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LIQUIDITY-CONSTRAINED HOUSEHOLDS IN AN ITALIAN CROSS-SECTION

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ABSTRACT

Liquidity-Constrained Households in an Italian Cross-Section*

This paper attempts to evaluate the effects of capital market imperfections on consumer behaviour, on the basis of cross-sectional Italian data. We evaluate the difference between desired and observed consumption using a technique proposed by Hayashi. We find that in Italy borrowing constraints are more severe than in the United States, and that they are more stringent for young households, non-home-owners, the unemployed and consumers living in the Southern regions.

JEL classification: 122, 315
Keywords: consumption, liquidity constraints, imperfect capital markets

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NON-TECHNICAL SUMMARY

In this paper we use cross-sectional Italian data to evaluate the effects of borrowing constraints on consumer behaviour. The analysis has two related but distinct purposes. *First*, we attempt to measure the empirical relevance of borrowing constraints in the Italian economy. *Second*, we analyse the characteristics of liquidity-constrained households. In both cases the technique employed consists in splitting the sample into low- and high-saving households and using only data relative to the latter group to estimate a reduced-form equation for desired consumption in the absence of liquidity constraints. The assumption is that high-saving households should not be liquidity-constrained. The 'gap' between desired and actual consumption is then used as a summary measure of the effects of liquidity constraints.

This methodology was proposed by Hayashi in his 1985 study. He pointed out that trying to use cross-sectional data to test for liquidity constraints by specifying an explicit optimal consumption rule, runs into a number of theoretical and empirical difficulties. The main one is that in the presence of credit rationing this rule cannot be derived in closed form. As an alternative, he suggested using a reduced form to approximate the desired consumption of households that are currently unconstrained but will be constrained in the future. The reduced-form equation for desired consumption is taken to be a linear-quadratic function of observable variables such as age, income, wealth and family size. Actual and desired consumption are equal for currently unconstrained consumers, whereas for liquidity-constrained consumers actual is less than desired consumption. Assuming that households can spend at most a proportion p of their disposable income on current consumption, one obtains a limited dependent variable model in which the dependent variable is equal to desired consumption for unconstrained households, and is p times disposable income for the constrained households. In other words, p times disposable income is the threshold value of desired consumption above which a household is supposed to be currently liquidity-constrained.

If some households are liquidity-constrained in the current period, estimating the model by the Tobit method produces consistent estimates, while ordinary least squares estimates are not consistent; but if no household is liquidity-constrained, both estimators are consistent, although OLS is more efficient.

We evaluate the stringency of borrowing constraints by calculating the gap between actual consumption and the predicted value of desired consumption from the Tobit estimates. This method gives us a way to quantify the impact of liquidity constraints on consumption, as well as to compare our results for Italian

households with those obtained by Hayashi for the United States. Another advantage of this method is that we can compute the gap between actual and desired consumption conditional on certain population characteristics, such as age, unemployment, home-ownership and regional location, and examine whether the gap — i.e. the impact of borrowing constraints — differs systematically according to these characteristics.

The data that we use are drawn from the survey prepared by the Bank of Italy in 1984. The survey has not so far been used extensively for econometric purposes, both because of the tendency on the part of Italian households to misreport income and wealth, and because it lacks information on important variables such as labour supply and wage rates, social security, financial wealth and attitudes towards credit and saving. Despite these shortcomings, the survey is a unique source of knowledge on the behaviour of Italian households. The 1984 survey contains information on consumption, income, wealth and a few demographic characteristics of 4,172 households. These were reduced to 2,515, trying to match the characteristics of our sample with those of the 1963-4 Survey of Financial Characteristics of Consumers analysed by Hayashi.

The interest of the comparison with Hayashi's results for the United States stems from the fact that in Italy the market for consumer loans is currently far less developed than in the United States. In this sense the present study extends to microeconomic data the approach used in CEPR Discussion Paper No. 244, where we reported evidence based on time-series data and on the characteristics of credit markets, in order to measure the relative importance of liquidity constraints in a number of countries. In the previous Discussion Paper we concluded that the excess sensitivity of consumption to current income fluctuations is higher in countries where credit market imperfections appear to be more pervasive. In particular, the evidence is consistent with the hypothesis that in Italy borrowing constraints are more severe than in the United States.

In this paper we investigate whether this macroeconomic conclusion is supported by microeconomic evidence on household behaviour. Again we find support for the idea that in Italy liquidity constraints significantly affect individual consumption and that they are more severe than in the United States. Computing the difference between the consumption/income ratio predicted by the Tobit estimates (0.884) and the actual mean of this ratio in the sample (0.786), the 'gap' between desired and actual consumption ratio is about 10%. Using the same threshold value (p=0.85) and almost the same list of regressors, Hayashi obtains a value of 3.4% for the United States on 1963-4 data. The discrepancy between the two estimates is consistent with other evidence on the different degree of development of consumer credit markets in the two countries. During the years 1980-5 in the United States, total consumer credit has averaged 22% of personal consumption expenditure, while it has only been 4.1% of

consumption in Italy. Even taking into account that Hayashi's microdata refer to 1963-4, the difference between the two markets is still conspicuous, since at that time consumer credit was 20.7% of personal consumption expenditure in the United States.

The second purpose of this paper is to study the characteristics of households that face borrowing constraints, in greater detail than has been done in the literature so far. Existing work has concentrated on the relationship between the age of consumers and the probability of being liquidity-constrained, and has found that in general it is younger households that tend to be rationed in credit markets. Here we extend the analysis to consider other individual characteristics that may enter the rules employed by banks to decide on the extension of consumer credit or mortgage loans, such as unemployment, home-ownership and regional location. The policy relevance of this analysis is clear. If liquidity constraints are more stringent for well defined groups of the population, the fiscal multipliers and the welfare merits of transfers aimed at these groups are likely to be substantial.

Indeed we find that households' characteristics significantly affect the magnitude of the estimated gap between actual and desired consumption. This gap is highest for households headed by people less than 30 years old, and lowest for those headed by people over 50. We interpret this finding as evidence that the young are more likely to be liquidity-constrained than the old, reflecting the higher weight of human capital in the total net worth of the young. There is also some evidence that differences in tastes reinforce the effect of liquidity constraints on the young, and conversely weaken it for the elderly. It is tempting to explain this result as arising from the lower thriftiness of the cohorts born after the Second World War. If this is correct, liquidity constraints impose a higher welfare loss on the young than on the rest of the population, not only because the young face tighter credit rationing, but also because in the sample they place a higher implicit value on current than on future consumption.

The consumption gap is also found to be particularly large for the unemployed and for non-home-owners. This accords with the notion that banks consider unemployment and lack of home-ownership as negative signals about the worthiness of their credit applicants. The welfare and policy implications of these results should not be under-rated. If being out of work significantly increases the probability of being denied credit to finance current consumption, involuntary unemployment entails more hardship than otherwise would be the case. Similarly, young households may be trapped in an uncomfortable situation. If they are denied a mortgage, they are prevented from buying a house and this in turn causes them to be denied other loans, to finance, for instance, current consumption.

Finally, the difference in the structure and characteristics of the Southern and Northern banking industry may explain why for Southern households the gap between desired and actual consumption is comparatively large. In the South banks are in fact characterized by a lower number of branches relative to the population, charge a considerably higher lending rate and face a higher risk of default. These features tend to make credit harder to obtain or more costly for Southern households.

Introduction

This paper is an attempt to evaluate the effects of capital market imperfections on consumer behavior on the basis of cross-sectional Italian data. So far the only studies on this topic based on household-level data have concerned the United States (Hall and Mishkin 1982, Kowalewski and Smith 1979, Hayashi 1985, Zeldes 1984, Altonji and Siow 1987) and Japan (Hayashi 1986).

The analysis aims at two related but distinct purposes. First, we want to measure the empirical magnitude of the phenomenon in the Italian economy, employing the same strategy used by Kowalesky and Smith (1979), Zeldes (1984) and Hayashi (1985), who analyze United States cross-sectional data dividing the sample into high and low-saving households. We draw from Hayashi's (1985) study the technique to evaluate the difference between desired and observed consumption and use his results for the United States to assess comparatively the stringency of liquidity constraints in the Italian economy.

In this sense the present study extends to microeconomic data the approach used in a companion paper (Jappelli and Pagano 1988) where we compare evidence based on time-series data and on the characteristics of credit markets to measure the comparative importance of liquidity constraints in a variety of countries. There we conclude that the excess sensitivity of consumption to current income fluctuations is higher in countries where credit market imperfections appear to be more pervasive. In particular, we find that in Italy borrowing constraints are much more severe than in the United States. Here we inquire if this conclusion is supported or contradicted by microeconomic evidence on household behavior. Although cross-sectional analyses of this type often suffer from measurement error in crucial variables (such as income and

consumption), they avoid the aggregation problems that plague the estimation of Euler equations on macroeconomic time series.

The second purpose of this paper is to study the characteristics of households that face borrowing constraints in greater detail than has been done in the literature so far. Existing work has concentrated on the relationship between the age of consumers and the probability of being liquidity-constrained, and has found that in general it is younger households that tend to be rationed in credit markets. Here we extend this analysis to other individual characteristics that are likely to enter the rules employed by banks to decide on the extension of consumer credit or mortgage loans, i.e. unemployment, home-ownership and regional location.

Unemployment holds substantial promise as an explanator of credit rationing, as shown so far in the context of time-series studies. Hamermesh (1982) finds substantial evidence of liquidity constraints among unemployment insurance recipients. Flavin (1985) estimates Euler equations for aggregate consumption and shows that, contrary to the permanent income hypothesis, consumption is significantly reduced by an increase in unemployment. Additional evidence in the same direction has been uncovered by Weber (1987) using U.K. aggregate data. The welfare and policy implications of this point are substantial. If being out of work significantly increases the probability of being denied credit to finance current consumption, involuntary unemployment may entail substantial more hardship than otherwise would be the case.

Homeownership may be a screening device used by banks to select among risky applicants and thus become a signal of credit worthiness, over and above the bank's estimate of the applicant's permanent income. This is because owning a

house may send a useful signal about past credit history, beside providing a collateral asset in new loans. If this is the case, young households may be trapped in a rather uncomfortable situation: if they cannot obtain a housing mortgage, they may be prevented from buying a house and this in turn may cause them to be denied other loans, to finance, for instance, current consumption.

The reason why we include regional location among the possible determinants of liquidity constraints is peculiar to the Italian economy. There is evidence that in the North of the country banks are more efficient and compete in larger numbers for the market than in the South, and also that the riskiness and the enforcement costs of loan contracts is higher in the South. Both factors may have adverse consequences for the consumer credit and mortgage markets, in the sense of making the stringency of liquidity constraints in the South more severe for potential borrowers.

The plan of the paper is as follows. In Section 1 we lay out the method and describe the data to be used in the estimation. In Section 2 we provide comparative evidence of the stringency of liquidity constraints in Italy using Hayashi's (1985) results for the United States as a benchmark. In Section 3, we analyze the characteristics of liquidity constrained households. Section 4 contains the conclusions and addresses some policy issues.

1. Estimation method and data set

The methodology adopted here has been proposed by Hayashi (1985). He points out that trying to use cross-sectional data to test for liquidity constraints by

specifying a closed-form optimal consumption rule explicitly runs into a number of theoretical and empirical difficulties. The main one is that in the presence of credit rationing this rule cannot be derived. As an alternative, he suggests a reduced-form approach to model desired consumption C^* for a consumer who maximizes utility subject to borrowing constraints in all future periods but not in the current one. The assumed reduced form is a linear function of observables X available in the cross-section, such as age, income, wealth, family size:

$$(1) \quad C^* = X'\beta + e, \qquad \text{with} \quad E(e|X) = 0$$

Since the reduced-form for desired consumption is assumed to be a linear-quadratic approximation to any consumption rule, the variables in X include also squares and interaction terms. Denoting by C^a actual consumption, for currently unconstrained consumers $C^a = C^*$, whereas for liquidity-constrained consumers $C^a < C^*$. Assuming that households can spend at least a proportion p of their disposable income Y on current consumption, we can define a limited dependent variable z that takes the value of desired consumption for unconstrained households, and the value pY for constrained ones:

$$(2) \quad z = \begin{cases} C^a = X'\beta + e, & \text{if } C^a = C^* = X'\beta + e < pY \\ pY, & \text{otherwise} \end{cases}$$

where p can be larger than one. In other words, pY is the threshold value of desired consumption above which a household is supposed to be currently liquidity constrained. The relationship (2) can be estimated by the Tobit method if the disturbance e is normal and homoskedastic. The model can easily accommodate measurement errors in actual consumption and disposable income.

If some households are liquidity-constrained in the current period, estimating (2) by Tobit produces consistent estimates, while estimating $C^a = X'\beta + e$ alone by OLS does not. If instead no household is liquidity-constrained, both estimators are consistent, although OLS is more efficient. Having obtained estimates of desired consumption, there are two ways of assessing the presence and the stringency of borrowing constraints.

The first approach is a Hausman specification test between the unrestricted Tobit estimates and the restricted OLS parameters. The former is consistent both under the permanent income hypothesis and under that of borrowing constraints, while the latter is consistent only under the permanent income hypothesis.

The second way of evaluating the stringency of borrowing constraints is to evaluate the gap between actual consumption and desired consumption, as estimated by Tobit. The latter method is more informal, but gives us a way to quantify the impact of liquidity constraints on consumption, as well as to compare our results for Italian households with those obtained by Hayashi for the United States. Another advantage of this method is that we can compute the gap between actual and desired consumption conditional on certain population characteristics, such as age, unemployment, homeownership and regional location, and check whether the gap -- i.e. the impact of borrowing constraints -- differs systematically according to these characteristics.

The data that we use are drawn from the survey prepared by the Bank of Italy in 1984 and described in Cannari and Gressani (1985). The survey has not been used extensively for econometric purposes so far[1], because of the tendency to misreport income and wealth on the part of Italian households, and because it lacks information in important areas, such as labor supply and wage rates, social security, attitudes towards credit and saving and financial wealth. Despite these shortcomings, the survey is a unique source of knowledge on the behavior of Italian households. We hope that this study will provide an incentive to future researchers to tap this resource.

The 1984 survey contains information on consumption, income, wealth and a few demographic characteristics of 4172 households. These were reduced to 2515, trying to match the characteristics of our sample with those of the 1963-4 Survey of Financial Characteristics of Consumers analyzed by Hayashi. Specifically, we have excluded observations if data on total family disposable income, wealth and consumption were missing. To face at least partly the problem of misreporting of income, we have also excluded from the sample households whose head is self-employed or a farmer. To reduce heteroskedasticity in consumption, we exclude the elderly (household whose head is over 65), households with net wealth greater than Lit. 500 million, those who report an annual income below Lit. 1 million, and those with a consumption-income ratio greater than 5. For the same purpose, all variables in equation (2) are divided by disposable income.

Income Y is defined as net total disposable income of the household, i.e. the sum of net labor income, transfers and net capital income (dividends, interest income and imputed rents on owner-occupied housing) of all components

of the family. Wealth is real wealth, inclusive of properties, business and other valuables net of debt contracted for their purchase. Unfortunately, the survey does not provide information on financial assets held by households.

Table 1 contains descriptive statistics for all the variable used in the estimation. In Columns 1 and 2 we report means and standard deviations for the entire sample. The same statistics are displayed in columns 3-4 for the subsample of low-saving families (C/Y > 0.85) and in column 5-6 for high-saving households (C/Y < 0.85). Households with relatively low propensity to save have a smaller wealth-income ratio (2.58 against 2.81) and are on average younger (11.4 percent are below 30 years old versus 8.8 percent in the high-saving group)[2]. They are also more likely to be headed by an unemployed worker (2.3 versus 0.6 percent) and less likely to live in the North (62.6 versus 68.8 percent). Finally, the proportion of households who do not own their house is higher in the low-saving group than in the other (53.2 versus 36.8 percent).

2. The effect of liquidity constraints on consumption

Our estimates are intended to throw light on two separate issues. The first issue, that is addressed in this section, is to assess the stringency of liquidity constraints in Italy relative to the United States. This comparison

Table 1

Sample means and standard deviations*

	Entire sample		Consumption-income ratio > 0.85		Consumption-income ratio < 0.85	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
	(1)	(2)	(3)	(4)	(5)	(6)
Consumption-income ratio (C/Y)	0.786	0.283	1.081	0.236	0.626	0.143
Wealth-income ratio (W/Y)	2.723	3.213	2.576	3.540	2.807	3.019
Family size (FS)	3.339	1.340	3.297	1.386	3.362	1.314
Age < 30	0.097	0.297	0.114	0.319	0.088	0.284
30 < Age < 40 (AGE35)	0.261	0.439	0.269	0.444	0.257	0.437
40 < Age < 50 (AGE45)	0.260	0.439	0.252	0.434	0.265	0.441
50 < Age < 65 (AGE58)	0.382	0.486	0.365	0.482	0.391	0.488
EDUCATION	3.031	1.091	3.195	1.040	2.942	1.109
UNEMPLOYED	0.012	0.110	0.023	0.149	0.006	0.051
REGION	0.666	0.472	0.626	0.484	0.688	0.464
Non-homeowner (NOHOME)	0.425	0.495	0.532	0.499	0.368	0.482
No. of obs.	2,515		882		1,633	

* The average disposable income Y is 21,513 thousand Lire.
Education, age, region, unemployed and non-homeowner are dummy variables. "Education" takes the value 1 for college degree, 2 for high school diploma, 3 for eight years of education, 4 for five years of education (primary school), 5 for people who do not complete primary school, 6 for no education. "Unemployed", "region" and "non-homeowner" take the value of 1 for households that are headed by an unemployed, live in the North and do not own a house, respectively.

is of interest because the Italian market for consumer credit is far less developed than its American counterpart, so that one should expect credit rationing to be relatively more severe. In the next section we shall characterize the households that are more likely to be liquidity constrained in greater detail than has been previously done. The purpose of the latter exercise is twofold. On one hand, knowledge of these characteristics helps to illuminate the nature of the criteria presumably used by financial intermediaries to ration credit to consumers. On the other, it may provide useful guidelines for policy intervention.

Table 2 displays the estimates of the equation for desired consumption C^* under the assumption of no liquidity constraints (OLS) and under the alternative assumption that at least some households might be liquidity constrained. The threshold value used in the sample separation rule of equation (2) is set at 0.85 in the Tobit estimation (see below for the sensitivity of our results to the choice of p).

The regressors in columns 1 to 4 of Table 2 include disposable income, wealth, family size, education and dummies for age and homeownership as well as interaction terms. The OLS and Tobit coefficient estimates differ considerably. A formal way of evaluating the distance between the two estimators is a Hausman specification test, as explained in Section 1. In this case the test rejects overwhelmingly the null hypothesis of no liquidity constraints, as indicated in the table. The rejection suggests that the behavior of the households above the

Table 2

Estimates for the reduced form for desired consumption

	OLS estimates		Tobit estimates*		OLS estimates		Tobit estimates*	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I/Y	2389	4.5	4501	4.7	2000	4.8	4478	6.5
W/Y	-0.012	-1.9	-0.017	-1.8	0.0031	1.7	0.0051	1.9
Y	-0.51E-5	-8.4	-0.183	-1.8	-0.52E-5	-9.1	-0.35E-5	-4.0
NOHOME/Y	480.5	2.4	872.2	2.8	638.8	3.8	1151.3	4.3
FS/Y	577.5	6.0	1764.1	8.9	548.1	9.7	1128.1	11.3
EDUCATION/Y	-420.1	-5.5	-688.8	-5.6	-372.5	-4.8	-650.3	-5.2
AGE35/Y	-621.5	-1.3	-2135.7	-2.3	-153.3	-0.6	-491.8	-1.2
AGE45/Y	568.9	1.2	10.29	0.1	61.2	0.2	-186.1	-0.4
AGE58/Y	-410.9	-1.0	-1299.4	-1.5	-375.8	-1.6	-608.2	-1.5
W^2/Y	0.16E-7	1.2	0.20E-7	1.0				
AGE35*W/Y	-0.0073	-1.2	-0.0074	-0.8				
AGE45*W/Y	-0.0046	-0.7	-0.0052	-0.6				
AGE58*W/Y	0.0051	1.0	0.0073	1.0				
FS*W/Y	0.0037	3.0	0.0050	2.7				
AGE35	0.054	1.4	0.14	2.2				
AGE45	-0.019	-0.5	0.03	0.5				
AGE58	-0.0062	-0.2	0.052	0.9				
FS	-0.015	-1.9	-0.064	-5.0				
REGION/Y					261.2	1.8	518.9	2.2
UNEMPLOYED/Y					588.5	1.5	1477.8	1.7
CONSTANT	0.757	19.4	0.63	9.5	0.717	30.1	0.55	12.9
Adj. R^2	0.280				0.276			
SE	0.240		0.321		0.241		0.323	
Predicted C/Y	**0.786**		**0.884**		**0.786**		**0.882**	

* The average disposable income Y is 21,513 thousand Lire.
The threshold parameter p used in the Tobit regression is set at 0.85. The Hausman test statistic is 38031.28, to be compared with the 1 percent theoretical value of a chi-squared with 19 degrees of freedom of 38.6.

threshold p is significantly different from that of the rest of the sample. Since it is reasonable to think that most liquidity constrained households are above the threshold, the rejection can be interpreted naturally as stemming from the constraints faced by these households.

A more intuitive way of assessing the effect of liquidity constraints on consumption is to compute the difference between the consumption-income ratio predicted by Tobit (0.884) and the actual mean of this ratio in the sample (0.786). According to these estimates, the "gap" between desired and actual consumption ratio is about 10 percent. Using the same threshold value (p=0.85) and almost the same list of regressors, Hayashi (1985) obtains a value of 3.4 percent for the United States on 1963-4 data[3]. The discrepancy between the two estimates accords with the idea that in Italy consumer credit is harder to obtain than in the United States. As a matter of fact the size of the market for consumer credit differs widely across the two countries. From 1980 to 1985 in the United States total consumer credit averages 22 percent of personal consumption expenditure, while it is only 4.1 percent of consumption in Italy. Even if one takes into account that Hayashi's microdata refer to 1963-4, the difference between the two markets is conspicuous. In those two years total consumer credit averaged 20.7 percent of personal consumption expenditure in the United States.

In the other two regressions reported in Table 2 we drop the interaction terms and add two dummies, one for regional location and one for unemployment. It appears that the fit of the OLS and Tobit estimates, as well as the gap between desired and actual consumption, is practically unaffected.

One may wonder how sensitive the results are to the choice of the threshold parameter p. As a matter of fact, the choice of p is a balancing act between gain of consistency and loss of efficiency. The threshold should be low enough as to ensure that all the constrained households are excluded from the estimation of the consumption rule for the unconstrained. However, lowering p entails loosing observations in the estimate for desired consumption. In Table 3 we perform a sensitivity analysis on the value of the threshold parameter p, letting it vary from 0.6 to 1.2. As p increases, the consumption gap, reported in column 4, obviously decreases. Nevertheless, it is still higher than the gap estimated for the United States data until p reaches the value of 1.0. It should also be noted that, qualitatively, none of the results reported below is affected by the choice of p.

3. The characteristics of liquidity constrained households

We now turn to the second issue of this paper, namely to evaluating how households' characteristics -- age, unemployment, homeownership and regional location -- affect the magnitude of the gap between desired and actual consumption[4]. Each of these variables may affect this gap in two different ways. First, they may enter the consumption rule of each household, especially by capturing individual tastes, and on this account should be added to the list

Table 3

Sensitivity of the Tobit regression to the choice of the threshold parameter p of equation (3)

Limit (p)	Number of limit observations	Mean of predicted desired consumption-income ratio, $E(C^*/Y)$	Gap between desired and actual* mean consumption-income ratio, $E(C^*/Y)-E(C/Y)$
(1)	(2)	(3)	(4)
0.60	1,830	1.290	0.504
0.65	1,655	1.171	0.385
0.70	1,481	1.072	0.286
0.75	1,287	0.990	0.204
0.80	1,087	0.930	0.144
0.85	882	0.882	0.096
0.90	713	0.853	0.067
0.95	583	0.833	0.047
1.00	446	0.817	0.031
1.05	356	0.808	0.022
1.10	282	0.801	0.015
1.15	231	0.797	0.011
1.20	192	0.794	0.008
OLS	0	0.786	0.000

* The actual mean consumption-income ratio is 0.786, that obviously coincides with the mean ratio predicted by OLS.

of regressors in the Tobit estimation. Second, they may act as screening devices for financial intermediaries in the extension of credit to households. For this reason, these variables can be used also to partition the sample in order to compute the gap between desired and actual consumption for different groups of the population.

Further, there are two ways of computing these gaps. For concreteness, suppose that one wants to evaluate whether the consumption gap is larger for households that live in the North than for those living in the South. The first method is to compute the gap for the two groups using the Tobit parameter estimates for the entire sample, namely the coefficients listed in column (7) of Table 2. Another method is to employ parameter estimates obtained from separate Tobit regressions on the samples of Northern and Southern households.

In practice, these two measures differ in the way that one controls for the preferences of Northern and Southern households. With the first method one employs the same coefficient vector to compute desired consumption. Thus, the assumption is that Southern and Northern households obey to the same consumption rule, and that the gap results only from differences in the values of the explanatory variables. With the second method, instead, one allows both for differences in the consumption rule and for differences in the value of the regressors. For brevity, we refer to the first measure of the gap as G_P and to the second as G_T (where the subscripts P and T stand for "partial" and "total"). Defining

x_i = the mean vector of the matrix of regressors of subsample i,

μ_i = the mean of the actual consumption-income ratio in subsample i,

b = the coefficient vector estimated on the entire sample,

b_i = the coefficient vector estimated on subsample i,

G_T can be expressed as the sum of G_P and a term reflecting the difference between the consumption rule of group i and that of the population:

$$(3) \quad G_T = x_i'b_i - \mu_i = (x_i'b - \mu_i) + x_i'(b_i - b) = G_P + x_i'(b_i - b).$$

In Table 4 we report both measures of the gap. Column (1) reports the subsample means μ_i, column (2) an estimate of desired consumption $x_i'b$ and column (3) the difference between the two, i.e. G_P. In column (4) and (5) we report the number of observations used to estimate the subsample Tobit regressions and the limit observations, respectively. Column (7) is instead G_T, i.e. the difference between the subsample Tobit estimate of desired consumption $x_i'b_i$ in column (6) and the sample means of column (1).

The first four rows of the table show how age interacts with liquidity constraints. The gap G_P in column (3) is highest for households headed by people below 30 years old, and lowest for those headed by people above 50. Since this measure is computed holding the consumption rule (and thus preferences) constant, we interpret it as evidence that the young are comparatively more likely to be liquidity constrained than the old, probably a

Table 4

The effect of age, unemployment, homeownership and regional location on the gap between desired and actual consumption

	Entire Sample Estimates*			Sub-Sample Estimates*			
	$E(C/Y) = \mu_i$	$E(C^*/Y) = x_i'b$	$G_P = x_i'b-\mu_i$	Number of obs.	Limit obs.	$E(C^*/Y) = x_i'b_i$	$G_T = x_i'b_i-\mu_i$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Age < 30	0.839	0.970	0.131	245	101	1.002	0.163
30 < Age < 40	0.806	0.894	0.088	656	237	0.910	0.104
40 < Age < 50	0.785	0.892	0.107	654	222	0.883	0.098
50 < Age < 65	0.758	0.844	0.086	960	322	0.837	0.079
Employed	0.783	0.876	0.093	2,484	862	0.876	0.093
Unemployed	1.028	1.326	0.298	31	20	1.459	0.431
Homeowners	0.742	0.817	0.075	1,445	413	0.802	0.060
Non-homeowners	0.845	0.973	0.128	1,070	469	1.002	0.157
North	0.766	0.841	0.075	1,675	552	0.846	0.080
South	0.824	0.963	0.139	840	330	0.956	0.132
All	0.786	0.882	0.096	2,515	882	0.882	0.096

* Columns (1), (2) and (3) make use of the coefficients of the Tobit regression estimated on the entire sample (2,515 observations). Columns (6) and (7) employ the coefficients of the Tobit regression estimated only on the relevant sub-sample. In all regressions the threshold parameter p is kept fixed at 0.85.

reflection of the higher weight of human capital in their total net worth. The gap G_T in column (7), that allows also for different preferences of the young relative to the old, shows that differences in tastes reinforce the effect of liquidity constraints on the young, and conversely weaken it for the old. It is tempting to intepret the difference between G_T and G_P as arising from the lower thriftiness of the cohorts born after the second world war. If this is correct, the welfare loss imposed on the young by liquidity constraints is not only higher because they face tighter credit rationing, but also because in the sample young cohorts attribute a higher shadow value to current relative to future consumption.

The positive interaction between unemployment and the consumption gap accords with the notion that banks consider unemployment as a negative signal about the credit-worthiness of the household. Scanning column (3), it appears that G_P is about three times larger for the unemployed than for the employed. The estimates of G_T in column (7) are quite unreliable given the paucity of the non-limit observations used to estimate the coefficients on the subsample of the unemployed. The reason why there are so few observations for the unemployed in the data set is that we restrict the definition of "unemployed" only to those households whose head is actually out of work and actively looking for a job. In principle, since we are treating the household as the decision unit, we should pay attention to unemployed members of the family beside the head of the household. However, data on umemployment concerning other members of the household are well known to be extremely unreliable in Italian surveys. Very often, when questioned on unemployment, housewifes and younger family members who hold precarious jobs in the black economy describe themselves as unemployed,

because they are searching for stable employment entitling them to insurance and welfare benefits.

Just as holding a stable employment position, owning a house appears to provide a distinct signal of credit-worthiness to financial intermediaries. The measure G_P for the group of non-homeowners is in fact substantially higher than for homeowners. The fact that for the non-homeowners the total gap measure G_T is higher than G_P indicates that for them preferences reinforce the effect of liquidity constraints. This is most likely to be the result of the interaction of homeownership with cohort effects. Indeed, the proportion of young households is much higher among non-homeowners (47.2 percent below 40 years old) than among homeowners (27.3 percent in the same age bracket).

At the bottom of Table 4 we report the estimates of G_P and G_T for the subsamples of households living in the North and in the South. The G_P index for the South is almost twice as high as that for the North. The difference in the structure and characteristics of the Southern and Northern banking industry may be at the root of the difference between the estimated gaps. In the South the industry is characterized by a lower number of branches relative to the population, a considerably higher lending rate, and by a higher risk of default[5]. All these features operate in the direction of making credit harder to come or more costly for Southern households. Finally, since the gap as measured by G_T in column (7) is almost identical to that measured by G_P, it appears that the consumption rule of Southern households does not differ appreciably from that of Northern households.

4. Conclusions

The major findings of this paper can be summarized as follows. Using a cross-section of Italian households, we have found that:

(i) liquidity constraints significantly affect individual consumption;

(ii) in Italy borrowing constraints are more severe than in the United States, thus lending support to the conclusions of previous research (Jappelli and Pagano 1988) based on aggregate data and institutional comparison for several countries;

(iii) borrowing constraints are more stringent for young households, non-homeowners, unemployed and consumers living in the Southern regions, suggesting that the fiscal multipliers -- and possibly also the welfare merits -- of transfers aimed at these groups of the population are likely to be substantial.

Footnotes

[1] An exception is Brugiavini (1987), who tests the hypothesis that the wealth-income ratio declines after retirement on this data set.

[2] The entries for the age variable in Table 1 indicate the proportion of households headed by individuals less than 30 years old, between 30 and 40, between 40 and 50 and between 50 and 65. The Survey tape provides in fact information on age only for these wide age brackets.

[3] See Table VII, p. 204. Hayashi's estimate of the desired consumption ratio is 0.984, to be compared with an actual value of 0.950. The list of regressors that we use here differs from his only in that we do not include liquid assets, that are not available in the survey we use.

[4] In a general equilibrium framework homeownership and unemployment may be modelled better as choice variables. In our analysis, that can be regarded as a partial equilibrium one, these variables are assumed to be exogenous to the decision problem faced by households.

[5] In 1985 there were 153 branches per million inhabitants in the South versus a comparable figure of 274 in the North. In the same year the difference between the lending rate to firms in the South and in the North has been 2.4 percentage points. This accords with the very few data that we possess on interest charged on personal consumer loans by banks in the two regions. In 1986 the rate charged by Banco di Napoli was about 2 percentage points higher than that charged by the Cassa di Risparmio di Torino (a Northern bank) for 12 months personal loans. There is also evidence that Southern banks operate in a riskier environment. According to data reported in the Annual Report of the Bank of Italy, in 1985 the percentage of loans classified as defaulted was 10 percent in the South and only 6 percent in the North.

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