PERMANENT AND TEMPORARY LABOUR: JOB AND WORKER FLOWS IN SWEDEN, 1989-1998

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Abstract

We use direct information on quarterly establishment-level hires and separations, as well as employee stocks to analyse the dynamics of permanent and temporary contracts. Job and worker flow rates for temporary contracts are at least 10 times higher than those for permanent contracts, indicating that previous results based on all types of contracts are dominated by the high turnover of temporary employment. Our results indicate that job destruction varies more than job creation in shrinking manufacturing industries while we observe the contrary for the services. Job reallocation is counter-cyclical only for permanent contracts in manufacturing, implying substantial heterogeneity in job turnover across industries and contract types.

JEL-codes: J21, J23
KEYWORDS Job creation and Job destruction, Worker Flows, Dual Labour Markets.

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1. INTRODUCTION

Many recent studies examine job flows on establishment level to investigate the dynamics of employment growth.[1] Earlier research makes no distinction between different types of employment contracts, although several European countries' employment legislation discriminate between permanent and temporary contracts. Recent evidence from Spain, where in 1984 a labour market reform allowed firms to hire workers on temporary contracts, shows clear differences between labour demand for permanent and for temporary workers. Alonso & Borrega (1998) report that both the absolute and the relative amount of permanent employees decreased after 1984. Another effect of the reform was increased employment volatility, due to the higher volatility of temporary jobs (see Cabrales & Hopenhayn (1997)).

Most previous studies examine data on manufacturing establishments.[2] There are, however, reasons to believe that job and worker dynamics can be systematically different in manufacturing as compared to services. Reallocation in large capital-intensive manufacturing establishments is characterised by high costs. On the contrary, smaller and less capital intensive service-oriented establishments might easier adjust to changes. Technological and organisational differences between manufacturing and non-manufacturing establishments could also imply different possibilities of utilising temporary employment. Hiring and firing costs associated with temporary contracts are relatively low since these contracts, consider on average, workers with lower general and firm specific skills, part time work and lower wages. Moreover, temporary contracts are less protected by the labour laws as compared to permanent ones.

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[1] See Leonard (1987), Dunne et. al. (1989), Davis & Haltiwanger (1990,1992) for job flows. Abowd *et al.* (1996), Anderson & Meyer (1994), Burda & Wyplosz (1994), Burgess *et al.* (1996), Hamermesh (1996), Persson (1998), Albeack & Sörensen (1998) and Andersson (1999) study both job- and worker flows. For related theoretical literature, see e.g. Hopenhayn (1992), Burda & Wyplosz (1994), Caballero & Hammour (1994), Mortensen (1994), Mortensen & Pissarides (1994), Caballero & Hammour (1996) and Bertola & Rogerson (1997).

[2] OECD (1994), Andersson and Meyer (1994), Lane (1996) and Foote (1998) are examples of studies that examine sectoral differences.

The purpose of this paper is to examine job and worker flow dynamics for temporary and permanent contracts as well as across various sectors of activity. The motivation is that labour adjustment costs are most likely different across contract types and among various sectors of activity.

Our data contain quarterly information on the stock of permanent and temporary contracts as well as direct information on hires and separations for permanent and temporary workers. The information is from a representative sample of Swedish private establishments covering the period 1989:1-1998:4.[3] This kind of data has not been used to study labour flow dynamics previously.[4] Our data allow us to measure gross job flows in two different ways. We compute job flows using the standard measure (change in the stock of employees) and compare the results with gross job flows based on our direct measures of hires and separations. Net hires and separations yield gross job creation or destruction. We argue that the conventional stock-based measure is more vulnerable to measurement error than our measure based on hires and separations. This is confirmed by our results indicating that the first difference of the number of employees yield flows which are around 25% higher than flow levels computed on the basis of direct information on hires and separations. The two measures, however, yield almost identical patterns of change over time.

Considering the differences in gross job flows across contract types we find that job flow rates for temporary contracts are around 10 times larger than job flows for permanent contracts. Gross job flow rates for all contracts drop substantially when we remove flows associated with temporary contracts which cover around 10 per cent of the total employment.

Previous results for the U.S. and Canada indicate that job destruction varies more than job creation while Albaek and Sörensen (1998), studying data on Danish manufacturing, find no difference in the variation in gross job flows.

[3] The data is from Statistics Sweden (SCB).

[4] Hamermesh (1996) on Dutch firm data and Abowd et al. (1996) for French establishments, also have direct information on worker flows. However, due to the short time span of the data, they have limited possibilities of studying the dynamics of job and worker flows. These studies also exclude smaller establishments.

Examining data for the entire private sector in Sweden, we observe no major difference in the volatility for job destruction and job creation for the two types of contracts.

Foote (1998) reports results indicating that the larger variation in job destruction than in job creation in US manufacturing is a result of sluggish adjustment in declining industries. Studying 14 industries in the Swedish private sector we find that the relative job destruction — job creation volatility is correlated with net employment change. Industries with declining employment exhibit higher job destruction volatility compared to job creation.

Earlier evidence on the cyclical pattern of job reallocation (job creation + job destruction) is mostly on aggregated series for manufacturing. The dominant picture from previous research is that job turnover is counter-cyclical. Boeri (1996) questions the generality of this result arguing that this mainly concerns the manufacturing industry dominated by large establishments. We investigate the cyclicality of job turnover along several dimensions, both with respect to type of contract and sector of activity. Results imply that job reallocation associated with temporary contracts is acyclical in both manufacturing and non-manufacturing sectors. For permanent contracts, job reallocation exhibits a countercyclical pattern only in manufacturing.

We also examine worker flows and report worker reallocation (separations + hires) rates associated with permanent contracts that are around 25 per cent yearly. Our estimate for the lower bound of worker reallocation associated with temporary contracts is ten times the worker reallocation for permanent contracts. We find that on an annual basis, permanent-worker reallocation is on average 8 percentage points larger than permanent-job reallocation. This is much lower than the earlier observed differences between total worker and job flows, implying that previous reported rates of worker turnover, based on matched establishment-worker panels, are highly dominated by employer switches of temporary workers.

The low excess worker reallocation for permanent jobs we observe could reflect a low fraction of bad job-matches. For instance, if costs for labour turnover are high, more effort is made to find a good match. Our low rate of excess worker reallocation for permanent contracts would then reflect good matches as a result of cautious hiring policies. This, however, takes place at the cost of a higher turnover rate for temporary workers.

The remainder of the paper is organised as follows. The importance of distinguishing between contract types for identifying and interpreting gross job flows is discussed in Section 2. This section also presents the main features of the Swedish labour legislation concerning hiring and firing of workers. The data is described in Section 3. Section 4 deals with two measures of job flows. Section 5 compares the estimates for these measures to test the consistency of the data. Section 6 presents the results for the pattern of gross job flows. Worker flows are investigated in Section 7. Section 8 concludes the paper.

2. JOBS: PERMANENT AND TEMPORARY CONTRACTS

The definition of a job in the related literature is often very pragmatic: an employment position filled by a worker. Lack of information on the type of contract means that it is not always clear how to interpret the results on labour flows. Small labour flows might mask important changes in the relative weight of temporary to permanent contracts. A stable economy, on the other hand, can generate large labour flows due to ordinary variation in temporary employment.

Consider the following example as an illustration. There are two establishments *A* and *B*. *A* employs 90 permanent and 15 temporary workers and *B* has 90 permanent and 5 temporary workers. This economy has then 10 per cent temporary employment. There are also 10 unemployed and a number of individuals outside the labour force. The establishments hire temporary workers from time to time, according to a regular small variation in labour demand due to e.g. absenteeism, parental leave, etc. Everything else is unchanged. After a period, we observe that establishment *A* has 5 temporary

employees and *B* has 15 temporary employees. This yields no change in total employment. Disregarding the fraction of temporary and permanent contracts, the aggregate job creation rate is (105-95)/(105+95)=0.05 and the aggregate job destruction rate is (105-95)/(95+105)=0.05 implying a job reallocation rate of 0.10. Now, one calculates hires and separations by identifying the number of workers who have switched employers. Temporary workers naturally switch jobs often and they could frequently enter and exit employment. Assume that half of the temporary workers in establishments *A* and *B* and unemployed workers have switched employers or employment status between the two points in time. This would yield 15 hires and 15 separations and worker flow rates of 0.075 and a worker reallocation rate of 0.15. High job turnover rates in this example simply reflect that establishments change the fraction of temporary employment for a number of reasons. Moreover, temporary workers often change jobs and move across various employment statuses.

It is easy to imagine other situations when the composition of permanent and temporary contracts varies without a stronger effect on the total number of employees in an establishment. The lack of information on contract types might yield gross job flows that are difficult to interpret in terms of labour market flexibility. Comparable gross labour flows could mask important changes in the composition of employment types over time. Furthermore, similar gross labour flows can be observed across countries with radically different employment structures and labour market institutions. The previously reported results for the US and many European countries indicate similar average gross job flows for all contracts, though the labour markets in these countries are very different with respect to legislation restricting hiring and firing of workers.[5] When temporary contracts are characterised by low hiring and firing costs, employment adjustment mainly takes place by adjusting the stock of temporary

[5] Bertola & Rogerson (1997) explain the high gross job flows in Europe by the compressed wage structure. High wage compression can lead to high job reallocation when the centralised bargaining wages exceed the lowest wages that would emerge in a decentralised wage setting system.

contracts and lead to high average rates of gross job flows as a result of the high volatility of temporary employment.

The employment protection legislation in Sweden restricts hiring and firing of workers. Time-limited contracts are allowed for (i) one trial period of six months, (ii) seasonal or temporarily excessive work loads, (iii) replacement of employees on leave, (iv) workers over 67 and a few other cases. For some cases there are limitations on the duration of the contract. The employees are for example obliged to transform a temporary contract to a permanent one if the employee has had time-limited contracts for 3 years out of a 5 year period.

Concerning termination costs of employment contracts, the labour law (LAS) is more restrictive for permanent contracts than for temporary ones. Under such circumstances, an increase in firm employment, most likely starts by increasing the number of temporary workers. In this way, firms obtain an option to transform a fraction of temporary contracts to permanent contracts, if the initial uncertainty about demand decreases. Analogously, in a downturn, temporary contracts are the first to be terminated. Lower termination costs associated with temporary contracts enable firms to reduce adjustment costs by using temporary workers as a buffer for employment adjustment.[6] This implies larger volatility for temporary contracts compared to permanent contracts.

3. DATA

The data are from the Short Term Employment Statistics (*Kortperiodisk Sysselsättningsstatistik*) collected by Statistics Sweden (SCB). These data contain quarterly information on worker turnover and employment stocks for a panel of around 10,000 establishments in the non-agricultural private sector, during the period 1989:1 – 1998:4. The structure of the survey is as follows. A representative sample is drawn from the population of private-sector

[6] See Saint-Paul (1996), Cabrales and Hopenhayn (1997) and Alonso-Borrego (1998) for analyses of temporary and permanent employment.

establishments of all sizes in Sweden, stratified according to industry affiliation and establishment size.

In order to update the sample to include newly started establishments and avoid attrition due to exits, 10 per cent of the sample is replaced every year for the period 1989-1994, and every six months starting in 1995. The establishments are randomly divided into three equal groups. Each group responds every quarter to questions on employment and worker turnover for one month each. The information on the number of employees refers to a particular date in the month, while separations and hires refer to flows during the entire month. As an example, one third of the sampled establishments in the second quarter report information for April, while the other two groups report the corresponding information for May and June. The information on establishment employment as well as hires and separations is supplied for both permanent (time unlimited) and temporary (time limited) contracts, separately for men and for women (see Appendix A for data description).

4. TWO MEASURES OF JOB CREATION AND JOB DESTRUCTION

We compute the standard measure for job flows on the basis of the changes in the stock of employees over time, and denote these flows by the subindex *stock.* Job flows can also be computed from direct information on worker flows into and out of establishments. These job flows are subsequently denoted by the subindex *flow.* A comparison of flows calculated using these different sources of information (number of employees, hires and separations) serves as a test of logical consistency of the data. Moreover, since establishments simultaneously report hires and separations during one month, flow measures based on these variables do not contain false flows due to inability of matching establishments over time. Hence, a comparison of the two measures could give an indication of the importance of false flows due to

problems associated with matching establishment identity over time.[7] The two measures of job flows for a given type of contract in an establishment *e* during the period *t* are related as follows:

$$JC_{et,stock}\ (= n_{et} - n_{e,t-1}) \ ^{o}\ JC_{et,flow}\ (= h_{et} - s_{et}) \qquad if\ h_{et} \ ^{3}\ s_{et},$$
$$JD_{et,stock}\ (= n_{e,t-1} - n_{et}) \ ^{o}\ JD_{et,flow}\ (= s_{et} - h_{et}) \qquad if\ s_{et} \ ^{3}\ h_{et}$$

JC_{et} and JD_{et} denote job creation and destruction, h_{et} and s_{et} are hires and separations, respectively, during the period *t*, while n_{et} denotes the number of employees at time *t*.

The data contain information on hires and separations for one month in a quarter. Assuming that flows are uniformly distributed over the months in a quarter, we can estimate quarterly flows for each establishment. However, hires and separations might vary from month to month. For example, hiring could be co-ordinated, which implies that the probability of observing hiring during a given month depends on actual hires in the previous month. The same may hold for separations. Our assumption of uniform distribution of hires and separations leads to an underestimation (overestimation) of these flows for those establishments who report small (large) flows. Since the establishments are randomly drawn to answer the questionnaire each month, these errors are random. An estimate of these flows aggregated over a sufficiently large number of observations yields an unbiased estimate of the true measure of labour flows.

Job flow rates computed on the basis of employment stocks during a period, are defined as flows between dates corresponding to the middle of two subsequent quarters, e.g. mid-February to mid-May. Denoting by w_{et} the sampling weight for establishment *e* at time *t*, the job flows rates (*JCR* and *JDR*) in sector *k* are given by:

[7] Various methods have been used to track establishments over time. See for instance appendix 4 in Davis et. al. (1997). Statistics Sweden controls for all changes that are larger than 25 per cent of the number of employees.

$$JCR_{kt,stock} = \sum_{e \in k+} 0.5(w_{et,} + w_{e,t-1})(n_{et} - n_{e,t-1})/ \sum_{e \in k} 0.5(w_{et} + w_{e,t-1})0.5(n_{et} + n_{e,t-1})$$

$$JDR_{kt,stock} = \sum_{e \in k-} 0.5(w_{et,} + w_{e,t-1})(n_{e,t-1} - n_{et})/ \sum_{e \in k} 0.5(w_{et} + w_{e,t-1})0.5(n_{et} + n_{e,t-1}),$$

where $k+(-)$ denotes the class of expanding (contracting) establishments during period t. The corresponding measures based on direct information on worker flows are given by:

$$JCR_{kt,flow} = \sum_{e \in k+} 3\, w_{et}\,(h_{et} - s_{et}) / \sum_{e \in k} w_{et}\, n_{et;}\ \text{if } h_{et} \geq s_{et,}$$

$$JDR_{kt,flow} = \sum_{e \in k-} 3\, w_{et}\,(s_{et} - h_{et}) / \sum_{e \in k} w_{et}\, n_{et;}\ \text{if } s_{et} \geq h_{et,}$$

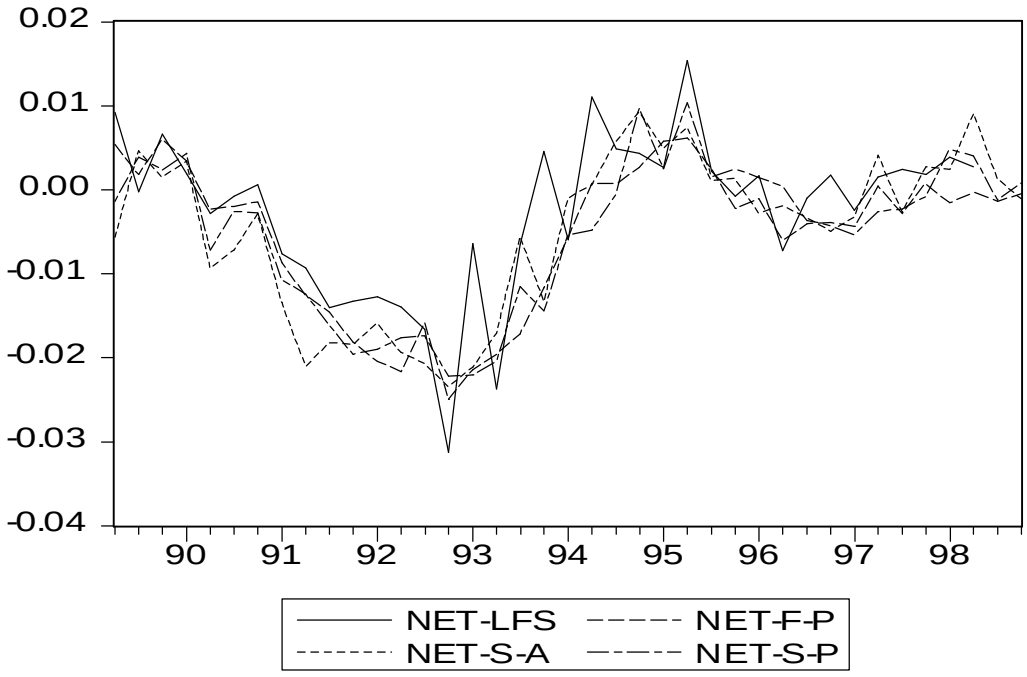
These job flow measures refer to overlapping periods. The JCR_{stock} and JDR_{stock} correspond to flows between the middle of two subsequent quarters, while JCR_{flow} and JDR_{flow} refer to flows during a quarter.

Another source of difference is the impact of measurement error on these two measures. The errors sum up and generate a false flow when the errors in the stock of employees (or hires and separations) are not positively and perfectly correlated over time (or across hires and separations). When the errors are positively but not perfectly correlated, there will be false flows that amount to the differences in the errors. The errors in the flow-based measure stems from the same reporter and at the same time while the errors in the stock measure stem from two points in time and possibly from two different reporters. This implies that the stock measure is more vulnerable to measurement errors compared to the flow-based measure.

5. COMPARING JOB FLOWS BASED ON STOCK AND FLOW DATA

We examine the reliability of the measures for permanent and temporary jobs by computing net employment changes and examine whether these are compatible with net employment changes reported in Labour Force Surveys (AKU). Results reported by SCB and our calculations indicate that the weighted sum of all permanent and temporary jobs yields net employment changes which are not significantly different from the corresponding figures from the Labour Force Surveys (see Figure 1).[8]

Figure 1. Net Employment Change



NET-LFS: All types of contracts according to Labour Force Surveys (AKU).
NET-S-A: Stock based – permanent and temporary job flows
NET-F-P: Flow based – permanent jobs
NET-S-P: Stock based – permanent jobs
All series are seasonally adjusted.

[8] Employment stocks in *KS* (Short Term Employment Statistics) measures the number of jobs, while *AKU* (Labour Force Surveys) refers to the number of individuals who worked at least one hour during the previous week.

Figures 2 and 3 depict the two measures of job flows. For permanent contracts, the stock-based quarterly job flow levels are on average 25 per cent higher than flow-based gross job flows. The level difference between these two measures, might be due to measurement error and problems associated with matching establishments over time. Furthermore, including temporary contracts yields job flows that are around 25 per cent higher on annual basis, as compared to job flows corresponding only to permanent contracts. The changes in these job flows, however, are very similar. Considering permanent contracts, the two measures for gross job creation have a correlation of 0.81. The corresponding correlation for gross job destruction is 0.82. We can easily see that the net employment changes based on the two measures are essentially identical – the correlation for the net employment change is 0.93. We conclude from these results that our information on permanent and temporary employees as well as hires and separations concerning permanent contracts are reliable and consistent.

Figure 2. Job Creation Rates

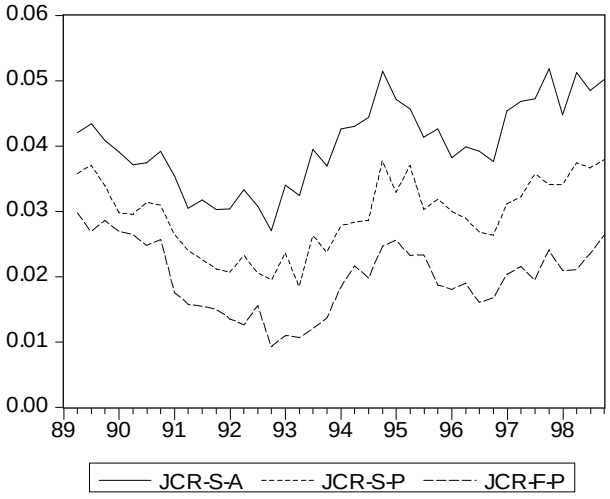
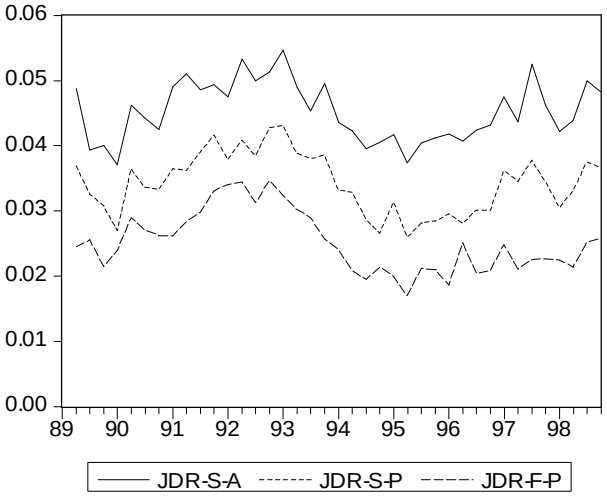


Figure 3. Job Destruction Rates



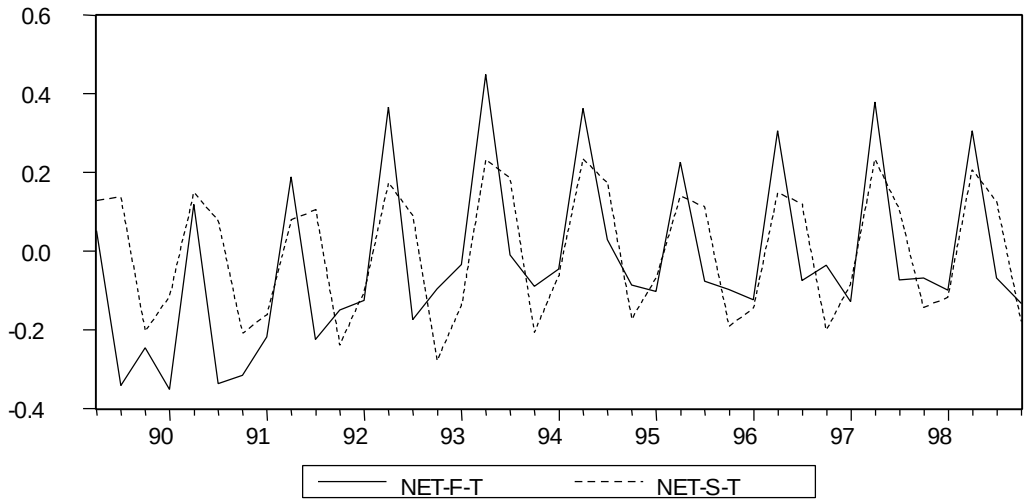
JC(D)R-S-A: Stock based – permanent and temporary job flows .
JC(D)R-S-P: Stock based - permanent job flows.
JC(D)R-F-P: Flow based – permanent job flows.
All series are seasonally adjusted.

Estimating the change in the total number of permanent and temporary jobs based on the number of hired and separated workers yields unreasonably high employment increases. Inspecting the net employment changes for permanent and temporary jobs separately indicates that worker flows for temporary jobs are responsible for this result. The large differences between hires and separations indicate that establishments either under-report separations or over-report hires for temporary workers. A possible source of the large gap between separations and hires for temporary workers is the data construction and the instruction given to the establishments. Establishments are asked to report trial employment for permanent contracts as temporary hires.

In Sweden employers have the opportunity to employ workers for a period of trial, not longer than 6 months. The period of trial can serve as an evaluation of the quality of the match between the firm and the employee. If the match is good, the firm can transform the contract to a time-unlimited permanent contract. A worker that goes from a temporary contract to a permanent contract stays in the establishment, and firms might then not report such a case as a separation associated with a temporary job.

To correct for underreporting of temporary quits we add hiring of permanent workers to quits of temporary workers, taking into account that the most newly employed workers hired for a permanent contract start their employment with a temporary contract for a trial period. Of course such an assumption might lead to an overestimation of separations from temporary jobs. Otherwise, we expect the net employment change based on net hires and separations for temporary contracts to be similar to net employment change for temporary jobs based on changes in the stock of temporary employment. Figure 4 presents the net employment change for temporary jobs based on our two measures.

Figure 4. Net Employment Change



NET-F-T: Flow based – temporary jobs
NET-S-T: Stock based – temporary jobs

The net changes are very similar except for the first two years. In the early nineties, before the sharp increase in unemployment, it is likely that permanent employment without a period of trial was more common than during the period after the rise in unemployment. If this is true, the lower net change based on net hires and separations is due to overestimation of separations from temporary jobs in the beginning of the period, when we assume that all permanent jobs start with a trial period. [9]

Comparing our two measures for gross job creation or destruction associated with temporary contracts yields on average of around 25 per cent higher flows on the basis of net hires and separations as compared to changes in temporary employment stocks during a quarter. This difference is most likely due to the following sources. The flow-based measure contains all job flows while the stock-based measure only captures the flows from one date to another date three months later. This is especially important in the case of temporary employment when job duration is often shorter than three months. Another source is that establishments, when reporting the stock of employees, are asked

[9] Employment for a trial period is a minor part of temporary contracts. According to Statistics Sweden, this category of temporary contract together with about 6 other categories amounts to 40 per cent of all temporary contracts.

not to include those who are employed on an hourly basis and are not present at work that particular date.

We conclude that the flows for the permanent jobs seem to be consistent and reliable, though the stock-based measure might overestimate the true job flows for these contracts. Moreover, for temporary employment we obtain rather good approximations of the extent of job flows for temporary contracts.

6. DYNAMICS OF TEMPORARY AND PERMANENT JOBS IN MANUFACTURING AND SERVICES

Concerning permanent contracts for the private sector, annual job creation is on average 8 per cent and varies between 11 per cent at the peak of the boom in 1989 to 5 per cent in 1993. Gross job destruction is on average 10 per cent and varies between 8 per cent in 1995 and 14 per cent in 1992 (See Table B1.). This can be compared with job flow rates for temporary contracts that are on average around 10 times larger.[10] Furthermore, results depicted in Figures B2 and B3 illustrate that job creation and job destruction systematically differ across sectors of activity. Job flows are much lower in manufacturing than in non-manufacturing. For permanent contracts, annual job reallocation is on average 13 per cent in manufacturing compared to 21 per cent in non-manufacturing. Examining these flows in 14 industries, job reallocation turns out to be the largest in hotels and restaurants, construction, services and trade. The lowest job reallocation rates are observed in food, mining, metal and machinery (See Table B2).

Job creation is pro-cyclical and job destruction is counter-cyclical for both types of contracts in both sectors. Permanent job flows in manufacturing are more sensitive to cyclical changes, measured as the correlation between job

[10] The employment share of temporary jobs is around 10 per cent in the private sector. This share is 6 percent in manufacturing and 12 per cent in the service industries.

creation (destruction) and net employment change, than job flows in non-manufacturing. [11]

Job creation and job destruction for both types of contracts are negatively and significantly correlated in manufacturing. If gross job flows were driven by aggregate symmetric shocks, these flows would have a correlation of –1. For permanent contracts, metal and machinery (– 0.74) comes closest followed by construction (–0.59), and wood and paper (–0.54). The sign of this correlation is unstable in non-manufacturing. When it is based on a panel of 8 sectors in non-manufacturing, the unweighted correlation is positive and significant, while it is negative and significant when we use aggregated data for all establishments in the non-manufacturing sector (See Table B4 for correlations).[12] Temporary gross job flows are, however, negatively correlated in both sectors. These correlations range between –0.5 and –0.8. Inspecting the relationship between gross job flows by size-classes, reported in Table B3, indicates that these flows are negatively and significantly correlated for all size classes except for the class of small establishments with less than 10 employees. The correlation between gross job creation and gross job destruction increases in absolute value and is –0.79 for the largest plants. These observations suggest that the dynamics of the traditional industrial sectors dominated by large establishments are not far from the clear-cut picture of employment growth driven by aggregate symmetric shocks. In the case of more service-oriented activities, covering smaller establishments, there is no

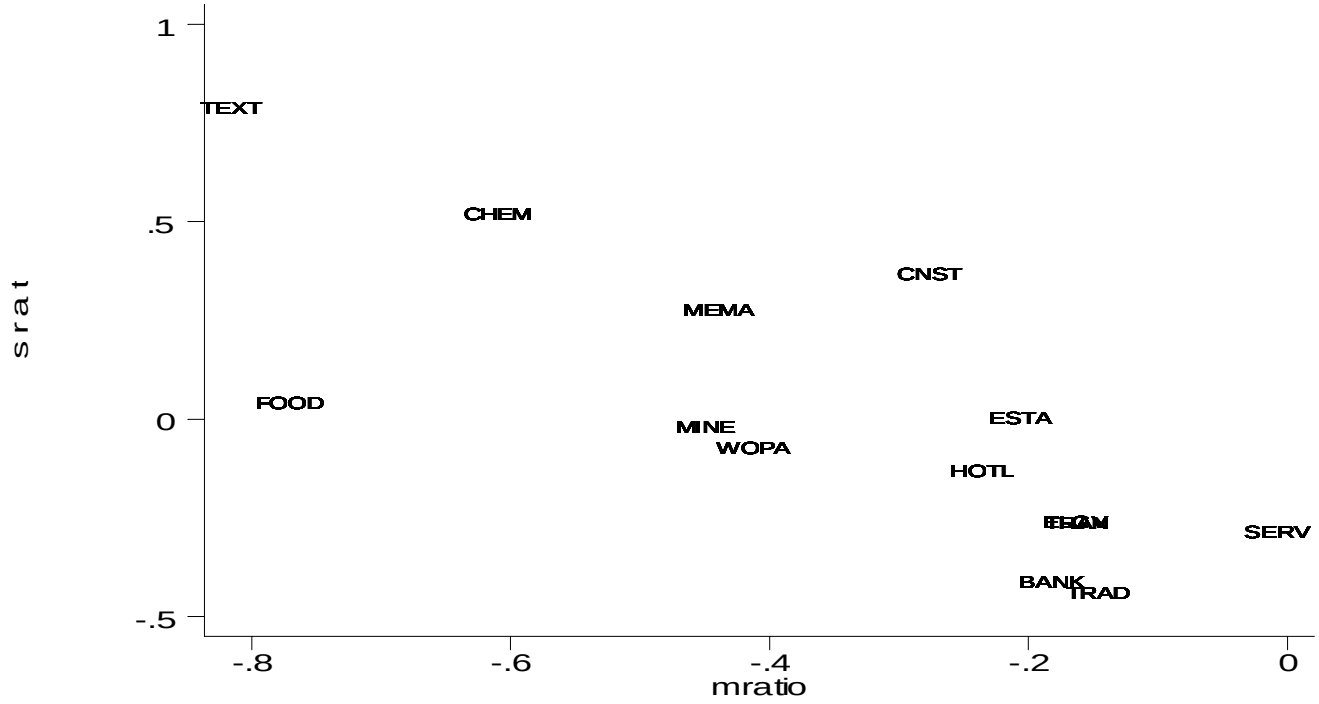
[11] We compute correlations by using data on various level of aggregations. We run correlations on estimated flows for 14 two-digit industries (6 manufacturing and 8 non-manufacturing industries). This data set yields 320 observations in manufacturing and 320 in non-manufacturing . We also use estimated flows for the two sectors (without disaggregation into 2-digit industries) yielding 40 observations in each sector. In all cases both measures (flow-based and stock-based job flows) are estimated. Throughout the paper, we test the stability of the estimated correlations by running Spearman rank correlations. Results are qualitatively unchanged when Spearman correlations are not reported.

[12] The hypothesis of no correlation between job creation and job destruction could not be rejected for the banking, electricity, food, hotel and restaurants, services, trade and transport. We found negative and significant correlation between job destruction and job creation in the real estate, construction, mining, wood and paper industries as well as for metal and machinery, and negative and marginally significant correlation for chemistry and textile.

systematic relation between contraction in employment in some establishments and expansion in others.

A result in the previous literature is that job destruction varies more than job creation (c.f. Davis et al.(1997)). Foote (1998) suggests that this observation is related to sluggish labour adjustment and reflects declining employment in manufacturing. He presents results for the US indicating that the relative volatility of job destruction compared to job creation is negatively correlated with the industry employment trend. Using data for our 14 industries, we find a similar pattern in our data. Results depicted in Figure 4 indicate that industrial sectors such as metal and machinery (MEMA), textile (TEXT) and chemistry (CHEM), characterised by the largest fall in employment, also exhibit the highest relative volatility in job destruction.

Figure 4. Relative volatility of permanent gross job-flows and net employment growth in 14 industries in 1989-1998.



sratio=log(standard deviation of job destruction / standard deviation of job creation)

mratio=log(mean job creation/mean job destruction)

Another question raised in the literature is whether job reallocation is counter-cyclical or not. Correlating our figures for job reallocation, including both permanent and temporary jobs, and net employment change for 39 quarterly observations yields a coefficient of 0.15, but insignificant. The corresponding figures for permanent and temporary job reallocation is –0.11 and 0.24, respectively, both insignificant. This implies that job reallocation is acyclical for the entire private sector in Sweden. However, an insignificant correlation between aggregated job reallocation and net-employment changes might mask contradictory patterns on a lower level, as well as for different types of jobs.

Considering only manufacturing establishments, it turns out that job reallocation (including both types of contracts) is acyclical. However, we find a counter-cyclical pattern for permanent contracts and an acyclical pattern for temporary contracts. For non-manufacturing establishments, job reallocation is acyclical for both types of contracts (See Table B4). Using data on finer industry classification, job reallocation is pro-cyclical in electricity, trade, transport, banking and services while metal and machinery, construction, chemistry and textile exhibit significant counter cyclical patterns. For other sectors job reallocation is acyclical. Examining the cyclical pattern of job reallocation by establishment size indicates that job reallocation in small establishments is significantly pro cyclical (r=+0.46) and this pattern turns out to be highly significant and counter cyclical as we move to the largest establishments (r=-0.49).

Our observations on the cyclical pattern of job reallocation can be summarised as follows. Job reallocation is only counter-cyclical for permanent contracts in traditional manufacturing industries dominated by large establishments. A reason could be higher labour adjustment costs in these establishments implying that manufacturing establishments concentrate job reallocation to periods of low activity when adjustment costs due to production

loss are lower. On the other hand, the smaller non-manufacturing establishments, having lower costs of adjustment, restructure their economic activity more evenly over time and rather steer the restructuring to periods of high activity when gains of productivity improvements are higher.

7. HIRES AND SEPARATIONS

Few previous studies deal with both job and worker flows. Studies using matched worker-establishment data all report extremely high rates of worker reallocation. Burgess *et al*. (1996) report a quarterly worker reallocation rate of 24 per cent in the manufacturing sector in the state of Maryland, indicating that roughly every worker experiences a hiring or separation during one year. Persson (1998) reports a 50 per cent annual worker reallocation for all Swedish establishments except construction. Albaek & Sörensen (1998), studying the Danish manufacturing sector, find an annual worker reallocation of 57 per cent. Previous studies estimate hires and separations by identifying employer switches. This procedure is very sensitive to the fraction of temporary to total employment, as illustrated in our example in Section 2. Temporary workers switch jobs often and temporary jobs are often filled by different workers during different time periods. Given that the fraction of temporary workers is around 10 per cent, worker flows estimated in this way can be strongly dominated by temporary worker hires and separations.

Using direct measures of hires and separations for permanent workers, we find that mean worker reallocation equals 25 per cent on a yearly basis. This figure is much lower than previous results, indicating that flows estimated from matched establishment-worker data may be dominated by temporary worker flows. Notice that our direct hires and separations cover all employer switches, while previous studies cover only a part of hires and separations using information on employer affiliations for two dates. On the other hand, given that permanent jobs usually last more than a year, computing employer switches for permanent workers yields a good estimate of total hires and separations. The

higher flows reported in earlier studies more likely stem from the inclusion of temporary contracts.

Results for permanent hires and separations are reported in Table B1. Worker flows in manufacturing and non-manufacturing are plotted in Appendix B. Permanent hires exhibit high volatility, ranging from nearly 19 per cent in 1989 to a low of 7 per cent in 1993. The mean hiring rate equals 12 per cent. The corresponding figure of the separation rate is 14 per cent, varying between 11 per cent in 1996 and 18 per cent in 1990. Despite a severe net employment contraction during 1991-94, some firms still hired at a rate equal to half the job destruction. These simultaneous hires and separations indicate heterogeneity in firms' labour demand. However, we find that expanding establishments hire around 80 per cent of total hires and contracting establishments stand for 80 per cent of total separations.

The difference in net employment changes across industries combined with low inter-industry worker mobility would yield differences in worker turnover across industries. We observe the highest worker reallocation in services, whereas the lowest worker reallocation is found in electricity. Worker reallocation decreases with establishment size, varying from 0.34 in the smallest size-class to 0.17 in establishments with over 500 employees. However, we find no systematic relation between excess worker reallocation and establishment-size (see Table B3.). Instead, excess worker reallocation is remarkably stable, with all size-classes having a mean of around 7-8 per cent. On the other hand, there are large differences across industries. The highest excess worker reallocations are observed in the hotel, transport and services, whereas the lowest figures are found in electricity, mining and textiles. These industry differences seem to be worker, rather than job driven. Industries with high worker turnover do experience high excess worker reallocation, and these are service sectors with relatively higher shares of temporary employment.

Average excess annual worker-reallocation is 0.075. An excess worker reallocation of 7 per cent for permanent jobs means that between 3.5 and 7 per

cent of permanent workers change jobs to improve their job-match, or to leave or enter employment.

Summing separations and hires for temporary workers yields the worker reallocation for temporary workers. This yields an upper bound for worker reallocation associated with temporary contracts. As noted earlier, due to the construction of data, hires associated with a trial period for permanent contracts are registered as temporary hires. Removing all hires for permanent contracts yields an estimate for the lower bound of temporary-worker reallocation. This assumes that all permanent contracts start with a trial period on a temporary contract. Table B5 reports estimated worker flow rates for temporary workers as well as for all workers. The lower bound is, on an annual basis, around 240 per cent and the upper bound is around 350 per cent. These figures can be compared with the worker reallocation rate of 25 per cent for permanent contracts.

One interpretation of the low excess worker reallocation for permanent workers is that it represents a low fraction of bad job-matches. Permanent jobs are strongly protected by law and labour unions in Sweden, implying high firing costs. Our low rate of excess job turnover for permanent contracts would then reflect good matches as a result of cautious hiring policies. Another explanation is that the employment protection law reduces the lay-off rate for the low-productivity workers with permanent contracts. This, however, takes place at costs of higher turnover rate for temporary workers. A conclusion is that the Swedish labour market exhibits a clear pattern of dualism associated with permanent and temporary employment.

8. CONCLUSIONS

Using direct information on hires and separations, we report results indicating that previous findings on labour flows, aggregated over all contract types, are partly dominated by unstable temporary jobs and mobile temporary workers. Gross job and worker flows vary strongly in levels, and exhibit

systematically different cyclical patterns across temporary and permanent contracts as well as between manufacturing and services.

Temporary job-flows are around ten times higher than job flows for permanent contracts. Temporary contracts also exhibit substantially higher volatility than permanent contracts. The employment trend, however, seems to be governed by permanent jobs while temporary employment seems to work as an adjustment buffer. Furthermore, the relative volatility of gross job flows is systematically correlated with net employment growth: job destruction varies more than job creation in declining industries.

We find no clear cyclical pattern of job reallocation, except for permanent contracts in manufacturing. This can be interpreted as an indication that adjustment costs do not seem to explain the job reallocation pattern in services. The general pattern of employment adjustment is heterogeneous and varies strongly across sectors and contract types.

Finally our results imply that worker turnover for temporary contracts is at least 10 times higher than the turnover for permanent workers. This highlights that the high average rate of worker mobility is a result of high turnover of temporary workers and the dual structure of the Swedish labour market.

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Appendix A: Description of the Data

Variables:

Permanent employees: All employees with a *time-unlimited* employment contract at the middle of a month. Self-employed and working shareholders are considered to be permanent workers.

Temporary employees: All employees with a *time-limited* employment contract at the middle of a given month. Employees employed on an hourly basis, not present on the actual date, are not included.

Permanent Hires: The number of individuals hired on a *time-unlimited* basis during the actual month.

Temporary Hires: The number of individuals hired on a *time-limited* basis during the actual month.

Permanent Separations: The number of individuals separated on a *time-unlimited* basis during the actual month.

Temporary Separations: The number of individuals separated on a *time-limited* basis during the actual month.

Industry Classification: We divide our data into 14 sectors of activity, roughly corresponding to the two-digit system of industry classification. Since the establishments' industry affiliation is given in the old system of industry classification (SNI69) for observations from the period 1989-1994 and according to the new system (SNI92) for the period 1995-1998, we construct sectors to be able to compare data over the entire period. This leads to some minor misclassifications.

Number of establishments, yearly averages.

1989	11332
1990	10716
1991	10644
1992	10489
1993	12024
1994	12286
1995	12445
1996	12627
1997	11335
1998	11424

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APPENDIX B: TABLES AND FIGURES[13]

TABLE B1. PERMANENT-JOB AND WORKER-FLOW *RATES* 1989:1-1998:4.

Year:Q	Employment	Job Creation	Job Destruction	Net empl. Change	Job Reallocation	Excess Job Reallocation	Hires	Separations	Worker Reallocation	Excess Worker Reall.
89:1	2 173 627	0.026	0.019	0.007	0.046	0.039	0.045	0.038	0.084	0.038
89:2	2 133 784	0.030	0.024	0.006	0.054	0.048	0.050	0.044	0.094	0.040
89:3	2 124 913	0.028	0.026	0.001	0.054	0.053	0.049	0.047	0.096	0.042
89:4	2 131 268	0.026	0.022	0.003	0.048	0.045	0.045	0.041	0.086	0.038
89		0.110	0.092	0.018	0.202	0.185	0.189	0.171	0.360	0.158
90:1	2 194 207	0.029	0.023	0.006	0.051	0.045	0.047	0.042	0.089	0.038
90:2	2 162 600	0.027	0.028	-0.002	0.055	0.053	0.046	0.048	0.093	0.038
90:3	2 144 246	0.026	0.028	-0.002	0.054	0.051	0.043	0.046	0.089	0.035
90:4	2 128 317	0.023	0.027	-0.004	0.050	0.046	0.037	0.041	0.079	0.028
90		0.104	0.106	-0.002	0.210	0.208	0.174	0.176	0.350	0.140
91:1	2 181 616	0.019	0.025	-0.006	0.043	0.037	0.029	0.036	0.065	0.022
91:2	2 145 423	0.016	0.028	-0.012	0.044	0.032	0.024	0.036	0.060	0.016
91:3	2 095 586	0.016	0.031	-0.015	0.047	0.032	0.024	0.039	0.063	0.016
91:4	2 047 471	0.014	0.034	-0.021	0.048	0.027	0.019	0.040	0.058	0.011
91		0.064	0.118	-0.054	0.182	0.128	0.096	0.150	0.246	0.064
92:1	2 059 555	0.014	0.032	-0.018	0.047	0.029	0.019	0.037	0.056	0.010
92:2	2 000 878	0.013	0.034	-0.021	0.047	0.025	0.016	0.037	0.054	0.007
92:3	1 942 679	0.016	0.032	-0.016	0.049	0.032	0.021	0.038	0.059	0.011
92:4	1 891 247	0.008	0.036	-0.028	0.044	0.017	0.012	0.039	0.051	0.007
92		0.052	0.134	-0.083	0.186	0.103	0.069	0.151	0.220	0.034
93:1	1 880 181	0.012	0.031	-0.019	0.042	0.023	0.015	0.034	0.049	0.007
93:2	1 831 840	0.011	0.030	-0.019	0.040	0.021	0.015	0.034	0.049	0.009
93:3	1 798 805	0.012	0.030	-0.018	0.042	0.025	0.017	0.035	0.053	0.010
93:4	1 760 539	0.012	0.027	-0.014	0.039	0.025	0.018	0.032	0.050	0.011
93		0.047	0.117	-0.070	0.164	0.094	0.066	0.135	0.201	0.037
94:1	1 834 242	0.020	0.023	-0.003	0.042	0.039	0.026	0.029	0.054	0.012
94:2	1 823 905	0.022	0.021	0.002	0.043	0.041	0.030	0.028	0.058	0.015
94:3	1 813 438	0.020	0.020	0.000	0.041	0.040	0.029	0.029	0.057	0.017
94:4	1 823 195	0.022	0.022	0.000	0.044	0.044	0.030	0.031	0.061	0.017
94		0.084	0.086	-0.002	0.170	0.168	0.114	0.116	0.230	0.060
95:1	1 913 772	0.027	0.019	0.008	0.046	0.039	0.036	0.029	0.065	0.018
95:2	1 919 869	0.024	0.017	0.007	0.041	0.034	0.034	0.027	0.060	0.020
95:3	1 985 309	0.024	0.022	0.002	0.046	0.044	0.032	0.029	0.061	0.015
95:4	1 984 479	0.017	0.022	-0.005	0.039	0.034	0.025	0.030	0.054	0.015
95		0.092	0.079	0.012	0.171	0.159	0.126	0.114	0.240	0.069
96:1	1 977 185	0.019	0.018	0.001	0.037	0.036	0.026	0.025	0.050	0.013
96:2	1 968 413	0.019	0.025	-0.006	0.044	0.038	0.025	0.031	0.057	0.013
96:3	1 992 529	0.017	0.021	-0.004	0.038	0.034	0.023	0.027	0.050	0.012
96:4	1 979 671	0.015	0.022	-0.007	0.037	0.030	0.021	0.027	0.048	0.011
96		0.070	0.085	-0.015	0.155	0.140	0.095	0.110	0.204	0.049
97:1	1 970 680	0.022	0.024	-0.002	0.045	0.043	0.029	0.031	0.061	0.015
97:2	1 954 569	0.022	0.021	0.001	0.043	0.042	0.030	0.029	0.059	0.016
97:3	1 994 206	0.020	0.024	-0.003	0.044	0.041	0.029	0.032	0.061	0.017
97:4	1 976 648	0.022	0.023	-0.002	0.045	0.043	0.031	0.032	0.063	0.018
97		0.085	0.091	-0.006	0.176	0.170	0.118	0.124	0.243	0.066
98:1	1 996 482	0.022	0.021	0.001	0.044	0.043	0.032	0.031	0.063	0.020
98:2	2 004 077	0.021	0.021	0.000	0.042	0.042	0.030	0.030	0.060	0.017
98:3	2 040 763	0.024	0.026	-0.002	0.050	0.049	0.038	0.039	0.077	0.026
98:4	2 024 356	0.024	0.027	-0.003	0.050	0.047	0.034	0.038	0.072	0.022
98		0.092	0.095	-0.004	0.187	0.183	0.134	0.138	0.272	0.085
Mean		0.080	0.100	-0.021	0.180	0.154	0.118	0.139	0.257	0.076
Max		0.110	0.134	0.018	0.210	0.208	0.189	0.176	0.360	0.158
Min		0.047	0.079	-0.083	0.155	0.094	0.066	0.110	0.201	0.034
St Dev		0.021	0.018	0.035	0.017	0.037	0.040	0.023	0.056	0.041

[13] All reported flows in the tables are computed according to our flow-based measure described in Section 3.

TABLE B2. PERMANENT JOB AND WORKER FLOW *RATES* BY INDUSTRY FOR 1989-1998.

		Employment share	Job Creation	Job Destruction	Net empl. Change	Job Reallocation	Excess Job reallocation	Hires	Separations	Worker Reallocation	Excess W. Reall.
Mining:	Mean	0.004	0.043	0.069	-0.026	0.112	0.082	0.058	0.085	0.143	0.031
	Min	0.004	0.020	0.051	-0.066	0.072	0.040	0.027	0.059	0.087	0.010
	Max	0.005	0.063	0.102	0.012	0.145	0.114	0.101	0.112	0.197	0.078
	STD	0.000	0.015	0.018	0.023	0.024	0.025	0.022	0.021	0.036	0.021
Food:	Mean	0.032	0.038	0.083	-0.045	0.121	0.076	0.070	0.115	0.185	0.064
	Min	0.027	0.016	0.059	-0.093	0.086	0.033	0.034	0.074	0.120	0.027
	Max	0.035	0.070	0.114	-0.014	0.158	0.141	0.162	0.179	0.340	0.182
	STD	0.003	0.019	0.016	0.024	0.025	0.037	0.043	0.034	0.074	0.054
Textile:	Mean	0.010	0.050	0.111	-0.060	0.161	0.096	0.074	0.135	0.209	0.048
	Min	0.007	0.017	0.057	-0.174	0.085	0.034	0.029	0.077	0.124	0.017
	Max	0.014	0.070	0.191	0.012	0.234	0.135	0.123	0.204	0.304	0.112
	STD	0.003	0.019	0.053	0.064	0.048	0.034	0.031	0.056	0.064	0.031
Wood etc.:	Mean	0.075	0.054	0.081	-0.027	0.136	0.106	0.079	0.106	0.185	0.050
	Min	0.062	0.020	0.054	-0.095	0.115	0.041	0.032	0.078	0.152	0.022
	Max	0.088	0.083	0.116	0.007	0.162	0.158	0.138	0.134	0.272	0.111
	STD	0.010	0.017	0.018	0.032	0.015	0.033	0.031	0.019	0.041	0.030
Chemistry:	Mean	0.041	0.046	0.084	-0.038	0.130	0.091	0.077	0.115	0.192	0.062
	Min	0.038	0.020	0.047	-0.110	0.096	0.041	0.037	0.072	0.139	0.019
	Max	0.045	0.070	0.130	0.004	0.166	0.140	0.152	0.178	0.329	0.163
	STD	0.002	0.017	0.031	0.041	0.028	0.033	0.037	0.037	0.062	0.044
Machinery:	Mean	0.204	0.051	0.077	-0.026	0.128	0.090	0.082	0.109	0.191	0.063
	Min	0.192	0.027	0.048	-0.091	0.098	0.054	0.038	0.079	0.149	0.021
	Max	0.220	0.089	0.118	0.041	0.145	0.136	0.145	0.150	0.296	0.155
	STD	0.008	0.020	0.026	0.043	0.016	0.025	0.036	0.027	0.047	0.042
Electr. Etc.	Mean	0.011	0.038	0.042	-0.005	0.080	0.063	0.050	0.055	0.106	0.026
	Min	0.007	0.012	0.036	-0.035	0.048	0.024	0.018	0.042	0.060	0.011
	Max	0.013	0.078	0.057	0.035	0.120	0.098	0.115	0.080	0.194	0.074
	STD	0.002	0.020	0.007	0.021	0.022	0.024	0.028	0.011	0.038	0.018
Construct.:	Mean	0.083	0.107	0.141	-0.034	0.248	0.190	0.133	0.168	0.301	0.053
	Min	0.069	0.068	0.095	-0.145	0.180	0.136	0.081	0.108	0.205	0.020
	Max	0.102	0.157	0.217	0.060	0.293	0.261	0.221	0.231	0.382	0.129
	STD	0.012	0.033	0.045	0.071	0.033	0.040	0.051	0.037	0.054	0.040
Trade:	Mean	0.208	0.092	0.106	-0.013	0.198	0.173	0.132	0.145	0.277	0.079
	Min	0.193	0.046	0.090	-0.073	0.164	0.092	0.066	0.117	0.205	0.041
	Max	0.220	0.135	0.125	0.030	0.242	0.234	0.206	0.190	0.383	0.141
	STD	0.012	0.027	0.013	0.032	0.027	0.042	0.043	0.023	0.061	0.034
Hotel-Rest.:	Mean	0.027	0.150	0.191	-0.040	0.341	0.282	0.255	0.296	0.551	0.210
	Min	0.025	0.098	0.138	-0.128	0.272	0.196	0.141	0.227	0.390	0.084
	Max	0.028	0.240	0.267	0.053	0.457	0.381	0.469	0.467	0.886	0.459
	STD	0.001	0.044	0.041	0.062	0.058	0.065	0.104	0.083	0.178	0.124
Transport.:	Mean	0.062	0.085	0.104	-0.019	0.188	0.148	0.135	0.154	0.289	0.101
	Min	0.058	0.041	0.078	-0.087	0.154	0.082	0.064	0.109	0.212	0.047
	Max	0.068	0.153	0.128	0.041	0.264	0.223	0.257	0.216	0.473	0.214
	STD	0.004	0.035	0.020	0.047	0.032	0.046	0.060	0.033	0.084	0.061
Banking:	Mean	0.038	0.054	0.066	-0.012	0.120	0.093	0.081	0.093	0.174	0.054
	Min	0.035	0.022	0.049	-0.058	0.096	0.045	0.034	0.076	0.127	0.024
	Max	0.040	0.099	0.094	0.034	0.163	0.129	0.161	0.127	0.288	0.124
	STD	0.002	0.024	0.013	0.031	0.023	0.023	0.039	0.015	0.050	0.032
Real Estate:	Mean	0.022	0.078	0.095	-0.016	0.173	0.138	0.106	0.122	0.229	0.056
	Min	0.018	0.050	0.065	-0.090	0.146	0.099	0.060	0.099	0.176	0.020
	Max	0.024	0.119	0.150	0.038	0.210	0.173	0.141	0.163	0.282	0.106
	STD	0.002	0.023	0.026	0.043	0.022	0.027	0.033	0.021	0.034	0.032
Oth. Serv.:	Mean	0.185	0.108	0.108	0.000	0.216	0.191	0.155	0.155	0.309	0.094
	Min	0.137	0.067	0.090	-0.066	0.175	0.135	0.092	0.130	0.223	0.044
	Max	0.238	0.144	0.151	0.030	0.261	0.234	0.233	0.203	0.436	0.193
	STD	0.041	0.023	0.018	0.032	0.026	0.028	0.047	0.029	0.071	0.050

TABLE B3. PERMANENT-JOB AND WORKER-FLOW *RATES* BY ESTABLISHMENT SIZE CLASSES FOR 1989-1998.

Year	Size	Employm. Share	Job Creation	Job Destruction	Net empl. Change	Job Reallocation	Hires	Separations	Worker Reallocation	Excess Worker Reallocation
1989	1-9	0.184	0.191	0.131	0.061	0.322	0.252	0.192	0.444	0.122
	10-49	0.276	0.137	0.105	0.032	0.241	0.204	0.172	0.376	0.135
	50-99	0.122	0.106	0.088	0.017	0.194	0.187	0.170	0.357	0.163
	100-499	0.240	0.072	0.077	-0.005	0.148	0.167	0.172	0.338	0.190
	500-	0.177	0.040	0.057	-0.017	0.096	0.131	0.148	0.279	0.182
1990	1-9	0.195	0.190	0.149	0.040	0.339	0.244	0.204	0.448	0.109
	10-49	0.277	0.128	0.117	0.011	0.245	0.199	0.188	0.386	0.141
	50-99	0.119	0.101	0.103	-0.002	0.204	0.168	0.170	0.338	0.135
	100-499	0.238	0.063	0.094	-0.031	0.157	0.146	0.177	0.323	0.166
	500-	0.172	0.028	0.060	-0.032	0.088	0.097	0.129	0.225	0.138
1991	1-9	0.205	0.126	0.149	-0.023	0.275	0.161	0.184	0.345	0.070
	10-49	0.289	0.076	0.128	-0.052	0.204	0.108	0.160	0.268	0.064
	50-99	0.116	0.049	0.119	-0.070	0.168	0.078	0.147	0.225	0.057
	100-499	0.232	0.035	0.106	-0.071	0.142	0.071	0.142	0.213	0.071
	500-	0.159	0.014	0.075	-0.062	0.089	0.039	0.100	0.139	0.051
1992	1-9	0.218	0.106	0.168	-0.062	0.275	0.121	0.183	0.304	0.029
	10-49	0.290	0.056	0.141	-0.085	0.197	0.073	0.159	0.232	0.035
	50-99	0.116	0.035	0.161	-0.127	0.196	0.052	0.178	0.230	0.034
	100-499	0.222	0.028	0.114	-0.086	0.142	0.047	0.134	0.181	0.039
	500-	0.154	0.013	0.084	-0.070	0.097	0.029	0.099	0.128	0.031
1993	1-9	0.232	0.081	0.136	-0.055	0.217	0.101	0.156	0.257	0.040
	10-49	0.288	0.054	0.128	-0.074	0.182	0.072	0.146	0.218	0.036
	50-99	0.114	0.044	0.120	-0.076	0.164	0.057	0.134	0.191	0.027
	100-499	0.220	0.029	0.101	-0.072	0.131	0.051	0.123	0.174	0.043
	500-	0.146	0.010	0.086	-0.076	0.096	0.026	0.102	0.128	0.032
1994	1-9	0.232	0.137	0.116	0.021	0.253	0.170	0.149	0.320	0.066
	10-49	0.289	0.105	0.098	0.007	0.203	0.135	0.128	0.264	0.061
	50-99	0.115	0.070	0.084	-0.013	0.154	0.097	0.110	0.207	0.053
	100-499	0.218	0.041	0.069	-0.027	0.110	0.069	0.096	0.165	0.054
	500-	0.146	0.033	0.041	-0.008	0.074	0.064	0.071	0.135	0.061
1995	1-9	0.235	0.142	0.120	0.022	0.262	0.178	0.156	0.335	0.072
	10-49	0.287	0.107	0.088	0.019	0.195	0.143	0.123	0.266	0.071
	50-99	0.115	0.075	0.068	0.007	0.144	0.103	0.096	0.199	0.055
	100-499	0.215	0.050	0.060	-0.010	0.110	0.083	0.092	0.175	0.065
	500-	0.147	0.052	0.034	0.018	0.086	0.091	0.073	0.164	0.078
1996	1-9	0.233	0.117	0.115	0.001	0.232	0.136	0.135	0.272	0.040
	10-49	0.292	0.079	0.095	-0.016	0.174	0.105	0.121	0.227	0.053
	50-99	0.115	0.063	0.085	-0.022	0.149	0.085	0.107	0.192	0.044
	100-499	0.212	0.038	0.065	-0.028	0.103	0.062	0.089	0.151	0.048
	500-	0.147	0.030	0.047	-0.017	0.077	0.062	0.078	0.140	0.064
1997	1-9	0.232	0.145	0.146	-0.001	0.291	0.178	0.178	0.356	0.065
	10-49	0.290	0.098	0.093	0.004	0.191	0.131	0.127	0.258	0.067
	50-99	0.120	0.066	0.076	-0.010	0.142	0.098	0.108	0.205	0.063
	100-499	0.210	0.048	0.069	-0.020	0.117	0.079	0.100	0.179	0.062
	500-	0.148	0.035	0.045	-0.010	0.079	0.073	0.083	0.156	0.077
1998	1-9	0.236	0.140	0.151	-0.012	0.291	0.184	0.196	0.380	0.089
	10-49	0.298	0.114	0.092	0.022	0.206	0.156	0.134	0.289	0.084
	50-99	0.116	0.082	0.092	-0.010	0.174	0.126	0.136	0.263	0.088
	100-499	0.202	0.049	0.074	-0.025	0.122	0.085	0.110	0.195	0.073
	500-	0.149	0.036	0.045	-0.009	0.081	0.083	0.092	0.175	0.094
Means	1-9	0.220	0.137	0.138	-0.001	0.276	0.173	0.173	0.346	0.070
	10-49	0.288	0.095	0.108	-0.013	0.204	0.133	0.146	0.278	0.075
	50-99	0.117	0.069	0.100	-0.031	0.169	0.105	0.136	0.241	0.072
	100-499	0.221	0.045	0.083	-0.038	0.128	0.086	0.123	0.209	0.081
	500-	0.155	0.029	0.057	-0.028	0.086	0.069	0.098	0.167	0.081

TABLE B4. CORRELATION BETWEEN GROSS JOB FLOW RATES AND NET EMPLOYMENT CHANGE. 1989:2 – 1998:4.

	Private sector		Manufacturing[a]				Non-manufacturing[a]			
ρ_{ALL} (JC, JD)	-0,74***		-0,77***		-0,40***		-0,69***		0,26***	
ρ_{PERM}(JC, JD)	-0,27*		-0,57***		-0,25***		0,01		0,40***	
ρ_{TEMP}(JC, JD)	-0,80***		-0,77***		-0,61***		-0,78***		-0,48***	
Observations	39		39		234		39		312	
	NET-P	NET-A	NET-P[a]		NET-A[a]		NET-P[a]		NET-A[a]	
ρ (JC_{ALL}, NET)	0,57***	0,94***	0,55***	0,35***	0,94***	0,83***	0,59***	0,24***	0,93***	0,56***
ρ (JC_{PERM}, NET)	0,78***	0,39**	0,84***	0,76***	0,43***	0,25***	0,72***	0,47***	0,38**	0,24***
ρ (JC_{TEMP}, NET)	0,13	0,85***	-0,04	-0,07	0,71***	0,71***	0,20	0,05	0,87***	0,65***
ρ (JD_{ALL}, NET)	-0,45***	-0,92***	-0,61***	-0,33***	-0,94***	-0,84***	-0,45***	-0,39***	-0,91***	-0,65***
ρ (JD_{PERM}, NET)	-0,82***	-0,48***	-0,93***	-0,82***	-0,63***	-0,40***	-0,69***	-0,62***	-0,42***	-0,33***
ρ (JD_{TEMP}, NET)	-0,08	-0,82***	0,03	-0,03	-0,70***	-0,76***	-0,17	-0,08	-0,86***	-0,65***
ρ (JR_{ALL}, NET)	0,24	0,16	-0,11	0,01	-0,02	-0,03	0,24	-0,11[b]	0,12	-0,09[b]
ρ (JR_{PERM}, NET)	-0,08	-0,11	-0,43***	-0,14**	-0,41***	-0,16**	0,037	-0,13[b]	-0,05	-0,08
ρ (JR_{TEMP}, NET)	0,10	0,24	-0,03	-0,11[b]	0,17	-0,00	0,08	-0,03	0,19	0,02
Observations	39	39	39	234	39	234	39	312	39	312

NOTES:

i) These correlations are computed using our stock-based measures. Using the flow-based measure yields essentially the same results.
a) The correlations in the left column are based on aggregated job flows. The correlations in the right column are based on a panel of industries (6 in manufacturing and 8 in non-manufacturing).
b) The Pearson correlations are significant at conventional levels but turn to insignificant using Spearman rank correlation

TABLE B5. LOWER- AND UPPER-BOUND FOR TEMPORARY AND TOTAL WORKER REALLOCATION *RATES* 1989-98.

Sector		Temporary contracts		All contracts	
		Lower bound	Upper bound	Lower bound	Upper bound
Private sector	Mean	2.37	3.50	0.46	0.57
	STD	0.43	0.17	0.04	0.07
Manufacturing	Mean	2.49	3.86	0.33	0.41
	STD	0.66	0.17	0.04	0.06
Non-manufacturing	Mean	2.34	3.41	0.54	0.66
	STD	0.39	0.18	0.04	0.08

Figure B1a. Net Employment Change in Non-Manufacturing

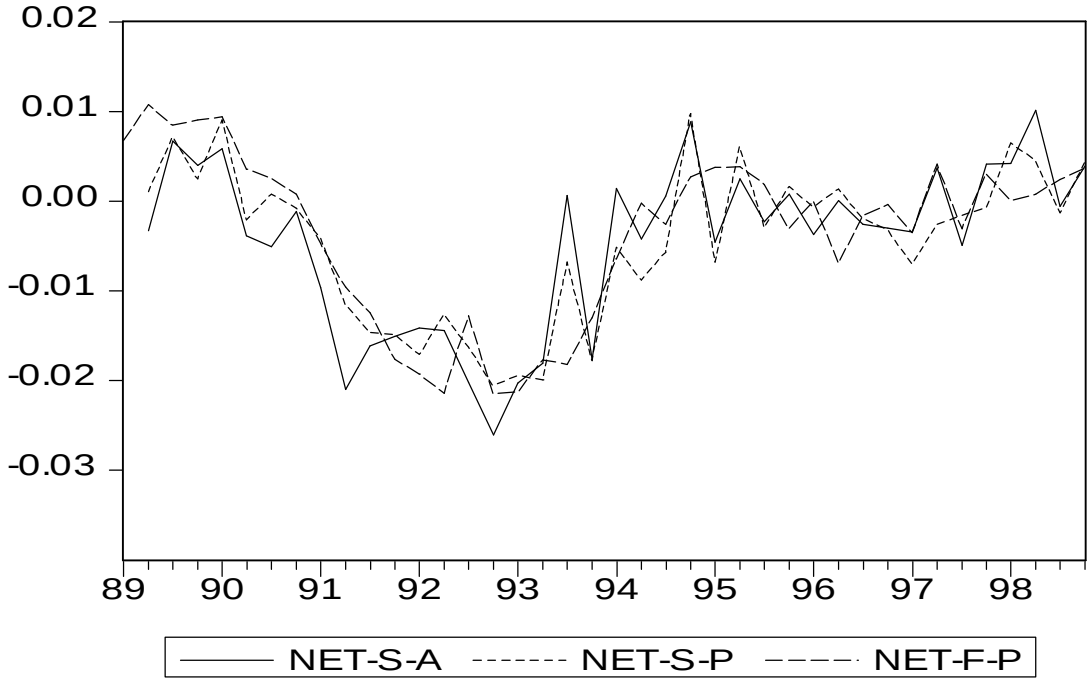
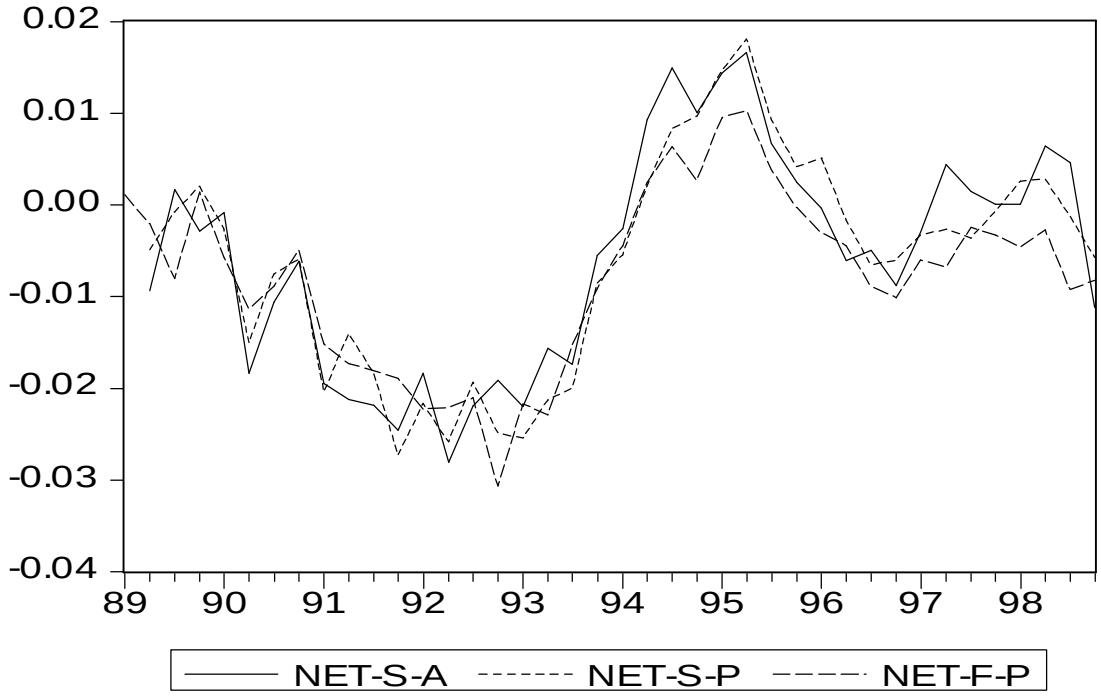


Figure B1b. Net Employment Change in Manufacturing



NET-S-A: Stock based – all job flows.
NET-S-P: Stock based – permanent jobs
NET-F-P: Flow based – permanent jobs
All series are seasonally adjusted.

Figure B2a Job Creation rates in Non-Manufacturing

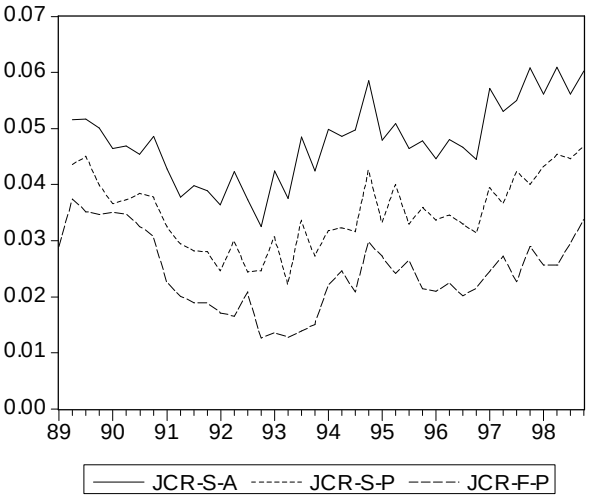
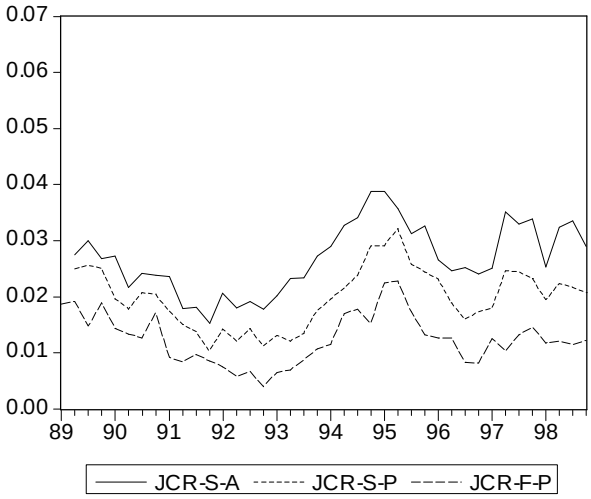


Figure B2b. Job Creation rates in Manufacturing



JCR-S-A: Stock based - all job flows.
JCR-S-P: Stock based - permanent job flows.
JCR-F-P: Flow based - permanent job flows .
All series are seasonally adjusted.

Figure B3a. Job Destructions rates in Non-Manufacturing

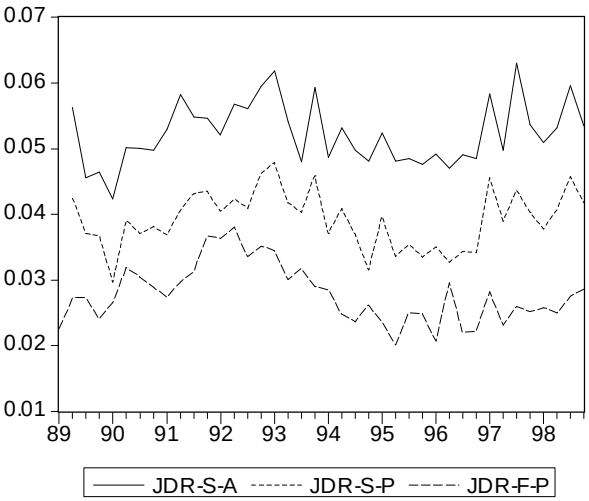
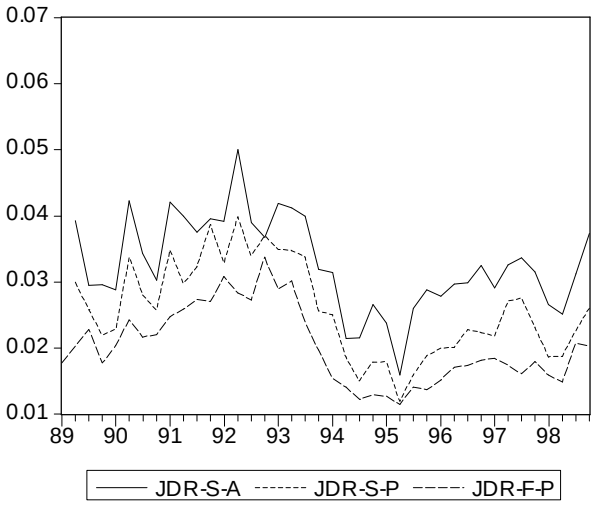


Figure B3b. Job Destruction rates in Manufacturing



JDR-S-A: Stock based - all job flows
JDR-S-P: Stock based - permanent job flows
JDR-F-P: Flow based - permanent job flows
All series are seasonally adjusted.

Figur B4a. Worker Flows for Permanent Contracts in Non-Manufacturing

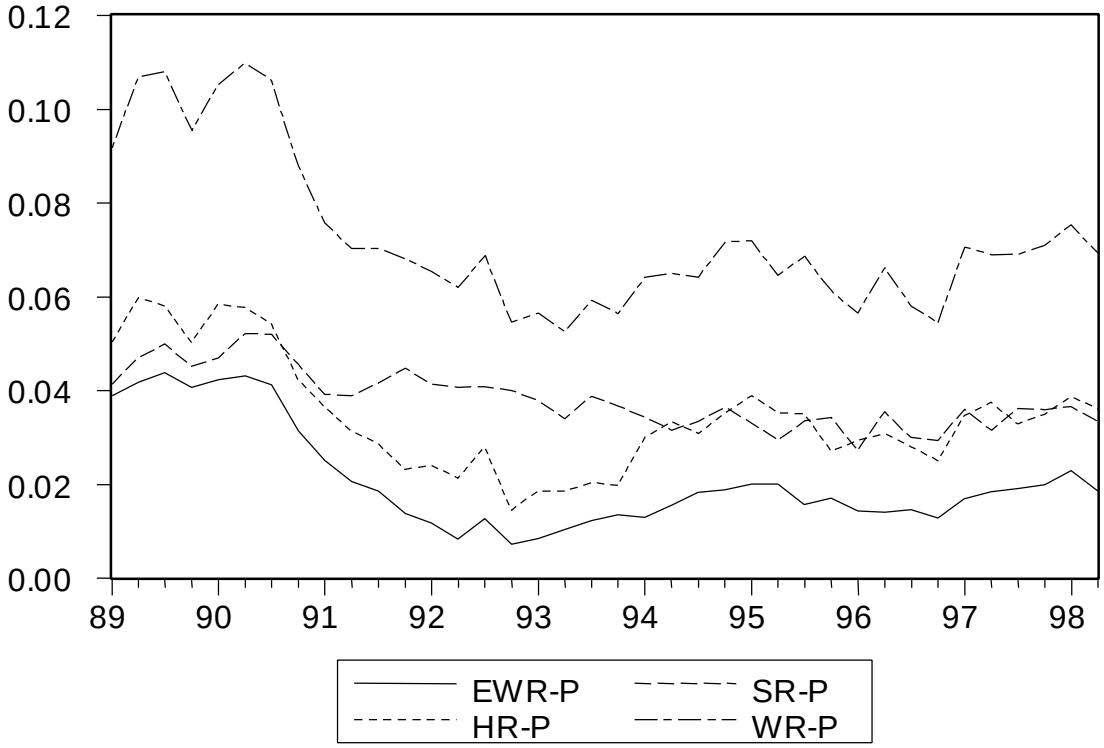
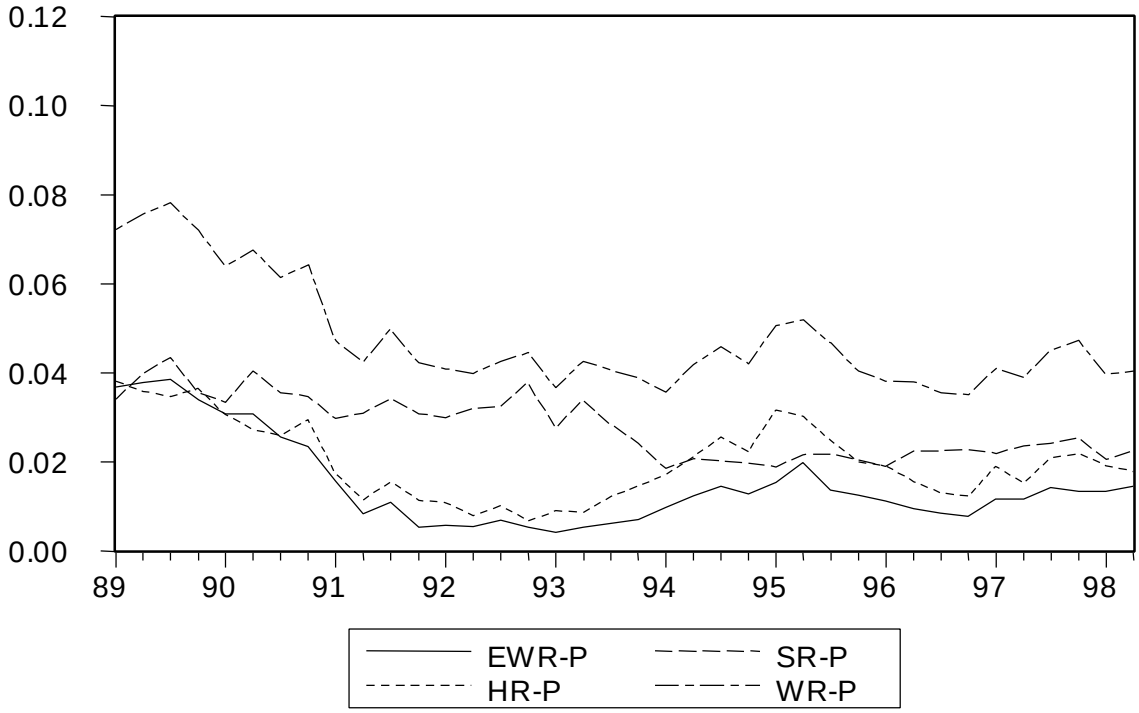


Figure B4b. Worker Flows for Permanent Contracts in Manufacturing



WR-P: Permanent worker reallocation
HR-P: Permanent hires
SR-P: Permanent separations
EWR-P: Permanent excess worker reallocation