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An Empirical Analysis of Earnings And Employment Risk

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Abstract

The mean and higher moments of the distribution of future income are crucial determinants of individual choices. These moments are usually estimated in panel data from past income realizations. In this paper we rely instead on subjective expectations available in the 1995 Survey of Household Income and Wealth, a large random sample representative of Italian households. The survey elicits information on the distribution of future earnings and on the probability of unemployment in a parsimonious way. This allows us to estimate the distribution of future income for each individual in the sample. We relate various features of these distributions to demographic variables observable in the cross-section. The data help us understanding how individual uncertainty evolves over the life cycle and if attitudes towards risk affect occupational choices and income riskiness.

Key words: Subjective expectations, income risk, unemployment.
JEL classification: E21

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Appendix

1. Introduction

Economists routinely propose models in which current decisions depend on expectations of future variables. For instance, theories of intertemporal choice with incomplete markets posit that people react to expected income. When the strong assumptions that lead to certainty equivalence are relaxed, theory also predicts that people respond to higher moments of the distribution of future income (Kimball, 1990). The relevant moments are those of the subjective income distribution conditional on information available at the time the decisions are made.

Only under the extreme hypothesis of complete markets the measurement of individual income risk is not an issue. But when idiosyncratic shocks matter, measuring microeconomic uncertainty becomes a crucial issue in applied econometrics and in calibration of general and partial equilibrium models. In a recent survey, Browning, Hansen and Heckman (1999) argue that calibrating economic models with imperfect insurance "requires a measure of the magnitude of microeconomic uncertainty, and how that uncertainty evolves over the business cycle [...]. This introduces the possibility of additional sources of heterogeneity because different economic agents may confront fundamentally different risks".

These remarks have implications for many areas of research. Measuring individual uncertainty is crucial when trying to determine the importance of precautionary saving. Individual uncertainty affects the width of the inaction band in *Ss* models of durable demand and housing investment. Income risk can lead prudent individuals to demand a higher risk premium on risky assets, affects portfolio choice and the demand for insurance against insurable risks. More generally, income risk can impact labor supply, education and occupation choice, job search, and many other economic decisions.

Two approaches have emerged in the literature to extract moments of the distribution of future income from observable variables. One relies on panel data and infers expectations and possibly higher moments of the individual distribution from past income realizations. To be valid, this method requires assuming that individuals condition on the same set of variables to form expectations, that the individuals and the econometrician have the same information set and that the econometrician knows the stochastic process that generates individual expectations. It is an unhappy feature of applied economics that implausible assumptions and procedures get accepted for lack of sound alternatives.

A second strand of literature has recently proposed to rely on survey questions, not retrospective data, to elicit information on the conditional distribution of future income. The main advantage of survey questions over inference based on realizations is that they do not require the econometrician to know the variables that individuals consider in forming their expectations.

Following this line of research, we rely on subjective expectations drawn from the 1995 Survey a Household Income and Wealth (SHIW), a large representative sample of the Italian population. As will be seen, to estimate the moments of the income distribution from survey data we must rely on some assumptions and imputations specific to our dataset.

Our contribution to the literature is on method and substance. On the methodological side, we take explicitly into account that the distribution of future income results from three distinct elements: the probability of job loss, the distribution of future wages and the distribution of unemployment compensation. Depending on the institutional features of the labor market, each of these elements may be more or less important in determining the overall income distribution. For instance, if job search is costless and wages and prices are fully flexible, future income depends only on wage fluctuations; but if wages are sticky or fixed, income variability depends mainly on fluctuations in employment status. Previous studies focus mainly on wages or income from all sources. The distribution of wages neglects the impact of the probability of unemployment and the distribution of benefits. Expectations about income from all sources make it hard (if not impossible) to assess the separate impact of wage and unemployment uncertainty on overall income uncertainty. Subjective information on future employment prospects available in the 1998 SHIW allows us to tackle the first issue directly. Moreover, we can use external information to impute unemployment benefits as a function of various demographic and labor status variables, thus accounting for the second element.

On substance, we provide evidence that is useful for various branches of research that, directly or indirectly, need to make assumptions about various moments of the conditional distribution of individual incomes. First, we construct empirical profiles of income uncertainty and of the probability of unemployment over the working career. The estimated age profiles help us understanding how uncertainty evolves over the life cycle. The analysis is important because simulation studies always neglect age-related heterogeneity in income risk. Second, we compare unemployment risk in Italy and in the US using comparable survey questions. This allows us to highlight the role of labor market flexibility and other institutional factors. Finally, we relate unemployment risk, the coefficient of variation of future income and an index of the asymmetry of the income distribution to a set of demographic characteristics and to an index of risk aversion. The correlation between income risk and risk aversion allows us to assess the severity of the self-selection problem that potentially plagues many empirical studies of precautionary saving and portfolio choice. The relation between our measures of earnings uncertainty and workers' characteristics helps identifying variables associated with job security.

The rest of the paper is organized as follows. In Section 2 we survey the literature based on subjective income expectations and describe the main characteristics of the survey. In Section 3 we estimate the overall individual labor income distribution combining the probability of unemployment with information on future earnings and imputation of unemployment benefits. In Section 4 we provide ample description of the cross-sectional characteristics of the income distributions. In Section 5 we present the age profiles of the probability of unemployment and of the coefficient of variation of future income. The cross-country comparison between unemployment risk in Italy and the United States is taken up in Section 6. In Section 7 we test if individuals that face lower income risk also are more risk-averse. Section 8 summarizes our main findings.

2. Previous evidence and sample design

In order to derive empirical measures of subjective income expectations and income risk, one must design appropriate survey questions to characterize either the density or the cumulative distribution function of future income. In the literature both approaches have been taken. Guiso, Jappelli and Terlizzese (1992) is based on survey questions posed in the 1989 SHIW eliciting information about the density of future earnings. Recently, Dominitz and Manski (1997a; 1997b), Dominitz (1998) and Das and Donkers (1997) have followed the alternative approach; so does the design of the 1995 SHIW.[1]

The 1995 SHIW has data on income, consumption, financial wealth, real estate wealth, and several demographic variables for a representative sample of 8,135 Italian households (including 14,699 income recipients). Interviews were conducted between May and October of 1996. Balance-sheet items are end-1995 values. Income and flow variables refer to 1995.[2] The survey also covers job search activity, hours of work and labor force participation.

A special section of the survey was designed to characterize the distribution of future income and the probability of unemployment. To our knowledge, the only two other surveys containing information on employment prospects are the Health and Retirement Survey (HRS), conducted at the University of Michigan since 1992, and the Survey of Economic Expectations (SEE), conducted at the University of Wisconsin-Madison since 1994.[3] The SEE is a national telephone survey of the US population. The survey is limited in scope and small in size (1,300 households interviewed in 1996). The drawbacks of the HRS data are that the survey has no questions about income expectations and that respondents' age is deliberately restricted to the 51-61 range (in 1992), i.e. individuals approaching retirement for whom unemployment risk could be negligible or altogether absent. Explicitly considering unemployment probabilities at younger ages is important, because employment risk is one of the major determinants of future income prospects.

Our survey questions focus on earnings rather than disposable income and on individuals rather than households. Focus on earnings avoids mixing labor income and capital

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[1] Other studies rely on retrospective income information to estimate measures of income risk from panel data. We comment on this approach in Section 4.

[2] Brandolini and Cannari (1994) describe the main features of the SHIW, its sample design, interviewing procedure and response rates. Details about the 1995 sample can be found in Banca d'Italia (1997). The dataset can be obtained by writing to: Banca d'Italia, Research Department, Via Nazionale 91, 00196 Rome, Italy.

[3] The wording of the HRS question is as follows: "Sometimes people are permanently laid off from jobs they want to keep. On a scale from 0 to 10, where 0 equals absolutely no chance and 10 equals absolutely certain, how likely is it that you will loose your job during the next year?". The wording of the SEE question is: "I would like you to think about your employment prospects over the next 12 months. What do you think is the percent chance that you will lose your job during the next 12 months?" The HRS changed the question wording in 1994, to a percent chance on a scale from 0 to 100.

income uncertainty.[4] Focus on individuals avoids relying on one person to evaluate the income prospects of other household members. Unlike the SEE, the 1995 SHIW households report the distribution of after-tax income, rather than gross income.[5] One advantage of using after-tax income is that most household choices ultimately depend on disposable income, not income before taxes. Furthermore, since in Italy income taxes and social security contributions are withheld at source, employees are better informed about their after-tax earnings.

Four questions on income expectations were asked to *half* of the overall sample after excluding the currently retired and people not in the labor force (a total of 4,799 individuals).[6] Both the employed, the unemployed and the job seekers are asked to state, on a scale from 0 to 100, their chances of having a job in the 12 months following the interview. Each individual assigning a positive probability to being employed is then asked to report the minimum (y_m) and the maximum (y_M) incomes he or she expects to earn if employed, and the probability of earning less than the midpoint of the support of the distribution, $Prob(y \leq (y_m + y_M)/2) = \pi$. The exact wording of the survey questions is provided below. All respondents are first asked:

(i) "Do you expect to voluntarily retire or stop working in the next 12 months?"

If the answer is "Yes" the interviewer goes on to the next survey section. If the answer is "No" each respondent is asked questions (ii) through (v) below:

(ii) "What are the chances that in the next 12 months you will keep your job or find one (or start a new activity)? In other words, if you were to assign a score between 0 and 100 to the chance of keeping your job or of finding one (or of starting a new business), what score would you assign? ("0" if you are certain not to work, "100" if you are certain to work). The following table is shown to the respondent:

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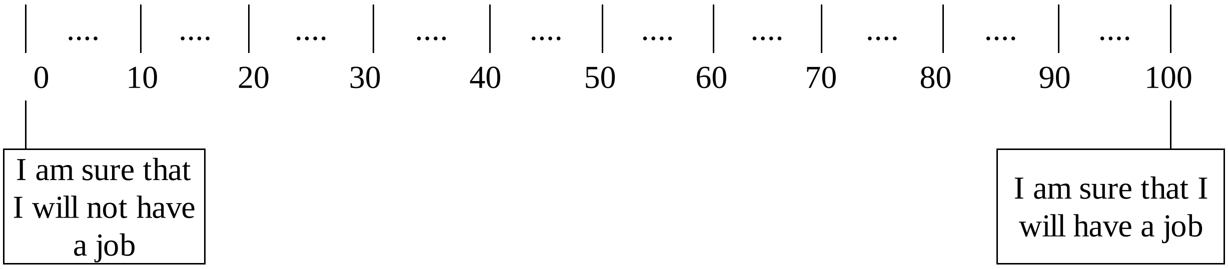
[4] One of the purposes of the survey questions was to allow tests of models with precautionary saving. Interest rate risk has ambiguous effects on saving and can to a large extent be avoided by portfolio diversification. Thus measures of income risk that are based on the probability distribution of disposable income can potentially bias tests of precautionary saving.

[5] Prior to 1994 the SEE questions focus on labor income at the household level; since 1994 they concern individual income. Dominitz (1998) uses SEE data to analyze the probability of being employed and the distribution of weekly earnings. Manski and Straub (2000) focus only on the probability of being employed. Neither study takes into account unemployment compensation.

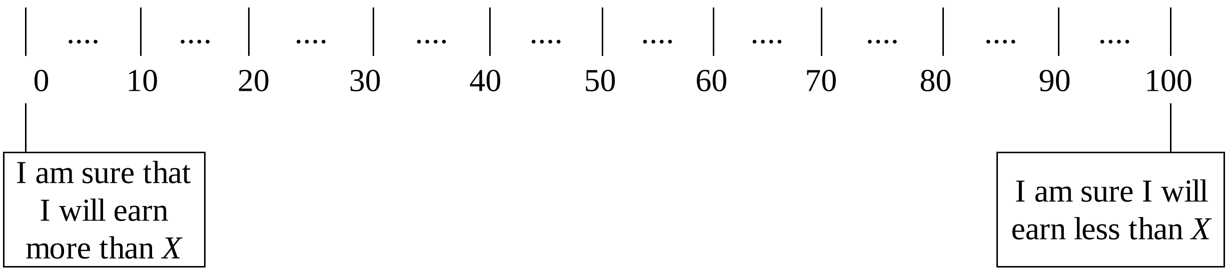
[6] The 1995 SHIW contains two special sections, respectively on subjective income expectations and past labor market experience. To reduce overall interview time, half of the sample is asked questions from the first section and the other half questions from the second section. Allocation of households to the two sections is random and based on the year of birth of the head (odd or even).



(iii) Suppose you will keep your job or that in the next 12 months you will find one. What is the minimum annual income, net of taxes and contributions that you expect to earn from this job?

(iv) Again suppose you will keep your job or that in the next 12 months you will find one. What is the maximum annual income, net of taxes and contributions that you expect to earn from this job?

(v) What are the chances that you will earn less than *X* (where *X* is computed by the interviewer as [(iii)+(iv)]/2)? In other words, if you were to assign a score between 0 and 100 to the chance of earning less than *X*, what score would you assign? ("0" if you are certain to earn more than *X*, "100" if you are certain to earn less than *X*). The following table is shown to the respondent:



The first question excludes transitions into retirement or out of the labor force. Question (ii) aims at obtaining information on the probability of employment for both the currently employed and the unemployed, taking into account job mobility, i.e. that some respondents plan to quit or to change job. However, in practice the interpretation of the question could be different for the currently employed and for the unemployed. Moreover, it is not clear that the respondent, if employed, reports only involuntary job losses rather than *any* change in employment status (including job mobility). Thus, the question could be subject to measurement error and misrepresent true unemployment risk. In Section 4 we will therefore cross-examine the reliability of the unemployment question by comparing the average subjective unemployment probability with actual unemployment rates drawn from labor force statistics; we also compare unemployment probabilities with actual labor market transition probabilities.

In the next section we describe how we combine the information derived from these four questions to estimate the distribution of future income, both conditional and unconditional on working. From the original 4,799 observations, we exclude 209 who expected to retire or to drop out from the labor force within a year and 385 individuals with missing data on questions (ii) through (v) above. The non-response rate is therefore 8 percent ($\frac{385}{4,590}$), and the final sample includes 4,205 individuals.

3. The individual distributions

The distribution of future income depends on the distribution of future earnings if the individual is employed and on the distribution of unemployment benefits if he or she is unemployed. The two distributions have to be weighted by the probability of the two states, so that the distribution of future income is the mixture of two distributions:

$$x_i = \begin{cases} y_i & \text{with probability} \quad (1 - p_i) \\ b_i & \text{with probability} \quad p_i \end{cases} \tag{1}$$

where y_i is earnings if employed, b_i unemployment benefits if unemployed, p_i the probability of unemployment and i refers to the i-th individual in the sample. We will denote by $f(y_i)$ the individual distribution of future earnings, or simply the earnings distribution, $g(b_i)$ the individual distribution of benefits and $h(x_i) = (1-p_i)f(y_i) + p_i g(b_i)$ the individual distribution of future income, or simply the income distribution.

As noticed, if the individual is currently employed, p_i is the probability of loosing the current job and not finding one in the 12 months following the interview; if the individual is currently unemployed, p_i is the probability of not finding a job. For the self-employed p_i can be interpreted as the probability of personal bankruptcy. Unemployment benefits b_i should include not only unemployment compensation, but also any other resources that are formally or informally transferred in case of unemployment.

Dropping individual subscripts, the expected value of income of individual i is then:

$$E(x)=(1-p)\ E(y)+p\ E(b) \tag{2}$$

where $E(y)$ and $E(b)$ denote the expected values of y and b, respectively. The variance of the mixture income distribution is:

$$\begin{aligned} Var(x) &= (1-p)\int \left[y-E(x)\right]^2 f(y)dy + p\int \left[b-E(x)\right]^2 g(b)db = \\ &(1-p)Var(y) + pVar(b) + p(1-p)\left[E(y)-E(b)\right]^2 \end{aligned} \tag{3}$$

To make equations (2) and (3) operational we need to make explicit assumptions about the distribution of benefits $g(b)$ and about the earnings distribution $f(y)$. In fact, the SHIW provides information on p, some information on $f(y)$ and no information on $g(b)$.

For benefits we assume that each individual forms point expectations about b.[7] Based on the rules governing Italian welfare programs, we thus impute a value $\bar{b}$ to each individual in the sample. We use survey data and aggregate information to determine eligibility requirements and welfare benefits. The latter vary substantially across population groups. For instance, the self-employed and the long-term unemployed are entitled to very few welfare programs. Since in Italy information on eligibility requirement and welfare benefits are coded in the legislation and widely known to the public, the assumption of point expectations is reasonable. However, our imputation does not take into account other private transfers (monetary or in kind), which may represent an important income source in case of unemployment. The imputation procedure is detailed in the Appendix.

As far as $f(y)$ is concerned, recall that the survey provides information on the support of the distribution $[y_{m,}\ y_M]$ and on the probability mass to the left of the mid-point of the

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[7] It is straightforward to allow also for uncertain unemployment benefits. For instance, one could assume that not all workers file for the benefits they are, at least in principle, entitled to. Alternatively, that help from relatives or friends in case of lay-off is uncertain. Finally, that compensation received by young unemployed depends on the number of eligible unemployed in the region of residence. But each of these scenarios is inherently arbitrary, so we prefer to stick to the case in which benefits are not a random variable.

support, $Prob(y \leq (y_m+y_M)/2) = \pi$. Knowing the support of the distribution, we can express the expected value and variance of y as

$$E(y) = \int_{y_m}^{y_M} yf(y)dy \tag{4}$$

$$Var(y) = \left[\int_{y_m}^{y_M} y^2 f(y)dy - \left(\int_{y_m}^{y_M} y \ f(y)dy \right)^2 \right]. \tag{5}$$

We consider two assumptions concerning $f(y)$. The first is that y is uniformly distributed over each of the two intervals $[y_m, (y_m+y_M)/2]$ and $((y_m+y_M)/2, y_M]$. If π=0.5 the distribution collapses to a single uniform distribution defined in the interval $[y_m, y_M]$. A second possibility is to assume that the distribution is triangular over the same two intervals; if π=0.5 the distribution again collapses to a single triangular distribution over the interval $[y_m, y_M]$. The expressions to compute the mean and the variance of the triangular distributions are reported in the Appendix. Note that in both cases $E(y)$ and $Var(y)$ depend only on the three known parameters, y_m, y_M, and π. The triangular distribution, (which is shown in Figure 1), is a more plausible description of the probability distribution of earnings, because outcomes further away from the mid-point receive less weight. For this reason in the remainder of the paper we report statistics computed according to the triangular distribution. We also checked the sensitivity of the results on the assumption of a uniform distribution. All results were very similar and are not reported for brevity.

If people have point expectations about benefits, $Var(b)$=0 and we can rewrite equations (2) and (3) as:

$$E(x) = (1-p)E(y) + p\bar{b} \tag{6}$$

$$Var(x) = (1-p)Var(y) + p(1-p)\left[E(y) - \bar{b}\right]^2 \tag{7}$$

The coefficient of variation provides a convenient measure of income risk that is particularly useful for comparison between different individuals, groups or samples. The coefficient of variation of earnings, $CV(y)=Sd(y)/E(y)$, is immediately obtained by the ratio between the square root of equation (5) and equation (4). It is of course affected by distributional assumptions. The coefficient of variation of income is:

$$CV(x) = \frac{Sd(x)}{E(x)} = \frac{\sqrt{(1-p)Var(y) + p(1-p)\left[E(y) - \bar{b}\right]^2}}{(1-p)E(y) + p\bar{b}} \tag{8}$$

Equation (8) highlights that the relation between the probability of unemployment and overall income risk, as measured by $CV(x)$, is non-linear. The standard deviation of income $Sd(x)$ equals the standard deviation of earnings if p=0 and zero if p=1, is concave in p and is maximized when $p = 1/2 - \frac{Var(y)}{2\left[E(y) - \bar{b}\right]^2} = p^* < 0.5$. Thus an increase in p above p^* reduces expected income and raises $Sd(x)$. The probability p affects also the expectation of income (the denominator of equation 8), so that the relation between p and $CV(x)$ too is a non-linear function of $Var(y)$, $E(y)$ and $\bar{b}$.[8]

This is illustrated in Figure 2, where we set $E(y)$=100 and $Var(y)$=16, so that $CV(y)$=4 percent; as will be seen in Section 4, this value is close to the median coefficient of variation of earnings in our sample. The figure reports $CV(x)$ of individuals with the same earnings distribution but different unemployment probabilities. The lower curve plots $CV(x)$ as a function of p if $\bar{b}$=0.8×$E(y)$, approximately the level of benefits to which are entitled large firm employees. For an individual with p=0.2 (about the sample average of the probability in our sample), $CV(x)$ is 8 percent. The coefficient of variation reaches a maximum at 10 percent for an individual with p=0.5, and then declines for individuals with higher values of p. The higher curve refers to individuals who are entitled to $\bar{b}$=0.50×$E(y)$; as explained in the Appendix, this situation is typical for employees of small firms. The much larger value of [$E(y)-\bar{b}$] raises the weight of p in determining the riskiness of future income. For an individual with p=0.2, $CV(x)$ is now 22 percent. The impact of the probability of

[8] If unemployment benefits are stochastic, $Var(b)$ further increases $CV(x)$.

unemployment is maximum for an individual with p=70 percent, $CV(x)$=35 percent.

The figure shows that $CV(x)$ is very sensitive to the level of unemployment benefits at all levels of p. The imputation of $\bar{b}$ can be questionable, particularly because it neglects informal transfers. Thus in the next section we report information on both $CV(y)$, which is independent from $\bar{b}$ and p, and on $CV(x)$.

Since we have an estimate of the distributions at the individual level, we can easily check if the distributions are symmetric. We thus construct and analyze an index of skewness of the distributions, $AS(y) = \frac{M(y) - E(y)}{Sd(y)}$ for earnings and $AS(x) = \frac{M(x) - E(x)}{Sd(x)}$ for income, where $M(\cdot)$ is the median of the distribution. The formula for the median is reported in the Appendix. In Section 7 we will consider more in detail how this index varies with individual characteristics.

4. The cross-sectional distributions

The foregoing definitions and assumptions allow us to compute the mean and variance of both future earnings and future income for each individual in the sample, and therefore to obtain a cross-sectional distribution of individual means and variances. These cross-sectional distributions are conveniently summarized in Table 1 by the cross-sectional distribution of the probability of unemployment and of the individual coefficient of variation.

Column (1) of Table 1 displays the cross-sectional distribution of p. For over 40 percent of the sample p=0, a signal of substantial rigidity in the labor market; the incidence of p=0 among the employed is even higher. On the other hand, only 3 percent of the sample is certain to be unemployed in the year following the interview (p=1).[9] A sizable fraction of the sample reports substantial unemployment uncertainty: for 20 percent the probability exceeds 50 percent.

Columns (2) displays the deciles of the coefficient of variation of earnings,

[9] As we argue in Section 2, due to the wording of the questions, a high p does not necessarily reflect worsening employment prospects. For instance, women who anticipate having a child, or young men expecting compulsory military service may correctly report temporary exit from the labor force in the year following the survey, rather than job dismissal or inability to find a job.

$CV(y)=Sd(y)/E(y)$. The cross-sectional distribution of the coefficient of variation $CV(y)$ is right skewed, as shown by the positive difference between the cross-sectional mean, equal to 4.13 percent, and the cross-sectional median, 3.14 percent.

The cross-sectional distribution of $CV(y)$ can be compared with previous evidence for Italy. Guiso, Jappelli and Terlizzese (1992) use subjective expectations from the 1989 SHIW. Since no question on employment prospects was asked in 1989, a proper comparison between the 1995 and the 1989 SHIW must focus on $CV(y)$. In that survey respondents were asked a rather different set of questions about earnings prospects. They had to assign probability weights, summing to 100, to a set of intervals of income changes over the 12 months following the interview.[10]

It is not obvious whether asking questions about the density function of future income is more effective (in terms of minimizing the probability of non-response and in eliciting meaningful data) than questions about the cumulative distribution function. We can provide some evidence on this important issue comparing non-responses to the questions on expectations in the 1989 and 1995 SHIW.[11] In 1989 5,954 of those interviewed did not answer the questions on the subjective income density function (a non-response rate of 43 percent). In 1995 the fraction of non-respondents to the questions on the cumulative distribution was only 8 percent. In contrast, in 1989 a much higher faction of respondents reported no income risk (34 percent), while the same fraction in 1995 was only 13 percent. The much higher response rate suggests that the 1995 questions concerning the cumulative distribution function are easier to grasp and thus provide more reliable information. Further evidence (not reported for brevity) indicates that the probability of non-response in 1989 is statistically significantly lower for the more educated, the resident in the North and the young. In contrast, the same demographic variables do not significantly affect the probability of non-response in 1995.

Regardless of the assumptions on the shape of the distribution, the cross-sectional average of $CV(y)$ is higher in 1995 than in 1989 (about 2 percent), reflecting differences in sample design and risk across sample periods. In fact, the 1995 interviews were completed

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[10] The wording of these questions and details about the construction of the variables are reported in Guiso, Jappelli and Terlizzese (1992).

[11] Evidence for other countries is not available because the surveys with expectation questions have not changed format over time.

between May and October of 1996 (a recession year), whereas the 1989 interviews were completed in the spring of 1990, at the end of an upswing. Nonetheless, $CV(y)$ in both years is fundamentally characterized by the small magnitude of income risk.

Column (3) of Table 1 reports the cross-sectional distribution of the coefficient of variation of income, $CV(x)=Sd(x)/E(x)$, which combines the variance of earnings with information on the probability of unemployment and the imputation of benefits (see equation 8). For the bottom part of the distribution, where p is zero or close to zero, there is not much difference between $CV(y)$ and $CV(x)$. But already at the median the impact of p is substantial: the cross-sectional median of $CV(x)$ is 5.83 percent. In the top two deciles the impact of p and of imputed benefits is dramatic, because the coefficient of variation exceeds 40 percent, so that the overall cross-sectional mean is 24.29 percent. The high values in the top two deciles often refer to self-employed or high-income people for which benefits are low relative to earnings. Given the substantial asymmetry of the cross-sectional distributions of $CV(y)$ and particularly of $CV(x)$, in the remaining of the paper we use the median as location parameter and rely on regressions estimated by Least Absolute Deviations, which are robust to outlying observations.

It is not easy to compare $CV(y)$ or $CV(x)$ with measures of income risk obtained by regression analysis. MaCurdy (1982) estimates a univariate income process and reports that the standard deviation of the growth rate of income is 23.5 percent in the PSID. Although this number is close to the average $CV(x)$ in our sample, part of the income variability in panel data is certainly due to measurement error and unobserved heterogeneity. Furthermore, the time-series error of the income process estimated with panel data does not necessarily reflect the innovation faced by individuals, who might consider a much larger set of variables than the econometrician and therefore have superior information about their income prospects. Finally, the standard errors estimated by univariate income functions may reflect inequality rather than true ex-ante uncertainty. Moments of the income distribution estimated with survey questions may therefore be more reliable than panel data estimates.

Intertemporal choice models (for instance, models with precautionary saving or portfolio allocations) emphasize the role of lifetime income uncertainty rather than uncertainty one period ahead, which is the focus of the paper. One can show that under a set of reasonable assumptions (finite horizon and constant conditional variances), the conditional variance of lifetime income is proportional to the conditional variance one period ahead. If the income process is an arithmetic random walk, the proportionality factor is a deterministic function of age and of the discount rate.[12]

We now examine how *p* and the moments of the income distribution vary across demographic groups. Averages of the probability of unemployment are presented in Table 2 for the employed, the unemployed and the total sample. If workers are identical in all characteristics and unemployment were purely voluntary, one should observe no large differences in unemployment probabilities between the two groups. But this is clearly not the case: *p* is much higher for the currently unemployed (64 percent against 15 percent), suggesting strong state-dependence or heterogeneity in employment status. Furthermore, the large differences within demographic groups suggest that layoffs are not generated by random draws, but strongly related to market and individual characteristics.[13] Interestingly, these figures are close to labor market transition probabilities obtained from panel data of the Labor Force Survey run by the National Statistical Office (ISTAT). In 1999 for those currently unemployed, the probability of remaining unemployed was 63.6 percent, quite close to that reported in Table 3. For those currently employed the probability of becoming unemployed over the year was 5.2 percent, substantially lower than that reported in the table. One explanation is that some of the currently employed interpret the unemployment question (i) in Section 2 as referring to job mobility, not unemployment. Alternatively, that the employed are more pessimistic about job prospects than justified on the basis of official statistics.

With the exception of gender, health and job search status, the pattern of *p* by demographic group is similar, regardless of employment status. The probability is higher for the young, the less well educated, residents in the South, and those employed in small private firms. Stratifying by employment status, we find that active job seekers report a lower *p* (63 percent) than non-searchers (68 percent); among the employed, the pattern is reversed (29 against 13 percent). One possible interpretation is that the unemployed who search are those

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[12] If the income process is the sum of a permanent random walk component and a transitory white noise component (a popular characterization of the income process), then lifetime income uncertainty is still proportional to uncertainty one period ahead, provided one knows how much of the total income variance is due to transitory or permanent shocks. With serial correlation in the transitory shock, however, the proportionality no longer holds.

[13] Carroll (1997) assumes that the probability of unemployment is constant in each period and for each individual and simulates a buffer-stock model of consumption. The evidence in Table 2 is strongly at variance

with reasonable chance of finding a job, while those who don't are discouraged by a high perceived probability of remaining unemployed anyway, consistent with the presence of fixed costs of search. Alternatively, the unemployed who don't search may report lower unemployment probabilities simply because job search improves employment prospects. As for the employed, it is likely that some of them search when still employed because they anticipate losing their job, and this is correctly reflected in the higher reported probability of unemployment.

The cross-sectional medians by demographic groups of realized 1995 income, $\bar{b}$, $E(x)$ and $Cv(x)$ are reported in Table 3. Though income expectations and realizations refer to different years, on average they are quite close (9,814 and 9,900 Euros, respectively).[14] Several groups expect an income decline, particularly the elderly, people self-reporting poor health status, and employees of small firms. The pattern of unemployment benefits across groups reflects Italian welfare legislation program: public sector employees and employees of large firms are more likely to receive substantial income support in the case of unemployment. Very few welfare programs support the self-employed in case of drops in earnings.

The cross-sectional pattern of the coefficient of variation confirms that employees of the private sector (particularly of small firms) and the self-employed perceive high risk (the median of the coefficient of variation in the group is 8.16 percent), while public sector employees perceive little risk (2.15 percent). Active job seekers expect more volatile incomes than those who are not currently searching. Finally, the young and residents in the South face comparatively more risk.

5. The cross-sectional age-profiles

Income and employment uncertainty change over the life cycle. At the beginning of their career, people face a wide range of possible opportunities involving different patterns of

with this assumption.

[14] Since interviews were completed between May and October of 1996, they reflect expectations stretching well into 1997, whereas income realizations refer to the calendar year 1995. Furthermore, 1995 earnings do not include benefits, while $E(x)$ does. The comparison is especially misleading for the unemployed, which had no earnings in 1995 but are assumed to receive unemployment benefits in the future.

lifetime earnings, but also different patterns of lifetime income uncertainty. Later on, by choice or chance some of the original opportunities are no longer available and individuals eventually settle in jobs with well-defined characteristics.

Knowledge of the evolution over time of earnings and employment risk matters in a variety of contexts. It is important in simulation studies of lifetime wealth accumulation that feature precautionary saving (for instance Carroll, 1997). It helps understanding the age pattern of the composition of the household portfolio and of the willingness to hold risky assets. Insofar as the availability of credit depends on the riskiness of income prospects, it can help understand the age profile of households facing liquidity constraints.

We report separate age profiles for the probability of unemployment p, the coefficient of variation of earnings $CV(y)$ and the coefficient of variation of income $CV(x)$. To compute the age profiles, we run kernel regressions for each of these variables on age using a Gaussian weight function. Since we want to focus on the evolution of income risk over the working career, the sample is restricted to the currently employed aged 20 to 50. The profiles are estimated for two education groups, up to compulsory schooling and more than compulsory schooling. They represent the effect of age on p, $CV(y)$, and $CV(x)$, without controlling for other age-related individual characteristics. Since we use a pure cross-section, we make no attempt at disentangling age effects from cohort effects.

It is clear that uncertainty varies considerably over the life cycle. The age profile of p in the top left of Figure 3 declines for both education groups. One way to interpret the profile is that, due to asymmetric information on workers' ability and on-the-job learning, workers perceive that employers prefer to lay off young workers. That is, when employers choose to lay off a worker, they pick from a group on which they have little information, which often is the group with short tenure. The decline of p with age is particularly strong for individuals with higher education (in this group p declines from 25 percent for the young to 5 percent for the 50 years old), possibly because firm's knowledge of white-collar workers is more strongly correlated with tenure and because these jobs offer a wider spectrum of career possibilities.

The age profile of $CV(y)$ in the top right of Figure 2 is concave for both education groups, and the shape is quite similar: an increasing profile in the late 20s, followed by a decline in the 30s and a flat profile after 40. The age profile of $CV(x)$ in the bottom left of Figure 2 is dominated by the age pattern of p. Again, it signals that income riskiness tends to decline with age, an effect that is particularly strong for individuals with higher education: in this group $CV(x)$ declines from 40 to 10 percent.

6. A comparison of unemployment risk in Italy and the US

International comparison of overall income uncertainty is considered in Dominitz and Manski (1997b) and Das and Donkers (1997). They show that perceived income uncertainty is much higher in the US than in Europe (represented by Italy and the Netherlands). The most natural explanation for the difference between perceived risk in Europe and the United States is that it reflects tighter labor market regulations and more generous welfare programs in Europe (OECD, 1999).

In this section we complement their evidence by focusing instead on perceived unemployment risk. If indeed differences in income uncertainty between the US and Europe mainly stem from differences in labor market regulations, than they should become manifest when comparing unemployment probabilities. This comparison could also help understand better the source of the difference. In Figure 4 we report the cumulative distribution function of the probability of unemployment in Italy and in the United States. Manski and Straub (2000) provide data for the United States. For comparison with the US study, we focus on those currently employed. Apart from the large difference at $p=0$, the two cumulative distributions are surprisingly similar: in both countries 70 percent of individuals perceives $p\leq10$ percent; and 10 percent faces $p>60$ percent. The main difference in the two distributions is at low levels of p: the fraction of those facing no risk of job loss is much higher in Italy than in the United States (60 against 30 percent) a reflection of the different institutional characteristics of the labor market, with a tougher job protection legislation in Italy than in the US and of the larger size and stability of public sector's jobs in Italy.

The comparison between the two countries could be affected by the high Italian unemployment rates, particularly in the Southern regions. To insulate the comparison from cyclical and structural differences in the labor market, we drop individuals living in provinces where the unemployment rate exceeds 7 percent, leaving us with a sample in which the overall unemployment rate is close to the 1993 US national average (we retain roughly 1,000 observations). At low levels of *p* the large difference between the two countries is quite substantial; at higher levels of *p* the shape of the distribution function tends to become similar.

Since the difference between Italy and the United States is concentrated in the bottom part of the *p* distribution, in Table 4 we focus on the demographic characteristics of the sub-samples of those reporting p=0 and p>0. Regardless of group, the fraction of individuals reporting p=0 is much higher in Italy. The qualitative pattern across groups is similar in the two countries: the group with p=0 is larger for those with longer tenure (as proxied by age), those with college education and the self-employed. But note the very high premium for job stability of Italian college graduates: over 72 percent reports p=0 against 57 percent in the group with low education. The comparison confirms the different nature of the two labor markets: tighter regulation of Italian labor markets reduce substantially the employee's perceived risk of job dismissal relative to the United States.

There is a growing literature that compares the effect of labor market institutions on the amount of risk that workers face, earnings inequality, and the consequent welfare effects. Bertola and Ichino (1995) argue that labor market institutions are the main determinants of the degree of risk perceived at the individual level. They make a strong case that workers in countries where labor markets are highly flexible (as the United States) perceive higher income risk than workers in countries with more rigid labor market institutions and wages (as Italy). According to Bertola and Ichino, the probability of unemployment depends on employment status: the unemployed are more likely to find a job and the employed are more likely to be laid off in countries with more flexible labor markets. Using simulations Flinn (1998) compares the implications of lifetime welfare inequality of labor market institutions in Italy and the United States. He finds that the American flexible system is characterized by higher cross-sectional dispersion in earnings (and therefore higher income risk) but lower inequality in lifetime welfare, compared to the Italian inflexible system.[15]

Overall, the international comparison supports some of the hypothesis advanced by Bertola and Ichino. Provided that the differences in *p* and overall income uncertainty do not reflect sample design and other measurement problems, there is compelling evidence that in countries with greater labor market flexibility on-the-job wage uncertainty is higher than in

[15] Flinn ignores differences in earnings uncertainty and heterogeneity in the probabilities of unemployment in the two countries. This is a case where survey questions could be very useful to calibrate simulation studies.

countries with more rigid labor markets. At the same time, our analysis in this section shows that for the employed p is higher in environments with more flexible labor markets; unfortunately, for the unemployed we cannot make the comparison because we lack data for the US.

7. Income risk and risk aversion

One objection to the use of income risk indicators in empirical tests of household behavior is that coefficient estimates can be biased by self-selection. This can happen if unobserved preferences correlate with income risk. For instance, risk-averse people may choose low risk occupations and avoid risky jobs, such as self-employment or employment by small firms. Consider then an applied economist who wants to estimate the importance of precautionary saving and runs a regression of saving on income risk omitting risk aversion. The coefficient of income risk will be biased downward by the endogeneity of the risk indicator: even an insignificant coefficient can be consistent with precautionary saving because income risk is negatively correlated with an omitted variable (risk aversion). See Dynan (1993) for an empirical example and a discussion.

A question in the 1995 SHIW provides a unique opportunity to measure individual attitudes towards risk and to gauge the severity of the self-selection problem.[16] Each household head was asked: "Suppose you have the opportunity to invest in a risky asset. There is an equal chance that you will gain 5,000 Euros or lose everything. At most, how much would you be willing to pay to purchase this asset?". The expected value of such a lottery is 5,000 Euro, and most households (95 percent) report a price that is strictly less than the expected value of the lottery, that is they are risk averse. We then define three indicators corresponding to low (willingness to pay strictly less than 1,250 Euro), medium (between 1,250 and 2,500) and high (2,500 or more) risk aversion.

In Table 5 we regress p, $CV(y)$, $CV(x)$ and $AS(x)$ on a set of demographic characteristics and the risk aversion indicators. As the risk-aversion question is asked only to household heads and other observations are lost because of missing or zero current earnings, the sample is restricted to 1,556 individuals.[17] If individuals self-select into jobs according to their attitudes toward risk, their risk aversion should help predict the probability of unemployment, the coefficient of variation, and the index of asymmetry, after controlling for individual characteristics. In general we find the expectation variables difficult to predict on the basis of observable characteristics, as witnessed by the low R^2 reported in Table 5. This may reflect large error in measuring income riskiness or the fact that income riskiness has a large individual component that is not associated with standard demographic variables. However, some interesting patterns emerge from the data.

In column (1) we focus on the probability of unemployment. As in the descriptive analysis of Table 2, we find that p has a strong inverse correlation with education. An additional year of education reduces the probability of unemployment by 1.2 percentage points (in this sample the mean is 14 percent). Residence in Southern Italy, where the unemployment rate is about 3 times the national average, has the expected effect: moving an individual from the North to the South would raise the probability of facing unemployment by roughly 10 percentage points. The coefficient of age is negative but poorly measured, and so are other demographic characteristics. The risk aversion indicators do not explain unemployment risk.

In column (2) we relate $CV(y)$ to the same set of variables (recall that $CV(y)$ refers to the earnings distribution if employed). Age and education reduce earnings variability, while being male increases it. The coefficients of the other demographic variables and of the dummies for risk aversion are not statistically different from zero.

The third column of Table 5 refers to $CV(x)$. The general pattern of results is somewhat similar to that of $CV(y)$, with one notable exception: the coefficient of the dummy for high risk aversion in this regression is negative and precisely estimated (a t-statistic of –2.4). The coefficient suggests that more risk adverse individuals choose occupations where $CV(x)$ is 1.3 percent lower than for the less risk averse (the median of $CV(x)$ in this sub-sample is 4.22, the mean 22). This implies that the self-selection effect cannot be easily dismissed in empirical studies.[18]

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[16] Questions on risk attitudes are also asked in the HRS, and have been used by Barsky *et al.* (1997).

[17] The lottery question was submitted to the whole sample of 8,135 household heads, but only 3,458 answered and were willing to participate. Out of the 4,677 who did not, 1,586 reported a "do not know" answer and 3,091 overtly refused to answer or to participate with positive price.

[18] Risk aversion can be measured correctly only if income is non-random. For instance, if the lottery is

Another important characteristic of the individual distribution is asymmetry.[19] We measure the asymmetry of the income distribution with the index $AS(x) = \frac{M(x) - E(x)}{Sd(x)}$, which ranges from –1 to 1. If $AS(x)>0$ the distribution is skewed to the right, implying that very unfavorable events receive more weight than favorable events. Intuitively, individuals who dislike negative income shocks should select themselves in occupation with positive $AS(x)$. In column (4) of Table 5 this intuition is confirmed. We find that risk aversion is associated with a distribution that is skewed to the right. This implies that risk-averse individuals select themselves into occupations where large negative income events occur with relatively low probability. This channel adds to the selection effect due to income uncertainty described above.

8. Conclusions

In this paper we propose a new set of indicators of expected income and subjective income risk using the 1995 Bank of Italy Survey of Household Income and Wealth. Their main advantage is that they are derived from simple yet powerful questions. With suitable assumptions, these questions allow estimation of moments of the distribution of future income taking into account the probability of unemployment and the distribution of unemployment compensation. We can thus examine the entire conditional distribution of income, rather than focusing on just one aspect, like most of the empirical literature. We point out that variations in the perceived probability of unemployment explain a large part of the differences in income prospects. This suggests that one should account separately for employment and income risk

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negatively correlated with income, the risk averse may be willing to pay the lottery more than its fair price of 5 million lire. In our case, the hypothetical question about risk aversion implies that the lottery is independent from income. Even if the two risks are independent, however, the Arrow-Pratt index of risk aversion depends on income risk. If preferences are proper in the sense of Pratt and Zeckhauser (1987), the riskier is income, the less willing is the individual to accept an additional independent risk, the lower the price that he is willing to pay for the lottery and the higher the index of risk aversion. This "background risk effect" can therefore attenuate the "self-selection effect". Empirically we find that risk aversion is negatively correlated with $CV(x)$, suggesting that the self-selection effect dominates. Clearly, if the background risk effect is also present, than the true self-selection is even stronger than it appears from our regressions.

[19] Caballero (1990) shows that the asymmetry of the income distribution prompts precautionary saving behavior.

in tests of households' behavior such as consumption and portfolio choice.

The second and third moment of the income distribution and the perceived probability of unemployment are then related to a set of demographic and preference characteristics. We find that demographic characteristics such as age, education and geographical location affect both unemployment risk and the variance of the subjective distribution of future earnings.

So far there is very limited evidence on the evolution of individual income risk over the life cycle and on the effect of risk aversion on income risk (the self-selection problem). Despite some theoretical work suggesting that asymmetry may be important for precautionary saving (Caballero, 1990), there has been no attempt at measuring higher moments of the income distribution. We provide evidence on these issues. First of all, we find strong evidence that the profiles of income and unemployment risk decline with age differently for individuals in different education groups, a finding that is consistent with models of the labor market in which asymmetric information and on-the-job-learning play an important role. Second, controlling for demographic variables, we find that risk aversion is a predictor of income risk. This correlation suggests that the more risk averse self-select themselves into occupations with low income risk. This finding is also consistent with the claim that the concern for security is a major factor in the traditionally long queue of Italians seeking civil service jobs. Finally, we find that the risk averse tend to select themselves in jobs with low probability of low income realizations.

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Appendix

1. Imputation of unemployment benefits

Under the Italian welfare programs in place in 1995-96, unemployment benefits depend on labor market status and individual characteristics. We separate the sample into four main groups: first-job seekers, long-term unemployed, currently employed, and self-employed. In principle, first-job seekers, long-term unemployed, and the self-employed are not entitled to benefits. However, they may be eligible for special welfare programs offering part-time jobs. For individuals in these groups we impute, by region, an average benefit equal to the ratio between 1995 public expenditure on these special welfare programs and the number of first-job seekers. Data are drawn from Alfredo Casotti and Maria Rosa Gheido (1997), "Lavori socialmente utili", *Diritto e Pratica del Lavoro*, 28. Rome: IPSOA.

Only the currently employed receive an explicit compensation in case of temporary lay-off. Unemployment compensation depends on gross earnings at the time of lay-off and on firm size. Benefit duration varies by firm size. Following current legislation, we use the following values:

- for those working in firms with over 50 employees and earning a gross monthly salary above 2.5 million lire, unemployment benefits are set at 1.5 million lire a month, and are received for twelve months following the lay-off;
- for those working in firms with over 50 employees and earning a gross monthly salary below 2.5 million lire, benefits are set either at 1.25 million lire monthly or 80 percent of gross salary, whichever is the less (duration is again 12 months);
- for those working in small firms (under 50 employees), benefits are set at 30 percent of gross monthly income, and are received for 6 months.

Finally, we set unemployment benefits equal to minimum earnings (y_m) when the former exceeds the latter.

2. The triangular distribution

Assume that the earnings distribution is triangular over the two intervals $[y_m, (y_m+y_M)/2]$ and $((y_m+y_M)/2, y_M]$. The probability mass to the left of the midpoint $(y_m+y_M)/2$ is constrained to be equal to π as in Figure 2.The density function of the distribution is:

$$f(y) = 8\frac{\pi(y-y_m)}{(y_M-y_m)^2}\mathbf{1}\left\{y_m \le y < \frac{(y_m+y_M)}{2}\right\} + 8\frac{(1-\pi)(y_M-y)}{(y_M-y_m)^2}\mathbf{1}\left\{\frac{(y_m+y_M)}{2} \le y \le y_M\right\}$$

and the mean and variance of earnings are:

$$E(y) = \frac{\pi}{3}(2y_m + y_M) + \frac{1-\pi}{3}(y_m + 2y_M)$$

$$Var(y) = \frac{\pi}{24}(11y_m^2 + 10y_m y_M + 3y_M^2) + \frac{1-\pi}{24}(3y_m^2 + 10y_m y_M + 11y_M^2) - [E(y)]^2$$

$E(x)$ and $Var(x)$ are then computed using equations (6) and (7) in the text. The median of the distribution of earnings $M(y)$ is given by:

$$M(y)=\left[y_m+\frac{y_M-y_m}{2\sqrt{2\pi}}\right]\mathbf{1}\{\pi>0.5\}+\left[y_M-\frac{y_M-y_m}{2\sqrt{2(1-\pi)}}\right]\mathbf{1}\{\pi<0.5\}+\left(\frac{y_m+y_M}{2}\right)\mathbf{1}\{\pi=0.5\}$$

while the median of the income distribution $M(x)$ is:

$$M(x)=\begin{cases} b & \text{if } p\geq 0.5 \\ y_M-\dfrac{(y_M-y_m)}{2\sqrt{2(1-\pi)p}} & \text{if } \pi<0.5 \text{ and } p<0.5 \\ y_m+\dfrac{(y_M-y_m)}{2}\sqrt{\dfrac{1-2p}{2(1-p)\pi}} & \text{if } \pi>0.5 \text{ and } p<0.5 \\ \dfrac{(y_M+y_m)}{2} & \text{if } \pi=0.5 \text{ and } p<0.5 \\ M(y) & \text{if } p=0 \end{cases}$$

Table 1

Deciles of the cross-sectional distribution of the probability of unemployment and of the coefficient of variation

The table reports percentage values of the deciles of the cross-sectional distributions of the probability of unemployment, the coefficient of variation of earnings and the coefficient of variation of income. The coefficient of variation of earnings is defined as $CV(y)=Sd(y)/E(y)$, where $Sd(y)$ is the standard deviation and $E(y)$ the mean of earnings. The coefficient of variation of income is defined as $CV(x)=Sd(x)/E(x)$ where $Sd(x)$ is the standard deviation and $E(x)$ the mean of income; mean and standard deviation in this case take into account the probability of unemployment and expected benefits. The number of observations is 4,205. All statistics are computed using sample weights.

Deciles	Probability of unemployment *p*	Coefficient of variation of earnings $CV(y)$	Coefficient of variation of income $CV(x)$
	(1)	(2)	(3)
I	0	0.00	0.00
II	0	0.99	1.24
III	0	1.67	2.14
IV	0	2.24	3.71
Median	10	3.14	5.83
VI	10	3.87	10.21
VII	30	4.91	18.00
VIII	50	6.26	39.64
IX	80	8.84	75.17
Mean	22.13	4.13	24.29

Table 2

Probability of unemployment by selected demographic characteristics

The table reports percentage values of the average probability of unemployment in the year following the interview by selected demographic groups. All means are computed using sample weights.

	Unemployed in 1995	Employed in 1995	Whole sample
	(1)	(2)	(3)
Age			
< 35	61.82	17.61	27.86
35-44	59.46	13.01	15.99
≥ 45	76.50	13.62	18.81
Gender			
Male	65.50	14.50	21.63
Female	61.10	15.96	22.90
Education			
Compulsory	67.19	18.31	26.13
High School	61.67	12.81	19.43
College	49.26	8.84	13.50
Region			
North	50.10	11.75	14.28
Center	60.10	12.73	19.66
South	69.75	22.57	34.80
Health status			
Poor	62.45	22.66	32.67
Fair	78.83	15.19	23.26
Good	63.43	14.89	21.77
Sector			
Public	-	9.29	9.29
Private	-	17.34	17.34
Firm size			
<20	-	21.30	21.30
20-99	-	19.94	19.94
>99	-	10.69	10.69
Job search			
Searching	62.57	29.38	48.44
Not searching	68.32	13.44	15.36
Risk aversion			
High	66.91	13.62	17.47
Low	72.80	13.63	17.85
Sample average	63.67	15.06	22.13
Number of observations	659	3,546	4,205

Table 3

Cross-sectional medians by selected demographic characteristics

The table reports the cross-sectional medians by selected demographic characteristics. $E(x)$ denotes the mean of income; CV(x) the coefficient of variation of income (percentage values), defined as $CV(x)=Sd(x)/E(x)$, where $Sd(x)$ is the standard deviation of income. In columns 1-3 values are expressed in Euros. Cross-sectional medians are computed using sample weights. The number of observations is 4,205.

	Earnings in 1995	Benefits	$E(x)$	$CV(x)$
	(1)	(2)	(3)	(4)
Age				
< 35	8264	1757	8781	7.95
35-44	11415	6611	11226	4.54
≥ 45	11363	2479	11234	4.52
Gender				
Male	10330	2063	10744	6.32
Female	8264	2975	8729	5.41
Education				
Compulsory	8678	1375	8626	8.16
High School	10330	5165	10847	4.59
College	12913	7748	13760	3.64
Region				
North	10330	2292	10589	5.87
Center	9710	2892	10261	4.94
South	7231	2292	7954	6.14
Health status				
Poor	8574	1986	7231	5.83
Fair	9814	1910	9477	5.81
Good	9815	2475	10048	5.83
Sector				
Public	12190	7748	12138	2.15
Private	9297	1223	9297	8.87
Occupation				
Employee	10847	7438	10778	4.44
Self-employed	8662	68	10230	8.16
Unemployed	0	5165	5940	9.22
Firm size				
<20	8729	1253	7748	28.20
20-99	9814	1757	9039	10.71
>99	12913	7748	12397	4.04
Job search				
Searching	1291	2066	6284	12.83
Not searching	10743	2445	10847	4.54
Risk aversion				
High	11911	2407	11622	4.41
Low	11467	1788	11622	6.26
Total sample	9814	2353	9900	5.83

Table 4

Fraction of respondents with zero and positive probability of unemployment: A comparison between Italy and the US

The table reports the fraction of respondents (in percentage values) with zero (p=0) and positive (p>0) probability of unemployment in Italy and in the United States in the year following the interview by selected demographic groups. Data for the United States are drawn from the Survey of Economic Expectations. We thank Charles Mansky and John Straub for making available to us the distributions for the United States. Individuals older than 50 years of age and the unemployed are excluded.

	Italy		United States	
	p =0	p >0	p =0	p>0
Age				
<35	51	49	27	73
35-44	64	36	32	68
>45	65	35	42	58
Education				
No college	57	43	30	70
College	72	28	32	68
Occupation				
Employee	58	42	29	71
Self-employed	60	40	48	52
Total sample	59	41	31	69

Table 5
The determinants of the probability of unemployment,
the coefficient of variation and the asymmetry of expected income

The table reports regressions of the probability of unemployment *p*, the coefficient of variation of earnings *CV*(*y*), the coefficient of variation of income *CV*(*x*), and the index of asymmetry *AS*(*x*), all multiplied by 100. *CV*(*y*) is defined as *CV*(*y*)=*Sd*(*y*)/*E*(*y*), where *Sd*(*y*) is the standard deviation and *E*(*y*) the mean of earnings. *CV*(*x*) is defined as *CV*(*x*)=*Sd*(*x*)/*E*(*x*), where *Sd*(*x*) is the standard deviation and *E*(*x*) the mean of income. *AS*(*x*) is defined as [*E*(*x*)-*M*(*x*)]/*Sd*(*x*), where *M*(*x*) is the median of the income distribution. The regressions for *CV*(*y*), *CV*(*x*), and *AS*(*x*) are estimated by Least Absolute Deviations. The regression for *p* is estimated by Ordinary Least Squares. The sample excludes the unemployed and observations with missing values for risk aversion. Omitted characteristics are: Resident in the Center, Fair health, and Low risk aversion. The number of observations is 1,556. Standard errors are reported in parenthesis.

	p	*CV(y)*	*CV*(*x*)	*AS*(*x*)
	(1)	(2)	(3)	(4)
Age	-0.0605 (0.0687)	-0.0176 (0.0097)	-0.0390 (0.0209)	-0.1402 (0.0982)
Male	-2.8611 (1.8140)	0.5914 (0. 2543)	1.4471 (0.5507)	-1.4646 (2.5929)
Education (in years)	-1.2043 (0. 1488)	-0.0682 (0.0210)	-0.3199 (0.0450)	-0.3008 (0.2127)
Resident in the North	-0. 6061 (1.6174)	-0.2858 (0.2275)	0.2927 (0.4903)	-4.7788 (2.3119)
Resident in the South	9.0034 (1.6712)	0.0205 (0.2352)	0.5486 (0.5067)	0.5706 (2.3889)
Poor health	1.0687 (4.3194)	-0.2120 (0.6022)	-2.3892 (1.3007)	2.5685 (6.1742)
Good health	-0.9839 (1.7631)	0.0057 (0.2484)	-1.1623 (0.5365)	2.3533 (2.5201)
High risk aversion	0.0414 (1.7276)	-0.2712 (0.2422)	-1.2599 (0.5247)	8.3309 (2.4694)
Moderate risk aversion	-0.9990 (2.2029)	0.1025 (0.3095)	0.3619 (0.6697)	6.9153 (3.1489)
Constant	29.3199 (4.6181)	3.7897 (0.6502)	9.8846 (1.4045)	1.0199 (6.6011)
R^2	0.0808	0.0103	0.0080	0.0168

Figure 1

The triangular distribution of earnings

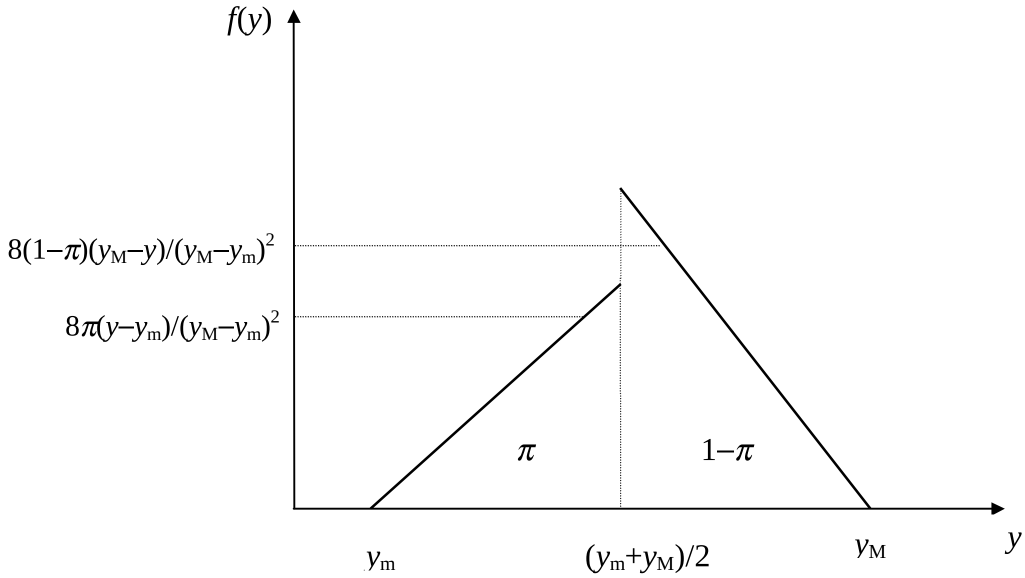

Figure 2

The effect of the probability of unemployment on the coefficient of variation of income

The figure reports the relation between the probability of unemployment and the coefficient of variation of income *CV*(*x*). In the examples average earnings *E*(*y*) and the variance of earnings *Var*(*y*) are set at 100 and 16 respectively. In the upper line unemployment benefits are set at 80 percent of *E*(y), in the lower line at 50 percent.

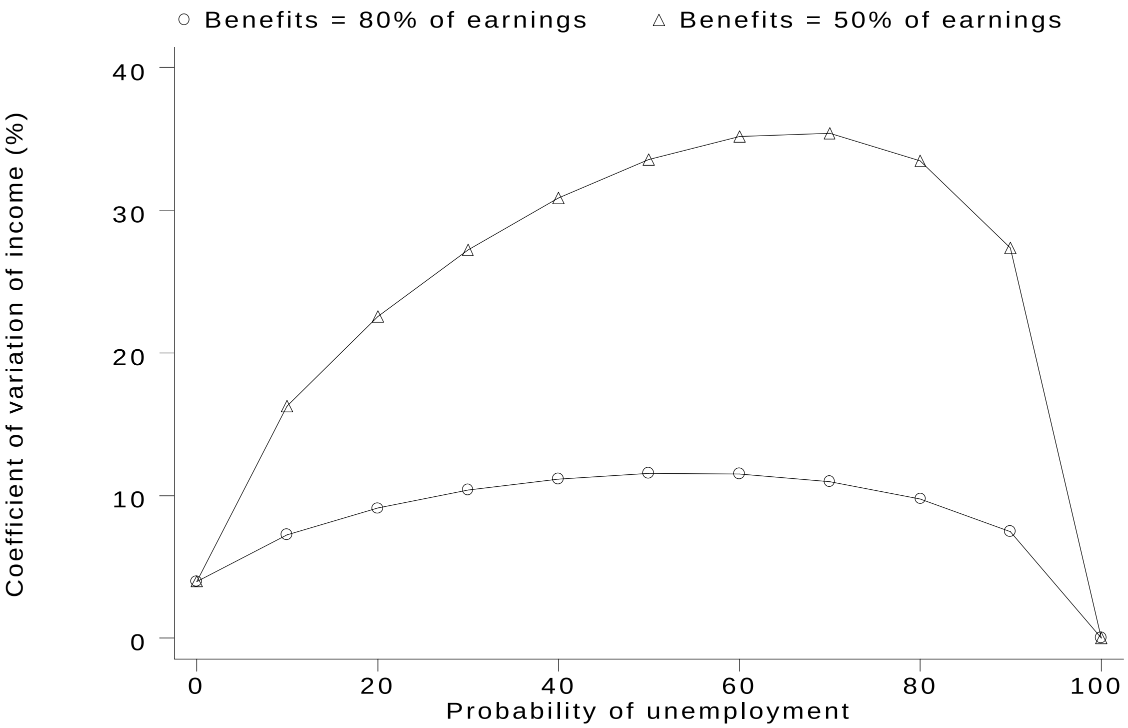

Figure 3

Age profiles of the probability of unemployment, earnings and income

The age profiles are estimated by a kernel regression using a Gaussian weight function. Each regression is estimated separately for employed workers who completed junior high school (low education) and those who completed high school or college (high education).

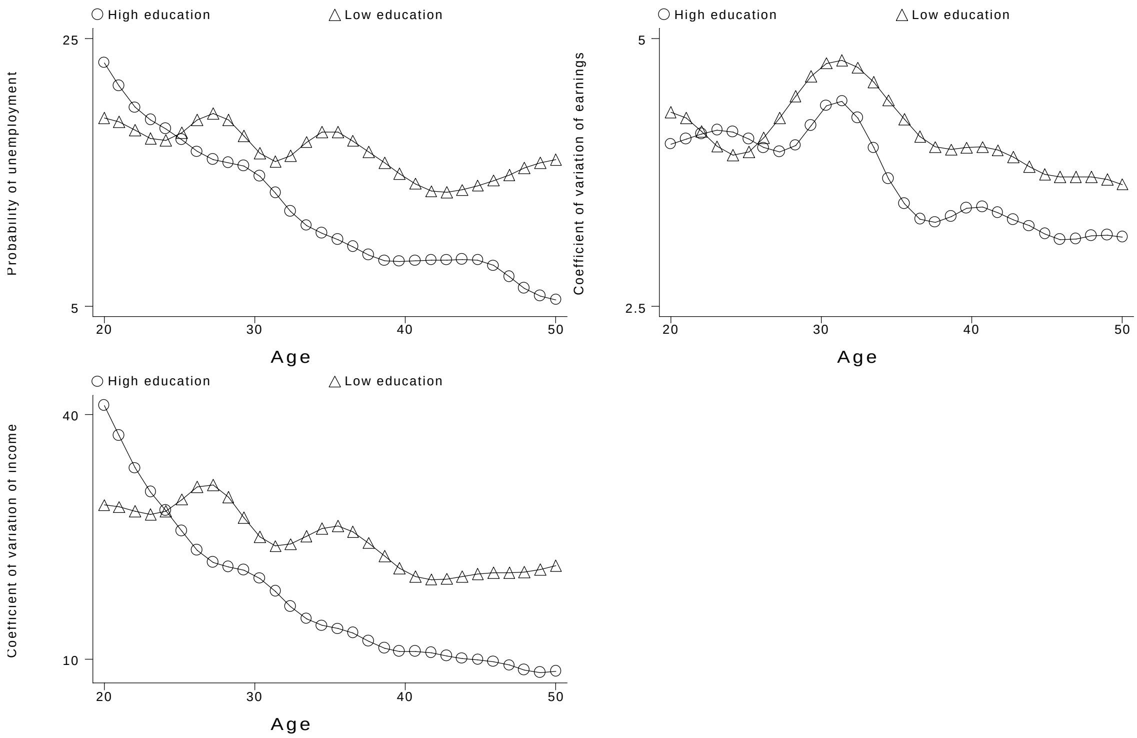

Figure 4

The probability of unemployment in Italy and the United States

The figure reports the subjective probability of unemployment in Italy and the United States. Data for the United States are drawn from the 1994-1998 Survey of Economic Expectations (SEE), see Manski and Straub (2000). The higher line for Italy excludes individuals living in provinces where the average unemployment rate (drawn from aggregate labor force statistics) exceeds 7 percent in 1995.