarrying industry. At the other end of the scale, it is in the construction sector that these contracts are most rarely used (3.1 p.c. of workers). In this branch of activity, apprenticeship

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[15] Three years under some stringent conditions.

[16] Dhyne and Mahy (2008) examined in detail the mechanism for adjusting the workforce to the activity level of firms through the choice of employment contract. Their analysis is based on the full-format version of the social balance sheets, which contain detailed information about entries and exits of workers by employment contract.

is very common: this training period probably enables the applicant worker to be assessed without the apprenticeship having to be extended by a fixed-term contract. Moreover, because of labour shortages, employers probably have an incentive to offer permanent contracts to attract and hold on to workers. In the other branches, the proportion of fixed-term contracts ranges from 3.6 to 5.4 p.c.

While, for the whole population, the share of fixed-term contracts in 2006 was back to the same level as that observed during the previous peak in economic activity, some branches have seen this share expand considerably, whereas it has fallen in others. It is in the horeca branch that the increase has been the sharpest, rising from 11 p.c. in 2000 to more than 15 p.c. in 2006. It grew by more than 2 percentage points in the mining and quarrying industry and by about 0.5 of a percentage point in the trade and repair branch, in transport and communication and in real estate and business services. It has remained stable in the construction sector and fallen back in the other branches of activity surveyed. The decline was particularly marked in financial and insurance services and in the energy and water branch (almost 2 percentage points), but has been smaller in the manufacturing industry (-0.8 point).

Figure 10   Job creation and destruction rates by type of employment contract
(percentages)
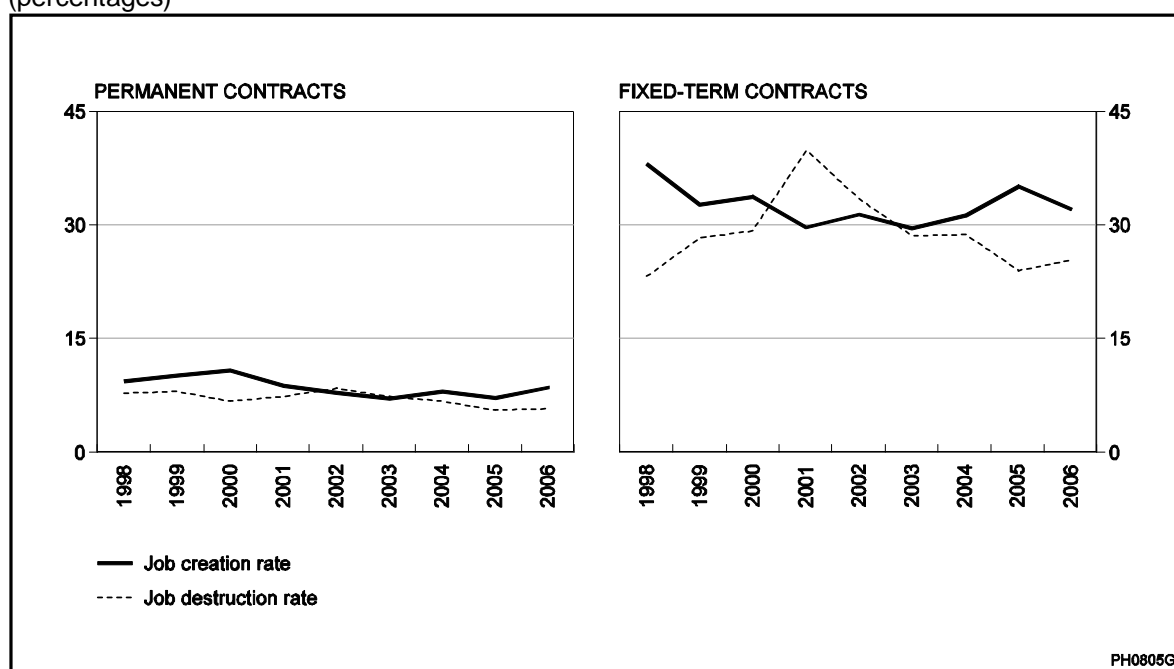
Source: NBB.

As expected, job creation and destruction rates are much higher for fixed-term contracts: the average job creation rate was 32.6 p.c. between 1998 and 2006 and the job destruction rate reached 28.9 p.c., while the corresponding figures were only 8.7 and 7.1 p.c. respectively for permanent contracts.

The job reallocation rate for permanent contracts is also positively related to the economic cycle. For this type of contract, workforce adjustments tend to be made more by means of job creation than destruction. Conversely, for fixed-term contracts, the correlation between the job reallocation rate and GDP growth rate is negative, so that changes in employment first involve job losses, facilitated by more flexible regulations than those applicable to permanent contracts.

4   **CONCLUSIONS**

The paper describes job flows in Belgium using micro data at the firm level collected through the annual social balance sheets that companies have to file. The coverage of the study is very broad: all industries and commercial services are included and, within them, all firms with a strictly positive paid workforce are taken into account. As a result, the number of workers in our population of 175,445 firms is close to 90 p.c. of total paid employment, as recorded in the national accounts for the same sectors of activity C to K.

We contribute to the previous literature by studying a long period from 1998 to 2006, covering both upturns and downturns in the Belgian economy. Most previous studies treated the workforce as a homogeneous entity, while we are able to distinguish blue-collar workers from white-collar workers as well as the type of employment contract binding them to their firm.

The average job reallocation rate of 16 p.c. for the 1998-2006 period is very close to the figure from a previous study covering the years 1978 to 1985. Both the job creation and job destruction rates are found to be of similar magnitude, showing that there has been no deterioration on the Belgian labour market in terms of job mobility at the aggregate level. The job reallocation rate is found to be lightly pro-cyclical, which could be interpreted as indicative of a relatively rigid labour market. It should be noted however that the development of temporary agency work and of temporary lay-offs cannot be taken into account with our data.

We confirm previous results that job flows are dominated by flows corresponding to continuing firms, while job creations in start-ups and job destructions in exiting firms are nevertheless quite considerable, accounting on average for 27 p.c. of job creations and 30 p.c. of job losses during the observation period.

Our research confirms that job stability is fairly high in Belgium: almost 80 p.c. of newly-created jobs still exist one year later. There is also a high degree of persistence for destroyed jobs. Our findings from the cohort analysis point to the importance of business cycle conditions at entry for a firm, suggesting that deferred business cycle effects are economically significant and merit more thorough investigation.

Intersectoral shifts of employment represent a fairly small proportion of total excess job reallocation, averaging 10 p.c. among the 43 two-digit sub-sectors, while employment shifts among the 194 three-digit branches of activity account for 16 p.c. of excess job reallocation. The Belgian findings, like comparable studies for other countries, therefore suggest that excess job reallocation is not initially due to sectoral shocks or macroeconomic shocks which have a varying sectoral impact, but rather to firm-specific shocks. Belgium also has a higher excess inter-branch reallocation within the manufacturing industry than within services.

Job reallocation rates differ strongly by firm size. The job reallocation rate in large firms (1,000 employees or more) is nearly half of the corresponding rate for businesses with less than 10 employees. This suggests that job reallocation is to a large extent a small business phenomenon, even when average size is used in place of current firm size.

Because the social balance sheets do not contain any information at plant or establishment level, it was decided to treat firms based in a single region (single-region firms) separately from those located in more than one region (multi-region firms). Of the 175,445 firms in our population, 174,108 are located in a single region. The 1,337 multi-region firms were not allocated to any specific region, either in full or in part. These are frequently firms operating nationwide, such as

public transport operators or telecommunications companies, the postal service, retailers or credit institutions and, consequently, almost 90 p.c. of them have over 250 employees.

Among the single-region firms, companies in Flanders and Wallonia have a relatively similar business structure and are broadly active in the same sectors, which is reflected in similar job creation and destruction rates in the two regions. Those located in Brussels record higher job creation and destruction rates, partly due to the different structure of activity in the capital city, as Brussels-based single-region firms have roughly twice as many workers in horeca and in real estate and business services as the other regions.

Analyses of job flows that do not account for the heterogeneity of workers can often be misleading. Data from the social balance sheets make it possible to decompose job flows into blue-collar workers and white-collar workers, a distinction which entails large differences in terms of labour and social security law, not least for rules governing trial periods and redundancies. The data can also demonstrate that flows vary by status, not only with respect to magnitude and variation but also to direction. In the manufacturing sector, not only fewer jobs were created for blue-collar workers, but more jobs were destroyed too. On average, for every job destroyed among blue-collar workers, only 0.8 new jobs were created, while for white-collar workers, this ratio averages 1.2 jobs.

Under Belgian labour law, permanent contracts are the standard employment contract, with temporary contracts being limited to two years maximum. Over the period surveyed, almost 95 p.c. of workers were on a permanent contract. However, increasing use was made of temporary contracts in the late 1990s and again in the mid-2000s. The percentage share of fixed-term contracts in total employment tends to rise with the economic cycle and the use of fixed-term contracts also varies considerably between different branches of activity. They are particularly widespread in the hotel, restaurant and catering sector. As expected, job creation and destruction rates are much higher for fixed-term contracts. During the period under review, the average job creation and destruction rates were 32.6 p.c. and 28.9 p.c. respectively, while the corresponding figures were 8.7 and 7.1 p.c. for permanent contracts.

The creation of the longitudinal dataset for the whole population of firms required to file a social balance sheet with the Central Balance Sheet Office has given a new, updatable instrument to better monitor job flows in Belgium. Complementing this analysis with additional variables from the balance sheets would enable a better understanding of the evolution of aggregate productivity growth and, in particular, the role of employment reallocation in this process.

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APPENDIX: IMPUTATION OF MISSING VALUES

For some firms, social balance sheets may be missing for a part of the period under review. To be able to measure the annual variations in employment as correctly as possible, it was nevertheless essential to have continuous series. This is why, as far as possible, missing values during the reporting period were replaced by estimated values.

These "corrections" were only made for the missing data located between the first and the last year of filing. Missing data located before the first or after the last filed social balance sheet of a continuing firm were not replaced by estimated value, given the absence of information about the likely evolution of employment during these periods.

Two types of improvement were made.

As our principal variable of analysis is the number of workers at the end of the financial year and as the social balance sheet also registers the number of entries and exits of workers during the reporting year, it is possible to estimate missing employment data for the year t starting from the stock of workers recorded in $t+1$, less the number of entries plus the number of exits during the year $t+1$. This first type of improvement was used to fill in missing data covering only one year or to replace the last missing value in series of consecutive missing years. It could only be done for the total number of workers, not for the detailed data by contract type or by socio-professional status.

This technique of improving the database could not, however, be applied to other missing data in a time series of missing reporting periods: if we do not have the social balance sheet for the financial year $t+1$, it is impossible to estimate the employment change between t and $t+1$ correctly. In this last case, we chose to keep the last employment level recorded for every missing value observed (employment in t is consequently equal to employment recorded in $t-1$). This method of improvement amounts to attributing the whole employment change observed between two non-consecutive financial years to the last financial year for which employment is actually recorded (or estimated following the first method of improvement).

As an example, company Y filed a social balance sheet for the years 1998, 2001 and 2002. The data are thus missing for 1997, 1999, 2000, 2003 and following years. Nothing can be done about improving data for the financial year 1997 and for the period 2003-2006. On the other hand, employment in 2000 can be calculated using the number of workers at the end of 2001 and the number of workers' entries and exits recorded during this year. Employment in 1999 is assumed to be equal to employment in 1998.

Contents of the database before and after correction for missing values
(units)

	Number of firms			Number of workers		
	Before correction	Correction	After correction	Before correction	Correction	After correction
1997	87,269	0	87,269	1,590,641	0	1,590,641
1998	92,637	4,880	97,517	1,642,557	40,245	1,682,802
1999	96,897	6,435	103,332	1,697,273	57,530	1,754,803
2000	98,917	7,817	106,734	1,805,008	71,490	1,876,498
2001	99,466	9,358	108,824	1,819,828	72,264	1,892,092
2002	100,735	9,576	110,311	1,800,645	73,014	1,873,659
2003	103,986	7,968	111,954	1,796,980	60,512	1,857,492
2004	106,749	6,483	113,232	1,813,919	51,020	1,864,939
2005	108,480	4,600	113,080	1,834,193	38,916	1,873,109
2006	109,400	0	109,400	1,855,999	0	1,855,999

Source: NBB.

Thanks to the correction procedure, the level of employment taken into account is higher and its evolution is more regular. Nevertheless, the level of employment remains distorted by the absence, at both the beginning and the end of the period under review, of some (large) firms whose social balance sheets were missing or could not be taken in account. The level of employment during a financial year cannot thus be compared with that recorded one year before.

While it has generally been attempted to fill in missing data with estimated values, the opposite has been done for a limited number of firms, the best known being the SNCB (the Belgian Railway Company), which employed more than 38,000 workers at the end of the year 2006. Although these firms originally recorded their entire workforce in their annual accounts, they reported only part of it in their social balance sheets. The difference was explained by a legal vagueness relating to the various categories of workers to take into account in the social balance sheet, which had led these companies to leave out their statutory personnel. This anomaly in the number of workers recorded was rectified by the firms themselves in 1999, 2000 or 2001, depending of the firm. To avoid taking into account the variations resulting from this purely administrative rectification, data before the rectification were replaced by missing values.

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