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SHAPING EARNINGS INSECURITY: LABOR MARKET POLICY AND INSTITUTIONAL FACTORS

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We examine the relationship between earnings insecurity, labor market policies/institutions, product market regulation, and macroeconomic shocks across Europe in the 1990s by means of the non-linear least squares method. Earnings insecurity is proxied by transitory variability in earnings, which captures transitory earnings shocks, and by earnings volatility, which captures both permanent and transitory earnings shocks. Our results suggest that corporative bargaining systems, generous unemployment benefits, and deregulated product markets reduce the impact of macroeconomic shocks on transitory variability in earnings and earnings volatility, while a stronger labor protection legislation reduces the impact of macroeconomic shocks on earnings volatility. Several institutional mixes have the potential to reduce transitory variability, for example coupling a high corporatism with a high unionization, coupling protection mechanisms with activation policies, incorporating a trade-off between the generosity of unemployment benefits and the strictness of labor market regulation, and coupling product market deregulation with deregulated labor markets or with a high unionization. Two valuable lessons are that contextual interaction effects are important for understanding the influence of particular policies and institutions on earnings insecurity and that there is no one-size-fits all policy package for reducing the impact of the business cycle on transitory variability and volatility.

JEL Codes: C23, D31, J08, J31, J50, J60

Keywords: earnings volatility, economic insecurity, labor market policies and institutions, transitory variability in earnings

1. Introduction

In recent years, accelerating globalization and shrinking welfare safety nets have motivated a new concern with increasing economic insecurity (Mughan, 2007; Hacker, 2008; Milberg and Winkler, 2009). According to the International Labour Organization (ILO), economic security represents "basic social security, defined by access to basic needs infrastructure pertaining to health, education, dwelling, information, and social protection, as well as *work-related security*."

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Central to the "*work-related security*" is "*income security*" which "denotes adequate actual, perceived and expected income, either earned or in the form of social security and other benefits."[1] Since, in all countries, labor market earnings are the main source of labor market income, a large part of economic/income (in)security is necessarily determined by labor market earnings (in)security.

The focus of this paper is, therefore, on labor market earnings in(security) and its relationships with labor market policies and institutions. Specifically, using data for 14 European countries between 1994 and 2001 from the European Community Household Panel (ECHP), we ask whether there are systematic cross-country differences in year-to-year earnings fluctuations and risk, and how these relate to differences in labor market policies and institutions. This question is relevant in the context of the economic reality of the 1990s in Europe: the implementation of the single market (1992) and the preparation of the single currency (1993) increased the pressure on the European labor markets to change. Influenced by the 1994 OECD Job Strategy, Europe has been moving toward more flexible labor markets (OECD, 2004). The pace of change was different across Europe, supporting the expectation of increased country heterogeneity in labor market institutions and distributional outcomes (Palier, 2010). There is a growing concern, however, that labor market flexibility is likely to be associated with a higher earnings insecurity. We investigate whether the country heterogeneity in labor market policies/institutions can help us understand the cross-national differences in earnings insecurity across Europe.

Earnings insecurity or risk is proxied by measuring earnings variability, which is a measure fundamental to risk or insecurity, as witnessed by the expanding literature on earnings and income volatility (Hacker *et al.*, 2012).[2] We examine two measures of earnings variability, referred to as transitory variability in earnings and earnings volatility, which capture complementary aspects. Individual earnings variability is determined by variations in the permanent and the transitory component of earnings. The permanent earnings component reflects returns to persistent characteristics such as ability, education, and training, whereas the transitory earnings component captures the volatility in the labor market, random events influencing earnings in a particular period, expected to average out over time (Friedman and Kuznets, 1954). In a simple model, the earnings components can be expressed as:

$$Y_{it} = E(Y_{it} | X_i) + e_{it} = Xi\beta_t + e_{it}, \tag{1}$$

where Y_{it} are earnings of individual i in period t, X_i is a vector of permanent personal characteristics of individual i, β_t is a vector of possibly time-varying market returns to permanent personal characteristics, and e_{it} is the transitory component with time-varying variance. Transitory variability in earnings is measured by the variance in the transitory earnings component, meaning the variation in earnings around a persistent earnings path. A growing transitory variance indicates that

[1]ILO: http://www.ilo.org/public/english/protection/ses/download/docs/denition.pdf

[2]Relevant studies exploring the trends in earnings variability are: MaCurdy (1982), Abowd and Card (1989), Moffitt and Gottschalk (1995, 1998, 2002, 2008), Baker (1997), Baker and Solon (2003), Dickens (2000b), Ramos (2003), Kalwij and Alessie (2003), Cappellari (2004), Gustavsson (2004), Nichols (2008), Nichols and Zimmerman (2008), Sologon and O'Donoghue (2010), Sologon (2010), and Shin and Solon (2011).

individuals are facing increasing year-to-year earnings fluctuations (Baker and Solon, 2003).[3] The second measure, implemented first by Shin and Solon (2011), is based on the dispersion in the age-adjusted year-to-year earnings changes. It captures both transitory and permanent earnings shocks, unlike the first measure which captures only transitory shocks (Shin and Solon, 2011). As this measure also reflects shocks in returns to human capital and other persistent attributes, we consider it a measure of earnings volatility, following the financial literature and Shin and Solon (2011). The conceptual framework of our paper differs from the "anticipated hazards" perspective, focusing on experienced volatility.

The welfare implications of increasing earnings variability are contested in the literature. Whereas increasing earnings variability due to permanent earnings shocks is expected to affect welfare through consumption, consumption is insulated from transitory shocks if capital markets are perfect, in the sense that all workers can always freely borrow and lend at the same interest rate (Attanasio and Davis, 1996). If earnings variability is taken as a proxy for risk, and individuals are averse to future income risk, increasing earnings variability due to either permanent or transitory shocks may carry substantial welfare costs (Blundell and Preston, 1998; Creedy and Wilhelm, 2002; Gottschalk and Spolaore, 2002). Nevertheless, contemporary American and European political discourse is increasingly concerned about the economic security of families, as uncertain income and earnings prospects negatively affect individual well-being (Hacker, 2008; Nichols, 2008; Nichols and Zimmerman, 2008).

Whereas the literature exploring the trends in earnings variability has been expanding over the past decades, to our knowledge, there is no study exploring their potential policy and institutional driving factors.[4] We attempt to fill part of this gap in the literature. Using the OECD data on labor market policies and institutions and the two measures of earnings insecurity estimated with the ECHP, we apply a non-linear least squares method to explore the complex relationship between transitory variability in earnings, earnings volatility, and labor market policies and institutions. We consider the policies and institutions linked with the wage-setting mechanism, with a special focus on corporatism, unionization, labor market regulation and labor market support, and product market regulation. We aim to identify which institutional mixes have the potential to reduce earnings insecurity, and which policies and institutions shape the impact of adverse macroeconomic shocks on earnings insecurity. Using a different approach and data covering 30 years prior to the recent crisis for 40 OECD and BRIICS countries, Ahrend *et al*. (2011) find that these policies/institutions do matter in shaping the distributive impact of macroeconomic shocks on inequality and poverty. We reach similar conclusions to the OECD study. In addition, we show the importance of contextual interaction effects for the influence of particular policy and institutional factors on earnings variability.

[3]One must differentiate between the concept of earnings variability and earnings mobility, which is defined as the degree to which an individual's rank changes within the wage distribution and which is determined by the ratio between permanent and transitory variance (Kalwij and Alessie, 2003): a large contribution of permanent variance indicates that individual earnings are highly correlated over time and individuals experience low rates of earnings mobility.

[4]Sologon and O'Donoghue (2011a, 2011b, 2012) explore the role of labor market policies and institutions in understanding the cross-national differences in persistent earnings inequality and earnings mobility across Europe.

2. Theoretical Links between Earnings Variability and Institutional Factors

Individual earnings can be seen as composed of a permanent and a transitory component, assumed independent of each other (Weizsacker, 1993; Friedman and Kuznets, 1954). The permanent component reflects systematic individual characteristics such as ability, education, and training. The transitory component captures both individual random factors (e.g., illness and accident) and random changes in market conditions in a particular period, and is expected to average out over time. Individual earnings variability is determined by variations in the permanent and the transitory component.

We explore two measures of earnings variability. Transitory variability captures the instability in earnings due to transitory shocks. The second measure (earnings volatility) captures both the variability in the persistent earnings path (in the returns to the permanent earnings component), and in the transitory shocks around this path. As changes in the persistent earnings trajectories have long-term consequences, they should be included in the overall measure of earnings volatility (Shin and Solon, 2011).

The increase in earnings variability may be attributed to changes in policies and institutions, an increased earnings exposure to macroeconomic shocks, a rise in the temporary workforce which increases earnings exposure to shocks, an increased labor market volatility, an increased competitiveness, globalization and an increased international capital mobility (Rodrik, 1997; Katz and Autor, 1999). A period of skill-biased technological change with the spread of new technologies can, on the one hand, increase the demand for skills, and on the other hand increase earnings variability, as firms face uncertainty with respect to the abilities of their workers (Katz and Autor, 1999).

The labor market institutional framework may minimize or accentuate the adverse effects of macroeconomic shocks on earnings variability. Countries with different labor market policies and institutions are expected to have differing degrees of earnings variability (Rodrik, 1997; Katz and Autor, 1999). For understanding the cross-national variation in earnings variability we consider the labor market institutions and policies linked with the wage-setting mechanism, with a focus on corporatism, trade unions, Employment Protection Legislation (EPL), and labor market support as Active Labour Market Policies (ALMPs) and unemployment benefits. Besides labor market policies and institutions, we consider Product Market Regulation (PMR).

Regarding corporatism, recent studies on the impact of corporatism on wage structures have brought evidence that runs counter to the traditional view that corporatism generates labor market rigidity.[5] Teulings and Hartog (2008) argue that corporatist systems can be very flexible, even more so than decentralized ones,

[5]Corporatism refers to the degree of centralization and coordination of wage bargaining. Centralization refers to the aggregation level of bargaining (national, sectoral, firms), and coordination refers to the extent to which the decisions about wages and "income policies" taken between the representatives of the major economic groupings (trade unions and employers' associations) and often representatives of the government are coordinated in order to promote a mutual benefit (Calmfors and Driffill, 1988; Scarpetta, 1996; OECD, 2004; Teulings and Hartog, 2008).

because they allow the nominal contracts to be renegotiated to ensure a smooth adjustment to aggregate shocks. The degree of earnings variability depends on their adjustment path to negative shocks. The existing evidence on corporatist systems shows the importance of nominal contracts for wage flexibility and its adjustment path after a negative shock in aggregate demand. We follow the theoretical approach of Teulings (1995), where the wage adjustment is driven by shifts in the perceived trade-off between worker quality and wages. In the face of a negative shock to aggregate demand, skill bumping affects this trade-off.[6] During the downturn, workers with equal skills will get less complex jobs. In a decentralized economy, the adjustment starts with larger reductions in wages for the lowest-skill level, which is transmitted gradually to higher levels. All distortions add up to large wage reductions by firms. A centralized system would increase the efficiency of the adjustment process by coordinating the wage reductions due to aggregate shocks across firms (Teulings and Hartog, 2008). As corporatist systems deal with the adjustment to aggregate shocks, they may prevent the exacerbation of earnings variability under adverse shocks.

Regarding unionization, it is recognized that the stated purpose of unions is to reduce earnings disparities, and covered workers earn significantly higher wages and have less volatile profiles than the uncovered ones. Indirectly, the "benefit" of unionization stems from its impact on training and minimum wages. By forcing employers to provide training to their employees, they increase the employees' human capital and adaptability to new technologies (Aghion and Williamson, 2001), thereby reducing earnings variability for covered workers. However, even if unions decrease the within-group earnings variability, they may still increase the overall earnings variability by increasing the relative earnings variability between unionized and non-unionized workers. In addition, strong trade unions have the ability to increase wages above market-clearing levels at the cost of lower employment, which affects mainly workers with more elastic labor supply, such as younger workers, women, and older workers, which in turn will have more volatile earnings profiles (Bertola *et al*., 2002). Similarly with overall inequality, due to these potentially offsetting effects, the impact of unionization on earnings variability can only be resolved empirically (Fortin and Lemieux, 1997). Nonetheless, it has long been argued that, in practice, union influence on wage formation depends on the structure of collective bargaining.

Regarding labor market regulation, the literature points to the existence of both "benefits" and "costs" associated with a strict EPL. A strict EPL "benefit" covered workers by offering a better protection in the labor market and more stable earnings profiles. Cazes and Nesporova (2004) argue against a strict EPL because of its key role in generating labor market rigidity: EPL increases the cost of hiring and of layoffs, and consequently lowers labor turnover (Blanchard, 1999). A lower turnover is expected to affect mainly workers with

[6]In the skill bumping process, firms, which are ordered hierarchically based on their complexity, hire workers based on their skills hierarchy. The decrease in the number of jobs following a negative shock, assuming that firms adopt rigid wages, will force workers to accept jobs in less complex firms (Teulings and Hartog, 2008).

temporary contracts, as they have a weaker protection in the labor market. Thus, the potential "cost" of a strict EPL is widening differentials between workers with regular jobs covered by the EPL and workers with irregular jobs, or unemployed job-seekers, which may translate into a higher overall earnings variability.

ALMPs, which consist of job placement services and labor market programs such as job-search, vocational training, or hiring subsidies can improve the efficiency of job-matching, and enhance the work experience and skills of the unemployed, facilitating their reintegration into the labor market (Bassanini and Duval, 2006a, 2006b; Sologon and O'Donoghue, 2011b). These reintegrated workers, however, are the least protected in the labor market, and are expected to be the most affected by macroeconomic shocks. In the face of macroeconomic shocks, their presence in the labor market may amplify earnings variability, unless protection mechanisms are put in place to protect vulnerable groups.

The labor market support as generous unemployment benefits has both "benefits" and "costs." Short-term, more generous unemployment benefits may serve as cushioning mechanisms for earnings variability. When adverse macro shocks hit, there may be no job offers or job vacancies for some unemployed individuals, in which case unemployment insurance offsets earnings loss. Even if some jobs are forthcoming, generous unemployment benefits allow individuals to avoid wage cuts by refusing lower-paid jobs. This is consistent with Blanchard and Wolfers's (2000) finding that generous unemployment benefits lead to a larger effect of adverse shocks on unemployment. The long-term "benefit" of unemployment insurance is that longer and more generous unemployment benefits represent incentives not to accept low-paid jobs, thereby improving job-matching which fosters more stable earnings profiles (Bassanini and Duval, 2006a, 2006b). The "costs" of generous unemployment benefits stem from the disincentives to job-search, which negatively affect the employability and human capital of the unemployed, and result in unstable employment and earnings profiles.

We also include anti-competitive product market regulation (PMR) as recent studies have found that product market deregulation improves labor market performance (Nicoletti *et al*., 2001; Griffith and Harrison, 2004; Nicoletti and Scarpetta, 2005; Griffith *et al*., 2007; Fiori *et al*., 2012) and the economic resilience to adverse macroeconomic shocks (Canova *et al*., 2012). Product market restrictions hinder price and wage flexibility, which are considered crucial in allowing markets to absorb adverse macroeconomic shocks (Mongelli, 2008). More competitive markets allow for a faster price adjustment in response to shocks and a more efficient reallocation of resources. With respect to wage flexibility, recent studies show that product market competition may reduce wage premia and constrain the bargaining power of workers and unions (Jean and Nicoletti, 2004). The inclusion of PMR is in line with recent research trying to discover channels through which the labor market adjustments may be affected by product market competition and to understand the interplay between product and labor market regulation in determining labor market outcomes (Bassanini and Duval, 2006a, 2006b; Berger and Danninger, 2006).

All possible interactions across policies and institutions can affect earnings variability, and which policies complement/substitute each other should be established empirically. To sum up, transitory variability and volatility in earnings may result from changes in labor market policies and institutions and the sensitivity of wages to shocks in market conditions. Their magnitude depends on the ability of labor market policy and institutions to minimize the adverse effects of macroeconomic shocks.

3. Methodology

3.1. *Measuring Transitory Variability in Earnings and Earnings Volatility*

Transitory variability in earnings is measured by the variance in the transitory component of individual earnings, which captures the volatility in the labor market, random events influencing earnings in a particular period, and is expected to average out over time. This measure is estimated using complex parametric models of earnings dynamics (Moffitt and Gottschalk, 1995, 2002; Baker, 1997; Dickens, 2000b; Haider, 2001; Baker and Solon, 2003; Kalwij and Alessie, 2003; Ramos, 2003; Cappellari, 2004; Sologon and O'Donoghue, 2011b). Using ECHP, we estimate the covariance structure of earnings by four birth cohorts for each country and decompose earnings inequality into a permanent and a transitory component by applying equally weighted minimum distance methods. A complete discussion of the estimation method and results is available in Sologon and O'Donoghue (2010) and Sologon (2010). The general specification of the transitory component of earnings is an ARMA(1,1) process with time and cohort specific shifters:

$$\gamma_c \lambda_t v_{it} = \gamma_c \lambda_t \left[\rho v_{i,t-1} + \varepsilon_{it} + \theta \varepsilon_{i,t-1}\right], \varepsilon_{it} \sim iid\left(0, \sigma_\varepsilon^2\right), v_{i0} \sim iid\left(0, \sigma_{c,0}^2\right). \tag{2}$$

The time (λ_t) and cohort (γ_c) shifters allow the structure of transitory earnings to vary over time and across cohorts.[7] ε_{it} is white noise, the variance $\sigma_{c,0}^2$ measures the volatility of shocks in the first period for each cohort, and σ_ε^2 the volatility of shocks in subsequent years. ρ is the autoregressive parameter measuring the persistence of shocks.[8] Transitory variance in year t is estimated as $Var(\gamma_c \lambda_t v_{it})$. Transitory variability in earnings is measured by the overall within-cohort transitory variance, aggregated using the Shorrocks sub-group inequality decomposition (Shorrocks, 1984; Chakravarty, 2001): $EV_1 = TV = \sum_{c=1}^{4} n_c TV_c$. n_c and TV_c are the population share and the transitory variance of cohort c.

The second measure we use provides complementary information, by capturing both permanent and transitory shocks in the measure of earnings insecurity. As this measure also captures shocks in the returns to human capital and other persistent characteristics, we consider it a measure of earnings volatility following the financial literature and Shin and Solon (2011). It is based on the dispersion in the age-adjusted year-to-year earnings changes (Shin and Solon, 2011). We regress

[7]Four cohorts are considered (1940–50, 1951–60, 1961–70 and 1971–81).

[8]The MA parameter θ, which accommodates sharp drops in the lag-1 autocovariance compared with the other autocovariances, was found to differ significantly from 0 only in Italy, Greece, and Spain.

the changes in log earnings ($y_{it} - y_{i,t-2}$) on a quadratic polynomial in age, separately for each year.[9] The earnings volatility measure (EV_2) is the standard deviation of the age-adjusted residuals (Shin and Solon, 2011).

$$y_{it} - y_{i,t-2} = f\left(age, age^2\right) + r_{it}, EV_2 = SD(r_{it}). \tag{3}$$

Shin and Solon (2011) explain in detail the differences between the two measures.

3.2. *Estimation*

The relationship between earnings insecurity, labor market policies and institutions and macroeconomic shocks is estimated using non-linear least squares, pooling all countries. The unit of analysis is the country observed between 1994 and 2001. Two steps are envisaged. First, we explore the systemic institutional interactions to see how the relationship between policies/institutions and earnings insecurity varies depending on the institutional mix. Second, we test whether institutions interact with the macroeconomic shocks in shaping earnings variability to see which policies/institutions may reduce or exacerbate the impact of adverse macroeconomic shocks on earnings insecurity.

These regressions suffer from two problems which prevent the establishment of causality: first, the endogeneity between institutions and overall inequality is expected to affect also the relationship between institutions and the two measures of earnings variability; and second, the unobserved country-heterogeneity. These are long-standing and unsettled problems in the debate regarding the impact of labor market institutions, technological change, globalization, and immigration on earnings inequality, and are expected to affect earnings variability. The absence of good instruments prevents the establishment of causality. The estimated parameters should be interpreted as complex controlled associations, and not causal relationships.

3.2.1. Systemic Interactions

First, we explore the systemic institutional interactions to see how the relationship between policies/institutions and earnings variability varies depending on the institutional mix. The aim is to identify "policy packages" with the potential to reduce earnings variability. All possible interactions across these policies and institutions can affect earnings variability. Therefore, we need a comprehensive approach that incorporates all interactions. Undertaking a systematic analysis of policy interactions is not straightforward, as a model with seven policies/institutions implies including 21 cross-interactions, thereby inducing a substantial loss of degrees of freedom. This is of great concern, especially in studies with limited data points. To avoid this, we adopt an alternative strategy, following Bassanini and Duval (2006b) for unemployment and Sologon and O'Donoghue (2011a) for earnings mobility. We estimate systemic interactions, meaning interactions between each policy/institution and the overall institutional setting, defined as the sum of the direct effects of the policies/institutions. The interactions

[9]The changes are based on overlapping two-year differences: 1994–96, 1995–97, . . . , 1999–2001.

between policies/institutions are specified in a multiplicative form between the deviations of the respective policies/institutions from their sample mean, as is usual in macroeconomic equations. This specification enables the interpretation of the marginal effect of each policy/institution when the others are kept constant at the sample mean:

$$EV_{it} = \sum_{k=1}^{K} v_k X_{kit} + \sum_{k=1}^{K} \varphi_k (X_{kit} - \bar{X}_k)\left(\sum_{k=1}^{K} v_k (X_{kit} - \bar{X}_k) \right) + u_{it}. \tag{4}$$

i, t, and k are the country, period, and institution index. EV_{it} is earnings variability of country i in year t. v_k is the direct effect of policy/institution X_k on EV_t for a country with an average mix of policies and institutions. φ_k is the interaction effect between the policy/institution X_k and the overall institutional framework, expressed as the sum of the direct effects of policies/institutions (expressed in a deviation form in the interaction).

To facilitate the interpretation of the systemic interactions and to explore the extent to which the relationship between each policy/institution and earnings variability varies depending on the institutional mix, we evaluate the partial derivatives for institutional mixes that differ from the average country with a lower corporatism. We consider pairs of institutions: we compute the partial derivative of EV with respect to each policy/institution X_k (at its minimum, average, and maximum sample value), evaluated at different moments of policy/institution $X_j = \{Min, \bar{X}_j, Max\}$, holding the other factors constant at the average sample value. The mathematical derivations are included in Appendix A.1.

3.2.2. Interactions between Policies/Institutions and Shocks

Next, we explore the role of policies and institutions in shaping the impact of macroeconomic shocks on earnings variability.

Common Unobserved Shocks and Interactions with Policies/Institutions

First, we treat the macro shocks as unobserved but common to all countries. We incorporate them as time effects interacted with the institutional framework. This approach is in line with the approach implemented by Blanchard and Wolfers (2000) and Bassanini and Duval (2006a, 2006b) for unemployment, and by Sologon and O'Donoghue (2011a) for earnings mobility. This specification allows the effect of the common macroeconomic shocks on earnings variability to depend on the country-specific mix of labor market policies/institutions. This specification captures the basic hypothesis that given the same shocks, countries with weaker policies/institutions experience higher earnings variability.

$$EV_{it} = \tau_t \left(1 + \sum_{k=1}^{K} \gamma_k (X_{kit} - \bar{X}_k) \right) + u_{it}. \tag{5}$$

τ_t is the time effect for period t. γ_k is the interaction effect between the policy/institution X_k and the overall unobserved shock captured by τ_t.

Country-Specific Observed Shocks and Interactions with Policies/Institutions

Second, we replace the time effects by a set of country-specific observed macroeconomic shocks, $\sum_{s=1}^{S} \zeta_s Z_{sit}$.[10] ζ_s are the direct effects of shocks and γ_k the interaction effects between the policy/institution X_k and the aggregated macroeconomic shocks.

$$EV_{it} = \sum_{s=1}^{S} \zeta_s Z_{sit} \left(1 + \sum_{k=1}^{K} \gamma_k \left(X_{kit} - \bar{X}_k \right) \right) + u_{it}. \tag{6}$$

4. Data

Transitory variability in earnings and earnings volatility are estimated using the European Community Household Panel (ECHP) over the period 1994–2001. Luxembourg and Austria are observed between 1995 and 2001, and Finland between 1996 and 2001. Following the tradition of previous studies, we consider only men to avoid the selection bias attached to female earnings. The earnings measure is the real log hourly wage adjusted for CPI of workers aged 20 to 57, born between 1940 and 1981. The working sample for each country is an unbalanced panel, weighted using the "base weights" of the last wave observed for each individual, as recommended by Eurostat. Table A1 in Appendix A provides summary statistics on mean hourly earnings, the variance of log hourly earnings, and the inflows and outflows in the sample of positive earnings over time for each country. Mean hourly earnings increased in all countries, except in Austria. Overall inequality increased in Finland, the Netherlands, Luxembourg, Greece, Italy, and Portugal, and decreased in the rest. Throughout the period, Portugal and Denmark are the most and the least unequal.

Several studies explore the extent of attrition in ECHP and its impact on a typical empirical analysis. Behr *et al.* (2005) report that the extent and the determinants of panel attrition in ECHP vary between countries and across waves, but these differences do not bias the analysis of income mobility via transition matrices, of individual rank stability measures, of standard cross-sectional measures of inequality such as the Gini-index or the ranking of national results. Ayala *et al.* (2011) confirm that attrition does not seem to significantly affect the aggregated mobility indicators. Sologon and O'Donoghue (2011a) explore the correlations between several mobility indicators using the ECHP: the Shorrocks index, the Fields index (Fields, 2009), the Dickens index (Dickens, 2000a), the Immobility Ratio based on the transition matrix approach, and the Immobility Ratio defined as the ratio between persistent and transitory inequality (Kalwij and Alessie, 2003). On aggregate, conclusions in relation to mobility are reasonably robust to the measure used, with a rank correlation of mobility measures over 0.8. Since overall inequality and earnings mobility are closely linked to the permanent and transitory components of earnings inequality and with the year-to-year earnings changes, we expect the same limited impact of attrition on the two earnings variability measures used in this study.

[10]Blanchard and Wolfers (2000), Bassanini and Duval (2006a, 2006b) and Sologon and O'Donoghue (2011a) implement a similar approach.

The link between the two measures of earnings variability and labor market policies and institutions is investigated using the Bassanini and Duval (2006a, 2006b) (OECD) dataset. The institutional variables are: EPL, trade union density, the degree of corporatism, the spending on ALMPs, the average unemployment benefit replacement rate, PMR, and the tax wedge. The macroeconomic shock variables are: labor demand shock, terms of trade shock, total factor productivity shock, and the real interest shock. These variables are observed for most countries between 1994 and 2001.[11] Their description and summary statistics are included in Table A2 in Appendix A.[12]

5. Earnings Variability and Labor Market Policies and Institutions in Europe

The mid–late 1990s and early 2000s in Europe saw a recovery from the downturn of the early 1990s, following the reunification of Germany and the end of the cold war. The unemployment rate declined in all countries. The period saw falling average hours per worker with the rise of greater part-time working and flexibility (OECD, 2002). In parallel, the world witnessed an ICT technological growth and associated growth in equity prices as part of the dot-com bubble. Labor productivity growth slowed as lower productive workers were reintegrated in the labor market. Despite this, wage growth typically lagged labor productivity growth as the share of labor income declined, due to wage moderation.

The evolution of the European policies and institutions reflect, in general, deregulation trends in the product and labor markets, decreasing levels of union density and non-wage labor costs, increasing spending on ALMPs and greater generosity of unemployment benefits. Most countries experience at most two exceptions from these trends.[13] There is a substantial institutional heterogeneity across Europe, as shown in Figure 1 which plots pairs of labor market indicators in 2001.

The indicators in Figure 1 are re-scaled by setting the U.K., a typical Anglo-Saxon model with the lowest regulation, the lowest labor market support, low corporatism, among the lowest union densities and tax wedges, as the base. The labor market support is summarized by the arithmetic average between ALMPs and the unemployment benefit replacement rate, following Milberg and Winkler (2009). Ireland differs from the U.K. in labor market support, corporatism, and PMR.

The Northern countries (Denmark, Finland, and the Netherlands), Austria[14] and Belgium, which adopted the "Flexicurity" model with relatively low levels of labor market regulation coupled with relatively high levels of unemployment benefits and ALMPs, also have a high corporatism, among the highest union densities (except the Netherlands) and tax wedges, and among the lowest PMR. Denmark and the Netherlands, the pioneers of "Flexicurity," stand out with the highest levels of labor market support.

[11]Luxembourg and Greece have some missing institutional and shock variables. Some observations on shocks are missing for Portugal (labor demand and TFP, 1994–2001), Denmark (labor demand, 2000–01), and Ireland (labor demand, 1999–2001).

[12]For a detailed description, please refer to Bassanini and Duval (2006a, 2006b).

[13]Figure B1 in Appendix B plots the evolution of labor market institutions.

[14]Auer (2002) and European Commission (2006) discuss the success of "Flexicurity" in Austria.

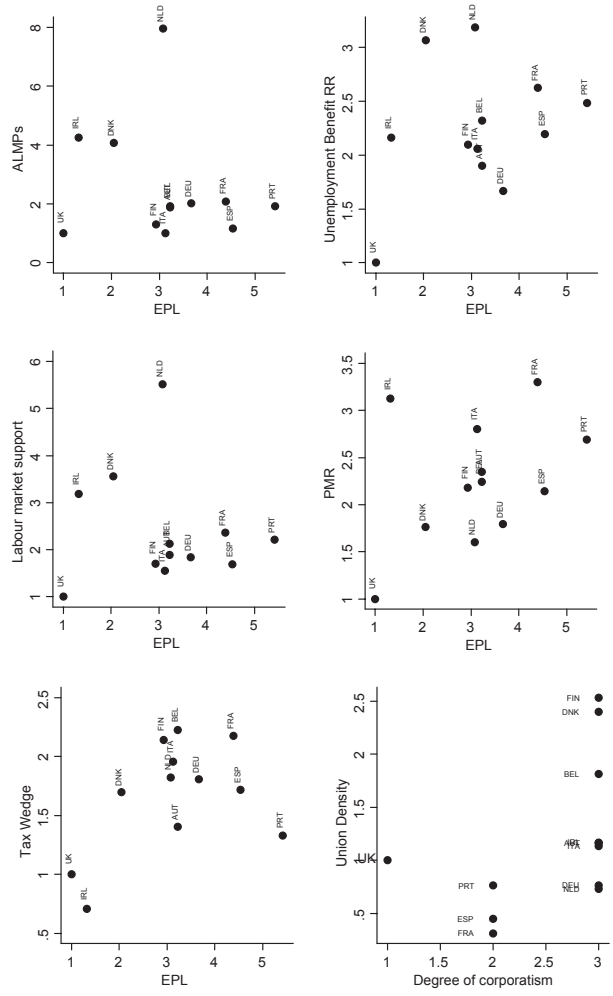

Figure 1. Labour Market Institutions in 2001

Notes: The indicators are re-scaled to set the U.K. as the base.
Source: Authors' plots based on OECD data.

The Continental countries (Germany, France, and Luxembourg[15]) have a stricter EPL and a lower unionization than the Nordic/Flexicurity countries. The degree of labor market support is lower than in Denmark and the Netherlands. In Germany, the other institutions are similar to the Nordic/Flexicurity countries. In France, PMR is higher and corporatism is lower than in Germany and the Nordic/Flexicurity countries. The Mediterranean countries (Portugal, Spain, Greece,[16] and Italy) have among the strictest regulation in the labor and product market, among the lowest levels of labor market support, among the lowest union

[15]Luxembourg has the highest union density among the three, but the other indicators are missing.
[16]Greece has a higher EPL and union density than Portugal. The other indicators are missing.

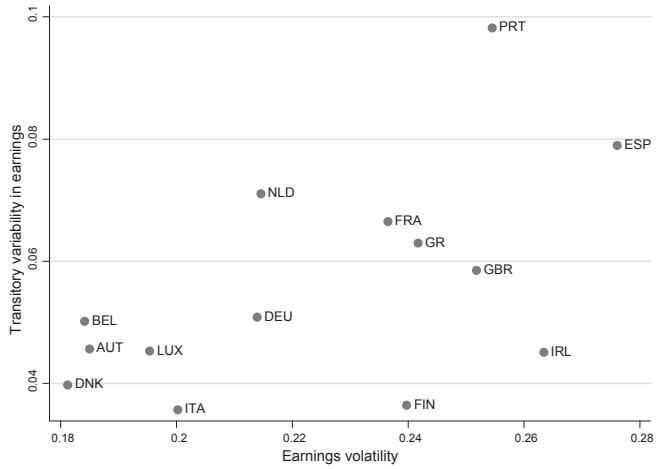

Figure 2. Transitory Variability in Earnings and Earnings Volatility across Europe in 2001
Source: Authors' calculations based on ECHP data.

densities, an intermediate corporatism, and medium-high tax wedges. Italy differs with a lower EPL and a high corporatism.

This heterogeneity has the potential to explain the differences in transitory variability and volatility in earnings across Europe.

Figure 2, which plots transitory variability in earnings and earnings volatility across Europe in 2001, illustrates that there are considerable differences in earnings variability between countries.[17] The "Flexicurity" countries have among the lowest levels of transitory variability and volatility, whereas the Mediterranean countries have among the highest. Large relative differences between countries can be observed also within each type. For example, Denmark and the Netherlands have among the most flexible labor markets in Europe, but their earnings variability outcomes differ considerably.

The institutional factors are expected to interact with the macroeconomic shocks in shaping earnings variability. The changes in macroeconomic shocks are similar across Europe.[18] These trends are not surprising, as these countries operate in the same world markets, with similar technology, industry, and occupation mixes. As these countries face similar macro shocks, the differences in institutions may explain the earnings variability across countries.

6. Estimation Results

We report first, in parallel for each model, the estimates for transitory variability in earnings and earnings volatility, and then we conclude with a discussion of our main findings.[19]

[17]Figure B2 in Appendix B shows the yearly trends in transitory variability and volatility.
[18]Figure B3 in Appendix B shows the evolution of selected macroeconomic shocks.
[19]Additional information regarding the fit of the models is available, in Figures B4 and B8 in Appendix B.

TABLE 1
POOLED OLS ESTIMATES

	(1) Transitory Variability in Earnings Estimate/t	(2) Earnings Volatility Estimate/t
EPL	0.002	–0.014***
	(0.671)	(–2.733)
Union density	0.006	–0.012
	(0.549)	(–0.545)
High corporatism	–0.021***	–0.045***
	(–4.665)	(–5.560)
ALMP	0.020	0.021
	(1.603)	(1.186)
Unemployment benefit RR	–0.028*	–0.060
	(–1.703)	(–1.610)
PMR	0.001	0.019***
	(0.411)	(4.795)
Tax wedge	–0.038	–0.046
	(–1.180)	(–0.954)
Constant	0.067***	0.272***
	(7.689)	(19.450)
Adj. R^2	0.333	0.610
N	93	69

Note: T statistics based on robust SE are reported in parentheses. *p < 0.1, **p < 0.05, ***p < 0.01.
Source: Authors' calculations based on ECHP and OECD data.

Before looking at more complex models discussed in Section 3.2, we evaluate first the overall effects of labor market policies/institutions on transitory variability in earnings and earnings volatility in a pooled OLS regression, reported in Table 1. The sign of the associations is, in general, consistent for both measures. Corporatist economies appear to have on average a lower transitory variability and volatility than countries with a more decentralized economy. The same holds for product market deregulation (lower PMR), albeit insignificant for volatility. The generosity of unemployment benefits and the stringency of EPL are associated with a lower transitory variability in earnings and a lower earnings volatility, respectively.

6.1. *Systemic Interactions*

Next we incorporate direct effects and systemic interactions (model (4)). Table 2 shows the estimates for transitory variability in earnings.[20] Most direct effects and systemic interactions are significant. The model has a high explanatory power, suggesting that the institutional framework plays an active role in shaping transitory variability in earnings in Europe.

To ease the interpretation of the systemic interactions, we report in Table A3 the partial derivatives of model (4) with respect to each institution. Appendix A.3 includes the complete discussion.

[20]Given the smaller number of observations available for earnings volatility, estimating the partial and the cross-derivatives from the systemic interactions is not feasible. Therefore, this model is estimated only for transitory variability in earnings.

TABLE 2
TRANSITORY VARIABILITY IN EARNINGS—SYSTEMIC INTERACTIONS

	Estimate	t
Direct effect, v_k		
EPL	–0.014***	–3.370
Union density	0.032**	2.420
High corporatism	0.017***	3.990
ALMPs	0.050**	2.590
Unemployment benefit RR	–0.040	–1.340
PMR	0.006***	2.850
Tax wedge	0.176***	5.810
Systemic interactions, φ_k		
EPL	–0.607***	–5.960
Union density	1.460***	3.470
High corporatism	–2.285***	–16.340
ALMPs	2.614***	5.460
Unemployment benefit RR	–3.305***	–3.760
PMR	0.378***	4.050
Tax wedge	6.702***	4.840
Adjusted R^2	0.949	
Observations	93	

Note: Non-linear least squares. *p < 0.1, **p < 0.05, ***p < 0.01.
Source: Authors' calculations based on ECHP and OECD data.

In summary, we find on the diagonal that most institutions display a U-shaped relationship with transitory variability in earnings.[21] For EPL and unemployment benefits, the effect is negative for low and average values, and turns positive for high values, signaling that too strict EPL and too generous unemployment benefits exacerbate transitory variability in earnings. Above average values of spending on ALMPs and of PMR are associated with higher transitory variability. Union density displays a positive relationship.

The effect of each policy/institution depends to a large extent on the institutional mix. This signals both "costs" and "benefits" associated with each policy/institution, the prevalence of either depending on the institutional mix, which is consistent with our expectations. We identify several institutional mixes with the potential to reduce transitory variability in earnings (Table A3, Figure B5,[22] Figure B6[23]).

First, the interaction between institutions reveals, as expected, that the influence of unions on transitory variability in earnings depends on the structure of collective bargaining. In corporatist systems, unionization is negatively associated with transitory variability. A centralized coordinated system may enhance the "benefit" of unionization for earnings stability.

Second, the interactions between policies and institutions show that:

- Under a lower corporatism, the "benefits" of unionization emerge when accompanied by regulated labor markets, by generous unemployment

[21]Each partial derivative is evaluated ceteris paribus at the average value and a lower corporatism.
[22]Figure B5 in Appendix B shows the partial derivatives of union density/EPL at its minimum/maximum value, for the same policy mixes.
[23]Figure B6 in Appendix B shows the partial derivatives of ALMPs/the unemployment benefit replacement rate at its minimum/maximum values, for the same policy mixes.

benefits, by deregulated product markets, and by low tax wedges. Among the analyzed institutional mixes, the strongest negative association between union density and transitory variability in earnings is found for low non-wage labor costs.

- For the average country with a lower corporatism, the degree of unionization enhances the "benefit" of EPL, unemployment benefits, and product market deregulation. The negative cross-derivatives between EPL and unionization, and between unemployment benefits and unionization, show that EPL and unemployment benefits may be more effective at the margin at reducing transitory variability when accompanied by high union densities. The positive cross-derivatives between PMR and unionization shows that product market deregulation may be more effective at the margin at reducing transitory variability when accompanied by high union densities.
- A centralized coordinated system enhances the "benefit" of labor market deregulation and of labor market support as ALMPs in reducing transitory variability.

Third, the interactions between policies reveal several policy mixes between labor market regulation and labor market support, between the two forms of labor market support, and between labor and product market regulation:[24]

- Above average levels of labor market support as ALMPs enhance the "benefit" of labor market regulation (EPL) in reducing transitory variability in earnings. The negative cross-derivative shows that EPL may be more effective at the margin at reducing transitory variability when accompanied by developed ALMPs. Even at strict levels, the effect of EPL becomes negative in the presence of developed ALMPs. The association between EPL and transitory variability, however, is stronger the lower the EPL, suggesting that the benefits of EPL for reducing transitory variability become smaller the higher the EPL. Across the policy mixes, the strongest negative association between EPL and transitory variability in earnings is found when ALMPs are developed.
- ALMPs also enhance the benefits of unemployment benefits. When accompanied by developed ALMPs, we find a monotonic strong negative relationship between unemployment benefits and transitory variability, ceteris paribus at the average. The same is found for deregulated labor markets. Among the analyzed institutional mixes, the strongest negative association between unemployment benefits and transitory variability is found when coupled with developed ALMPs and a low EPL.
- Evaluated at the average, ALMPs have the strongest negative associations with transitory variability when accompanied by highly regulated labor markets, by generous unemployment benefits, by low non-wage labor costs, or a high corporatism. Each of these conditions reinforces the negative effect of increasing ALMPs when they are low, and reduces the increase in transitory variability associated with increasing ALMPs when they are high.

[24]These findings hold for an average country with a lower corporatism, unless stated otherwise.

- Evaluated at the average, product market deregulation (decrease in PMR) is associated with a decrease in transitory variability across most institutional mixes. One interaction of interest in the context of the product market reforms across Europe is the one with EPL. We find that product market deregulation may be more effective at the margin at reducing transitory variability in deregulated labor markets.
- Labor market deregulation (evaluated at the average) exacerbates transitory variability in most institutional mixes, except when accompanied either by deregulated product markets, or by a high corporatism, or by generous unemployment benefits.

6.2. *Macroeconomic Shocks and Interactions*

Next, we explore the role of policies and institutions in shaping the impact of macroeconomic shocks on transitory variability in earnings and earnings volatility.

Common Unobserved Shocks and Interactions

First, we treat shocks as unobserved but common to all countries. Our basic hypothesis is that, given the same shocks, countries with weaker institutions experience higher transitory variability and volatility in earnings. Table 3 reports the estimates.

This model specification has a high explanatory power for both measures of earnings variability.[25] We discuss first the results for transitory variability in earnings. Column (1) displays the estimated parameters.[26] The significant interaction effects indicate that a high corporatism and deregulated product markets counteract the increase in transitory variability associated with adverse macro shocks, whereas ALMPs augment them. To get a sense of the magnitudes, column (2) gives the range of each institutional variable (in deviation from the sample mean). We take an adverse shock that would raise transitory variability by 1 percent for a country with an average mix of policies, and evaluate this effect (column (3)) when we consider, in turn min/max values of each institution. The range of the magnitude of this effect varies across institutions. The same shock is associated with a decrease of 36.18 percent in transitory variability in a corporatist system, a decrease of 12.07 percent in a deregulated product market (low PMR), and an increase of 29.18 percent under developed ALMPs, ceteris paribus at the average.

Next we look at earnings volatility.[27] A high corporatism, a deregulated product market, and a strictly regulated labor market emerge as filtering mechanisms against adverse macroeconomic shocks on earnings volatility: an adverse shock which would raise earnings volatility by 1 percent for the average country with a low corporatism is associated with a decrease of 15 percent in volatility under

[25]For earnings volatility, taking into account the interactions with the unobserved common shocks increases the explanatory power of the model from an adjusted R^2 of 0.61 to 0.99.

[26]The estimated time effects indicate that for a country with an average policy mix (and low corporatism), transitory variability increased by 18.65 percent (absolute increase of 0.0118) between 1994 and 2001.

[27]The estimated time effects indicate that for a country with an average mix of policies (and low corporatism), earnings volatility decreased by 9.45 percent (absolute decrease of 0.025) between 1994 and 2001.

TABLE 3

TIME EFFECTS INTERACTED WITH INSTITUTIONS

Transitory Variability in Earnings	(1) Estimates	t	(2) Range of Institutions/Policies Min	Max	(3) Implied Relative Change in Transitory Variability due to an Adverse Shock which Increases Transitory Variability by 1% for the Average Country (transitory variability for mean institutions and shocks = 0.0630) Min	Max
Time effects*	0.0118					
EPL	0.0109	0.29	−1.82167	1.4325	−1.01%	2.58%
Union density	0.1089	0.65	−0.27631	0.4212	−2.04%	5.63%
High corporatism	−0.3681***	−6.74	0	1	1.00%	−36.18%
ALMPs	0.2904*	1.77	−0.25193	0.9610	−6.39%	29.18%
Unemployment benefit RR	−0.4354	−1.43	−0.19437	0.2892	9.55%	−11.72%
PMR	0.0572*	1.82	−2.26252	1.8403	−12.07%	11.63%
Tax wedge	−0.2774	−0.68	−0.19774	0.1232	6.54%	−2.45%
Adj. R^2	09366					
Obs.	93					

Earnings Volatility	(1) Estimates	t	(2) Range of Institutions/Policies Min	Max	(3) Implied Relative Change in Volatility due to an Adverse Shock which Increases Volatility by 1% for the Average Country (volatility for mean institutions and shocks = 0.2647) Min	Max
Time effects*	−0.025					
EPL	−0.047***	−2.73	−1.82167	1.4325	9.68%	−5.83%
Union density	−0.064	−0.8	−0.27631	0.4212	2.78%	−1.71%
High corporatism	−0.159***	−5.63	0	1	1.00%	−15.01%
ALMPs	0.072	0.95	−0.25193	0.9610	−0.84%	8.00%
Unemployment benefit RR	−0.198	−1.41	−0.19437	0.2892	4.89%	−4.78%
PMR	0.056***	4.17	−2.26252	1.8403	−11.73%	11.35%
Tax wedge	−0.241	−1.35	−0.19774	0.1232	5.80%	−1.99%
Adj. R^2	0.9931					
Obs.	69					

Note: Non-linear least squares estimates. *p < 0.1, **p < 0.05, ***p < 0.01.
Source: Authors' calculations based on ECHP and OECD data.

a high corporatism, a decrease of 11.73 percent in deregulated product markets, and a decrease of 5.83 percent under a strict EPL (column (3)). Thus, whereas a high corporatism and deregulated product markets are effective at protecting individual earnings against transitory and permanent shocks triggered by adverse macro shocks, EPL may be more effective at mitigating the impact of permanent shocks.

Country-Specific Observed Shocks and Interactions

Next, the unobserved common shocks are replaced by a set of country-specific observed shocks: the labor demand shift, the rate of total factor productivity growth, the terms of trade, and the real rate of interest. Due to missing data on shocks, the panel is slightly unbalanced, reduced to 80 observations. Table 4 reports the estimation results.

Including observed shocks leads to a high explanatory power, but slightly lower than previous models. Three shocks are significant, a sign that the country-heterogeneity in the magnitude of shocks explains part of the cross-country differences in transitory variability in earnings and earnings volatility. Both measures of earnings variability are positively associated with the labor demand and the real interest rate shocks, and negatively associated with the terms of trade shock. These macroeconomic shocks are a source of transitory and permanent earnings shocks. Generous unemployment benefits emerge as effective tools in counteracting the increase in transitory variability and volatility associated with adverse macroeconomic shocks, cushioning individual earnings against both transitory and permanent earnings shocks. A high corporatism emerges as effective in protecting individual earnings mostly against transitory earnings shocks originating in the observed macro shocks, whereas EPL and product market deregulation emerge as effective in protecting individual earnings mostly against permanent earnings shocks originating in the observed macro shocks.

TABLE 4
Observed Shocks Interacted with Institutions

	Transitory Variability in Earnings		Earnings Volatility	
	Estimates	t	Estimates	t
EPL	–0.0576	–0.62	–0.1548**	–2.30
Union density	–0.1306	–0.39	–0.2846	–1.13
High corporatism	–0.2104*	–1.98	0.0058	0.07
ALMPs	0.2680	0.99	–0.0904	–0.47
Unemployment benefit RR	–1.0866***	–2.75	–0.8453**	–3.06
PMR	0.0051	0.11	0.0495*	1.79
Tax wedge	1.1377	1.07	2.3162***	3.20
LD shift	0.1094***	3.3	0.3957***	6.29
Terms of trade	–0.3146***	–6.94	–1.3439***	–12.03
TFP growth	–0.1789	–1.37	–0.224	–0.76
Real interest rate	0.4597***	4.86	2.1726***	7.77
Adj. R^2	0.9206		0.9837	
Obs.	80		58	

Note: Non-linear least squares estimates. *p < 0.1, **p < 0.05, ***p < 0.01.
Source: Authors' calculations based on ECHP and OECD data.

6.3. *Discussion of Main Findings*

Corporatism

We find that countries with a corporatist economy have on average a lower transitory variability and volatility in earnings than countries with a more decentralized economy. In addition, corporatist systems are effective in reducing the adverse effects of macroeconomic shocks on transitory variability and volatility, meaning in cushioning individual earnings against transitory and permanent shocks. Our findings support the view that corporatist systems can be more flexible than decentralized ones because they enable the renegotiation of nominal contracts, thereby increasing the efficiency of the adjustment process to adverse shocks (Teulings, 1995; Teulings and Hartog, 2008). The existing evidence on earnings losses for dismissed high-tenure workers shows that separations under rigid nominal contracts are highly inefficient, resulting in large long-term losses (Jacobson *et al*., 1993). As corporatist systems deal with the adjustment to aggregate shocks, they can ensure a smooth adjustment to aggregate shocks, thereby preventing the exacerbation of transitory variability and volatility in earnings. This is also consistent with the existing evidence that in decentralized economies there are large differences between incumbent workers and new hires, as the latter take the full burden of adjustment to changes in labor market conditions. In addition, wages of low-skilled workers were shown to be more sensitive to cyclical fluctuations and aggregate shocks than those of highly skilled workers (Teulings and Hartog, 2008).

From the cross-institutional interactions, a high corporatism emerges as a desired complement for enhancing the "benefits" of several institutional factors, such as unionization, labor market deregulation, and labor market support as activation policies.

Trade Unions

As expected, our findings suggest that there are both "costs" and "benefits" associated with a higher unionization, depending on the institutional mix. A higher unionization is expected to reflect a higher bargaining power of covered workers and a lower transitory variability in earnings. The overall transitory variability in earnings, however, depends also on the impact of unions on the insider–outsider differentials in earnings paths and levels.

Consistent with the theory on wage formation, the effect of unionization on transitory variability in earnings depends on the structure of collective bargaining. In corporatist economies, with a centralized and coordinated bargaining system, a higher unionization is negatively associated with transitory variability in earnings, opposite to what we find in countries with a lower corporatism. This is consistent with the positive employment outcomes of unionization found in centralized systems: unions in decentralized economies push toward claiming a larger share of the surplus, an effect which is mitigated in corporatist economies which benefit from a higher coordination (Teulings and Hartog, 2008).

For the average country with a lower corporatism, unionization has the strongest negative effect on transitory variability in earnings when accompanied by low non-wage labor costs. A low tax burden promotes employment, which

coupled with a high unionization promotes stable earnings profiles. In the same policy mix, unionization is associated with a decrease in transitory variability when accompanied either by regulated labor markets or by generous unemployment benefits. This is consistent with the expectation that EPL and the benefit system can increase the bargaining power of unions (Fiori *et al.*, 2012).

Employment Protection Legislation

For a country with an average mix of policies/institutions and a lower corporatism, we find a U-shaped relationship between transitory variability in earnings and EPL. At low and average values, a stricter labor market regulation is associated with a decrease in transitory variability in earnings. At strict levels, however, the association turns positive, suggesting that extreme levels of EPL make the "cost" of EPL on transitory variability dominant. Whereas a strict labor market regulation protects covered workers, it has the opposite effect on vulnerable workers with irregular profiles, unemployed job-seekers. A strict EPL is a source of labor market rigidity, which is expected to widen the differentials in earnings and employment profiles between covered workers with regular jobs ("insiders") and uncovered workers with irregular profiles ("outsiders") (Cazes and Nesporova, 2004).

Our results indicate that certain institutional mixes augment the "benefits" of EPL, whereas others augment its "costs". The "benefits" of EPL are enhanced the most when accompanied by a strong labor market support such as developed ALMPs. ALMPs are aimed to enhance the skills of the unemployed and facilitate their reintegration into the labor market (Bassanini and Duval, 2006a, 2006b; Sologon and O'Donoghue, 2011b). For an average country with developed ALMPs, transitory variability in earnings is lower the higher the EPL, but at a decreasing rate. Thus, the highest "benefits" in terms of reducing transitory variability are reaped when increasing EPL from low values. Whereas the "benefit" of increasing EPL from low values dominates across all mixes, the effect is the strongest when accompanied by developed ALMPs. This is consistent with the view that developed ALMPs increase the employability of vulnerable groups and moderate levels of EPL assure a smoother labor market reintegration of these groups.

Consistent with the expectation that employment protection can increase the bargaining power of unions (Fiori *et al.*, 2012), we find that EPL may be more effective at the margin at reducing transitory variability in earnings when coupled with high union densities.

Our findings suggest that, at the average, labor market deregulation may increase transitory variability in earnings in most institutional mixes. We find that generous unemployment benefits may counteract this increase, which is consistent with the view that unemployment benefits and EPL are substitute insurance mechanisms against the labor market risk (Boeri *et al.*, 2006; Neugart, 2007). In order to prevent an increase in transitory variability in earnings, increasing labor market flexibility needs to be accompanied by adequate protection mechanisms. A high corporatism may have a similar effect. Deregulated product markets may also counteract the increase in transitory variability associated with labor market deregulation, which is consistent with the evidence regarding the positive impact of product market deregulation on labor market performance.

EPL is also negatively associated with earnings volatility. The interactions with macroeconomic shocks reveal that EPL acts as a filtering mechanism against adverse macroeconomic shocks on earnings volatility, whereas for transitory variability in earnings the effects are not significant. This suggests that under adverse macro shocks, EPL has the potential to cushion individual earnings against persistent earnings shocks to a larger extent than against transitory shocks. Thus the volatility of earnings resulting from labor market deregulation may have a persistent nature.

Labor Market Support as Active Labor Market Programs

For an average policy mix combined with above average levels of spending on ALMPs, we find a positive association between ALMPs and transitory variability in earnings. ALMPs are also found to exacerbate the adverse effects of macro shocks on transitory variability in earnings. These findings are consistent with our expectations. ALMPs are aimed to enhance the employability of vulnerable groups, in order to facilitate their reintegration into the labor market (Bassanini and Duval, 2006a, 2006b; Sologon and O'Donoghue, 2012). In the absence of protection mechanisms, the presence of the reintegrated workers in the labor market can amplify transitory variability in earnings, as they are more sensitive to labor market conditions and shocks than incumbent workers.

Our findings signal that complementary protection mechanisms should be put in place to protect the vulnerable groups reintegrated into the labor market by these policies. We identify a set of policy/institutional mixes which have the potential to reduce this increase in transitory variability in earnings or even decrease it. We find that the increase in transitory variability associated with increasing ALMPs when they are already high is considerably lower when accompanied by highly regulated labor markets, by a high corporatism, by high unemployment benefit replacement rates, and by low non-wage labor costs. Under the same conditions, increasing ALMPs from an average level is actually associated with a decrease in transitory variability in earnings. Similarly, each of these conditions reinforces the negative effect of increasing ALMPs when they are low. Therefore, these institutional circumstances assure a smoother reintegration of workers into the labor market. Generous unemployment benefits favor a better job-matching, thus more stable employment profiles for the reintegrated workers; low non-wage labor costs favor less costly and faster reintegration into the labor market; and highly regulated labor markets and corporatist economies may provide a better labor market protection for the reintegrated workers.

Labor Market Support as Unemployment Benefit Replacement Rate

Evaluated at low and average levels, more generous unemployment benefits are associated with a lower transitory variability in earnings, ceteris paribus at the average. Unemployment benefits are also found to limit the adverse effect of macroeconomic shocks on both transitory variability in earnings and earnings volatility, meaning on both transitory and permanent shocks. Our findings are consistent with the short- and long-term "benefits" of unemployment insurance for reducing earnings variability. Short-term, unemployment insurance represents a

cushioning mechanism for earnings variability by allowing dismissed workers to stay unemployed after adverse shocks, instead of facing wage cuts by accepting lower paid jobs. Long-term, a generous unemployment insurance can improve job-matching, which increases the likelihood of more stable employment and earnings profiles (Bassanini and Duval, 2006a, 2006b).

These "benefits" are expected to be enhanced when accompanied by developed ALMPs, which increase the employability of vulnerable groups. Indeed, the decrease in transitory variability in earnings associated with an increase in the unemployment benefit replacement rate is enhanced when accompanied by developed ALMPs.

Developed ALMPs are also found to counteract the "costs" of too generous unemployment benefits, which are found to be detrimental for transitory variability in earnings for an average country. Too generous unemployment benefits are expected to weaken the job-search intensity, decrease the employability and human capital for the unemployed, which in turn translates into more unstable future employment and earnings profiles. When accompanied by developed ALMPs, however, the generosity of the unemployment benefit is negatively associated with transitory variability in earnings. The unemployment spells have an adverse effect on the employability and the human capital accumulation of the unemployed, expected to increase their earnings vulnerability once they re-enter the labor market, unless protection mechanisms and developed ALMPs are in place to counteract this increase in transitory variability in earnings.

We find that the decrease in transitory variability associated with an increase in the unemployment benefit replacement rate is the largest when ALMPs are very developed. Thus developed ALMPs have the potential to counteract the adverse effect of increasing the generosity of unemployment benefits for transitory variability in earnings, similar to unemployment (Bassanini and Duval, 2006a, 2006b).

A low EPL is also found to enhance the "benefits" of unemployment benefits in reducing transitory variability in earnings. The empirical evidence reveals a preference across the European countries for a policy trade-off between the EPL and unemployment benefits, usually perceived as substitute insurance mechanisms against the labor market risk (Boeri *et al*., 2006; Neugart, 2007). Our findings show that this policy trade-off has the potential to reduce transitory variability in earnings. For example, increasing unemployment benefits in countries with a low EPL or reducing the EPL in countries with generous unemployment benefits is associated with a decrease in transitory variability in earnings.

Product Market Regulation

We find that product market deregulation is associated with a decrease in earnings volatility and transitory variability, and counteracts the impact of adverse macroeconomic shocks on earnings volatility and transitory variability. Our findings are consistent with the evidence that product market reforms aimed at strengthening competition improve labor market performance in terms of employment and real wages and the economic resilience to adverse macroeconomic shocks (Nicoletti *et al*., 2001; Nicoletti and Scarpetta, 2005; Griffith *et al*., 2007; Mongelli, 2008; Canova *et al*., 2012; Fiori *et al*., 2012).

Likewise, we find that the association between PMR and transitory variability in earnings depends on the institutional mix. The interaction with EPL reveals that product market deregulation is more effective at the margin at reducing transitory variability in earnings in deregulated labor markets. Berger and Danninger (2006) and Bassanini and Duval (2006a, 2006b) find similar results for employment. The interaction with union density reveals that product market deregulation is more effective at the margin at reducing transitory variability in the presence of a high unionization. Our findings complement the evidence brought by Griffith *et al.* (2007), who show that a high unionization also affects the relationship between product market deregulation and employment and real wages: the increase in employment under the impact of product market deregulation is higher in the presence of a higher unionization, whereas the increase in real wage is lower under a higher unionization.

7. Concluding Remarks

Increasing economic insecurity of families stemming from increasing labor market earnings insecurity is a growing concern in both the U.S. and Europe. Our paper contributes to the literature on the institutional and policy determinants of economic insecurity by trying to understand the complex relationship between earnings insecurity, policies, institutions, and macroeconomic shocks. We explore this relationship in Europe, where the labor market reforms of the 1990s led to an increasing country-heterogeneity in labor market policies and institutions, which can help us understand the cross-national differences in earnings insecurity. Earnings insecurity is measured as transitory variability in earnings, which captures transitory earnings shocks, and as earnings volatility, which captures both permanent and transitory earnings shocks. We consider institutions and policies linked with the wage-setting mechanism (corporatism, unionization, EPL, ALMPs, and unemployment benefits), and product market (de)regulation.

The effect of most factors depends on the institutional mix. We identify several institutional mixes with the potential to reduce transitory variability in earnings.

A high corporatism emerges as a desired complement in several institutional mixes, enhancing the "benefit" of different factors in reducing transitory variability in earnings. One example is unionization, whose effect depends on the structure of collective bargaining: in corporatist economies, with a centralized and coordinated bargaining system, a higher unionization is negatively associated with transitory variability in earnings, in contrast to systems with a lower corporatism, ceteris paribus at the average. Under a lower corporatism, unionization is negatively associated with transitory variability in earnings, when accompanied, for example, by regulated labor markets or by generous unemployment benefits.

For an average institutional mix, we find a U-shaped relationship between EPL, unemployment benefits, and transitory variability in earnings. This signals that too strict levels of EPL and too generous unemployment benefits come at a "cost." This cost is, however, mitigated by developed ALMPs. When accompanied by developed ALMPs, the EPL and the unemployment benefits are

negatively associated with transitory variability in earnings. Coupling protection mechanisms with activation policies have the potential to reduce transitory variability in earnings.

The empirical evidence reveals a preference across the European countries for a policy trade-off between the EPL and unemployment benefits, usually perceived as substitute insurance mechanisms against the labor market risk (Boeri *et al.*, 2006; Neugart, 2007). Our findings show that this policy trade-off has the potential to reduce transitory variability in earnings. For example, increasing unemployment benefits in countries with a low EPL or reducing the EPL in countries with generous unemployment benefits is associated with a decrease in transitory variability in earnings. Our findings indicate a potential use of these policy instruments in reforms to increase labor market flexibility without increasing transitory variability in earnings, which are relevant in the context of the "Flexicurity" reforms undertaken across Europe over the past decades. Further research is needed.

We bring evidence that labor market deregulation may increase transitory variability in earnings in most institutional mixes (evaluated at the average), unless these reforms are accompanied by adequate protection mechanisms. Besides generous unemployment benefits, a high corporatism and deregulated product markets emerge as effective in reducing the degree of transitory variability in earnings associated with deregulated labor markets.

Complementing recent findings on employment and real wages, we find that product market deregulation may improve labor market performance also in terms of earnings stability. Regarding the interplay with EPL, we find that product market deregulation may be more effective at the margin at reducing transitory variability in earnings in deregulated labor markets.

Several institutions/policies shape the distributional effects of macroeconomic shocks on transitory variability in earnings and earnings volatility. We bring supporting evidence that corporatist systems can be more flexible than decentralized ones, enabling a smooth adjustment of earnings to aggregate shocks, thereby preventing the exacerbation of transitory variability in earnings and earnings volatility. In line with the evidence that product market reforms improve the economic resilience to macro shock, we find that product market deregulation is effective in counteracting the adverse effects of macroeconomic shocks on transitory variability and volatility. EPL and unemployment benefits, seen as alternative insurance mechanisms against the labor market risk, are also found to counteract the adverse effects of macroeconomic shocks on earnings volatility, and earnings volatility and transitory variability, respectively.

Developed ALMPs are found to augment transitory variability in earnings in periods of adverse macroeconomic shocks. As these policies are crucial instruments for reintegrating the vulnerable groups into the labor market, they need to be accompanied by appropriate protection mechanisms, such as, a high corporatism, generous unemployment benefits, or regulated labor markets in order to counteract the increase in transitory variability in earnings.

A valuable lesson from our research is that contextual interaction effects are important for understanding the influence of particular policy and institutional factors on labor market outcomes. We bring evidence that the same factor can have different impacts in different "policy packages." These findings are relevant

in the context of the "Flexicurity" and deregulation wave undertaken by many European countries. The lesson to be drawn is that "Flexicurity" comes at a cost and the institutional framework in place needs to be adapted to reintegrate the vulnerable groups into the labor market, to offer adequate protection, and to favor their investment in human capital for future stable careers.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Appendix A
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