The Measurement of Household Liabilities: Conceptual Issues and Practice

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Abstract

Observed differences in the incidence of household debt between countries makes the possibility of differences in household and supplier debt behaviour an intriguing empirical question. A large number of theoretical concepts concerning household debt have been raised including the demand, and supply of debt, credit constraints, search behaviour by households and adverse selection. A comparison of ten national surveys from a range of countries which spans the high incidence though to the low incidence of debt economies shows that due to very great differences in the data collected comparable research between countries is difficult and in many cases impossible. A list of additional variable which could be usefully collected by all of the surveys is suggested.

1. Introduction

Evidence shows that there are significant differences between countries in the volume of household debt outstanding, in debt as a proportion of GDP and in the proportion of households which hold it. Broadly speaking we can distinguish between North America and the UK, with relatively high levels of debt compared to disposable income, northern mainland European countries (for example France, Germany, and Sweden) with intermediate levels of debt, and southern European countries, for example Italy, with the lowest levels of debt (Crook 2005). This leads to the question as to whether these differences in debt incidence are reflected in different household behaviour with regard to debt. Recent theoretical microeconomic issues which have concerned economists have included the demand and supply of debt, credit constraints, adverse selection and moral hazard, searching for credit terms and default behaviour. In this paper we review a selection of the available national surveys which may be, or have been, used to test hypotheses relating to these issues. Our aim is to see whether data is available from national surveys to enable comparable studies in

different countries to be undertaken and, if not, what additional data might be required to be collected by these surveys to shed light on these issues.

First we briefly review some of the theoretical issues. Second, we review the comparability of data which is collected in ten national surveys and relate the availability to the economic concepts. The final section concludes. It should be said at the outset that there a number of surveys which have not been included here, either because of a binding time constraint or because of difficulty in gaining information. This is no reflection on the comprehensive nature of their data collection.

2. Theoretical Concepts

Demand and Supply

The most influential model of the demand for household credit is the PIH (Friedman 1957). A household wishes to maximise its expected lifetime utility subject to an intertemporal budget constraint. This can be represented as follows:

$$\text{Max} \sum_{j=0}^{\infty} \beta^j u\left(c_{t+j}, z_{t+j}\right) \qquad (1)$$
$$s.t.\ \ A_{t+1} = \left(1 + r_{t+1}\right)\left(A_t + y_t - c_t\right)$$

where E_t demotes expectations conditional on information at time t, c_t is consumption at time t, z_t denotes variables that affect the household's marginal utility at time t (for example household size), y_t is labour income at time t, r_t is the interest rate, A_t is assets and β is the household's discount factor. If we assume that the interest rate is constant and equal to the discount rate and that the utility function is quadratic, we can derive an equation to explain consumption:

$$c_t = aA_t + a\sum_{j=0}^{\infty}(1+r)^{-j} E_t(y_{t+j}) \qquad (2)$$

where *a* is the annuity factor. This shows that current consumption depends on the annuity values of expected future income, that is permanent income. From this we can derive an expression relating saving or borrowing to expected changes in labour income:

$$s_t = -\sum_{j=0}^{\infty} (1+r)^{-j} E_t (y_{t+j} - y_{t+j-1}) \qquad (3)$$

When, at time *t*, the present value of expected changes in income is positive, the household will run down its assets and may borrow to repay in future years when income is predicted to exceed permanent income.

This can be represented in the familiar life cycle diagram of the household in which consumption is constant over the household's lifetime (assuming z is constant) with the household borrowing to finance consumption in its early stages – in the expectation that income will rise – and then repaying these debts in later stages – when income is expected to fall.

The analysis so far is of a household borrowing to finance current consumption. But if a good to be bought is consumed over several years, that is it is a durable, then more borrowing may occur in early periods than is indicated by equation (3) which assumes that goods and services are consumed in one period only. Secondly, a household may wish to invest in its human capital to increase its future income. So borrowing would be higher because increases in income are expected (equation 3), the education must be paid for and because labour income will be lower whilst the education is received.

To empirically model the demand for household credit we therefore need data on credit to finance consumption, to finance the purchase of durables and to finance education. In the next section we examine the inter-country availability of such data.

The estimation of cross sectional demand for debt functions is made difficult by the fact that for some households we cannot observe this amount because some

households are credit constrained. Theory predicts we can write the demand for debt, $D^d{}_t$, as:

$$D_t^d = c_t - y_t - kA_t \tag{4}$$

Suppose we represent the empirical model corresponding to (2) as (dropping the t subscript for convenience and where *i* denotes household *i*)

$$D_i^d = f^d(x_i^d) + \varepsilon_{1i} \tag{5}$$

and the supply function as

$$D_i^s = f(x_i^s) + \varepsilon_{2i} \tag{6}$$

and so the observed volume of credit as

$$D_i = f^d(x_i^d) - \pi_i(f^d(x_i^d) - f^s(x_i^s)) + \varepsilon_{3i} \tag{7}$$

If a household is credit constrained then $\pi_i = 1$, otherwise $\pi_i = 0$. There are essentially two ways of parameterising (7). One is to gain values of π_i from survey data (Cox and Jappelli (1993), Duca and Rosenthal (1993), Crook (2001)); the other is to estimate (3) and (4) as a simultaneous disequilibrium or switching equation (Garcia (1997), Grant (2003)). To pursue the former, information on whether a household is credit constrained is required since one cannot observe a household's *ex ante* demand if it is credit constrained. To pursue the latter, identifying restrictions are required. In the past this has sometimes proved problematic.

Few cross-sectional supply of debt functions have been estimated, although the estimation of (7) using the above methodology has been accomplished.

A rapidly growing area of interest, both to practitioners and to economists, is the prediction of the probability that a household will default on debt obligations (Greene (1998), Boyes et al (1989), Crook et al (2003), Avery et al (2004)). Virtually all credit

lending institutions use credit scoring models which are proprietary, using what economists call "administrative data". These models are entirely predictive rather than explanatory or based on economic theory. Models built using applicant data from an individual bank may not be representative of the population of all households because each bank may attract a particular segmental group of applicants or customers due to its advertising and reputation. However generic models using credit bureau data, pooled across institutions, may be more representative. Administrative data relating to variables collected by the institution (such as repayment behaviour or debt outstanding) will be more accurate than recalled data by a survey respondent. But household demographic and economic data may not be more accurate in administrative data, especially when an applicant may believe there is benefit in supplying biased information.

If we wish to use data which is not restricted to a specific institution and which includes a wide range of covariates with the aim of explaining default probabilities, then we need to use nationally representative survey data or credit bureau data. In this context we need a definition of default. Many possibilities arise: missed n successive payments in a year, missed n scheduled payments (not necessarily in succession) in a year, become n scheduled payments in arrears in a year, or arrears reach percent of oustandings within a year and so on. Kelly (1998) considers a very large number of alternative definitions.

Credit constraints

Many definitions of credit constraints are possible (Crook 2005). A commonly accepted theoretical definition was proposed by Hayashi (1987). A household is credit constrained if either (i) it is unable to borrow beyond a certain limit or (ii) the household faces a borrowing rate which differs from the lending rate. Essentially the budget set is kinked.

Credit constraints are economically significant for many reasons. The PIH assumes a household can borrow or lend all it wishes at a single interest rate. Much evidence suggests that instead of a household's current consumption being constant over time, in fact it varies with current income by more than the change in permanent income

that a change in current income may yield. One possible explanation for this excess sensitivity is that the household faces credit constraints since binding credit constraints would make the marginal propensity to consume out of current income higher than in their absence. This has implications for the effectiveness of taxation policy and the effects of other shocks to disposable income. Jappelli and Pagano (1994) show how credit constraints can increase the steady state aggregate saving rate. Credit constraints also have implications for social welfare (Imrohorglu 1989) and the welfare implications of tax cuts (Hubbard and Judd 1986) and may be of interest from an equity perspective.

Credit constraints are also important empirically in the sense that some hypotheses can be tested and some empirical functions can be parameterised only if those households who are credit constrained can be identified. Thus many empirical tests of the PIH partition the data into those households who are believed to be constrained and those who are not. The first approach to the estimation of demand for credit functions relies on the identification of constrained households to avoid sample selection bias.

3. Survey Data

Tables 1 to 4 summarise the characteristics of ten surveys which aim to be representative of certain characteristics of national populations and which contain information on stocks of different types of credit. This is not an exhaustive survey, but it includes surveys from the largest countries where such surveys are carried out.

3.1.1 General Survey Characteristics

Table 1 shows that the unit of observation *for variables relating to debt* is in most cases the 'household', though this is not always defined. So the SHIW, HILDA, SIHC, HUS and BHP's questionnaires specify the 'household' whereas the PSID and SFS collect data for the 'family'. Presumably the difference is that a household may contain individuals who are not related by birth, marriage/partnership or economic dependence on the head. The SCF is explicit in collecting data for the primary economic unit defined as 'an individual or couple and others who are financially

dependent on them'. Questions relating to the volumes of debt relate to the 'family'. In contrast debt outstanding is collected at the level of the individual in the GSOEP, though it can obviously be aggregated to the household. But those which do not collect data at the individual level cannot disaggregate it to individuals.

The surveys differ considerably in sample sizes and in the proportion of the population surveyed. In some cases some groups are oversampled: for example the SCF oversamples high wealth households drawn from tax files, but from 1989 onwards these households cannot be identified. However the inclusion of sampling weights, which indicate the number of households which each observation represents, allows unbiased estimates of means and proportions from the raw data. Such weights are included in all of the surveys. In some cases, for example the SCF, the weights also take account of non-response.

Different disciplines adopt a different position on whether or not the sampling weights should be used in cross-sectional regressions. In principle, the use of weights will increase the efficiency of parameter estimates although non-standard methods must be used to estimate standard errors of the estimates. Typical methods include the use of Huber's sandwich estimator and bootstrapping.

A further difficulty with surveys which include multistage area probability sampling with clustering, for example the SCF, is that unless the survey indicates which cases are a member of each cluster, the use of for example Huber standard errors are only approximations. Currently neither the SCF nor any of the other surveys include this information, usually because of potential breaches of confidentiality undertakings.

Issues concerning how weights are to be estimated, especially when the data contains panels, are left to other discussions.

Many of the surveys: PSID, GSOEP, SHIW, HILDA, HUS, BHP contain panels, but the SCF contains only a very small panel element (1479 cases) and then only for 1983-89, and the SFS, SHIC and NSIFE do not contain panel data at all. Moreover the duration of inclusion of a household within those studies which do contain panel elements is often only a few waves. For example Magri (2002) reports that the panel

component in the SHIW is: 45% of the 1998 sample was interviewed in 1995, 45% of the 1995 sample was interviewed in 1993, 43% of the 1993 sample was interviewed in 1991, 27% of 1991 in 1989. Of course these re-interviews do not contain exactly the same households.

In answering questions related to debt, panel data is especially useful for several reasons. First the PIH shows that borrowing changes 1 for 1 with current income when current income is below permanent income. An empirical demand for debt function should therefore include a measure of permanent income. Studies which have used survey data without a panel element (e.g. Cox and Jappelli who used the 1983 SCF) have often followed the King and Dicks-Mureaux (1981) method to estimate permanent income. Thus permanent income is estimated as a weighted average of the difference between current earnings and that due to age, and on the other hand, an amount which is determined by household characteristics like education. However with panel data the income of an individual household can be traced over several years and permanent income estimated more accurately. Second, panel data would obviously allow the researcher to account for household specific effects.

A further aspect of the samples is their frequency. This differs considerably and ranges from annually (BHP, HILDA and GSOEP) to occasionally and irregularly (SFS). Clearly a more frequently sampled panel will yield more useful information than one sampled less frequently since one would expect lower attrition and obviously more data points. However some surveys have changed their sample significantly between certain waves. For example the PSID core sample included a Latino sample in 1990 but replaced this by an immigrant sample in 1997.

3.1.2 Classifications of Debt Information

Perhaps the most useful aspect of household debt is current debt outstanding. The estimates of debt outstanding differ in many ways between the surveys. Table 2 is an attempt to use three different classifications which can be applied consistently across many of the surveys. As can be seen none of these classifications does yield comparable figures across countries. If we classify into three very aggregated categories: mortgages, credit cards and others, Table 2a shows that even this is not

consistently possible in all cases. Thus debt outstanding on credit cards is not separable in the PSID, SHIW, GSOEP, SFS, HUS or NSFIE, It is separately identifiable only in the SCF and SFS. In most cases mortgage loans to buy property are identified but in the PSID and SFS only mortgage loans to be used on any type of good are estimated.

Some surveys do not include an estimate of all household debt from all types of lenders. The SIHC includes only loans to buy, or which are secured on property, as does the BHP. The GSOEP excludes individual loans which are less than €2.5k.

If we classify loans by type of security, again even a high level of aggregation does not provide a universally applicable classification across all countries. Loans secured on the home can be used for many purposes (the SCF investigates this), but loans secured on vehicles tend not to be used for other purposes. The SHIW, GSOEP, SFS, BHP and NSFIE do not allow this classification at all. The PSID does not distinguish between loans secured on vehicles and unsecured loans and the SIHC and HUS aggregate loans secured on vehicles and those secured on the home.

Finally Table 2c attempts a classification based on the type of good or service for which a loan was used. Again several studies are not suited to this. All categories can be identified within the SCF, but we can only identify loans to buy property, vehicles and other goods and services in the case of the PSID; the SHIW does not identify loans for home improvement, and the GSOEP only distinguishes between loans to buy property and loans for other purposes. The desired level of borrowing implied by the PIH relates strictly to consumer expenditure and so it is unfortunate that only the SCF, and SHIW identify these types of debts.

The PIH has been amended to incorporate the consumption of durables in two ways. In one approach (Alessi, Devereux and Weber (1997), Brugiavini and Weber (1994), Chah et al (1995)) the household's utility function is amended to include the stock of durables as an argument. In a second approach, the (S*,s*) models, the household purchases a durable if its stock falls below a target level (Dar-Ilan and Blinder (1987), Grossman and Laraque (1990)). Whilst the parameters of (S*, s*) models have been

empirically estimated, no study has yet used these concepts to empirically model the demand for household debt.

3.1.3 Information on Specific Types of Debt

Table 3 uses the classification of the most comprehensive surveys, the SCF, to show the type of information available for each type of loan. The most comprehensive amount of data is collected for mortgages (Table 3a). The SCF and PSID distinguish between mortgages, loan contracts and equity loans on the principle residence, whereas the other surveys collect variously, loans for purchase of dwellings (SHIW), or all loans secured on the house (HUS) and other variants.

All of the studies give the amount of mortgage debt currently outstanding, though in some cases, for example the SHIW, the figure is strictly loans for the purchase of property, whether a mortgage or a loan of some other form from a financial institution. However, as Bertola and Hochguertel (2005) argue, even current debt outstanding does not indicate the true future debt obligation of a debtor since it ignores the financial charges which the debtor is obligated to pay. None of the surveys considered in this paper seek direct information on debt outstanding *including subsequent finance charges*. In fact, if the interest rate is variable it is impossible to know what this future obligation is. Of course some debtors may form an expected value of this amount, but this expected value is not collected. There is more chance that if the interest rate is fixed the debtor would know what the future interest payments would be since he/she would be used to making fixed regular payments in the past. But for mortgages only the SCF, and SHIW tell us whether the rate is fixed or variable.

In fact one cannot calculate the original debt obligation when the mortgage was taken out in many surveys, for example the SCF, without making some very strong assumptions, because the original amount borrowed is not collected. (Though in the SCF the original interest rate is). Even if this could be calculated, it may not be well explained by the *current* demographics or economic characteristics of a household (the characteristics which are collected) since the loan could be many years old. In the

panel datasets one may be able to trace the original value of a mortgage provided it was taken out within the period covered by the panel.

Theory implies that the demand and supply of debt functions contain an interest rate, which, given risk based pricing by lenders and information asymmetries, may differ between households. But only the SCF, SHIW and HUS record information on mortgage interest rates actually paid, and then it is the current rate not the rate when the loan was originally taken out. Still, a household can change mortgage suppliers (albeit with transactions costs), and so the behavioural differences between the current and original interest rates may not be of practical importance. Whilst the PIH includes the interest rate, a household may alter its demand for debt more readily in response to changes in *regular payments*. Whilst not all payments are made monthly, all of the studies except the SFS, BHP, HUS and NSFIE, allow the amount, which on average is paid per month, to be calculated.

Of course there are different interest rates which in principle could be calculated. For example the flat rate on the initial principal or the compound rate, which is approximately the "annual percentage rate" – a rate required to be quoted under the Consumer Credit Act 1974 in the UK. But none of the surveys specifies which rate is being asked for. Further, past studies for the US (Durkin 1973, Parker and Shay 1974) have not been encouraging as to the accuracy of consumer's awareness of interest rates, albeit for consumer loans rather than mortgages. But of course, increased marketing efforts by lenders may make such results irrelevant now.

The SCF, SIHC and BHP allow identification of the use which was made for the mortgage loan (in the latter case only for additional mortgages) and so would allow the estimation of home equity withdrawal. But only the SCF allows the type of institution from which the mortgage was gained to be identified.

Four surveys: the SCF, GSOEP, HILDA and BHP, give information as to whether the household was behind schedule or having difficulty making repayments. This type of information could give an indication of the risk likely to be experienced by a lender

when lending to a household and so would be relevant to include in a supply of debt function (Crook 2001, Duca and Rosenthal 1993).

Table 3b shows available information relating to household credit card debt. Surprisingly only the SCF collects data on the current interest rate (and then only for the card with the largest balance), the type of granting institution, and type of credit card (credit, store, gas etc). Only the SCF and HILDA gain data on the credit limit. This is unfortunate because if we wish to estimate the demand for credit card debt using the first method described in section 1, we need to know for which households demand exceeds supply, and comparison of credit card debt outstanding with the credit limit may indicate this. This is needed to estimate the selection equation to avoid sample selection bias.

Only four surveys collect data on whether the household usually pay off their credit card debt. Only two studies, the SCF and PSID collect the current interest rate on lines of credit, so only in these studies could the demand and supply of such debt be credibly estimated.

The SCF collects broadly the same information relating to each of: loans for home improvement, loans on real estate and vacation properties, debts owed to buy vehicles, educational debts and other loans. This information includes the amount outstanding excluding interest, the current interest rate, data to calculate average monthly payments, number of agreed payments, type of lending institution which granted the loan, and whether the household is behind/ ahead/ on schedule with repayments.

No other survey gives relevant data for loans for home improvement. The HUS gives debt outstanding and current interest rate for loans for real estate and vacation properties. Some information on debt owed to buy vehicles is available in the PSID: the original amount borrowed (including interest charges), number of agreed payments and monthly payments and debt currently outstanding is available in the SHIW and SFS.

Education loans have been studied by Souleles (2000), but apart from the SCF only the SFS and HILDA contain any information on these loans and it is only debt outstanding.

3.1.4 Credit Constraints

Several empirical ways of identifying households which face credit constraints have been proposed and include the following. A household is credit constrained if:

(i) a household applied for a loan in the last n years and was rejected by a particular lender, or given less than it wished, and the household was unable to gain as much as it wished even after it reapplied to the same or another institution (rejected); or the household was discouraged from applying for a loan because it thought it may be turned down (discouraged). This definition has been used by Jappelli (1990), Crook (1996), Cox and Jappelli (1993), Duca and Rosenthal (1993), Japelli, Pischke and Souleles (1998) amongst others.

(ii) A household applied for a loan in the last n years and was rejected (used by Calem and Mester 1995)

(iii) As (i) but excluding those who have a credit card or line of credit. The argument is that if a household had either, then it has access to further credit and so did not face binding credit constraints.

(iv) A household does not have a credit card. The argument here, proposed by Jappelli et al 1998, is that one may wish to parameterise models deduced from Euler equations which relate only to non durable expenditure.

Table 4 shows that only the SCF and SHIW include information which elicit the information contained in definitions (i) to (iv). However the periods covered differ considerably. Unless each household applies annually and receives the same response each time, the difference in period covered may inflate the proportion of households rejected in the SCF compared with the SHIW. The SFS contains information on whether anyone in a household was rejected for a credit card but not on whether the household applied.

A number of studies have tried to explain which households are credit constrained in the US and in Italy using these measures, for example Jappelli (1990), and Magri (2002). Some have used definition (i), others have omitted the requirement that a household applied. If one is going to use definition (i) then:

$$P(cc) = P(rj \text{ and } ap) = P(rj \mid ap).P(ap) \neq P(rj) \qquad (8)$$

where *P(cc)* is the probability of being credit constrained, *P(rj)* is the probability the household's application is rejected (but not that the household *applied* and is rejected), *P(ap)* is the probability a household applies for credit. So the different results reported for Italy between Guiso, Jappelli and Terlizze (1996) and Fabri and Padula (2002) may be due simply to the former estimating *P(rj)* and the latter estimating *P(cc)*.

Definition (i) is the most commonly used empirical definition, but is not accepted by everyone. One problem is that a household may apply for such a large loan that they have no realistic chance of repaying it. But the household would be recorded as being credit constrained. The definition is even more problematic when discouraged borrowers are included. As Jappelli et al (1998) argue, definition (i) may indicate a household faces a borrowing constraint for loans to buy durables, yet empirical models deduced from Euler equations relate only to consumption. Definition (iv) omits those who are discouraged, yet such people may believe they are constrained in the theoretical sense. Definitions (iii) and (iv) would include individuals who had a credit card but were unable to gain all the credit on it that they wished because they were at their credit limit. But these defeinitions would include those who are not constrained and who do not have a credit card because they choose not to borrow.

Attanazio (1994) makes the obvious point that we do not know how accurate the survey responses are. In comparison, administrative data on rejected credit applications will be very considerably more accurate.

The implications of not having survey data on credit constraints are that either one does not know who in a country is credit constrained or one has to use indirect methods which require some very strong assumptions, which in many cases are of questionable empirical validity. Several methods have been used. They are as follows.

(i) *Simulation*. Examples are studies by Deaton (1991) Carroll (1992) and Attanasio et al (1994). Attanasio assumes utility is intertemporarily separable, income has a determinisitic trend modelled as a third degree polynomial in age, and a stochastic element, only income is uncertain and so on. The simulation suggests, given the assumptions made combinations of preferences, earnings profiles, demographic changes, and institutional arrangements that make binding credit constraints likely.

(ii) *Ad hoc assumptions*. This approach was adopted by early studies that needed to separate households into those who were and those who were not constrained to test the plausibility of the PIH. Thus Runkle (1991) using the PSID (which does not have questions relating to definitions 1 or 2) split his sample into first, those who rented or owned their home and second, whether two month's income was smaller or larger than the annualised value of the household's asset income. Zeldes (1989), Hayashi (1985), Davies (1991) and others did likewise in well known studies.

(iii) *Structural modelling*. Here a PIH model including a borrowing constraint is assumed so as to derive an Euler equation with a Kuhn-Tucker multiplier indicating a household to be credit constrained. This is the regressed on various characteristics (Brugiavini et al (1994))

(iv) *Disequilibrium modelling*. As explained above one estimates stochastic values of π_i in (7) which is made a function of exogenous variables which would be included in supply and demand functions (Grant: 2003). Alternatively a switching model can be used (Garcia et al:1997) whereby an Euler equation involving π_i was derived. Both studies use the CEX which does not include questions yielding information of the type in definitions 1 or 2.

4. Further Characteristics of Household Debt

We have discussed the availability of data on volumes of debt outstanding, interest rates and so on by type of debt. We now consider additional aspects of debt, or the market in which debt is traded, without specific reference to particular types of credit, many of which are discussed by Bertola and Hochguertel (2005).

1. Transactions costs

No data is collected in any of the surveys considered on annual fees for credit cards or for administrative fees for any other type of loans.

2. Information Asymmetry and Lender risk

Information asymmetry can give rise to credit constraints (Stiglitz and Weiss (1981)). There are a number of issues here. In one case Stiglitz and Weiss describe credit constraints as occurring when observationally equivalent potential borrowers are denied credit. But Survey data is most unlikely, in practice, to illicit the same detailed information as is available to a financial institution which makes household loans. And even if it did elicit the same raw data researchers are most unlikely to be able to replicate the scoring model used by lenders to make lending decisions. So relatively crude approximations must be used. Some of the surveys do collect data which may *ex post* indicate the riskiness of loans which have been granted. The SCF collects data on whether a member of a household has ever been bankrupt and when, whether a member of the household has ever been two or more payments in arrears in the last year on debt products, whether the household is ahead of schedule, on schedule or behind schedule for each type of loan separately. The SCF also collects data on whether a household has mortgage protection insurance, which is well known amongst lenders as being highly predictive of the probability of default. The only other studies which collect anything like this information are the SFS, which collects whether a household is two or more payments behind in (presumably) credit card bills, and the HILDA which collects whether a household is behind etc with credit payments in general. However all of the studies enable various liquidity ratios to be calculated at household level which may proxy risk of default.

3. Consumer Information

Although some work has been done to model consumer search behaviour for credit terms (Crook 2002) the only dataset which contains a measure of search behaviour for credit products is the SCF. This has a 5 point ordinal Likert scale of the extent to which the household shops around It is not obvious how one could examine households' awareness of debt terms from any of the surveys since the true value of these terms could not be independently derived from the data.

4. Consumer Attitudes

Consumer attitudes have been used in models of credit constraints since they may be expected to affect credit demand, Ferri and Simon (2002), Crook (2001). However only the SCF collects such data. Similarly a household's attitude to risk is collected directly only in one survey: the SCF and then only very crudely as a simple four ranking of alternative combinations of risk and return.

5. Relationships

The effects of relationships between a lending institution and a potential borrower has been examined by Chravatti and Scott (1999), Ferri and Simon (2002) and Chrakrovati and Yilmazer (2004) when shedding light on agency loss. The idea is that the closer the relationship in some senses, the greater the information both parties have about each other and the lower the risk experienced by the lender. Hence *cet par* the lower the interest rate charged and the lower the probability a household is credit constrained (using the self reported definition (i) above). But only two studies contain such information. The SCF has detailed information on the number of accounts a household has with each lending institution and length of time a borrower has had a relationship with the lending institution. The SHIW also contains information on the length of time a household has had an account with the bank which it uses most frequently and whether it has a loan product from that bank. No other survey in our review contains such information.

5. Conclusion

It is impossible to predict the data that will be required for future research into household debt because we do not know what future questions will be asked. However we can make statements about the availability of comparable data in different countries to test future hypotheses, and about the inter-country comparability of data which has been used in at least one country to explore certain economic hypotheses. Data on debt outstanding, except in total, cannot be compared between the surveys we have considered because of different ways in which the data on loans has been classified. It is possible to compare debt outstanding on mortgages and on other debt, separately, but a finer classification would exclude the majority of countries because the classifications which are used differ significantly. Classifying debt outstanding by type of security or collateral is also not possible for several countries and so a finer comparison, based on the use of debt, than 'property' and 'other', is really impossible.

The SCF undoubtedly contains more variables relating to household debt which are of interest to an economist interested in demand, supply, credit constraints, search behaviour, and agency loss in credit transactions than any other study. To enable inter-country comparisons to be made more data must be collected in other studies. The additional includes, depending on the survey, questions relating to credit constraints for each type of debt within a uniform time period, defined interest rates on each type of debt, the purchase of default insurance on each type of debt, the length of time accounts have been held and the incidence of default (using a standardised definition). For particular types of debt the variables might be as follows. For credit cards and other forms of revolving credit including overdrafts: the amount of credit card debt outstanding after the last payment, how much of the balance is usually paid off, the type of card, the credit limit and the number actually used. For loans for home improvement and for the purchase of vehicles: debt currently outstanding, interest rate, whether the interest rate is fixed or variable, monthly payments, number of agreed payments, and value of purchase. Separate information on educational loans would allow a large number of hypotheses to be examined which

would be of importance from the point of view of national education policy. The types of debt to be separately distinguished should be standardised and that in the SCF is as good as any.

Of course it would be especially useful if statisticians could release more information about the clustering of the observations, but obviously a balance has to be struck with confidentiality requirements.

Finally, these conclusions are based on consideration only of the ten surveys which have been examined. There are other surveys (for example the Cyprus SCF which we believe follows the SCF closely), generally relating to smaller countries, which it was not possible to consider. If they were considered it is possible the conclusions may be altered slightly, but we doubt by very much.

Footnote to Tables

SCF	*Survey of Consumer Finances*, Board of Governors of the Federal Reserve System, Wasington DC.
PSID	*Panel Study of Income Dynamics*, Institute of Social Research, University of Michigan, Michigan..
SHIW	*Survey of Household Income and Wealth*, Bank d'Italia, Rome.
GSOEP	*The German Socio-Economic Panel Study*, DIW, Berlin.
SFS	*Survey of Financial Security*, Pensions and Wealth Surveys Section, Income Statistics Division, Statistics Canada, Ottawa.
HILDA	*Household Income and Labour Dynamics Survey*, Institute of Applied Economic and Social Research, University of Melbourne, Melbourne.
SIHC	*Survey of Income and Housing Costs,* Australian Bureau of Statistics. (Renamed from 2002-03 to *Survey of Income and Housing*.)
HUS	*Household Market and Non-Market Activities*, Goteborg University, Goteborg, Sweden.
BHP	*British Household Panel Survey*, Institute for Social and Economic Research, University of Essex, Colchester.
NSFIE	*National Survey of Family Income and Expenditure*, Statistics Bureau, Ministry of Internal Affairs and Communications, Tokyo.

Table 1
Sampling Units

Survey	Unit of Observation for Debt variables	Sample Sizes	Panel or Independent cross section	Frequency
SCF 01 (USA)	Primary economic unit (an individual or couple and others who are financially dependent on them i.e. a Household) Demographics and employment for individuals	In 2001 Households: 4442 cases	Panel in 1983-89 only (1479 cases). Otherwise independent CS	Every 3 years from 1983
PSID 03 (USA)	Family	In 2003 Households: 7000 cases Individuals: 65000 cases Core sample reduced in 1997 Latino sample added 1990 but replaced by immigrant sample in 1997	Panel	Annual 1961-97, biennial thereafter
SHIW 02 (Italy)	Household Demographics and employment for individuals	In 2002: Households 8011 cases Individuals 21148 cases	Panel sub sample: 3605 cases in 2002-2000	Every 3 years 1989-1998, Biennial thereafter
GSOEP (Germany) 02	Individuals	In 2003 Households 12692 cases Individuals 22592 cases	Panel	Annual since 1984 Liabilities only in 2002
SFS 99 (Canada)	Family	1999 Households: approx 25000 cases	Independent cross section	Occasionally
HILDA 03 (Australia)	Household	In 2003 Households: 7245 cases Individuals 13041 cases	Panel (11993 individuals in 2002-2003)	Annual
SIHC 99(SIH from 02-03) (Australia)	Household	In 2001-02: Households: 6786	Independent cross section	Annual since 1994-5 Biennual from 2003-4
HUS 98 (Sweden)	Household	In 1998: Individuals: 3822 cases	Panel (2352 individuals in 1996-8) Partners who leave home continue to be interviewed	Every 2-3 years until 1998
BHP 04 (UK)	Household. Demographics and employment for individuals aged 16+	In 2004: Households: 9045 cases	Panel Initial sample (5511) plus all households which persons in initial sample joined	Annual 1991 -
NSFIE 99 (Japan)				

Table 2
(a) Current Debt Outstanding by Type of Debt

Survey	Mortgage Principal	Credit card	Other	Total
SCF 01 (USA)	√ loans to buy property	√	All	All types, all types of lenders
PSID 03 (USA)	√	Incld in Other	All	All types, all types of lenders
SHIW 02 (Italy)	√ loans to buy or restructure property	Incld in Other	All	All types, all types of lenders
GSOEP 02 (Germany)	Any loans to buy property	Incld in Other	All where each loan is ≥ €2.5k	All types, all types of lenders
SFS 99 (Canada)	√	Incld in Other	All	All types, all types of lenders
HILDA 03 (Australia)	√ loans to buy property	√	All	All types, all types of lenders
SIHC 99 (Australia)	√ loans to buy or secured on property			
HUS 98 (Sweden)	√ also any loans to buy property	Incld in Other	All	All types, all types of lenders
BHP 04 (UK)	√ loans to buy property			
NSFIE 99 Japan)	Any Loans to purchase land or property	Incld in Other	All	All types, all types of lenders

(b) Current debt Outstanding by Type of Security

Survey	Secured on Home	Secured on vehicles	Not secured
SCF 01 (USA)	√	√	√
PSID 03 (USA)	√	Can't distinguish between other loans	
SHIW 02 (Italy)			
GSOEP 02 (Germany)			
SFS 99 (Canada)			
HILDA 03 (Australia)	√		
SIHC 99 (Australia)	√	Incld with secured on home	√
HUS 98 (Sweden)	√	Incld with secured on home	√
BHP 04 (UK)			
NSFIE 99 (Japan)			

(c) Current Debt Outstanding by Use of Debt

Survey	Buy Property	Consumer expenditure	Home improvements	Buy vehicles	Other
SCF 01 (USA)	√	√	√	√	√
PSID 03 (USA)	√			√ Original amount borrowed)	√
SHIW 02 (Italy)	√	√		√	√
GSOEP 02 (Germany)	√				√ (each loan ≥ € 2.5k)
SFS 99 (Canada)	√			√	√
HILDA 03 (Australia)	√				
SIHC 99 (Australia)					
HUS 98 (Sweden)					
BHP 04 (UK)	√				
NSFIE 99 (Japan)	√				

Table 3 Details by Type of Credit

(a) Mortgages

Survey		When taken out	Amount Outstanding currently	Duration	Current interest rate	Interest rate Fixed or variable	What rate does int rate depend on	Value of monthly payments	Govt Guaranteed	How many more years	Mortgage insurance taken	Purpose money used for	Type of institution	Behind schedules/Able to make payments without difficulty	Ques about other mortgages
SCF 01 (USA)	Mortgages, loan contracts, equity loans on principal residence separately	√ for each loan separately	√ for each loan separately	√ for each loan separately	√ for each loan separately	√	√	√ for each loan separately	√	√ for each loan separately	√	√	√ for each loan separately	√ for each loan separately	
PSID 03 (USA)	Mortgages, loan contract, home equity separately	√ for each mortgage separately	√ Principal for each mortgage separately		√ for each loan separately			√ for each mortgage separately		√ for each mortgage separately					
SHIW 02 (Italy)	Loans for purchase of dwelling (in aggregate)		√	√	√	√		√							
GSOEP 02 (Germany)	Debts on house or apartment where live (aggregate)		√					√						√	
SFS 99 (Canada)	All mortgages in aggregate		√												
HILDA 03 (Australia)	Loans to buy home		√ for each loan secured on home or vac home					√		√				√	
SIHC 99 (Australia)	Mortgages or secured loans		√ for each mortgage or secured loan					√ for each mortgage or secured loan				√ for each mortgage or secured loan			
HUS 98	All loans		√		√										

(Sweden)	secured on home (in aggregate)		Also: Original amount for each of mortgages, other bank loans, loans from seller, loans from relatives												
BHP 04 (UK)		√	√							√ Original mortgage		√ Additional mortgage		√ (≥2 m behind rent or mortgage)	√ Additional mortgages or loans
NSFIE 99 (Japan)	Liabilities for purchase, build, extension, rebuild of houses or land		√												

(b) Credit Cards

Survey	Av no of payments made per month	Amount outstanding after last payment	Current interest rate	New charges last month	Usually Pay off bal	Credit Limit	Type of institution	Type of card (Credit, store, gas, charge)	Number used	Number possessed
SCF 01 (USA)		√ (for each type)	√ (card with largest bal)	√(for each type)	√ (cc only)	√ (aggregate)	√ (cc only)	√ (for each type)		√ (for each type)
PSID 03 (USA)										
SHIW 02 (Italy)	√ (aggregate)									√
GSOEP 02 (Germany)										
SFS 99 (Canada)	Only with instalment debt				√				√	
HILDA 03 (Australia)		√ (for those in resp name and in joint names separately)			√ (for those in resp's name and joint names separately)	√ (for those in rep name and in joint names separately)			√ (>1 or 0)	
SIHC 99 (Australia)										
HUS 98 (Sweden)										
BHP 04 (UK)										
NSFIE 99 (Japan)										

(c) Lines of Credit

Survey	Types	Av no of payments made per month	Amount outstanding after last payment	Current interest rate	Amount borrowed last time	Usually Pay off balance	Credit Limit	Type of institution	What money used for	Secured on home equity	
SCF 01 (USA)	All		√	√	√		√	√	√	√	
PSID 03 (USA)	Secured on house equity only		√	√							
SFS 99 (Canada)			√								

(d) Loans for Home Improvement

Survey		When most recent taken out	Amount Outstanding currently	Duration	Current interest rate	Interest rate Fixed or variable	What rate does int rate depend on	Value of monthly payments	Govt Guaranteed	How many more years			Type of institution	Behind schedules/Able to make payments without difficulty	Ques about other mortgages
SCF 01 (USA)		√	√	√	√			√		√			√	√	
SHIW02 (Italy)		√													

(e) Loans on real estate and Vacation Properties

Survey		When taken out	Amount Outstanding currently	Duration	Current interest rate	Interest rate Fixed or variable	What rate does int rate depend on	Value of monthly payments	Govt Guaranteed	How many more years		Type of institution	Behind schedules/Able to make payments without difficulty
SCF 01 (USA)		√ (for each loan separately)	√ (for each loan separately)	√ (for each loan separately)	√ (for each loan separately)	√		√ (for each loan separately)		√ (for each loan separately)		√ (for each loan separately)	√ (for each loan separately)
HUS 98 (Sweden)			√		√								
HILDA 03 (Australia)			√										

(f) Owed to Family Business

Survey		When taken out	Amount Outstanding currently	Duration	Current interest rate	Interest rate Fixed or variable	What rate does int rate depend on	Value of monthly payments	Govt Guaranteed	How many more years		Type of institution	Behind schedules/Able to make payments without difficulty
SCF 01 (USA)			√										

(g) Debts owed to buy vehicles

Survey		When taken out	Original amount borrowed	Amount Outstanding currently	Duration	Current interest rate	Interest rate Fixed or variable	What rate does int rate depend on	Value of monthly payments	How many more years	No of payments agreed to make	Type of institution	Behind schedules/Able to make payments without difficulty
SCF 01 (USA)	All types of vehicles	√ yr; for each loan separately	√ for each loan separately	√ for each loan separately		√ for each loan separately			√ for each loan separately	√ for each loan separately	√ monthly	√ for each loan separately	√ for each loan separately
PSID 03 (USA)	For cars purchased in last 2 years		√ incl finance charges						√		√		
SHIW 02 (Italy)	All types of vehicles			√									
GSOEP 02 (Germany)													
SFS 99 (Canada)	All types of vehicles			√									
HILDA 03 (Australia)													
SIHC 99 (Australia)													
HUS 98 (Sweden)													
BHP 04 (UK)													
NSFIE 99 (Japan)													

(h) Educational Loans

Survey		When taken out	Original amount borrowed	Amount Outstanding currently	Duration	Current interest rate	Interest rate Fixed or variable	What rate does int rate depend on	Value of monthly payments	How many more years	No of payments agreed to make	Type of institution	Behind schedules/Able to make payments without difficulty	When starts to pay
SCF 01 (USA)		√ yr; for each loan separately	√ for each loan separately	√ for each loan separately		√ for each loan separately			√ for each loan separately	√ for each loan separately	√ monthly	√ for each loan separately	√ for each loan separately	√ for each loan separately
PSID 03 (USA)														
SHIW 02 (Italy)														
GSOEP 02 (Germany)														
SFS 99 (Canada)				√										
HILDA 03 (Australia)				√										
SIHC 99 (Australia)														
HUS 98 (Sweden)														
BHP 04 (UK)														
NSFIE 99 (Japan)														

(i) Other loans (excl mortgages, loan contracts, credit cards, lines of credit, home improvement, loans on real estate or vacation homes, owed to business, vehicles, education)

Survey		When taken out	Original amount borrowed	Amount Outstanding currently	Duration	Current interest rate	Interest rate Fixed or variable	What rate does int rate depend on	Value of monthly payments	How many more years	No of payments agreed to make	Purpose of loan	Type of institution	Behind schedules/Able to make payments without difficulty
SCF 01 (USA)		√ yr; for each loan separately	√ for each loan separately	√ for each loan separately		√ for each loan separately			√ for each loan separately	√ for each loan separately	√ monthly	√ for each loan separately	√ for each loan separately	√ for each loan separately

Table 4
Rejected Applications for Credit

Survey	**Applied for credit**	**Accepted, Rejected or restricted**	**Able to get amount applied for from reapplication**	**Thought of applying but changed mind**
SCF (USA)	√ (in last 5 years)	√ (in last 5 years)	√ (in last 5 years)	√ (in last 5 years)
SHIW (Italy)	√ (in last 1 year)	√ (in last 1 year)		√ (in last 1 year)
SFS (Canada)		√(Rejected)		

References

Alessi, R., Devereux, M. and Weber, G (1997) Intertemporal consumption, durables and liquidity constraints: a cohort analysis. *European Economic review*, 41, 37-59.

Attanazio, O.P. (1994) The *Intertemporal Allocation of Consumption: Theory and Evidence*. NBER Working Paper No 4811. Cambridge Massachusetts, NBER.

Bar-Ilan, A. and Blinder, A.S. (1987*) Life-Cycle Permanent-Income Model and Consumer Durables*. Working Paper No 2149, Cambridge Massachusetts: NBER.

Bertola, G. and Hochguertel, S. (2005) *Household Debt and Credit*. LSW White paper.

Boyes, W.J., Hoffman, D.L. and Law, S.A. (1989) Econometric analysis of bank scoring problems. *Journal of Econometrics*, 40, 3-14.

Brugiavini, M. and Weber, G. (1994) Durables and non durables consumption: evidence from Italian household data. In A. Ando, L Guiso and I Visco (eds) *Saving and The Accumulation of Wealth*. Cambridge, Cambridge University Press.

Avery, R.B., Calem, P.S. and Canner, G.B.(2004) Credit scoring: do situational circumstance matters? *Journal of Banking and Finance*, 28(4) 835-856.

Calem, P.S. and Mester, L. (1995) Consumer behaviour and the stickiness of credit card interest rates. *American Economic Review*, 85, 1327-1336.

Carroll, C (1992) Buffer *Stock Saving and the Permanent Income Hypothesis.* Mimeo.

Chah, E.Y., Ramey, V.A. and Starr, R.M. (1995) Liquidity constraints and intertemporal consumer optimisation theory and evidence from durable goods. *Journal of Money, Credit and Banking*, 27, 272-287.

Chrakrovatti, S. and Scott, J.S. (1999) Relationship and rationing in consumer loans. *Journal of Business*, 72, 523-544.

Chrakrovatti, S. and Yilmazer, T. (2004) *A Re-Examination Of Relationships In The Loan Granting Process*. Purdue University: Mimeo.

Cox, D and Jappelli, T. (1993) the effect of borrowing constraints on consumer liabilities. *Journal of Money, Credit and Banking*, 25, 197-213.

Crook, J.N. (1996) Credit constraints and US households. *Applied Financial Economics*, 6, 477-485.

Crook J.N. (2001) The demand for household debt in the USA: evidence from the 1995 Survey of Consumer finance. *Applied Financial Economics*, 11, 83-91.

Crook, J.N. (2002) *Adverse Selection and Search in the Bank Credit Card Market*. Credit Research Centre Working Paper , University of Edinburgh. WP01/2

Crook J.N. and Banasik J (2003) Does reject inference really improve the performance of application scoring models? *Journal of Banking and Finance,* 28, 857-874.

Crook, J.N.(2005) The demand and supply of household: debt a cross country comparison in G Bertola, R Disney and C Grant (eds) *The Economics of Consumer Credit; European Experience and Lessons From The US*, MIT Press (forthcoming).

Davies A. J. and Weber, G (1991) Credit and British consumers: some microevidence. *Fiscal Studies* 12 (3) 61-84.

Deaton, A. (1991) Saving and liquidity constraints. *Econometrica*, 59, 1221-1248.

Duca, D. J. and Rosenthal, S.S. (1993) Borrowing constraints, household debt and racial discrimination in loan markets. *Journal of Financial Intermediation*, 3, 77-103.

Durkin, T A (1973) Consumer awareness of credit terms: review and new evidence. *Journal of Business*, 48(2), 253-63.

Fabbri, D. and Padula, M. (2002) *Does poor legal enforcement make households credit constrained?* Working Paper No 65, Centre for Studies in Economics and Finance, University of Salerno.

Ferri, G. and Simon, P. (2002) *Constrained Consumer lending: Methods Using the Survey of Consumer Finances*. Working Paper, University of Barri.

Friedman, M (1957*) A Theory of the Consumption Function*. Princeton: Princeton University Press.

Garcia, R. Lusardi, A. and Ng, S (1997) Excess sensitivity and asymmetries in consumption: an empirical investigation. *Journal of Money, Credit and Banking*, 29(2), may, 154-176.

Grant, C. (2003) *Estimating credit constraints among US households.* Mimeo. Finance and Consumption Chair, European University Institute, Florence.

Greene, W. H. (1998) Sample selection problems in credit scoring models. *Japan and the World Economy*, 10(3), 299-316.

Grossman, S.J. and Loroque, G (1990) Asset pricing and optimal portfolio choice in the presence of consumption goods. *Econometrica*, 58(1), 25-51.

Guiso, L., Jappelli, T. and Terlizzese, D. (1996) Income risk, borrowing constraints, and portfolio choice. *American Economic Review*, 86(1) March, 158-172.

Hayashi, F. (1985) The effects of liquidiy constraints on consumption:: a cross sectional analaysis. *Quarterly Journal of Economics*, C, 183-206.

Hayashi, F. (1987) Tests for liquidity constraints: a critical survey and some new observations. In T.F. Bewley (ed) *Advances in Econometrics: Fifth World Congress,* vol II, 91-120.

Hubbard, G. and Judd, K. (1986) Liquidity constraints, fiscal policy and consumption. *Brookings Papers on Economic Activity*, 1-50.

Imrohoroglu, A. (1989) Cost of business cycles with indivisibilities and credit constraints. *Journal of Political Economy*, 100, 118-142.

Jappelli, T (1990) Who is credit constrained in the US economy? *Quarterly Journal of Economics*, 105, 219-234.

Jappelli, T and Pagano, M.(1994) Consumption and capital market imperfrctions: an international comparison. *American Economic Review*, 79, 1088-1105.

Jappelli, T. Pischke, J-S and Souleles, N.S. (1998) Testing for liquidity constraints in Euler equations with complementary data sources. *Review of Economics and Statistics*, 251-262.

Kelly, M (1998) PhD thesis, Milton Keynes: Open University.

Magri, S. (2002) Italian *households' debt: determinants of demand and supply.* Mimeo. Rome: Bank of Italy.

Parker, G.C and Shay, R.P. (1974) Some factors affecting awareness of annual percentage rates in consumer instalment credit transactions. *Journal of Finance* 29(1), 217-225.

Runkle, D.E. (1991) Liquidity constraints and the permanent income hypothesis. *Journal of Monetary Economics*, 27, 73-98.

Souleles, N. (20002) College tuition and household savings and consumption. *Journal of Public Economics*, 77(2), 185-207.

Stiglitz, J and Weiss, A. (1981) Credit rationing in markets with imperfect information. *American Economic Review*, 71, 393-410.

Zeldes, S.P. (1989) Consumption and liquidity constraints: an empirical investigation. *Journal of Political Economy*, 97, 305-346.