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Abstract

There is growing interest in understanding firms' temporary and permanent employment practices and how institutional changes shape them. Using data on Spanish establishments, we examine: (a) how employers adjust temporary and permanent job and worker flows to prior employment expectations, and (b) how the 1994 and 1997 labour reforms promoting permanent employment affected establishments' employment practices. Generally, establishments' prior employment expectations are realized through changes in all job and worker flows. However, establishments uniquely rely on temporary hires as a buffer to confront diminishing long-run employment expectations. None of the reforms significantly affected establishments' net temporary or permanent employment flows.

I. Introduction

During the 1980s, several countries implemented labour market reforms with the intent of lowering unemployment levels unseen since the Great Depression by promoting the use of fixed-term or temporary work contracts.[1] As opposed to indefinite-term or permanent work contracts, these temporary work contracts created a work relationship of known duration and provided employers with substantial reductions in dismissal costs in the form of limited or non-existent severance payments and unfair discharge suits by workers. Temporary employment quickly grew in some of these countries following the aforementioned reforms. Specifically, following the Workers' Statute reform in 1984, the fraction of wage and salary workers holding temporary work contracts in Spain rose from less than 10 percent in the early 1980s to approximately 30 percent of employment contracts by the second half of the 1980s (Dolado et al. 2002). This high proportion of temporary workers has barely changed since the beginning of the 1990's despite two labour market reforms in 1994 and 1997 that attempted to reduce establishments' reliance on temporary contracts by promoting their use of permanent work contracts instead (Toharia and Malo 2000).[2] Hence, there is a growing interest in gaining a better understanding of establishments' employment practices leading to the observed net employment levels –in particular, hiring, dismissal, job creation and job destruction– and how each of these practices may have changed following the 1990s reforms. In particular, how do establishments use temporary and permanent work contracts? Do establishments alter both their temporary and permanent gross job and worker flows in response to growing or diminishing net employment expectations? Or do they exclusively rely on temporary employment flows as a buffer? Do plant level employment practices by type of work contract differ depending on

[1] See, for example, Lindbeck (1993) for historical series of unemployment rates for several countries. See Bertola and Ichino (1995) for a comparative analysis of legal reforms in Europe in the last two decades.

[2] Specifically, the 1994 labour reform eliminated –with some minor exceptions– the 'employment promotion fixed-term contract' designed by the 1984 labour reform as a means to lower the unemployment rate. However, these efforts were in part frustrated by establishments' increased reliance on other temporary work contracts, such as the 'per task or service' temporary work contract. Additionally, the 1994 labour reform recognized temporary help agencies, which quickly developed thereafter. Moreover, the new reform introduced a new type of dismissal on economic grounds, which tried to reduce the bureaucratic requirements for economic dismissals of workers on permanent work contracts. The subsequent 1997 labour reform further promoted employers' use of permanent work contracts by reducing the hiring and dismissal costs associated to the signing of a new type of permanent work contract (the so-called 'employment promotion permanent contract'), whether directly or through the conversion of a temporary work contract to a permanent status. As a result, both of these reforms may have affected establishments' temporary and permanent gross job and worker flows; hence, the need to examine whether and how establishments' employment practices changed pre and post these reforms.

whether the establishment's changing net employment expectations are for the short-run versus the long run? Finally, what other factors (such as the labour reforms of 1994 and 1997 aimed at reducing temporary employment) are potentially shaping establishments' gross job and worker flows by type of work contract?

In this paper, we rely on Spanish data from the *Encuesta de Coyuntura Laboural* (ECL) or Survey of Economic Situation to address these questions. The ECL is a quarterly longitudinal survey including detailed information on stocks and gross flows of workers at the establishment level as well as on establishments' net employment expectations for the next quarter and year. For the purpose of this study, we use data on establishments having 500 or more workers during the period 1/1993-1/2002[3] to examine the extent to which establishments appropriately forecast their short-run and long run employment needs by comparing their *realized* net employment flows to their *expected* net employment changes for any given quarter. Subsequently, we examine establishments' reliance on temporary, permanent, or both types of gross employment flows to meet their changing net employment expectations for the short-run and long run. We pay special attention to establishments' use of temporary gross job and worker flows as a buffer and explore how the passage of labour reforms targeting firms' extensive reliance on temporary employment may have affected the dynamics of gross job and worker flows by type of work contract at the plant level.

Learning about establishments' ability to appropriately forecast their employment needs as well as about establishments' reliance on temporary and permanent job and worker flows to meet their changing net employment expectations for the short-run and long run is of interest for various reasons. First, it provides valuable insights regarding establishments' temporary and permanent employment practices and the effectiveness of different policies in reducing their reliance on temporary employment contracts. If establishments use temporary and permanent work contracts in a complementary manner, policies inducing the substitution of temporary for permanent contracts as a means to reduce the high temporary employment rate may be fruitless. In contrast, if establishments use temporary employment as a buffer, the aforementioned policies may be successful at encouraging establishments' greater reliance on permanent work contracts. Secondly, deciphering whether establishments make use of temporary job and worker flows as

[3] This is the only stratum of establishments for which detailed longitudinal information on gross flows is made available.

buffers can reveal important information regarding the potential for temporary workers to be promoted by their employers to a permanent position, as intended by the 1997 labour reform. Lastly, establishments' ability to appropriately forecast and meet their net employment expectations may provide some useful clues regarding their potential profitability.

This paper proceeds as follows. In section II, we briefly discuss the analytical framework for our research. In section III, we describe our dataset and provide a descriptive analysis of job and worker flows at the plant level by type of work contract. Section IV contains a detailed discussion of the methodology. Our results are discussed in Section V and Section VI summarizes our findings.

II. Analytical Framework

Following the seminal work by Oi (1962), an extensive literature has examined the dynamics of labour demand adjustment in terms of employment and worker-hours based to adjustment costs and the source of these adjustment costs faced by employers.[4] Overall, this literature predicts that average employment levels may not be affected by adjustment costs, whereas net employment dynamics may be smoother in the presence of large adjustment costs. Although the dynamic labour demand literature addresses net employment, it fails to provide us with a clear understanding of the gross job and worker flows dynamics (job creation, job destruction, hires, and separations) underlying net employment levels. This is of interest in light of the existing evidence on the significant extent of job creation and destruction taking place in establishments with unchanged employment levels (Davis and Haltiwanger 1990, 1992).

By the same token, despite the theoretical evidence on higher dismissal costs reducing *total* job reallocation and worker turnover rates (e.g. Blanchard and Portugal 2001), the literature on the dynamics of labour demand adjustment does not provide a clear prediction of gross job and worker flows' dynamics by type of work contract in the presence of both permanent contracts characterized by large dismissal costs and temporary contracts with the opposite characteristics (Bentolila and Saint-Paul 1992, Cabrales and Hopenhayn 1997, Sanz Gómez 1994). Instead, other studies, such as Goux et al. (2001), have examined how the availability of temporary contracts affects the average employment level. They posit that the effect of temporary work contracts on the average employment level depends on the technological environment and the distribution of productivity shocks across time. Nonetheless, they note that temporary contracts allow firms to adapt to short-term fluctuations in their economic environment –as in the case of a short-term increase in demand, through hiring, even when a long-term economic downturn is being forecasted. Layoffs are only used as a last resort to confront large employment contractions.

Some researchers have intended to gain a better understanding of establishments' temporary and permanent employment practices and of the impact that the availability of temporary contracts may have had on gross job and worker flows' dynamics. In particular, focusing on Spain, García-Serrano (1998) uses establishment-level data from the *Encuesta de Coyuntura Laboural* (ECL) for 1993-1994 and examines the role played by temporary contracts in explaining worker turnover and

[4] See Hamermesh (1993) for a synthesis of this theoretical and empirical literature.

job reallocation rates.[5] He shows that worker turnover and job reallocation are higher for temporary work contracts, and that temporary work contracts account for the majority of job creation, job destruction, and for the difference between worker turnover rates and job reallocation rates (also called 'churning'). However, García-Serrano does not examine establishments' temporary and permanent job and worker flows' dynamics in response to their changing net employment expectations for the short-run and long run. Secondly, due to the short data span available at the time of his study, García-Serrano's analysis does not enable us to learn about potential changes in establishments' gross job and worker flows by type of work contract following the legislative reforms of the second half of the 1990s. This is particularly of interest in light of the theoretical evidence of how dismissal costs may affect employment flows (Bentolila and Saint Paul, 1992; Blanchard and Portugal, 2001; Goux et al., 2001). Finally, possibly due to the shortage of empirical analyses on job and worker flows by type of work contract, García-Serrano chooses to strictly focus on a descriptive aggregate analysis of temporary and permanent gross job and worker flows.

In this paper, we address these three caveats using quarterly data from the first quarter of 1993 through the first quarter of 2002 of the ECL, exploiting the information on net employment expectations variables for the next quarter and year, and estimating econometric models using the individual characteristics of establishments included in the survey. Our study first examines the extent to which establishments appropriately forecast their future employment needs by comparing their *realized* net employment flows to their *expected* net employment changes for any given quarter. Secondly, we describe establishments' use of temporary, permanent, or both types of employment flows to meet their short-run and long run net employment expectations. In particular, since net employment expectations can be considered proxies of the expected booms and crises, we use them in our analysis to gauge establishments' use of temporary gross job and worker flows as a buffer. Finally, we look at the changes in establishments' temporary and permanent employment practices following the 1994 and 1997 labour reforms that promoted firms' use of permanent work contracts by lowering firing costs for dismissals on economic grounds (in 1994) and lowering the employment costs associated to the new employment promotion permanent contract (in 1997).

[5] To our knowledge, this is the only research examining gross job and worker flows by contract type using the Davis-Haltiwanger methodology.

III. Data and Descriptive Analysis

A) The Data Base

The data for this research come from the *Encuesta de Coyuntura Laboural* (ECL) or Survey of Economic Situation. The ECL is a longitudinal survey carried out on a quarterly basis since the second quarter of 1990 by the Spanish Ministry of Labour and Social Affairs. It surveys establishments with more than five workers in non-agriculture industries, with the exception of Public Administration, Defense and Social Security, diplomatic delegations, and international and religious organizations in the service sector. In 1997, the ECL underwent important methodological changes involving the inclusion of establishments with less than 5 workers in the survey sample along with a new sample stratification methodology.

We use data on establishments having more than 500 employees for the period 1/1993-1/2002.[6] This is the only stratum of micro data and the only time period for which detailed information on establishment level gross employment flows (employment stock at the moment and at the end of the previous quarter, as well as the number of arrivals and separations by type of work contract during the quarter) has been made publicly available.[7] Furthermore, this is the only stratum of firms unaffected by the 1997 changes to the survey methodology. On average, this stratum represents approximately 15 percent of non-agriculture employment of which 20 percent of their workforce are on temporary contracts depending on the time period under examination (García-Serrano 1998). Since approximately 30 percent of wage and salary workers hold temporary work contracts in Spain, our gross and net temporary flows may, in any event, be considered under-estimates of the gross and net temporary flows in the entire universe of Spanish establishments. There are a couple of reasons as for why this is the case. First, our sample consists of large establishments for which the percentage of workers with temporary contracts is smaller than for small and medium size establishments not included in the sample. Second, for any given worker, the ECL does not record hirings and separations taking place within the same establishment during the same month. For instance, if a worker is hired in the first month of the quarter, separated in the second month, and re-hired in the third month during any given quarter,

[6] García-Serrano (1998) uses the same stratum of establishments. In fact, detailed employment data are also made available for those establishments whose workforce fell below 500 during any given survey quarter but they returns above this threshold. The Spanish Ministry of Employment only provides the whole survey when excluding the information on gross flows, which would not be useful for our research.

[7] While data on the number of arrivals and separations by type of temporary work contract during any given quarter are also collected by the survey, we are unable to exploit this information due to the changes of groups of temporary contracts introduced in the questionnaire during our period of analysis.

the ECL records two hires and one separation within that establishment during that quarter. However, if a worker is hired, separated and re-hired during the same month, the ECL only records one hiring. Hence, the ECL provides under-estimates of gross and net temporary flows of shorter duration. Despite these shortcomings, the high frequency and longitudinal information on establishment level gross employment flows (by type of work contract), net employment expectations for the short-run and for the long run, and other establishment level characteristics (such as size, industry, and location) make the ECL a unique and well-suited survey for the analysis proposed in this study.

B) Gross Job and Worker Flows by Contract Type

Using data on the employment stock by contract type, we compute the usual indicators of job creation and job destruction developed by Davis and Haltiwanger (1990, 1992) for temporary (JPOSt and JNEGt), permanent (JPOSp and JNEGp), and total plant level employment (JPOS and JNEG). Similarly, we exploit the information on hires and separations by contract type at the establishment level to construct indicators of gross worker flows (WPOS and WNEG), gross temporary worker flows (WPOSt and WNEGt), and gross permanent worker flows (WPOSp and WNEGp). Finally, we derive net employment flows for temporary, permanent, and total employment (NETt, NETp, and NET, respectively).[8] All indicators are multiplied by 1000 for scaling purposes.

Figures 1 through 3 show the quarterly evolution of gross flows for the total workforce (Figure 1), for temporary workers (Figure 2) and for permanent workers (Figure 3) in large establishments. Gross temporary and permanent worker flows typically exceed gross temporary and permanent job flows, causing a significant amount of churning. This is especially true in the case of temporary workers, while for permanent workers is only clear from 1997 onwards.

When looking at gross job and worker flows separately, total and temporary job creation, as well as job destruction flows, displays a slightly increasing trend (Figure 1 and Figure 2), whereas this is only true for job creation flows in the case of permanent employment (Figure 3). Similarly, while total and temporary gross worker flows appear to continuously grow over the entire time period, permanent worker flows only display this trend from 1997 onwards (Figure 3). These structural breaks in the data for permanent job creation and worker flows may be linked to the 1997

[8] See the appendix for a detailed description of the methodology used in the construction of gross job and worker flows.

labour reform, which lowered the dismissal costs associated with the new type of permanent contract regulated by the law.[9] While the reform did not affect pre-existing permanent contracts nor establishments' use of other types of permanent contracts, it allowed for the conversion of temporary contracts to the new type of permanent contract characterized by lower dismissal costs. Accordingly, Figure 2 shows a significant decline in temporary workers flows after 1997, which could be linked to the ongoing conversion of temporary contracts into permanent contracts and the increase in permanent job creation during that period (Figure 3).

With the purpose of gaining a better understanding of the relationship between temporary and permanent gross flows at the establishment level, Table 1 displays the correlation coefficients for gross job and worker flows between as well as within contract type categories. All correlations between temporary and permanent gross flows in the first row of Table 1 are positive. Hence, when gross flows of temporary workers increase (decrease), gross flows of permanent workers also increase (decrease). However, the correlation of temporary and permanent gross flows exceeds 50 percent in only one occasion (for gross hires), questioning the view of positive correlations as contrary to the hypothesis of temporary employment being used as a buffer.

In contrast, within contract type, the correlation coefficients between gross worker flows by contract type displayed in the second and third rows of Table 1 are rather high: 0.96 for all workers, 0.97 for temporary workers, and 0.81 for permanent workers. Yet, as in Davis et al. (1996),[10] the correlation coefficient for total and permanent gross job flows are (-0.12) and (-0.11), respectively. Hence, establishments seem to simultaneously hire and dismiss workers (even within contract category), whereas they rarely create and destroy jobs. Finally, also within contract type, positive gross job and worker flows are highly correlated (0.69 for temporary flows and 0.94 for permanent flows), while the correlation coefficients between negative temporary or permanent gross job and worker flows do not exceed 0.45. That is, job creation is

[9] An earlier reform was passed in 1994 facilitating individual dismissals on economic grounds. Previous to this reform, the only manner to dismiss a worker on economic grounds was through collective dismissals (which require a prior authorization from Public Administration). The 1997 reform clarified the legal definition of individual dismissals based on economic grounds. For further details on the changes on individual dismissals introduced by these reforms, see Malo (2000).

[10] See Tables 5.2 to 5.4 in Davis et al. (1996), pages 95-97. They only find a positive correlation between total job creation and total job destruction for single-unit establishments (0.34) and establishments with less than 100 employees (0.45 for establishments with 0-19 employees and 0.11 for establishments with 20-49 employees).

closely linked to new hires, whereas this is not necessarily the case for job destruction and workers' separations, regardless of work contract type.

In sum, at first glance, the positive correlations between temporary and permanent gross job and worker flows do not lend support to the view of temporary employment flows being used as a buffer. However, a closer look at the magnitude of these correlation coefficients, reveals the lack of proportionality between temporary and permanent flows and the different dynamics of positive and negative job and worker flows within contract type.

C) Net Employment Expectations and Gross Job and Worker Flows by Contract Type

We create two sets of dichotomous variables to capture establishments' net employment (stock) variation expectations for the following quarter and for the following year. For both the short-run (next quarter) and the long run (next year), establishments are asked to indicate whether they expect their employment stock to increase, remain unchanged, or decrease. Figures 4 and 5 show the quarterly evolution of net employment expectations for the next quarter and year, respectively. On average, seventy percent of the establishments in our sample expect their employment stock to remain unchanged during the upcoming quarter and year, while approximately 15 percent of the establishments expect it to either increase or decrease during the same time period. In addition, the graphs reveal how expectations fluctuate with the business cycle. For instance, the percentage of establishments with increasing net employment expectations is rather low during the first part of the time period being examined (coinciding with the economic downturn), and visibly rises from the end of 1996 onwards (a period of economic expansion).

The survey also asks establishments to provide, when feasible, an estimate of their expected net employment variation for the following quarter and year. Table A in the appendix shows the mean values for establishments' next quarter and next year employment expectations. However, due to the non-negligible number of missing observations for this question, we focus our attention on the overall sign of establishments' short-run and long run net employment expectations.

Table 2 compares establishments' net employment change *expectations* for any given quarter to their *observed* average net employment fluctuations during that period. We distinguish between establishments' net employment expectations for the upcoming quarter and year, and disaggregate the observed net employment changes by type of work contract. Our intent is to learn about establishments' reliance on temporary versus permanent contracts in

addressing their net employment change expectations.[11] The figures in Table 2 show that, when expectations are fulfilled, the adjustment occurs primarily through temporary contracts in the event of increasing net employment expectations and through permanent contracts in the case of decreasing net employment expectations, especially in the long run. This finding is in line to those obtained by Goux et al. (2001), who find that adjustment to most shocks, and above all positive shocks, occurs mainly through temporary contracts characterized by lower termination costs. In contrast, employers may rely on permanent worker layoffs as a means to adjust to large employment contractions.

In any event, since net employment changes may result from a variety of combinations of gross worker flows, Table 3 displays average gross job and worker flows by establishments' quarterly and yearly net employment expectations.[12] Overall, net permanent and temporary flows closely follow establishments' short-run and long run employment expectations with one main exception. Net temporary employment is positive for unchanged and diminishing net employment expectations for the long-run. In fact, we can see that temporary worker flows (WPOSt and WNEGt) are particularly higher in this case of long-term diminishing net employment expectations, suggesting that establishments' rely on temporary work contracts as a buffer. This finding is in line with the dynamic labour demand model presented by Goux et al. (2001), who show that establishments will continue to hire temporary workers in order to accommodate a short-term increase in demand even under a long-run economic downturn to avoid the future costly dismissal of permanent employees.

In sum, establishments seem to primarily rely on temporary contracts to meet their increasing net employment expectations, whereas they predominantly use permanent work contracts to accommodate their diminishing net employment expectations. This is particularly evident when examining establishments' average net employment fluctuations following their long run net employment change expectations for that period. Nonetheless, we also find that establishments

[11] As explained earlier, establishments classify their net employment change expectations into one of the following three categories: unchanged, increasing, or diminishing. Because net employment rarely stays unchanged in large establishments from one period to the next, we use an alternative definition of the 'unchanged' net employment category. In particular, since mass layoffs occur when gross employment is reduced by 10 percent or more within a given quarter, we have considered net employment changes of up to $\pm$ 5 percent as part of the 'unchanged' net employment category in Table 2. Since establishments in our sample have, on average, 1000 workers, a $\pm$ 5 percent change in net employment translates to an average net employment fluctuation of (-50; +50) workers in any given quarter.

[12] These gross job and worker flows indicators are computed at the establishment level; hence: $N_t = \Sigma_i N_{i,t} = N_{i,t}$. See the appendix.

continue to hire temporary workers even when expecting a long-run economic downturn, possibly as a buffer. In order to better understand these complex dynamics and to properly separate the effects of employers' net employment expectations on job and worker flows by contract type at the plant level from that of other establishment, institutional, and macroeconomic characteristics, we now turn to the regression analysis.

IV. Empirical Methodology

In modeling establishments' temporary and permanent net employment, gross job and gross worker flows in response to their short-run and long run net employment expectations for any given quarter, we account for a variety of variables possibly influencing establishments' employment practices ranging from general establishment characteristics to institutional and macroeconomic controls.

In the first category of general establishment descriptors, we include information regarding the establishment size and its workforce composition. Smaller establishments may be more likely to rely on temporary workers as a means to confront changes in their product demand or financial constraints. Similarly, the ratio of temporary to permanent workers may affect the management's decision to create or destroy employment within contract category if establishments want to maintain a core of permanent workers. Hence, we include information on both of these variables. However, since the establishment's size and workforce composition may be contemporaneously affected by the establishment's employment practices, we include lags of these variables in order to guarantee their predetermined character.

Also within the set of general establishment characteristics, we account for the presence and scope of a collective agreement given its potential impact on the establishment's employment practices.[13] Similarly, we include information on the establishment's sector and industry in our model to address the higher volume of job and worker rotation characterizing the private sector as well as certain industries, such as services and construction. Furthermore, the analysis incorporates regional dummies to account for macroeconomic differences in the

[13] Due to the institutional framework of Spanish collective bargaining, collective agreements extend to any establishment of the sector. Therefore, the relevant distinction is not between having or not having a collective agreement, but the scope of the collective agreement applied in the establishment. For details see, for example, Jimeno and Toharia (1993b).

institutional and economic environment in which establishments operate, as typified by regional unemployment rates, among many others.[14]

In order to further address institutional and macroeconomic factors at the national level, we first include dummies indicative of the first post-reform period (from 1994 through 1997) and the second post-reform period (from 1997 onwards, when both reforms targeting a reduction of temporary employment were actively in place). In addition, we account for the average size and temporary to permanent employment ratios at *other* establishments in our sample (that is, excluding the establishment itself). These two variables should capture the macroeconomic business environment affecting the establishment's own employment practices. Finally, a set of quarterly dummies is also included in the model to address seasonal employment fluctuations.

The aforementioned arguments suggest the following panel data model:

(1) $$y_{it} = X_{it}\beta + Z_i\delta + \mu_i + \varepsilon_{it}$$

where y_{it} represents the various temporary and permanent gross job and worker flows being examined;[15] X_{it} is a vector of time-varying characteristics –including the establishment's net employment change expectations, lagged size, lagged ratio of temporary to permanent workers, internal collective bargaining, industry, and other establishments' size and workforce composition– and sets of quarterly and reform dummies; Z_i is a vector including information on time-invariant characteristics of the establishments in our sample, such as their location and whether they belong to the public sector; μ_i is the unobserved establishment specific and time invariant effect, assumed to have zero mean, finite variance σ_υ^2, and to be identically distributed (i.i.d.) over the panel; and ε_{it} is the idiosyncratic error, also assumed to have zero mean, finite variance σ_e^2, and to be i.i.d. over all the observations in our panel.

In deciding whether to estimate the above model by fixed-effects or random-effects, we first examine whether μ_i is uncorrelated with other explanatory variables in our model. If the unobserved establishment-specific effect is potentially correlated with some explanatory

[14] A description of the variables used in our regression analysis, along with their means and standard deviations, is provided in Table B in the appendix.

[15] We choose to separately examine temporary and permanent flows versus the ratio of temporary to permanent flows at the establishment to understand if changes in the ratio of temporary to permanent employment at the plant level following a change in one of the regressors are driven by changes in temporary employment flows, permanent employment flows, or both. Additionally, because our sample of establishments coincides for all temporary and permanent gross flows' regressions, we are still able to make direct coefficient comparisons when evaluating the differential effect of a given regressor on temporary versus permanent job and worker flows.

variables, the fixed-effects method is needed since the use of random-effects would yield inconsistent estimates. Both the Breusch and Pagan Lagrangian multiplier and the Hausman specification tests suggest the specification of the individual effects as fixed.[16] However, as noted by Hausman and Taylor (1981), the within-estimator does not allow us to obtain the coefficients for our time-invariant variables (such as the establishment's location or sector). Therefore, we employ the Hausman-Taylor's method, which uses those regressors uncorrelated with the individual effect as instruments for endogenous time-invariant regressors. In this manner, the Hausman-Taylor's method allows for the identification and efficient estimation of all coefficients in the model. In particular, we can rewrite the model in
equation (1) as follows:

(2) $$y_{it} = X_{1it}\beta_1 + X_{2it}\beta_2 + Z_{1i}\delta_1 + Z_{2i}\delta_2 + \mu_i + \varepsilon_{it}$$

where X_{2it} (containing the establishment's net employment change expectations, lagged size, lagged ratio of temporary to permanent workers, internal collective bargaining dummy, and industry) and Z_{2i} (establishment's sector) are considered to be potentially correlated with time-invariant and unobserved establishment-level characteristics captured by μ_i.[17] The Hausman-Taylor's method uses the within estimator to consistently estimate β_1 and β_2. It then obtains the within-residuals and regresses them on Z_{1i} and Z_{2i}, using the vectors X_{1it} (containing the average size and temporary to permanent employment ratio at other establishments in the sample, quarterly dummies, and dummies indicative of the post labour reforms' periods) and Z_{1i} (regional dummies) as instruments. The within estimates β_1 and β_2 and the (halfway) IV estimates of δ_1 and δ_2 are then used to obtain estimates of the variance components for our unbalanced panel (σ_υ^2 and σ_e^2), which, in turn, are utilized to apply the GLS transformation to each of the variables in equation (2). The final Hausman-Taylor estimates are obtained via an instrumental variable technique using $\widetilde{X}_{it}, \overline{X}_{1i}$, and Z_{1i} as instruments, where $\widetilde{X}$ stands for the GLS-transformed time-varying regressors and $\overline{X}$ represents the within panel mean deviations. In this manner, we are able to obtain consistent and efficient estimates of β_1, β_2, δ_1 and δ_2.

V. Results

[16] Results are available from the authors upon request.
[17] At this point it is worth noting that our results were robust to alternative specifications of the variables considered to be correlated with the time-invariant individual effect.

A) Net Employment Expectations and Total Gross Job and Worker Flows

Before examining how plants respond to their short-run and long run net employment expectations with variations in their temporary and permanent job and workers flows, we examine their changes in *total* gross job and worker flows. Table 4 displays the estimates from the panel regression analysis of total gross job and worker flows using Hausman-Taylor's method. In particular, columns 1 and 2 present the estimates for job creation and job destruction rates, columns 3 and 4 show the estimates for hires and separation rates, and the last column (column 5) presents the estimates corresponding to the overall net employment change at the establishment level.

Short-term net employment expectations affect net employment flows in the expected direction. In particular, short-run increasing net employment expectations are met with rising net employment flows (32 workers per 1,000 at the establishment) primarily resulting from growing job creation and hires, and limited job destruction. Additionally, short-run declining employment expectations are followed by reductions in net employment flows (24 workers per 1,000) resulting from increases in job destruction and separations, and limited job creation. In contrast, long-term employment expectations do not seem to significantly alter establishments' total gross worker nor job flows.

Focusing on other variables of interest to our study and, like Davis et al. (1996), we find that job creation flows, hires, and overall net employment flows are lower among larger establishments. Similarly, the presence of collective bargaining at firm level significantly reduces job creation and worker flows, resulting in lower net employment flows among large establishments (as in García-Serrano and Malo, 2002). This effect confirms the reduced employment fluctuations often observed in the presence of unions and employment protection measures. It will be of interest to assess if this effect differs by type of work contract. Also worth noting is the greater job creation, job destruction, worker hiring, and worker separation among public sector (relative to private sector) establishments, which, nonetheless, does not significantly alter net employment flows at these plants.

Finally, we find that the post-1997 period –a period during which both the 1994 and 1997 reforms were effective since the 1997 reform did not invalidate the previous reform from 1994– witnessed significant increases in gross worker hires and separations. The increased worker

flows confirm earlier studies' theoretical predictions[18] of the impact that a reduction in employment protection may have on employment flows. However, the results do not show a significant change in net employment flows at large establishments following the passage of the labour reforms. Because total net employment flows may mask significant changes in temporary and permanent net employment flows, we now turn to examine the response of gross and net employment flows by type of work contract to the establishment's net employment change expectations.

B) Net Employment Expectations and Temporary Gross Job and Worker Flows

Table 5 presents the results for temporary gross job and worker flows. Our major variable of interest, net employment change expectations, provides some interesting insights. In particular, short-run net employment growth expectations seem to be met with an increase in net temporary employment (of approximately 130 per 1,000 workers at the establishment), resulting from the combination of statistically significant increases in temporary job creation (92 positions per 1,000) and hires (135 temporary hires per 1,000), and simultaneous decreases in temporary job destruction rates (38 positions per 1,000). This finding confirms the hypothesis that establishments rely on temporary employment as a means to meet short-run changes in their product demand as well as other transitory employment needs, such as substituting permanent workers on leave. However, long run net employment growth expectations do not seem to significantly alter establishments' temporary employment practices.

As in the case of short-run net employment growth expectations, establishments seem to respond to their diminishing net employment expectations with changes in their net temporary employment, although of a divergent nature depending on the time frame for the formulated employment expectation. In particular, short-run diminishing employment expectations appear to be followed by statistically significant decreases in temporary job creation rates (35 positions per 1,000) and significant increases in temporary job destruction rates (130 positions per 1,000). In contrast, establishments respond to long run diminishing employment expectations with an increase in temporary job creation (96 positions per 1,000) and a corresponding decline in temporary job destruction rates (28 positions per 1,000). Hence, at the moment, the results seem to lend support to the use of temporary workers as a buffer, with the interesting twist of distinguishing between establishments' responses to short-run versus long run net employment

[18] See, for example, Nickell (1986) or Bentolila and Saint-Paul (1992).

change expectations. In particular, establishments confront short-run diminishing employment expectations with an average reduction of 164 temporary contracts per 1,000 at the establishment. In contrast, establishments increase the number of temporary workers by approximately 123 per 1,000 employees when facing long run diminishing employment expectations. As posited by Goux et al. (2001), establishments' response may possibly be due to their preference to use temporary employment as a buffer, helping them address short-term increases in demand (as previously confirmed by the descriptive analysis) while avoiding the future costly dismissal of permanent employees. At any rate, the possibility exists that establishments alter both temporary as well as permanent gross job and worker flows in response to changing net employment expectations (Davia and Hernanz 2002, Hernanz 2002). Our analysis of permanent job and worker flows in Table 6 will enable us to address this question.

However, before proceeding any further, it is worth discussing the role played by other establishment descriptors in their temporary employment practices. First, even within our set of large establishments, temporary job creation and hires are significantly lower among larger plants, while temporary job destruction rates appear to be significantly higher. Overall, as in the case of total net employment flows, we observe lower net temporary employment flows in larger plants. Second, as in García-Serrano and Malo (2002), the presence of internal collective bargaining significantly increases temporary job destruction as well as separations. This effect may partially be due to the higher wages typically paid at establishments with a collective agreement at the establishment level (Jimeno and Toharia 1993b). As a result, internal collective bargaining significantly reduces net temporary flows. Third, temporary net employment flows appear to be lower in public sector establishments, with the industrial category also playing a significant role in temporary job and worker flows in a variety of instances.

Finally, as pointed out earlier, the 1994 and 1997 labour reforms were introduced to reduce establishments' reliance on temporary work contracts. Possibly in response to the reduction in permanent work contracts' dismissal costs implemented by the reforms, temporary worker flows significantly decreased during the post-reform periods. In particular, as intended by the reforms, the post-reform period of 1994-1997 (when only the 1994 reform was in place) and the post-reform period of 1997-2002 (when both the 1994 and 1997 reforms were effective) were followed by significant reductions in overall temporary hiring rates at large

establishments.[19] However, given the simultaneous decline in temporary workers' separation rates at these plants, the post-reform periods did not witness a significant change in net temporary employment at the establishments being examined.

C) Net Employment Expectations and Permanent Gross Job and Worker Flows

Table 6 shows the results from estimating our models for permanent gross job and worker flows. As in the case of temporary employment, net employment growth expectations for the short-run seem to be met with increases in permanent job creation rates and reductions in permanent job destruction rates. Additionally, diminishing net employment expectations for the short-run are followed by higher job destruction rates.

Nevertheless, we find some noticeable differences with respect to temporary flows. First, the impact of changing net employment expectations for the next quarter on the establishment's net permanent employment flows (on average, in the order of 8 permanent positions per 1,000) is considerably smaller than the effect of similar expectations on the plant's net temporary employment flows (fluctuating between 130 and 164 per 1,000). While larger fluctuations in temporary employment flows are suggestive of establishments' use of temporary employment as a buffer, they are, to a certain extent, expected due to the shorter duration of temporary work contracts. For this reason, it is helpful to look at other potential differences in the use of temporary and permanent job and worker flows by establishments. In this respect, an additional illuminating fact is establishments' exclusive reliance on temporary employment to confront long run diminishing net employment expectations. This finding further supports establishments' use of temporary work contracts as a buffer possibly to avoid the future costly dismissal of permanent employees.

Other establishment characteristics also play a role in establishments' permanent employment policies. In particular, we find that, as in the case of temporary flows, plant size is directly linked to permanent job destruction and inversely related to permanent job creation, hires, and net employment. In contrast, unlike temporary employment, permanent employment practices seem to be affected by the existing ratio of temporary to permanent workers at the

[19] We have estimated additional regressions (not included here but available upon request) including interactions of the post-reforms' period dummies with the net employment expectations' dummies to examine any changes in establishments' temporary and permanent employment dynamics in response to their previous net employment expectations pre and post the reforms. However, no significant changes are found and our basic results still hold, providing additional evidence of the significant decrease of temporary workers' flows following the reforms.

establishment. In particular, permanent job creation and destruction rates increase with the proportion of temporary workers in the plant; nonetheless, the magnitude of such effect is rather small. Additionally, establishments in the public sector seem to display significantly higher permanent job creation, job destruction, hiring and separation rates than their counterparts in the private sector. This finding further supports the results from Table 5 suggestive of private establishments' prominent reliance on temporary contracts as a means to create and destroy employment.

Finally, the results in Table 6 reveal the proliferation of permanent worker hires and job creation rates during the post-1994 and, particularly, during the post-1997 labour reform periods. Correspondingly, this time period witnessed a significant increase in permanent worker dismissals. In this respect, our results confirm the existing evidence on the increasing use of permanent work contracts by firms (e.g. Kugler et al. 2003) as well as on the higher termination rate of permanent contracts (Cebrián et al. 2003) following the 1997 reform. In addition, our findings provide further support of the theoretical prediction that reduced employment protection –as in the case of the lower dismissal costs associated to the new permanent work contract figure– induce greater job and worker flows. At any rate, it is worth noting that, as in the case of temporary employment, the existence of simultaneous job and worker flows of opposite signs resulted in unchanged net permanent employment flows. This overall effect is also consistent with the predictions of dynamic labour demand models, according to which a decrease in firing costs changes employment dynamics (in this case, permanent employment dynamics), but not average employment levels.

VI. Conclusions

Previous theoretical as well as empirical work has stressed the importance of distinguishing between temporary and permanent work contracts when examining firms' employment practices and the institutional changes that shape them. This paper adds to this literature with an analysis of: (a) how employers adjust their temporary and permanent job and worker flows to their prior employment expectations, and (b) how the 1994 and 1997 labour reforms promoting permanent employment affected establishments' employment practices.

First of all, we find that establishments appear to increase both temporary and permanent employment in response to short-run net employment growth expectations, whereas they

decrease employment in the two contract categories following short-run diminishing net employment expectations. Nonetheless, short-run changes in net employment expectations result in net temporary employment flows 16 to 21 times larger than the corresponding net permanent employment flows. Furthermore, establishments exclusively increase their net temporary employment flows (by as much as 124 workers per 1,000) when confronting long run diminishing net employment expectations. It is this reliance on temporary employment when facing an economic downturn in the long run that hints on establishments' partial dependency on temporary work contracts as a buffer, with the implications of such usage on the possibility of contract conversion from a temporary to a permanent status.

Second, we find evidence that establishments' permanent worker flows increased while their temporary worker flows decreased following the reduction in dismissal costs associated to the new permanent contract figure introduced by the 1997 labour reform. However, as in the dynamic labour demand literature, we do not find a significant change in establishments' net flows (neither temporary nor permanent flows) pre and post the reforms.

In sum, our findings shed some light on establishments' reliance on temporary (relative to permanent) job and worker flows to confront short-run and long run net employment change expectations. Additionally, the results reveal the changing temporary and permanent employment flows in response to the implementation of the 1990s' labour reforms despite the often unobserved variations in net employment levels economy-wide within each contract category. Nonetheless, the possibility exists that the reforms may have had a different effect on gross and net job and worker flows in small and medium size establishments not included in our sample. Given their predominance in the Spanish entrepreneurial fiber, the availability of detailed employment stock and flow data for small and medium size establishments would prove particularly useful in furthering our understanding of establishments' employment practices by type of work contract.

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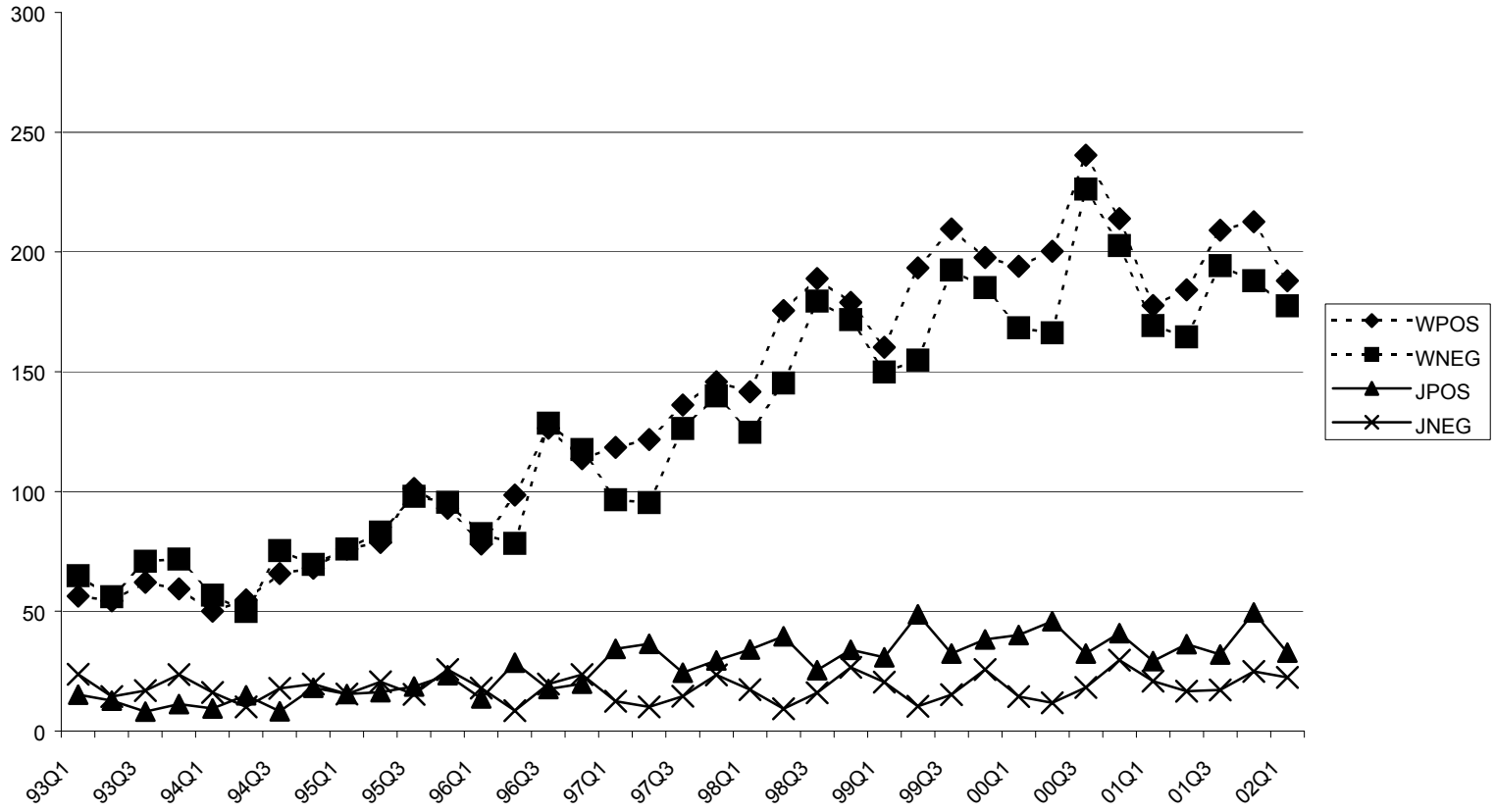

Figure 1. Quarterly Gross Flows in Thousands (All Workers). ECL, 1993:1-2002:1

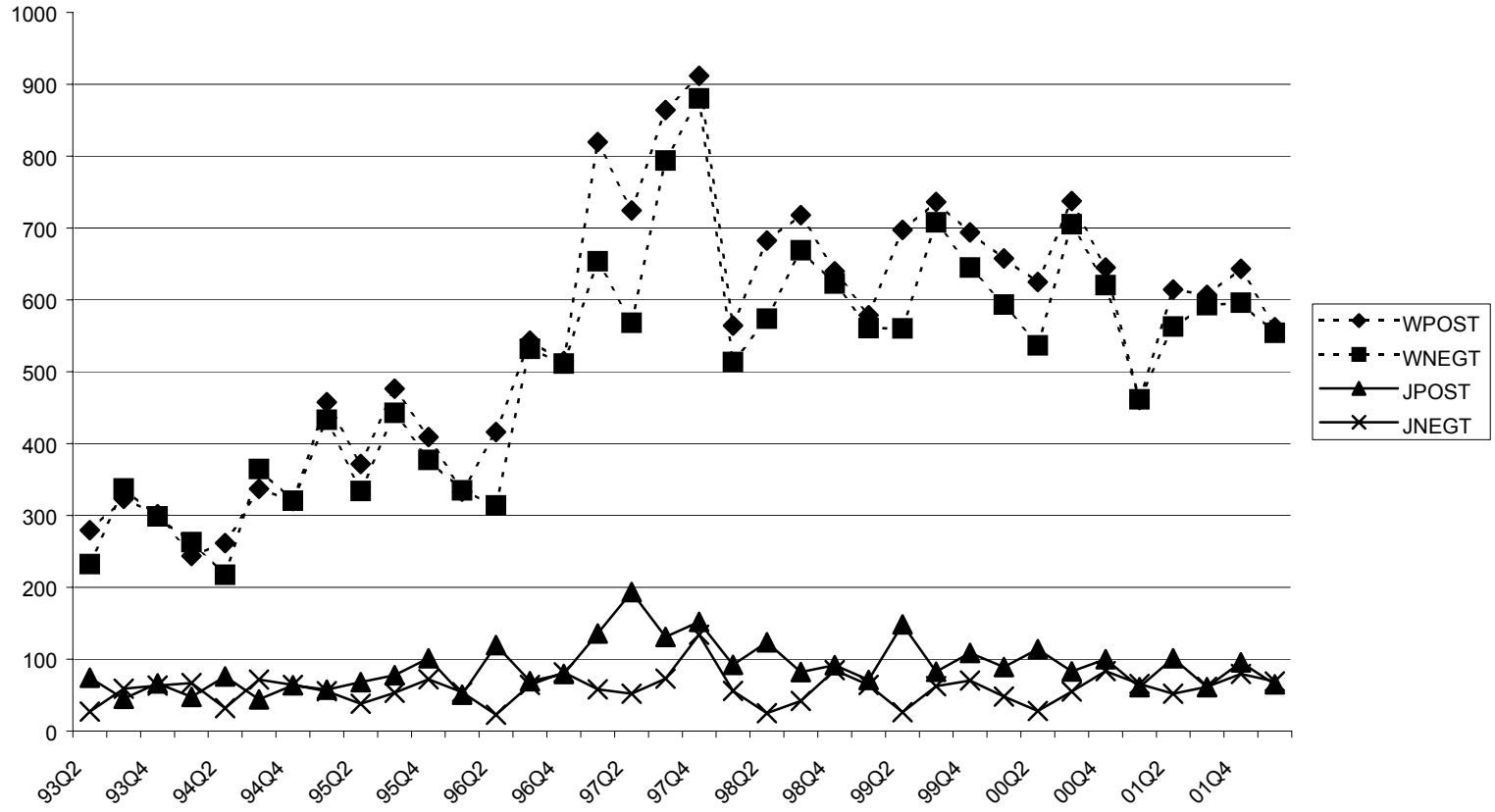

Figure 2. Quarterly Gross Flows in Thousands (Workers with a Temporary Contract). ECL, 1993:2-2002:1

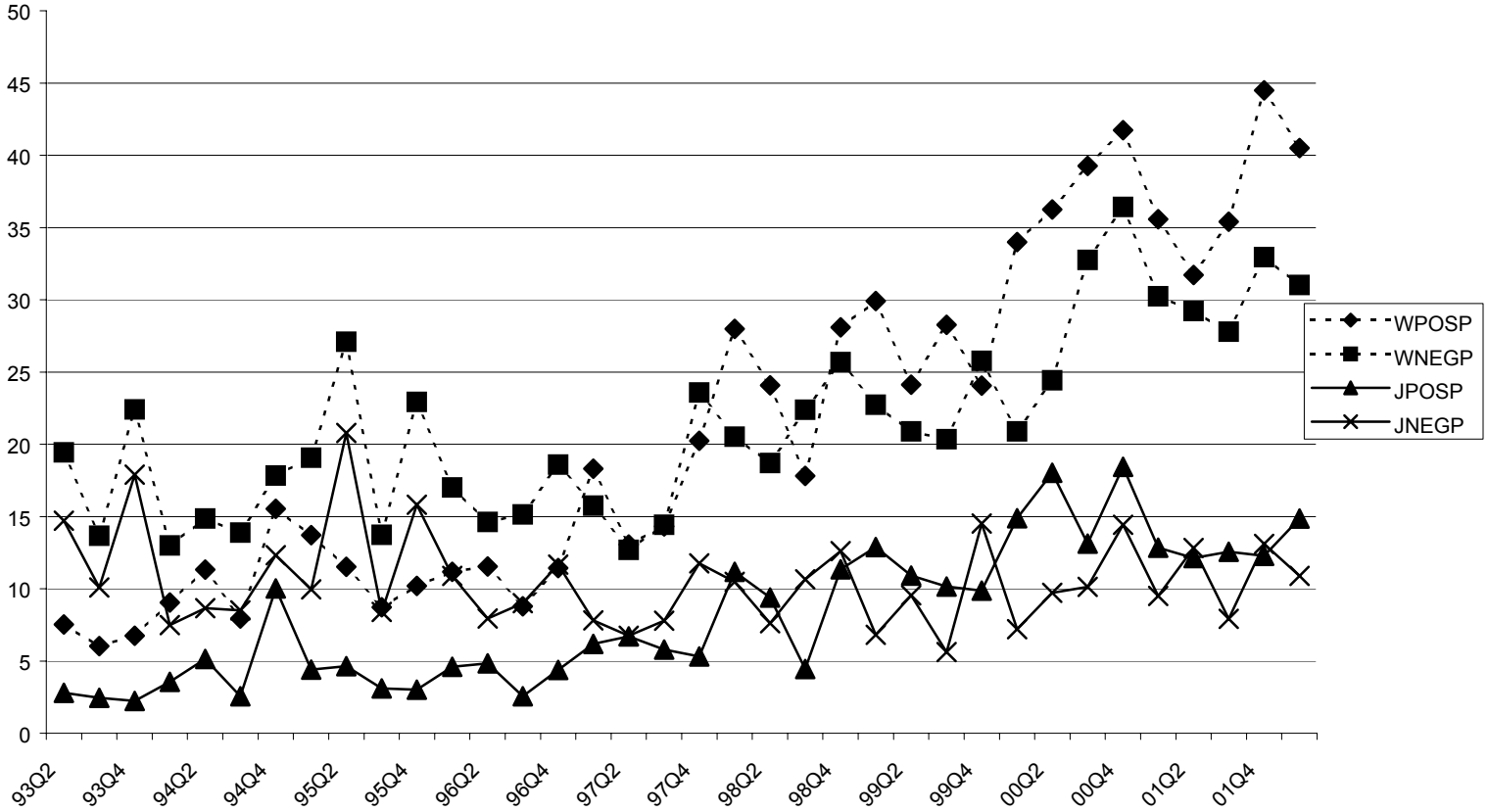

Figure 3. Quarterly Gross Flows in Thousands (Workers with a Permanent Contract). ECL, 1993:2-2002:1

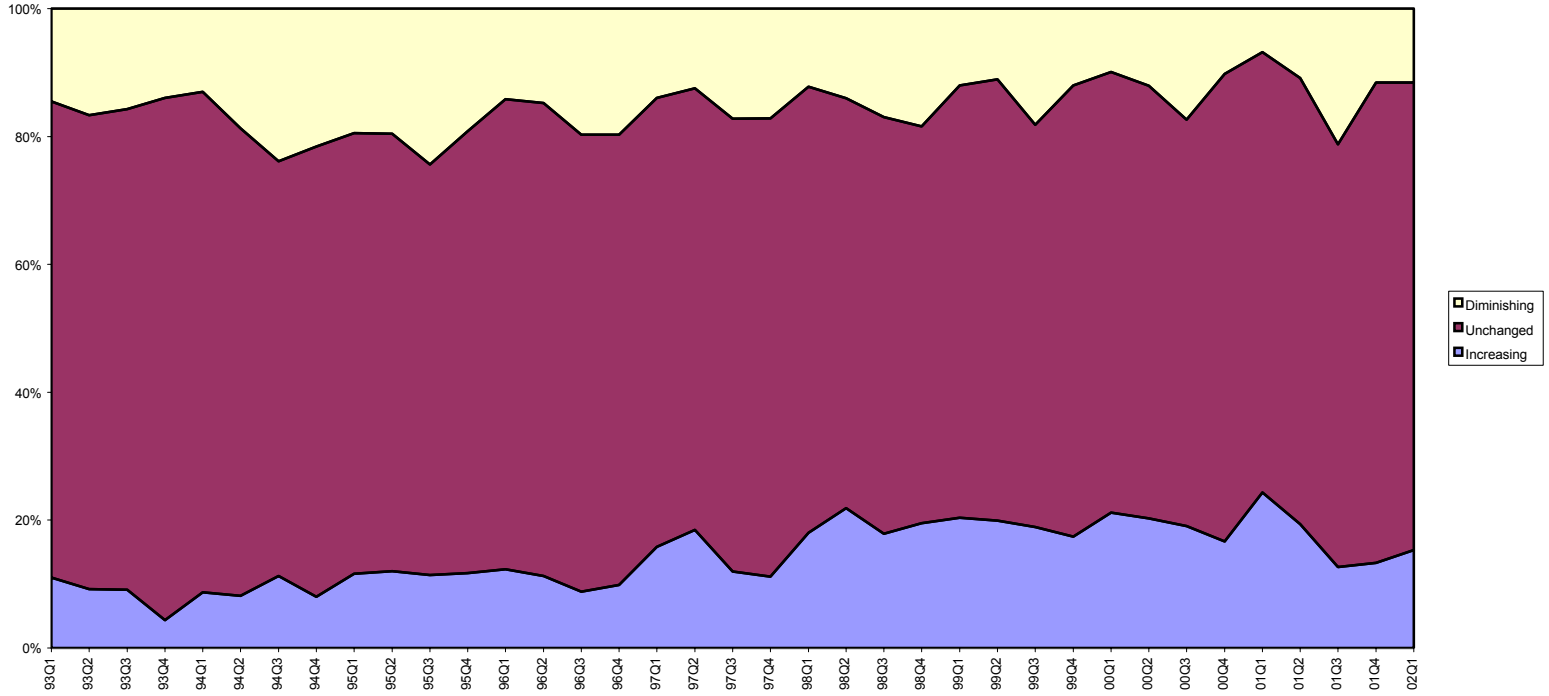

Figure 4. Next Quarter's Net Employment Expectations. ECL, 1993:1-2002:1

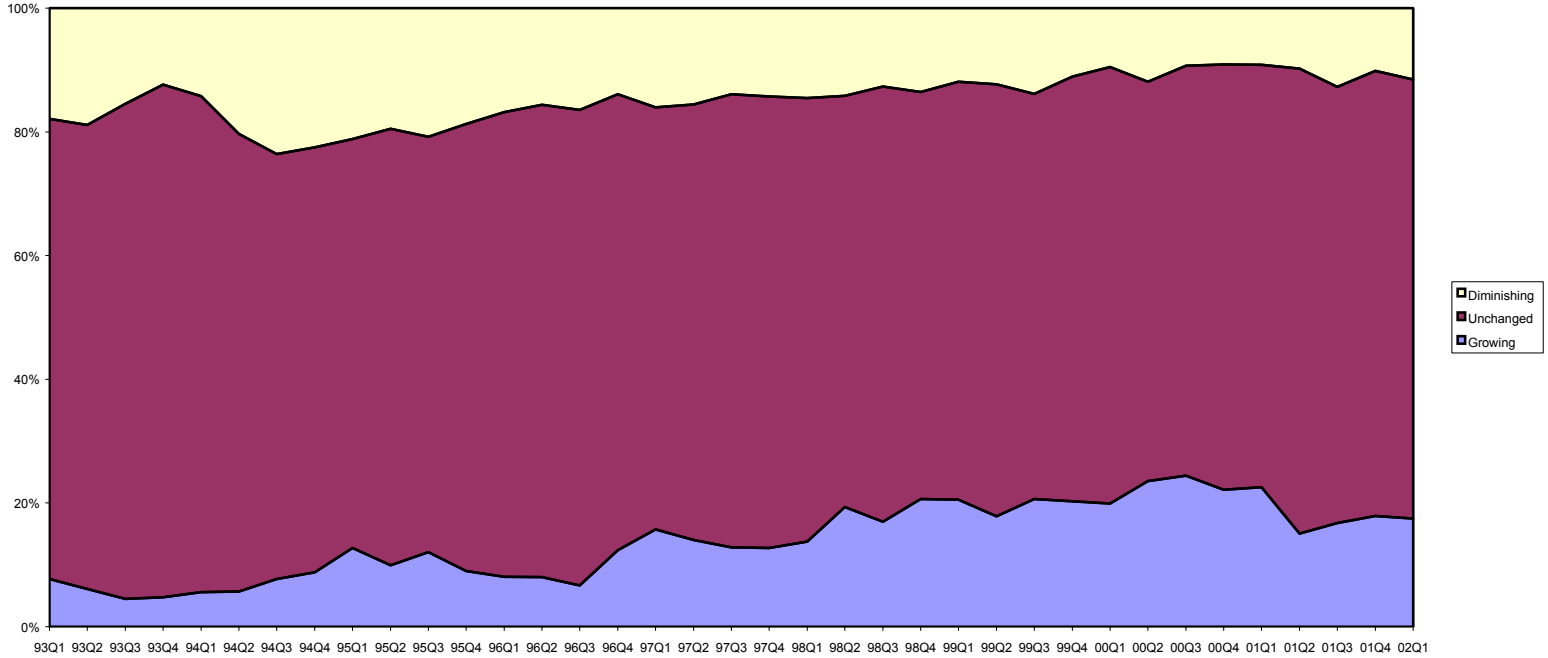

Figure 5. Next Year's Net Employment Expectations. ECL, 1993:1-2002:1

Table 1. Correlation of Quarterly Gross Flows

	Correlation of Temporary and Permanent Job and Worker Flows			
	WPOSt x WPOSp	**WNEGt x WNEGp**	**JPOSt x JPOSp**	**JNEGt x JNEGp**
	0.52	0.36	0.17	0.14
	Correlation of Job and Worker Flows by Contract Type			
	WPOS x WNEG	**JPOS x JNEG**	**WPOS x JPOS**	**WNEG x JNEG**
All	0.96	-0.12	0.37	0.25
Temporary	0.97	0.00	0.69	0.44
Permanent	0.81	-0.11	0.94	0.46

Source: Authors' tabulations using the ECL.

Table 2. Average Net Employment Change by Type of Work Contract and by Establishments' Net Employment Change Expectations for Next Quarter and Next Year

Net Employment Expectation	Observed Net Employment Change	Contract Type		All
		Temp.	Perm.	
Expectations for Next Quarter				
Increasing	Increasing [70.4%]	52	34	86
	Not Increasing [29.6%]	-55	-1	-56
Unchanged	Unchanged [71.4%]	-2	4	2
	Not unchanged [28.6%]	33	30	63
Diminishing	Decreasing [60.7%]	-22	-30	-52
	Not decreasing [39.3%]	62	30	92
Total		**11**	**11**	**22**
Expectations for Next Year				
Increasing	Increasing [91%]	390	92	482
	Not Increasing [9%]	-57	-17	-74
Unchanged	Unchanged [34.6%]	2	-2	0
	Not unchanged [65.4%]	363	45	408
Diminishing	Decreasing [63%]	-15	-86	-101
	Not decreasing [37%]	224	83	307
Total		**242**	**34**	**276**

Source: Authors' tabulations using the ECL.

Table 3. Gross Flows (in Thousands) by Contract Type and by Establishments' Net Employment Expectations

Expectations for Next Quarter (All)	**JPOS**	**JNEG**	**WPOS**	**WNEG**	**NET**
Increasing	56.94	12.07	259.60	214.73	44.87
Unchanged	24.25	17.61	146.45	139.82	6.63
Diminishing	17.14	32.65	73.62	89.13	-15.50
Expectations for Next Quarter (Temps)	**JPOSt**	**JNEGt**	**WPOSt**	**WNEGt**	**NETt**
Increasing	199.96	63.72	630.49	494.25	136.24
Unchanged	125.88	97.79	611.22	583.13	28.09
Diminishing	195.49	250.69	548.08	603.28	-55.20
Expectations for Next Quarter (Perms)	**JPOSp**	**JNEGp**	**WPOSp**	**WNEGp**	**NETp**
Increasing	22.58	10.71	41.11	29.24	11.87
Unchanged	12.28	11.10	29.20	28.02	1.18
Diminishing	11.83	21.47	21.05	30.69	-9.64
Expectations for Next Year (All)	**JPOS**	**JNEG**	**WPOS**	**WNEG**	**NET**
Increasing	109.05	15.14	906.56	812.65	93.91
Unchanged	55.67	27.93	585.93	558.19	27.74
Diminishing	24.28	55.17	180.33	211.24	-30.91
Expectations for Next Year (Temps)	**JPOSt**	**JNEGt**	**WPOSt**	**WNEGt**	**NETt**
Increasing	452.39	85.57	2973.38	2606.56	366.82
Unchanged	380.08	174.15	3796.18	3590.25	205.93
Diminishing	874.20	446.44	6052.71	5624.95	427.76
Expectations for Next Year (Perms)	**JPOSp**	**JNEGp**	**WPOSp**	**WNEGp**	**NETp**
Increasing	68.50	28.30	165.29	125.09	40.20
Unchanged	39.18	43.56	145.59	149.97	-4.38
Diminishing	20.57	54.41	53.24	87.08	-33.84

Source: Authors' tabulations using the ECL.

Table 4. Hausman-Taylor Estimates of Quarterly Gross Job and Worker Flows (S.E. in Parentheses)

Independent Variables	JPOS	JNEG	WPOS	WNEG	NET
Expectations for Next Quarter					
Increasing	21.9262***	-10.0874***	36.2930***	4.2763	32.0233***
	(1.1754)	(0.9782)	(3.4054)	(3.3522)	(1.7329)
Diminishing	-5.0070***	19.2532***	-6.0979	18.1562***	-24.2707***
	(1.3657)	(1.1363)	(3.9575)	(3.8957)	(2.0132)
Expectations for Next Year					
Increasing	-2.5799**	-0.1889	2.0402	4.4236	-2.3799
	(1.2560)	(1.0453)	(3.6388)	(3.5820)	(1.8518)
Diminishing	-0.9334	-3.2581**	-1.8486	-4.1462	2.3000
	(1.5475)	(1.2876)	(4.4846)	(4.4146)	(2.2813)
Establishment Size at (t-1)	-2.6812***	1.5774***	-3.3274***	0.9388***	-4.2656***
	(0.1195)	(0.0994)	(0.3467)	(0.3413)	(0.1762)
Temp to Perm Ratio at (t-1)	-0.0146*	-0.0098	-0.1060***	-0.1012***	-0.0047
	(0.0075)	(0.0063)	(0.0219)	(0.0215)	(0.0111)
Others' Avg. Size	0.8717	-2.3723**	-5.2142	-8.5117**	3.1866*
	(1.2684)	(1.0548)	(3.6781)	(3.6206)	(1.8694)
Others' Avg. Temp to Perm Ratio	0.4010**	-0.1187	1.1631**	0.6531	0.5239*
	(0.1903)	(0.1583)	(0.5518)	(0.5432)	(0.2805)
Collective Bargaining at firm level	-2.6241*	5.1038***	-19.1608***	-11.4824***	-7.8210***
	(1.4582)	(1.2128)	(4.2280)	(4.1619)	(2.1493)
Public Sector	57.9922***	32.4752***	349.5575***	321.6746***	25.4135
	(18.6771)	(12.4704)	(92.0201)	(89.3522)	(24.6958)
Energy	0.5642	9.2377**	-37.9895***	-29.4195**	-8.7058
	(4.7596)	(3.9608)	(13.7901)	(13.5748)	(7.0169)
Chemicals, Rubber, Plastics	1.1700	10.0066**	-35.9645**	-27.1864*	-8.8889
	(5.2048)	(4.3312)	(15.0808)	(14.8454)	(7.6732)
Machinery	4.1163	3.7183	-38.8597***	-39.4527***	0.4563
	(4.4344)	(3.6895)	(12.8506)	(12.6500)	(6.5369)
Other Manufacturing	1.3032	1.8552	-16.8591	-16.4423	-0.5199
	(3.9407)	(3.2790)	(11.4190)	(11.2408)	(5.8094)
Construction	11.2983*	-6.2819	-1.5351	-19.3249	17.6598*
	(6.5877)	(5.4812)	(19.0906)	(18.7925)	(9.7112)
Trade	15.4467***	-7.1805**	-16.9053*	-39.6041***	22.4671***
	(3.4850)	(2.8976)	(10.1074)	(9.9494)	(5.1358)
Transportation & Comm.	-5.3629*	1.8114	-11.5577	-4.3905	-7.3390*
	(2.9271)	(2.4334)	(8.4911)	(8.3584)	(4.3134)
Finance & Insurance	-1.2484	0.6423	-21.7637***	-19.8004***	-2.0039
	(2.2545)	(1.8756)	(6.5342)	(6.4322)	(3.3233)
Post-Labour Reforms' Period					
Post-1994 Reform Period	1.2296	-2.2332	7.1319	3.7617	3.5317
	(2.6009)	(2.1639)	(7.5378)	(7.4201)	(3.8340)
Post-1997 Reform Period	3.3165	-1.9949	36.4256***	31.1718***	5.4097
	(2.6906)	(2.2375)	(7.8028)	(7.6809)	(3.9654)
No. Of Observations	24141	24141	24141	24141	24141
Number of Groups	1724	1724	1724	1724	1724
Prob > Chi2	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: ***indicates statistical significance at the 1 percent level, **indicates significance at the 5 percent level, and *indicates significance at the 10 percent level. The regressions include a constant term, regional and quarter dummies. Unchanged employment, collective bargaining, private sector and other services are used as reference categories.

Table 5. Hausman-Taylor Estimates of Quarterly Gross Temporary Job and Worker Flows (S.E. in Parentheses)

Independent Variables	JPOSt	JNEGt	WPOSt	WNEGt	NETt
Expectations for Next Quarter					
Increasing	92.3305***	-37.7599***	135.0528**	5.0717	130.0676***
	(13.3094)	(9.7193)	(62.3088)	(62.0111)	(17.3080)
Diminishing	-34.7637**	129.9172***	-52.3386	111.3450	-164.3664***
	(15.4392)	(11.2697)	(72.3214)	(71.9726)	(20.0701)
Expectations for Next Year					
Increasing	-14.9824	-14.6721	-1.7794	-1.4437	-0.4126
	(14.2233)	(10.3869)	(66.5852)	(66.2672)	(18.4967)
Diminishing	95.5301***	-27.6004**	95.1967	-28.5879	123.4935***
	(17.4938)	(12.7691)	(81.9487)	(81.5533)	(22.7403)
Establishment Size at (t-1)	-9.2060***	3.1306***	-19.6641***	-7.1578	-12.3196***
	(1.3423)	(0.9774)	(6.3052)	(6.2736)	(1.7413)
Temp to Perm Ratio at (t-1)	0.0003	-0.0211	-0.2131	-0.2360	0.0217
	(0.0855)	(0.0624)	(0.4002)	(0.3983)	(0.1112)
Others' Avg. Size	-16.123	0.9293	-69.7576	-53.8232	-16.7599
	(-14.2904)	(10.4230)	(67.0185)	(66.6889)	(18.5641)
Others' Avg. Temp to Perm Ratio	-7.3433***	-3.0618*	-10.2011	-5.7930	-4.2697
	(2.1454)	(1.5650)	(10.0591)	(10.0098)	(2.7873)
Collective Bargaining at firm level	20.4005	55.9829***	102.7472	137.1534*	-35.1663*
	(16.4427)	(11.9950)	(77.0901)	(76.7128)	(21.3634)
Public Sector	-201.8591**	176.5592***	-541.0874	-153.4352	-375.8903***
	(96.4423)	(64.0919)	(534.4472)	(523.7404)	(115.4746)
Energy	38.3723	88.1032**	464.3219*	511.9516**	-49.8839
	(53.8626)	(39.3239)	(252.2239)	(251.0144)	(70.0298)
Chemicals, Rubber, Plastics	78.6817	74.8878*	42.5140	39.2841	3.7718
	(58.9042)	(43.0122)	(275.8022)	(274.4807)	(76.5958)
Machinery	93.7872*	31.5768	-1054.7010***	-1117.2990***	60.9934
	(50.0745)	(36.5220)	(234.7241)	(233.5828)	(65.0496)
Other Manufacturing	15.4026	51.6692	834.4262***	868.5103***	-36.7081
	(44.5513)	(32.5143)	(208.7084)	(207.7014)	(57.9058)
Construction	104.0596	3.6743	486.5522	384.4887	98.6513
	(74.4549)	(54.3377)	(348.8229)	(347.1374)	(96.7719)
Trade	143.8783***	30.2004	133.3379	19.6107	113.2249**
	(39.2067)	(28.5803)	(183.9835)	(183.0709)	(50.9075)
Transportation & Comm.	84.5489**	-0.4268	116.4290	31.6278	85.2399**
	(32.9042)	(23.9815)	(154.4485)	(153.6792)	(42.7172)
Finance & Insurance	83.6194***	19.9081	0.1900	-63.3707	64.1104*
	(25.4575)	(18.5740)	(119.3102)	(118.7306)	(33.0804)
Post-Labour Reforms' Period					
Post-1994 Reform Period	-5.6361	33.0966	-623.7917***	-583.8119***	-39.0064
	(29.4118)	(21.4742)	(137.7388)	(137.0765)	(38.2417)
Post-1997 Reform Period	57.7168**	47.8045**	-353.5798**	-361.0135**	9.1956
	(30.3408)	(22.1385)	(142.2215)	(141.5270)	(39.4279)
No. Of Observations	24141	24141	24141	24141	24141
Number of Groups	1724	1724	1724	1724	1724
Prob > Chi2	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: ***indicates statistical significance at the 1 percent level, **indicates significance at the 5 percent level, and *indicates significance at the 10 percent level. The regressions include a constant term, regional and quarter dummies. Unchanged employment, collective bargaining, private sector and other services are used as reference categories.

Table 6. Hausman-Taylor Estimates of Quarterly Gross Permanent Job and Worker Flows (S.E. in Parentheses)

Independent Variables	JPOSp	JNEGp	WPOSp	WNEGp	NETp
Expectations for Next Quarter					
Increasing	5.9099***	-2.7439**	5.1352	-3.4849	8.6308***
	(1.0415)	(1.3164)	(7.3701)	(7.9529)	(1.7499)
Diminishing	0.5982	8.8985***	-10.5443	-2.2356	-8.3326***
	(1.2096)	(1.5285)	(8.5593)	(9.2360)	(2.0319)
Expectations for Next Year					
Increasing	0.3111	2.3145*	0.8990	2.8747	-1.9752
	(1.1129)	(1.4067)	(7.8756)	(8.4984)	(1.8700)
Diminishing	-1.001	-0.3081	0.8354	1.4915	-0.6811
	(1.3707)	(1.7319)	(9.6988)	(10.4656)	(2.3024)
Establishment Size at (t-1)	-1.2756***	0.5084***	-1.3428*	0.4453	-1.7862***
	(0.1057)	(0.1334)	(0.7480)	(0.8071)	(0.1774)
Temp to Perm Ratio at (t-1)	0.0226***	0.0482***	-0.0020	0.0491	-0.0510***
	(0.0067)	(0.0085)	(0.0636)	(0.0687)	(0.0151)
Others' Avg. Size	1.7131	-0.7604	6.4915	4.0157	2.4418
	(1.1224)	(1.4174)	(7.9417)	(8.5692)	(1.8844)
Others' Avg. Temp to Perm Ratio	0.1096	-0.1095	-0.0549	-0.2675	0.2177
	(0.1684)	(0.2127)	(1.1917)	(1.2859)	(0.2828)
Collective Bargaining at firm level	0.0230	1.7552	-0.4591	1.2935	-1.7833
	(1.2907)	(1.6301)	(9.1323)	(9.8540)	(2.1672)
Public Sector	34.2229***	58.7742***	279.0786***	303.7598***	-23.4664
	(11.9076)	(12.8876)	(81.9095)	(87.6266)	(17.4836)
Energy	0.4922	5.2856	-5.9448	-1.2735	-4.7260
	(4.2168)	(5.3294)	(29.8390)	(32.1984)	(7.0844)
Chemicals, Rubber, Plastics	1.1843	2.9905	-12.5182	-10.6192	-1.8236
	(4.6110)	(5.8275)	(32.6286)	(35.2085)	(7.7466)
Machinery	-1.8760	-3.5530	-19.9933	-21.6946	1.7888
	(3.9273)	(4.9618)	(27.7890)	(29.9858)	(6.5962)
Other Manufacturing	-0.1346	-1.4632	-5.4568	-6.9305	1.4232
	(3.4906)	(4.4108)	(24.6996)	(26.6524)	(5.8635)
Construction	3.3613	-7.7983	-12.4162	-23.9231	11.3583
	(5.8346)	(7.3725)	(41.2851)	(44.5490)	(9.8004)
Trade	5.1556*	-7.2916*	-7.5068	-20.0428	12.4943**
	(3.0830)	(3.8923)	(21.8117)	(23.5350)	(5.1746)
Transportation & Comm.	-1.6606	-1.9158	-12.2402	-12.4918	0.2393
	(2.5889)	(3.2680)	(18.3158)	(19.7628)	(4.3448)
Finance & Insurance	-3.0856	-2.2271	-13.5253	-12.7187	-0.8647
	(1.9964)	(2.5221)	(14.1260)	(15.2427)	(3.3529)
Post-Labour Reforms' Period					
Post-1994 Reform Period	4.1178*	2.1595	41.9816**	39.9950**	2.0023
	(2.3035)	(2.9108)	(16.2996)	(17.5882)	(3.8694)
Post-1997 Reform Period	8.0721***	4.8724	54.2636***	51.1036***	3.2214
	(2.3811)	(3.0072)	(16.8476)	(18.1791)	(3.9980)
No. Of Observations	24141	24141	24138	24138	24138
Number of Groups	1724	1724	1724	1724	1724
Prob > Chi2	0.0000	0.0000	0.3481	0.8787	0.0000

Notes: ***indicates statistical significance at the 1 percent level, **indicates significance at the 5 percent level, and *indicates significance at the 10 percent level. The regressions include a constant term, regional and quarter dummies. Unchanged expectations, collective bargaining, private sector and other services are used as reference categories.

Appendix

Methodology Used to Construct Gross Job and Worker Flows

Our methodology follows the empirical approach outlined in Davis and Haltiwanger (1990), which has been extensively used in most of the subsequent literature. Worker turnover (gross flows of workers) can be divided into two components: worker mobility related to gross job reallocation (due to job creation and job destruction processes), and worker mobility in excess of job reallocation (occurring independently of job flows). As our data set gives information on external gross flows of workers (hires and separations) at establishment level, it is possible to measure total worker reallocation and its components.

First of all, let us consider total gross worker turnover. Given the size of establishment *i* at times *t* ($E_{i,t}$) and *t-1* ($E_{i,t-1}$), the average size of establishment *i* between *t-1* and *t* is defined as follows: $N_{i,t} = (E_{i,t} + E_{i,t-1}) / 2$. By aggregating, it is possible to obtain the size of the whole economy: $N_t = \Sigma_i N_{i,t}$.

The hiring (separation) rate is defined as the proportion of the number of workers arriving in (leaving) establishments between *t-1* and *t* with respect to the employment stock:

$$h_{i,t} = H_{i,t} / N_{i,t} \; (s_{i,t} = S_{i,t} / N_{i,t}).$$

Then, by aggregating, we may calculate the aggregate hiring rate:

$$WPOS_t = \Sigma_i \, (N_{i,t} / N_t) \cdot h_{i,t}$$

and the aggregate separation rate:

$$WNEG_t = \Sigma_i \, (N_{i,t} / N_t) \cdot s_{i,t}$$

The sum of both rates is the worker turnover or worker reallocation rate (WR_t). It gives us an idea of gross external mobility of workers in the whole economy:

$$WR_t = WPOS_t + WNEG_t$$

Now let us consider the case of job flows. First, the employment growth rate in each establishment is defined as follows: $g_{i,t} = (E_{i,t} - E_{i,t-1}) / N_{i,t} = (H_{i,t} - S_{i,t}) / N_{i,t}$. In other words, the employment growth rate can be calculated either as the difference between current and past employment stocks, or as the difference between hires and separations in the corresponding period of time. In both cases, it provides us with insights on the establishment's net job creation or destruction rate. Then, by aggregating, we define the job creation rate as:

$$JPOS_t = \Sigma_i (N_{i,t} / N_t) \cdot g_{i,t}, \qquad \text{for } g_{i,t}>0$$

and the job destruction rate as:

$$JNEG_t = \Sigma_i (N_{i,t} / N_t) \cdot \left/ g_{i,t} \right/, \qquad \text{for } g_{i,t}<0$$

The job reallocation rate (JR_t) is the sum of both rates. It provides us with an estimate of the external mobility of workers (in the whole economy) due to job creation and job destruction:

$$JR_t = JPOS_t + JNEG_t$$

The rotation component of worker turnover across establishments (RR_t) can be then defined as the extent of worker reallocation taking place in excess of job flows:

$$RR_t = WR_t - JR_t = 2 \cdot min (H_t, S_t)$$

Finally, aggregate net employment growth rates are given by the difference between both job creation and job destruction rates. It also may be computed as the difference between total hires and total separations:

$$NET_t = JPOS_t - JNEG_t = WPOS_t - WNEG_t$$

Table A. Expected Net Employment Variation

	Next Quarter		Next Year	
Quarters	**Mean**	**S.D.**	**Mean**	**S.D.**
93Q1	6.49	9.32	5.35	7.37
93Q2	5.09	10.04	5.48	8.90
93Q3	5.77	8.63	4.91	4.62
93Q4	4.81	9.93	5.35	6.80
94Q1	4.18	5.45	4.99	6.40
94Q2	5.44	16.83	4.91	15.04
94Q3	5.37	10.34	4.14	5.87
94Q4	3.44	8.31	4.99	7.93
95Q1	6.34	13.78	10.32	25.35
95Q2	5.78	11.58	7.95	16.73
95Q3	7.47	14.69	7.71	14.02
95Q4	7.40	15.46	8.21	15.13
96Q1	6.86	14.12	8.17	15.71
96Q2	6.75	11.44	7.26	10.49
96Q3	6.95	13.28	6.29	10.44
96Q4	4.99	11.85	6.42	12.69
97Q1	4.31	9.35	4.94	7.56
97Q2	5.75	11.57	5.94	11.55
97Q3	6.97	14.37	7.45	14.83
97Q4	8.74	12.33	9.13	11.99
98Q1	6.34	9.55	7.66	9.91
98Q2	6.66	8.92	7.63	9.66
98Q3	6.07	9.03	6.50	8.51
98Q4	5.52	7.07	8.87	9.86
99Q1	5.43	8.25	7.49	9.89
99Q2	6.84	8.51	7.97	9.50
99Q3	6.88	10.26	7.36	9.13
99Q4	4.60	6.93	9.10	12.51
00Q1	5.31	7.84	7.17	9.24
00Q2	6.86	11.95	7.49	10.94
00Q3	6.29	10.18	6.47	8.99
00Q4	5.59	8.35	7.66	9.68
01Q1	4.85	7.10	5.75	8.17
01Q2	6.88	9.01	7.95	9.30
01Q3	6.12	9.27	5.84	8.16
01Q4	5.72	9.87	5.68	8.70
02Q1	5.63	9.07	5.98	8.80
Total	**6.01**	**10.46**	**6.97**	**11.13**

Source: Authors' tabulations using the ECL.

Table B. Description, Means, and Standard Deviations

Variables	Description	Mean	S.D.
Total Quarterly Flows			
JPOS	Establishment's quarterly job creation flows	31.0031	79.8369
JNEG	Establishment's quarterly job destruction flows	20.1116	56.9422
WPOS	Establishment's quarterly flows of hires	167.7219	397.5693
WNEG	Establishment's quarterly flows of separations	156.8304	387.9570
WNET	Establishment's quarterly net employment flows	10.8915	104.2277
Quarterly Flows by Contract Type			
JPOSt	Establishment's quarterly temporary job creation flows	145.7271	580.3452
JNEGt	Establishment's quarterly temporary job destruction flows	105.4999	463.4559
WPOSt	Establishment's quarterly flows of temporary hires	592.9241	2901.9280
WNEGt	Establishment's quarterly flows of temporary separations	554.4274	2919.7620
WNETt	Establishment's quarterly net temporary employment flows	40.3531	764.3033
JPOSp	Establishment's quarterly permanent job creation flows	13.6731	77.9558
JNEGp	Establishment's quarterly permanent job destruction flows	11.7660	63.7998
WPOSp	Establishment's quarterly flows of permanent hires	31.0655	381.1060
WNEGp	Establishment's quarterly flows of permanent separations	29.0647	394.1472
WNETp	Establishment's quarterly net permanent employment flows	2.0461	105.9823
Expectations for Next Quarter			
Increasing	Dummy variable indicative of Increasing net employment expectations for the next quarter	0.1639	0.3702
Unchanged	Dummy variable indicative of unchanged net employment expectations for the next quarter	0.7041	0.4565
Diminishing	Dummy variable indicative of Diminishing net employment expectations for the next quarter	0.1320	0.3385
Expectations for Next Year			
Increasing	Dummy variable indicative of Increasing net employment expectations for the next year	0.1559	0.3628
Unchanged	Dummy variable indicative of unchanged net employment expectations for the next year	0.7249	0.4466
Diminishing	Dummy variable indicative of Diminishing net employment expectations for the next year	0.1192	0.3240
Other Establishment Characteristics			
Establishment Size at (t-1)	Establishment's size last quarter in hundreds of workers	12.4157	15.0865
Temp to Perm Ratio at (t-1)	Establishment's temp to perm ratio last quarter	4.0325	53.2546
Others' Avg. Size	Other establishments' average size	12.4640	0.3997
Others' Avg. Temp to Perm Ratio	Other establishments' average temp to perm ratio	2.7044	0.5087
Collective Bargaining	Establishment-level collective bargaining dummy	0.3885	0.4874
Public Sector	Dummy variable equal to 1 if establishment is public	0.5944	0.4127
Energy	Industry dummy	0.0343	0.1819
Chemicals, Rubber, Plastics	Industry dummy	0.0446	0.2064
Machinery	Industry dummy	0.1240	0.3296
Other Manufacturing	Industry dummy	0.0510	0.2200
Construction	Industry dummy	0.0173	0.1305
Trade	Industry dummy	0.0998	0.2997
Transportation & Comm.	Industry dummy	0.0806	0.2723
Finance & Insurance	Industry dummy	0.0792	0.2701
Other Services	Industry dummy	0.4418	0.4966

Table B – Continued

Variables	Description	Mean	S.D.
Time Related Variables			
First Quarter	Quarter dummy	0.2554	0.4361
Second Quarter	Quarter dummy	0.2430	0.4289
Third Quarter	Quarter dummy	0.2527	0.4346
Fourth Quarter	Quarter dummy	0.2489	0.4324
Pre-reforms dummy	Dummy indicative of the pre-1994 period	0.0906	0.2871
Post-1994 Reform Period	Dummy indicative of the post-1994 period	0.2806	0.4493
Post-1997 Reform Period	Dummy indicative of the post-1997 period	0.6287	0.4831
Regional Dummies			
Andalucia	Regional dummy	0.1118	0.3151
Aragón	Regional dummy	0.0335	0.1799
Asturias	Regional dummy	0.0280	0.1650
Balears Islands	Regional dummy	0.0197	0.1389
Canary Islands	Regional dummy	0.0405	0.1972
Cantabria	Regional dummy	0.0145	0.1196
Castilla La Mancha	Regional dummy	0.0150	0.1220
Castilla y León	Regional dummy	0.0388	0.1931
Cataluña	Regional dummy	0.2179	0.4128
Extremadura	Regional dummy	0.0699	0.2549
Galicia	Regional dummy	0.0059	0.0766
La Rioja	Regional dummy	0.0414	0.1992
Madrid	Regional dummy	0.2558	0.4363
Murcia	Regional dummy	0.0223	0.1478
Navarra	Regional dummy	0.0195	0.1383
País Vasco	Regional dummy	0.0604	0.2383
Valencia	Regional dummy	0.0050	0.0703

Source: Authors' tabulations using the ECL.

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