Consumption Smoothing and the Structure of Labor and Credit Markets

Giuseppe Bertola and Winfried Koeniger *

February 8, 2005

Abstract

Smoother labor incomes alleviate credit constraints by reducing workers' desire to borrow, and prospects of upward income mobility have smaller beneficial effects for currently poor workers when borrowing constraints are binding. These simple theoretical insights are consistent with the empirically more pronounced tendency of poor would-borrowers to favor government redistribution in countries where consumer credit is relatively scarce. Our theoretical perspective and empirical results offer more general insights as to ways in which historically determined features and politico-economic interactions may jointly shape institutional aspects of different markets, and as to appropriate design of reform processes.

Keywords: Consumer credit, Redistribution, Borrowing constraints.

JEL Nos: E21, E24, E61

*Bertola: Università di Torino, EUI, and CEPR. Koeniger: IZA, Bonn and EUI. This work is part of the *Finance and Consumption in the EU Chair* research program, sponsored by Findomestic Banca and CETELEM at the European University Institute. For helpful comments on previous drafts we are grateful to Torben Andersen, Daniele Checchi, Gianluca Femminis, Olmo Silva, Etienne Wasmer, and workshop participants at Università del Piemonte Orientale, IZA Bonn, IIES Stockholm, CEP London, German Economic Association, Università Cattolica Milano, SED, EALE, CERGE Prague, and RUESG Helsinki.

1 Introduction

In the United States and other Anglo-Saxon countries a largely unregulated labor market is an important source of risk for households, and financial markets are relatively well developed. In Continental Europe, and especially in Southern Europe, labor market risk is more pervasively controlled by various institutional features and financial market transactions are relatively limited. Many interpretations of this type of evidence are possible. For example, Fogli (2000) focuses on family-level interactions, in that young people may live longer with their parents in countries where stringent employment protection legislation (EPL) implies slim job-finding chances and credit is scarcer than in countries where labor markets are flexible and borrowing is easy, and Pagano and Volpin (2002) show that EPL's role in deterring takeover bids is especially important in countries where protection of shareholder's rights is weak. More general connections between features of financial and labor markets are theoretically clear: unemployment insurance (Acemoglu and Shimer, 1999) or employment protection (Bertola, 2004) can address efficiency and insurance issues when financial markets are realistically incomplete, and redistributive labor income taxation has beneficial effects in the absence of insurance markets (Varian, 1980 and other references in Agell, 2002). The small number of cross-country observations and the large number of potentially relevant and poorly measured country-specific variables, however, makes it is difficult to test formally the empirical relevance of such plausible theoretical mechanisms.

In this paper, we focus on liquidity constraints as a relatively well understood source of imperfect consumption smoothing. Studying how workers' desire and ability to borrow depend on institutional interference with labor-market outcomes and on the efficiency of credit markets, we aim at gaining insight into more general interactions between the institutional structure of financial and labor markets. Labor-income stabilization may be intuitively beneficial in the absence of the consumption smoothing afforded by credit and other financial markets: Hansen and Imrohoroglu's (1992) numerical study, for example, indicates that unemployment insurance can address the negative welfare implications of liquidity constraints, if imperfectly so if insurance engenders moral hazard in the labor market. We assess the theoretical plausibility in a simpler setting, amenable to analytic derivation of sufficient conditions for tighter borrowing constraints to make smoother labor incomes more attractive to workers. Empirically, we find that availability of credit reduces individual preferences for government redistribution and for other forms of institutional interference with employment and wage risk.

In Section 2 we outline a simple modelling framework in which labor income stability may reduce desired borrowing by individuals who expect their income to increase, and may make it easier for them to obtain credit. To the extent that the negative welfare implications of credit

constraints are more pronounced when labor income profiles make borrowing more desirable, income-compressing policies make it possible to smooth consumption intertemporally as well as across different states of the world, and are more beneficial for currently poor would-borrowers than a simpler insurance-based perspective would make them. We characterize conditions for this effect to be present, noting that precautionary-saving motives play an important role in determining its intensity—which also depends on the volatility of income fluctuations: redistribution is less appealing for currently poor individuals who can look forward to future reversals of fortune, as shown by Benabou and Ok (2001); but credit constraints, by reducing consumption-smoothing opportunities, weaken the welfare impact of future income expectations.

Theoretical characterization of such high-order interactions between individual welfare and the credit market environment makes it possible in Section 3 to interpret empirical relationships between individual characteristics and indicators of consumer credit availability and support for government redistribution. Analyzing international survey data from an empirical perspective similar to that of Alesina and La Ferrara (2001), we find that the relationship between individuals' stated attitudes for redistribution, income, and age is heterogeneous across countries in ways that are readily rationalized by our theoretical results. Controlling for current resources, younger individuals looking forward to higher future income favor income-smoothing redistribution and do so more strongly in countries where credit access is more limited. The concluding Section 4 discusses more general implications of our theoretical perspective and empirical findings, noting in particular that the desirability and political feasibility of labor and financial market reforms should be assessed taking into account both markets' structure.

2 A simple model of imperfect consumption smoothing

We consider two periods in the life of consumers who wish to maximize

$$U = u(c_1) + \beta E\left[u(c_2)\right], \tag{1}$$

where U and $u(\cdot)$ respectively denote lifetime and instantaneous utility; c_t denotes consumption in period t; β is the discount factor, and $E[\cdot]$ is a conditional expectation formed on the basis of possibly constrained saving behavior and of the individual's labor income process. A longer time horizon would make it necessary to model wealth dynamics, and to study the resulting model numerically or for restrictive functional forms.

We strive for analytical tractability also as regards the model's labor-income process, which we specify so as to introduce borrowing motives and income-variability concerns in the simplest

possible way. In the first period, an individual's labor income takes one of two values, w_b and w_g. It would be straightforward to allow for expected labor income growth, but since its implications are similar to those of heavier discounting of future utility we let the second-period realization have the same (unconditional) distribution as the first period's: if the low value $w_b < w_g$ is realized in the first period, in the second period labor income still equals w_b with probability $1-p$ and increases to w_g with probability p. Symmetrically, a high first-period labor income persists with probability $1-p$ and falls to w_b with probability p. The labor income process is taken as given by the individual, but the intensity and strength of labor-income shocks (due to labor-demand or individual-specific events) may depend on the economy's structure and institutions, as we discuss below.

The only choice open to individuals in this simple model is how much to consume in early life, and the relevant first order condition offers insights of broader qualitative generality as regards the welfare impact of borrowing opportunities and labor-income processes. Since $w_b < w_g$ and $p > 0$, individuals who earn w_b in the first period expect their income to increase: if r is the interest rate and

$$u'(w_b) > \beta(1+r)\left[pu'(w_g) + (1-p)u'(w_b)\right], \tag{2}$$

they would like to borrow in order to smooth their intertemporal consumption profile. Uncertainty around the expectation of higher income, however, affects credit supply conditions.

In the model and in the real world, borrowing is constrained by repayment limits, in that lax *ex post* enforcement of repayment obligations restricts *ex ante* borrowing opportunities. In our simple model we suppose that enforcing loan repayment is impossible if this would reduce second-period consumption below a strictly positive lower bound, and that the borrower's labor income cannot be verified. Since a borrower's realized income may remain flat at w_b, we have in this setting

Assumption 1: *It is impossible to borrow more than* $(\kappa + \xi w_b)/(1+r)$, *where* $\kappa < (1-\xi)w_b$.

By this borrowing limit, second-period consumption cannot fall below the positive upper bound $(1-\xi)w_b - \kappa > 0$ if the borrower's labor income remains low and the loan is repaid.[1] Lenders would be able to recover larger payments without reducing the borrower's consumption below that limit when labor income is realized at w_g. But if they are unable to verify whether that is the case, then loan repayment cannot be conditional on labor income: all loans up to

[1] In the limit case case $\kappa = (1-\xi)w_b$ there is no exogenous restriction on borrowing behavior if marginal utility tends to infinity at zero, ruling out optimality of zero consumption with positive probability (Carroll, 1997).

the limit stated in Assumption 1 are repaid in full, while larger loans—the repayment of which could not be enforced—are not granted.

While it would be possible to model more complex contractual and informational structures, the sharpness of the borrowing limit in Assumption 1 conveniently allows κ to index imperfect enforceability of repayment obligations, and also lets borrowing opportunities be affected by the lower bound w_b of future labor income if $\xi > 0$. In the model, a positive $\xi > 0$ introduces an important interaction between the welfare effects of income inequality and of borrowing constraints: it is arguably realistic to the extent that loans are more easily obtained by individuals whose jobs are secure (in Italy, and in other countries where dependent employment is a very stable source of income, loans can be explicitly collateralized by a portion of the borrower's wages, subsequently paid directly to the creditor). Through this channel credit supply depends not only on the structural features of the credit market studied by Jappelli and Pagano (1994) and others, but also on aspects of the same labor-income process that also determines demand for credit.

2.1 Income compression and redistribution

We are interested in welfare interactions between credit constraints and redistributive labor market policies. Formally, we consider a tax-and-subsidy scheme that decreases by $\tau \geq 0$ the take-home pay of individuals earning w_g and increases by $\lambda\tau$ that of individuals earning w_b. Parameter τ indexes the intensity of redistribution or, more generally, of institutional interference with *laissez faire* labor income inequality. For simplicity, we characterize the welfare effects of redistribution supposing that the same τ applies in the two periods; allowing τ to vary over the lifetime of individuals would affect intertemporal consumption smoothing in analytically complex, but conceptually straightforward ways. Parameter λ allows redistribution to affect the mean as well as the dispersion of individual incomes. In our individual-level derivations, it indexes the strength of redistribution's welfare benefits for low-income workers, hence the extent to which redistribution can effectively offset credit market imperfections.[2] From a more general perspective $\lambda \leq 1$ can be interpreted as an index of the strength of deadweight losses, such as reduction of individual incentives to exert on-the-job or search effort. This simple parameterization may straightforwardly represent progressive taxation or unemployment insurance schemes, as well as a variety of policies meant to reduce uncertainty about each worker's disposable income at the same time as they decrease productive efficiency: for

[2] The role of λ is similar, but not identical to that of parameter ξ introduced above. Like a large ξ, a large λ increases the effectiveness of redistribution in relaxing liquidity constraints: by smoothing the income process, however, λ reduces the desire to borrow, while ξ chiefly makes borrowing easier.

example, wage compression in mandatorily extended collective contracts can smooth pre-tax labor income (Agell and Lommerud, 1992).

Denoting with ω_i the *laissez faire* labor income of group i, when a policy of this type is implemented high-wage workers earn $w_g = \omega_g - \tau$ and low-wage workers earn $w_b = \omega_b + \tau\lambda$. We will study the welfare implications redistribution under the assumption that $u'(w_g) < \beta(1+r)\left[pu'(w_b) + (1-p)u'(w_g)\right]$. This makes it optimal for initially lucky workers to carry assets with liquidation value $a > 0$ to the second period of their life, and achieve welfare

$$U_g \equiv u(w_g - \frac{a}{1+r}) + \beta\left[pu(w_b + a) + (1-p)u(w_g + a)\right]. \tag{3}$$

As a is chosen so as to satisfy the unconstrained Euler equation, a policy perturbation has no first-order welfare effects through saving behavior. Hence,

$$\frac{dU_g}{d\tau} = -u'\left(w_g - \frac{a}{1+r}\right) - \beta(1-p)u'(w_g + a) + \beta p\lambda u'(w_b + a). \tag{4}$$

This expression can be positive, as long as λ is not so small as to make redistribution ineffective, if utility is very concave and p is large enough to make insurance an important concern for this group of individuals.

Obviously, the credit restrictions only affect the welfare of low income would-borrowers, in ways we now proceed to characterize. The constraint imposed by Assumption 1 is binding if borrowing more than $b = -(\kappa + \xi w_b)$ would be necessary in order to satisfy the Euler equation. In this case the shadow price of the constraint is positive:

$$\mu(w_b, w_g, \kappa) \equiv u'(w_b + \frac{\kappa + \xi w_b}{1+r}) - \beta(1+r)\left[pu'(w_g - \kappa - \xi w_b) + (1-p)u'(w_b - \kappa - \xi w_b)\right] > 0. \tag{5}$$

Slackness of the Euler condition implies that exchanging one unit of future consumption for $(1+r)^{-1}$ units of current consumption improves a credit-constrained individual's welfare. If the financial market cannot provide better borrowing opportunities, it is interesting to explore how the welfare of initially low-income individuals,

$$U_b = u(w_b + \frac{\kappa + \xi w_b}{1+r}) + \beta\left[pu(w_g - \kappa - \xi w_b) + (1-p)u(w_b - \kappa - \xi w_b)\right], \tag{6}$$

may benefit from a relaxation of borrowing constraints though an improvement of the worst-case labor income. Like its counterpart in (4) for positive-assets individuals, the relevant derivative

$$\begin{aligned} \frac{dU_b}{d\tau} &= u'\left(w_b + \frac{\kappa + \xi w_b}{1+r}\right)\lambda + \mu(w_b, w_g, \kappa)\frac{\xi\lambda}{1+r} \\ &\quad + \beta\left((1-p)\left[\lambda u'(w_b - (\kappa + \xi w_b))\right] - p\left[u'(w_g - (\kappa + \xi w_b)\right]\right) \end{aligned} \tag{7}$$

can but need not be positive, depending on the strength of insurance concerns and on the effectiveness of redistribution in addressing them. The positive shadow price $\mu(\cdot)$, however, when multiplied by $\mu > 0$ quite intuitively tends to increase the welfare benefits of redistribution for individuals who would like to borrow against a higher expected future income, but are prevented from doing so by solvency constraints, as indexed by κ in Assumption 1.

The welfare effect of the resulting borrowing constraint tightness is $dU_b/d\kappa = \mu(w_b, w_g, \kappa)/(1+r)$. Its interaction with redistribution is

$$\begin{aligned}\frac{\partial^2 U_b}{\partial\kappa\partial\tau} &= \frac{1}{1+r}\frac{\partial\mu(\omega_b+\lambda\tau,\omega_g-\tau,\kappa)}{\partial\tau} \\ &= \frac{\lambda}{1+r}u''\left(w_b+\frac{\kappa+\xi w_b}{1+r}\right)\left(1+\frac{\xi}{1+r}\right) \\ &\quad +\beta\left\{(\xi\lambda+1)\,pu''(w_g-(\kappa+\xi w_b))+(\xi-1)\,\lambda(1-p)u''(w_b-(\kappa+\xi w_b))\right\}.\end{aligned} \tag{8}$$

This mixed derivative is certainly negative if

$$\frac{\lambda}{1+r}u''\left(w_b+\frac{\kappa+\xi w_b}{1+r}\right)-\beta\lambda(1-p)u''(w_b-(\kappa+\xi w_b))<0, \tag{9}$$

and more strongly negative if a large λ implies that the policy is effective in boosting the income and consumption of relatively poor individuals.

In light of the condition (2) for borrowing to be desirable, a sufficient condition for (9) is[3]

$$\frac{u''(w_b-(\kappa+\xi w_b))}{u''\left(w_b+\frac{\kappa+\xi w_b}{1+r}\right)}<1+\frac{p}{1-p}\frac{u'(w_g)}{u'(w_b)}, \tag{10}$$

which is certainly satisfied if $u'''(\cdot)\leq 0$, as in that case the left-hand side is smaller than or equal to one while the right-hand side of (10) is always larger than unity.

Thus, we have

Result 1: *If $u'''(\cdot)\leq 0$ or the more general sufficient condition* (10) *holds, then redistribution is more beneficial for borrowers when credit is tighter, as indexed by a smaller κ in Assumption 1.*

When credit markets afford less consumption smoothing, then redistribution can play a more beneficial role in appropriately aligning borrowers' marginal utilities over time and across labor-income realizations. This effect is intuitive, but can be overturned if a strongly positive

[3] To see this, consider that (9) can be written $(1-p)\,u''(w_b-(\kappa+\xi w_b))/u''\left(w_b+\frac{\kappa+\xi w_b}{1+r}\right)<\frac{1}{\beta(1+r)}$ and (2) can be written $1-p\frac{u'(w_b)-u'(w_g)}{u'(w_b)}<\frac{1}{\beta(1+r)}$. The latter inequality implies the former if (10) holds.

$u'''(\cdot)$ introduces precautionary motives for individual saving and borrowing choices. Less dispersed second-period income induces more borrowing by a prudent consumer, and can increase the welfare impact $\mu(\cdot)$ of borrowing constraints if marginal utility is strongly convex. On the other side of the same coin, allowing larger debt makes insurance more desirable if repayment upon realization of low labor income brings consumption to a steeply decreasing portion of the marginal utility function. Hence, more efficient credit markets can potentially make redistribution more attractive, and our empirical work below should be seen as a joint test of the effect's empirical strength and of a preference-regularity condition in the form (10).

2.2 Labor-income persistence and credit constraints

Since upward income mobility makes borrowing more desirable for low-income individuals, a larger p on the right-hand side of Result 1's sufficient condition (10) makes it easier for it to hold. We proceed to analyze the welfare implications of that parameter in more detail, noting that institutional interference can protect workers from wage and employment risk by increasing the persistence of individual labor-market outcomes as well as by reducing the size of the resulting income fluctuations. Stringent employment protection legislation, for example, is intuitively associated with highly persistent employment and unemployment (see, e.g., Bertola and Rogerson, 1997).

We have shown that redistribution tends to be less attractive if credit markets are relatively more developed. A larger p, for any given labor income differential $w_g - w_b$, implies a steeper slope of expected income profiles and stronger desire to borrow in our simple model. Since lifetime welfare can also be equalized by a high likelihood p of transitions across the model's labor-income realizations, it is interesting to explore in more detail the role of that parameter.

The effect of a higher p on the welfare of the initially unlucky and liquidity constrained individuals, in equation (6) above, is

$$\frac{\partial U_b}{\partial p} = \beta \left[u(w_g - \kappa - \xi w_b) - u(w_b - \kappa - \xi w_b) \right] > 0 \ . \tag{11}$$

The derivative is clearly positive, since a larger p makes a high income more likely in the second period. Symmetrically, the effect of a higher p on the welfare (3) of the individuals who have high wages and save initially is negative,

$$\frac{\partial U_g}{\partial p} = \beta \left[u(w_b + a) - u(w_g + a) \right] < 0, \tag{12}$$

where the envelope theorem allows us to neglect the effect of p on a. The effect is more negative when lucky agents do not bring large assets to the future, and less negative if wage inequality is less pronounced (possibly as a result of tax-and-subsidy policy).

Recalling that redistribution affects wages according to $dw_g = -d\tau$, $dw_b = \lambda d\tau$, our simple setting offers an equally simple representation of the prospect-of-upward-mobility (POUM) effect analyzed by Benabou and Ok (2001):

$$\frac{\partial^2 U_b}{\partial \tau \partial p} = -\beta \left[u'(w_g - \kappa - \xi w_b)\,(1 + \xi\lambda) + u'(w_b - \kappa - \xi w_b)\lambda(1 - \xi) \right] < 0 \ .$$

Income mobility leads currently poor agents to like redistribution less, and may even lead them to oppose it if λ is small and p is large. However, our simple model delivers an unambiguous sign prediction for the relationship between the index of (upward) income mobility p of initially low-income individuals, and the interaction between redistribution and liquidity constraints on which we focus:

$$\frac{\partial^3 U_b}{\partial \tau \partial p \partial \kappa} = \beta \left[u''(w_g - \kappa - \xi w_b)\,(1 + \xi\lambda) + u''(w_b - \kappa - \xi w_b)\lambda(1 - \xi) \right] < 0,$$

and this establishes

Result 2: *The benefits of redistribution for individuals who are currently poor are smaller when these individuals can look forward to more strongly increasing expected income (p is large) and credit is less restricted (κ is large).*

Intuitively, less efficient credit markets weaken the welfare impact of income mobility because they prevent low income agents to anticipate more of their higher future labor income. Hence, the POUM effect is less pronounced when borrowing is more constrained. The welfare effect of higher future income (a steeper expected labor income profile) is larger when consumption can be smoothed by borrowing. The effect becomes less pronounced if $w_g - w_b$ is smaller, as might be implied by a more incisive tax-and-subsidy policy of the type we consider above.

The fact that higher persistence of labor-market states reduces workers' desired borrowing introduces another channel of interaction between credit market structure and labor market institutions: policies that reduce the turbulence of individual workers' labor market status, such as stringent employment protection, are *ceteris paribus* more desirable when credit is scarce.

3 Credit and empirical attitudes towards redistribution

The simple analytical results above focus on interactions between an individual's environment and his/her utility outcomes. We are ultimately interested in how such attitudes may shape

country-level policy making, and explain why (as noted in the introduction, and further discussed below) labor markets appear to be heavily regulated in countries where financial markets are difficult to access for workers. Empirical assessment at the aggregate level is difficult, however, because information is scarce. Loan-to-value ratios, collected and reported by Jappelli and Pagano (1994) as a suitable indicator of credit supply conditions, are available for a rather small number of countries which differ in many more respects than is possible to control for along the cross-sectional dimension. To the extent that financial market conditions vary over time, country-specific developments can be analyzed in microeconomic data sets (such as that analyzed by Koeniger, 2004 for the UK), but scarcity of comparable time-series information and the stability of most countries' institutional structure makes it difficult to implement a time-series perspective on broad cross-country evidence.

In this section, accordingly, we proceed to seek empirical support for the relevant theoretical interactions in microeconomic surveys of attitudes towards redistribution and other forms of government interferences with individual income processes. Our theoretical derivations' focus on high-order interactions between individual and market characteristics makes it possible to exploit individual heterogeneity in micro data sets in order to test the model's predictions. The information provided by interactions of individual circumstances and environmental features is directly relevant to the theoretical results of interest. As regards personal circumstances, relatively poor individuals should be relatively more in favor of redistribution. Our model delivers more detailed implications: to the extent that an individual's currently lower income is associated with expectations of faster-rising future income, its association with preferences for redistribution should be weaker (marginal utility gains smaller) if the environment allows better access to credit. As regards the characteristics of individual agents' environment, we exploit available aggregate information on credit market development. Interacting loan-to-value ratios with data on individual income, age and their interactions, we can test whether the relationship between credit market development and gains from redistribution predicted by Result 1 are present in the data.

3.1 Data

The International Social Survey Programme (ISSP) has collected representative data on the role of the government in the years 1985, 1990 and 1996. The questions are issued as a supplement to existing national surveys. The answers to a very direct ISSP question (see Table 1 for the exact formulation) offer an opportunity to assess individual attitudes towards government redistribution: we code the five possible qualitative answers in increasing order, so that higher values of the variable indicate that a respondent is more strongly in favor of

redistribution. To capture a key characteristic of the environment in which this question is answered by individual respondents, we merge with the ISSP dataset country-specific loan-to-value ratios (LTV). This indicator measures the maximum fraction of house value financed by collateralized mortgages in the 1981-87 period, and is available for 15 of the countries where the ISSP role-of-government supplement was administered in 1996: Australia, Canada, France, Germany, Great Britain, Ireland, Italy, Japan, New Zealand, Norway, Spain, Sweden and the United States (Jappelli and Pagano 1994, Table 1 column 3); only 1971-80 data are available for Israel and the Philippines (ibid., column 2). We choose the 1996 cross-section of the ISSP since the overlap between the two samples of countries is much smaller for the 1985 and 1990 ISSP surveys.

The resulting data set offers an opportunity to assess directly the relationship between credit market development and the perceived benefits of income equality. Our theoretical perspective suggests that currently poor agents benefit more from redistribution in countries where bad access to credit does not allow to smooth out expected income growth. Empirically, they should express stronger support for the government's role in income distribution. The correlation between country-level averages of ISSP survey answers and LTV is indeed negative, if insignificantly so and, of course, far from informative in light of the many unobserved factors driving both variables in the very limited cross-country sample. At the individual level, however, a regression can exploit variation in the many relevant individual characteristics observed in the ISSP data, and can be specified so as to elicit the data's information regarding the interaction effects identified by our simple theoretical results.

Table 1 displays the summary statistics and definitions of the variables in our preferred multivariate-regression sample. Australia, Germany, and the US each provide over 10% of the sample's 9,800 observations, other countries' representation range down to 3% for New Zealand. Available data do not allow measurement of expected income profiles on an individual basis, and cannot disentangle permanent inequality from temporary shocks around expected income growth paths. Permanent income differences can be proxied by education and self-assessed socioeconomic class membership and, to the extent that younger agents may look forward to faster-increasing future earnings along realistically hump-shaped life-cycle income profiles, the steepness of expected income profiles can be proxied by age information. Income is also available in the ISSP data, on an individual and/or household basis. All else being equal, a lower current income realization should be associated to a stronger inclination to favor redistribution. Aiming to control for such obvious effects, our preferred specification captures the role of current resources on the basis of the respondent's within-country income quartile dummies, and tests the more subtle theoretical implications of interest on the basis

of that indicator's interaction effects with other relevant variables. We prefer income quartiles to absolute income levels. Firstly, because quantile statistics are not affected by definitional and currency-denomination issues when used as indicators of an individual's position in the country's redistribution scheme, which has unobservable and generally nonlinear form. Secondly, because absolute income levels may be affected by the general redistributive policies we are interested in, even on a pre-tax basis, and therefore fail to be exogenous if the preferences expressed in the ISSP data are to some extent reflected in the relevant country's policy configuration. Quantile statistics are immune to such bias as long redistribution schemes leave the relative income position unchanged. Of course, if some of the raw income-level variation eliminated by classifying income observations into quartiles is a source of relevant information (rather than noise, or bias), then our preferred specification inefficiently wastes relevant information. Accordingly, we also test the robustness of our results in alternative specifications featuring absolute income levels, and regard the quartile-based specifications as a conservative estimate of the effects of interest.

3.2 Regression results

We proceed to estimate an ordered probit model on the ordinal "taste for redistribution" responses: formally, we suppose that

$$\text{prob}(y_i = j) = \text{prob}(k_{j-1} < X_i\beta + u_i \leq k_j)$$

where $y_i \in \{1, 2, 3, 4, 5\}$ is the survey's qualitative indication of individual i's preferences as regards government redistribution; k_j, for $j = 1, 2, 3, 4, 5$, are the boundaries of the region where the latent variable $X_i\beta + u_i$ triggers outcome j; u_i is normally distributed across individuals (ordered logit estimates, not reported, yield very similar results), and the mean $X_i\beta$ of the latent variable depends linearly on the elements of the X matrix of covariates. The matrix contains the main and interaction terms listed in Table 2 and its notes. In the Table, we report coefficients and significance levels (computed on the basis of standard errors robust to country-level covariance clustering) for the main variables of interest, namely the loan-to-value ratio, income, age and their interactions.

In column 1, the specification controls for observable heterogeneity across households, while the specification reported in column 2 also controls for country fixed effects and their interactions with the covariates. In column 3 we report binary probit estimates (collapsing values 1-3 of the dependent variable to 0 and values 4-5 to 1, resulting in a 55% split of the observations); the absence of intermediate categories makes it possible to compute a more readily

interpretable marginal-effect representation of the results. Finally, in column 4 we report the coefficients of a simple linear regression in the form

$$y_i = X_i\gamma + v_i$$

which, while arbitrarily attributing a cardinal interpretation to the survey answers, makes it possible to assess the effects of interest quantitatively rather than qualitatively.

Recall that our results refer to the different determinants of heterogeneous support for redistribution in countries with different credit conditions. The character of heterogeneous support is captured by the interaction terms, in bold face in Table 2. Within each country, agents with lower income are not surprisingly in favor of more redistribution, and relatively more so if they are younger. All specifications deliver a similar message: in countries with a higher loan-to-value ratio, low income households are less in favor of redistribution and this effect is stronger if they are younger and looking forward to higher future labor income.

The coefficients of the loan-to-value ratio and its interactions with age and income in column 1 are jointly significant at the 1% level. The relevant likelihood-ratio test statistic is $\chi^2(8) = 56.07$. In column 2 we find that the sign of the coefficients is robust to controlling for unobserved country effects and their interactions with covariates, while their significance is somewhat reduced. A specification (not reported) that interacts income, age and their interactions with unrestricted country dummies rather than with the loan-to-value of course delivers a better fit: the hypothesis that specification 2 fits the data equally well can be rejected at the .5% level ($\chi^2(77) = 113.08$). The sizable robust significance of the coefficients of specifications 1 and 2, however, does indicate that the loan-to-value ratio plays an important role in shaping the relationship between different individuals' economic circumstances and taste for redistribution.

When we aggregate the replies in two categories (column 3) the signs of the reported marginal effects are the same as the coefficients in the ordered-probit specification. This allows us to conclude, for example, that a larger LTV is significantly associated with a smaller impact of current income on preferences for redistribution. The simple parametric specification reported in column 4 interestingly delivers the same pattern of signs as in the qualitative specifications, and makes it possible to assess the estimates' implications for the effects of income and age on the taste for redistribution of individuals living in different credit environments, without having to keep track of their other characteristics as would be necessary in a nonlinear model.

In Figure 1 we plot the linear model's taste-for-redistribution predictions for differently poor and differently old individuals living in environments featuring different LTVs. For concreteness, predicted values are computed for the LTV observation of Italy (56%) and the US (89%). The inclination to favor government redistribution depends on income in sensible ways:

poorer households not surprisingly are more in favor of redistribution than richer ones. For each income quartile, and for all age groups, the inclination to favor redistribution is higher when all coefficients that our specification allows to depend on LTV are evaluated at the Italian rather than US level of LTV. This is consistent with our model's theoretical perspective, and the effects are quantitatively non-negligible. For example, as shown in Figure 1, changing the LTV from the US to the Italian level has a larger impact on a 2nd quartile American individual's taste for redistribution as a change in his or her income that would move it from the third to the first quartile.

Interestingly, the relationship between taste for redistribution and current income is less pronounced when LTV is higher. To the extent that observable characteristics capture permanent income, this is implied by our theoretical results, since the negative welfare implications of currently low incomes that are expected to increase can be reduced by the consumption smoothing afforded by access to borrowing opportunities. The empirical relationship between age and inclinations to favor redistribution also turns out to depend on each country's LTV in theoretically sensible ways. Again referring to Figure 1, in the US age is much less relevant than in Italy to individual attitudes towards redistribution. Empirically, the main effect of age has the opposite sign as the interaction effect of age and LTV: the LTV observed for the US happens to be such as to lead the two to almost cancel each other out, so taste for redistribution is (approximately) independent of age in the US. Theoretically, the fact that age (almost) does not matter when the credit market is as efficient as it is in the US is consistent with the notion that upward-sloping income expectations should not be relevant to the slope of young people's consumption path when it is possible for them to borrow so as to satisfy the Euler equation: in a well-functioning financial market, the average lifetime level of income should indeed be much more relevant than its slope in determining individual attitudes towards redistribution.

3.3 Robustness and extensions

In summary, our estimates imply that low-income households favor redistribution more in countries with less developed credit markets, and especially so when their young age makes them likely borrowers. We proceed to probe the robustness of the ordered probit specification reported in Table 2. In Table 3 we report various specifications, controlling (except in column 2) for country fixed effects and their interactions with the covariates.

In column 1 we add a control for household size. This reduces the number of observations substantially, because that information is not available for some countries, but the results of interest are not substantially affected. In column 2 we drop the country dummies which in the specifications discussed so far subsumed all country-specific variation, and their interaction

with the covariates: we can then include country-specific variables, namely the LTV (not significant) and country-specific indicators of average income and inequality. The PPP-adjusted per-capita income is drawn from the Penn World Tables for 1995 or 1996 (depending on each country's ISSP sampling year); p5p1 is the ratio of the median to the first decile of the overall wage distribution (OECD, 1996, Table 3.1). The estimated coefficients of per-capita income and p5p1 are significantly negative and significant. Taken at face value this indicates that citizens of richer and more unequal societies are less in favor of redistribution, but of course other omitted country characteristics could drive this result. The interaction coefficients of interest are broadly similar. In regressions not reported we find that the results for the interactions of the loan-to-value ratio are robust to inclusion of country dummies as well as interactions of household income and age with country-specific income means and inequality indicators.

In columns 3 and 4 we include as a regressor PPP-adjusted individual or household income levels (in linear and quadratic form) instead of income-quartile dummies. Income is measured in gross terms for some countries and in net terms for others, and may introduce bias. It is comforting to find, however, that the results of interest are broadly unchanged when income is included: the taste for redistribution declines (at a decreasing rate) in that measure of income; the effect is stronger for young individuals; and both effects become less pronounced if the loan-to-value ratio is higher. The main age effect implies that the young have a higher taste for redistribution, but less so if they have better access to credit. Column 3 reports the results for individual income, which is not available for Italian observations: the results are more significant in column 4, where household income is included.

We have performed and can discuss briefly other robustness test. Other questions in the ISSP refer to more specific aspects of redistribution: using as dependent variables the respondents' attitudes towards a role for the Government "in redistribution between rich and poor" or "in providing a decent standard of living for the unemployed" or "in helping university students from low-income families" yields results that are qualitatively similar to those we report, if sometimes less significant. As regards sources of variation on the right-hand side of the regressions of interest, it is important to notice that many country-specific institutional features are correlated with the credit-supply conditions we focus on. This is not surprising from the perspective of this paper since, for example, the severe borrowing constraints that make redistribution and other income-stabilization policies more appealing for a country's citizens may well lead them to be implemented. The process through which such implementation may occur is complex and highly country-specific, however, and the correlations across countries' institutions apparent in the data are clearly driven by unmeasured differences in their initial conditions and political dynamics.

In order to explore the specific role of credit conditions, we have run regressions where other institutions replace the LTV variable in all the interaction terms. The results suggest that the LTV's significance in our preferred regressions is not driven by spurious factors. For example, none of the interaction coefficients is significant if an indicator for employment protection replaces the LTV, and the results discussed above are less statistically significant and by far less robust if the LTV is replaced by the La Porta et al. (1998, Table 5, column 1) indicator of judicial efficiency. Employment-protection legislation and judicial efficiency are both correlated with LTV, if rather weakly, in ways that suggest that judicial efficiency may be an exogenous factor implying poor credit availability on the one hand, and a strong political tendency to protect workers from consumption volatility. If credit availability is indeed predetermined with respect to labor market institutions, our theoretical derivations suggest that individuals living in countries with inefficient credit markets may view labor market regulation as second-best substitute for better credit access. Cross-country data, however, are far from being rich enough to support specification and estimation of such channels of causation.

Other aspects of our theoretical approach can be brought to bear on survey evidence of individual policy preferences. Viewing both labor market policies and credit market efficiency as predetermined, the high-order interaction effect identified by Result 2 could potentially be tested on ISSP data and available policy indicators. Since more stringent EPL implies higher persistence of labor incomes (a lower p in our analytical derivations), the sign of interactions between an EPL indicator with income, age, and LTV in regressions similar to those reported above offers information as to the empirical validity of the third-derivative characterization in Result 2. Specifically, we would expect currently poor households to be more in favor of redistribution in markets where stringent EPL reduces prospects of upward mobility, and more strongly so if credit markets are less developed. This specification, like those discussed above, has methodological value added as a way to exploit within-country micro-data variation in order to obtain cross-country insights that may be more easily generalizable than the purely within-country information generated by "natural" policy experiments. When run on our data, however, it yields mixed sign patterns, and much lower levels of significance: available data, while offering robust support to Result 1, are unable to offer suitable information as to the subtler interactions characterized by Result 2.

4 Concluding remarks

Our analysis establishes that redistribution and labor market regulation appear theoretically and empirically more desirable when credit supply constraints are more binding. The micro-

data evidence suggests that the mechanism we emphasize in our simple model might play a role for aggregate policy choices. If financial market efficiency is viewed as exogenously predetermined, perhaps by the legal traditions emphasized by La Porta et al. (1998), any policy-choice mechanism that gives some weight to the views of would-be borrowers could straightforwardly explain why, as noted by the contributions reviewed in the Introduction, redistribution and labor market regulation are empirically more prevalent in the same countries where access to credit is limited. Formal modelling of the link between individual preferences and actually implemented policies, however, would require specific assumptions about the timing and politico-economic structure of policy choices, which could be viewed as the result of *ex ante* welfare maximization at a constitutional stage, or of complex politico-economic interactions between heterogeneous agents with conflicting interests.

The details of politico-economic mechanisms need not be constant across countries, periods, and policies: in the absence of detailed information about them, cross-country evidence cannot be used to test formally this suggestive insight. Our theoretical perspective and empirical results, however, suggest that structural and reform issues should be discussed in a broader context than is usually the case. Since increasing income insecurity makes it all the more painful for workers to lack access to consumption smoothing instruments, labor market deregulation does not improve the economy's ability to deliver welfare to its citizens unless accompanied by reforms aimed at easing borrowing constraints. Historical legacies can help empirical work to identify the empirical effects, but do not condemn countries to perpetually different systems of economic relations (see Rodrik et al., forthcoming). Thus, labor market institutions should be updated when an economy's credit markets develop: it is not surprising to witness heavy resistance to labor market liberalization in countries in which credit supply remains relatively constrained, such as Italy, while the United Kingdom's high level of financial market development may well have allowed that country to drastically reform its labor market in the 1980s (Koeniger, 2004).

Needless to say, additional work could flesh out our model's implications in more complex and realistic terms. The mechanisms through which redistribution or labor-income compression entail deadweight costs could be modelled explicitly, and need not be independent of the circumstances determining credit access: for example, if better developed financial markets make it easier for agents to elude taxation, then the efficiency costs of redistribution would be larger in the same economies that value its consumption-smoothing role less, strengthening the correlation implied by Result 1. Similarly, the particularly sharp limitation of credit access in our Assumption 1 could be relaxed to treat explicitly more sophisticated forms of financial market imperfections. It would then be possible to study the extent to which consumer

credit bureaus (in turn influenced by privacy and competition concerns) may improve credit opportunities, and to characterize how bankruptcy rules may make credit more difficult to obtain while at the same time offering some insurance against persistently bad labor market outcomes. Chatterjee et al. (2002) calibrate on U.S. data a general equilibrium model where consumers face labor income risk, and default opportunities limit their access to credit at the same time as they make it possible for them to obtain partial insurance. Cross-country analysis from this perspective is an interesting direction for further research, as these aspects offer additional reasons why economies with sophisticated credit markets, like the United States, may find a deregulated labor market appealing.

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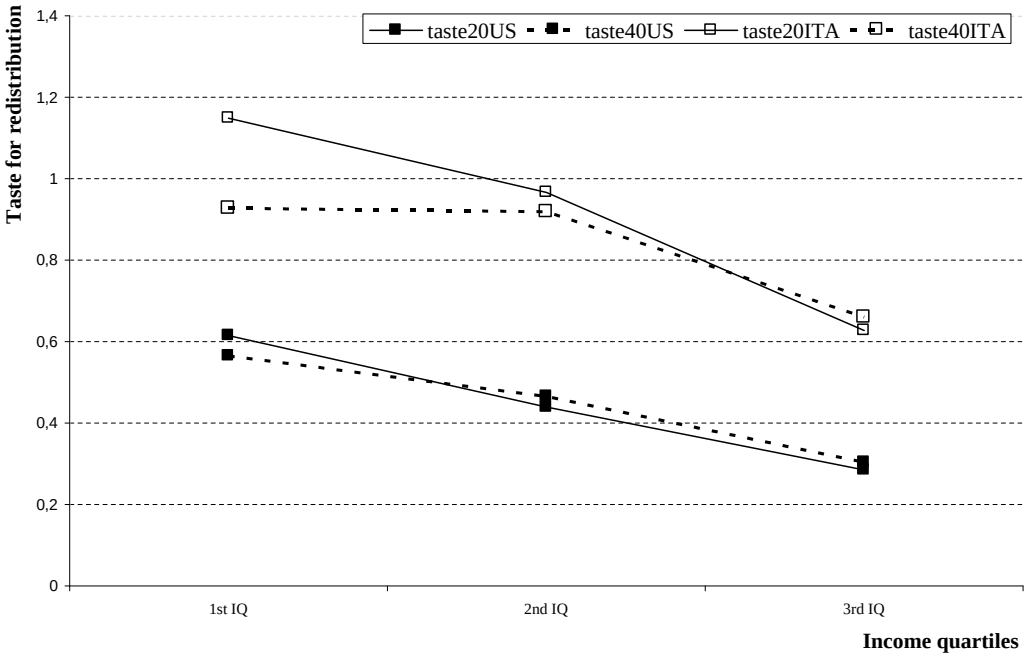

Figure 1: Predictions from the linear specification inclination to favor redistribution as a function of of respondents' income and age: evaluated at the LTV values observed in the US and Italy, and for 20 and 40 years of age, all other terms set to zero wthout loss of comparative generality.

Table 1: Descriptive statistics and definitions

	Mean	Std.Dev.	Min	Max	Definition
taste for redistribution	2.70	1.30	1	5	Opinion on "It is the responsibility of the government to reduce the differences in income between people with high incomes and those with low incomes." Agree strongly=5, Agree=4, Neither agree nor disagree=3, Disagree=4, Disagree strongly=1.
loan-to-value ratio (LTV)	81.16	9.57	56	95	Mortgage loan as % of house value, country average
age	43.51	14.04	16	94	Age of respondent in years
household income quartile (IQ):					*Within-country family income quartile*
first	0.23	0.42	0	1	
second	0.23	0.42	0	1	
third	0.29	0.45	0	1	
					Respondent's self-assessed social status:
middle class	0.56	0.50	0	1	lower middle class/middle class=1, zero otherwise
upper class	0.09	0.28	0	1	upper middle class/upper class=1, zero otherwise
sex	0.45	0.50	0	1	Respondent male= 0, female=1
married	0.67	0.47	0	1	married or living as married=1, zero otherwise
completed secondary school	0.55	0.50	0	1	Secondary school degree= 1, zero otherwise
completed university degree	0.15	0.36	0	1	University degree=1, zero otherwise
currently unemployed	0.02	0.15	0	1	Respondent unemployed=1, zero otherwise
spouse unemployed *	0.03	0.18	0	1	Spouse unemployed=1, zero otherwise
retired	0.08	0.27	0	1	Respondent retired=1, zero otherwise
disabled	0.01	0.11	0	1	Respondent disabled=1, zero otherwise
self employed	0.17	0.37	0	1	Respondent self-employed=1, zero otherwise
USA	0.11	0.31	0	1	
New Zealand	0.03	0.18	0	1	
Philippines	0.06	0.23	0	1	
Australia	0.14	0.34	0	1	
Canada	0.05	0.22	0	1	
Japan	0.05	0.22	0	1	
Great Britain	0.08	0.27	0	1	
Norway	0.07	0.26	0	1	
Germany	0.13	0.33	0	1	
Italy	0.05	0.22	0	1	
Ireland	0.08	0.27	0	1	
France	0.06	0.24	0	1	
Israel					
Spain					
Sweden	0.09	0.29	0	1	

* statistics reported for the 6,556 observations of married individuals. Overall sample size is 9,800.

Data are from the ISSP 1996 merged with the loan-to-value variable compiled by Jappelli and Pagano (1994). The countries present in both sources are Australia, Germany, Great Britain,United States, Italy, Ireland, Norway, Sweden, New Zealand, Canada, Philippines, Israel, Japan, Spain, France. The data from Israel do not contain information on party membership and household earnings. The data from Spain do not have information on marital status, employment of the spouse, party and class membership. The arithmetic mean of each household-quartile dummy does not equal .25 because the quartiles have been defined using all available observations for income within each country before dropping observations where some of the variables of interest are missing.

Table 2: Main estimates

	Dependent Variable: **"It is the responsibility of government to redistribute..."**							
	(5= agree strongly, ... 1= disagree strongly) **Ordered Probit**				(1= agree, 0= disagree) **Binary Probit**		(5= agree strongly, ... 1= disagree strongly) **Linear**	
	(1)		(2)		(3)		(4)	
	Coefficient	*p-value* [1]	*Coefficient*	*p-value* [1]	*Coefficient* *	*p-value* [1]	*Coefficient*	*p-value* [1]
loan-to-value ratio (LTV)	0.005	0.45						
Interactions of LTV with								
age / 1000	-0.416	0.04	-0.359	0.14	-0.204	0.00	-0.429	0.16
household income quartile (IQ), first	-0.022	0.09	-0.020	0.09	-0.012	0.00	-0.021	0.11
second	-0.025	0.00	-0.018	0.00	-0.012	0.00	-0.018	0.00
third	-0.012	0.34	-0.010	0.48	-0.004	0.44	-0.010	0.54
first IQ * age/1000	0.838	0.01	0.625	0.03	0.327	0.00	0.688	0.05
second IQ * age/1000	0.778	0.00	0.503	0.00	0.313	0.00	0.541	0.00
third IQ * age/1000	0.517	0.04	0.379	0.22	0.138	0.09	0.408	0.25
Controls								
age / 1000	34.495	0.03	31.995	0.11	17.894	0.00	38.189	0.13
first IQ	2.471	0.03	2.308	0.02	0.751	0.00	2.565	0.04
second IQ	2.497	0.00	1.904	0.00	0.727	0.00	2.032	0.00
third IQ	1.313	0.22	1.110	0.36	0.347	0.34	1.153	0.41
first IQ * age/1000	-73.590	0.01	-57.346	0.03	-28.814	0.00	-63.733	0.04
second IQ * age/1000	-65.048	0.00	-42.958	0.00	-26.060	0.00	-46.807	0.00
third IQ * age/1000	-43.262	0.04	-32.348	0.22	-11.024	0.10	-35.395	0.24
Other covariates [2]	Yes		Yes		Yes		Yes	
Country dummies	No		Yes		Yes		Yes	
Interactions of country dummies with other covariates	No		Yes		Yes		Yes	
9800 observations								
log.likelihood	-14,935		-14,539		-6,187			
R^2							0.15	

[1] p-values are computed on the basis of standard errors robust to country-level covariance clustering.

[2] The specifications also include: sex, married, married*spouse unemployed, currently unemployed, completed secondary school, completed university degree, retired, disabled, self employed, middle class, upper class.

* The coefficents displayed are marginal effects. For dummy variables these are effects of discrete changes from 0 to1.

Sources: Micro data from ISSP 1996; merged with available country-specific loan-to-value ratios from Jappelli and Pagano (1994). Spain and Israel excluded because of missing covariates.

Table 3: Robustness-test estimates

Ordered Probit Estimation *Dependent Variable:* **"It is the responsibility of government to redistribute..."**

(5= agree strongly to 1= disagree strongly)

	(1)		(2)			(3)		(4)	
	Coefficient	*p-value* [1]	*Coefficient*	*p-value* [1]		*Coefficient*	*p-value* [1]	*Coefficient*	*p-value* [1]
loan-to-value ratio (LTV)	-		0.012	0.12					
per-capita income/1000 (PPP-adjusted)	-		-0.054	0.00					
p5/p1 (ratio of median over first decile of wage dsitribution)	-		-0.337	0.00					
Interactions of LTV with					*Interactions of LTV with*				
age / 1000	-0.381	0.08	-0.480	0.01	**age / 1000**	0.112	0.70	0.562	0.04
household income quartile (IQ), first	-0.020	0.03	-0.025	0.03	**income/1000 (inc)**	0.012	0.35	0.016	0.00
second	-0.020	0.00	-0.023	0.00	**inc squared (inc2)**	-0.006	0.03	-0.001	0.05
third	-0.016	0.17	-0.014	0.24					
first IQ * age/1000	0.599	0.02	0.831	0.01	**inc * age/1000**	-0.002	0.13	-0.002	0.02
second IQ * age/1000	0.535	0.00	0.714	0.00	**inc2 * age/1000**	0.001	0.00	0.000	0.35
third IQ * age/1000	0.491	0.05	0.507	0.03					
Controls					*Controls*				
age / 1000	36.064	0.04	41.460	0.01	age / 1000	-8.724	0.71	-49.687	0.02
first IQ	2.339	0.00	2.823	0.01	inc	-1.243	0.24	-1.586	0.00
second IQ	2.086	0.00	2.432	0.00	inc2	0.453	0.03	0.129	0.03
third IQ	1.629	0.09	1.470	0.13					
first IQ * age/1000	-54.617	0.02	-74.288	0.01	inc * age/1000	15.525	0.10	15.018	0.01
second IQ * age/1000	-45.772	0.00	-61.170	0.00	inc2 * age/1000	-4.742	0.00	-0.903	0.30
third IQ * age/1000	-42.996	0.04	-43.587	0.03					
Other covariates [2]	Yes		Yes		*Other covariates* [2]	Yes		Yes	
Country dummies	Yes		No		*Country dummies*	Yes		Yes	
Interactions of country dummies					*Inter.country dummies*				
with other covariates	Yes		No		*w.other covariates*	Yes		Yes	
Observations	7883		9226			9409		9800	
log.likelihood	-11,614		-13,908		log.likelihood	-13,881		-14,534	

[1] p-values are computed on the basis of standard errors robust to country-level covariance clustering.

[2] The specifications also include: sex, married, married*spouse unemployed, currently unemployed, completed secondary school, completed university degree, retired, disabled, self employed, middle class, upper class. In estimation (1) also household size is included.

Sources: Micro data from ISSP 1996; merged with available country-specific loan-to-value ratios from Jappelli and Pagano (1994). Spain and Israel excluded because of missing covariates. The sample size differs depending on data availability of the respective variables.