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International Consumption Insurance and Within-  
Country Risk Reallocation

Anna Lo Prete



**EUROPEAN UNIVERSITY INSTITUTE**  
**MAX WEBER PROGRAMME**

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**Abstract**

Institutions meant to reallocate risks that cannot be fully diversified on financial markets, such as labour income fluctuations, may also affect the response of aggregate consumption to country-specific income shocks. This paper empirically assesses this possibility by extending a standard cross-country consumption insurance test to account for the interaction between macroeconomic shocks and labour and credit market institutions. In a panel of 15 OECD countries observed over the 1971-2003 period, institutional heterogeneity is a significant determinant of cross-country differences in consumption responsiveness to income changes. The estimates are remarkably robust to the inclusion of unobservable country-level heterogeneity and time-varying institutional indicators.

**Keywords**

Risk-sharing, financial markets, labour and credit market institutions



ANNA LO PRETE

European University Institute, Max Weber Programme

## 1. Introduction

Understanding whether people effectively insure against country-specific shocks to their income or wealth is a central concern in international macroeconomics. Standard representative agent models of international trade in risky assets predict that, when markets are complete and there are no trade costs, optimizing agents should use markets in contingent claims to insure fully. In practice, however, the data soundly reject the hypothesis that cross-country consumption movements should be the same and should not be affected by country-specific circumstances. In the early 1990s, empirical studies found a substantial lack of risk sharing in consumption comovements across countries (consumption home bias), raising serious question about the so-called "full consumption insurance hypothesis".<sup>1</sup>

A large literature has tried to reconcile the theory with the data, providing several plausible but not fully satisfactory explanations for this evidence.

This paper belongs to the strand of studies that focuses on risk sharing under incomplete markets, and contributes to the ongoing debate by exploring the relationship between international asset trade in risky assets and (national) institutional insurance provisions. It empirically investigates whether institutions meant to reallocate risks that cannot be fully diversified on financial markets, such as labour income fluctuations, may also alter the way aggregate consumption responds to idiosyncratic income shocks.

The analysis is motivated by the idea that, when individuals differ in their possibility of accessing financial markets for consumption smoothing purposes, there could be an incentive for governments to use institutional instruments to mitigate the effect of country-level shocks. While new in international macroeconomics, the idea that a wide array of institutional arrangements may introduce a social insurance component in disposable incomes is a well-known feature of labour economics. The social insurance approach to institutional analysis, indeed, assesses the insurance role of labour market institutions under incomplete markets, although mainly focusing on individual or sector specific shocks rather than on country-level uncertainty.<sup>2</sup>

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<sup>1</sup> On testing consumption insurance see, for instance, Mace (1991) and Cochrane (1991) on micro data, and Obstfeld (1994), on consumption comovements across countries.

<sup>2</sup> The idea that a set of institutions may provide labour income with a non-market insurance component dates back to Azariadis (1975). But it was explicitly addressed and formalized only in the 1990s as, for instance, in Blank and Freeman (1994) and Agell (1999, 2002).

To find evidence of a (so far) unexplored insurance channel the present paper tests whether idiosyncratic income shocks may produce different consumption volatility outcomes depending on country institutional settings. OECD countries differ along several structural dimensions and this heterogeneity will be exploited to point out the significance of the interaction between shocks and institutions (à la Blanchard and Wolfers, 2000).

Empirical estimation in a panel of 15 OECD countries observed over the 1971-2003 period indicates that institutional heterogeneity is a significant determinant of cross-country differences in consumption responsiveness to income changes. The results are strikingly robust and have interesting implications. The analysis makes it possible to rank countries in terms of the effectiveness of various mixes of policies in providing social insurance coverage against country-level shocks. And the high significance of OECD aggregate income fluctuations for consumption suggests that OECD countries in practice trade financial assets mostly among themselves rather than with the rest of the world.

The paper is organized as follows. Section 2 outlines the basic features of the income insuring mechanism whereby labour market policies may provide country-specific risk sharing opportunities against country-level shocks. In doing so, it presents the main novelties of the approach proposed in the paper to the interpretation of international differences in consumption volatility. Section 3 discusses how structural features of labour and credit markets may, in theory, be relevant to consumption volatility, and how they may interact with macroeconomic shocks. Section 4 first presents the empirical strategy by showing how a standard cross-country consumption insurance test can be extended to account for the interaction between macroeconomic shocks and institutions. Then, it briefly describes data sources, referring to the Appendix for a detailed description of the institutional measures. The main estimation outcomes are reported in Section 5. Empirical findings indicate that institutional settings play a significant role as risk-shifting devices within national borders: they affect the response of aggregate consumption to country-specific shocks, and this association is remarkably robust to the inclusion of unobservable country-level heterogeneity, time series information, and further hypotheses and robustness checks. Section 6 discusses the implications of the present analysis for within-country and cross-country consumption risk diversification, by comparing institutional insurance provisions across countries and by assessing the extent of the integration of OECD financial markets. Section 7 concludes.

## **2. National institutions and cross-country risk allocation**

This Section motivates the claim that institutions meant to reallocate risks that cannot be fully diversified on financial markets, such as labour income fluctuations, may also alter the way aggregate consumption responds to country-specific income shocks. The literature has disregarded the interaction between macroeconomic shocks and non-market insurance provisions granted by national institutional settings. But do structural features of labour and credit markets matter for cross-country risk allocation?

In a framework where people can access complete markets the answer would be no. If it was possible to insure fully against country-specific shocks to income or wealth, consumption should not be affected by country-specific circumstances (the so-called "full consumption insurance hypothesis"). In that setting it would be hard to rationalize labour market institutions as risk-reducing devices: in an economy where workers may write and trade assets on their human capital consumption would be sheltered from labour income fluctuations. Under perfect financial markets also the bond market would be redundant. Empirically, however, there is very little evidence of risk sharing in consumption comovements across countries (consumption home bias), and the behaviour of cross-country (per capita)



consumption growth rates reflects the existence of a more imperfect and complicated world than the one formalized by complete market models of international trade in risky assets.

In reality, indeed, private markets do not perfectly accommodate the demand for insurance against labour income fluctuations. Nevertheless, people can still access alternative consumption smoothing channels. For instance, if risks are not fully insurable by trade in contingent securities, agents may self-insure by borrowing and lending on credit markets. According to the permanent income hypothesis (PIH), consumption is expected to respond to idiosyncratic shocks, even if only to their permanent component, thus leading to a rejection of the full consumption insurance hypothesis. But not even intertemporal trade in riskless bonds solves the issue in a world where lending and borrowing opportunities are limited by the existence of many credit market imperfections.<sup>3</sup> Actual departures from the complete-market paradigm suggests that, in a second-best environment, there could be scope for non-market insurance mechanisms, such as formal and informal institutions, to provide risk sharing arrangements as an alternative to asset trade on financial markets, thus making the answer to the preceding question less obvious.

This paper tests the hypothesis that structural features of labour and credit markets matter for cross-country risk allocation by assessing whether institutional heterogeneity is a significant determinant of cross-country differences in consumption responsiveness to income changes. While intertemporal trade in riskless bonds is a well-known alternative to asset trade on financial markets, the central contribution of the present analysis to the literature consists in uncovering the basic features of a (so far) unexplored income-insuring mechanism whereby labour market policies may provide country-specific risk sharing opportunities against country-level shocks.

A precursor to the present approach to the study of the role of national institutions in international macroeconomics is a paper by Bertola and Drazen (1994) on capital flow volatility, which suggests that when individuals differ in their possibility of accessing financial markets to smooth consumption, there could be an incentive for governments to use institutional instruments to smooth out the effects of country-specific shocks. Although promising for its positive and normative implications, this idea has not been explored either theoretically or empirically. The present paper, instead, takes the argument further and investigates the social insurance role of labour market institutions as risk-reducing devices meant to mitigate the fluctuations of otherwise non-traded national income components.

The interpretation that the paper advances for the observed differences in consumption volatility across countries hinges upon two elements: the insurance role of labour market institutions, and the impact of their interaction with country-level shocks in terms of macroeconomic insurance outcomes.

As regards the first element, an important reference for the present approach to the analysis of the (insurance) outcomes of institutions can be found in labour economics. The social insurance approach to institutional analysis states that, while the introduction of labour market institutions may be hardly motivated in a frictionless economy where workers can perfectly insure against labour income risk, several institutional features such as job security provisions (Bertola, 2004), wage setting (Agell and Lommerud, 1992, and Agell, 2002) and unemployment insurance benefits (Acemoglu and Shimer, 1999) may represent second-best instruments for sharing risk in a reality characterized by incomplete and imperfect financial markets. All the contributions in the field focus on income shocks which are idiosyncratic to an individual agent or sector within a country and cancel out in the national aggregate. The present analysis, instead, investigates whether the same institutions may provide insurance in

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<sup>3</sup> See Asdrubali and Kim (2005) for an assessment of the contribution of intertemporal and intratemporal consumption smoothing to risk-sharing.

the form of a risk reallocation between agent types within national borders when the shock is aggregate to a country as a whole.

What about the impact of labour market institutions on macroeconomic shocks? The key elements of the income insuring mechanism whereby labour market institutional features may promote risk-shifting arrangements between agents with or without access to financial markets are illustrated in theory in a companion paper (Lo Prete, 2007). Briefly, the reduction of employment and wage fluctuations, as well as the possibility to reallocate the burden of public spending on benefits systems from labour incomes to internationally diversifiable capital incomes, may be part of a policy package able to foster what may be dubbed "within-country risk reallocation". The mechanism redistributes total national incomes from labour to capital when business conditions turn good, and from capital to labour when business conditions turn bad, overall leading to a negative correlation of the labour share with productivity shocks. In turn, this insurance channel, by mitigating the fluctuations of otherwise uninsured labour incomes at the expense of an amplification of the fluctuations of tradable national income components, is expected to affect the response of aggregate consumption to country-specific income shocks.

### **3. Institutional features influencing consumption insurance**

As argued in the above Section, there are at least two broad alternatives to risk sharing on international financial markets, and, hence, two broad structural features that can be expected to influence the transmission of idiosyncratic income shocks: the mix of labour market policies, which relates to the intratemporal dimension of consumption smoothing (within-country risk reallocation); and the efficiency of credit markets, which relates to self-insurance and liquidity constraints (intertemporal consumption smoothing).

To assess the characteristics of national labour and credit markets and provide information on both the cross-sectional and the time-varying dimensions of institutions, this paper relies on various indicators of institutional intervention taken from the OECD, several studies, and the author's calculations. Needless to say, the available empirical counterparts are useful but imperfect measures of the institutional dimensions they want to represent. Moreover, there are several gaps in both the cross-sectional and time series data: comparable indicators are not available for all the OECD countries and, in past decades, data have not always been recorded on a yearly basis, so that information on time variation is sometimes scarce.

The database that has been collected for the paper includes data on 15 OECD countries observed over the 1971-2003 period. Leaving precise definitions of the variables to the Appendix, this Section offers a discussion of the information content of the indicators, and of the theoretical hypotheses as to how each institution may contribute to smoothing out macroeconomic shocks.

#### **3.1. Information on cross-sectional heterogeneity**

The first step of the analysis will be to define the main characteristics of the institutional structures of labour and credit markets by exploiting information on cross-sectional heterogeneity. Institutions in the labour market will be grouped in four main categories, according to whether they relate to employment protection, unemployment benefits systems, the characteristics of the wage bargaining process, and labour taxation. Then, the structural features of credit markets will be summarized by using an indicator of credit supply conditions.

### *Employment protection*

Employment protection legislation (EPL) is the mix of all the mandatory measures that regulate hiring and firing with the aim of protecting employment. The OECD provides two synthetic indicators of the tightness of EPL. Both measures account for several dimensions of employment protection which pertain to laws governing regular and temporary contracts, and differ in that the more recently compiled, the so-called "version 2", adds items on collective dismissals' requirements. Table 1 reports the values of the two indicators in the early 2000s. The Spearman's rank correlation coefficient indicates that the information provided by these indicators is very similar. Turning to the data, there is a wide variation of EPL across states: "Anglo-Saxon" countries have less stringent regulations; Continental Europe, despite a notable variety in provisions, grants a greater protection to workers; Denmark departs from the "Continental model", and constitutes a third way by combining low EPL and high social protection - the so-called "flexicurity" approach. Along with social protection, these policies are usually viewed as determinants of labour market "rigidity". Actually, the effect of EPL on employment and wages is quite ambiguous and closely related to the wage-setting process, while its (beneficial) impact on workers' welfare and productive efficiency when markets are incomplete has been assessed in some recent contributions (see, for instance, Bertola, 2004). The present analysis on EPL insurance outcomes against aggregate shocks will add a new dimension to the ongoing debate. As outlined in labour economics, in the presence of turnover costs the labour share is increased (decreased) when business conditions turn bad (good) with respect to what would happen in a free-market economy (see Kessing, 2003, and Giammarioli et alii, 2002). Adjustment costs drive a wedge between the marginal product of labour and the wage that firms pay to employees and hence reduce labour income fluctuations across states of nature. Overall, employment protection policies are expected to play a significant role in reallocating risks within national borders and thus in shielding otherwise uninsured incomes.

### *Unemployment benefit systems*

Public unemployment benefit systems are meant to provide what moral hazard prevents private insurance companies from supplying: insurance against the risk of unemployment and social assistance to unemployed workers.

Two dimensions that may summarize well the sufficiency of unemployment benefits are the level of income that is maintained when becoming unemployed, measured by the so-called replacement rate, and the duration of the entitlement to unemployment benefits. The OECD (2004a) reports two indicators for the level of benefits: Net replacement rates (NRRs), a refined measure made available in updated OECD databases which takes into account the progressivity of the tax system and indexes (net) in-work income maintained after a job loss; and an older raw measure of the generosity of the benefits system, Gross replacement rates (GRRs). The last row of Table 1 shows that the rank correlation between the two indicators is low, so their information content is actually different. Since NRRs capture the effect of payroll deductions, taxes, and transfers they provide more accurate information on the direct effect of unemployment benefits, and better fit the present analysis.<sup>4</sup> The fifth column of Table 1 reports data on the duration of unemployment benefits measured as the maximum number of months of entitlement to benefits provisions. Relatively low levels of benefits are granted in Anglo-Saxon countries, Japan, Italy, Spain and Belgium; the duration of entitlement is low in Austria and all the above-listed countries with the exception of Spain and Belgium. The literature has not yet analyzed the effect of unemployment benefits on

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<sup>4</sup> For a detailed discussion on the advantages of using NRRs instead of GRRs when assessing the insurance scope of unemployment benefits, see OECD (2004a).

labour share dynamics. Intuitively, the response of consumption growth rates to unemployment shocks may even be (relatively) amplified in countries where longer unemployment benefits and higher replacement rates are granted according to whether the cost of benefits systems is not fully reallocated from uninsured labour incomes to internationally diversifiable capital incomes.

A third dimension of the structure of unemployment benefit systems is the amount of spending on Active Labour Market Programmes (ALMPs), which includes all the social expenditures, other than education, undertaken to promote and increase the quality of employment for those enrolled in the programmes. The values in Table 1 refer to an index built as spending on ALMPs per unemployed person as a percentage of GDP per member of the labour force (see Nickell, 1997). Low values of ALMPs are typically recorded in countries with less generous benefits systems.<sup>5</sup> This may indicate that high ALMPs are meant to offset the adverse effects of unemployment benefit systems on the willingness to fill a vacant position and hence push unemployed individuals into work. In the present framework, ALMPs would be expected to represent a cost and thus to imply additional consumption losses if, as it could be reasonably expected, they were partially financed out of labour incomes.

### *Wage bargaining*

Institutional features that have a direct impact on wage setting, such as trade union power and coordination in wage bargaining, may be relevant elements of the mix of policies which aims at shielding workers from uninsurable income fluctuations.

The power of trade unions can be summarized by two complementary indicators: collective bargaining coverage, that is, the share of workers actually covered by union bargaining; and union density, which measures the percentage of wage-earners who are members of a trade union. Wage-setting institutions play a significant role in most OECD countries. Table 2 shows that collective bargaining coverage is high everywhere but in Anglo-Saxon countries and Japan. Trade union density, instead, is quite low on average, with values below 30% in Anglo-Saxon countries, Japan, and half of Continental Europe. This gap is worth noting, as the degree to which union decisions affect workers who are not enrolled in their ranks may index the relevance of insider practices. When restrictive rules on union membership and the presence of turnover costs may endow incumbent workers (insiders) with additional bargaining power with respect to outsiders (see Lindbeck and Snower, 2001), the implications of collective bargaining coverage for the stabilization of overall labour income and workers' aggregate consumption are ambiguous, depending for example on whether insiders exploit their power to allow marginal workers to be employed at lower wages or on temporary contracts (Fehr, 1990).

A second important aspect of wage determination is the degree of coordination in wage bargaining on the part of both unions and employers. The corresponding indicator, reported in the third column of Table 2, measures the extent to which trade unions consider the consequences of wage setting for the whole economy (the higher the index, the wider the scope of coordination). Data indicate that coordination is high in all countries except Canada, France, the UK, and the US. To the extent that coordination makes wage bargaining more sensitive to cyclical conditions (see, for instance, Nickell and Layard, 1999), it may be expected to increase the responsiveness of aggregate consumption to country-specific shocks in the present setting.

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<sup>5</sup> Among Scandinavian countries, which record high values on all the benefit system dimensions, Finland represents an exception, with a value of ALMPs more than three times lower than those of Denmark and Sweden.

### *Labour taxation*

Taxes on labour income are mandatory contributions collected by the government to insure workers against (uninsurable) shocks to their incomes. The effective tax burden, or "tax wedge", is computed as the difference between the cost of labour borne by the employer and the net take-home pay (see OECD, 2005). Two dimensions of the tax burden may be relevant for the present purposes: the average tax wedge, which captures the overall generosity of the social security system; and the marginal tax wedge, a measure of progressivity which accounts for the percentage of additional earnings that is taxed away. Table 2 shows that the marginal tax rate exceeds the average rate in all the countries, indicating that all the systems are to some extent progressive. Continental Europe exhibits, with the exceptions of Portugal and Spain, marginal rates higher than Anglo-Saxon countries and Japan. The Spearman's rank correlation coefficient between marginal and average tax wedges is low, meaning that the different information content of the two measures generates a significant gap in country rankings. Since what matters for consumption insurance is the tax system's contribution to reducing the variance of net income across states of nature, progressivity (hence, the marginal measure) is arguably the most relevant feature of this institutional dimension.

### *Efficiency of credit markets*

Besides within-country risk reallocation, when markets are incomplete, a well-known alternative to trade in contingent securities is intertemporal trade in risk-free bonds. Workers' ability to smooth consumption intertemporally and self-insure depends on the degree of development of credit markets: liquidity constraints and other credit market imperfections impose serious limits on borrowing and lending. The direct effect of these restrictions can be summarized by an indicator of credit supply conditions, the loan-to-value ratio (LTV). Table 2 reports two measures: the typical LTV can be interpreted as the fraction of house value that is financed, on average, by private intermediaries in a country; the maximum LTV accounts for the maximum access to financing that the mortgage market can grant to households.<sup>6</sup> The first measure is more informative in terms of overall limits to borrowing in a country, while the maximum LTV refers to collateralized mortgages provided to first class borrowers only (i.e. to agents who are not going to face borrowing constraints). The Spearman's statistic shows that this gap in information contents leads to different rankings. Countries are very heterogeneous as regards typical LTV ratios: Austria, France, Germany, Italy, Spain and the UK exhibit the lower ratios, equal to or below 70%. Instead, maximum LTV ratios are above 80% across the whole sample and indicate a substantial convergence towards higher efficiency of credit markets, at least for individuals who were allowed to borrow.

## **3.2. Time-varying institutional indicators**

Consider next how the relevant institutional features have changed over time. Given limitations on data availability, it has been possible to collect information on the time variation of eleven of the institutional measures listed in Tables 1 and 2 (ALMPs and typical LTV are missing). Referring to the Appendix for a detailed discussion on time series and compilation strategies, this Subsection summarizes the informative contribution of institutional time-variation to the present analysis with the help of some descriptive statistics. The contents of Table 3 will allow, first, to draw a general picture of the change in the set of indicators and, then, to describe what happened to each institutional dimension.

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<sup>6</sup> For a more precise definition of the two indicators, see the data Appendix.

Overall, as the first column of Table 3 indicates, the time span for which observations are available differs substantially across the variables. Most indicators have records since the 1970s or the 1980s, while fewer observations are available for EPL version 2 and the marginal tax wedge, which record values since the late 1990s, and for NRRs, with a series compiled by the OECD only for the early 2000s. Looking at time variation, the Table reports changes in average (with respect to the country sample) levels of the indicators and Spearman's rank correlation statistics, which provide information on the change in countries' relative positions. Acknowledging the differences in the available time span, average values seem to indicate that institutions have remained quite stable over time. Changes in levels are smaller than 10% for most indicators, while more important variation is observed for EPL version 1 and trade union density, which decreased by 21% and 15% respectively, and GRRs and maximum LTV ratios which increased by 62% and 29%. Turning to the Spearman's statistics, it is possible to understand if these changes reflect a common evolutionary pattern in all the countries, or are concentrated in particular countries.<sup>7</sup> Correlations refer to country rankings at three points in time (1971, 1980, and 1990) with respect to the situation in 2003 (or the latest available year of observation). Over the 1971-2003 period, institutional change in terms of relative positions has been low with the exceptions of GRRs and maximum LTV ratios.

To refine the picture, previous findings may be read in the light of historical information on the evolution of single institutions. EPL has significantly changed since the 1970s, when employment protection laws were introduced for the first time in several countries. Over the past 15 years there has been some convergence in regulations across countries, with the main changes occurring in the 1990s: EPL has been relaxed in all the countries, with stronger reforms in Denmark, Italy and Spain. As Table 3 confirms, EPL decreased on average by 21% over the period, but the relative positions have not changed much, especially since the late 1980s.

Benefit systems are almost stable as regards the length of entitlement, but show a significant variation in the level of unemployment benefits. Unfortunately there is basically no information about the change in NRRs; given that countries differ greatly in benefit taxation, this measure would have been the more powerful indicator of replacement rates for international comparisons. As for unemployment insurance, GRRs increased by over 60% over the period; up to the early 1980s all countries implemented more generous benefit systems, but since then they have moved in different directions, thus leading to significant differences in international rankings.

Data on wage-setting institutions are by far the most complete. All the indicators record a decrease over the past 30 years, more pronounced for trade union density. Overall, the substantial stability of rankings indicates that all the countries experienced a similar evolutionary pattern.

Information on the change in labour taxation is available mainly for average tax wedges. The general degree of fiscal pressure has changed, mainly in the 1980s, in slightly different ways across countries, but, on average, has not varied significantly. The scarce information on the progressivity of labour taxation allows to (just) detect a substantial stability in the indicator since the late 1990s in all the countries.

Finally, maximum LTV ratios changed both in levels and in relative terms. Looking at the data, this finding may be ascribed to the increase and relative convergence of credit markets standards in the country sample, which led several countries to occupy the same rank and, hence, biased the Spearman's rank coefficient.

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<sup>7</sup> The statistic can be read as follows: a high Spearman's rank correlation coefficient indicates that country ranking has not changed very much and hence that institutions have varied in similar ways in the country sample.

The discussion on time variation pointed out that, in most cases, the relative position of countries has not changed much over the last decades (the ranking has changed substantially only as regards GRRs and maximum LTV ratios). Thus, empirical specifications with time-invariant institutional indicators should capture most of the information in the data, but using the (limited) available information on time variation within each country can offer additional evidence as to the robustness of the results.

#### 4. Shock-institution interaction: the empirical specification

This Section develops a consumption-based empirical analysis to test for the existence of within-country risk reallocation: a baseline model of consumption insurance under complete markets will be modified to account for both market incompleteness and the existence of alternative insurance channels at the national level (i.e. within-country risk reallocation and intertemporal trade in riskless bonds). Then, it will present the set of macroeconomic variables and institutional indicators which will be included in the empirical specification.

##### 4.1. The empirical model

Standard representative agent models used to study risk sharing behaviour under complete markets predict that individual consumption should move together with aggregate consumption rather than with idiosyncratic variables (e.g. country-specific income).<sup>8</sup> Under CRRA preferences, this hypothesis can be empirically tested in terms of growth rates by estimating the following linear model:

$$\Delta c_{jt} = \delta_t + \beta \Delta \tilde{y}_{jt} + \alpha_j + \varepsilon_{jt} \quad (1)$$

where  $\Delta c_{jt} = \Delta \ln C_{jt}$  is the first difference of the natural logarithm of real consumption per capita of country  $j$  in period  $t$ , a measure for the growth rate of consumption;  $\delta_t$  a dummy variable accounting for the common consumption growth rate in the aggregate; and  $\tilde{y}_{jt}$  the country-specific shock variable, namely the idiosyncratic rate of growth of real output per capita. The disturbance term,  $\varepsilon_{jt}$ , includes several effects: the time-varying component of individual and aggregate preference shocks; unexpected changes to permanent income; and (possible) measurement errors from consumption and income data. If markets were complete, agents would share all the risk and unexpected revisions to permanent income should be identical across countries and captured by the aggregate consumption growth rate. Hence, consumption would not depend on idiosyncratic income growth and the hypothesis  $\beta = 0$  would hold true. Finally, while standard models of international trade in risky assets assume that the share that each country holds of the initial world tradable output is constant, the introduction of country dummies ( $\alpha_j$ ) is intended to check for (potential) changes in the international distribution of assets. A negative (positive) and significant country effect would indicate a current account deficit (surplus), thus signalling an increase (decrease) in a country's share in world tradable output over the period.

As discussed in Section 2, empirical analyses of international data led to a rejection of the full consumption insurance hypothesis, finding that the estimated  $\beta$  from model (1)

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<sup>8</sup> For a derivation of the testable implications of consumption insurance under complete markets (and extensions to include uninsurable risk components) see, for instance, Obstfeld (1994).



significantly differs from zero. Moreover, as stated in Lewis (1999), by running separate regressions of the country-specific growth rate of consumption on the country-specific growth rate of income, it can be shown that the coefficient in front of the idiosyncratic variable not only differs from zero but is even country-specific. The empirical strategy proposed in this paper stresses the importance of institutional heterogeneity by testing whether the difference in slopes may be explained by differences in institutional (non-market) insurance provisions.

The idea that the effects of idiosyncratic income shocks on consumption depend on country-specific sets of national institutions may be included in equation (1) by using the modelling strategy developed by Blanchard and Wolfers (2000) to study the interaction between shocks and institutions and its role in explaining unemployment dynamics. The empirical model becomes:

$$\Delta c_{jt} = \delta_t + \beta \Delta \tilde{y}_{jt} \left( 1 + \sum_{i=1}^I \gamma_i \tilde{X}_{ij} \right) + \alpha_j + \varepsilon_{jt} \quad (2)$$

In the above specification, the risk-sharing behaviour of those agents who can fully insure consumption and the behaviour of agents who consume what they earn due to financial market incompleteness coexist. Consumption growth rates are determined by two factors: a common (cross-country) movement, captured by the time dummy, and a country-specific change in income. The expression in parenthesis accounts for the interaction between idiosyncratic shocks and (heterogeneous) national institutional settings.  $\tilde{X}_{ij}$  is the value of institution  $i$  in country  $j$ , computed as the deviation from the mean value in the aggregate. While in (2) institutional indicators do not exhibit the time subscript  $t$  (i.e. are time-invariant), the next Section will report estimates from a model including institutional time-varying measures, too. It is worth noting that each institution is allowed to interact separately with the shock; the parameters  $\gamma_i$  enter with a negative (positive) sign when institution  $i$  contributes to smooth out (amplify) the effect of the shock. This specification, as pointed out by Blanchard and Wolfers, captures at a descriptive level the idea that heterogeneity in institutional provisions matters to the way in which shocks affect macroeconomic outcomes.

The coefficient  $\beta$  represents the sensitivity of consumption growth to idiosyncratic income growth of a country displaying an average (with respect to the sample aggregate) institutional framework. Notice the difference with respect to what is predicted by the basic model of international trade in risky assets: here full insurance ( $\beta = 0$ ) may be reached through the combination of trade on financial markets and national social insurance. And, as anticipated above, the effect of the idiosyncratic income shock variable is expected not only to differ from zero, but even to be country-specific and related to the overall scope of the within-country risk reallocation provisions that each institutional setting may grant.

To conclude on the empirical strategy, equation (1) will be estimated by using a pooled-OLS, while, following Blanchard and Wolfers (2000), the model in (2) by using non-linear least squares.

## 4.2. Data on shocks and institutions

The database compiled for this paper includes annual data on OECD countries and a set of institutional indicators. The analysis is made on the 15 countries for which the data on all the relevant institutional indicators discussed below exist, namely: Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Portugal, Spain, Sweden, the United Kingdom, and the United States. Countries are observed over the 1971-2003 time



interval, and data availability allows to build up an unbalanced panel, for a total of 470 observations.

Data on national accounts are taken from the World Development Indicators online database of the World Bank. Income and consumption series refer to per capita annual real income and consumption, computed (respectively) as Gross Domestic Product and Household Private Consumption Expenditure, deflated by the Consumer Price Index, and divided by Population.<sup>9</sup> The main macroeconomic shock variable is a proxy for the idiosyncratic rate of growth of real output per capita, computed as the difference between the growth rate of income in a country and the mean growth rate of income in the sample aggregate:  $\Delta\tilde{y}_{jt} = \Delta\ln Y_{jt} - \Delta\ln Y_t^A$ .<sup>10</sup> In addition, all the empirical models in which shocks and institutions are interacted account for the effects of the Portuguese Revolution by including a "pre-Portuguese revolution dummy" which takes value 1 before 1975 and zero otherwise. Given the focus on labour income fluctuations, this control is introduced in the light of Blanchard (1997)'s estimate that, after the revolution, the Portuguese labour share increased permanently.

Institutional indicators are provided by OECD publications, several studies in the labour economic literature, and the author's calculations (see the Appendix for a detailed description of the labour and credit market institutions database compiled for the paper). The model in (2) will be, first, estimated using the set of nine time-invariant institutional indicators that better capture the insurance features of labour and credit markets settings (see Section 3), namely:

- employment protection legislation (version 2),
- net replacement rates,
- unemployment benefit duration,
- active labour market policies,
- collective bargaining coverage,
- trade union density,
- coordination in wage bargaining,
- marginal labour tax wedge,<sup>11</sup>
- typical LTV ratios.

The robustness of the (main) estimation outcomes from this benchmark specification will then be addressed by including alternative institutional indicators, time-varying institutional measures, and additional macroeconomic shock variables.

## 5. Results

This Section first analyzes the interactions between shocks and institutions by investigating whether the perfect risk sharing prediction of complete market models is rejected or not in the panel of 15 OECD countries over the 1971-2003 period. Then, it shows that institutional heterogeneity is a significant determinant of cross-country differences in consumption volatility, and assesses whether results from the main specification are robust to the inclusion of information on institutional time variation and further issues.

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<sup>9</sup> See Section 5.3, on robustness checks, for a discussion on the choice to use the CPI index deflator instead of the PPP index.

<sup>10</sup> On the choice of this proxy for the country-specific shock variable see, for instance, Lewis (1996) and Asdrubali et alii (1996).

<sup>11</sup> The choice of labour market dimensions resembles Blanchard and Wolfers (2000) and Bertola et alii (2002), who adopt the set of eight measures originally compiled by Nickell (1997), with the difference that here replacement rates and the labour tax wedge are represented by less general measures of benefit and tax systems to provide a more precise description of the direct (insurance) effect of these institutions.

## 5.1. Does institutional heterogeneity matter?

The first two columns of Table 4 report the outcomes from estimating model (1), and differ according to whether country dummies are included or not. The results are similar since country effects are jointly not significant, while time dummies track well the average consumption growth in the country aggregate. The coefficient in front of the idiosyncratic income shock variable is positive and highly significant. This result, unless driven by measurement errors, represents a firm rejection of the full consumption insurance hypothesis as in the previous literature.<sup>12</sup>

Moreover, by running a seemingly unrelated estimation of the impact of idiosyncratic income shocks on idiosyncratic consumption growth rates, the estimated  $\beta$ -s (not reported) differ significantly across countries. The remaining part of this paper explores the possibility that these differences can be explained by accounting for the role that heterogeneous (national) institutional settings play in smoothing out the effects of country-specific shocks.

The last two columns of Table 4 show the outcomes from estimating the specification in (2). The results are fairly strong: by allowing idiosyncratic macroeconomic shocks to interact with a set of time-invariant institutions, the model captures important features of the data.

The coefficients of institutional indicators are jointly strongly significant. The adjusted R-squared indicates that the overall fit is fairly good, and higher than that of the model in columns 1 and 2 without interaction terms. Higher values of employment protection legislation, benefit replacement rates, union density, progressivity of tax systems, and credit market development are associated with higher income shielding (negative sign); longer-lasting benefit duration, higher expenditures on ALMPs, higher collective bargaining coverage and coordination in wage bargaining contribute to amplify the effects of income shocks (positive sign). The impact of institutions is statistically significant in six cases out of nine.

In terms of broad institutional categories, the strictness of employment protection laws and the progressivity of the tax system do play a role in smoothing out shocks, confirming the priors formulated in Section 3. Findings on benefit systems deserve attention: unemployment insurance provisions are relevant not in terms of the level but of the duration, and, together with higher spending on ALMPs, longer lengths of entitlement imply a greater cyclicity of consumption. This evidence suggests that the cost of more generous benefit systems is partially born by labour incomes (i.e. is not fully shifted onto internationally diversifiable capital incomes), thus implying a (relatively) higher aggregate consumption volatility. Turning to systems of wage determination, they seem to exert an insurance function mainly through trade union density. The positive sign of collective bargaining coverage and coordination in wage bargaining suggests that insider practices and the inclusion of economy-wide considerations in the wage-setting process would weaken within-country risk reallocation if they were relevant. Finally, the efficiency of credit markets significantly contributes to smoothing out macroeconomic shocks, thus confirming the importance of intertemporal trade opportunities.

The impact of idiosyncratic income shocks is still positive and significantly different from zero, indicating that market incompleteness matters even when financial market risk sharing opportunities are integrated by within-country risk reallocation. The pre-Portuguese revolution dummy displays a positive and significant coefficient, too, indicating that the

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<sup>12</sup> P-values are computed under the assumption of iid residuals. A White test run on residuals from the specifications where country effects are included indicates that the null hypothesis of homoskedasticity cannot be rejected.

downsizing imposed on the share of labour under the dictatorship (i.e. before 1975) had the same effect as an exogenous increase in the volatility of non-tradable labour incomes.<sup>13</sup>

As regards the role of period and country effects, period effects account for the average consumption growth rate in the country aggregate, while country effects are jointly not significant. While not central to the point of this paper, it is interesting to find out which countries, if any, record current account imbalances over the period. This can be estimated by constraining the coefficients in front of the dummy variables to sum to zero, and then considering the extent to which the behaviour of each country deviates from the average behaviour in the aggregate (see Suits, 1984). Only the country effects of Denmark, Japan, and Portugal turn out to be significant. The estimates, reported in Table 5, indicate that consumption has grown faster than output in Denmark and Portugal (negative sign)<sup>14</sup> and more slowly in Japan (positive sign). For future research, these findings open up the interesting issue of trying to understand the causes of the change in saving behaviour that these three countries seem to have displayed over the period.

So far, the discussion has focused on qualitative considerations on the role of institutional settings. But what can be said about the quantitative impact of national policies? To get an idea of the magnitudes of the (estimated) effects of each institution, consider Table 6. The first column reports estimation results from the benchmark specification which includes both time and country dummies. The central part of the Table shows the range of values of the indicators, which, recall, are computed as deviations from the mean in the aggregate. To understand how to read the table, consider the last two columns of, for instance, the first row. They show that, if countries differed with respect to employment protection legislation only, an idiosyncratic shock that would be worth one percentage point in a country with the mean values of all the institutions would lead to a 1,46 percentage point shock in the country which displays the lowest ELP value, and to a 0,59 percentage point shock in the country with the most stringent EPL provisions. According to the last part of the table, progressive labour taxation is the most effective income smoothing policy. Other institutions produce smaller and quite similar effects: EPL, trade union density, and LTV ratio by decreasing the cyclicalities of consumption; unemployment benefit duration and ALMPs by increasing the responsiveness of consumption to macroeconomic shocks.

The final part of this Subsection investigates the implications of using alternative institutional indicators. The estimates collected in Table 7 refer to results obtained by substituting, one at a time, the indicators of the benchmark specification with alternative measures for employment protection (column 1), replacement rates (column 2), labour taxation (column 3), and credit market efficiency (column 4). All the models include time dummies, country effects, and the pre-Portuguese revolution control variable.

The first column of Table 7 embeds the EPL version 1 index. The results basically replicate the findings of Table 4 (with the exception of the ALMPs coefficient which becomes not significant). These similarities in empirical findings are due to the fact that the two indicators of EPL have very much the same information content (see Section 3). Estimates in column (2) and column (3) refer to specifications which include more general measures of benefits and tax systems. The inclusion of the Gross Replacement Rates does not worsen the goodness of

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<sup>13</sup> The exclusion of this macroeconomic shock variable would not affect the main estimation results. As will be discussed next, it matters (only) to the significance of the Portugal country effect.

<sup>14</sup> The Portugal country effect is significant only when controlling for the effects of the Portuguese revolution. This finding may be interpreted as follows: the share owned by Portugal in world tradable output before 1974 was higher than it would have been under free markets, because (tradable) capital incomes were granted a higher share in national production. By getting rid of this "dictatorship-induced" upper bias, it has been possible to show that on average (over the period) Portugal has increased its share in world output.

fit, but causes a loss in significance of two interaction terms - those referring to employment protection and labour taxation. These two institutional dimensions are no more relevant even when substituting the average tax wedge indicator for its marginal-rate version; moreover, in column (3), coordination in wage bargaining becomes significant, while overall the goodness of fit worsens. The fourth and last column embeds the maximum LTV ratios; unlike Table 4, the model finds no significant effects for ALMPs and credit market's efficiency and exhibits a much lower adjusted R-squared.

An interesting feature of the results is that the shock-institution interaction terms are jointly significant in all four models. This indicates that, in general, some caution is needed when evaluating the information content of individual institutional indicators. The scope of any empirical analysis is, of course, limited. Related studies have investigated interactions among labour market policies (see, for instance, Coe and Snower, 1997, and Bassanini and Duval, 2006), as well as the relationship between labour and credit market institutions to explore the possibility that standard intratemporal insurance-based incentives to implement redistribution policies are enhanced when people cannot fully access intertemporal trade in noncontingent bonds (Bertola and Koeniger, 2007). However, theoretically, the complementarities among institutions are still poorly understood. The empirical analysis proposed in this paper, apart from including in the main specification those measures that better capture the direct insurance effects of institutions, leaves to future research the task of taking into account the potential interaction among different policies.

## 5.2. Accounting for the evolution of institutions over time

This Subsection investigates the implications of using time-varying measures for most of the nine institutional dimensions under analysis. As discussed in the Appendix, it has been possible to collect time series for all the institutions in the dataset with the exception of ALMPs and typical LTV ratios. Information on time variation is more detailed for some indicators than others: the period span for which data are available goes from the full 1971-2003 time interval to (just) a three-year period (see Table 3).

Notice that estimates in Table 8 refer to a slightly different set of institutional measures to the one considered in the time-invariant specification. The main differences pertain to two dimensions: employment protection and credit market efficiency. To allow for as much time variation as possible, employment protection has been measured using EPL version 1 and the efficiency of credit markets with the maximum LTV ratios.

Estimation outcomes in Table 8 show that adding time series information does confirm the main conclusions of the time-invariant model. The effects of the shock-institution interactions preserve their sign. That is, institutions contribute in the same way to smoothing out (negative sign) or increasing (positive sign) the impact of macroeconomic shocks; and, even though the size of the decreases in the coefficients is almost one half, the impacts of the institutional dimensions are jointly significant.

As regards the significance of the role of each institution, a direct comparison with Table 4 is not possible, as some indicators are not the same; what is possible to assess is the similarity in outcomes. The effect of employment protection, ALMPs, trade union density, and labour taxation is the same as in the time-invariant specification.<sup>15</sup>

The inclusion of country effects, however, slightly modifies the findings on benefits systems: in column (1), the impact of replacement rates is significant, while the same cannot be said of duration of entitlement; when country dummies are included (column 2), the

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<sup>15</sup> Note that ALMPs, being the only time-invariant indicator, could absorb any slope heterogeneity which cannot be accounted for in the time-varying specification.

opposite is true, thus confirming the findings of the time invariant specification in Table 4. Collective bargaining coverage appears to increase significantly the impact of macroeconomic shocks on consumption; recalling what was said in Section 3.1, this finding can be interpreted as evidence in favour of the idea that insider practices may harm the overall scope of within-country risk reallocation. The coefficient in front of the LTV indicator has the expected negative sign, but is no more significantly different from zero, as was the case for the maximum LTV in the time-invariant specification of Table 7. This finding may well indicate that the maximum LTV ratio provides a less accurate indication of the relevance of credit constraints than the typical LTV ratio.

Once institutional time variation is added, the lack of joint significance of country dummies indicates that institutional reforms do not have different effects in different countries. It is worth noting that country effects in column (2) are, individually, significant for the same countries as in the previous Subsection, namely Denmark, Japan, and Portugal. Finally, macroeconomic shocks play the same role as in the time-invariant case.

To conclude on institutional time variation, consider the implications of including alternative institutional variables. Table 9 shows the results of modifying the above specification to include two measures which decrease the overall degree of time variation, and two indexes for which more detailed time series are available but which are less suited to a consumption insurance analysis. The specification in column (1) embeds the EPL version 2 indicator; estimates do not significantly differ from the results in Table 8. The inclusion of typical LTV (second column) confirms priors about the importance of accounting for the evolution of credit markets; when the latter information is missing, two of the most significant institutional dimensions, employment protection and trade union density, lose significance. Overall, the adjusted R-squared indicates that the more time variation is added, the lower the goodness of fit. This may reflect the poor quality, along the time dimension, of the indicators on labour and credit market institutions - a conclusion which makes the results obtained by using time-varying measures even stronger. The third and the fourth columns, which include respectively GRRs and average tax wedge, do a far worse job in explaining the evolution of consumption growth rates. These findings may be ascribed both to the change in relative position implied by their time series, and to the lack of precision in capturing the direct (insurance) effect of the institutional dimensions.

What is remarkable when considering the evolution of institutions over time is the similarity of the outcomes to time-invariant cross-sectional results. Unlike studies by Blanchard and Wolfers (2000) and Bertola et alii (2002), which have first analyzed the interaction between shocks and institutions to explain unemployment dynamics, the present analysis finds basically the same results by using time-invariant and time-varying institutional indicators. This evidence can be considered a preliminary step towards a more accurate analysis: as new information on time variation is made available by the OECD or similar studies, there will be scope for further research on how mixes of policies have evolved over time.

### **5.3. Further hypotheses and robustness checks**

A few points are worth noting on aspects of robustness that have not been explicitly dealt with so far.

First of all, the above results indicate that the efficiency of credit markets is a relevant feature when evaluating the role of country-specific insurance channels: the less binding are country-specific liquidity constraints, the higher the possibility of insuring via intertemporal trade. These findings suggest that some caution is needed when deciding which approach to choose for estimating the model in (2). The reasoning proceeds as follows. When people

smooth consumption intertemporally and credit markets are imperfect, observed rule-of-thumb behaviour may be (at least partially) due to deviations from the permanent income hypothesis. If this was the case, consumption would exhibit excess sensitivity to past income, and unexpected changes in (idiosyncratic) real disposable income would likely contain information about idiosyncratic changes in permanent income. Hence, implementing non-linear least squares would lead to an upward biased  $\beta$  estimate, since consumption growth rates could be expected to be sensitive to current idiosyncratic income changes.

To deal with this potential endogeneity problem, the model in (2) has been modified to include as separate terms the idiosyncratic shock variable and the shock-institution interaction terms, and then has been estimated by using the instrumental variable (IV) technique. The instruments introduced to predict future changes in idiosyncratic income growth and in consumption changes are lagged values of both idiosyncratic income and consumption growth rates.<sup>16</sup> Regression outcomes indicate that the variables are not relevant instruments (i.e. not significant in the first-stage regression), an empirical finding that can be interpreted as follows. Even if consumption sensitivity is likely to play an important role when looking at country-level consumption and income variables, in the present dataset, when looking at aggregate variables, idiosyncratic income growth becomes almost unpredictable and consumption seems to follow a random walk. In summary, no bias arises when running non-linear least squares.

Next, while institutions have been treated as predetermined, one may wonder whether they are actually endogenous to risk. Countries are substantially heterogeneous in the configuration of risk-reducing institutional settings for reasons mainly rooted in different historical patterns. Although country dummies can account for any endogeneity to risk along the cross-sectional dimension they cannot capture the endogeneity that may arise along the time dimension as a result of the change in external risk. The international integration of markets by affecting households' exposure to external risk may induce changes in non-market insurance provisions. Although interesting and worth to be dealt with in another paper, this issue is not central to the present analysis. Endogeneity to risk is not as severe as it looks at a first glance; indeed, there are other factors such as random variation in institutional structures due to elections that can be relevant along the time dimension and, as seen in the previous Sections, institutions have been quite stable over time despite the high pace of the globalization process.

Considering the specification in (2), a minor concern may stem from the choice to track the path of consumption risk sharing on international financial markets by using time dummies instead of the growth rate of consumption in the country aggregate (as for instance in Mace, 1991). A simple model will allow to assess whether time dummies track well the average growth rate in the OECD sample:

$$\Delta c_{jt} = \delta_0 \Delta c_t^A + \beta \Delta \tilde{y}_{jt} \left( 1 + \sum_{i=1}^I \gamma_i \tilde{X}_{ij} \right) + \alpha_j + \varepsilon_{jt} \quad (3)$$

where  $c_t^A$  is the natural logarithm of real mean aggregate consumption. In the above specification, perfect risk sharing is tested by the joint hypothesis  $\delta_0 = 1$  and  $\beta = 0$ . Comparing estimates from the above equation (reported in the first column of Table 10, Panel A) with those in Table 4, it becomes clear that the results are basically unaffected by the choice of using different measures of risk sharing behaviour.

Finally, the choice to deflate consumption and income variables by using national Consumption Price Indexes (CPIs) distinguishes the present analysis from international

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<sup>16</sup> See Campbell and Mankiw (1990) on the use of the instrumental variables approach. And Bayoumi (1997) for a discussion on the choice of the instruments.



macroeconomic studies which, in most cases, use macro data from the Penn World Table Database and thus compare countries on the basis of Purchasing Power Parities (PPPs). To understand why this may represent a problem for international data comparability, consider the nature of the two price deflators. CPIs and PPPs refer, respectively, to the time and the spatial dimension of price changes: the CPI measures how prices change over time, within country borders; the PPP indexes cross-country price changes. The choice of using the CPI in this paper has been motivated by the focus on the interaction between institutions and shocks to otherwise uninsurable domestic consumption components. What has not been explicitly dealt with is the impact (if any) of cross-country price changes.

Real (effective) exchange rate risks can affect estimation results only if they cannot be traded on international financial markets and, thus, constitute an undiversifiable risk component for all the agents in the economy. To test for this possibility, the model in (2), where the incidence of risk sharing behaviour is captured by time dummies, will be modified as follows:

$$\Delta c_{jt} = \delta_t + \delta_2 \widetilde{RE}_{jt} + \beta \Delta \tilde{y}_{jt} (1 + \sum_{i=1}^I \gamma_i \tilde{X}_{ij}) + \alpha_j + \varepsilon_{jt} \quad (4)$$

where the variable  $\widetilde{RE}_{jt}$  accounts for the aggregate, country  $j$ -specific, change in price levels, and the coefficient  $\delta_2$  captures the effect of (potentially) uninsurable exchange rate risks.<sup>17</sup> Since the relative price deflator used to compute cross-country price changes is available from 1976 onwards, the model will be estimated on data for the 1976-2003 time span. Results in the second column of Table 10 (Panel A) indicate that, as implicitly assumed in the previous Sections, real exchange rate risks are internationally diversifiable and thus do not affect risk sharing behaviour (i.e.  $\delta_2 = 0$ ).

Given that investors can trade effective exchange rate risk, a further check could be made to test if national institutions play any role in reallocating idiosyncratic income shocks due to cross-country changes in price levels. Once (4) is modified to embed the regressor  $\widetilde{RE}_{jt}$  in the shock-institution interaction term as an additional source of undiversifiable income risk for some agents in the economy, the results (not reported here) indicate that exchange rate risk does not affect within-country risk reallocation arrangements. Overall, evidence confirms what could have been intuitively expected: national institutions do not consider cross-country comparative (PPP) concerns when deciding on consumption insurance provisions.

## 6. Within and cross-country risk allocation

So far, this paper has argued that, when idiosyncratic risks to income or wealth are not fully tradable on financial markets, the heterogeneity of institutional frameworks is a significant determinant of cross-country differences in consumption responsiveness to country-level income shocks. The next step will be to consider the broad implications of the present analysis in terms of within-country and cross-country risk allocation. Loosely speaking, what can be learnt in terms of which countries do a better job in smoothing out country-level shocks? And of how close the integration of OECD financial markets is?

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<sup>17</sup> Since the PPP deflator allows comparisons of economic aggregates on the basis of physical levels of output, but does not account for price and exchange rate distortions, a more accurate measure has been preferred. The real (effective) exchange rate shock variable refers to the change in the ratio of the PPP conversion factor to the official exchange rate (Source: World Bank, World Development Indicators online database).

## 6.1. Risk (re)allocation within national borders

Structural features of labour and credit markets are considerably heterogeneous across OECD countries. The present analysis makes it possible to derive some interesting implications of this diversity in terms of the effectiveness of various mixes of policies in providing social insurance coverage against country-level shocks.

Countries can be compared on the basis of within-country risk reallocation provisions by running a simple exercise. In a similar way to Table 6, it is possible to compute the magnitude of the (relative) effect that a specific set of institutions exerts on country-level shocks. Table 11 shows the implied range of impact of a country-level shock which would increase consumption by 1% in a country with the average values of all institutions. Looking at the results in the second column, there is a notable variety in institutional insurance provisions across countries.

The most effective risk-reducing institutional settings belong to Scandinavian countries, with the notable exception of Denmark. According to the present analysis, Finland and Sweden succeed in smoothing out a shock by more than one half (up to 0,44% and 0,47%, respectively), while the "flexicurity" Danish model, by combining lower degrees of employment protection and very generous benefits systems, does not provide a good mix of policies, and overall leads to an amplification of country-level shocks (up to 1,17%).

The evidence on Continental Europe is mixed. Austria, Belgium, Germany, Portugal, and, to a lesser extent, Italy relatively dampen the effect of idiosyncratic shocks. The Netherlands seem to perform as a country with a mean (in values) set of institutions would. France, with relatively lower values of wage-setting indicators and higher spending on benefit systems, and Spain, with less trade union power and less progressivity in the tax system, slightly amplify shocks in relative terms, up to 1,03% and 1,08% respectively.

In Anglo-Saxon countries and Japan the implementation of policies seems far less powerful in providing income insurance. In line with any intuitive expectation, economies that rely more on financial markets and on private insurance schemes than on public safety-net provisions display a higher responsiveness of aggregate consumption to country level shocks.

To summarize this simple exercise, the paper offers a first insight on the importance of institutional heterogeneity in affecting the way aggregate consumption responds to country-level shocks. From a normative point of view, the issue is far more demanding since even these preliminary results suggest that national labour and credit market reforms need to be carefully assessed as affecting risk sharing opportunities available to agents who likely do not have access to international financial markets. Clearly, more detailed analyses would be warranted of the macroeconomic insurance implications of specific national labour and credit market institutions and on policy complementarities.

## 6.2. Is consumption risk globally diversified?

A second implication of the analysis relates to the degree of integration of global financial markets. The previous estimation strategy makes it possible to investigate whether OECD countries mainly trade consumption risk among themselves. So far consumption insurance has been tested against shocks which were idiosyncratic with respect to the prevailing conditions in the 15 OECD country sample. That is, it has been implicitly assumed that cross-border trade in contingent assets works more efficiently within the OECD countries than world-wide. Is this a reasonable approximation of how things work in reality?

To address the issue, consider the hypothesis that the 15 OECD countries trade the assets that hedge their relative consumption risk only among themselves. Thus, they constitute a macroeconomic entity and a simple testable implication follows: a common shock to all the components of such a macro-area should affect their consumption growth rates in the same



way. Consider, for instance, the impact of a (supply) shock to the price of oil and estimate the following model:

$$\Delta c_{jt} = \delta_0 \Delta c_t^A + \delta_1 OILP_t + \beta \Delta \tilde{y}_{jt} (1 + \sum_{i=1}^I \gamma_i \tilde{X}_{ij}) + \alpha_j + \varepsilon_{jt} \quad (5)$$

To emphasize the behaviour of aggregate variables, the above specification includes the average growth rate of consumption in the macro-area ( $\Delta c_t^A$ ) instead of period dummies. The variable OILP refers to changes in the real price of oil and, hence, the coefficient  $\delta_1$  captures the effects of the common shock to the world economy.<sup>18</sup>

If OECD countries constitute a macro-area, they will all respond in the same way to the shock and the joint hypothesis  $\delta_0 = 1$  and  $\delta_1 = 0$  will hold true. The results from estimating (5) are shown in the third column of Table 10 (Panel A). The coefficient in front of the aggregate consumption growth rate almost equals one and is strongly significant, while the oil price shock variable does not significantly differ from zero. These findings are sufficient to justify the implicit assumption at the basis of the empirical specification adopted in the previous Section.

To corroborate the hypothesis that the 15 OECD countries in the sample share almost fully tradable risks among each other, at least one further check is needed. Perfect risk sharing would imply that the growth rate of tradable consumption in the OECD sub-sample equals the growth rate of tradable consumption in the rest of the world. This prediction can be tested by investigating the determinants of the aggregate growth rate in the 15 OECD sample:

$$\Delta c_t^A = \delta_0 \Delta c_t^{world} + \delta_1 OILP_t + \varepsilon_{jt} \quad (6)$$

where  $\Delta c_t^{world}$  is the growth rate of world consumption.<sup>19</sup> The hypothesis of (world-wide) perfect risk sharing would imply that the joint hypothesis  $\delta_0 = 1$  and  $\delta_1 = 0$  is true. Panel B of Table 10 reports on the estimation outcomes from (6). The results indicate that the mean consumption growth rate in the OECD sample is only slightly correlated with world consumption growth while the effect of oil price changes is highly significant; hence there is no evidence of perfect international consumption risk sharing in the data.

Overall, the above evidence raises serious questions about the extent of financial market integration. It suggests not only that markets are imperfect and incomplete, but that OECD countries seem to have a strong bias towards trading assets among themselves, too. It would be interesting in further research to assess the role of national institutions and undiversifiable consumption risks in the world economy, enlarging the sample to include countries which possess (at least) developing financial markets.

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<sup>18</sup> The real oil price is computed as the annual average crude oil price, in dollars, adjusted for inflation using the current US CPI (Sources: [www.inflationdata.com](http://www.inflationdata.com), on data from US Department of Energy, and Bureau of Labour Statistics).

<sup>19</sup> The "world" comprehends the 30 OECD countries plus the 14 countries which best rank for financial markets developments in The Business Week Global 1000 ranking of 2004, namely: Argentina, Brazil, Chile, China, Hong Kong (China), India, Indonesia, Israel, Malaysia, Philippines, Russian Federation, Singapore, South Africa, Thailand.

## 7. Concluding remarks

This paper has argued that several characteristics of institutional interference with free-market outcomes provide risk sharing opportunities in a world where people differ in their ability to access financial markets. Its empirical findings provide robust evidence of the existence of an association between institutional income redistribution devices and country-level consumption and income dynamics and pave the way for a number of theoretical studies and empirical applications in both international macroeconomics and labour economics.

Besides the directions for future research suggested in the paper, there are of course cross-country differences in the degree of access to financial markets as well as potential interactions between structural reforms in the labour market, the development of financial markets, and the change in the exposure to external risk implied by the globalization of markets that it will be interesting to assess. Moreover, the implications of the interaction between international asset trade and (national) institutional insurance provisions could be analyzed in terms of portfolio allocation and hedging strategies, with the aim of contributing to the literature on the observed "home bias in equities".

As regards normative implications, the paper suggests that structural reforms in the labour market, if not accompanied by an increase in credit and asset availability, may reduce the risk sharing opportunities available to agents who likely do not have access to financial markets. Hence, it would be advisable to undertake further analyses on how labour market institutions affect labour share dynamics, and on the interactions between within-country risk allocation provisions and the effectiveness of private insurance instruments available on credit and financial markets.

## **A. Labour and credit market institutions database**

The Appendix shows the main novelties of the dataset in terms of up-dated and (sometimes) newly-compiled indicators, and provides a comprehensive overview of the institutional measures available in the literature. The data analysis is organized as follows. The next Subsection will present the main features of the database and its links with the existing literature. Then, institutional indicators will be introduced and discussed one at a time.

### **A.1. Data and sources, general features**

The set of institutional indicators used in the empirical analysis provides information on the evolution of labour and credit markets in 15 OECD countries from 1971 to 2003. The countries in the sample are: Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Portugal, Spain, Sweden, the United Kingdom, and the United States.<sup>20</sup> The indicators refer to thirteen institutional dimensions. Time series have been constructed for eleven institutional measures according to the following (from now on "standard") compilation strategy: when yearly observations were missing, data have been interpolated; and for years before (after) the first (last) observation available no change has been assumed, thus assigning the value recorded in the first (last) year of observation back (up) to all years since the starting (ending) point in the dataset.

The database has been assembled with the aim of enriching the set of institutional indicators previously used in labour economics to include some measures more suitable to a consumption smoothing analysis and information made available in recent OECD publications. Table A.1 surveys the general features of the most complete datasets used in the strand of the literature which studies the macroeconomic outcomes of sets of labour market institutions, and shows how they relate to the present database. Nickell, in 1997, wrote a seminal paper where he analyzed the role of eight institutional dimensions in explaining long-term trends in unemployment dynamics. Then, more recent studies by Blanchard and Wolfers in 2000 (BW), Bertola Blau and Kahn in 2002 (BBK), and Nickell Nunziata and Ochel in 2005 (NNO), have extended the scope of the analysis and the sample of institutional indicators by including updated measures and information on time variation.

It is worth noting that, even if every year the OECD updates and attempts to improve the quality of the institutional indicators made available through its publications, data limitations are still a burden on institutional analyses, and collecting a comprehensive dataset of institutional indicators can be quite a hard task. As the table shows, the primary sources of data on institutional indicators are OECD publications and datasets compiled by several authors (e.g. Lazear, 1990, on employment protection and Visser, 1996, on trade union density). Existing datasets differ appreciably as regards the definitions of their indicators and time variation; the choice of institutional measures is driven by their goodness of fit with respect to the subject of analysis (e.g. explaining long-term vs. short-term trends of the dependent variable), and by the quality and availability of data. In what follows, the indicators will be presented and compared according to the institutional dimension they belong to.

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<sup>20</sup> These are the countries for which it has been possible to collect data for all the variables included in the baseline time-invariant specification (see Section 4).

## A.2. Institutional indicators

### *Employment protection legislation (EPL)*

The first attempt to measure the strictness of employment protection laws dates back to Lazear (1990), who collected data on severance payments and notice periods expressed in means over the period 1956-1984. More comprehensive indicators are compiled by the OECD, which provides two versions of the EPL index. The broader one, the so-called version 2, describes EPL along 18 basic items, grouped in three main categories: employment protection for regular contracts (8); regulations of temporary contracts (6); and specific requirements for collective dismissals (4). The indicator is built as a weighted average of these items, and recorded at two points in time: 1998 ("late 1990s") and 2003. EPL version 1 is a less broad measure: it is computed as the unweighted average of the two categories for which data are available since 1985 ("late 1980s"), namely regulations on regular and temporary contracts. Values on both the indicators, reported in the OECD Employment Outlook (2004), range from 0 to 6, with lower scores indexing looser regulations.

Starting from these two data sources, previous studies built EPL time series as follows. BW expressed values in rankings, chained data from Lazear with the OECD's ELP version 1 index, and linearly interpolated when observations were not available. BBK used the same time series made available by BW. NNO interpolated the BW series to get yearly observations and readjusted data in mean, obtaining an indicator ranging between 0 and 2.

The present dataset compiles two time series: the first exploits information provided by the EPL version 2 only, and thus allows for little time variation; the second is built using both EPL version 1 and Lazear's data. The compilation strategy differs from those adopted by previous works since it acknowledges that Lazear's data provide information only on two out of the fourteen basic items that constitute the OECD's index: the EPL version 1 index has been, first, decomposed into 14 items; then, it has been extended by substituting Lazear's data for those recorded in 1985 for severance payments and period of notice components and by following the general rule of dating back the value of the first observation available.<sup>21</sup>

### *Benefit replacement rates (NRRs and GRRs)*

OECD Benefits and Wages (2004) compiles two indicators of the level of unemployment benefits: net replacement rates (NRRs) and gross replacement rates (GRRs). The first indicates the percentage of in-work pay that is maintained when becoming unemployed. It represents an update with respect to GRRs, is available only for the early 2000s, and better fits a benefits analysis: by taking into account the progressivity of taxes and income redistribution policies, it makes it possible to better isolate the effects of benefits from those of other relevant institutional dimensions; moreover, given that countries greatly differ in benefit taxation, it represents a more powerful indicator for international comparisons.<sup>22</sup> The measure included in the dataset refers to the average of NRRs over 60 months of unemployment, calculated for four family types and two earning levels (in percentage values). Unfortunately, it is not possible to build a time-varying measure for NRRs; the models used to

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<sup>21</sup> Lazear's data are first converted from the original unit of measurement and normalized to range from 0 to 6 according to the scores' assignment scheme of the OECD (see Annex 2.A1 of the OECD Employment Outlook, 2004). Then, the two derived items are weighted according to the OECD weighting scheme and become part of the final time-varying index of EPL. Lazear reports data on severance payment upon dismissals and on notice period granted to workers with ten years of service, while the OECD distinguish and convert data referring to workers with 9 months, 4 years and 20 years tenure. Here it has been chosen to apply to data from Lazear the conversion scheme corresponding to 20 years tenure.

<sup>22</sup> For a detailed comparison of the two indicators, see OECD Benefits and Wages 2002.

compute this indicator have been revisited since 2001, thus introducing a break in the time series that does not allow for comparability with the values available for 1997 and 1999 (OECD, 2002).

All the previous studies in the literature use GRRs. This is a raw measure of the generosity of the benefit system, whose main advantage is the richer historical dimension: it is available since 1961 and recorded on a 2-year basis up to 2003. The measure in the dataset corresponds to the average of the gross unemployment benefit replacement rates for two earnings levels, three family situations, and three durations of unemployment.<sup>23</sup> It is worth recalling, from Section 3.1, that the information content of GRRs greatly differs from that of NRRs.

#### *Duration of unemployment benefits*

To index the length of unemployment benefit entitlement the dataset used the (monthly) "maximum benefit duration" of entitlement to unemployment insurance.<sup>24</sup>

The corresponding time series is built on values collected for 1989 (OECD Employment Outlook, 1991), 1996 (OECD Employment Outlook, 1996), and 2002 (OECD Benefits and Wages: OECD Indicators, 2004). Observations have been transformed from monthly to yearly (with "unlimited" duration normalized to 7 years), and a time series has been compiled following the standard compilation strategy.

The time-varying indicator is something new with respect to previous studies. Indeed, BW and BBK used time invariant indexes corresponding respectively to the yearly length of unemployment benefit entitlement and to some indicators of benefit duration ranging between 0 and 4. NNO computed a time series by using a variable which is a weighted average of the ratios of GRRs received at various years of unemployment to (as a common basis) GRRs granted in the first year.

#### *Active Labour Market Programmes*

The Active Labour Market Policies index is defined as originally in Nickell (1997), and then in BW and BBK, as the amount of expenditures on ALMPs per unemployed person as a percentage of GDP per member of the labour force.<sup>25</sup> As in previous papers by BW and BBK, no time series has been compiled for this indicator; NNO simply did not include ALMPs in the set of institutional indicators.

#### *Collective bargaining coverage*

The collective bargaining coverage index is taken from OECD Employment Outlook (2004). It is recorded for three years: 1980, 1990, and 2000. Data are interpolated according to the standard compilation strategy. BBK and NNO used OECD data and the same compilation strategy, while BW did not compile a time series for this institutional indicator.

#### *Trade union density*

The OECD Labour Market Statistics Database (online) provides data on trade union density rates by collecting both surveys and administrative information. Administrative information

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<sup>23</sup> The measure of GRRs available in previous datasets refers to the benefits granted in the first year of unemployment only.

<sup>24</sup> This measure disregards the contribution of other types of benefits like unemployment assistance, guaranteed minimum income, and social welfare.

<sup>25</sup> In previous studies the dependent variable was the unemployment rate. To avoid endogeneity problems stemming from the fact that current GDP was normalized on current unemployment, they instrumented ALMPs with a variable built as current GDP spent on ALMP on the average unemployment rate over a period.

for the EU countries refers to the so-called Visser's version: data are adjusted for non-active and self-employed members, following the model used by Ebbinghaus and Visser (2000) and by the OECD (1991); while for non-EU countries no adjustment has been performed. The database uses, for EU countries, administrative data, available for 1970-2001 (sometimes 2002). Portugal and Spain have less information, since 1978 and 1981 (up to 2001), respectively. The Canada, UK and the USA series are built as a mix of administrative and survey data, using the latter where possible (in line with the OECD standard approach). The USA series contains surveys data for 1973-2002 and administrative data for 1970-1972; Canada has administrative data for 1970-1983, and survey information for 1984-2002; the UK has administrative data for 1970-1994, and surveys for 1995-2002. Exploiting this information and following the standard compilation strategy, a time series has been assembled.

As regards previous studies: BW employed a time-invariant measure only; BBK an indicator from Visser (1996), available over the 1970-1993 period; and NNO information on EU countries contained in Ebbinghaus and Visser (2000), plus various national and international sources and compilation criteria to get information for non-EU countries.

### *Coordination in wage bargaining*

To index coordination in wage bargaining the indicator compiled by the OECD and published in Employment Outlook (2004) has been used. According to the OECD, this measure represents an improvement with respect to indicators made available in previous editions, since it benefits from more detailed descriptive information and richer historical data. The index has a range between 1 and 5, with higher values indicating economy-wide levels of coordination, and is recorded on a 5-year basis over the period 1970-2000. The corresponding time series has been completed following the standard compilation strategy.

Indexes used in previous works differ both in range and (because of less precise information being available in past years) information content. BW use data from Nickell (1997), without building a time series. BBK employ a continuous variable made available in the OECD Employment Outlook (1994). NNO compiled two indexes: the first by interpolating data from OECD Employment Outlook (1996) and then matching the resulting series with the data provided by Belot and Van Ours (2000); the second was based on Nickell et alii (2001) and allowed for short-term variation (for a full description see Ochel, 2000).

### *Labour taxation*

Measures of labour taxation are provided by "Taxing Wages: 2003/2004" (OECD, 2005) and by the OECD online database. The OECD (2005) calculates the tax "wedge" as income taxes plus employee and employer contributions less cash benefits, as a percentage of total labour costs (i.e. gross wages plus employer social security contribution and, in some countries, payroll taxes). The index is computed for eight illustrative family types and three earnings levels (computed as percentages of the earnings of an average production worker, APW).

The marginal tax wedge in the dataset is an unweighted average of the homonymous indicator over four family types; the indicator is available for the period 1997-2003. The average tax wedge refers to the tax wedge of a one-earner family with two children (i.e. "married" APW); data are collected on a two-year basis for the period 1979-1997, and every year since 1999. Historical data between 1979 and 2004 are available for all countries with the exception of France, for which information about employers' social security contributions is missing over the 1979-1993 period.

In previous studies, information on tax burdens refers to slightly different tax/benefits combinations: BW use data from Nickell (1997), who computes the tax wedge on the basis of average payroll, income and consumption tax rates; BBK add, to income and payroll taxes, mandated benefits; NNO include payroll, income and consumption tax rates. Only NNO provide a time series, over the 1960-1995 period, by updating data from the London School of Economics CEP-OECD database.

### *Loan-to-Value ratios*

Loan-to-Value is an index of labour supply conditions that measures the ability of the mortgage markets to provide access to financing. Data are collected by several authors on the basis of national and international sources and according to different compilation criteria. This makes it hard to compare existing datasets and, together with poor data availability, explains why no time series for LTV is so far available. Leaving to future research a critical assessment of the information used in previous studies, the dataset includes two indicators exploiting data provided by an OECD Economic Study by Catte et alii (2004), and by Jappelli and Pagano (1994). The OECD collects data for typical and maximum LTV without reporting on the years of observation; here the choice has been to ascribe the records to the "early 2000s" (i.e. to the 2000-2003 period).<sup>26</sup> It has not been possible to compile a time series for the typical LTV because early data (Jappelli and Pagano, 1993) only refer to the maximum LTV. The maximum LTV time series included in the present dataset assembles data by Jappelli and Pagano (for 1961-1970, 1971-1980, 1981-1987) with those reported by the OECD, and various sources adding information on countries not included by the OECD, namely: Canada (Canada Mortgage and Housing Corporation), Japan (Standard & Poor's Reports), and the USA (Millennial Housing Commission).<sup>27</sup>

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<sup>26</sup> The assumption is not going to affect results: estimation outcomes do not significantly change when ascribing the values to longer time spans.

<sup>27</sup> On Canadian data, see [www.cmhc-schl.gc.ca](http://www.cmhc-schl.gc.ca). Standard & Poor's Reports on Japanese Mortgage Market are by Kenji Kondo (2002): "Coming Changes to Japanese Housing Market Likely to Further Boost RMBS Issuance"; and Naoko Nemoto (2005): "Battle Over Japan's Mortgage Market Raises Default Risks". On US data, see Collins (2002): "Pursuing the American Dream: Homeownership and the Role of Federal Housing Policy", Paper prepared for the Millennial Housing Commission.

## References

- Acemoglu, Daron and Robert Shimer (1999): "Efficient Unemployment Insurance", *Journal of Political Economy*, 107, 893-928.
- Agell, Jonas (2002): "On the determinants of labour market institutions: Rent seeking vs. social insurance", *German Economic Review*, 3,107-135.
- Agell, Jonas (1999): "On the Benefits from Rigid Labour Markets: Norms, Market Failures, and Social Insurance", *The Economic Journal*, 109, February, 143-164.
- Agell, Jonas and Kjell E. Lommerud (1992): "Union Egalitarianism and Income Insurance", *Economica*, 59, 295-310.
- Asdrubali, Pierfederico and Soyoung Kim (2005): "Incomplete Intertemporal Consumption Smoothing and Incomplete Risksharing", *Econ WPA (International Finance)*, June, 1-19.
- Asdrubali, Pierfederico, Sorensen, Bent E. and Oved Yosha (1996): "Channels of Interstate Risk Sharing: United States 1963-1990", *Quarterly Journal of Economics*, November, 1081-1110.
- Azariadis, Costas (1975): "Implicit Contracts and Underemployment Equilibria", *Journal of Political Economy*, 83(6), December, 1183-1202.
- Bassanini, Andrea and Romain Duval (2006): "Employment Patterns in OECD Countries: Reassessing the Role of Policies and Institutions", *OECD Social, Employment and Migration Working Papers*, 35, June, 1-129.
- Bayoumi, Tamim (1997): "Explaining Consumption: A Simple Test of Alternative Hypotheses", *Working Paper of the International Monetary Fund*, May, 1-29.
- Belot, Michèle and Jan C. van Ours (2000): "Does the Recent Success of Some OECD Countries in Lowering their Unemployment Rates Lie in the Clever Design of their Labour Market Reforms?", *IZA Discussion Paper Series*, 147, April, 1-47.
- Bertola, Giuseppe, Blau, Francine D. and Lawrence M. Kahn (2002): "Comparative Analysis of Employment Outcomes: Lessons for the United States from International labour Market Evidence", in A. Krueger and R. Solow (eds.), *The Roaring Nineties: Can Full Employment Be Sustained?*, Russell Sage and Century Foundations, 159-218.
- Bertola, Giuseppe and Allan Drazen (1994): "Will Government Policy Magnify Capital Flow Volatility?", in L. Leiderman and A. Razin (eds.), *Capital Mobility: The impact on consumption, investment and growth*, Cambridge University Press/CEPR, 273-277.
- Bertola, Giuseppe and Winfried Koeniger (2007): "Consumption Smoothing and Income Redistribution", *European Economic Review*, 51(8), 1941-1958.
- Blanchard, Olivier (1997): "The Medium Run", *Brookings Papers on Economic Activity*, 2(1997), 89-158.
- Blanchard, Olivier and Justin Wolfers (2000): "The Role of Shocks and Institutions in the Rise of European Unemployment: The Aggregate Evidence", *The Economic Journal*, 110(462), C1-C33.
- Blank, Rebecca M. and Richard B. Freeman (1994): "Evaluating the Connection between Social Protection and Economic Flexibility", in R.M. Blank (eds.), *Social Protection vs. Economic Flexibility: Is There a Tradeoff?*, University of Chicago Press, Chicago.
- Business Week (2004): *The Global 1000*, July, The McGraw-Hill.



- Campbell, John Y. and Gregory Mankiw (1990): "Permanent Income, Current Income and Consumption", *Journal of Business and Economic Statistics*, July, 265-279.
- Catte, Pietro, Nathalie Girouard, Robert Price, and Christophe André (2004): "The Contribution of Housing Markets to Cyclical Resilience", *OECD Economic Studies*, 38, C1-C32.
- Cochrane, John H. (1991): "A Simple Test of Consumption Insurance", *Journal of Political Economy*, 99(5), 957-976.
- Coe, David T. and Dennis J. Snower (1997): "Policies Complementaries: The Case for Fundamental labour Market Reform", *IMF Staff Papers*, 44(1), March, 1-35.
- Ebbinghaus, Bernhard and Jelle Visser (2000): "*Trade Unions in Western Europe since 1945*", Macmillan, London.
- Fehr, Ernst (1990): "Cooperation, Harassment, and Involuntary Unemployment: Comment", *American Economic Review*, 80(3), June, 624-630.
- Giammarioli, Nicola, Messina, Julian, Steinberger, Thomas and Chiara Strozzi (2002): "European labour Share Dynamics: An Institutional Perspective", *EUI Economics Working Papers*, ECO 2002/13, 1-30.
- Jappelli, Tullio and Marco Pagano (1994): "Savings, Growth, and Liquidity Constraints", *Quarterly Journal of Economics*, 109(1), February, 83-109.
- Kessing, Sebastian G. (2003): "A note on the determinants of labour share movements", *Economics Letters*, 81, 9-12.
- Lazear, Edward P. (1990): "Job security provisions and employment", *Quarterly Journal of Economics*, 105(3), 669-726.
- Lewis, Karen K. (1999): "Trying to Explain Home Bias in Equities and Consumption", *Journal of Economic Literature*, 37, June, 571-608.
- Lewis, Karen K. (1996): "What Can Explain the Apparent Lack of International Consumption Risk Sharing?", *Journal of Political Economy*, 104(2), 267-297.
- Lo Prete, Anna (2007): "Modelling Institutional Insurance and International Asset Trade", *draft*, November.
- Mace, Barbara (1991): "Full Insurance in the Presence of Aggregate Uncertainty", *Journal of Political Economy*, 99, 5, 928-956.
- Nickell, Stephen (1997): "Unemployment and labour Market Rigidities: Europe versus North America", *Journal of Economic Perspectives*, 11(3), Summer, 55-74.
- Nickell, Stephen and Richard Layard (1999): "Labour Market Institutions and Economic Performance", in O. Ashenfelter and D. Card (eds.), "*Handbook of Labour Economics*", Vol. 3C, North-Holland, Amsterdam, 3029-3084.
- Nickell, Stephen, Luca Nunziata and Wolfgang Ochel (2005): "Unemployment in the OECD since the 1960s. What Do We Know?", *The Economic Journal*, 115, January, 1-27.
- Obstfeld, Maurice and Kenneth Rogoff (1996): "*Foundations of International Macroeconomics*", MIT Press, Cambridge.
- Ochel, Wolfgang (2000): "Collective Bargaining (Centralization and Coordination)", *IFO Institute of Munich*.
- OECD (2005): "*Taxing Wages: 2003/2004*", OECD Publications, Paris.

- OECD (2004a): "*Benefits and Wages: OECD Indicators*", OECD Publications, Paris.
- OECD (2004b): "*OECD Employment Outlook*", OECD Publications, Paris.
- OECD (2002): "*Benefits and Wages: OECD Indicators*", OECD Publications, Paris.
- OECD (1996): "*OECD Employment Outlook*", OECD Publications, Paris.
- OECD (1994): "*OECD Employment Outlook*", OECD Publications, Paris.
- OECD (1991): "*OECD Employment Outlook*", OECD Publications, Paris.
- OECD: "*OECD Labour Market Statistics-INDICATORS*", Online Database, Paris.
- Suits, Daniel B. (1984): "Dummy Variables: Mechanics v. Interpretation", *The Review of Economics and Statistics*, 66(1), February, 177-180.
- Visser, Jelle (1996): "Union Membership Trends Revisited", *CESAR Research Paper*, 1996/4.

Table 1. National Institutional Features, early 2000s (first part)

	Employment Protection Index		Benefit Replacement Rates (%)		Benefit Duration (monthly)	ALMPs Index
	EPL version 2		NRRs	GRRs		
	EPL version 1	EPL version 2				
Austria	2.2	1.9	73	32	9	11.0
Belgium	2.5	2.2	65	38	unlimited	18.8
Canada	1.1	0.8	51	15	9	5.9
Denmark	1.8	1.4	79	51	48	35.0
Finland	2.1	2	77	35	23	10.3
France	2.9	3	73	44	30	14.6
Germany	2.5	2.2	76	30	12	14.8
Italy	2.4	1.9	6	34	6	4.9
Japan	1.8	1.8	65	9	10	5.7
Netherlands	2.3	2.1	77	53	18	60.6
Portugal	3.5	3.5	69	41	24	14.6
Spain	3.1	3.1	53	36	24	7.6
Sweden	2.6	2.2	77	24	14	34.1
United Kingdom	1.1	0.7	65	17	6	6.9
United States	0.7	0.2	31	14	6	3.1
Rank correlation	0.97		0.49			

Notes: Data refer to 2001, or earliest available values over 2000s: EPL (2003), NRRs (2001), GRRs (2001), Benefit duration (2002), ALMPs (2001). The statistic used to evaluate the "Rank correlation" is the Spearman's rank correlation coefficient.

Table 2. National Institutional Features, early 2000s (second part)

	CB Coverage (%)	Union Density (%)	Coordination Index	Labour Taxation		Loan-to-Value Ratios	
				Marginal Tax wedge, rate in (%)	Average	Typical	Maximum
Austria	95	35.7	4.0	56.6	29.0	60	80
Belgium	90	55.8	4.5	66.6	40.3	83	100
Canada	32	28.2	1.0	43.9	20.4	75	95
Denmark	80	73.8	4.0	50.8	30.7	80	80
Finland	90	77.8	5.0	56.9	38.8	75	80
France	90	9.6	2.0	54.1	39.4	67	100
Germany	68	23.5	4.0	58.1	32.7	67	80
Italy	80	34.8	4.0	53.7	35.4	55	80
Japan	15	20.9	4.0	28.1	20.4	80	100
Netherlands	80	22.6	4.0	51.3	33.0	90	115
Portugal	80	23.4	4.0	38.0	24.1	83	90
Spain	80	13.8	3.0	43.6	31.1	70	100
Sweden	90	78.3	3.0	52.5	41.1	77	80
United Kingdom	30	30.7	1.0	46.5	18.1	69	110
United States	14	12.6	1.0	40.2	18.3	78	100
Rank correlation					0.70		0.38

Notes: Data refer to 2001, or earliest available values over 2000s: CB Coverage (2000), Union density (2001), Coordination (average over 1995-2000), Tax wedges (2001), LTV ratios (2002). The statistic used to evaluate the "Rank correlation" is the Spearman's rank correlation coefficient.

Table 3. National Institutional Features: Time Variation, 1971-2003

	First and last year of recorded observations	Average values (levels)			Spearman's Rank Correlation with 2003 measure			
		1971	2003	Change	1971	1980	1990	1990
EPL version 1	1971-2003 <sup>a</sup>	2.4	1.9	-0.21	0.80	0.86 <sup>b</sup>	0.89	0.89
EPL version 2	1998-2003	2.3	2.2	-0.04	-	-	0.94	0.94
NRRs	2001-2003	62.5	62.4	0.00	-	-	0.97	0.97
GRRs	1971-2003	19.3	31.3	0.62	0.34	0.58	0.87	0.87
Benefit Duration	1989-2002	1.8	1.8	0.01	-	0.84	0.85	0.85
CB Coverage	1980-2000	68.2	67.6	-0.01	-	0.84	0.91	0.91
Union Density	1971-2002	42.1	35.9	-0.15	0.86	0.90	0.99	0.99
Coordination	1970-2000 <sup>a</sup>	3.5	3.2	-0.08	0.80	0.80	0.89	0.89
Tax Wedge, Marginal	1997-2003	50.1	49.4	-0.01	-	-	0.92	0.92
Tax Wedge, Average	1979-2003	29.2	29.6	0.01	0.80	0.76	0.79	0.79
LTV maximum	1971-2003 <sup>a</sup>	71.1	91.3	0.29	0.15	0.08 <sup>c</sup>	0.44	0.44

Notes: (a) Time series have average values over some period interval (see the data Appendix): EPL version 1 1971-1984; Coordination 1971-1974, 1975-1979, and so on (5-year basis); LTV maximum 1971-1980, 1981-1987.

(b) The rank correlation coefficient refers to 1985.

(c) The rank correlation coefficient refers to 1981.

Table 4. Standard Complete-Market Model, and Shocks Interacted with Time-Invariant Institutions Model

	1	2	3	4
Dependent variable: Country-specific Consumption growth rate				
Idiosyncratic income shock	0.794 ( 0.000 )	0.791 ( 0.000 )	0.826 ( 0.000 )	0.817 ( 0.000 )
Pre-Portuguese Revolution			0.019 ( 0.007 )	0.024 ( 0.001 )
Employment Protection			- 0.298 ( 0.053 )	- 0.311 ( 0.058 )
Benefit replacement rate			- 0.001 ( 0.769 )	- 0.001 ( 0.819 )
Duration of entitlement			0.114 ( 0.003 )	0.115 ( 0.004 )
ALMPs			0.010 ( 0.012 )	0.008 ( 0.038 )
Coll. Barg. Coverage			0.009 ( 0.156 )	0.010 ( 0.156 )
Trade union density			- 0.008 ( 0.003 )	- 0.008 ( 0.002 )
Coordination			0.051 ( 0.200 )	0.047 ( 0.251 )
Labour tax wedge			- 0.028 ( 0.023 )	- 0.030 ( 0.028 )
Loan-to-value ratio			- 0.022 ( 0.005 )	- 0.021 ( 0.012 )
Period Dummies	yes	yes	yes	yes
Country Dummies	no	yes	no	yes
Number obs.	470	470	470	470
Adj. R_squared	0.8564	0.8571	0.8646	0.8660

Notes: P-values in parentheses. Pooled-OLS estimation results in columns (1) and (2), NL-LS estimation results in columns (3) and (4).

Test on the joint significance of the country effects: the null hypothesis of the Wald test is rejected neither in column 2 ( $F(14,422)=1,16$ ) nor in column 4 ( $F(9,412)=1,30$ ).

Test on the joint significance of the shock-institution interaction terms: the null hypothesis of the Wald test is rejected both in column 3 ( $F(9,426)=3,42$ ) and column 4 ( $F(9,412)=3,20$ ).

Table 5. Country Effects (units in percentage points)

Austria	0.190	( 0.396 )	Japan	0.456	( 0.041 )
Belgium	0.142	( 0.522 )	Netherlands	- 0.181	( 0.431 )
Canada	- 0.015	( 0.946 )	Portugal	- 0.430	( 0.076 )
Denmark	- 0.478	( 0.034 )	Spain	- 0.223	( 0.319 )
Finland	0.073	( 0.746 )	Sweden	- 0.196	( 0.380 )
France	0.025	( 0.909 )	United Kingdom	0.293	( 0.190 )
Germany	- 0.122	( 0.759 )	United States	0.255	( 0.269 )
Italy	0.210	( 0.391 )			

Notes: Estimates refer to the regression reported in Table 4, column (4). P-values in parentheses.

Table 6. Within-country Risk Reallocation, Sense of Magnitudes (by Institution)

Dependent variable: Country-specific Consumption growth rate			
	Estimation results	Range of independent variable <sup>a</sup>	Implied range of effect of the shock (mean=1)
Idiosyncratic income shock	0.817 ( 0.000 )		
Employment Protection	- 0.311 ( 0.058 )	-1.47 1.33	1.46 0.59
Benefit replacement rate	- 0.001 ( 0.819 )	-56.47 16.53	1.06 0.98
Duration of entitlement	0.115 ( 0.004 )	-1.29 5.21	0.85 1.60
ALMPs	0.008 ( 0.038 )	-13.41 44.12	0.89 1.35
Coll. Barg. Coverage	0.010 ( 0.156 )	-53.6 27.4	0.46 1.27
Trade union density	- 0.008 ( 0.002 )	-26.5 42.2	1.21 0.66
Coordination	0.047 ( 0.251 )	-2.23 1.77	0.90 1.08
Labour tax wedge	- 0.030 ( 0.028 )	-21.3 17.19	1.64 0.48
Loan-to-value ratio	- 0.021 ( 0.012 )	-18.93 16.07	1.40 0.66

Notes: Estimates refer to the regression reported in Table 4, column (4); the model includes period effects, country effects, and the Portuguese Revolution dummy. P-values in parentheses.

(a) Institutional variables are expressed as deviations from the mean value in the country aggregate.



Table 7. Alternative Measures of Institutions, Time-Invariant Institutional Indicators

Dependent variable: Country-specific Consumption growth rate				
	EPL (version 1)	GRRs	Tax Wedge (average)	LTV (maximum)
Idiosyncratic income shock	0.820 ( 0.000 )	0.819 ( 0.000 )	0.842 ( 0.000 )	0.778 ( 0.000 )
Employment Protection	- 0.288 ( 0.047 )	- 0.209 ( 0.289 )	- 0.026 ( 0.786 )	- 0.499 ( 0.007 )
Benefit replacement rate	0.001 ( 0.672 )	0.007 ( 0.401 )	- 0.001 ( 0.842 )	- 0.004 ( 0.149 )
Duration of entitlement	0.114 ( 0.004 )	0.091 ( 0.060 )	0.088 ( 0.014 )	0.061 ( 0.098 )
ALMPs	0.006 ( 0.149 )	0.007 ( 0.087 )	0.010 ( 0.012 )	0.000 ( 0.986 )
Coll. Barg. Coverage	0.009 ( 0.141 )	0.004 ( 0.706 )	- 0.001 ( 0.885 )	0.021 ( 0.016 )
Trade union density	- 0.009 ( 0.002 )	- 0.006 ( 0.099 )	- 0.006 ( 0.044 )	- 0.006 ( 0.102 )
Coordination	0.060 ( 0.149 )	0.037 ( 0.386 )	0.066 ( 0.095 )	0.037 ( 0.394 )
Labour tax wedge	- 0.029 ( 0.024 )	- 0.023 ( 0.126 )	- 0.014 ( 0.105 )	- 0.035 ( 0.037 )
Loan-to-value ratio	- 0.020 ( 0.016 )	- 0.022 ( 0.005 )	- 0.020 ( 0.012 )	0.010 ( 0.218 )
Number obs.	470	470	470	470
Adj. R_squared	0.8661	0.8662	0.8651	0.8645

Notes: NL-LS estimation. All the models include period effects, country effects, and the Pre-Portuguese Revolution dummy. P-values in parentheses. Test on the joint significance of the shock-institutions interaction terms: the null hypothesis of the Wald test is rejected: in column 1  $F(9,412)=3.27$ ; in column 2  $F(9,426)=3.30$ ; in column 3  $F(9,426)=3.07$ ; in column 4  $F(9,426)=2.42$ .

Table 8. Shocks interacted with Time-Varying Institutional Indicators

Dependent variable: Country-specific Consumption growth rate				
	1		2	
Idiosyncratic income shock	0.823	( 0.000 )	0.822	( 0.000 )
Pre-Portuguese Revolution	0.019	( 0.007 )	0.025	( 0.001 )
Employment Protection	- 0.101	( 0.048 )	- 0.087	( 0.096 )
Benefit replacement rate	- 0.006	( 0.063 )	- 0.005	( 0.119 )
Duration of entitlement	0.060	( 0.136 )	0.068	( 0.099 )
ALMPs	0.009	( 0.014 )	0.008	( 0.047 )
Coll. Barg. Coverage	0.008	( 0.046 )	0.008	( 0.033 )
Trade union density	- 0.004	( 0.077 )	- 0.004	( 0.045 )
Coordination	0.012	( 0.739 )	0.004	( 0.907 )
Labour tax wedge	- 0.016	( 0.026 )	- 0.019	( 0.015 )
Loan-to-value ratio	- 0.007	( 0.108 )	- 0.005	( 0.265 )
Period Dummies	yes		yes	
Country Dummies	no		yes	
Number obs.	470		470	
Adj. R_squared	0.8619		0.8638	

Notes: NL-LS estimation. P-values in parentheses.

Test on the joint significance of the shock-institution interaction terms: the null hypothesis of the Wald test is rejected both in column 1 ( $F(9,426)=2,36$ ) and column 2 ( $F(9,412)=2,44$ ).

Table 9. Alternative Measures of Institutions, Time-Varying Institutional Indicators

	EPL (version 2)	LTV typical	GRRs	Average Tax Wedge
Idiosyncratic income shock	0.826 ( 0.000 )	0.830 ( 0.000 )	0.826 ( 0.000 )	0.833 ( 0.000 )
Employment Protection (version1)	- 0.123 ( 0.069 )	- 0.045 ( 0.373 )	- 0.029 ( 0.616 )	0.003 ( 0.949 )
Benefit replacement rate	- 0.005 ( 0.153 )	- 0.005 ( 0.127 )	0.004 ( 0.348 )	- 0.003 ( 0.352 )
Duration of entitlement	0.067 ( 0.102 )	0.108 ( 0.021 )	0.033 ( 0.455 )	0.030 ( 0.426 )
ALMPs	0.007 ( 0.054 )	0.008 ( 0.028 )	0.003 ( 0.424 )	0.008 ( 0.050 )
Coll. Barg. Coverage	0.010 ( 0.022 )	0.006 ( 0.132 )	0.005 ( 0.202 )	0.003 ( 0.359 )
Trade union density	- 0.004 ( 0.089 )	- 0.002 ( 0.550 )	- 0.004 ( 0.055 )	- 0.005 ( 0.014 )
Coordination	- 0.008 ( 0.810 )	0.004 ( 0.904 )	- 0.026 ( 0.450 )	0.012 ( 0.732 )
Labour tax wedge	- 0.022 ( 0.010 )	- 0.027 ( 0.001 )	- 0.013 ( 0.042 )	- 0.010 ( 0.249 )
Loan-to-value ratio (maximum)	- 0.006 ( 0.176 )	- 0.013 ( 0.073 )	- 0.008 ( 0.079 )	- 0.005 ( 0.406 )
Number obs.	470	470	470	470
Adj. R_squared	0.8639	0.8644	0.8633	0.8622

Notes: NL-LS estimation. All the models include period effects, country effects, and the Pre-Portuguese Revolution dummy. P-values in parentheses. Test on the joint significance of the shock-institution interaction terms: the null hypothesis of the Wald test is rejected: in column 1  $F(9,412)=2.52$ ; in column 2  $F(9,426)=2.71$ ; in column 3  $F(9,426)=2.27$ ; in column 4  $F(9,426)=1.92$ .

Table 10. Robustness Checks, and Insights on Cross-Country Risk Allocation

A. Dependent variable: Country-specific Consumption growth rate			
	1	2	3
15 OECD (mean) Consumption growth rate	0.993 ( 0.000 ) <sup>a</sup>	-	0.992 ( 0.000 ) <sup>b</sup>
Worldwide shock to oil price	-	-	0.000 ( 0.875 ) <sup>b</sup>
Country-specific shock to exchange rates	-	0.000 ( 0.766 )	-
Idiosyncratic income shock	0.806 ( 0.000 )	0.840 ( 0.000 )	0.805 ( 0.000 )
Employment Protection (version1)	- 0.287 ( 0.065 )	- 0.289 ( 0.095 )	- 0.287 ( 0.066 )
Benefit replacement rate	- 0.000 ( 0.855 )	0.002 ( 0.421 )	- 0.000 ( 0.857 )
Duration of entitlement	0.099 ( 0.009 )	0.095 ( 0.027 )	0.099 ( 0.009 )
ALMPs	0.007 ( 0.063 )	0.009 ( 0.034 )	0.007 ( 0.063 )
Coll. Barg. Coverage	0.009 ( 0.147 )	0.010 ( 0.137 )	0.009 ( 0.149 )
Trade union density	- 0.007 ( 0.006 )	- 0.006 ( 0.053 )	- 0.007 ( 0.006 )
Coordination	- 0.032 ( 0.412 )	0.004 ( 0.925 )	0.032 ( 0.413 )
Labour tax wedge	- 0.028 ( 0.026 )	- 0.033 ( 0.018 )	- 0.028 ( 0.026 )
Loan-to-value ratio (maximum)	- 0.017 ( 0.025 )	- 0.018 ( 0.058 )	- 0.017 ( 0.025 )
Pre-Portuguese Revolution	yes	no	yes
Period dummies	no	yes	no
Number obs.	470	400	470
Adj. R_squared	0.8742	0.8400	0.8739
B. Dependent variable: 15 OECD (mean) Consumption growth rate			
World Consumption Growth Rate	0.243 ( 0.000 )		
Worldwide shock (oil price changes)	0.010 ( 0.007 )		
Number obs.	470		
Adj. R_squared	0.2877		

Notes: NL-LS estimation. All the models include country effects. P-values in parentheses. The model in column (2) is estimated using data for the sub-period.1976-2003.

(a) The hypothesis that the coefficient is equal to 1 cannot be rejected:  $F(1,444)=0,03$ .

(b) The joint hypothesis that the coefficient in front of the mean consumption growth rate variable equals 1 and the coefficient in front of the worldwide shock to oil price variable equals 0 cannot be rejected:  $F(2,444)=294,95$ .

Table 11. Risk Reallocation Within National Borders

Dependent variable: Country-specific Consumption growth rate			
	Estimation results		Implied range of effect of the shock (mean=1)
Idiosyncratic income shock	0.81/ ( 0.000 )		
Employment Protection	- 0.311 ( 0.058 )	Austria	0.91
Benefit replacement rate	- 0.001 ( 0.819 )	Belgium	0.65
Duration of entitlement	0.115 ( 0.004 )	Canada	1.23
ALMPs	0.008 ( 0.038 )	Denmark	1.17
Coll. Barg. Coverage	0.010 ( 0.156 )	Finland	0.44
Trade union density	- 0.008 ( 0.002 )	France	1.03
Coordination	0.047 ( 0.251 )	Germany	0.78
Labour tax wedge	- 0.050 ( 0.028 )	Italy	0.98
Loan-to-value ratio	- 0.021 ( 0.012 )	Japan	1.45
		Netherlands	1.00
		Portugal	0.86
Pie-Port. Rev. Dummy	yes	Spain	1.08
Period Dummies	yes	Sweden	0.47
Country Dummies	yes	United Kingdom	1.35
Adj. R_squared	0.8660	United States	1.59

Notes: Estimates refer to the regression reported in Table 4, column (4). P-values in parentheses.

Table A.1. Institutional Indicators in the Literature, Comparing Datasets

	NICKELL (1997)	BLANCHARD and WOLFERS (2000)	BERTOLA, BLAU and KAHN (2002)	NICKELL, NUNZIATA and OCHEL (2005)	LO PRETE (2008)
<b>Institutional Indicators</b>	Time INVARIANT	Time VARYING	Time VARYING	Time VARYING	Time INVARIANT
Employment Protection Legislation	Ranking on OECD (EPL version 1)	Nickell EPL version1 (OECD) + Lazear (1990)	BW BW	BW interpolated and readjusted in mean, index 0-2	Two indexes 0-6 (EPL version1 and EPL version2, OECD)
Replacement rates	GRRs in 1st year (OECD)	Nickell yes	BW no	GRRs every 2 years (OECD), interpolated	EPL version1 + Lazear (severance pay and notice); EPL version2 NRRs and GRRs (OECD) <sup>a</sup> NRRs and GRRs (OECD)
Unemployment Benefit Duration	Length of entitlement (years)	Nickell no	Indicator of duration 0-4 no	Index built using GRRs data	Length of entitlement (years) yes
ALMP	Index by Nickell on OECD data	Nickell no	BW no	no	Index defined as in Nickell (1997) no
Collective Bargaining Coverage	Index 1-3 (OECD)	Nickell no	Index % (OECD) yes	no	Index % (OECD) yes
Trade Union Density	Index % (OECD)	Nickell no	Index % (OECD) and Visser, 1998 Yes (OECD and Visser, 1998)	Index % from Ebbinghaus and Visser (2000) plus various (national) sources	Index % (OECD online database) Index % (OECD)
Coordination in wage bargaining	Index 2-6 (OECD)	Nickell no	Ranking on OECD data yes	Two indexes 1-3 (OECD and other sources)	Index 1-5 (OECD) yes
Labour taxation	Total tax rate (payroll, income and consumption taxes)	Nickell no	Labour taxation (payroll and income taxes plus mandated benefits) no	Tax wedge (payroll, income and consumption tax rates)	Total tax wedge, marginal and average rate (OECD) Total tax wedge, marginal and average rate
Credit market development	no	no	no	no	LTV ratios, typical and maximum (OECD, Jappelli and Pagano, 1994) LTV maximum
<b>Sample</b>					
Period	1980-1994	1960-1995+	1970-1999	1961-1995	1971-2003
Periodicity	6-year	5-year	5-year	annual	annual
Number of countries	20	20	26	20	15

Notes: Where the call records "Nickell" or "BW" the indicator used in the dataset is the same as the one compiled by, respectively, Nickell (1997) or Blanchard and Wolfers (2000).

(a) Data refer to average NRRs over 5 years of unemployment, and to the average of GRRs for three lengths of unemployment.