

**What hides behind an unemployment rate:
Comparing Portuguese and U.S. labor markets.
Data appendix.**

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This appendix describes the three Portuguese data sources used and the methodology employed to obtain the measures of job and worker flows in each table.

A. The Quadros de Pessoal survey

The first data set, *Quadros de Pessoal* is based on an annual survey conducted by the Portuguese Ministry of Employment; it covers all establishments with wage earners. Answering this survey is mandatory, and the survey collects detailed information on both the wages and the characteristics of each individual employee (regular wages, subsidies, hours worked, date of admission, age, gender, schooling, qualification level, part-time status, occupation, type of collective agreement, promotions, etc.) as well as basic information about the establishment and the firm (size, ownership, shipments, SIC codes, location, etc.). Each year the survey collects information on around 140,000 establishments and 2 million individuals.

By law, this information is then sent to the statistical department of the Ministry of Employment, is supplied to the employer association, and

is made available to every worker in a public space of the establishment. This last requirement facilitates the work of the services of the Ministry of Employment that monitor compliance of firms with the law (e.g. illegal work). The administrative nature of the data and its public availability imply a high degree of coverage and reliability.

The Ministry of Employment has been conducting this survey since 1982 and the employment and wage data refer to the month of March for the period 1982-93 and the month of October since 1994. In our analysis we use information for the period 1982 until 1995. The raw data that we use is organized in three data sets corresponding to the level of aggregation of the information: individual-level, establishment level, and firm level.

Constructing expansions and contractions

To obtain the number of jobs created due to the expansion of employment and the number of jobs destroyed due to the contraction of employment in existing establishments, we use the information on total employment in two consecutive years for continuing establishments. This is possible because each establishment, when it first reports to the survey, is given an identifier number. The Ministry of Employment is especially careful in trying to avoid giving a new number to an establishment already in the file, using a number of routines (for the most part, based on the location of the establishment) designed for this purpose.

Constructing entries

Since the ID firm numbers are assigned sequentially, new firms can be identified by comparing their identifier number with the highest identifier number in the previous year. A similar procedure is used to identify the creation of a new establishment within a multi-establishment firm since establishment ID numbers are also given by order of creation within the firm.

A number of issues arise here. First, some firms report to the survey with

a delay. We have made no attempt to retime the date of birth because the available information is insufficient to do so. Evidence on the tenure of the workers suggests that most of the new firms first report to the survey within a year of their actual creation. Second, despite the care used by the statistical department of the Ministry of Employment in giving new ID numbers, false entries may still occur. As a check, we have used the information from the tenure of the worker with the longest (and/or the second longest) tenure in the firm. (This check obviously could not be used for new establishments within multi-establishment firms.) This check invalidated less than 10% of entries.

Constructing exits

We identify an exit whenever an establishment fails to report to the survey. However errors inevitably occur. In particular, some establishments temporarily fail to respond, or to respond in time. Temporary exits are relatively rare events in the Quadros de Pessoal survey and, typically, do not last for more than one year. Accordingly, we assume that observed temporary exits do not represent true exits and impose the condition that an establishment never again reports to the survey (that is, until October of 1995) for this to be considered a true exit. In the case of temporary exits, we construct missing employment numbers by interpolation using the two closest available numbers.

We then compute the various job flows using the methodology employed by Steve Davis, John Haltiwanger, and Scott Schuh (1996): The *entry rate* is the sum of employment at time t in new establishments, divided by total employment. The *exit rate* is the sum of employment at time $t - 1$ over exiting establishments, divided by total employment. The *expansion (contraction) rate* is the sum of changes from $t - 1$ to t in employment over all continuing establishments with increasing (decreasing) employment, divided

by total employment. In each case, total employment is constructed as the average of employment at time $t - 1$ and at time t .

The survey covers all sectors of the economy. For comparison with the United States, we also construct the same series for manufacturing only, and for firms with five or more employees.

For comparison with the United States, we also construct firm size and sector adjusted job flows. For manufacturing, we divide establishments in class sizes, following the grid size in Davis et al, Table 4-1. We then compute job creation and destruction for each class size, and then compute overall job creation and destruction, using U.S. rather than Portuguese shares of employment in each class (using the numbers in part 2 of Table 4-1 in Davis et al. For the economy as a whole, we follow the same method, but using the size grid, the size and the sectoral composition from Table 860, Statistical Abstract of the United States, 1993.

B. Inquérito ao Emprego Estruturado (Employment Survey)

The second data set, *Inquérito ao Emprego Estruturado*, is a quarterly survey of establishments, also run by the Portuguese Ministry of Employment, for the purpose of collecting information about job and worker turnover. It also contains detailed information on the composition of the establishment work force: employment by age, gender, type of contract (open-ended, fixed-term, or temporary contracts), and part-time status.

The sample is designed to include all establishments with 100 or more employees, and establishments with 1-99 employees with probabilities that increase with the size of the establishment (according to five size groups). We use these probabilities to properly weight each plant in order to obtain a representative sample. Each year the sample is obtained from the Quadros

de Pessoal survey and it covers all firms with wage earners in all sectors of the economy with the exception of agriculture and fishery. (Since it is a survey of firms, it does not include the public administration.) On average, for the period 1991-1995, the Employment Survey surveyed around 6,000 establishments each quarter.

Job flows

We compute quarterly expansion and contraction rates in the same way as with the annual survey. Given the sampling design however (the sample is only refreshed annually), we cannot construct quarterly series for job flows due to entries or to exits. In tables 2 and 4, we construct quarterly flows due to entries simply as one fourth of the annual flows. The treatment of exits is more complex. If firms decrease employment steadily before finally exiting, some of the flows categorized as “job flows due to exits” in annual data will appear as “job flows due to contractions” in quarterly data, until the firm finally exits. For example, if a firm has employment of 30 in quarter 1, 10 in quarter 2 and exits in quarter 3, the number for the “job flow due to exits” using annual data will be equal to 30. But, of this 30, 20 will appear in quarterly data as a “job flow due to contraction” in an existing firms. It is easy to show that, if exits are staggered over the year, and the employment in exiting firms decreases linearly before exit, the right computation for the quarterly exit rate is as one-fourth the annual exit rate, times a correction factor of 0.4. If instead the employment decline is concentrated at the time of exit, then the correction factor is 1.0 (equivalently, there is no need for a correction). Based on other work by one of the authors on exiting firms (Pedro Portugal, José Mata, and Paulo Guiramáes (1997)), we use a correction factor of 0.6.

For comparison with the United States numbers, we also compute job flows just for manufacturing, and just for firms with five or more employees.

For comparison with annual job flows from expansions and contractions from the Quadros de Pessoal, we construct changes in employment at each firm from quarter $t - 4$ to quarter t , and then construct series for expansion and contraction series in the standard way.

To construct the quarterly persistence rates given in footnote 4 of the text, we proceed as follows. For Portugal, we follow the same methodology as that described in Davis et al (in section A.1.3. of their book). This gives a quarterly persistence rate for job destruction of 0.85. For the United States, we start from the quarterly persistence rate for 1979-1991, which was computed for us by John Haltiwanger, and is equal to 0.72. The U.S. persistence rate however includes job destruction due to exits (which are permanent), while the Portuguese one refers only to job destruction in continuing establishments. Thus, we correct the U.S. rate by taking into account the proportion of job destruction due to exits (11.6%), assuming a persistence rate of 1 for exits. This gives a persistence rate, for job destruction in continuing establishments, of 0.68.

Worker flows

The other strength of this data set is the fact that establishments are asked about gross worker flows. That is, the survey contains information on the number of workers that either exited or joined the establishment over the course of the previous quarter. In addition, such flows can be decomposed according to a number of reasons: job creation, job substitution, return from a temporary exit, job destruction, voluntary exits, and temporary exit. (Temporary exits are not temporary layoffs. There are no temporary layoffs in Portugal, despite legislation introduced in the early 1980s with the purpose of making them available to firms.)

We use this information to construct gross worker inflows and outflows. Since the temporary exits are, for the most part, due to sick and maternity

leave we exclude them from the worker gross flows. (Temporary exits account for less than 10% of flows.) Our measure of quarterly worker inflows is the sum of the number of workers joining establishments during quarter t , minus returns from temporary exits, divided by average employment at times $t - 1$ and t . Similarly, the measure of quarterly worker outflows is simply the sum of the number of workers leaving establishments in quarter t , minus temporary exits, divided by average employment in quarters $t - 1$ and t .

C. Inquérito ao Emprego (INE Household Survey)

The third dataset is a CPS type household survey conducted by the Instituto Nacional de Estatística (INE). Every quarter the INE surveys around 40,000 individuals to obtain information about the labor market. The basic structure of the survey follows the instructions of Eurostat, making the definitions of the basic labor market indicators identical to those in other European countries (e.g., employment, unemployment, inactivity). We had access to the raw data from the INE survey for the 1992-1996 period.

Each quarter, 1/6 of the sample is rotated out. Thus, each quarter, we can compute the labor status of a worker in quarter $t - 1$ and t for 5/6 of the workers in the current sample. To make sure that we were tracking the same individual, we used a number of filters beyond the ID number: the order number, age and gender. Preliminary work on the relevance of labor status measurement error (of the type documented by Abowd and Zellner for the United States) has led us to believe that this is not a serious issue in this survey. We find negligible evidence of inconsistencies in the observed labor market transitions. One reason is a high—18 percent—re-interview rate. Another is the lack, relative to the United States, of high frequency

movements in and out of unemployment.

The computation of the quarterly transitions of employment to unemployment (EU), employment to inactivity (EI), unemployment to employment (UE), and inactivity to employment (IE) is conventional. For example, the flow of workers from employment to unemployment is equal to the number of workers reporting being employed in quarter $t-1$ and reporting being unemployed in quarter t , divided by total employment at $t-1$.

We define an employment-to-employment (EE) transition as a situation where: first, the worker was employed in the previous quarter; second, there is an increment in the reported total number of jobs held to date; third, the reported tenure in the current job is less than or equal to 3 months; and fourth, the worker reports moving directly from another job. Transitions that satisfy the first three criteria but not the fourth are allocated proportionately to (EU) flows and to (EI) flows.

In order to make the universe of workers comparable to that of firms in the quarterly Employment survey, we also compute these flows excluding from the sample self-employed workers, public servants (that is, workers from the Public Administration, Education, Health, and Sanitation sectors), and private household employees. The results for this smaller sample are reported in line 2 of Table 7.