



**UCD GEARY INSTITUTE FOR PUBLIC POLICY
DISCUSSION PAPER SERIES**

**Differences in Borrowing Behaviour between Core and
Peripheral Economies — Economic Environment
versus Financial Perceptions**

Weiou Wu
University of Limerick

Apostolos Fasianos
University of Limerick

Stephen Kinsella
University of Limerick

Geary WP2015/16
August 24, 2015

UCD Geary Institute Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

Any opinions expressed here are those of the author(s) and not those of UCD Geary Institute. Research published in this series may include views on policy, but the institute itself takes no institutional policy positions.

Differences in Borrowing Behaviour between Core and Peripheral Economies

— Economic Environment versus Financial Perceptions

Weiou Wu, Apostolos Fasianos and Stephen Kinsella

Abstract: Using the Eurosystem Household Finance and Consumption (HFCS) data, this paper identifies the key differences in borrowing behaviour between core and peripheral nations. As such, we focus on non-collateralized debt such as credit card loans, bank overdrafts and other forms of non-collateralized debt, which reflect daily borrowing behaviour more closely than does mortgage debt. We examine the differences in levels and prevalence of these debts, and break down these differences into two major components: financial perceptions and the economic environment. We aim to explain to what extent these influences contribute to the differences in debt ownership and levels of holding between core and peripheral countries in Europe. We found that differences in financial perceptions do contribute to the differences in debt in a significant way, while the economic environment contributes little to this outcome. Households in the European periphery are much more conducive to debt if they have the same financial perceptions as those in the core countries in Europe.

Keywords: Household Debt, Counterfactual Decomposition, Demography, Risk Preference and Financial Expectation.

1. Introduction

Like collateralized debt, non-collateralized debts often exhibit large variations across households. However, due to their unique characteristics, such as low borrowing amounts and high interest rates, they are often short-lived compared with, for example, the lifelong nature of a mortgage debt. Thus, the ownership and amount of the non-collateralized debt are more directly influenced by an individual's borrowing behaviour, the nature of which often depends on an individual's personal characteristics and frame of mind towards borrowing, such as an attitude towards borrowing and spending, salary expectation, and awareness of total indebtedness (Brown et al., 2005; Brown et al., 2008; Brown et al., 2013). This paper therefore seeks to determine how these factors (with regard to a household's financial perceptions) affect the borrowing involved in non-collateralized debt and, further, to what extent households with similar characteristics and borrowing conditions, but inhabiting different economic regions, differ with respect to the ownership and levels of debt holdings.

The analysis of the impact of financial perceptions, as undertaken in this paper, makes it distinctive and forms the basis for its own influential contribution to the literature. Rather than exploring traditional debt determinants that are quantifiable to a degree, we account for more endogenous influences that are related to perceptions towards borrowing. The discussion of financial perceptions, such as financial expectation, attitude towards risk and awareness of indebtedness, uncovers previously unidentified effects on household's borrowing behaviour. Furthermore, these outcomes of financial perception are also believed to be stronger for non-collateralized loans than collateralized loans. This is because the level and long-run repayment schedules are predetermined for collateralized loans, which in turn are less likely to be affected by individual perceptions towards borrowing, these perceptions changing according to each household's financial situation.

To investigate the short-term nature of the problem, we use a novel dataset, namely the Eurosystem Household Finance and Consumption Survey, to compare differences in household lending behaviour (e.g. the decision to participate and the *amount* of liabilities held conditional on participation) between core and peripheral nations in Europe. However, such a comparison also needs to take into account the fact that that

the influences leading to these differences themselves differ across underlying economic regions. Therefore, we use a new counterfactual decomposition method based on the Recentered Influence Function (RIF), which decomposes the overall differences in debt holdings into covariate effects and coefficient effects based on RIF-regressions for quantiles (Firpo et al.; 2009; Fortin et al., 2011), to conduct a country-level comparison.

This method overcomes the drawbacks of the conventional Blinder-Oaxaca decomposition which focuses only on the mean of the distribution, thus masking important differences across the full debt distribution. The unconditional quantile regression they represent enables interpretation of the coefficient using an approach that is relevant for policy purposes. For example, consideration is given to what constitutes the partial effects of variations in household characteristics and to how that effect varies across the overall debt distribution. As such, it provides a more insightful interpretation to the Blinder-Oaxaca decomposition methodology, which is restricted to the mean of the debt distribution. Compared to other methods that also allow quantile decomposition such as the conditional quantile regression used by Machado and Mata (2005) and extended by Christelis et al. (2013), this procedure is resilient to the sequence that covariates enter in a detailed decomposition.

This paper makes several original contributions to the existing literature. First, this paper is the first to explore the differences with regard to borrowing behaviour in non-collateralized debt, while most published papers focus on collateralized debt (for example, La Cava and Simon, 2005; Brown et al., 2008; Brown and Taylor, 2008; Meniago et al., 2013). We are particularly interested in comparing core and peripheral economies. Since the peripheral states, such as Greece, Italy, Spain and Portugal, are characterized by high levels of debt, lower than average GDP per capita, current account deficits, and government budget deficits, which could lead to potential different market outcomes compared to core economies. It will be interesting to see how the market participants that share common characteristics differ across the two economic regions. The results will also generate some new insights on the structural differences between the core and peripheral countries

Secondly, we will study the Euro area household liability issues, based on a novel dataset, namely the Eurosystem Household Finance and Consumption Survey, the first

wave of which was released in 2011. This provides comparable data for 15 Euro area countries, allowing us to compare the fundamental differences between core and peripheral nations, as well as to decompose these differences into those from the total economic environment and those from the financial perception. The relevant analysis can help us to understand the changing structure of household debt after the Eurozone crisis and to maintain a stable and sustainable economy for Europe. In addition, the year of the survey used in our empirical study is particularly interesting from a macroeconomic perspective. Since the economy has still not yet fully recovered from the crisis which occurred during the years our survey was conducted, the analysis contained herein will help to develop a yardstick and to provide policy suggestions by which to speed up the recovery process for these countries.

Thirdly, we focus on a set of new characteristics that could influence the household liabilities, namely financial perception. This has attracted limited attention in the literature so far due to a shortage of data availability at household level. Our use of these variables distinguishes the *effects* from the household characteristics widely used in household level studies; these differences, which previously contributed little of a conclusive nature (Christelis et al., 2012), thus now find a unique place in terms of contribution to the literature.

Finally, we apply a new counterfactual decomposition method based on the RIF regression as introduced by Firpo et al. (2009). The RIF quantile regression method enables us to answer questions such as:

- Do the differences in underlying influences from population characteristics and financial perception vary across the debt distribution?
- Is there evidence for such differences being greater at the bottom of the debt distribution or at the top?
- How much difference is due to variation in relation to the overall characteristics between core and periphery and their influence on the debt holdings and how much is due to the debt holdings that are affected by the same characteristics, with later a specific focus on three major influences from financial perception the

financial expectation, the attitude towards risk and the awareness of indebtedness?

We document considerable differences between core and peripheral economies with regard to household borrowing behaviour. These differences arise predominately from the divergent financial perceptions that households with similar characteristics hold. We show that households that have similar characteristics tend to have a quite different probability of participation to the credit card market under a given set of variables. In most cases, the participation rates are greater in core countries than in the European periphery. The same is not true, however, for the levels of debt holdings. Peripheral residences tend to borrow more than households from core economies, even after adjusting for any differences in the configuration of a set of characteristics.

The rest of the paper is organized as follows: Section 2 reviews the relevant literature. Section 3 introduces the data used in our paper, while section 4 presents the empirical analysis. The last section concludes the paper.

2. Literature review

What determines a household's borrowing behaviour? The literature on the determinants of household liability provides a normative answer to this question under a wide range of demographic characteristics, financial circumstances and economic conditions (see, for example, Brown and Taylor, 2008; Christelis, et al., 2013; Bover et al., 2014). Amongst the many mechanisms investigated, the impact on the decision to participate and on the amount of liabilities held conditional on participation are two primary factors that define household lending behaviour.

Relatively, extensive literatures have found that the levels of household liabilities are significantly affected by household characteristics, such as income, consumption and wealth. For example, Brown and Taylor (2008) found age and income to have a significant impact on household financial circumstances including their debts. Focusing specifically on one of the non-collateralized debts, namely credit card debt, Ekici and Dunn (2009) found a negative association between credit card borrowing and consumption growth. Brown et al. (2005, 2008) investigated the impact from financial

expectation on household debt. Instead of looking at the levels of debt, Duygan-Bump and Grant (2009) explored the determinants of household's debt repayment behaviour and found that arrears are often associated with adverse shocks to household's income and health. Becker and Shabani (2010) examined the relationship between outstanding debt and a household's investment preferences. They found households with outstanding debt are less likely to own stocks and bonds compared to similar households without debt.

In addition to studies focusing at a household level on survey data, Meniago et al (2013) applied a co-integration analysis and Error Correction Model on quarterly time series data between household debt in South Africa and macroeconomic factors. They found that an increase in household debt is affected by positive changes in consumer prices, GDP and household consumption. Consistent with Meniago (2013), Meng et al (2013) applied a co-integrated vector auto-regression model to explore the determinants of Australian household debt and found that housing prices, GDP and population have a positive effect on borrowing.

Amongst many studies on the determinants of household debt, population characteristics are expected to have an important influence on the level and composition of household debt (Yilmazer and DeVaney, 2005). Using age as an example, the level of debt holding varies among different age groups. However, the findings with regards to the debt and demography are mixed, particularly for young people. One stream of research represented by Kinsella (2013) claimed that those 16-30 year olds, who cannot access the debt market in a significant way because of credit restrictions, will therefore have very little debt. In contrast, another stream of research found that outstanding debt, especially for non-collateralized debt, had been borrowed heavily by the young and the riskless (Haughwout et al. 2014).

Clearly, different age groups will have different levels of debt, and these will be associated with different debt compositions, which form the basis of their borrowing behaviours. When debt becomes a major problem—in the case of excessive leverage, for example—it becomes imperative to understand who holds that debt, and to question whether debt within similar age brackets could lead to different outcomes on debt

holdings, ensuring the long-term sustainability of the debt and demography issue. Further, given the fundamental differences in debt holdings for different age cohorts and the increasing complexity of the debt composition, an awareness of how different age cohorts react to shocks, their likely evolution with respect to their debt – and, importantly, the structure of that debt – will reveal a fundamental problem which, at the same time, will lead to a consideration of the evolving social structure of the European economy.

This paper therefore accounts for the age effect on the evolution of debt and, further, raises new questions regarding additional important influences on surrounding issues. One important influence that we analyse in our paper is that of risk-taking. Attitude towards risk also forms the foundations of lending behaviour. Different people, naturally, have different risk-tolerance levels, and given the uncertainty surrounding capacities to acquire debt, it is important to demonstrate whether these differences in debt holdings at country level are, in fact, due to an individual's risk tolerance. The relationship between risk-taking and household debt is challenging to pinpoint empirically because households have heterogeneous risk attitudes and other hidden traits impacting on their borrowing behaviours. A number of studies have documented a positive relationship between risk-taking and financial wealth (see, for example, Bucciol and Miniaci, 2011; Calvet and Sodini, 2014). It is surprising that inter-personal differences in attitudes toward risk have not attracted much attention in the empirical literature on household debt; one reason as indicated by Brown (2013) being the shortage of risk preference measurement at individual and household level. This paper therefore also adds to the current literature on household debt by documenting and analysing inter-country differences in borrowers' lending behaviours and links these differences to risk-taking.

The other influence we consider here is the future expectation in regard to an individual's financial situation. Brown et al (2005) found that financial expectation impacts positively on the level and growth of the household debt using a British panel data. In a more recent study, Brown et al (2008) reported a similar relationship between financial expectation and mortgage debt. Their research is based on a sample of households over a nine-year period ranging from 1993 to 2001, which allows them to

track for events such as marriage or childbirth, and in turn may influence the level of mortgage debt. Since our dataset does not contain information on the total amount of mortgage debt over a relatively long horizon¹, we are not able to track down the influence of financial expectation on mortgage debt. To address this issue, we focus on one particular type of debt, namely non-collateralized debt, which is sensitive to future expectation at the time of interviewing.

3. Methodology

In this section, we present the decomposition method used to model the difference in debt prevalence and debt holdings conditional on participation, where the first is calculated as the probability of holding or not holding a particular debt. Thus for debt prevalence, the procedure first involves estimating a logit model, which can be expressed as

$$P_j = F(X\beta)$$

Where j stands for the country.

For debt holdings conditional on participation, the conventional Blinder-Oaxaca procedure decomposes the differences between two groups' mean outcome by first estimating an Ordinary-Least-Square equation for each group. Next, the procedure goes on to decompose the differences into the "explained" or covariate component due to group differences in the predictors, and the "unexplained" or coefficient component due to differences in the regression coefficients, so that each group has the same predictor level.

However, this conventional decomposition method is based on the mean of debt distribution. To decompose the differences across the debt distribution, it is necessary to go beyond this traditional method. DiNardo et al. (1996) decompose the differences into a part that is due to the changes in the marginal distributions of independent variables between two groups. Juhn et al. (1993), followed by DiNardo et al. (1996),

¹ Our survey results are only obtained from one particular year.

Fortin and Lemieux (1998) and Donald et al. (2000) performed a counterfactual decomposition based on the conditional distribution of the outcome variable. Machado and Mata (2005) proposed a method which shows a detailed decomposition at each conditional quantile of the distribution of the outcome variable. Firpo et al. (2009) and Fortin et al. (2011) decompose the overall gender pay difference based on RIF-regression for quantiles.

In this study, we use the RIF-regression for quantiles of the debt distribution for several reasons. First, compared with the traditional Blinder-Oaxaca method, which is based on the mean of the distribution, our method can provide a richer description of the distribution. This is achieved by not only providing information contributed overall by differences in debt determinant characteristics (and the influences arising from those characteristics on debt holdings), but also from the contribution of each covariate to each decile of the debt distribution. The modification of conditional quantile regressions enables an interpretation of the coefficients in a manner that is associated with the partial effect that a change in independent variables has on the amount of debt holdings; and further, how that effect varies across the debt distribution. Second, our approach builds upon the concept of Recentered Influence Function, which has been widely used recently in aggregate decompositions, and is relatively more moderate than the standard conditional quantile as in Machado and Mata (2005)'s process. That is, the error term is allowed to correlate with co-variates in the model, as long as the correlation is similar within the two groups under consideration. Compared with other methods, the RIF regressions assume no general equilibrium effects; that is, the counterfactual debt distribution remains the same when the marginal distribution of one group's independent variable replaces the other.

The RIF method involves the construction of a counterfactual density, indicating what the debt distribution of one economic region would be if the region faced the same characteristics as its competitor. Let for D_q for $\in (0,1)$, is the q th quantile of the unconditional distribution of the (*log*) debt. As discussed above, we perform regional decomposition in debt holdings of the following form:

$$D^p - D^c = \{X^p \beta^p - X^c \beta^p\} + \{X^c \beta^p - X^c \beta^c\}$$

where the differences in the right hand side of the equation denote either the debt prevalence of the total non-collateralized debt and its subcategories, or the difference in

log outstanding amount conditional on participation, evaluated at different quantiles of the debt distribution. The first estimation involves estimating a linear logit model for the debt prevalence where the difference quantiles of the debt distribution is evaluated by a RIF regression model.

4. Data and Descriptive Statistics

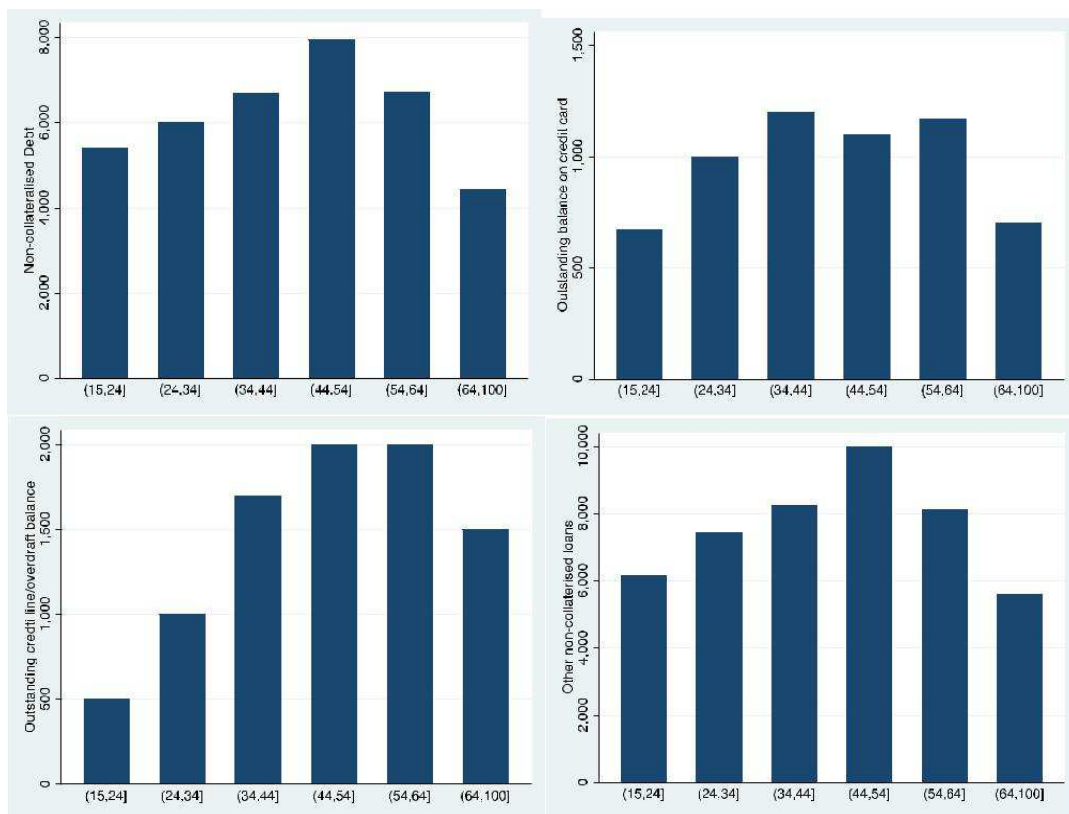
Our analysis uses the newly available Eurosystem Household Finance and Consumption (HFCS) survey, a cross-sectional dataset that contains information on household characteristics, and their financial states, including debt, wealth and income across 15 euro-area countries. The first wave of the survey was conducted between end-2008 to mid-2011, in all euro countries except Ireland and Estonia.

The household debt section takes account of both collateralized and non-collateralized debt. For the non-collateralized debt, it was further divided into three subcategories including credit card debt, credit lines and bank overdrafts, and other forms of non-mortgage debt such as consumer debt, car loans, etc. Since the survey asks whether households own a particular debt and how much it is worth, it therefore not only provides information on the participation rate but also the amount of the corresponding debt.

For the purpose of this paper, we did not use the data for Malta, Finland and France, as they do not include some of the core variables such as age and the attitude towards risk. Thus, we have 7 countries for the European periphery in total, including Cyprus, Spain, Greece, Italy, Portugal, Slovenia and Slovakia; and 5 core European countries for our analysis, including Austria, Belgium, Germany, Luxembourg and Netherlands. Figure 1 plots the median value of the total outstanding amount for different age groups. As can be seen, those 15-24 year olds who cannot access the debt market in a significant way because of credit restrictions therefore have very little debt. This is especially evident for the outstanding credit line and bank overdraft. However, this group has a

relatively higher amount for education loans as reflected in the last panel in Figure 1. On the other hand, those 30-50 year olds who borrowed heavily before and during the construction boom of 2002-2007, are now extremely indebted. The average borrowing amount on non-collateralized loans reaches 5000 euros for people between 45 to 54 years old. Finally, those over 64 years old and who are saving in a precautionary way or in order to affect their pension provision post retirement, have little debt.

Figure 1: Outstanding amount of non-collateralized debt for different age groups



In the above figure, three different types of debt are examined. The credit card debt is the third largest source of household indebtedness, and makes its unique impact on the economy. The meaning behind an increasing amount credit card debt is twofold: on the one hand, higher credit card debt means higher consumption spending which puts the economy on a positive track. On the other hand, if the income stays low, this might indicate an increased demand for borrowing to 'make ends meet' rather than being a reflection of a well-founded increase in consumer confidence. The credit card borrowing reflects strongly on the financial perception of a household. The second type

of non-collateralized debt is bank overdraft or credit lines, with the former usually linked to the latter. The remainder, such as student loans, car loans, etc., forms the other types of non-collateralized debt.

Christelis et al. (2013), and Sierminska and Doorley (2013) both find household characteristics contribute relatively little to the differences in debt holdings across countries. Christelis et al. (2013) suggest that it is rather the economic environment that plays a key role, and that the US economic environment is more conducive to having debt than the economic environment of European countries. In this paper, we analyse the effect of the financial perception, such as financial expectation, the attitude towards risk and the awareness of indebtedness.

Literature has already revealed a strong relationship between financial perceptions and household debt. Brown et al. (2005) and Brown et al. (2008) analysed the relationship between debt and financial expectation. Their calculation of financial expectation is measured by a financial expectation index. Davies and Lea (1995) analysed students' attitude towards debt and explained their results in the context of a life-cycle theory. Godwin (1997), using U.S. panel data, explores the dynamics of households' use of credit and their attitudes towards credit.

In HFCS data, households are asked the following question: *Over the next year, do you expect your (household's) total income to go up more than prices, less than prices, or about the same as prices?* Following Brown et al. (2005, 2008), we construct a financial expectation series, where households who answer *less than prices* were coded as 0, *about the same as prices* were coded as 1 and *more than prices* were coded as 2. Thus, the index ranks household according to their financial expectation. We also construct a dummy variable for whether a household expects to receive an inheritance in the future.

For risk preferences, we also construct a series, coding the series to 4, for the question, *Which of the following statements comes closest to describing the amount of financial risk that you (and your husband/wife/partner) are willing to take when you save or make investments?* as follows;

Take substantial financial risks expecting to earn substantial returns: 3.

Take above average financial risks expecting to earn above average returns: 2.

Take average financial risks expecting to earn average returns: 1.

Not willing to take any financial risk: 0

To capture the awareness of indebtedness, we look at the answers to whether the last 12 months expenses were below/above income. If the answer is *expenses less than income*, then we give a value of 0; if the answer is *expenses about the same as income*, we give a value of 1; and if the answer is *expenses exceeded income*, we give a value of 2.

Finally, we also control for variables that we expect to have an impact on the household debt, as suggested by both theory and established empirical work. In particular, we include the age group dummy, where we divided the age of the household into 6 groups: between 18 to 24, between 25 to 34, between 35 to 44, between 45 to 54, between 55 to 64, and over 65. We also include dummies for education, household size, gender dummy, marital status, employment percentile (which is calculated by the number of household members in employment divided by the number of household members), and finally, we include dummies for income quantiles.

5. Decomposing the Debt Prevalence

Is the difference in debt prevalence between core and periphery countries explained by the households' financial perceptions and their demographic characteristics, or is it dependent on the broader institutional and economic setting? Table 1 provides the results of the counterfactual decomposition of prevalence for the case of non-collateralized debt and the three subcategories. From Table 1, we can observe the most important contributors to the covariate effect, which are all in favour of the periphery countries. That is, in households having the same financial expectations, risk preferences and a clear idea of their indebtedness, the probability of getting a non-collateralized debt in the periphery is larger than in the core countries. The reason behind this might be that, in the peripheral economies, the household financial portfolio constructed by household debt, asset and income has changed dramatically, leading to the sovereign debt crisis in Europe. Household debt rapidly increased before the crisis,

contributing to the inflation of the asset bubble, leading to a relatively stable debt-to-asset ratio due to a boom in housing and stock markets. When property and share prices fell during the financial crisis, a fall in household net wealth followed and this, combined with reduced income due to a shirking economy, made it hard for them hard to service their debt. This resulted in the financial portfolio of many households entering into an unsustainable state. Thus, financial perceptions overtake the economic condition and become the main contributor to the total difference in the debt prevalence.

What is noticeable is that in all cases, except credit card consumption, the difference in taking on non-collateralized debt between core and periphery is largely due to the coefficient effect and always in favour of periphery. In other words, the economic environment in the periphery seems more conducive to having different kinds of non-collateralized debt except for credit card consumption, where the household financial characteristics and financial perception have the same level of contribution as the economic environment. The results are consistent across the three subcategories of debt for the coefficient effect. For the household characteristics, we find a positive covariate effect for bank overdraft and other non-collateralized debt. For the variables relating to financial perception, we find the effects are mixed. The awareness of indebtedness seems to have a positive covariate effect, except in the case of credit card. Finally, it would seem that financial expectations do not play a very important role in determining the difference in debt prevalence.

With regards to the coefficient effect, we can see all coefficient effects are in favour of European peripheral countries. As can be observed in Table 1, the coefficient effect for the household characteristics is quite consistent across the non-collateralized debt and the three subcategories. Compared with other variables, the risk preference accounts for most of the coefficient effects, with the highest impact being on credit card debt. This coefficient effect implies that, for any given level of risk preferences, the probability of having a credit card is large in the periphery.

6. Decomposing the levels of Debt Holdings

In this section, we applied a RIF regression on the quantiles of the debt distributions for the amount of total household non-collateralized debt and its three subcategories: bank overdraft, credit card, and other collateralized debt. We tested for the overall covariate and coefficient effect as described in Section 3 as well as individual possible influences from the financial perception, which has been further grouped into the household financial expectation, the risk preference and the awareness of the indebtedness. The decomposition method described in Section 3 can be written from the viewpoint of the peripheral countries. That is, the covariate effect measures the expected change in periphery's mean outcome, if periphery would have the same household characteristics and financial perception as those for the core.

We will only examine those households that have reported their outstanding amount of non-collateralized debt. The results for the detailed decomposition are presented in Table 2 to 4, for the counterfactual decomposition at 3 different quantiles of the debt distribution. The differences in the total log amount of debt conditional on participation are then decomposed into two parts, one related to the financial perception and household characteristics (covariate effect), and the other related to the total economic environment (coefficient effect).

The detailed decomposition can be explained as follows: the observed differences in debt between periphery and core countries are decomposed into that which is due to difference in the outstanding amount of debt that would have been observed had the **core** countries displayed the same household characteristics and financial perception as those in **the periphery**, that is, it represents the contribution of the household characteristics and financial perception (often termed "covariate" or "composition" effect). The second is due to the difference in the outstanding amount of debt that would have prevailed if core countries faced the same coefficients as those in the periphery, that is, it reflects the contribution of differences in coefficients (coefficient effects).

Table 1: Differences in prevalence of non-collateralized debt

| | Total | Overdraft | Credit Card | Other |
|--------------------|-------------------|-------------------|-------------------|-------------------|
| Total difference | 0.269 (0.012) | 0.176 (0.016) | 0.042 (0.020) | 0.097 (0.019) |
| Expectation | 0.002 (0.001) | 0 (0.003) | 0.001 (0.004) | 0.003 (0.005) |
| Risk | 0.005 (0.002) | 0.005 (0.002) | -0.011 (0.003) | -0.029 (0.005) |
| Indebtedness | 0.123 (0.01) | -0.063 (0.012) | 0.012 (0.015) | -0.112 (0.003) |
| Other | -0.005 (0.003) | 0.007 (0.003) | 0.013 (0.004) | 0.006 (0.004) |
| Covariate effect | 0.155 (0.011) | -0.021 (0.015) | 0.021 (0.019) | -0.126 (0.017) |
| Expectation | 0.004 (0.023) | 0.015 (0.021) | -0.007 (0.024) | 0.02 (0.026) |
| Risk | 0.038 (0.021) | 0.044 (0.024) | 0.069 (0.035) | 0.116 (0.043) |
| Indebtedness | 0.01 (0.056) | 0.099 (0.070) | -0.031 (0.078) | 0.142 (0.106) |
| Other | 0.09 (0.023) | 0.174 (0.035) | 0.031 (0.035) | 0.1 (0.041) |
| Coefficient effect | 0.114 (0.012) | 0.197 (0.021) | 0.021 (0.222) | 0.223 (0.174) |

Using the RIF regression, we are able to decompose the total differences at different quantiles of the distribution of the observed outcome variables into those raising from different configuration of household and financial perception, and those resulting from

differences in the influence of a given set of characteristics other than household characteristics and financial perception (economic environment).

For a detailed decomposition, we first decompose differences in the outstanding amount of the total non-collateralized debt and the three subcategories. We report the results at 25th, 50th, and 75th percentile in Table 2, 3, and 4 respectively. As can be seen, the estimated differences vary across different quantiles for the total differences and the same independent variables. The results for the detailed decomposition and the standard errors are presented in the tables. The standard errors we presented are obtained from a bootstrap method by running the RIF regression at difference quantiles of the distribution and repeating the estimation and decomposition 300 times.

Since we are modelling the differences in the outcome variable between periphery and core countries in Europe, the more similar the market or economic conditions in a set of countries or regions, the more similar should be the differences for the amount of holdings at different quantiles of the debt distribution between counties or regions with the same economic environment. On the other hand, covariate effects show the extent to which differences in the non-collateralized debt are due to the differences in the configuration of the household characteristics and financial perception between core and peripheral countries.

In the following section, we will first present the results with regards to the coefficient effect and covariate effect for the decomposition and then we will present results for each variable with regards to the financial perception across different quantiles of the debt distribution. According to the detailed decomposition presented in the following tables, it may be seen that while a positive covariate effect implies that in households with similar characteristics and financial perceptions in peripheral nations it is more conducive to have debt, the positive coefficient effect indicates that the economic environment is more conducive to incurring debt.

Table 2 shows the difference in the amount of holding at 25th percentile of the debt distribution for different types of collateralized debts between periphery and core counties in Europe and their counterfactual decomposition into covariate and

coefficient effect relating to the household characteristics and financial perception. The total differences calculated between core and periphery for the 25th quantile of the total debt is 0.299. The difference for bank overdraft is significant almost for all three subcategories, at 0.493. The difference for other non-collateralized debt is low at the bottom of the debt distribution. The differences are positive for the total non-collateralized debt, suggesting the fact that peripheral counties have higher debt than core counties at the bottom of the debt distribution.

Moreover, for the total non-collateralized debt, the covariate effect measured from the view point of periphery is negative and significant. -0.097 gives the expected change in the periphery's debt at the 25th quantile of the debt distribution, if peripheral countries had the same financial perception and household characteristics as those in the core. The negative indication further implies that if the characteristics and perception towards borrowing in core countries is applied to the periphery, the debt level will decrease. In other words, financial perception in European peripheral countries is more conducive to having debt than in European core countries.

By contrast, the positive coefficient effect for the total debt is significantly positive. 0.396 quantifies the expected change in the periphery's non-collateralized debt, at 25th quantile of the distribution affected by the economic environment – if all counties have the same characteristics and financial perception as those in the periphery. Since the coefficient effect is positive, this implies that if the same coefficient in peripheral counties applies to the core, the debt level will increase. Overall, the gap between the core and the periphery is smaller at the bottom of the debt distribution, because the periphery has lower endowments of debt determining characteristics at that level. Moving on to the three subcategories of debt, the total differences in credit card consumption are negative, suggesting a higher debt at the bottom of the scale of distribution of credit card holdings for the core countries, which indicates a higher regard for the use of credit cards in core counties than in the periphery. The higher number of credit card holdings in core countries is mainly due to the lower effect from the economic environment. That is, the economic environment condition is more conducive to taking out debt in core countries than in the periphery.

Table 2: Differences in Debt Holdings – Q25

| | Credit | | | |
|--------------------|-------------------|-------------------|-------------------|-------------------|
| | Total | Overdraft | Card | Other |
| Total difference | 0.299 (0.132) | 0.493 (0.086) | -0.29 (0.084) | 0.067 (0.062) |
| Expectation | 0.002 (0.005) | -0.002 (0.016) | 0.005 (0.029) | 0.01 (0.028) |
| Risk | -0.023 (0.011) | 0.002 (0.007) | 0.01 (0.01) | -0.05 (0.015) |
| Indebtedness | -0.005 (0.015) | -0.001 (0.011) | 0.001 (0.01) | -0.005 (0.011) |
| Other | -0.071 (0.02) | -0.206 (0.03) | -0.24 (0.029) | -0.3 (0.03) |
| Covariate effect | -0.097 0.023 | -0.207 0.002 | -0.224 0.0993 | -0.345 0.021 |
| Expectation | -0.361 (0.431) | -0.311 (0.268) | 0.024 (0.138) | -0.037 (0.198) |
| Risk | -0.086 (0.55) | 0.182 (0.317) | -0.141 (0.373) | -0.24 (0.259) |
| Indebtedness | 0.269 (0.547) | 0.144 (0.277) | -0.057 (0.325) | 0.191 (0.236) |
| Other | 0.574 (0.854) | 0.685 (0.447) | 0.108 (0.461) | 0.498 (0.515) |
| Coefficient effect | 0.396 (0.234) | 0.7 (0.212) | -0.066 (0.298) | 0.412 (0.239) |

The differences in the mean of the distribution, as presented in Table 3, are much greater than the differences at the bottom of the debt distribution. The covariate effects are most significant and in favour of the core countries. That is, if the European core are assumed to have the same economic environment as that faced by households in periphery countries, the covariate effect would make the core households more prone to assuming a larger non-collateralized debt than that assumed by the periphery

countries. Credit card utilization is larger in the core countries than in the European periphery, as indicated by negative total differences. These variations mainly come from the differences in household characteristics and economic conditions. Relatively speaking, the financial perception contributes less to differences in credit card debt holding.

Table 3: Differences in Debt Holdings – Q50

| | Total | Overdraft | Credit Card | Other |
|--------------------|-------------------|-------------------|-------------------|-------------------|
| Total difference | 0.102 (0.063) | 0.319 (0.079) | -0.342 (0.04) | -0.19 (0.062) |
| Expectation | 0.001 (0.004) | 0.009 (0.008) | 0.028 (0.015) | 0.042 (0.01) |
| Risk | -0.023 (0.008) | 0.006 (0.007) | 0.022 (0.007) | -0.074 (0.01) |
| Indebtedness | 0.004 (0.009) | 0.004 (0.007) | 0.01 (0.007) | 0.001 (0.007) |
| Other | -0.1 (0.019) | -0.226 (0.021) | -0.256 (0.022) | -0.042 (0.032) |
| Covariate effect | -0.118 (0.021) | -0.207 (0.088) | -0.196 (0.078) | -0.073 (0.023) |
| Expectation | -0.031 (0.317) | 0.206 (0.139) | 0.077 (0.107) | 0.025 (0.106) |
| Risk | 0.019 (0.312) | -0.149 (0.244) | 0.179 (0.194) | -0.699 (0.381) |
| Indebtedness | -0.165 (0.353) | 0.203 (0.235) | 0.014 (0.245) | 0.072 (0.176) |
| Other | 0.397 (0.599) | 0.266 (0.657) | -0.416 (0.835) | 0.485 (0.948) |
| Coefficient effect | 0.22 (0.013) | 0.526 (0.002) | -0.146 (0.012) | -0.117 (0.322) |

Table 4: Differences in Debt Holdings – Q75

| | Credit | | | |
|--------------------|---------|-----------|---------|---------|
| | Total | Overdraft | Card | Other |
| Total difference | 0.142 | 0.385 | -0.086 | -0.325 |
| | (0.059) | (0.052) | (0.043) | (0.054) |
| Expectation | 0.005 | -0.007 | 0.005 | 0.011 |
| | (0.005) | (0.008) | (0.013) | (0.009) |
| Risk | -0.012 | 0.012 | 0.036 | -0.076 |
| | (0.009) | (0.008) | (0.009) | (0.012) |
| Indebtedness | 0 | -0.001 | -0.001 | 0 |
| | (0.009) | (0.007) | (0.006) | (0.007) |
| Other | -0.133 | -0.189 | -0.191 | -0.602 |
| | (0.025) | (0.027) | (0.032) | (0.039) |
| Covariate effect | -0.14 | -0.185 | -0.151 | -0.667 |
| | (0.043) | (0.022) | (0.023) | (0.012) |
| Expectation | 0.142 | 0 | -0.062 | 0.006 |
| | (0.25) | (0.131) | (0.085) | (0.098) |
| Risk | -0.358 | -0.168 | 0.109 | -0.187 |
| | (0.232) | (0.19) | (0.166) | (0.096) |
| Indebtedness | -0.226 | -0.056 | -0.01 | -0.001 |
| | (0.165) | (0.156) | (0.165) | (0.091) |
| Other | 0.724 | 0.794 | 0.028 | 0.524 |
| | (0.272) | (0.205) | (0.398) | (0.255) |
| Coefficient effect | 0.282 | 0.57 | 0.065 | 0.342 |
| | (0.223) | (0.023) | (0.212) | (0.132) |

Moving on to the top of the debt distribution, the decomposition results for both credit card and other non-collateralized debt show the core counties as having a higher amount of holdings than in the periphery, and this modification in the differences is mainly from changes in household characteristics.

7. Conclusion

This paper examines the differences in non-collateralized debt between core and peripheral nations in Europe. Using the Eurosystem Household Finance and Consumption (HFCS) data, we identify key differences in borrowing behaviour between core and peripheral nations. As such, we focus on non-collateralized debt, in particular credit card loans, bank overdraft and other forms of non-collateralized debt, which reflect the daily borrowing behaviour more closely than does mortgage debt. We examine the differences in the levels and prevalence of these debts, and decompose the differences into two major components: those induced by financial perceptions and those induced by the economic environment. We aim to explain to what extent these influences contribute to the differences in debt ownership and the extent of holding between core and peripheral countries in Europe.

We applied a RIF regression for quantile distribution on the levels of household debt conditional on participation. Compared with the traditional Blinder-Oaxaca method, which is based on the mean of the distribution, our method can provide a richer description of the distribution, by not only providing information on the overall contribution from the differences in debt determinant characteristics and influences from those characteristics on debt holdings, but also by examining the contribution of each covariate to each decile of the debt distribution.

We found that differences in financial perception contribute to the differences in debt in a significant way, while the economic environment contributes little to this outcome. Households in the European periphery are much more conducive to debt if they have similar financial perceptions to those in the core countries in Europe. Moreover, we discovered that a substantial role existed in terms of household attitude towards risk in explaining the differences in the amount of debt holdings conditional on participation. That is, the European periphery, given the same risk preferences and facing the same core conditions, would hold more debt. The indications for the covariate and coefficient are the same across the three subcategories. With regard to bank overdraft, there is a large difference in the debt at the bottom of the distribution. This remains the case whether or not such evidence is exhibited by differences in the economic condition,

when households in core and periphery have the same characteristics and financial perceptions.

References

- Attanasio, O., 1998, Cohort analysis of saving behavior by U.S. Households, *The Journal of Human Resources* 33, 575-609.
- Becker, T., and R. Shabani, 2010, Outstanding debt and the household portfolio, *Review of Financial Studies* 23, 2900-2934.
- Bover, O., J. Maria Casado, S. Costa, P. Du Caju, Y. McCarthy, E. Sierminska, P. Tzamourani, E. Villanueva, and T. Zavadil, 2014, The distribution of debt across euro area countries: The role of individual characteristics, institutions and credit conditions, ECB Working Paper Series No. 1639.
- Brown, S., G. Garino, and K. Taylor, 2013, Household debt and attitude towards risk, *Review of Income and Wealth* 59, 283-304.
- Brown, S., G. Garino, K. Taylor, and W. Price, 2005, Debt and financial expectations: An individual- and household-level analysis, *Economic Inquiry* 43, 100-120.
- Brown, S., and K. Taylor, 2008, Household debt and financial assets: Evidence from Germany, Great Britain and the USA, *Journal of the Royal Statistical Society: Series A (Statistics in Society)* 171, 615-643.
- Christelis, D., D. Georgarakos, and M. Haliassos, 2012, Differences in portfolios across countries: Economic environment versus household characteristics, *Review of Economics and Statistics* 95, 220-236.
- Coile, C., and K. Milligan, 2009, How household portfolios evolve after retirement: The effect of aging and health shocks, *Review of Income and Wealth* 55, 226-248.
- Davies, E., and Lea, S. E. G., 1995, Student attitudes towards student debt, *Journal of Economic Psychology* 16, 663-679.

DiNardo, J. and Fortin, N.M. and Lemieux, T., 1996, Labor market institutions and the distribution of wages, 1973-1992: A semiparametric approach, *Econometrica* 64, 1001-1044.

Donald, S.G., Green, D.A. and Paarsch, H.J., 2000, Differences in wage distributions between Canada and the United States: An application of a flexible estimator of distribution functions in the presence of covariates, *Review of Economic Studies* 67, 609-633.

Duygan-Bump, B., and C. Grant, 2009, Household debt repayment behaviour: What role do institutions play? *Economic Policy* 24, 108-140.

Ekici, T., and L. Dunn, 2009, Credit card debt and consumption: Evidence from household-level data, *Applied Economics* 42, 455-462.

Firpo, S., N. M. Fortin, and T. Lemieux, 2009, Unconditional quantile regressions, *Econometrica* 77, 953-973.

Fortin, N., Lemieux T., and S. Firpo, 2011, Decomposition methods in economics, in Orley and David Card Ashenfelter, ed.: *Handbooks of labor economics* (Elsevier B.V., San Diego and Amsterdam).

Fortin, N.M. and Lemieux, T., 1998, Rank regressions, wage distributions, and the gender gap, *Journal of Human Resources* 33, 610-643.

Godwin, D. D., 1997, Dynamics of households' income, debt and attitudes towards credit, 1983- 9, *Journal of Consumer Affairs* 31, 303-325.

Juhn, C. and Murphy, K.M. and Pierce, B., 1993, Wage inequality and the rise in returns to skill, *Journal of Political Economy* 101, 410-442.

L., Pelizzon, and Weber G., 2008, Are household portfolios efficient? An analysis conditional on housing, *Journal of Financial and Quantitative Analysis* 43, 401-431.

La Cava, G., and J. Simon, 2005, Household debt and financial constraints in Australia, *Australian Economic Review* 38, 40-60.

Machado, J., and J. Mata, 2005, Counterfactual decomposition of changes in wage distributions using quantile regression, *Journal of Applied Econometrics* 20, 445-465.

Meng, X., N. Hoang, and M. Siriwardana, 2013, The determinants of Australian household debt: A macro level study, *Journal of Asian Economics* 29, 80-90.

Meniago, C., J. Mukuddem-Petersen, M. Petersen, and I. Mongale, 2013, What causes household debt to increase in South Africa? *Economic Modelling* 33, 482-492.

S., Brown, G. Garino, and K. Taylor, 2008, Mortgages and financial expectations: A household-level analysis, *Southern Economic Journal* 74, 857-878.

Yilmazer, T., and S. DeVaney, 2005, Household debt over the life cycle, *Financial Services Review* 14, 285-304.