

# Labour churning and employment to employment flows. Long term dynamics in Veneto<sup>1</sup>

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## Abstract.

Labour excess reallocation or churning is computed exploiting the difference between worker flows and job flows. Churning or excess reallocation is defined as total worker reallocation flow net of reallocations due firm birth and death. But people, as well as firms, are born and die, and workers reallocation flows due to new entrances and retirements cannot be disposed off as excess reallocation.

A new definition of churning is presented, measuring directly worker reallocation flows through the development of the vacancy chain model. An iterative procedure computes the successive reallocation runs, beginning from an autonomous vacancy, and reconstructs the complete process through all its steps. The procedure is implemented and applied to a large employer-level longitudinal panel based on a highly industrialized region in the North- East of Italy, the Veneto. Our results are meaningfully compared with others people definitions and results.

An increasing large part of worker flows, in the Veneto labour market, is made by excess reallocation, which is now much higher than ten or fifteen years ago. Background characteristics of workers, firms/work places (local labour markets) are identified and the reallocation flows cyclical pattern is discussed.

*JEL classification:* J21; J44; R23;

*Keywords:* Job Flows; Worker Flows; Regional Labour Markets.

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<sup>1</sup> This research is part of the Miur project 1999-2001, n. 9913193479 and 2002-2003, n. 2001134473.

## I. Introduction.

This article explores the empirical relationship between job and worker flows at the employer level. Workers differ greatly in the set of skills, capabilities and expectations and jobs differ greatly in diligence and skills they require from workers. The diversity between workers and jobs, and the large flows of workers among jobs, has pointed out that the search process, at the micro level, is complex: shrinking employers engage in hirings and growing employers fire workers. Job flows and worker flows are surprisingly large in all phases of the cycle and worker inflows and outflows are contemporaneously observed within the same productive unit.<sup>2</sup> The fact that gross flows are much larger than net flows implies a great deal of heterogeneity of the firms, jobs and workers.

The term worker flows refer to all movements into and out of jobs. Job flows measure the creation and destruction of jobs in a time unit, reflecting the expansion and contraction of occupation at the establishment level.

Worker flows can originate from job creation and from job destruction, but can be also in excess of the changing number of jobs. If worker flows reflect all movements of workers into and out of jobs and job flows represent the creation-destruction of jobs, the difference between worker flows and job flows has to do with the process of workers reallocation and is labelled excess reallocation or churning (Burgess, Lane and Stevens, 2000; Davis and Haltiwanger, 1999).

Churning can arise because workers quit their employers to look for a better job or better working conditions and are replaced, *workers churning employers*, or/and because employers simultaneously hire and fire workers, *employers churning workers*, in order to improve their workforce quality, the skill mix available to the firm. Churning reflects a *bad* match or a match that is susceptible of improvement according to the worker and/or to the employer or a short-term equilibrium match.

Churning is commonly defined as the difference between total turnover and job turnover or as the ratio of the two. This definition is far from satisfactory as it includes several spurious components that have not much in common with the flow reallocation concept, as it is commonly understood and defined. For example at any time instant new workers are entering the labour market and workers retire, and these flows should not be included in the excess reallocation measure; flows due to workers demography share the same *nature* of flows due to firms demography and should be treated on the same principles.

Our work aims at a more appropriate definition of churning, building on the vacancy chain model. Churning is strictly defined on the basis of the replacement process that follows a quit or on the hiring that follows a firing: the definition is based on the early work by Akerloff, Rose and Yellen (1988) and by Contini and Revelli (1988), but adopts a more general framework, corrects some previous inconsistencies and computes the churning value directly, taking into account all the steps of the induced reallocation process. The churning proposed definition, based on counting employment to employment flows, appears more coherent than other people measures and provides less ambiguous results.

The article is organized as follows. Section II briefly describes the data and the framework used to present our results. The alternative two definitions of churning or reallocation flows are

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<sup>2</sup> The unit of analysis is the unit which pays social security for its employees. In the case of firms with several establishments - that meet some specified requirements – each establishment is entitled to pay directly social security contributions for their employees. A firm using a decentralized payment system can always ‘centralize’ social security payments within a single unit. Due to such an ambiguity we use the word ‘establishment’ and avoid the word firm, as the subject of social security contributions.

The problems inherent to the evaluation of the effect of the fiscal bonus – D.L. 30 December 1979, n. 663 - accorded to the firms declaring for the first time their irregular employees to social security, and the consequent, large, break in the series in 1980-1981, advice us to skip the earlier years, 1975-1981, and limit our research to the period 1982-1997.

presented and compared in Section III. Under very restrictive assumptions the two definitions are identical, but in the general case the vacancy chain model produces more meaningful results. Section IV presents the most relevant results of the vacancy chain model with reference to the Veneto longitudinal panel and the following section concludes.

## II. Data.

Recent works on job and worker flows exploits matched employer-worker data to examine whether worker engagements and separations are related with job creations and destructions at the employer level. Studies cover various countries and sectors since the late seventies up to now. Some studies rely on a quarterly frequency and some on an annual frequency (Abowd and Kramartz, 1999; Bingley and Westergard-Nielsen, 2000; Burgess, Lane and Stevens, 2000; 2001; Heisz and Picot, 2001; Leonard and von Audrenrode, 1999).

The ideal dataset for analysing the divergence between job and worker flows is based on the universe of employers matched by the universe of workers, because job flows are defined on the employer behaviour over time. We exploit a long panel of such data. The longitudinal panel we work with is built on the administrative records of the Italian Social Security System (Inps). It refers to the total population of employers and employees in two provinces, Treviso and Vicenza, of an Italian North-eastern region, Veneto. Everyone employed in this territory in the private sector (no state and local government, with few exceptions), from 1982 to 1997, is included except for those who are self-employed, farm workers and people who receive no salary.

Inps data provide register-based information on all establishments located in Treviso and Vicenza and on employees that have been hired by those establishments for at least one day during the period of observation, independently of the workers place of residence. The longitudinal panel is based on monthly histories of the working life of each employee built on the Social Security archive unit of observation, the employer-day. Employers are identified by their identification number, which changes if ownership, in a strict sense, changes.

A ‘cleaned’ social security archive has been used. The engagements/separations and the creations/destructions that are due to a change in the unit that pays the social security contribution not matched by a corresponding change of the working population assessed at the establishment level are defined as ‘spurious’ and have been deleted. This has lead to a reduction of 1.3% of total engagements and separations in manufacturing. Similarly, if there are short breaks in the employment spell, as long as the worker continues at the old employer, his spell is considered uninterrupted.<sup>3</sup> The complex matching procedure is explained in Occari and Pitingaro (1997).

Data include all individual employment spells with an employer, of whatever duration, and this probably results in very short employment spells.<sup>4</sup> All employment size are maintained because our territory is characterized by a multitude of very small units: the average plant size in 1996 is 13 employees.

The longitudinal panel has records on establishment and worker flows from 1982 to 1997, a rather long period of time, compared with other studies of this kind; employers are classified in the three-digit sector classification, ATECO 1981.<sup>5</sup> The long period of time covered by the database allows us to discuss the role of quits, hires and turnover in relation to two expansionary cycles: 1984 - 1990 and 1993 - 1996 (Occari and Pitingaro, 1998).

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<sup>3</sup> These procedure are common practice among people working with social security data, see Bingley and Westergård-Nielsen (2002).

<sup>4</sup> In a related work (Tattara and Valentini, 2003) we have demonstrated that although short spells characterize the average job, they are concentrated on the young age of workers while average long spells characterize the average worker current experience.

<sup>5</sup> Revelli (1995) and Rapiti (1998). On the Inps data base used in the present paper, see Tattara and Volpe (2001, 18-22).

### III Alternative churning definitions.

III.1. Churning defined as the excess of Total Turnover over Gross Job Turnover. Engagements measure new hires. Separations measure disclosed contracts, i.e. quits and layoffs. Both are defined in continuous time. Net employment change, in a definite time interval, is the difference between engagements and separations. Turnover is defined as the number of engagements or separations in the economy in a definite time interval. The gross rate of worker turnover is defined as the ratio between turnover and the number of individuals exposed to the turnover risk ( $TR_t$ ).

( $e_t$ ) are total engagements and ( $s_t$ ) total separations in the time interval. ( $TR_t$ ) represents the whole set of workers that, at any moment in the time period, have shown as employed. In such a way the worker flow (numerator) is meaningfully compared to the whole set of workers that are potential candidates for originating such flow. TR is computed as the stock at the beginning of the period + the hired persons in the period, who are not part of the initial stock.<sup>6</sup> In that our study diverges from classical turnover studies, where the denominator index is the employment stock (past employment, current employment or an average of the two: Davis and Haltiwanger, 1999).  $TT_t = (e_t + s_t)/TR_t$ .<sup>7</sup>

Job turnover refers to gross changes of positions and not to changes in employment contracts. An important dynamic aspect of economic growth is due to the growth and decline of firms and establishments. A job created means the addition of an extra employee to the stock of workers in an establishment; a job destroyed means a unit reduction in employment in a specific establishment. Their sum, in absolute terms, is the magnitude of the job flow. Job turnover is computed by adding job creations ( $c_{nt}$ ) and job destructions ( $d_{nt}$ ) at the establishment level in the time unit, where  $n$  is an index for the establishment number,  $n = 1, \dots, F$ . The rate of job turnover or gross job turnover is the ratio between creations plus destructions and the number of individuals exposed to the turnover risk ( $TR_t$ ).  $GJT_t = \sum_{n=1}^F (c_{nt} + d_{nt})/TR_t$

Changes in jobs are influenced by economic growth, business cycle, structural change and competition between industries. Job turnover depends on the size of the establishments, as a bigger size internalizes many changes between jobs that are not captured by the measure adopted, on the length of the period and on the choice of the period of time considered. According to our calculations, taking into account the year 1996, the sum of job creations and destructions counted adding creations and destructions every quarter, at the establishment level, amounts to 60.000, while job creations and destructions counted yearly are just half of that: 34.000 jobs. 26.000 jobs are temporary jobs, i.e. jobs which are created and destroyed during the year 1996. Many temporary jobs are seasonal work: i.e. the second quarter each year accounts for almost all seasonal creations and the third quarter for almost all seasonal destructions and seasonal work is not counted as creation or destruction if job computation is accomplished at yearly intervals.

In every industrial sector firms create jobs and firms destruct jobs. Creations and destructions frequently coexist in subunits (Boeri, 1996; Davis and Haltiwanger, 1999; Leonard, 1987). If such is the case a positive job turnover implies a positive total turnover. But a positive total turnover can take place even without any job turnover. Assume jobs and employment totally fixed. Turnover can be nonetheless positive because of the natural worker mobility due to retirements and new entrances.

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<sup>6</sup> The advantages provided by the new definition of the denominator (TR) over the more traditional formulation are argued in Tattara and Valentini (2003).

<sup>7</sup> Many times Total Turnover is computed at the individual level. The latter is better labelled Gross Worker Turnover,  $GWT_t = (e_{it} + s_{it})/TR_t$ . ( $e_{it}$ ) are individual engagements and ( $s_{it}$ ) are individual separations in the time interval ( $t$ ). GWT, differs from Total Turnover, as accessions and separations are counted per capita. In our sample GWT is rather different from TT as many people are hired several times in the time interval.

For GWT computation, see Tattara and Valentini (2003).

The relation among the aforesaid measures at time  $t$  is:  $e_t - s_t = c_{nt} - d_{nt} = \Delta E_t$ . The difference between engagements and separations or between creations and destructions is a measure of the net stock growth.

Although in many contemporary economic systems the increase in manufacturing employment is negligible or nil, this is the result of the creation of many new jobs and the parallel process of destruction. Worker flows exceed movements due to job creations and destructions, worker movements in excess of these flows are referred to, by many authors, as excess reallocation or churning. According to this definition churning or gross excess reallocation is defined as the ratio or the difference between TT and GJT.<sup>8</sup>  $CH_t = TT_t/GJT_t$  or  $(TT_t - GJT_t)/TR_t$ .

The general churning definition is that of replaced quit or of parallel hiring and firing; in both cases churning expresses the revaluation of a job match, initiated either by the employee or by the employer. According to Burgess, Lane and Stevens (2000) the word reallocation means that the employer or the employee revise their past decisions and reallocate, while remaining in the same state. The worker moves to a different employer but remains employed. The employer keeps the same employment level but reshapes his firm skill mixture.

III.2. Churning defined counting the employment-to-employment (E-to-E) episodes. In contemporaneous labour markets a large proportion of quits are due to job switches that involve no spell of unemployment, i.e. are employment to employment (henceforth E-to-E flows) switches. Indeed every reallocation activity, a replaced quit or layoff, is susceptible of creating a secondary wave of reallocations and this a third wave and so on ad infinitum. For example a worker who quits an old job looking for a better salary, or who retires, creates a job vacancy that provides the opportunity for another employed worker to take the new position; this second quit opens a further vacancy and the chain continues as far as other employed workers reshuffle across the new set of job openings. A vacancy chain consists of a succession of E-to-E switches that involve no intervening spell of unemployment and no leakages (new entrances or exits).<sup>9</sup>

A vacancy chains is triggered by the creation of an autonomous vacancy. Once a vacancy opens up within an employer it may be filled by: 1. Hiring a worker from the rank of the employed, i.e. hiring from another firm. 2. Hiring a worker from the pool of the non-employed, i.e. from the unemployed or from out of the labour force.

Hiring from the employed can materialize in: 1.1. Hiring a worker from another firm where that worker is filling an active position and leaves beside him a vacant position. 1.2. Hiring a worker from another firm where that worker is redundant and is not replaced.

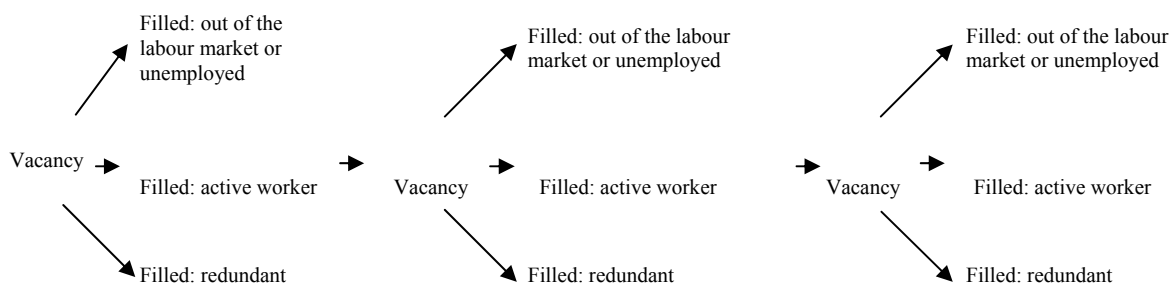
The probability of hiring from the employed is likely to create a sequence of new vacancies. The expected length of such sequence depends on the probability of hiring from each of the three sets of workers: the out of the labour force, the redundant, and the active job worker. Hiring a worker out of the labour force, or a redundant worker sets no chain or brings an end to the existing chain. Only hiring an active worker sets a positive chain and allows the chain to proceed to a successive step.

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<sup>8</sup> The most frequent definition is that of the difference between TT and GJT. The ratio alternative definition is introduced for reasons explained in the following pages.

<sup>9</sup> New entrances and exits end the vacancy chain.

In the following chart the horizontal arrows represent the mechanism of the vacancy chain. Diagonal arrows point to the leakages from the chain.



The probability to encounter a redundant position is function of the firm reaction to a disclosure and of the availability of workers with the required skills in the labour market. The probability for hiring from the employed and from the unemployed depends on the tightness of the labour market. A tight market is defined as a market with few new entrants and few unemployed. In a tight market, hiring other firms employees (E-to-E) is more likely because the set of out-of-the-labour-force job seekers relative to the employed job seekers is limited, thus the vacancy chains are longer.

The vacancy chain ends only when a vacancy is not filled (i.e. a redundant position) or is filled by an individual who is either unemployed (E-to-U) or out of the labour force (E-to-O).<sup>10</sup> The length of the vacancy chain can be defined as the inverse of the number of job switches that occur for each autonomous vacancy (Akerloff, Rose and Yellen, 1988).

The measure of churning, as the set of the reallocation waves, connects the various reallocation episodes in a sequence, beginning with the creation of an autonomous vacancy or of an autonomous job opening: an increase in employment, a withdrawal of an active worker from the labour force, a retirement, a firing or a voluntary quit into unemployment.

III.3. The differences between the two definitions. A numerical example illustrates the differences between the two previous definitions. Assume an economy, which increases employment by 100 employees and this is achieved by 150 hires and 50 separations, i.e. 100 new jobs are created. Assume that 50 hires and 50 separations are E-to-E episodes within the same firm: their sum is the number of reallocation episodes counted twice. Assume all new jobs are in new firms,  $a + s = 200$ ,  $c + d = 100$ ,  $a + s - c - d = 100 = \text{churning}$ . Churning is a measure of E-to-E switches, and the two definitions lead to the same result.

Of course out of the 50 E-to-E hires, 50 hires can be placed in increasing firms and the 50 separations in decreasing firms. In such a case  $a + s = 200$ ,  $c + d = 200$ ,  $a + s - c - d = 0$ . No excess reallocation exists, as every association and every separation has its counterpart in a creation and in a destruction. Churning computed as the difference between TT and GJT is zero, but E-to-E switches stay at 100.

A slightly more complex example underlines the ambiguous nature of churning. Go back to the previous example: 150 hires and 50 separations, on balance 100 new jobs. Assume 150 associations due to hiring from unemployment (U-to-E) and 50 separations due to retirements (out of the labour force: E-to-O). Assume that the same firm hires from the unemployed to replace the retirements and keeps the same size.  $a + s = 200$ ,  $c + d = 100$ ,  $a + s - c - d = 100 = \text{churning}$ . But

<sup>10</sup> Davis and Haltiwanger (1999, p.2758) argue that the traditional churning definition neglects the second workers wave following the first creation-destruction: "For example, a person who quits an old job in favour of a newly created job potentially creates a chain of further quits as other workers reshuffle across the new set of job openings. It follows that the direct plus indirect contribution of job flows to worker reallocation exceeds the figures....". Not quite the point. TT-GJT embeds *all the worker waves*, but the two ways of computing the churning magnitude, TT-GJT and E-to-E, are built on very different definitions of the reallocation process.

E-to-E episodes are zero in face of 200 *workers' transfers* (U-to-E and E-to-O). These episodes might be more properly labelled allocation episodes as workers change their previous status, from unemployment to employment and from employment to retirement without reallocation at all.<sup>11</sup>

At the end the difference between total turnover and job turnover is a measure of hirings and separations in the economy related to firms that have not changed their size from one observation date to another. Such hirings and separations are caused by several elements, included new entrances and retirements, and the result has not much to do with reallocation workers flows.<sup>12</sup> Only under strong limiting assumptions the two ways of looking at the reallocation process, through churning and counting the E-to-E episodes, come to the same thing.

Consider an economy with no net employment variation, apart for an original quit, and where all hirings come from the employed, i.e. there are no entrances and exits (no employee births and deaths). By definition all engagements amount to reallocations (E-to-E). Churning can be indifferently computed on the basis of TT and GJT or as the limit of the successive waves of reallocation set in motion by the original quit (first numerical example).

Let  $p_t(e_t)$  be the probability of hiring from the active employee. Following Contini and Revelli (1997) for the infinite time horizon, at the beginning of  $t$ , the sum of the vacancies created  $V_t$  is the sum of the elements of a geometric series of ratio  $p_t(e_t)$ . Assume that, at time  $t$ ,  $v_t$  vacancies open up. The number of jobs filled by active workers is  $v_t p_t(e_t)$ , the number of further vacancies filled by already active workers is  $v_t p_t(e_t) p_t(e_t) = v_t p_t^2(e_t)$  and so on. The sum of all successive vacancies is

$$V_t = v_t p_t(e_t) + v_t p_t^2(e_t) + \dots + v_t p_t^n(e_t) + \dots = v_t p_t(e_t) \sum_{i=0}^{\infty} p_t^i(e_t) = v_t p_t(e_t) \frac{1}{1 - p_t(e_t)} \quad (1)$$

The average length of the chain  $L_t$  is computed as the ratio between the number of the various transitions  $V_t$  (chain rings) and the total number of the starting episodes of the chains,  $v_t p_t(e_t)$ , (chain seeds).

$$L_t = \frac{1}{1 - p_t(e_t)} \quad (2)$$

$v_t$ , the first step vacancy,  $v_t$ , is approximated by Contini and Revelli (1997) by  $c_t$  (creation), assuming that the first vacancy is a replaced vacancy.

In a stationary world the sum of all the vacancies is equal to the ratio between TT and GJT. Engagements are the sum of the creations plus engagements due to the reallocation process, i.e..

$$e_t = V_t + c_t = \frac{c_t}{1 - p_t(e_t)} \quad (3)$$

<sup>11</sup> In E-U every association or separation counts 1 allocation episode. In E-E a single association (and a single separation) counts 1 reallocation episode.

<sup>12</sup> For example Boeri, 1996, p. 618 "there are a number of problems with the use of job turnover data in arguing about the cyclical properties of unobserved worker flows. The first problem is that job turnover and labour turnover statistics are not comparable, as they come from different sources and use different units and methods of measurement. Job turnover counts jobs, while the statistical units of labour turnover are the individuals. Job turnover is a discrete time measure, while labour turnover is not. Job turnover is, in fact, measured by taking first differences of employment stocks, while labour turnover records all hirings and separations in a given time period. Finally, available data on job turnover do not allow individual jobs in establishment to be distinguished. Hence, changes in characteristics of jobs offered by establishment are not recorded when they do not involve change in the size of business units..... Job turnover can, at best, provide an upper bound (because some workers can move directly from shrinking to expanding units, in which case their change of job would be counted twice by job turnover statistics) for the number of worker reallocations involved by measured changes in the distribution of jobs across business units. And labour turnover can be at best considered an upper bound for the amount of worker reallocations involved by registered hirings and separations insofar as LT, like JT, double counts job-to-job shifts. The difference between LT and JT is therefore some combination of job to job shifts and hiring and separations occurring in establishments that have not altered the size of their workforce from one observation date to another rather than simply a measure of job-to-job shifts. And this difference is quite large...."

while separations are equal to destructions ( $d_t$ ) plus separations due to the reallocation process, i.e.

$$s_t = d_t + V_t = d_t + p_t(e_t) \frac{c_t}{1 - p_t(e_t)} \quad (4)$$

Substituting the expressions of  $e_t$  and  $s_t$  in (3) and (4), and taking into account that in stationary state,  $c_t = d_t$  and  $e_t = s_t$ , and substituting in (3) we get  $e_t + s_t = \frac{c_t}{1 - p_t(e_t)} + \frac{d_t}{1 - p_t(e_t)}$ .

Rearranging

$$\frac{TT_t}{GJT_t} = \frac{1}{1 - p_t(e_t)} \quad (5)$$

Remember the meaning of the ratio between Total turnover and Gross job turnover,

$$\frac{TT_t}{GJT_t} = \frac{(s_t + e_t)/TR_t}{(c_t + d_t)/TR_t}.$$

So churning, defined as the average measure of E-to-E flows, is easily obtained from computing the ratio between total turnover and gross job turnover, i.e. E-to-E switches are identical to the churning definition based on total turnover and job flows.<sup>13</sup>

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Under less restrictive assumptions the two ways of computing churning lead to very different results. Basically job turnover and labour turnover statistics are difficult to compare, as they come from different sources and use different units and methods of measurement.

The job turnover uncertain definition is at the root of many theoretical and computational problems. Job turnover crucially depends on firm vertical integration and on timing. It does not allow a proper counting of seasonal work, which represents, under many aspects, a true creation/destruction process in the economy. Additionally, the difference between labour turnover and job turnover captures E-to-U or E-to-O flows associated with worker reallocation across a given set of jobs (due to people births and deaths), and this exceeds the proper significance of the word reallocation.

Let us start infringing the two crucial assumptions that are at the basis of the relation (5)

$$\frac{TT_t}{GJT_t} = \frac{1}{1 - p_t(e_t)}.$$

**III.3.1. Stationarity.** In a labour market with a non-zero balance between entrances and exits, churning, defined as a ratio of TT to GJT, misrepresents the true replacement process.

In a growing economy, let us assume  $e_t - s_t = \delta_t > 0$ , from (11)

$$\begin{aligned} s_t &= d_t + p_t(e_t)e_t = d_t + p_t(e_t)(\delta_t + s_t) \Rightarrow s_t - p_t(e_t)s_t = d_t + p_t(e_t)\delta_t \Rightarrow \\ \Rightarrow s_t &= \frac{d_t + p_t(e_t)\delta_t}{(1 - p_t(e_t))} + e_t - e_t \end{aligned} \quad (6)$$

<sup>13</sup> If  $TT - GJT = V$ ,  $TT/GJT$  is the average length of the reallocation waves counted by  $TT - GJT$ .

Churning defined as the ratio between TT and GJT is of course different from the more used churning definition, i.e. churning as  $(TT - GJT)/TR$ , but both measures look at the same reality from slightly different angles. The latter provides an index of the number of jobs churning on a number of individuals exposed to the mobility risk, the former provides an index of total reallocation over job reallocation, where job reallocation is assumed to represent a 'physiologic' reference magnitude.



From (3):

$$s_t + e_t = \frac{d_t + p_t(e_t)\delta_t}{(1 - p_t(e_t))} + \frac{c_t}{(1 - p_t(e_t))} \Rightarrow (s_t + e_t)(1 - p_t(e_t)) = d_t + p_t(e_t)\delta_t + c_t \Rightarrow$$

$$\Rightarrow p_t(e_t) = \frac{(s_t + e_t) - (d_t + c_t)}{(s_t + e_t + \delta_t)} = \frac{TT_t - GJT_t}{TT_t + d_t/TR_t} \quad (7)$$

With simple algebra:

$$\frac{1}{1 - p_t(e_t)} = \frac{TT_t + \delta_t/TR_t}{GJT_t + \delta_t/TR_t} \quad (8)$$

In a growing economy gross excess reallocation overvalues the true replacement process, represented by the sum of the successive reallocation waves. In a declining economy gross excess reallocation undervalues the replacement flows ( $\delta_t < 0$ ). In our territory the rate of growth in employment has reached in some years 4% ( $e_t - s_t \cong 10.000$  in absolute value) and the gross excess reallocation overvalues the magnitude of the E-to-E flows by 3-4% per year, on average, just because of the positive growth rate of the economy (table 1).

III.3.2. Other spurious components. The previous algebraic proof assumes stationarity and autonomous vacancies (the beginning of the chain) as the result of job creations. Such assumptions are far from reality.

Consider an open position, following a retirement, filled by a new entrant in the labour market,<sup>14</sup> or hiring and separation flows resulting from the firm personnel policy exploiting specific segments of the labour market (i.e. job on call or seasonal contracts) or taking advantage of specific training-work programs (i.e. work and training program – cfl – and apprenticeship): worker flows are larger than job flows but no reallocation is implied, according to the common meaning of the word reallocation.

In a world where employment grows, workers retire, enter the labour market after schooling and are seasonal or fixed term employees, only a limited part of the gross excess reallocation can be traced back to successive E-to-E flows. In such loose context churning, defined as the difference between TT and GJT, embeds several worker flows that represent no reallocation at all.

Churning computed as the difference between total and job turnover includes: 1. Workers who quit and are replaced by young workers entering the labour market (O-to-E) or by unemployed workers (U-to-E: a change of state for both); 2. Workers who retires (E-to-O) and are replaced by unemployed workers (U-to-E: a change of state for both); 3. Workers who are hired seasonally (O-to-E) and at the end of the season are not replaced (E-to-O), so that the seasonal job is counted neither as creation nor as destruction.

These are not trifling inclusions. At a theoretical level they express common labour market features or represent explicit personnel policies pursued by firms in order to exploit peaks in demand and/or particular segments of the labour market. Seasonal work is common practice in many Veneto manufacturing firms and expresses a genuine process of job creation: production is temporally concentrated in the summer months, when additional labour force from young people is available.<sup>15</sup>

<sup>14</sup> Basically, a worker's death followed by a birth.

<sup>15</sup> Practically these workers are not computed in the job turnover magnitude, as the relative employment spell disappears over the year, and are consequently counted as part of the reallocation process.

\* \* \*

At the empirical level, according to the longitudinal database at hand, the overvaluation of churning due to the inclusion of the above mentioned spurious component, amounts to almost 40%. Just take churning computed as the difference between TT and GJT: 4% of replacement are due to retirements, 14% to seasonal work and 22% to new entrances into the labour market. The inclusion of such a huge number of improper candidates in the churning index leads to blurred results.

Table 1. Churning (TT-GJT) and churning spurious components. Manufacturing.

	Churning ratio	Churning as a percentage of total turnover	Seasonal worker flows	New entrances into manufacturing	Retirement replaced by unemployed or out of the labour market	Increase/dec rease in employment effect $1/(1-p(e))$
1982	18,17	57,43	12,21	25,63	7,05	2,19
1983	16,72	54,39	11,54	24,91	8,26	1,95
1984	18,85	56,84	11,47	29,69	6,41	2,30
1985	22,98	60,69	12,64	29,56	4,94	2,75
1986	23,87	62,02	12,46	27,63	4,40	2,81
1987	26,82	64,45	13,68	25,62	3,41	2,98
1988	30,70	67,57	13,51	21,54	3,11	3,26
1989	33,51	70,30	14,47	19,50	2,31	3,60
1990	32,98	70,89	14,99	19,69	2,47	3,53
1991	28,27	68,45	15,64	17,99	3,04	3,16
1992	25,31	64,80	15,91	16,13	4,10	2,66
1993	20,75	60,20	15,42	17,28	5,35	2,39
1994	30,41	69,18	16,68	17,67	5,15	3,43
1995	36,65	73,59	18,24	16,61	1,99	4,07
1996	33,62	72,82	16,36	15,64	3,68	3,72
average	26,64	64,91	14,35	21,67	4,38	2,99
st.dev	3,10	6,10	2,05	4,86	1,83	0,62

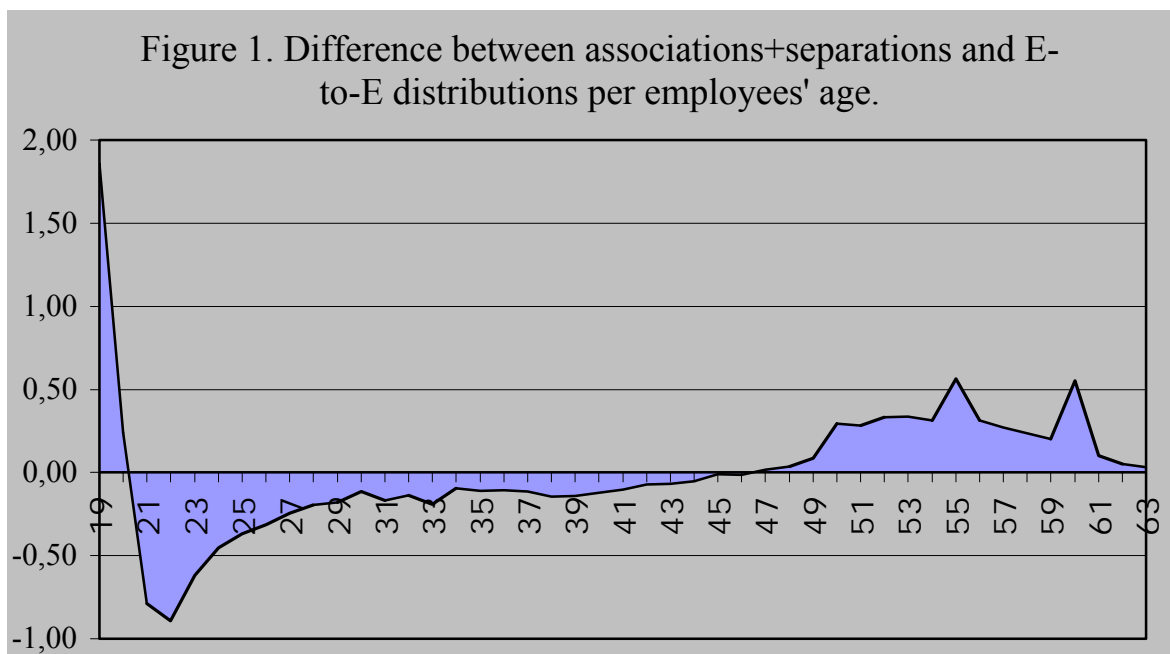
Method: manufacturing without building and energy.

Beside the difference in magnitude, the time pattern of the series reported in table 1 diverges, as new entrants and seasonal workers behave very differently, in many cases antithetically, to workers subject to E-to-E flows. E-to-E reallocations concern mainly professional workers looking for better employment (table 2), while new entrants and seasonal workers are, usually, low qualified very young workers. The same is true for workers involved in young worker training programs or in job on call practices that frequently end up in very short-term contracts.

The growth rate of the economy and the seasonal employment component are clearly and deeply cyclical. The number of retired workers is affected by the various rumours about changes in the Italian retirement scheme, but at the end the retirement series has an anti-cyclical pattern, as people are pushed towards retirement when demand is weak. Replacement with people out of the labour market or unemployed is timidly anti-cyclical, with a decisive declining trend due to the birth rate decline in the seventies and to the increase in the years of compulsory schooling; both elements, in face of high demand, give rise to a tighter Veneto labour market and to an increasing number of E-to-E hirings. First entrances into the employees archive follow the cycle, with a declining trend due to population ageing and a sign of recovery at the end of the period, due to immigration.

The effect of spurious inclusions in the gross excess reallocation measure is clearly evident in figure 1 where the distribution of engagements + separations (the Total turnover numerator) is compared with the distribution of E-to-E flows in relation to the workers' age. Engagements and

separations include young people and old people movements, which are typically employment to unemployment or to out of the labour market shifts (the two positive areas in figure 1), while it underestimates the importance of the E-to-E shifts (the negative area). E-to-E shifts are typical of young workers (20-30 years old) where voluntary shifts are most likely and where employees-firms matchings are probably still not very definitive.



#### IV. E-E flows. Computation and results.

IV.1. E-to-E shifts in Veneto manufacturing. According to the Inps longitudinal panel, E-to-E flows represent 50% of the total flows ( $a + s$ ). E-to-E are defined according to the worker's transfer speed. In our computation to register an E-to-E flow, the transfer process must be accomplished within 4 months.

In empirical work quick re-hires are the most suitable data to represent E-to-E shifts: a long matching period brings many uncertainties to the concept of replacement itself, as slow replacements are indistinguishable from flows coming from and going into unemployment. Among E-to-E shifts, quick reallocation from manufacturing in manufacturing takes a relevant place, underlined by the frequent claims by local entrepreneurs concerning labour poaching practices. E-to-E within manufacturing represents 50% of the total E-to-E switches included in the panel that refer to the whole of the private non-agricultural sectors. The analysis is limited to manufacturing.

The direct calculation of the vacancy chain requires an employer-level database referring to the whole population so to be able to take into account all the reallocation waves which follow from an initial autonomous vacancy or an autonomous job opening. The software devised in order to compute the vacancy chain model aims at reconstructing the single successive rings of the chain or the reallocative waves in the labour market.

The vacancy chain computational software is based on the following:

assumptions	implementation
Definition of the chain domain or of the labour market boundaries.	The geographical boundaries are the two provinces of Treviso and Vicenza and the branch boundaries are manufacturing (Ateco.1981. 3 and 4).
Out of the labour force worker	A worker having no previous entrance in the social security archives or unemployed. An unemployed worker is a worker, which has entered the Inps archive in the past, but has not been hired during four months or more, after the disclosure of the preceding contract.
Active worker	A worker previously employed (i.e. separated since 4 months or less) in manufacturing in Treviso or Vicenza, replaced within 4 months.
A new entrant	A worker, which entered for the first time the Inps archive in 1982-1997.
Vacant position: a vacant position is created when an existing contract is disclosed or when the employer wants to hire an additional worker and draws up a new contract.	A separation followed by an association, an association not preceded by a separation.
Beginning of the chain or chain seed	A vacant position filled by an active worker and is not accompanied by a separation by the same employer within three months. <sup>16</sup> Or a vacant position created by a new job or a retirement.
Ring of the chain	Filling of a vacancy by a worker within 4 months.
Redundant position	A quit or a layoff without replacement within 4 months.
Out of the labour force worker	A worker having no previous entrance in the social security archives or unemployed. An unemployed worker is a worker, which has entered the Inps archive in the past, but has not been hired during four months or more, after the disclosure of the preceding contract.
Time	The vacancy runs from twelve months before to twelve months after the year of reference. Almost all the waves exhaust within this time period.

Of course the tighter the boundaries, the shorter the chain, as leakages get more numerous. Leakages, measured by hirings originating outside our territory are, on average, less than 2.5% of total quick hirings.

The replacement process has been computed under various binding conditions imposed to the E-to-E matching: blue collars substituted by blue collars, separations matched by engagements only if the salary of the engaged worker ranges within  $\pm 30\%$  from the salary of the separated worker

<sup>16</sup> Contini and Revelli assume that the number of the initial vacancies is equal to creations. Our computational procedure is more general as open positions include quits and retirements as specified.

etc.... The computed bounded chains are a bit smaller than the unbounded chains. The two procedures have been tested for a couple of years and the difference did not exceed 5%, so eventually no further restriction is made than the time of the matching (less or equal to four months). The number of rings that make a chain is limited to 10, given that the 99,9% of the computed chain length ends within 10 months.

The results of the computation process are summarized taking directly into account our longitudinal database for the calendar year 1989.

<u>65.048</u>	Total new contracts, registered in the year 1989, of workers, of whatever place of origin, in manufacturing (3 and 4) in establishments in Treviso and Vicenza. <sup>17</sup>
29.934	Quick hires (re-employed in $\leq 4$ months) of workers in manufacturing (3 and 4) in establishments in Treviso and Vicenza. Previous employment: whatever.
35.114	Slow hires (re-employed in $\geq 4$ months) and new entrants in manufacturing (3 and 4) in establishments in Treviso and Vicenza. New entrants are 16.787 (48% of the total). Slow rehiring are 18.327.
<u>19.987</u>	Quick hires (re-employed in $\leq 4$ months) of workers in manufacturing (3 and 4) in establishments in Treviso and Vicenza. Previous employment: manufacturing (3 and 4) in Treviso and Vicenza. These are the intra-employment components, i.e. the true reallocation flows.
<u>17.898</u>	Hires tracked through the vacancy chain computation (about 90% of quick hires, i.e. of 19.987).
21.135	Endogenous components of the chain or active reallocating workers. The vacancies at the beginning of the chains or <u>chain seeds</u> count 7.654. The remaining <u>multiplied</u> component of the chain counts 13.481. <sup>18</sup>
2.026	Redundant workers

In our territory quick hires in manufacturing represent an average of 23% of total employment mobility for a given stock, with fluctuations that make such a measure vary between 19% and 33% in the peak year 1989. Schettkat, in his study of the German labour market, refers to values comparable to these as to a tight labour market (Schettkat, 1996b).

The vacancy chain model provides a basic key to understanding why total separations are strongly pro-cyclical (figure 2), an occurrence not easily explained by the contemporary literature, according to Akerloff, Rose and Yellen (1988).<sup>19</sup> Separations are cyclical because the market is non-clearing. In a clearing market wages represent the opportunity cost to the worker; people don't covet jobs held by others so that when a vacancy opens people don't move. If the market is non-clearing, people covet others people jobs and move only when a vacancy opens up. A vacancy opens up any time the entrepreneurs revise their matching looking to improve the productive assortment of their employees, and any time people leave voluntarily their position searching for a better job. Both these events are likely to take place when demand is high and this explains why autonomous vacancies (the heads of the chain) are pro-cyclical: people separate in peak years and stick to their employment during bad years (figure 3).

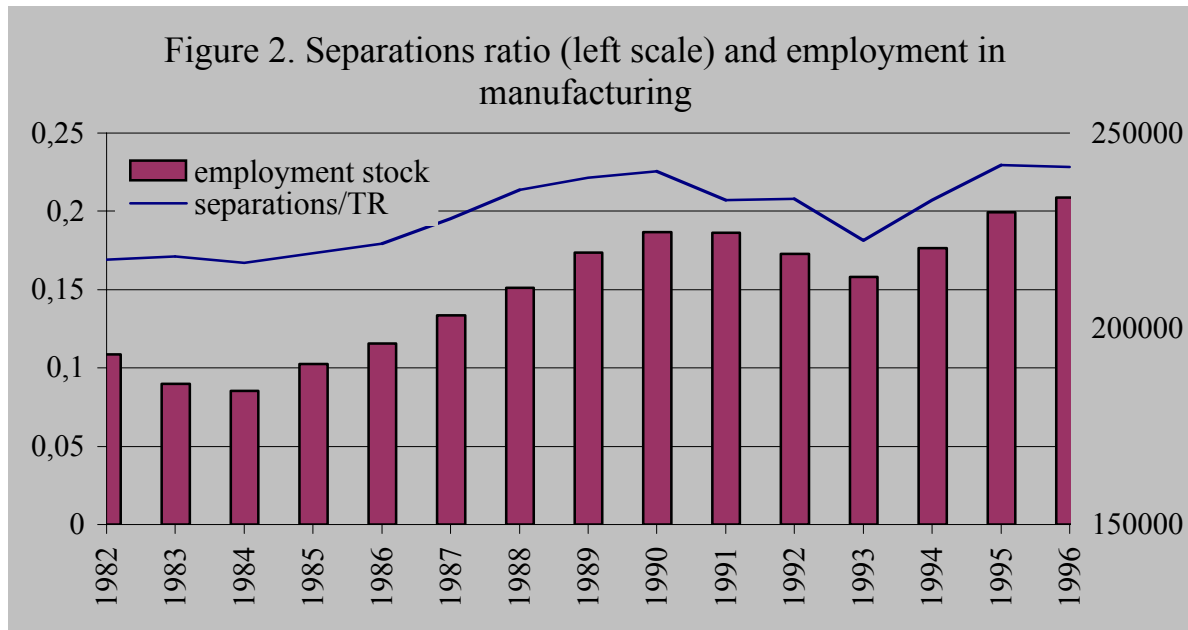
In our territory separations are mainly voluntary. From a telephone survey conducted among 400 workers employed in manufacturing in the Treviso province in the years 2001-2002 (Poster, 2004), 2/3 of separations are declared voluntary in nature. The low unemployment economy is an economy

<sup>17</sup> Establishments that declare their employee contributions to the Inps. See footnote 3.

<sup>18</sup> 21.135 is larger than 19.987 as the multiplier process extends over 1989.

<sup>19</sup> For a more recent assessment, Shiner (2003)

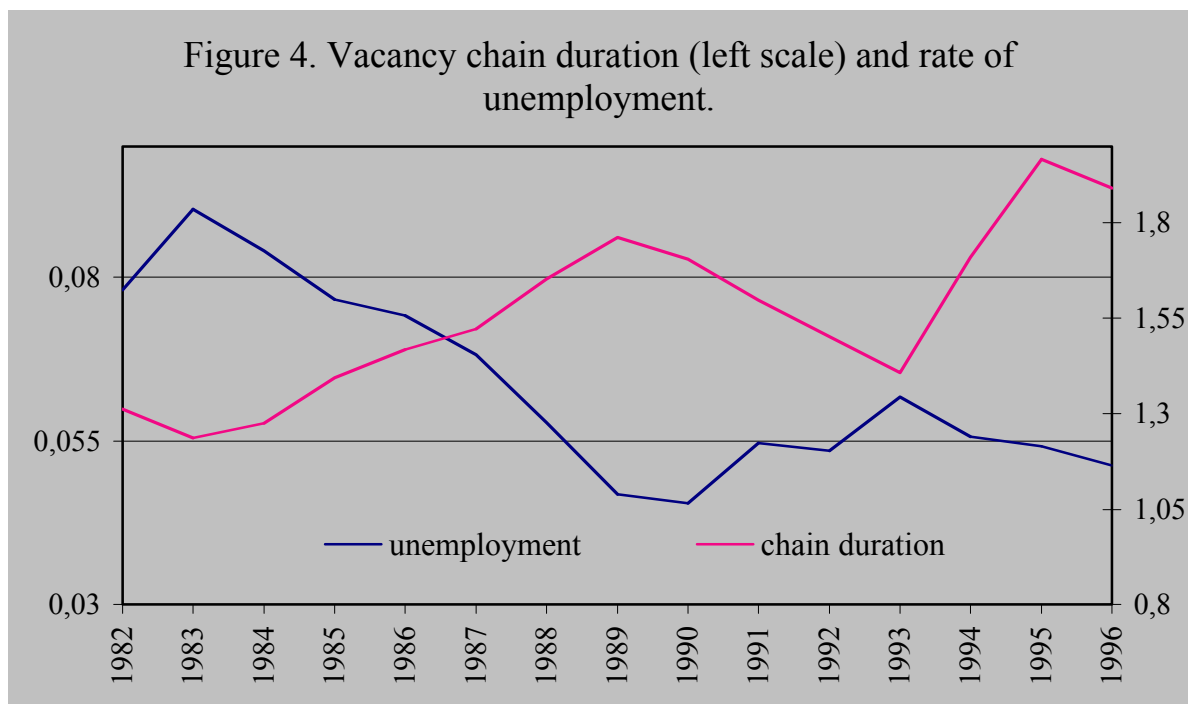
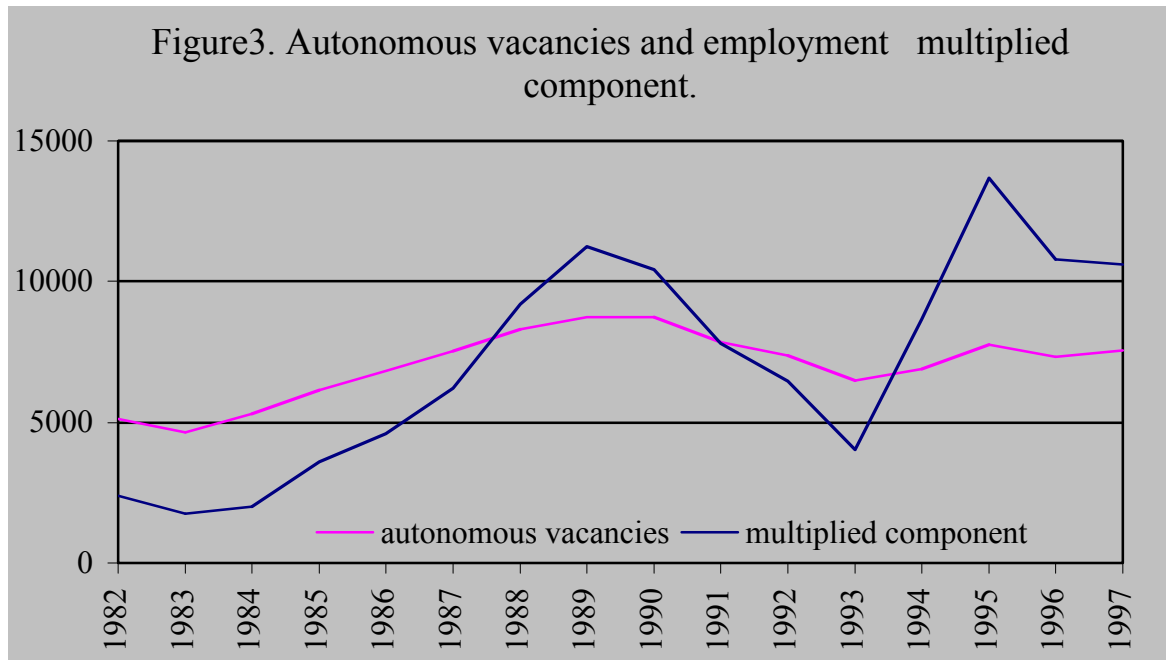
of opportunity in which workers that are dissatisfied with their work have a higher degree of mobility and in which entrepreneurs, under pressure of demand, tend to rationalize their employment allocation.



Method: separation rate =  $s/TR$

The vacancy chain consists of a succession of E-to-E quits that involves very short spells of unemployment and vacancy chains are longer when unemployment is low. Employed individuals receive opportunities to move that are proportional to the number of autonomous vacancies in the labour market and autonomous vacancies leverage the total number of E-to-E movements (the multiplied component of figure 3), which is obviously much more cyclical. The autonomous vacancy series has an increasing cyclical trend, to which is superimposed a market cyclical pattern due to the multiplied component.

One of the causes of the autonomous vacancy creation is the ongoing process of economic change, which results in the destruction of some jobs (causing a permanent involuntary layoff of their incumbents), coupled with the simultaneous creation of new jobs and this is invariably pro-cyclical. Another important source of autonomous vacancy creation is the departure of individuals from the labour force. Finally vacancies are created when workers quit from employment to unemployment for various reasons (possibly anti-cyclical).



Method: the vacancy chain duration is measured by the vacancy multiplied component.

The length of the vacancy chain, i.e. the multiplied component, is longer when unemployment is low (figure 4 and table 2). Vacancy chains are short when unemployment is high because the number of jobseekers who are unemployed or out of the labour force is large relative to the number of employed jobseekers. In this case the probability of recruiting an unemployed individual to any given vacancy, thus ending the chain, is high. In a high pressure, low-unemployment economy, there are fewer unemployed or out-of-the-labour-force jobseekers relative to the employed jobseekers and vacancy chains are longer (figure 4).

The logic of the vacancy chain explains why total separations, and especially E-to-E separations, are pro-cyclic, without making any reference to labour market regulations. Separations increase as

opportunities expand; the opportunities for job switching are significantly greater when unemployment is low than when is high.

Table 1 last column provides the quota of Total engagements and separations accounted for by E-to-E switches: an average 23% (16% in 1982 and 25% in 1996). The total number of E-to-E flows was 6000 in 1982 to jump to 20.000 after 15 years, while in the same period the stock of manufacturing employees grew by less than 25%. Veneto labour market is tight because first entrances have undergone a substantial loss, declining from 10% of the employment stock of the late seventies to 6% of the mid eighties to a low of 3% in 1993. The entrance rate has subsequently partially recovered because of the positive contribution of non-EU workers, which have brought back the first entrances to 6% (table 1). The retirement rate<sup>20</sup> has not varied during the period at hand, except for a visible increase in 1994. Unemployment has continuously reduced. These two movements lead to a tendency towards longer vacancies as time goes by (the positive trend of figure 3), to which superimposes a movement due to the pro-cyclical nature of E-to-E movements: quits increase as opportunities expand and the opportunities for job switching are significantly greater when the rate of employment is high than when unemployed are numerous, so both quits and engagements due to reallocation go together. A decline in the rate of unemployment over the cycle in the early nineties (50% from 1984 to 1991) is associated with a rise in the separation rate of a similar amount (51%) and by a double increase in the E-to-E flows: the elasticity is roughly 2. An increase in the rate of unemployment (1991-1994) is associated with a decline in the separation rate of a similar amount and by a larger decline in E-to-E reallocations (figure 2 and 4).

IV.3. E-E worker flows: who quick reallocate and why? E-to-E flows explained by reallocation vary with gender and age. Males, as time goes on, take more part in the reallocation process than females: the ratio between the two first columns of table 3 increases towards the end of the period. Young people lose definitively ground in favour of more mature workers. At the end of the period 35% of workers constituting the vacancy chain are more than 27 years of age, while in the early eighties such percentage did not reach 20%: this is the result of the aging of the employee stock through time and of higher schooling.

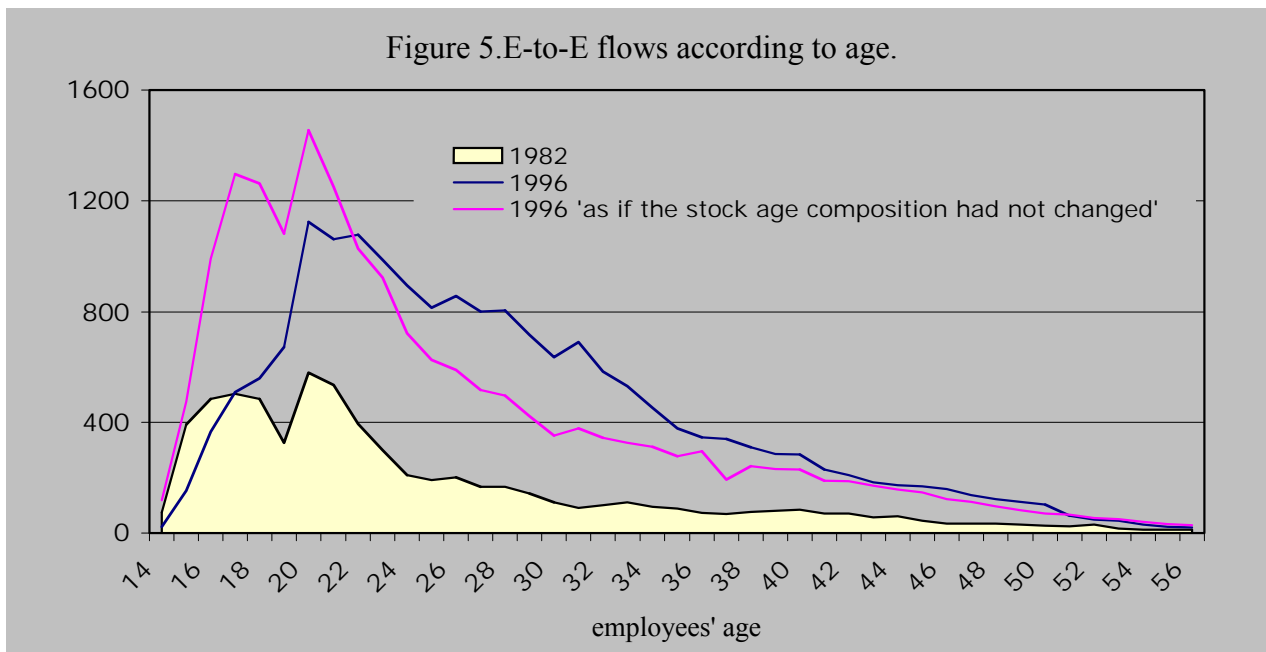
Is the entrepreneurs' claim about labour poaching warranted? The answer is positive because of two elements. First, the number of E-to-E flows has much increased through time, as already noticed. This increase is made clear comparing the two flow distributions in figure 5, the 1982 and the 1996 one. Second, a shift in the E-to-E distribution has taken place, which is not favourable to entrepreneurs and is more expensive to them. Very young people have always been very mobile and their mobility is in a way a *natural* character connected with age and learning on the job; specific legal provisions – the apprenticeship contract – has made such mobility relatively *non expensive* to the firm.<sup>21</sup> But the number of very young people in manufacturing has declined in 15 years by 30% following the decline in birth rate and the increased number of years spent at school. Now people enter the labour market at more mature age and entrance in nonetheless connected with a period of relative high mobility, with people shopping around and entrepreneurs revising their matching before finding suitable candidates. So E-to-E flows have moved upward and are now concerned with ages between 23 and 36; but the final result is mainly due to employees aging more than to a change in the E-to-E pattern. The employees stock in manufacturing for 27-36 years old workers is now much bigger than 15 years ago (+30%).

This move is particularly burdensome to the firms because E-to-E shifts embed a much higher cost, as there are no special provisions to the firms to ease mobility of people in their thirties. Labour poaching is probably not the appropriate word when apprentices quick shifts are implied but is appropriate when E-to-E flows concern people in their thirties.

<sup>20</sup> Approximated by computing the number of separations of workers more than 50 years old.

<sup>21</sup> The reduced E-to-E flows are due to the sharp decline of people entering the labour market before 19 years of age.





Different sectors of the economy are affected by E-to-E flows in very different measures. Table 4 reports the absolute number of workers taking part in E-to-E shifts per year. Some sectors are interested in reallocation mainly in the quality of chain beginners and we call them active sectors. Other sectors are affected by the E-to-E reallocation mainly as chain closers: passive sectors.<sup>22</sup> Chart 1, column 1 ranks the manufacturing sectors according to the reallocation flows in absolute numbers, column 2 assesses the dynamics of E-to-E flows through the period 1982-1996, while columns 3 ranks sectors according to the E-to-E shifts in relation to the sector stock. The first column provides, so to speak, the labour market point of view, how relevant are E-to-E flows in absolute terms, while the third column provides the employer point of view, i.e. how labour flows affect the sector employment.

Chart 1. Sectors involved in E-to-E flows.

E-to-E flows absolute numbers	Dynamics through time	E-to-E over sector stock
Metal and mech.products (31)	Strong positive	Machines and parts (32+34)
Garments and shoes (45)	Negative	Leather (44)
Furniture (46)	Positive	Metal and mech.products (31)
Machines and parts (32+34)	Strong positive	Plastic (48)
Textile (43)	None	Furniture (46)
Leather (44)	None	Garments and shoes (45)
Plastic (48)	Positive	Paper and printing (47)
Paper and printing (47)	Positive	Textile (43)

A vacancy chain beginner, is an active sector or gaining sector, and this role is played by general mechanics. A vacancy chain closer, is a passive or loser sector and the main passive sector is represented by garments and shoes.<sup>23</sup>

The probability that hiring from the employed is becoming more and more voluntary as time goes on can be related to the hiring speed. A quick replacement of a separating worker shows that the firm is willing to replace immediately the worker whose contract was disclosed, looking for a

<sup>22</sup> The differences among sectors are due to closure and starting positions, as E-to-E flows implies a perfect substitution between associations and separations at the firm level, and basically balance.

<sup>23</sup> The sector ranking is rather stable during the whole period at hand.

new worker. From the worker side, the quick finding of a new position is an index of the voluntary nature of the separation (a quit, not a layoff). (Relatively) slow fillings show a continuous downward trend, which is only interrupted by the 1993 depression, and points to a structural change in the matching process leading towards a more efficient market, given the high rate of reallocation.

The percentage of very quick fillings from the workers side follows the cycle, suggesting a prevalence of quits in upswings (large quota of fillings  $\leq 1$  month) and of layoffs in downswings (large slow fillings). From the employer side slow fillings decrease since 1988, to show that structural conditions in the labour market are now tighter than in the eighties. The same is true as we observe that quick fillings are in the nineties more numerous on the side of the employers than on the side of the entrepreneurs (table 3).<sup>24</sup>

Table 2. Treviso and Vicenza manufacturing. The vacancy chain numbers.

year	chain seeds or autonomous vacancies	multiplied component	multiplier	redundants	chain coverage	E-to-E % quota of engagements + separations
1982	2902	3810	1,313	624	0,970	15,8
1983	2328	2881	1,238	490	0,976	12,9
1984	2905	3706	1,276	524	0,970	15,4
1985	4120	5747	1,395	781	0,959	19,7
1986	4718	6925	1,468	1036	0,951	22,5
1987	5537	8426	1,522	1327	0,931	24,2
1988	6825	11278	1,652	1686	0,895	28,0
1989	7654	13481	1,761	2026	0,895	30,1
1990	7325	12480	1,704	1950	0,908	28,0
1991	5778	9223	1,596	1672	0,893	24,1
1992	4972	7468	1,502	1533	0,924	21,6
1993	3770	5304	1,407	1159	0,944	18,4
1994	5719	9771	1,709	1397	0,866	23,9
1995	7422	14595	1,966	1783	0,825	28,8
1996	6276	11857	1,889	1614	0,831	25,0

Method: Multiplied component: the number of a+s pertaining to the chain rings. Coverage is defined by the ratio between chain flows and total E-to-E quick flows.

<sup>24</sup> The underlining idea is the following. Assume all workers quit and find immediately a new job in different firms, while these firms have been looking for engagements since some months. The intra-employment filling time is shorter from the worker's perspective than from the firm perspective.

Table 3. Composition of the multiplied component or intra-employment.

	gender/TR		Age/TR				2 ≤ time month < 4, % (slow filling over total filling)	
	Male	Female	≤ 20	>20, ≤27	>27, ≤36	> 36	employee	employers
1982	3,1	2,9	5,9	3,6	2,0	1,2	21,9	25,9
1983	2,5	2,3	5,0	2,7	1,6	1,1	21,0	26,5
1984	3,1	3,0	6,7	3,5	2,1	1,3	22,0	29,2
1985	4,5	4,5	9,8	5,0	2,8	1,9	21,6	26,8
1986	5,1	5,2	11,1	5,8	3,4	2,1	22,3	27,3
1987	6,1	5,7	12,4	6,9	3,8	2,4	22,3	27,5
1988	7,9	6,7	14,5	9,0	5,1	3,0	19,5	28,1
1989	8,5	7,9	13,9	10,5	6,7	3,7	17,4	26,6
1990	7,8	7,1	12,2	9,5	6,5	3,7	16,8	25,6
1991	6,0	5,4	10,2	7,3	5,0	2,6	19,2	26,1
1992	5,1	4,5	9,7	6,2	4,2	2,2	20,7	25,7
1993	4,0	3,3	7,8	4,7	3,2	1,8	22,8	28,3
1994	6,	5,6	12,9	8,0	5,1	2,7	19,0	26,8
1995	8,7	7,5	15,0	10,7	7,3	4,2	16,3	23,9
1996	7,0	6,0	12,5	8,8	6,0	3,4	16,6	23,6

Table 4. E-to-E flows by sectors (ATECO 81)

Industrial Sectors: Ateco 1981								
	metal. + mechanical prod.(31)	machines and plants (32 +34)	textile (43)	leather (44)	garmn- shoes (45)	furniture (46)	paper, printing (47)	plastics (48)
1982	1410	679	759	665	1948	899	224	244
1983	1122	560	570	537	1478	612	175	217
1984	1437	760	766	695	1915	703	191	244
1985	2194	1028	1152	1096	2958	949	273	363
1986	2466	1174	1554	1303	3476	1188	257	451
1987	3312	1437	1737	1347	3862	1600	397	669
1988	4828	2121	2142	1570	4185	2222	588	892
1989	5598	2525	2537	1796	4719	2701	752	1107
1990	5303	2605	2523	1481	4183	2466	707	1038
1991	4071	2017	1684	1120	3178	2062	515	840
1992	3519	1725	1458	797	2538	1883	422	748
1993	2613	1251	1028	897	1752	1299	292	486
1994	4389	2269	1573	1367	2863	2042	483	901
1995	6568	3379	2153	1753	3676	2849	711	1230
1996	5366	2777	1849	1574	2887	2327	652	1149

Workers are ready to switch jobs for a higher wage or for a higher non-pecuniary reward. Among the reasons for moving to a new job, the already mentioned telephone inquiry among Treviso workers in manufacturing ranks ‘pecuniary reward’ at the second position, well behind the ‘career perspective’.

We establish empirically the importance of non-pecuniary rewards in quit decisions. Wages registered in the Inps longitudinal panel built by our research group provides a rough monetary measure of specific monetary rewards associated to E-to-E transitions. The result clearly shows that monetary rewards do not explain much; non-pecuniary rewards are important in explaining why many job changers realize insignificant or negative wage changes during the successive steps of the chain.

## V. Labour poaching. What policy options?

Workers reallocate both because jobs change through time and because workers move among a fixed number of jobs. The term churning flow measures the worker excess reallocation process, a process reflecting a bad match or a match that can be improved, according to the worker or to the employer. Can bad matches be defined as worker flows in excess of job flows, i.e. flows in excess of the changing number of jobs ? This is a misleading definition that counts as churning flows, workers' new entrances and exits from the labour market (births and deaths); these flows are not, by any means, reallocation flows and are very relevant in size. In our reference territory new entrances and retirements make almost 40% of the whole churning.

The direct counting of the reallocation process, E-to-E movements, leads to a more clean result. The mechanic of the process embeds an explanation for the cyclic pattern of the separation rates - a puzzle to the economists - without any unnecessary recourse to labour market rules and institutions.

The increase in the overall hiring and separation rates can be explained by an increase in E-to-E employment flows through longer hiring chains. This however is mainly the result of favourable macroeconomic conditions that are reflected on the micro level of activity. Better demand conditions, a reduction in unemployment and the parallel tightening of the labour market due to a reduction of new entrances and a couple of years with high retirement rates, positively influence the level of intra-employment mobility and determine longer vacancy chains.

All employers are interested by the reallocation process. The magnitude of E-to-E flows point to reallocation as a general phenomenon, explaining roughly 1/4 of all separations and hirings in the economy, distributed among various sectors. A substantial share of E-to-E flows is due to the structural decline in Veneto of textile, garments and related products and to the rapid development of the machine industry and the general mechanics.

Veneto entrepreneurs since various years have faced the problem of the shortage of labour and the problem of a very high workers' turnover. The vacancy chain model interesting results underline that E-to-E flows have affected, in more recent years, mature male professional workers, but this result is more the outcome of the aging process of the Veneto labour force than the result of specific changes in the mobility pattern according to age. 15 years ago E-to-E flows were mainly restricted to young workers because young workers were the predominant component of the employees stock. In the early eighties the negative aspects connected with labour quick shifts was not perceived by entrepreneurs because the apprentice contract made them inexpensive and mobility was limited it to the employees young age. It became relevant by the end of the nineties mainly because of the tightness of the labour market that almost doubled the E-to-E flows and of the aging of the employees that made such flows extend to workers of mature age and made them much more expensive.

Entrepreneurs have put forward different strategies to reduce workers mobility and tie the most productive workers to the firm. Wages are frequently negotiated at the individual level and loyalty is explicitly rewarded, recent collective agreements have been negotiated to link the individual worker's salary to a reduction in the worker turnover at the district level (for example in the furniture district). Training practices at the firm level are often, informally, connected with work career in the same firm, loans to young workers are to be paid back in case of resignation and entrepreneurs, often informally, agree to explicitly exclude reciprocal labour poaching practices.

## References

Akerloff George A., Andrew K. Rose and Janet L. Yellen, 1988, Job Switching and Job Satisfaction in the U.S. Labour Market, Brookings Papers on Economic Activity, 2, 496-594.

Anastasia Bruno, Maurizio Gambuzza and Maurizio Rasera, 2000, La diffusione dei contratti a tempo determinato: il caso veneto. In Agenzia per l'impiego (a cura di). Solo una grande giostra? Franco Angeli: Milano, 61-188.

Bingley Paul, Tor Eriksson, Axel Werwatz, Niels Westergård Nielsen, 1999, Beyond "Manucentrism". Some Fresh Facts About Job and Workers Flows, mimeo.

- Boeri Tito, 1996, Is job turnover countercyclical? Journal of labour economics, 14, 603-625.
- Burgess Simon, Julia Lane and David Stevens, 2000, Job Flows, Worker Flows, and Churning. Journal of Labour Economics, 18, 473-502.
- Burgess Simon, Julia Lane and David Stevens, 2001, Churning dynamics: an analysis of hires and separations at the employer level. Labour Economics, 8, 11-14
- Contini Bruno and Riccardo Revelli, 1988, Job creation and Labour Mobility: The Vacancy Chain Model and some Empirical Findings. Università di Torino WP
- Contini Bruno and Riccardo Revelli, 1997, Gross Flows vs. net Flows in the Labour Market: What is there to be learned? Labour Economics, 4, 245-263.
- Contini Bruno and Claudio Malpede, 2000, Gross Flows and Mobility: Where do We Stand? mimeo. Bressanone.
- Davis Steven J., John C. Haltiwanger and Scott Schuh, 1996, Job Creation and Destruction, Cambridge: MIT.
- Davis Steven J., John C. Haltiwanger, 1999, Gross Job Flows. In: Ashenfelter O. and D. Card (Eds.). Handbook of Labour Economics. v.3 Amsterdam: North Holland.
- Leonard Jonathan, S. 1987, In the Wrong Place at the Wrong Time. In Lang K. and Leonard J. S. (eds.) Unemployment and the Structure of the Labour Market, New York: Basil Blackwell.
- Leonard Jonathan, S. and Marc Van Audenrode, 2000, A Difference in Degree: Unemployment Despite Turnover in the Belgian Labour Market. Mimeo.
- Occari Fabio and Serafino Pitingaro, 1997, Demografia di impresa e mobilità del lavoro: una stima della componente spuria sulla base degli archivi Inps. WP CNR, Occupazione e livelli di attività in Italia.
- Occari Fabio and Serafino Pitingaro, 1998, Flussi di lavoratori e di posti di lavoro; un diverso approccio alle misure del turnover occupazionale. Economia e Società Regionale, 4, 13-37.
- Occari Fabio, Giuseppe Tattara and Mario Volpe, 1997, Occupazione, mobilità e componente femminile nel mercato del lavoro: i lavoratori dipendenti a Treviso e Vicenza. In Regione del Veneto, Il mercato del lavoro nel Veneto. Milano: Franco Angeli, 460-488.
- Poster (2004). Indagine sulla mobilità dei lavoratori in tre distretti della provincia di Treviso. Camera di Commercio di Treviso.
- Rapiti Fabio, 1998, La misurazione e il significato del turnover occupazionale e i problemi di confrontabilità delle statistiche. Quaderni di ricerca Istat, 3.
- Schettkat Ronald, 1992, The Labour Market Dynamics of Economics Restructuring: The United States and Germany in Transition. New York: Praeger Publishers.
- Schettkat Ronald, 1996a, Flow in Labour Markets: Concepts and International Comparative Results, in R. Schettkat (ed.), The Flow Analysis of Labour Market, London: Routledge.
- Schettkat Ronald, 1996b, Labour Markets Dynamics in Germany, in R. Schettkat (ed.), The Flow Analysis of Labour Market, London: Routledge.
- Schettkat Ronald, 1996c, The Flow Approach to Labour Market Analysis: Introduction, in R. Schettkat (ed.), The Flow Analysis of Labour Market, London: Routledge.
- Shiner Robert, 2003, The Cyclical Behaviour of Labour Markets, WP. University of Chicago and NBER, Sept. 17.
- Revelli Riccardo, 1995, Potenzialità degli archivi Inps ai fini della stima degli aggregati dei conti economici territoriali. Quaderni di ricerca Istat. Nuova serie.1

Tattara Giuseppe and Mario Volpe, 2001, I distretti industriali: definizioni e storia, in G. Tattara (a cura di), Il piccolo che nasce dal grande. Le molteplici facce dei distretti industriali veneti. FrancoAngeli: Milano, 9-77.

