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Job polarisation and  
household borrowing

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## Abstract

The last few decades have been accompanied by disruptive changes to the structure of employment which have led to deterioration in demand for middle-skill occupations, a process known as job polarisation. As the demand for middle-skill workers shrinks, expectations about households' income through their lifetime horizon are adjusted. It is unclear whether these expectations can loop back into the credit system, and affect the lending behaviour of credit institutions, or whether this process impacts on the households' self-assessment of their opportunities to borrow money. In this paper, we study how the process of job polarisation affects credit demand and supply, studying its relationship with credit constraint and credit quality.

**JEL codes:** G51, J24, D84, O15

**Keywords:** *Job polarisation, Job security, Household credit, Employment expectations*

## Non-technical summary

This article places itself at the crossroads between three different literature traditions: access to finance, job security and job polarisation.

The last few decades have been accompanied by disruptive changes to the structure of employment within advanced economies. On the one hand, this has led increasing demand of jobs which requires high level of skills, an increase that Branko Milanović has described as a natural trait of meritocratic capitalism. On the other hand, this same process have led to deterioration in demand for middle-skill occupations, a process known as job polarisation. This process has twofold impact: it heterogeneously impacts on future income expectations and, additionally, it affects job insecurity conditionally on skill.

The connections between rising polarisation and income inequality have been thoroughly studied. However, it is unclear whether these changes in income across occupation classes can loop back into the credit system, and affect the lending behaviour of credit institutions, or whether this process impacts on the households' self-assessment of their opportunities to borrow money. As the demand for middle-skill workers shrinks, expectations about household income though their lifetime horizon are adjusted. Practically, this is an unexpected downwards adjustment of permanent income and it changes individuals' as well as finance institutions' assessment of individual's future income. This has an impact on both applying for a loan and it being granted. In this paper, we study how the process of job polarisation affects credit demand and supply, studying its relationship with credit constraint and credit quality.

The analysis of this paper is based on two data sources: Household Consumption and Finance Survey (HFCS) and Labour Force Survey (LFS). We are linking these two data sources and the job polarisation indicators are based on the LFS. We analyse short-term (five years) job polarisation at the ISCO-08 two-digit level and the medium-term job polarisation at the ISCO-08 one-digit level. Access to finance and job security are analysed by using specific variables defined for the issues in the HFCS. We analyse the inter-relation of job polarisation and access to finance/job insecurity by defining two regression models: a naive model, and a self-selection one.

The fundamental difference of the two models is that in the naive model we assume that the job polarisation is an exogenous factor, i.e., that the household is not able to control it. The second model instead controls the self-selection issue caused by individuals self-selecting into occupations that were already experiencing polarisation.

We found medium-term polarisation to prevail over long-term polarisation when it comes to demand and supply of household debt. Our results indicate that, overall, for every 1% decrease in weekly hours in a given occupation over the last five years, equal (on average) to 25,000 full time jobs, the probability of a household (whose head is employed in that occupation) being refused credit increases by 0.7%. This happens regardless of the financial situation of the household, and holding the total number of jobs in an economy as fixed, meaning that these constraints are

entirely generated by expectations on changes in labour demand. We found job polarisation to be largely unrelated to perceived job security, with the former playing a larger role for credit supply, and the latter prevailing in terms of credit demand.

# 1 Introduction

Household wellbeing and distributional issues have been of rising concern in the economics and policy discussions in recent years. Distributional issues have gained more emphasis because of the 2008 subprime crisis. At the beginning of the crisis, the Stiglitz-Sen-Fitoussi Commission, which was nominated by French president Sarkozy, published its final report in 2008. The central message of the report was to emphasise the measurement of inequality and distribution. A few years after this, Thomas Piketty (2014) published his book on capital in the twenty-first century which concludes that the world is moving to an increasingly unequal period in which the capital is running the generation of income and the increasing income gets into pockets of the richest people.

Milanović (2019, pp. 13-23), who has actively contributed to this on-going inequality debate, notes that in liberal meritocratic societies, the capital-income rich are also labour-income rich, being highly paid managers or other elite professionals. These people work to draw their high salaries but these same people, whether through their inheritance or because they saved enough money, also possess extensive financial assets and draw a significant amount of income from them. Compared to the past and classical capitalism, the people at the top of the income distribution were financiers, rentiers and owners of large industrial holdings who did not have any labour income.

Among advanced economies, the increasingly unequal concentration of wealth highlighted by Piketty and Milanović is paralleled by a homologous trend towards increasing specialisation in labour markets. While an increasing number of jobs are requiring high amount of human capital as described by Milanović (2019), middle skill jobs are gradually disappearing, and the wage differential between high-skill and low-skill occupations is increasing in both the US and the EU (e.g., Autor et al., 2006; Autor and Dorn, 2013; Fernández-Macías and Hurley, 2016; Goos et al., 2009, 2014). Technological change in the meritocratic society leads to the creation of highly paid, highly specialised jobs and low-skill service occupations, but also to the disappearing of several other jobs. Increasing inequality and polarisation create a feedback loop where the rich get richer, and the poor get poorer: a non-trivial issue that can ultimately affect the quality of institutions, democratic stability and systemic trust (Kotschy and Sunde, 2020).

This process of job polarisation is not only downgrading jobs, but might influence expectations about job security, level of living and permanent income. On the one hand, polarisation might not only impact the actual level of consumption, but also the possibilities to save, accumulate wealth and, in particular, might limit access to credit market as permanent income flow is among the factors defining this access (Kavonius et al., 2021). As Sen (2000, p. 13) has pointed out "not having access to the credit market can, through causal linkages, lead to other deprivations such as income poverty, or the inability to take interesting opportunities that might have been both fulfilling and enriching but which may require an initial investment and use of credit". On the other hand, job depreciation might also lead to problems in amortising and maintaining

existing debt for households which are already indebted.

Studies on inequality have largely focused on low-income households or alternatively, the increasing wealth of the rich. Indebtedness is a less investigated topic and even the concept of the indebtedness is less established than the concept of poverty. Additionally, the connections between occupational outcomes, decreasing income perspectives and credit opportunities remain mostly unexplored.

This paper focuses on job-polarisation and security and how these are interlinked with credit prospects. Our focus can be further divided into two research questions: first, how is perceived job security connected to debt-taking behaviour and opportunities? This question tackles with how idiosyncratic conditions affecting an individual's own job security affects credit access. Second, is there a relationship between the downgrading process of jobs and debt taking? This question instead studies if households can experience credit exclusion due to outside expectations on the changing nature of jobs on an aggregate level.

The paper has been organised as follows: First, the related literature is discussed in Section 2. This topic is in the culmination point of three research areas: job-polarisation, access to finance and indebtedness, but also over-indebtedness. This is followed by defining the research question in Section 3 and the concepts and definitions applied. Then, the data (Section 4), and the empirical models (Section 5) are discussed. Finally, the results are presented (Section 6) and the conclusions (Section 7) are drawn.

## 2 Literature review

This article places itself at the crossroads between three different literature traditions: access to finance, job security and job polarisation. As far as the authors of this article are aware, no studies before ours have studied how job polarisation is related to the financial situation of households.

Credit constraint in general can arise from both demand and supply factors (Grant, 2007). Job conditions, in the context of financing, may lead to difficulties in accessing finance or over-indebtedness. This process is illustrated in Figure 1.

Increased job insecurity and job polarisation can lead to credit constraint in three ways. First, the household might already be indebted. If the increased insecurity is unexpected, the level of indebtedness is either such that the household can maintain the existing credit or it is not able to amortise it, i.e., the household is over-indebted. However, in this article we are not focusing on either households who are already indebted or who do not need financing, which we highlighted with a darker colour in the figure. Second, the household needs either additional or new credit and the household considers that it will not be issued to it. The former scenario is indicated in Figure 1 as self-exclusion. In the latter scenario the household enters the credit market instead. In this case there are three possible outcomes. First, the household has normal access to the credit markets and obtains the requested amount of credit. Second, that the household receives

credit but with higher interest than the average household or receives less than initially requested. Third, that the bank refuses to issue credit to the household.

Starting from the study by Autor et al. (2006), the erosion of demand for middle skills occupations relative to high-skilled and low-skilled jobs has increasingly gained attention in the economics literature. This phenomenon, more succinctly defined as job polarisation, has characterised both the US (Autor and Dorn, 2013; Autor, 2013, 2019) and the EU alike over the last decades (Goos et al., 2009, 2014; Adermon and Gustavsson, 2015; Fernández-Macías and Hurley, 2016).

Its causes have been thoroughly discussed. While the phenomenon can also be attributed to factors of labour supply, such as offshoring and the ageing of the middle skill workforce (Green, 2019), the general consensus is that the origins of the problems can predominantly be traced back to routine-biased technological changes (Goos et al., 2014). These studies also underline that the disappearance of routine-intensive occupations features both within and between-industry components. As a result of these developments, labour loses its competitive advantage to automated tasks in routine intensive activities (Acemoglu and Restrepo, 2018). As innovations in automation operate in the short to medium term, human capital investments cannot be recouped, leading to a decrease in relative demand for affected occupations, which, in practice, translates into the decline of middle skill jobs, in which routine task-intensity is usually at its highest, and the consequent increase in income inequality.

While most of these studies have focused on the changes which have taken place in the last few decades, without attempting to forecast future developments, a general expectation that demand for middle-skill professions will keep on decreasing in the future can be identified (Autor, 2019). It is worth wondering if these expectations can feed back into the economy, and which externalities might then generate.

With regards to access to finance, several studies have focused on the relationship between access to finance and wellbeing. Additionally, others have focused on the technical application defining access to finance, namely credit scoring, and its impact on credit development. These are also issues defining credit access as well as self-exclusion as described in Figure 1: in this regard, Birkenmaier and Fu's (2019) research question is connected to the one we are researching in this paper. While not directly researching the impact of job polarisation, they analysed the impact of large income drops on the credit record. The study applies U.S. data showing that household financial access is significantly affected by large income drops. Trumbull (2012) also argues that the relationship between access to credit markets and welfare is not unique only in the U.S. but is also evident in France. Along these lines, (Dwyer, 2018) concludes that credit and debt shape inequalities impact multiple pathways on social inclusion and exclusion directing life changes. This is very much in line with the observation by Sen (2000) in which he highlights that without access to the credit market, households may be unable to take up economic opportunities that could be enriching.

Many studies have focused to the credit scoring and technological development, which is

used in credit decision process. (Leyshon and Thrift, 1999) discuss how market knowledge and increasing implementation of information technology impacts on the retail banking and their and their customer decisions. In their paper, they conclude that at the time automatic credit-scoring systems were increasingly implemented in banks' credit decision mechanisms. Many studies focus on credit denial and the screening processes of the banks (Friedline and Freeman, 2016). For this paper, it is relevant that the credit scoring has an impact on credit denial but also on the self-exclusion. As Fourcade and Healy (2016) would put it, these are the credit constraints learnt by the households.

Another stream of literature focuses on existing debt and how it is being managed. Dynan and Kohn (2007) have researched broadly the causes and consequences of the rise of the U.S. indebtedness. The study concludes that the underlying reasons are housing investments and their price development, demographic factors, financial innovation and to a certain degree, the impatience of households. Keese (2019) focuses on the triggers and determinants of household indebtedness in Germany. Making use of the German Socio-Economic panel, the paper analyses how much over-indebtedness is driven by events such as unemployment, childbirth, divorce or the death of a partner. The paper concludes that unemployment and decrease of income is central in entering over-indebtedness. In particular, if the decrease of income is combined with a mortgage, the risk of not being able to manage finances increases.

As Castrén and Kavonius (2013) analysed the impact with actual historical data, the other aspect in financial stability analysis is to look at the impact of financial vulnerabilities to financial stability in the context of simulated shocks. In studies like these, the measure of the systemic risk is typically studied.

How does this literature connect with job security and polarisation? It is fair to expect firms to reallocate their investment and hiring decisions in favour of human capital that is not expected to suffer from the challenge arising from automation and offshoring. At the same time, credit institutions might be wary of investing in labour-intensive sectors with a high degree of substitutable human capital. Changes in the employment structure can also affect household borrowing decisions, as there is evidence for job insecurity to affect consumption (Benito, 2006), and for individual expectations to affect borrowing behaviour in general, as Kløve and Mehlum (2018) find that over-optimistic income and wealth outlooks can lead individuals to accrue unsustainable levels of debt. In the context of job security and polarisation, other studies (Georgieff and Lepinteur, 2018) have shown that economy-wide changes in labour demand can have polarising effect over individual expectations on job stability.

A compelling piece of evidence on the effect of job polarisation on credit markets in the business sectors comes from the research of Favilukis et al. (2020). They used aggregate and firm level data to show how industries experiencing wage and labour growth have easier access to credit. On a related note, Olsson and Tåg (2017) also find that routine-intensive and offshorable sectors characterised by low productivity are the most affected by buyouts which, by triggering investments in automation and offshoring, often lead to job losses.



Evidence on the access to credit for the household sector is limited to studying the effects of job status, and more specifically the effects of transition between employment and unemployment. In this regard, the literature has found a link between job status changes and access to household credit, such as Keys (2018) and Keese (2019). These papers all provide microeconomic evidence of problems in financing caused by the switch to unemployment. The opposite causal channel (whether poor credit scores affect employment opportunities) has been investigated by Dobbie et al. (2020), who found no significant association.

However, how changes in the labour composition affect access to markets remains largely unexplored. While the relationship between income inequality and credit access has been studied in the literature, such as by Coibion et al. (2020), who found that low-income household are more likely to experience higher credit prices and reduced access to credit, no study has so far focused on the effects of occupational outcomes over household demand and supply for credit while holding income as fixed. In this paper, we intend to bridge this gap, and study how economy-wide changes in the labour force, and most importantly expectations of change, affect the relationship between the household sector and credit markets.

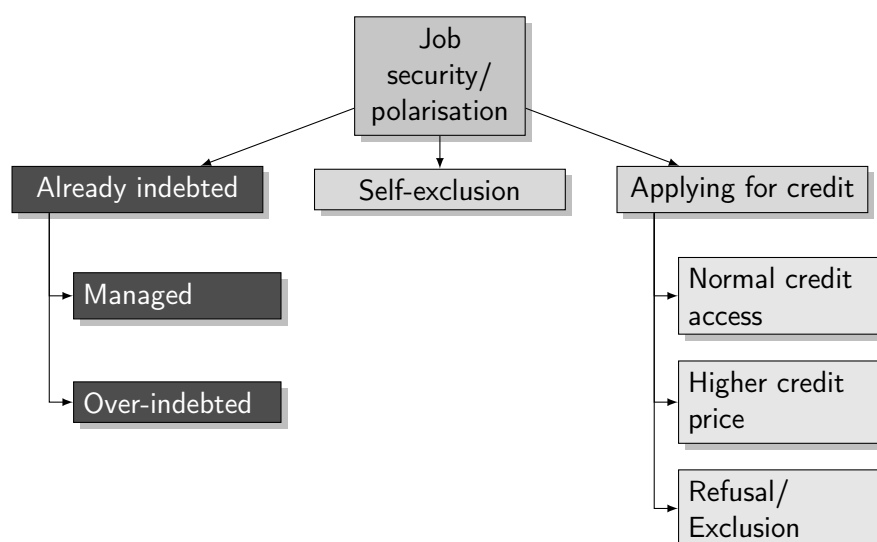


Figure 1: A sketch of the possible relationship between job security, polarisation and credit behaviour.

### 3 Research question

The aim of this article is to see how job polarisation has influence on the problems in financing and over-indebtedness. Job polarisation might affect households which need credit and households which are already indebted, as discussed earlier. In this article, we focus on credit access and leave the already indebted household for subsequent studies.

In this article we looked the impact of deterioration process in the short and medium run. In practice, we define short-term as five years and medium-term as 15 years. We measure job polarisation over these periods and investigate how it relates to access to credit today.

The starting point of the analysis is the permanent income hypothesis (Friedman, 1957). According to Friedman, consumption and, by extension, saving, is determined by long-term considerations, so that any transitory changes in income lead primarily to additions to assets or to the use of previously accumulated balances rather than to corresponding changes in consumption. To know how much transitory changes impact consumption the growth in income, consumption and wealth should be followed over a lifetime (Boushey, 2019). This also implies that if there is an unexpected shock in the income then adjustment of absolute consumption and savings can be expected.

The concept of job polarisation is relevant in this context, as recent decades have shown the deterioration of middle-skill jobs (see Autor, 2019; Fernández-Macías and Hurley, 2016; Goos et al., 2009) and the consequent rise of income inequality. We intend to test whether job security and job polarisation can impact income expectations in the long run, and in turn affect access to credit, and ultimately affect consumption. The key mechanism in the problems in financing is job polarisation. The problems in financing are defined in this paper from three perspectives: (1.) from the households' own demand for credit and self-exclusion from credit; (2.) from the willingness of financial institutions to supply credit, and; (3.) from the quality of credit and terms of borrowing themselves.

The topics of credit and access to finance have been much debated in the social sciences (Leyshon and Thrift, 1999; Langley, 2008; Trumbull, 2012; Lazarus and Lacan, 2018). Credit denial, which we are analysing in this context, is understood as a synonym for access to credit which is defined as an ability to use credit products and services from banks, credit companies and financial institutions (Friedline and Freeman, 2016; Birkenmaier and Fu, 2019).

The consequence of job insecurity and polarisation in terms of credit access can be seen from the permanent income hypothesis point of view as follows. On the one hand, the life- or long-time income is the defining factor in receiving finance. Job polarisation is an unexpected exogenous process which may lead to re-adjusting the permanent income. Therefore, re-adjustment has an impact on the supply and demand of access to credit. The credit institutions consider that the capability of amortising the debt is lower, and a potential credit applicant might consider that he/she has ended up in a situation in which financing no longer provided to him/her. Reassessing the risk might not lead only to increased difficulties in accessing credit, but also the credit institutions might assess their risk premiums and might only offer loans at high interest rates. As the capability of amortising debt decreases on the demand side, under life-cycle theory households might update their expectations on future income and labour status. Occupational changes might then affect a household's willingness to take on debt through this channel.

Information asymmetries can play a role in credit access (Stiglitz and Weiss, 1981), and it is clear that banks will need to proxy information on the borrower's occupational stability in some way. When requesting credit, household will disclose their occupation status, but not their idiosyncratic job security. Comparing how much job polarisation and security differ in terms of credit access and supply can provide a measure of these asymmetries and how well banks can

compensate for the lack on information on job stability beyond income, tenure and employment status information. The idea that credit institutions, like employers or insurance firms, might proxy unavailable individual information through other observables is not new to the economics literature. This form of statistical discrimination has been studied in Agan and Starr (2017); Doleac and Hansen (2020) and Bartik and Nelson (2019) for race (proxying for criminal records in the first two papers and credit scores in the third) and job applications.

Finally, if the household is already indebted, job expectations might have an impact on the capacity to amortise debt and, in the worst-case scenario, may lead to over-indebtedness. In these instances, debt has been taken on in a situation in which permanent income has been assumed to be higher and job polarisation can lead to either reduced or lost capability to amortise the debt: that is, over-indebtedness. However, in this paper we do not discuss how job polarisation relates to debt managing; rather our focus is on credit access.

## 4 Data and main variables

All variables used in the analysis are reported in Table 1. We used the Household Finance and Consumption Survey (HFCS) as our preferred data source. The survey collects detailed household-level data on a range of aspects of household balance sheets and related economic and demographic variables, including income, occupational information and household characteristics. The HFCS is conducted in a decentralized manner by the European Central Bank using a harmonised blueprint questionnaire. The HFCS is available for Austria, Belgium, Croatia, Cyprus, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Slovakia, Slovenia and Spain.

However, the data structure of the HFCS presents a few challenges for our analysis. In particular, while occupational information is provided for each member of the household, financial information relating to liabilities is usually nested at the household level. To account for how the occupational composition of a household affects debt, we focused on the specific occupation of the household head, which implies that we assume is the person who will be applying for credit, but the occupational status of other household members has also been considered.

Also, we restricted the sample to all households that have applied for (or have considered applying) credit within the last three years since the survey. In this way, the correlations with job security/polarisation can be measured in a relatively small timeframe, potentially increasing the chances that the household characteristics and macro-economic conditions captured at the time of the survey were still representative at the time of the credit application.

When looking at our main dependent variables, we focused on two aspects of credit access and conditions: credit constraint (including self-exclusion from credit, and credit refusal) and interest rates. The first two variables are already included in the HFCS.<sup>1</sup> As credit constraint

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<sup>1</sup>Variables *hc1400* "In the last three years, did you (or another member of your household) consider applying for a loan or credit but then decided not to, thinking that the application would be rejected?", and *hc1310* "In

describes the situation in which the household has applied for or considered applying for credit but was refused credit, received less credit than requested, or has not applied due to perceived credit constraints, we wanted to disentangle credit supply from credit demand. We did so by also studying credit refusal, which describes the same situation, but only for households which have applied for credit instead, omitting the self-excluded households that self-excluded. Finally, we studied self-exclusion by looking at how the decision to apply for credit is formed and influenced by changes in occupations (among all households who considered applying).

Interest rates have instead been constructed by dividing the sum of all interest payments from all the debt accumulated in the last three years by the total amount of this debt. As the year when the loan was taken is not available for all types of credit (it is missing for consumer credit), the missing year is imputed by the difference between the amount initially borrowed and the outstanding balance of the debt by the yearly repayments. If this difference is larger than three years, this source of credit has not been considered in the estimation. This calculation of interest rate might subject our results to attenuation bias because of the discounting of debt over the years because of inflation: we feel, however, that by focusing on such a short timespan characterized by low inflation, this bias is moderately contained and that the marginal contribution of adjusting the interest rate calculation for real rates is quite limited.

To measure perceived job security, we used the HFCS variable on probability of losing a job: "On a scale of 0 to 100, what do you think is the likelihood that you will lose your current job in the next twelve months [...]" (*pez010*). We inverted this variable and divided it by 100 so to harmonise it with the job polarisation variables in terms of comparability of results. As will be discussed later, dummies for the temporary and fixed term nature of work were also included in the control vector of the regression model, so that job security could be studied by holding contract characteristics as fixed.

The construction of a job polarisation variable required more effort. To ensure the largest period of job polarisation was examined, we focused on the third and latest wave of the survey (2017), but the analysis might be replicated on previous waves from 2011 and 2013.

While there is no defining year for the start of the current polarisation process, a large body of research has placed its start at the very end of the last century (Fernández-Macías and Hurley, 2016; Goos et al., 2014), and most studies on job polarisation focus on the transformation of the labour market in a period that can go back 15 years (Fernández-Macías and Hurley, 2016; Goos et al., 2009, 2014; Autor et al., 2006; Autor, 2019). Those that have studied polarisation for a longer period (such as Adermon and Gustavsson, 2015) find that task-biased polarisation has played a large statistical and economic role only since the turn of the century.

For these reasons, we decide to incorporate polarisation in our model by looking at both short term (a five-year timeframe) and medium term (15 years) polarisation. While these cut-offs are obviously arbitrary in nature, they provide a much-needed simplification for purposes of

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the last three years, has any lender or creditor turned down any request you [or someone in your household] made for credit, or not given you as much credit as you applied for?"

empirical tractability.

The aforementioned literature measured polarisation in terms of variation in total hours worked for each occupation in a given country over a specific timeframe (see, for example, Goos et al., 2014, 2009). For example, the polarisation indicator, say, for managerial occupations in a country is usually measured by the change between two specific years in the share of hours worked by managers against the total hours worked in the country. We followed a similar approach when creating our polarisation indicators, aggregating the data at the country and occupation level. Other indicators, such as the one from Dauth et al. (2014) have been considered, but data requirements often limited their empirical tractability in our research, meaning that these indicators could not be constructed. Also, the model-based nature of these indicators renders their interpretation less clear in the context of our model, hence why we opted for the simpler indicator focusing on the change in the share of hours worked in an occupation.

We measured medium-term polarisation from the baseline year 2002 combining official Eurostat data on average working hours and on the number of people employed in each occupation to obtain the total amount of hours of work supplied in an occupation for each country in years 2002 and 2017<sup>2</sup> Then, polarisation is measured as the difference in the share of hours worked in a given occupation and for a given country within each major occupational group (ISCO-08 one-digit codes) relative to the total occupation level in that same year, and the same relationship in 2002.

Short-term polarisation was measured using EU Labour Force Survey data from 2011 onwards. For short-term polarisation, we use a more granular indicator, and measure changes in the country-wide share of two-digit ISCO-08 occupations since 2012 instead.

In formulas, both short- and medium-term indicators are computed as:<sup>3</sup>

$$K_{ico} = \frac{\sum_{i=1}^N h_{ioc,t_1}}{\sum_{i=1}^N h_{ic,t_1}} - \frac{\sum_{i=1}^N h_{ioc,t_0}}{\sum_{i=1}^N h_{ic,t_0}} \quad (4.1)$$

Where  $h$  is the usual number of hours worked per week by each individual  $i$  in country  $c$  and occupation  $o$ , in years  $t_1$  (set as 2017) and  $t_0$ . The occupation subscript  $o$  reflects the one- or two-digit ISCO-08 code associated with the profession of the respondent. The 15- and five-years indicators were obtained by setting  $t_0$  in 2002 and 2012, respectively. In other words, for each country, each term in the right side of the equation gives the percentage of total hours worked in a given occupation relative to the total hours worked in a country, and polarisation is given by the difference between these percentages in 2017 and the baseline year (2002 or 2012).

This dichotomy between short and medium-term polarisation, and the differences in the granularity of the indicators, is linked to changes in the occupational coding conventions themselves.

<sup>2</sup>These data, based on EU-LFS estimates, is publicly available at: [https://ec.europa.eu/eurostat/databrowser/view/LFSA\\_EWHAIS\\_\\_custom\\_10689/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/LFSA_EWHAIS__custom_10689/default/table?lang=en) and [https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsq\\_eegais&lang=en](https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsq_eegais&lang=en). Data for all Euro area countries only available starting from 2000.

<sup>3</sup>LFS survey weights are omitted from the formula for simplicity.

At the one-digit ISCO-08 level, jobs are divided into 10 major occupational groups. At the two-digit level, these groups are further divided into more granular professions.

ISCO-08 occupational codes in the LFS are only available from 2011 onwards and are difficult to harmonise at the two-digit level with ISCO-88 codes, which were used in the previous rounds of the survey. While harmonisation for two-level codes is challenging (ILO, 2012), two-digit ISCO-88 codes can be directly converted into ISCO-08 at the one-digit level with relative ease: this means that, in the medium-term, our polarisation indicator can only be measured for major occupational groups.

These differences between classification schemes do not compromise our methodology, but actually come in our favour. As the nature of occupations changes, so does the demand for occupation: we needed to disentangle the idiosyncrasies borne from changes in the quality of occupations away from changes in the demand for specific skills and tasks. In other words, in a 15-year timespan, the same occupation might change its task structure completely, or might cease to exist altogether.

In the medium to long term, changes in the occupational structure can be expected to be accompanied by non-negligible idiosyncratic transformations in the nature of the occupation. These transformations are less likely to occur in the short term. These changes are reflected in the changing nature of ISCO classification standards themselves, which are updated precisely to consider the changing nature of occupations. For this reason, our strategy is not compromised by measuring changes in major (one-digit) occupational groups for the medium-term indicator, and changes in sub-major (two-digit) groups for the short-term.

## 5 Empirical model

In the short term, it is straightforward that phenomena such as job polarisation occur outside of the control of the individual. To account for that, a naive model would follow the following structure:

$$Y_{ico} = \alpha + X'_{ico}\beta + K'_{co}\gamma + \xi_c + e_{ico} \quad (5.1)$$

where we defined, for household  $i$ , in country  $c$  and occupation group  $o$ ,  $Y$  as the set of outcome variables of interest (credit constraint, credit refusal, credit self-exclusion and interest rates in a three years-span).  $X$  is a vector of control variables varying at the individual level and  $\beta$  a vector of coefficients. The coefficient vector  $\gamma$  captures the effect of our vector of job polarisation variables  $K$ . As mentioned earlier, we studied polarisation as both the medium-term 15-year change in hours worked within one-digit ISCO-08 occupations (major occupations) and the short-term five-year change for two-digit ISCO-08 occupations.

As  $K$  varies at the level of the country and occupation, country  $\xi_c$  fixed effects are identified, and  $\gamma$  will yield the within variation for each state. As the change in working hours should be measured relatively to the total working hours in each country, we would like to keep

Table 1: Main variables

VARIABLES	Definition	Source	original coding
Outcome variables			
Credit refusal	Household's credit applications have been refused at least once (last 3 years)	HFC5	DOCREDTREFUSAL
Credit self-exclusion	Household has considered applying for credit and applied for it (last 3 years)	HFC5†	HC1400
Credit constrained	Household has experienced either credit refusal or self-exclusion (last 3 years)	HFC5	DOCREDTITC
Interest rates	Weighted average of the interest rates of all loans received by the household in the last 3 years	HFC5†	–
Control variables			
5-years polarisation	% change in total hours worked between 2012 and 2017	LFS†	–
15-years polarisation	% change in total hours worked between 2002 and 2017	LFS†	–
Polarisation at $t_i$	% change in total hours worked between 2002 and $t_i$	LFS-HFC5†	–
Job security	Inverse of perceived likelihood of losing current main job within the last 12 months	HFC5†	PEZ010
Gross family income	Total family income before taxes, including interest payments (ln)	HFC5	DI2000
Labour income	Sum of received employee and self-employee income (ln)	HFC5†	DI1100, DI1200
Age	Age of reference person, Canberra definition	HFC5	DHAGEHI
Gender	Gender of reference person (female)	HFC5	DHGENDERHI
Weekly working hours	Hours worked per week in main job (average over year)	HFC5	PE0600
Time in main occupation	Years worked in main job	HFC5	PE0700
Household consumption	Average amount spent on consumer goods and services by the household (ln)	HFC5	HI0220
Pre-existing debt	Outstanding amount of all debt received before 2014	HFC5†	–
Household size	Household size	HFC5	DH0001
Household employment	Number of household members in employment	HFC5	DH0004
Education	Educational attainment of reference person (ISCED)	HFC5	PA0200
Job status	Labour status and status in employment	HFC5†	PE0100, PE0200
Foreign born	Born outside the country of fieldwork	HFC5†	RA0400
Property status	Household has acquired the main property through gifts or inheritances	HFC5†	HB0600
Investment attitudes	Self-assessed financial risk aversion	HFC5	HD1800
Occupation	Two-digit ISCO-08 occupation class	HFC5	PE0300

Notes: Outcome and control variables used in the analysis. All variables concern the reference person unless stated otherwise. †Author's re-elaboration using the stated data source. Original variable coding omitted when more than two variables have been used to construct the final variable.

country-idiosyncratic employment levels and credit propensity as fixed. This was achieved in two ways. First, idiosyncratic employment levels were considered when constructing the polarisation indicators, as detailed earlier in Section 4: this ensured that the  $\gamma$  coefficient would not be biased by the total employment levels in each country. Secondly, general differences in the credit system between countries were controlled for the state-level intercept  $\xi_c$  without the need of adding further controls.

Following from Abadie et al. (2017), standard errors were clustered at each occupation cluster (for a total of 50 clusters), as this is where the source of variation in treatment is located after controlling for country effects. Occupation fixed effects (which we will define as  $\psi_o$ ) can also be included for robustness, but this way  $\gamma$  will yield the within variation for each state and occupation cluster. Occupation intercepts were based on ISCO-08 two-digit sector codes.

Other individual-level controls were included in the vector  $X$ , including age (and its squared term), the level of education, gender, nationality, employment status (and temporary/fixed nature of a contract), years of experience in main occupation, labour income (in logarithmic terms) and hours working per week. We also included controls for individual risk propensity, and for property status of the main household residence (denoting whether the household already inherited the residence or is renting it). Household characteristics were also covered in  $X$ , comprising household total gross income (in logarithmic terms), and information on household components, such as their total number, the number of dependent children, and the number of members in employment. The choice of these controls is consistent with the determinants for credit demand studied by the literature on debt attitudes (Almenberg et al., 2021) and earnings stability (Cappellari and Leonardi, 2015).

While it is tempting to include fixed and financial assets as controls, it should be noted that these might be directly affected by credit access, meaning that they should be considered endogenous and, as such, be omitted from the equation. However, we needed to add controls of some form for the financial situation of the household. Other than controlling for the income components, consumption and individual risk attitudes, all ultimately affecting the accumulation of capital, we also added controls for the pre-existing level of indebtedness of the household. More specifically, we controlled for the outstanding amount of credit (in logarithmic form) for all pre-existing debt. This was obtained by subtracting the outstanding amount of credit obtained in the last three years from the total outstanding amount of credit a household is holding in its liabilities.

This naive model starts from the implicit assumption that  $K$  is exogenous to all individuals in the short to medium terms. While it is true that the process of job polarisation is outside of the control of the individual, there are reasons to argue that, if the process of job polarisation was already taking place, an individual might have had some control over their past occupational choices.

In other words, we were interested in looking at the effects of polarisation ex-post of an individual taking up a job. If all these changes occurred after the job was taken, the polarisation



variable should not suffer from bias. However, some of these changes might already have been occurring before an individual took a specific occupation. This creates a self-selection issue that has to be accounted for. This line of reasoning is not new to the literature: as Clark and Postel-Vinay (2008) find, individuals with lower risk propensity usually self-select into stabler jobs such as permanent public sector positions.

To account for this issue, an alternative strategy can be considered. One way to account for this problem is to quantify the level of job polarisation when the individual enters the labour market. The model could be adjusted to control for sector-specific employment levels the year the job was taken, adding as a control a variable the change in employment levels in the respondent's occupation between the long-term baseline year and the year the job was taken ("Polarisation at  $t_i$ ").<sup>4</sup>

The model would then resemble the following equation:

$$Y_{ico} = \alpha + X'_{ico}\beta + K_{co}\gamma + L_{ico}\delta + \xi_c + e_{ico} \quad (5.2)$$

This now includes the control  $L_{ico}$  (Polarisation at  $t_i$ ), measuring the economy-wide change in total working hours in a given occupation between the current year and the year the occupation was taken by the individual. This indicator is obtained using formula 4.1, and switching  $t_1$  for  $t_i$ , the year the individual started their last job, and setting  $t_0$  in 2002. The indicator will then denote the change in the relative polarisation level between the long-term baseline and  $t_i$ , the year the occupation was taken. We also define this baseline year as the start of the polarisation process: if the individual was in occupation before the baseline year, we set the change as 0.

As discussed earlier, most commentators place the start of the polarisation process at the turn of the millennium. For these reasons we adopted 2002 as our minimum baseline year for this self-selection control. While this choice did not completely shield our approach to selection bias caused by career and education decisions taken before the arbitrary baseline year, it is reasonable to argue that few workers entering the labour market before 2002 could have forecasted the labour market developments 15 years into the future and changed occupation before 2002.

The distribution of the three job polarisation variables is shown in Figure 2, with (a) showing polarisation in the short term, (b) in the medium term and (c) at the time the job was taken. It should be noted that these variables do not denote the general level of polarisation within jobs, but the relative frequency of occupational polarisation experienced by households which have applied for credit within the last three years. The distributions differ greatly between indicators. The dispersion of the medium-term polarisation is higher than the degree displayed by the short-term indicator, indicating that the greatest changes in the occupational structure occurred in the medium term. Polarisation at time  $t_i$  shows the highest kurtosis, meaning that most individuals

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<sup>4</sup>Alternatively, instrumental variables (such as the job of the parents of the reference person) could be used to achieve randomisation for the chosen occupation, and then exploit this randomisation to then predict the assigned degree polarisation. This is a more complicated strategy with extremely limited empirical tractability for the case at hand, given that only a handful of HFCS countries (Spain, France and Portugal) have data on parental occupation.

did not self-select into a job experiencing polarisation within the last 15 years.

Finally, additional selection concerns might arise when studying access to credit from the supply side. As access results from the equilibrium between demand and supply, it is clear that banks will only receive loan applications from individuals who believe that they can repay a loan or, at the very least, that the bank will accept it. If the explanatory variable is affected by this selection issue, we then might have another endogeneity problem.

This problem arises when the outcome variable is only observed for households having access into credit markets. This is a problem because the decision on whether the bank has approved the credit request is unobserved for households which never applied for credit, as households with no interest in ever applying for credit might enter the sample, affecting the estimator of interest.

In our case we exploited information on credit demand to overcome this selection problem. We did so by applying a filter to the sample so that only those households which had considered applying for credit within the last three years were kept in the estimation.<sup>5</sup>

Under the assumption that this "filter" is independent from other unobservable factors affecting credit demand, we could proceed with the estimation without worrying about endogenous selection when studying access to credit.<sup>6</sup> Naturally, this is a strong assumption, but we argue that controlling for income and consumption, and other households characteristics, should reasonably ensure that the endogenous components of credit demand are accounted for (for a review of determinants of credit choice, see Guiso and Sodini, 2013).

A serious effort to tackle the endogeneity in credit demand goes beyond the intention of this paper and is left to future research. As such, the job security results might not be robust to endogeneity in credit demand. However, if polarisation is assumed to be an exogenous process, which as we discussed is not an unreasonable statement after controlling for the relevant confounders, then its assignment occurs regardless of demand for credit, and the results for job polarisation can be claimed to be robust to selection bias.

Finally, it could be argued that local factors might influence credit conditions or job displacement. Howes (2021), for example, finds evidence for firm-level credit reallocation to create job polarization. To account for this issue, we might want to control for regional variation in lending and credit demand behaviour. We then offer additional robustness checks in Appendix A, Tables 7, 8, 9, and 10, in which we replace the country fixed effects with regional fixed effects. Data censoring in the LFS limits unfortunately the empirical tractability of a polarisation indicator based at the regional level: arguably, however, the disappearance of previously significant coefficients would

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<sup>5</sup>This "filter" variable was constructed by combining households which have either applied for credit within the last three years or have decided not to apply for credit (within the same timeframe) because of perceived credit constraint.

<sup>6</sup>Alternatively, Heckman selection models could be used to randomise the credit demand component, exploiting some other source of variation. This variation could be found, for example, in the receipt of gifts or inheritances. We have tested these methods with little success: traditional two-step Heckman models do not allow for clustered standard errors, which are a strict requirement for correct inference in our model, since the treatment is assigned at the occupation-country level. Maximum likelihood Heckman models allow for clustering but are more computationally intensive and can suffer from collinearity issues (Puhani, 2000), and in our case convergence could not be obtained precisely for these reasons.

indicate that the relationship between and polarisation and credit taking was spurious, at least in terms of regional access to credit. This however does not seem to be the case.

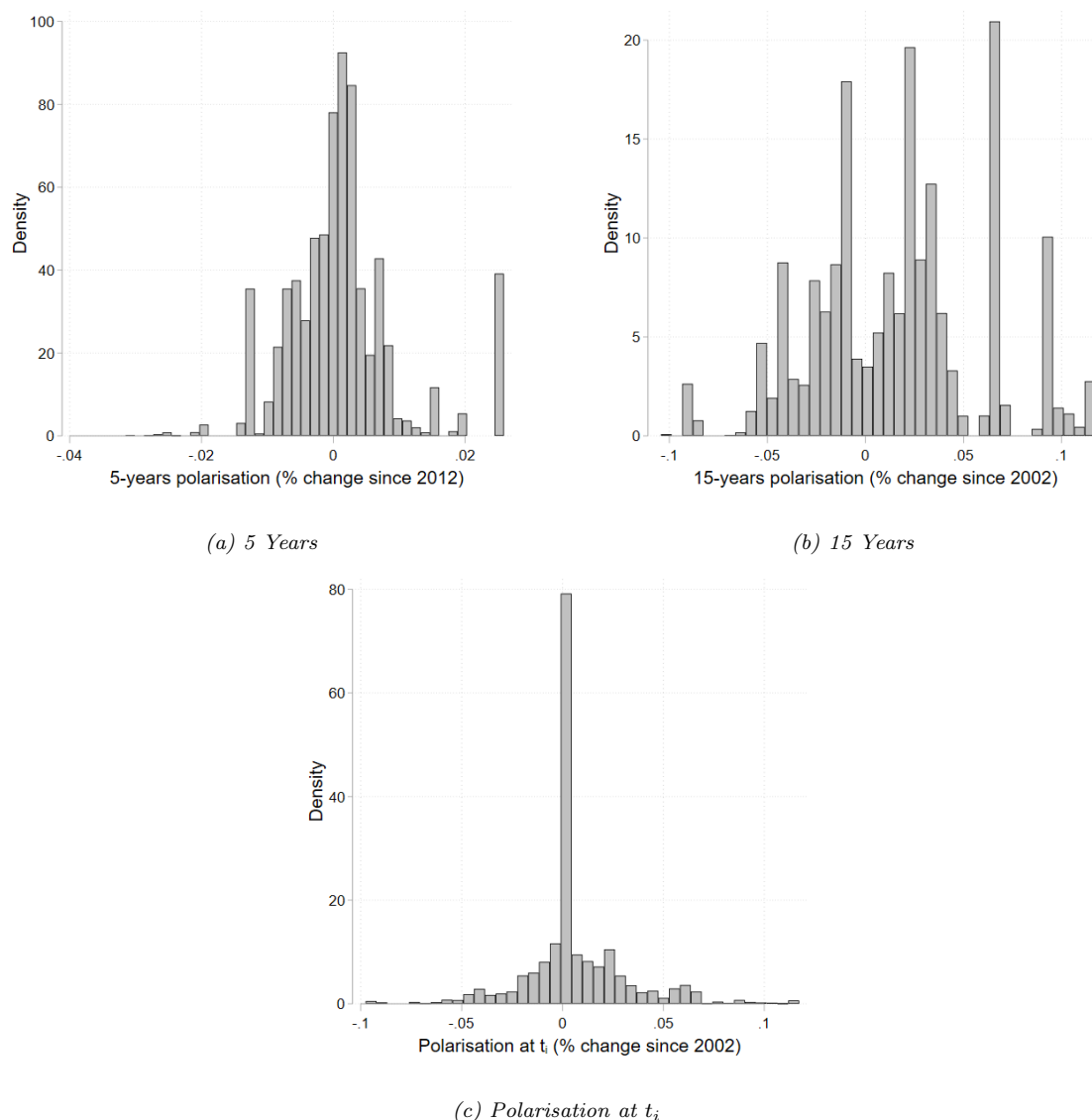


Figure 2: Frequency histograms of 5 (a) and 15 (b) years polarisation, relative to the total employment in each country in 2012 and 2002, and (c) polarisation at  $t_i$ .

## 6 Results and discussion

In this section, we show the main results from the model presented in section 5. In Tables 2, 3 and 5 we present results for the influence of job security, short- and medium-term polarisation over credit constraint, access to credit and self-exclusion, and interest rates. For each of these outcomes, we offer estimates with and without the self-selection control for polarisation (Polarisation at  $t_i$ ).

Table 2: Job polarization and credit constraint

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Perceived job security	-0.140*** (0.022)					-0.136*** (0.023)	
15-years polarisation (% change since 2002)		0.008 (0.092)		0.012 (0.088)	0.223* (0.113)		0.656** (0.255)
5-years polarisation (% change since 2012)			-0.793*** (0.255)	-0.798*** (0.267)	-0.778*** (0.280)		-1.354*** (0.416)
Polarisation at $t_i$ (% change)					-0.539*** (0.196)		-0.575*** (0.191)
Gross family income (ln)	-0.025*** (0.008)	-0.027*** (0.008)	-0.029*** (0.008)	-0.029*** (0.008)	-0.029*** (0.008)	-0.022** (0.008)	-0.026*** (0.009)
Labour income of reference person (ln)	-0.005 (0.003)	-0.006* (0.003)	-0.005* (0.003)	-0.005* (0.003)	-0.005* (0.003)	-0.005 (0.003)	-0.005 (0.003)
Age of reference person	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Gender of reference person, female	0.018* (0.011)	0.018* (0.011)	0.018* (0.011)	0.018* (0.011)	0.018* (0.011)	0.017 (0.010)	0.017* (0.010)
Weekly working hours	0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Time in main occupation	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)
Household monthly consumption (ln)	-0.035*** (0.006)	-0.033*** (0.007)	-0.031*** (0.007)	-0.031*** (0.007)	-0.031*** (0.007)	-0.030*** (0.006)	-0.028*** (0.007)
Outstanding debt, older than three years (ln)	-0.014*** (0.001)	-0.014*** (0.001)	-0.014*** (0.001)	-0.014*** (0.001)	-0.014*** (0.001)	-0.013*** (0.001)	-0.014*** (0.001)
Observations	9,587	9,910	9,855	9,855	9,855	9,586	9,855
Adjusted R-squared	0.245	0.242	0.243	0.243	0.243	0.248	0.246
Occupation controls	No	No	No	No	No	Yes	Yes
Member state controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reference person controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors clustered by occupation in parentheses. Other controls: household size, main residence property status, risk attitudes, no prior credit past the three-year mark, nationality, education and labour status of reference person.

\*p<.05; \*\*p<.01; \*\*\*p<.001

Table 3: Job polarization and credit refusal

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Perceived job security	-0.046** (0.019)					-0.042** (0.019)	
15-years polarisation (% change since 2002)		-0.015 (0.079)		-0.023 (0.071)	0.147 (0.089)		0.182 (0.248)
5-years polarisation (% change since 2012)			-0.749*** (0.205)	-0.740*** (0.213)	-0.709*** (0.217)		-0.915** (0.350)
Polarisation at $t_i$ (% change)					-0.453** (0.178)		-0.462** (0.175)
Gross family income (ln)	-0.019*** (0.006)	-0.019*** (0.007)	-0.020*** (0.007)	-0.020*** (0.007)	-0.020*** (0.007)	-0.018** (0.007)	-0.018** (0.007)
Labour income of reference person (ln)	-0.002 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.000 (0.002)
Age of reference person	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Gender of reference person, female	0.002 (0.007)	0.003 (0.007)	0.002 (0.007)	0.003 (0.007)	0.002 (0.007)	0.003 (0.007)	0.003 (0.007)
Weekly working hours	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Time in main occupation	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)
Household monthly consumption (ln)	-0.016*** (0.005)	-0.016*** (0.005)	-0.014** (0.005)	-0.014** (0.005)	-0.014** (0.005)	-0.013** (0.005)	-0.012** (0.005)
Outstanding debt, older than three years (ln)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
Observations	8,556	8,815	8,770	8,770	8,770	8,555	8,770
Adjusted R-squared	0.101	0.111	0.113	0.113	0.113	0.103	0.113
Occupation controls	No	No	No	No	No	Yes	Yes
Member state controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reference person controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors clustered by occupation in parentheses. Other controls: household size, main residence property status, risk attitudes, no prior credit past the three-year mark, nationality, education and labour status of reference person.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

Table 4: Job polarization and credit self-exclusion

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Credit self-exclusion						
	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Perceived job security	0.087*** (0.014)					0.084*** (0.014)	
15-years polarisation (% change since 2002)		0.102 (0.067)		0.097 (0.067)	0.083 (0.087)		0.021 (0.159)
5-years polarisation (% change since 2012)			-0.012 (0.216)	-0.057 (0.217)	-0.058 (0.219)		0.354 (0.448)
Polarisation at $t_i$ (% change)					0.036 (0.156)		0.058 (0.156)
Gross family income (ln)	0.004 (0.003)	0.007* (0.004)	0.008** (0.004)	0.008** (0.004)	0.008** (0.004)	0.004 (0.003)	0.007* (0.004)
Labour income of reference person (ln)	0.005* (0.003)	0.006** (0.003)	0.005* (0.003)	0.005* (0.003)	0.005* (0.003)	0.005* (0.003)	0.005* (0.003)
Age of reference person	-0.000 (0.000)	-0.000* (0.000)	-0.000* (0.000)	-0.000* (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)
Gender of reference person, female	-0.012 (0.008)	-0.013* (0.007)	-0.012 (0.007)	-0.013* (0.007)	-0.013* (0.007)	-0.012 (0.008)	-0.014* (0.007)
Weekly working hours	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001* (0.000)	-0.001* (0.000)
Time in main occupation	0.000 (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)	0.000 (0.000)	0.000 (0.000)
Household monthly consumption (ln)	0.012** (0.005)	0.009* (0.005)	0.009* (0.005)	0.009* (0.005)	0.009* (0.005)	0.012** (0.005)	0.010* (0.005)
Outstanding debt, older than three years (ln)	0.015*** (0.001)	0.015*** (0.001)	0.015*** (0.001)	0.015*** (0.001)	0.015*** (0.001)	0.015*** (0.001)	0.015*** (0.001)
Observations	10,005	10,340	10,285	10,285	10,285	10,004	10,285
Adjusted R-squared	0.431	0.430	0.431	0.431	0.431	0.432	0.431
Occupation controls	No	No	No	No	No	Yes	Yes
Member state controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reference person controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors clustered by occupation in parentheses. Other controls: household size, main residence property status, risk attitudes, no prior credit past the three-year mark, nationality, education and labour status of reference person.

\*p<.05; \*\*p<.01; \*\*\*p<.001

Table 5: Job polarization and interest rates

VARIABLES	Interest rates						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Perceived job security	-0.027 (0.228)	-0.977 (1.006)		-1.292 (1.012)	0.548 (1.329)	-0.005 (0.228)	
15-years polarisation (% change since 2002)			-3.417 (3.102)	-2.937 (3.238)	-2.543 (3.256)		-6.060 (4.128)
5-years polarisation (% change since 2012)					-4.997* (2.787)		7.089 (10.695)
Polarisation at t_i (% change)							-3.857 (2.802)
Gross family income (ln)	-0.476*** (0.121)	-0.471*** (0.118)	-0.469*** (0.131)	-0.467*** (0.132)	-0.465*** (0.132)	-0.455*** (0.123)	-0.450*** (0.135)
Labour income of reference person (ln)	0.035 (0.031)	0.042 (0.030)	0.034 (0.031)	0.034 (0.031)	0.033 (0.032)	0.039 (0.030)	0.039 (0.030)
Age of reference person	0.042*** (0.007)	0.041*** (0.007)	0.041*** (0.008)	0.041*** (0.008)	0.041*** (0.008)	0.042*** (0.007)	0.042*** (0.008)
Gender of reference person = 2	0.252** (0.103)	0.279*** (0.099)	0.204* (0.106)	0.209* (0.104)	0.203* (0.104)	0.298*** (0.105)	0.233** (0.109)
Weekly working hours	0.008 (0.007)	0.006 (0.006)	0.010 (0.007)	0.010 (0.007)	0.010 (0.007)	0.009 (0.007)	0.012* (0.007)
Time in main occupation	-0.021*** (0.007)	-0.021*** (0.007)	-0.020*** (0.007)	-0.020** (0.007)	-0.022*** (0.008)	-0.019*** (0.007)	-0.020** (0.008)
Household monthly consumption (ln)	-0.059 (0.090)	-0.071 (0.086)	-0.046 (0.090)	-0.043 (0.090)	-0.048 (0.089)	-0.032 (0.090)	-0.017 (0.089)
Outstanding debt, older than three years (ln)	0.050* (0.029)	0.061** (0.029)	0.063** (0.030)	0.063** (0.030)	0.062** (0.030)	0.050 (0.030)	0.063** (0.031)
No debt older than three years	-0.077 (0.279)	-0.019 (0.267)	-0.019 (0.272)	-0.017 (0.272)	-0.014 (0.273)	-0.072 (0.281)	0.003 (0.277)
Observations	7,218	7,389	6,751	6,751	6,751	7,218	6,751
Adjusted R-squared	0.307	0.303	0.310	0.310	0.310	0.308	0.311
Occupation controls	No	No	No	No	No	Yes	Yes
Member state controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reference person controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors clustered by occupation in parentheses. Other controls: household size, main residence property status, risk attitudes, no prior credit past the three-year mark, nationality, education and labour status of reference person.

\*p<.05; \*\*p<.01; \*\*\*p<.001

Looking at credit constraint in Table 2, Columns 1 to 5 each alternate between the job security and polarisation variables in a stepwise approach. Column 1 offers results for job security: we found that perceived job security is negatively and significantly related with situations of credit constraint. In other words, for every 1% increase in subjective job security, the probability of experiencing credit constraint is reduced by 0.14%.

It is important to recall that these results are robust to the job status of the respondent,<sup>7</sup> meaning that a statistically strong relationship between subjective security and credit constraint can be found regardless of whether the respondent is in a part-time, fixed terms or temporary employment arrangement, and independently of self-employment status too.

How are these results driven by endogenous self-assessed insecurity, and how much are they related with exogenous decaying demand for specific jobs? Columns 2 to 5 drop the job security variable and investigate the relationship between short to medium-term job polarisation and credit constraint. Columns 2 and 3 switch between the medium term and short-term variables, while column 4 shows their joint effect. Finally, column 5 introduces the control for self-selection into occupations experiencing polarisation (Polarisation at  $t_i$ ). We found a statistically significant effect of short-term polarisation in all columns in which the variable appears. Medium-term polarisation is usually not statistically significant, and only gains significance once the self-selection control is included.

These results should be interpreted that, for every 1% difference in the relative number of hours worked in the given occupation group between 2017 and the last five years, the probability of the household experiencing credit constraint decreases by around 0.77%.

Most importantly, the introduction of the self-selection control produces some compelling results, indicating that a 1% difference in the relative weight of an occupation between 2017 and the year the individual started working in their current job leads to an average 0.54% decrease in the probability of experiencing credit constraint. This strategy, as discussed earlier, is employed to account for potential self-selection into occupation groups experiencing polarisation within the last 15 years.

Interestingly, the introduction of the self-selection variable only reduces the magnitude of the short-term polarisation coefficient by a negligible margin, meaning that self-selection is only relevant in the context of medium-term polarisation (the coefficient of which, as a matter of fact, gains some magnitude and significance by the introduction of the self-selection variable), and that has no influence on short term polarisation. This can be explained by the intuition that, in the medium term, individuals might have time to reconsider their occupational choices given the macro-economic circumstances, while short-term occupational shocks leave individuals with little leeway.

These results are consistent with our theoretical framework and show that households with a head who has been employed in an occupation which has experienced a decrease in demand

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<sup>7</sup>The job status group of dummies are omitted from the table because of the lack of space, but the full model is available on request.



have higher probability of finding themselves credit constrained.

The inclusion of controls for individual and family financial characteristics (along with all other controls) rules out this relationship being driven by the income class of a given occupation, but rather suggests that expectations on income change and employment security do play a role in situations of credit constraint.

The full set of controls is included in all specifications, with the exceptions of occupational intercepts, which are introduced in Columns 6 and 7, featuring the same specifications offered in Columns 1 and 5 plus the occupational fixed effects.

The use of occupation controls in column 7 increases the effect of short-term polarisation but is countered by a positive coefficient on the medium-term coefficient. However, it should be recalled that, through the addition of occupational intercepts, we are only studying the effect of polarisation within each country and occupation group, so these estimates are to be interpreted as the lower bound of polarisation. These results suggest that when studying the variation within the same occupational groups, short-term and medium-term polarisation start to correlate with each other, yet the difference between the two coefficients confirms that on average the trend towards credit constraint persists regardless of the idiosyncrasies of individual occupations. Job security is only marginally affected by the use of occupation controls in column 6, with its coefficient retaining its sign and magnitude.

The models in Table 2 are estimated over the full population of households having considered credit, meaning that both credit demand and supply are bundled together. We might however wish to focus on the demand side and supply side of the phenomenon only. We do so in Tables 3 and 4.

Focusing on credit supply, Table 3 shows the relationship between job security and polarisation over the probability experiencing credit refusal or reduction at least once, estimating our model over the population of households which have applied for credit: in this way. Instead, table 4 focuses on the credit demand by studying the decision to apply for credit, estimated over the sample of all households which have considered applying for credit in the last three years.

The results of job polarisation are largely unchanged with regards to credit supply. The short-term coefficient retains significance, and its magnitude is only tempered by a few points. The full specification in column 5 indicates that a one-point increase in the relative importance of a job in a country during the last five years leads to a 0.71% decrease in the probability of seeing a credit application refused or reduced credit. The self-selection variable also displays a similar -0.45% coefficient.

What is most interesting is that perceived job security has a much smaller influence on credit refusal than it had over credit constraint. An increase in one percentage point in the perceived security only reduces the probability of rejection by around 0.05%, compared to the -0.14% coefficient seen earlier.

The picture is made clearer once we look at the credit demand specifications. Table 4 reveals that job polarisation has no statistically significant effect on self-exclusion, but that job security

does. More specifically we find that perceived job security affects the probability of applying for credit by around 0.09% for every 1% increase in perceived security. These results indicate that while job security affects credit access across the board, job polarisation might have a negligible effect on credit demand, while strongly influencing credit supply.

Intuitively, these results suggest that credit institutions do not take subjective considerations into account. However, these results are not trivial because they suggest that credit institutions still make generalisations about labour markets and adjust their lending decisions accordingly. Indeed, they suggest that perceived security does not necessarily align with job polarisation, and that while households might not take polarisation into account when building expectations on their jobs, credit institutions will take them into account instead.

Finally, the inclusion of occupational intercepts in columns 6 and 7 does not seem to significantly affect the estimates obtained earlier.

Focusing on credit constraint and refusal does not necessarily paint the full picture on the relationship between job polarisation and borrowing. Another important facet of credit pertains to the quality of credit accessible to a household.

In Table 5 we then studied the relationship between polarisation and interest rates. The sample is now censored to only include households which have had access to credit within the last three years.

However, in all specifications we find no significant association between interest rates and either job security or polarisation. These findings suggest that, although households experiencing polarisation are finding it more difficult to access credit, polarisation by itself does not seem to be connected with households experiencing harsher credit conditions.

This suggests that the relationship between credit constraint and debt quality might not necessarily lead to harder to manage debt. In other words, expectations about employment security and about the change in demand of a given occupation might restrain a household's demand for credit and credit institutions' willingness to supply credit, but these limitations, all being considered, are only limited at the credit access phase.

So far, we have seen how job security and polarisation affect household borrowing on average. We might be interested in seeing if these trends start to differ between countries. To do so, we looked again at credit constraint, and added interaction terms for each country and the job security/polarisation variables, using the same specifications from earlier.

Our results are shown in Figure 3, in which the interaction coefficients are plotted. The most notable result is that different patterns emerge for job polarisation and job security, meaning that the processes do not necessarily go in the same direction depending on country idiosyncrasies: while a negative trend can be detected for both variables, there are instances in which job polarisation is not significant while job security is, and a few instances in which the estimated coefficient for job security and polarisation is actually positive.

It should be noted that the introduction of these interaction terms greatly affects the quality of our estimates because, by introducing these terms, we effectively gave up the variability in the

job polarisation control introduced by the variation in countries. While these results should then be taken with a grain of salt, they are still informative because they provide an indication of the direction of the correlation of interest. Future research should exploit longitudinal data sources to identify country-specific differences in trends in job polarisation and debt-taking better.

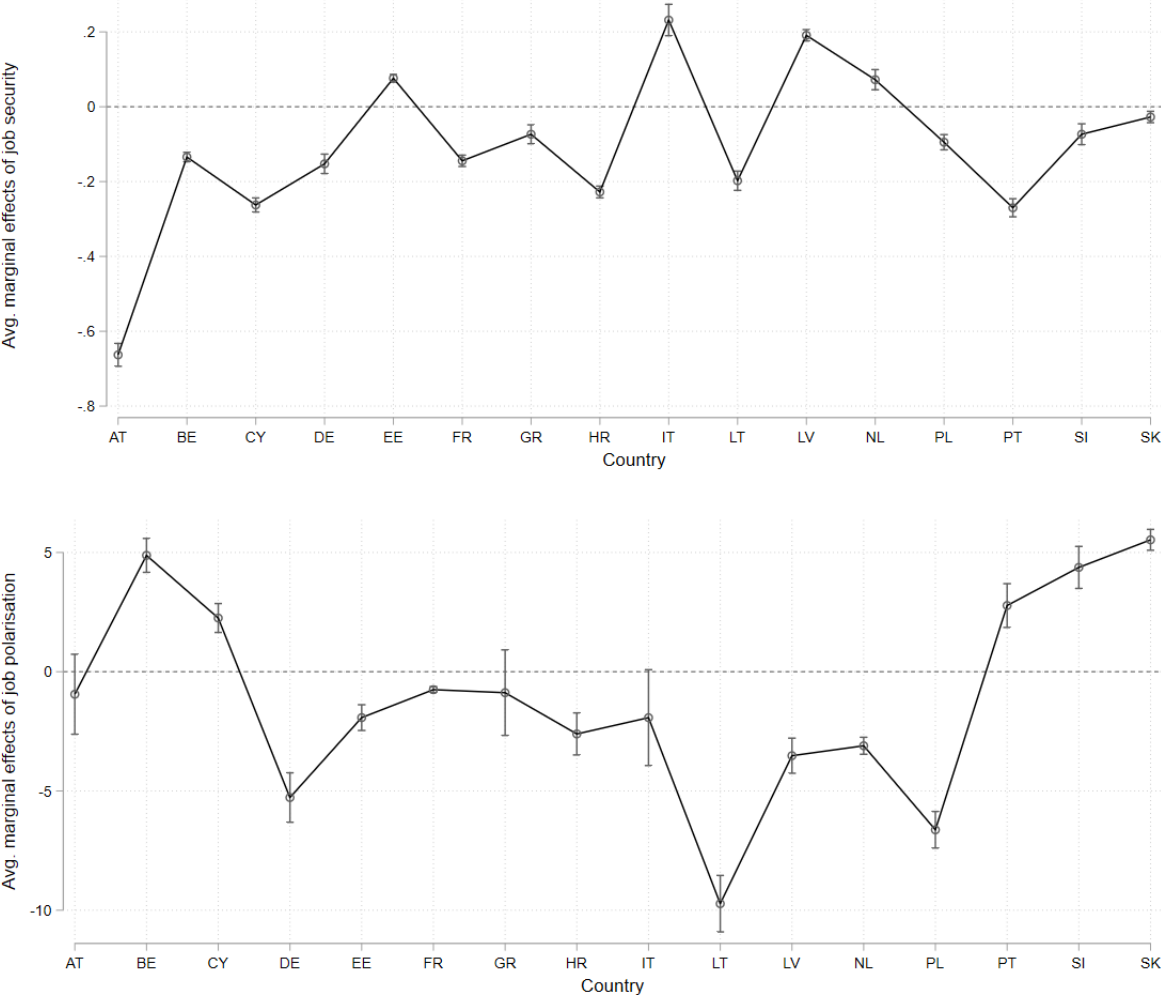


Figure 3: Interaction coefficients for job security/short term polarisation and HFCS countries over credit constraint. Standard errors clustered by country.

Robustness estimates using regional fixed effects are presented in Appendix A, Tables 7, 8, 9, and 10. We find little to no variation in terms of coefficient magnitude and significance compared to previous estimates.

So far, we have studied the residual correlation of job security and polarisation after conditioning for controls which we identified as potential confounders. While studying how expectations on job security arise goes beyond the scope of this paper, it is valuable to see how our security and polarisation variables correlate with these observed regressors.

In Table 6 from Appendix A, we show the correlations between our job security/polarisation

variables and the rest of controls used in our analysis. The job security/polarisation variables are now scaled by a  $\times 100$  factor to better appreciate the correlations with the other controls.

As expected, job security appears strongly correlated with most other controls. Its strong correlations with labour income, tenure and employment status are expected. The correlation with prior debt, household consumption, household income and low risk propensity also indicate that certain environmental factors might lead individuals to worry more about their employment situation.

Interestingly, the job polarisation indicators is not correlated with many variables, confirming their mostly exogenous nature. Some notable correlations are to be noted: long term polarisation is connected with education and weekly working hours, as does the job market entry polarisation variable. This confirms our theories regarding the nature of polarisation, as jobs as skill and education appear to have a strong influence on polarisation.

The negative relationship with household size, which also characterises job security, indicates that the decrease in of certainty about future employment prospects might lead to a decrease in fertility, supporting recent literature on the topic (De Paola et al., 2021).

Short term polarisation appears to be mostly connected with weekly working hours instead. This suggests that these changes in labour demand have mostly translated into a reduction of working hours, and have yet to translate into an income deterioration holding hours of work as fixed. The lack of correlation with most other variables suggests that these short term shocks are mostly exogenous.

## 7 Conclusions

In this paper, we studied the relationship between job polarisation and household debt taking behaviour, finding evidence of a positive relationship between growth in demand for occupations and access to credit.

We found short-term polarisation to prevail over medium-term polarisation when it comes to demand and supply of household debt. Our results indicate that, overall, for every 1% decrease in weekly hours in a given occupation over the last five years, equal (on average) to 25,000 full time jobs, the probability of a household (whose head is employed in that occupation) being refused credit increases by 0.7%.

This happens regardless of the financial situation of the household and holding the total number of jobs in an economy as fixed, meaning that these constraints are entirely generated by expectations on changes in labour demand.

We found job polarisation to be largely unrelated to perceived job security, with the former playing a larger role for credit supply, and the latter prevailing in terms of credit demand, suggesting the presence of strong informational asymmetries between lenders and borrowers that cannot be compensated by proxying idiosyncratic job security with economy-wide polarisation.

Interestingly, while households experience both (self-imposed) demand-side and supply-side

constraints in access to loans because of expectations of shrinking demand for occupations, households experiencing polarisation do not seem to face more difficulties than other households when dealing with repayments, as we find no significant effect of either job security or polarisation over interest rates, indicating that fears about a connection between polarisation and insolvency might be overstated.

It is important to recall that the associations we found, while strong, do not necessarily indicate causality. Households can only control polarisation by self-selecting into occupations that are expected to grow in the future. In this paper, we attempted to address this issue by controlling for the degree of polarisation the year a job was taken.

Our strategy should partially address this issue as human capital notoriously requires long term investments, and it is clear that polarisation affects the demand for jobs at a much faster rate. Households might find it difficult to predict how labour demand will change in the next few decades, let alone readjust their skills and qualifications so early.

Still, our approach does not fully solve for self-selection. It is still possible that self-selection occurs before the job is picked, during the period when an individual is still investing in their human capital.

Furthermore, our results find a general trend towards limitations in credit access across countries, but there is variability at the country level that deserves further analysis.

The value of our results then lies in signalling the existence of this relationship between job polarisation and debt-taking, and calls for further research on this context, better investigating the causal ramifications and country idiosyncrasies of this relationship. Future research can exploit the future availability of a HFCS panel to obtain longitudinal evidence on job polarisation and credit access, and check whether these trends are stable over time. A longitudinal approach would also help provide more robust country-level estimates, as time-dimensionality would be introduced to the polarisation variable. Alternative approaches, albeit studies a different set of outcomes, can be considered using other data sources such as EU-SILC.

## Supplementary material

Instructions on data access and codes used in our estimation can be found in the online data archive, available at: <https://sites.google.com/site/michelecantarella1992/data-archive-by-paper>.

## References

- Abadie, A., Athey, S., Imbens, G. W., and Wooldridge, J. (2017). When should you adjust standard errors for clustering? Working Paper 24003, National Bureau of Economic Research.
- Acemoglu, D. and Restrepo, P. (2018). The race between man and machine: Implications of technology for growth, factor shares, and employment. *American Economic Review*, 108(6):1488–1542.

- Adermon, A. and Gustavsson, M. (2015). Job polarization and task-biased technological change: Evidence from Sweden, 1975-2005. *The Scandinavian Journal of Economics*, 117(3):878–917.
- Agan, A. and Starr, S. (2017). Ban the Box, Criminal Records, and Racial Discrimination: A Field Experiment\*. *The Quarterly Journal of Economics*, 133(1):191–235.
- Almenberg, J., Lusardi, A., Säve-Söderbergh, J., and Vestman, R. (2021). Attitudes towards debt and debt behavior. *The Scandinavian Journal of Economics*, 123(3):780–809.
- Autor, D. H. (2013). The “task approach” to labor markets: an overview. *Journal for Labour Market Research*, 46(3):185–199.
- Autor, D. H. (2019). Work of the past, work of the future. *AEA Papers and Proceedings*, 109:1–32.
- Autor, D. H. and Dorn, D. (2013). The growth of low-skill service jobs and the polarization of the US labor market. *American Economic Review*, 103(5):1553–97.
- Autor, D. H., Katz, L. F., and Kearney, M. S. (2006). The polarization of the U.S. labor market. *The American Economic Review*, 96(2):189–194.
- Bartik, A. and Nelson, S. (2019). Deleting a signal: Evidence from pre-employment credit checks. Working Paper 2019-137, University of Chicago, Becker Friedman Institute for Economics.
- Benito, A. (2006). Does job insecurity affect household consumption? *Oxford Economic Papers*, 58(1):157–181.
- Birkenmaier, J. and Fu, Q. (2019). Does U.S. household financial access mediate the relationship between a large income drop and credit record? *Journal of Consumer Policy*, 42(2):267–283.
- Boushey, H. (2019). *Unbound : how inequality constricts our economy and what we can do about it*. Harvard University Press, Cambridge, Massachusetts London, England.
- Cappellari, L. and Leonardi, M. (2015). Earnings instability and tenure. *The Scandinavian Journal of Economics*, 118(2):202–234.
- Castrén, O. and Kavonius, I. K. (2013). Sector-level financial networks and macroprudential risk analysis in the euro area. In Fouque, J.-P. and Langsam, J., editors, *Handbook of Systemic Risk*, chapter 27, page 775–790. Cambridge University Press.
- Clark, A. and Postel-Vinay, F. (2008). Job security and job protection. *Oxford Economic Papers*, 61(2):207–239.
- Coibion, O., Gorodnichenko, Y., Kudlyak, M., and Mondragon, J. (2020). Greater Inequality and Household Borrowing: New Evidence from Household Data. *Journal of the European Economic Association*. jvz076.

- Dauth, W., Findeisen, S., and Suedekum, J. (2014). The rise of the east and the far east: German labor markets and trade integration. *Journal of the European Economic Association*, 12(6):1643–1675.
- De Paola, M., Nisticò, R., and Scoppa, V. (2021). Employment protection and fertility decisions: the unintended consequences of the Italian Jobs Act. *Economic Policy*, 36(108):735–773.
- Dobbie, W., Goldsmith-pinkham, P., Mahoney, N., and Song, J. (2020). Bad credit, no problem? credit and labor market consequences of bad credit reports. *The Journal of Finance*, 75(5):2377–2419.
- Doleac, J. L. and Hansen, B. (2020). The unintended consequences of “ban the box”: Statistical discrimination and employment outcomes when criminal histories are hidden. *Journal of Labor Economics*, 38(2):321–374.
- Dwyer, R. E. (2018). Credit, debt, and inequality. *Annual Review of Sociology*, 44(1):237–261.
- Dynan, K. E. and Kohn, D. L. (2007). The rise in U.S. household indebtedness: causes and consequences. Finance and Economics Discussion Series 2007-37, Board of Governors of the Federal Reserve System (U.S.).
- Favilukis, J., Lin, X., and Zhao, X. (2020). The elephant in the room: The impact of labor obligations on credit markets. *American Economic Review*, 110(6):1673–1712.
- Fernández-Macías, E. and Hurley, J. (2016). Routine-biased technical change and job polarization in Europe. *Socio-Economic Review*, 15(3):563–585.
- Fourcade, M. and Healy, K. (2016). Seeing like a market. *Socio-Economic Review*, page mww033.
- Friedline, T. and Freeman, A. (2016). The potential for savings accounts to protect young-adult households from unsecured debt in periods of macroeconomic stability and decline. *Social Service Review*, 90(1):83–129.
- Friedman, M. (1957). *A Theory of the Consumption Function*. National Bureau of Economic Research, Inc.
- Georgieff, A. and Lepinteur, A. (2018). Partial employment protection and perceived job security: evidence from France. *Oxford Economic Papers*, 70(3):846–867.
- Goos, M., Manning, A., and Salomons, A. (2009). Job polarization in europe. *American Economic Review*, 99(2):58–63.
- Goos, M., Manning, A., and Salomons, A. (2014). Explaining job polarization: Routine-biased technological change and offshoring. *American Economic Review*, 104(8):2509–26.

- Grant, C. (2007). Estimating credit constraints among US households. *Oxford Economic Papers*, 59(4):583–605.
- Green, A. (2019). What is happening to middle skill workers? OECD Social, Employment and Migration Working Papers No. 230.
- Guiso, L. and Sodini, P. (2013). Household finance: An emerging field. In *Handbook of the Economics of Finance*, pages 1397–1532. Elsevier.
- Howes, C. (2021). Why does structural change accelerate in recessions? the credit reallocation channel. *Journal of Financial Economics*.
- ILO (2012). *International Standard Classification of Occupations*, volume 1: Structure, group definitions and correspondence tables. International Labour Office, Geneva.
- Kavonius, I. K., Timonen, P., and Honkkila, J. (2021). Households’ credit denial – an empirical analysis using european data. Technical report.
- Keese, M. (2019). Triggers and Determinants of Severe Household Indebtedness in Germany. Ruhr Economic Papers No. 150, Rheinisch-Westfälisches Institut für Wirtschaftsforschung, Essen.
- Keys, B. J. (2018). The credit market consequences of job displacement. *The Review of Economics and Statistics*, 100(3):405–415.
- Kløve, E. and Mehlum, H. (2018). Positive illusions and the temptation to borrow. *Oxford Economic Papers*, 71(3):623–644.
- Kotschy, R. and Sunde, U. (2020). Income shocks, inequality, and democracy. *The Scandinavian Journal of Economics*, 123(1):295–326.
- Langley, P. (2008). *The everyday life of global finance : saving and borrowing in Anglo-America*. Oxford University Press, Oxford New York.
- Lazarus, J. and Lacan, L. (2018). Toward a relational sociology of credit: an exploration of the French literature. *Socio-Economic Review*, 18(2):575–597.
- Leyshon, A. and Thrift, N. (1999). Lists come alive: electronic systems of knowledge and the rise of credit-scoring in retail banking. *Economy and Society*, 28(3):434–466.
- Milanović, B. (2019). *Capitalism, alone : the future of the system that rules the world*. The Belknap Press of Harvard University Press, Cambridge, Massachusetts.
- Olsson, M. and Tåg, J. (2017). Private equity, layoffs, and job polarization. *Journal of Labor Economics*, 35(3):697 – 754.



- Piketty, T. (2014). *Capital in the twenty-first century*. The Belknap Press of Harvard University Press, Cambridge Massachusetts.
- Puhani, P. (2000). The Heckman correction for sample selection and its critique. *Journal of Economic Surveys*, 14(1):53–68.
- Sen, A. (2000). *Social exclusion : concept, application, and scrutiny*. Office of Environment and Social Development, Asian Development Bank, Manila, Philippines.
- Stiglitz, J. E. and Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review*, 71(3):393–410.
- Trumbull, G. (2012). Credit access and social welfare. *Politics & Society*, 40(1):9–34.

## Appendix

### A Additional regressions and robustness checks

Table 6: Correlations with other confounders

VARIABLES	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
	Job Security		Job pol. (15 yrs.)		Job pol. (5 yrs.)		Job pol. (5 yrs.)		Job pol. (5 yrs.)		Job pol. (5 yrs.)		Job pol. (5 yrs.)		Job pol. ( $t_i$ )	
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Gross family income (ln)	0.929** (0.458)	0.792* (0.449)	0.166 (0.126)	0.008 (0.037)	0.037 (0.042)	0.004 (0.015)	0.060 (0.041)	-0.023 (0.021)								
Labour income of reference person (ln)	0.546*** (0.185)	0.558*** (0.188)	0.000 (0.038)	0.003 (0.015)	0.010 (0.008)	0.003 (0.004)	-0.020 (0.025)	-0.015 (0.017)								
Age of reference person	-0.139*** (0.032)	-0.137*** (0.030)	0.004 (0.007)	0.002 (0.002)	0.001 (0.002)	-0.001 (0.001)	-0.006 (0.005)	-0.007*** (0.003)								
Gender of reference person, female	1.092** (0.483)	0.522 (0.447)	0.465* (0.271)	0.011 (0.041)	0.031 (0.056)	0.012 (0.019)	0.151 (0.122)	-0.021 (0.042)								
Weekly working hours	0.017 (0.029)	0.040 (0.031)	-0.037*** (0.010)	-0.006 (0.004)	-0.002 (0.001)	-0.002 (0.002)	-0.013*** (0.005)	-0.003 (0.003)								
Time in main occupation	0.236*** (0.024)	0.201*** (0.027)	0.016 (0.012)	0.002 (0.003)	-0.003 (0.002)	0.000 (0.001)	-0.039* (0.021)	-0.043** (0.021)								
Household size, 2	-1.001 (0.940)	-0.920 (0.963)	-0.132 (0.129)	-0.112* (0.063)	0.027 (0.027)	0.038* (0.020)	0.077 (0.079)	0.078 (0.065)								
Household size, 3	-1.439 (1.021)	-1.276 (1.035)	-0.497*** (0.147)	-0.115 (0.075)	-0.028 (0.033)	0.017 (0.023)	-0.202** (0.090)	-0.030 (0.078)								
Household size, 4	-2.312** (1.111)	-2.236* (1.123)	-0.487*** (0.155)	-0.147** (0.068)	-0.032 (0.035)	-0.003 (0.026)	-0.242** (0.117)	-0.093 (0.083)								
Household size, 5	-3.051** (1.339)	-3.116** (1.336)	-0.427** (0.201)	-0.082 (0.110)	-0.072 (0.053)	-0.031 (0.025)	-0.225 (0.157)	-0.043 (0.122)								
Household size, 6	-3.323* (1.774)	-3.548** (1.761)	-0.799*** (0.294)	-0.180 (0.121)	-0.139 (0.105)	-0.020 (0.049)	-0.701*** (0.227)	-0.355** (0.151)								
Observations	10,754	10,754	11,089	11,089	10,285	10,285	11,089	11,089								
Adjusted R-squared	0.184	0.193	0.186	0.806	0.026	0.475	0.100	0.384								
Occupation controls	No	Yes	No	Yes	No	Yes	No	Yes								
Member state controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes								
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes								
Reference person controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes								

Correlations with other confounders (continued)

VARIABLES	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
	Job Security		Job pol. (15 yrs.)		Job pol. (5 yrs.)		Job pol. (5 yrs.)		Job pol. (5 yrs.)		Job pol. (5 yrs.)		Job pol. (5 yrs.)		Job pol. (5 yrs.)	
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Education, Lower secondary	0.077 (1.300)	-0.070 (1.274)	1.924*** (0.469)	1.053*** (0.277)	0.125 (0.092)	0.102 (0.068)	0.583** (0.223)	0.224 (0.148)								
Education, Upper secondary	1.647 (1.035)	1.276 (1.003)	2.313*** (0.505)	1.197*** (0.313)	0.089 (0.084)	0.115 (0.071)	0.726*** (0.214)	0.263* (0.134)								
Education, Tertiary and higher	3.475*** (1.156)	1.649 (1.096)	4.953*** (1.028)	1.032*** (0.310)	0.211 (0.156)	0.061 (0.066)	1.704*** (0.386)	0.078 (0.160)								
Household monthly consumption (ln)	1.066** (0.512)	1.124** (0.512)	0.309* (0.163)	0.146*** (0.051)	0.060 (0.043)	0.012 (0.014)	0.057 (0.071)	-0.046 (0.047)								
Risk attitude, medium-low	-2.620** (1.240)	-2.432* (1.220)	-0.358 (0.300)	-0.137 (0.135)	0.054 (0.092)	0.015 (0.046)	-0.054 (0.173)	-0.002 (0.178)								
Risk attitude, medium-high 3	-2.060 (1.415)	-2.165 (1.374)	-0.068 (0.250)	-0.224* (0.121)	-0.029 (0.067)	-0.010 (0.050)	0.054 (0.188)	-0.004 (0.154)								
Risk attitude, high	-1.885 (1.394)	-2.053 (1.361)	-0.150 (0.311)	-0.211 (0.126)	-0.076 (0.057)	-0.005 (0.041)	-0.092 (0.198)	-0.047 (0.149)								
Outstanding debt, older than three years (ln)	0.166*** (0.052)	0.147*** (0.052)	0.003 (0.009)	-0.004 (0.004)	-0.000 (0.002)	-0.001 (0.002)	-0.010 (0.007)	-0.014* (0.008)								
No debt older than three years	1.985*** (0.572)	1.729*** (0.576)	0.117 (0.102)	-0.098*** (0.033)	0.017 (0.032)	-0.011 (0.016)	0.052 (0.064)	-0.037 (0.054)								
Observations	10,754	10,754	11,089	11,089	10,285	10,285	11,089	11,089								
Adjusted R-squared	0.184	0.193	0.186	0.806	0.026	0.475	0.100	0.384								
Occupation controls	No	Yes	No	Yes	No	Yes	No	Yes								
Member state controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes								
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes								
Reference person controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes								

Notes: Standard errors clustered by occupation in parentheses. Other controls: household size (if > 6), main residence property status, risk attitudes, no prior credit past the three-year mark, nationality, and labour status of reference person.

\*p < .05; \*\*p < .01; \*\*\*p < .001

Table 7: Job polarization and credit constraint

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Perceived job security	-0.132*** (0.020)	-0.041 (0.087)		-0.010 (0.088)	0.196* (0.111)	-0.128*** (0.021)	0.663** (0.258)
15-years polarisation (% change since 2002)			-0.802*** (0.259)	-0.797*** (0.265)	-0.777*** (0.278)		-1.411*** (0.401)
5-years polarisation (% change since 2012)					-0.530*** (0.195)		-0.568*** (0.188)
Polarisation at $t_i$ (% change)							
Gross family income (ln)	-0.020** (0.008)	-0.022*** (0.008)	-0.027*** (0.008)	-0.027*** (0.008)	-0.027*** (0.008)	-0.017** (0.008)	-0.024*** (0.009)
Labour income of reference person (ln)	-0.007** (0.003)	-0.008** (0.003)	-0.006* (0.003)	-0.006* (0.003)	-0.006* (0.003)	-0.007** (0.003)	-0.005 (0.003)
Age of reference person	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Gender of reference person, female	0.017 (0.011)	0.016 (0.010)	0.015 (0.011)	0.015 (0.011)	0.015 (0.011)	0.016 (0.010)	0.015 (0.010)
Weekly working hours	0.000 (0.000)	0.000 (0.000)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.000 (0.000)	0.000 (0.001)
Time in main occupation	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
Household monthly consumption (ln)	-0.040*** (0.007)	-0.038*** (0.008)	-0.032*** (0.007)	-0.032*** (0.007)	-0.032*** (0.007)	-0.035*** (0.007)	-0.029*** (0.007)
Outstanding debt, older than three years (ln)	-0.015*** (0.002)	-0.015*** (0.002)	-0.013*** (0.001)	-0.013*** (0.001)	-0.013*** (0.001)	-0.014*** (0.002)	-0.013*** (0.001)
No debt older than three years	-0.221*** (0.018)	-0.225*** (0.018)	-0.206*** (0.016)	-0.206*** (0.016)	-0.206*** (0.016)	-0.218*** (0.018)	-0.203*** (0.016)
Observations	10,331	10,655	9,851	9,851	9,851	10,331	9,851
Adjusted R-squared	0.253	0.251	0.246	0.246	0.247	0.255	0.250
Occupation controls	No	No	No	No	No	Yes	Yes
Member state controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reference person controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors clustered by occupation in parentheses. Other controls: household size, main residence property status, risk attitudes, no prior credit past the three-year mark, nationality, education and labour status of reference person.

\*p<.05; \*\*p<.01; \*\*\*p<.001

Table 8: Job polarization and credit self-exclusion

VARIABLES	Credit self-exclusion						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Perceived job security	0.079*** (0.013)					0.076*** (0.013)	
15-years polarisation (% change since 2002)		0.093 (0.066)		0.106 (0.070)	0.091 (0.092)		-0.015 (0.156)
5-years polarisation (% change since 2012)			-0.014 (0.201)	-0.063 (0.199)	-0.064 (0.201)		0.416 (0.439)
Polarisation at $t_i$ (% change)				0.038 (0.164)	0.038 (0.164)		0.063 (0.162)
Gross family income (ln)	0.003 (0.003)	0.006 (0.004)	0.007* (0.004)	0.007* (0.004)	0.007* (0.004)	0.003 (0.003)	0.006 (0.004)
Labour income of reference person (ln)	0.005** (0.002)	0.006** (0.002)	0.006** (0.003)	0.006** (0.003)	0.006** (0.003)	0.006** (0.002)	0.006** (0.003)
Age of reference person	-0.000 (0.000)	-0.001** (0.000)	-0.000* (0.000)	-0.000* (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)
Gender of reference person, female	-0.010 (0.007)	-0.011 (0.007)	-0.012 (0.008)	-0.013 (0.008)	-0.013 (0.008)	-0.012 (0.007)	-0.014* (0.008)
Weekly working hours	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.000)
Time in main occupation	0.001** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001** (0.000)	0.001** (0.000)	0.000 (0.000)	0.000* (0.000)
Household monthly consumption (ln)	0.013** (0.005)	0.010** (0.005)	0.010** (0.005)	0.010** (0.005)	0.010** (0.005)	0.013** (0.005)	0.010** (0.005)
Outstanding debt, older than three years (ln)	0.015*** (0.001)	0.015*** (0.001)	0.014*** (0.001)	0.014*** (0.001)	0.014*** (0.001)	0.015*** (0.001)	0.014*** (0.001)
No debt older than three years	0.178*** (0.015)	0.182*** (0.015)	0.174*** (0.015)	0.174*** (0.015)	0.174*** (0.015)	0.177*** (0.015)	0.172*** (0.014)
Observations	10,753	11,088	10,284	10,284	10,284	10,753	10,284
Adjusted R-squared	0.429	0.429	0.435	0.435	0.435	0.430	0.436
Occupation controls	No	No	No	No	No	Yes	Yes
Member state controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reference person controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors clustered by occupation in parentheses. Other controls: household size, main residence property status, risk attitudes, no prior credit past the three-year mark, nationality, education and labour status of reference person.

\*p<.05; \*\*p<.01; \*\*\*p<.001

Table 9: Job polarization and credit refusal

VARIABLES	Credit refusal						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Perceived job security	-0.049** (0.019)					-0.045** (0.019)	
15-years polarisation (% change since 2002)		-0.084 (0.076)		-0.042 (0.069)	0.121 (0.082)		0.185 (0.246)
5-years polarisation (% change since 2012)			-0.734*** (0.220)	-0.717*** (0.224)	-0.687*** (0.230)		-0.873** (0.364)
Polarisation at $t_i$ (% change)					-0.436** (0.179)		-0.451** (0.179)
Gross family income (ln)	-0.015** (0.007)	-0.014** (0.007)	-0.020*** (0.007)	-0.020*** (0.007)	-0.020*** (0.007)	-0.012* (0.007)	-0.018** (0.007)
Labour income of reference person (ln)	-0.003 (0.002)	-0.003 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.003)	-0.003 (0.002)	-0.001 (0.002)
Age of reference person	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Gender of reference person, female	0.005 (0.007)	0.005 (0.007)	0.001 (0.007)	0.001 (0.007)	0.001 (0.007)	0.006 (0.007)	0.002 (0.007)
Weekly working hours	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Time in main occupation	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Household monthly consumption (ln)	-0.022*** (0.006)	-0.021*** (0.006)	-0.014*** (0.005)	-0.014** (0.005)	-0.014*** (0.005)	-0.019*** (0.006)	-0.013** (0.005)
Outstanding debt, older than three years (ln)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)
No debt older than three years	-0.091*** (0.014)	-0.091*** (0.014)	-0.074*** (0.012)	-0.074*** (0.012)	-0.074*** (0.012)	-0.090*** (0.014)	-0.074*** (0.012)
Observations	9,239	9,498	8,769	8,769	8,769	9,239	8,769
Adjusted R-squared	0.109	0.118	0.119	0.119	0.120	0.111	0.120
Occupation controls	No	No	No	No	No	Yes	Yes
Member state controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reference person controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors clustered by occupation in parentheses. Other controls: household size, main residence property status, risk attitudes, no prior credit past the three-year mark, nationality, education and labour status of reference person.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

Table 10: Job polarization and interest rates

VARIABLES	Interest rates						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Perceived job security	-0.056 (0.269)					-0.060 (0.274)	
15-years polarisation (% change since 2002)		-1.667 (1.111)		-1.612 (1.143)	0.307 (1.335)		-6.758 (4.393)
5-years polarisation (% change since 2012)			-4.069 (3.544)	-3.470 (3.777)	-3.047 (3.795)		5.830 (12.577)
Polarisation at $t_i$ (% change)					-5.230* (2.807)		-3.816 (2.879)
Gross family income (ln)	-0.463*** (0.146)	-0.439*** (0.139)	-0.439*** (0.138)	-0.437*** (0.139)	-0.435*** (0.139)	-0.433*** (0.149)	-0.412*** (0.142)
Labour income of reference person (ln)	0.026 (0.034)	0.037 (0.032)	0.036 (0.032)	0.036 (0.032)	0.035 (0.032)	0.028 (0.032)	0.040 (0.031)
Age of reference person	0.043*** (0.008)	0.043*** (0.008)	0.043*** (0.008)	0.043*** (0.008)	0.042*** (0.008)	0.044*** (0.008)	0.043*** (0.008)
Gender of reference person, female	0.150 (0.114)	0.178 (0.109)	0.173 (0.111)	0.180 (0.109)	0.174 (0.108)	0.196* (0.115)	0.205* (0.112)
Weekly working hours	0.013* (0.007)	0.009 (0.007)	0.011 (0.007)	0.010 (0.007)	0.010 (0.007)	0.015** (0.007)	0.012* (0.007)
Time in main occupation	-0.018** (0.007)	-0.018** (0.007)	-0.018** (0.007)	-0.018** (0.007)	-0.021*** (0.008)	-0.016** (0.007)	-0.018** (0.008)
Household monthly consumption (ln)	-0.088 (0.092)	-0.120 (0.094)	-0.123 (0.095)	-0.119 (0.095)	-0.124 (0.093)	-0.058 (0.091)	-0.091 (0.092)
Outstanding debt, older than three years (ln)	0.065 (0.040)	0.080** (0.037)	0.080** (0.037)	0.080** (0.037)	0.080** (0.037)	0.062 (0.040)	0.077** (0.037)
Observations	6,502	6,671	6,646	6,646	6,646	6,499	6,646
Adjusted R-squared	0.316	0.308	0.307	0.307	0.308	0.317	0.309
Occupation controls	No	No	No	No	No	Yes	Yes
Member state controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reference person controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors clustered by occupation in parentheses. Other controls: household size, main residence property status, risk attitudes, no prior credit past the three-year mark, nationality, education and labour status of reference person.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$



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