

Consumer Bankruptcy Decision in Great Britain

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Abstract

We examine the effects of the bankruptcy benefit and adverse events on the consumer bankruptcy decision of approximately 66,000 individuals in Great Britain using a longitudinal survey. Employing zero-inflated ordered probit (ZIOP) model, we analyse the determinants of bankruptcy decision and the choice of the bankruptcy type, either the discharge of debts (termed *fresh start*) or the reorganisation of debts (termed *income gleaning*). We find that consumers are more likely to enter into bankruptcy proceedings when the bankruptcy benefit increases. However, separating the effect into its two components, our findings suggests that the dischargeable debt is the dominant factor in the consumer bankruptcy decision in Great Britain. In terms of adverse events, becoming unemployed is found to be the dominant factor influencing consumer bankruptcy decision. The effects of other adverse events differ across bankruptcy types. Individuals who experience the onset of health problems are more likely to choose the income gleaning, whereas individuals who get divorced or separated are more likely to choose the fresh start.

Keywords: Consumer bankruptcy, Bankruptcy benefit, Adverse events, Great Britain, The United Kingdom

JEL classification: D10; D14

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1. Introduction

The last two decades have seen a rapid growth of unsecured consumer debt in Great Britain. As a consequence, the consumer bankruptcy has also increased from a rare event to a relatively common phenomenon.¹ The total number of consumer bankruptcy filings has increased five-fold during this period, from around 30,000 in 1998 to 150,000 in 2018 (Figure 1).² As consumer bankruptcy has become a bigger issue, studies attempted to explain not only the increasing trend but also the reasons behind the decisions of consumers to file for bankruptcy.³

The literature on the consumer bankruptcy focuses on two theories in explaining the bankruptcy decision: *the strategic behaviour theory* and *the adverse events theory*. The strategic behaviour theory suggests that consumers file for bankruptcy when their financial benefit from bankruptcy is higher, regardless of their ability to repay. This view states that consumers act strategically and plan to file for bankruptcy in advance (White, 1998b; Zhang, Sabarwal, and Gan, 2015). The adverse events theory suggests that consumers file for bankruptcy because of the adverse events, such as unemployment, health problems and divorce, that they experience. These adverse events cause the financial distress in the form of income reduction and debt increase which eventually results in bankruptcy (Domowitz and Sartain, 1999; Himmelstein et al., 2005; Gross and Notowidigdo, 2011). However, empirical evidence supporting the theory is limited, mainly due to the lack of individual level data. Most of the individual level studies on the consumer bankruptcy use only US household data and apply to US bankruptcy procedures (see for example, Fay, Hurst, and White, 2002; Han and Li, 2011).

The literature also discusses the economic objectives of having consumer bankruptcy laws (White, 2005; Li and Sarte, 2006; Chatterjee and Gordon, 2012). One objective is to have a mechanism to repay at least partially to creditors in case of insolvency or default. If the creditors were not paid in case of default, this would harm the credit markets by increasing interest rates and reducing access to credits. A related objective is to protect debtors from

¹ The total debt held by the average British consumer was £30,832 in 2018, which is around 112% of average earnings and the average debt has been steadily increasing.

² One of the main reasons behind the increase in the UK is arguably the 2002 bankruptcy reform which have made the consumer bankruptcy more pro-debtor by reducing the time period of bankruptcy measures from three years to one year.

³ A partial list includes the following studies. An early work in this area, Sullivan, Warren, and Westbrook (1989), discusses the adverse events. White (1998a), Domowitz and Sartain (1999), Gross and Souleles (2002), Fay, Hurst, and White (2002) and Han and Li (2011) investigate both adverse events and bankruptcy benefits.

aggressive collection efforts by creditors because debtors may lose their jobs as a result of garnishment of debtors' vehicles or wages.⁴ Another objective is to provide partial consumption insurance to 'honest but unfortunate' debtors against adverse shocks to consumption such as divorce, job loss and health problems. If consumption decreases dramatically, it may cause bigger problems such as impact on debtor's family members, untreated health problems becoming permanent illnesses or disabilities.⁵

In this paper, we investigate the effects of the bankruptcy benefit and adverse events on the consumer bankruptcy decision in Great Britain. We utilise Wealth and Asset Survey (WAS), a unique longitudinal survey by Office of National Statistics, which covers approximately 60,000 individuals' demographics, well-being, income, assets, debt, and bankruptcy filings over the period of 2006 to 2014 in four waves. The data provides the granular detail to calculate an individual's bankruptcy benefit, simply the difference between dischargeable debts by filing bankruptcy and eligible assets for liquidation at the time. The survey also asks individuals whether they have entered into any formal insolvency proceedings or into a debt management scheme in the previous period. This allows us to identify not only the bankruptcy but also type of the insolvency proceedings that an individual has entered into, either the discharge of debts (termed *fresh start*) or the reorganisation of debts (termed *income gleaning*). WAS tracks adverse events, such as *unemployment*, *divorce* and *health problems*, that individuals have experienced between the waves during this period.

We test the predictions of two theories that are commonly used in the literature. The strategic behaviour theory suggests that consumers are more likely to file for bankruptcy when their benefit from bankruptcy is higher. In contrast, the adverse events theory posits that consumers file for bankruptcy due to adverse events, which reduce their income, and, therefore, their ability to repay debts. We use a zero-inflated ordered probit (ZIOP) model to account for the fact that bankruptcy is a rare event and, therefore, the data includes high fraction of non-bankrupts. ZIOP also deals with the endogeneity due to possible sample selection bias.

Our results show that consumers are more likely to enter into bankruptcy proceedings when the bankruptcy benefit increases. However, separating the effect into its two components, we find that the dischargeable debt is the dominant factor in the consumer bankruptcy decision in Great Britain. In terms of adverse events, we find that becoming unemployed is the dominant

⁴ See Chatterjee and Gordon (2012) for a discussion on the implications of eliminating bankruptcy protection for indebted individuals.

⁵ For a more detailed discussion, see White (2005).

factor influencing consumer bankruptcy decision. The effects of other adverse events differ across bankruptcy types. Individuals who experience the onset of health problems are more likely to choose the income gleaning, whereas individuals who get divorced or separated are more likely to choose the fresh start.

Our contribution to the literature is threefold. First, previous studies on the consumer bankruptcy decision treat bankruptcy as a uniform case and provide little information about the different bankruptcy types (Fay, Hurst, and White, 2002; Zhang, Sabarwal, and Gan, 2015).⁶ In reality, not all bankruptcy types have the same consequences; therefore, if possible, it is imperative to analyse bankruptcy types separately to better understand the bankruptcy decision. Having the required granular data, we investigate both the bankruptcy decision and the bankruptcy types and compare them rather than oversimplifying all the bankruptcy decisions as the same type. As the major contribution of this research, we test the strategic behaviour and adverse events theories according to the bankruptcy type.

Second, since the consumer bankruptcy is a legal process, bankruptcy filers must have formal debts from financial intermediaries in the form of consumer loan or a credit card loan. However, it is possible that some individuals are excluded from financial market voluntarily or involuntarily. Therefore, we suspect that the non-bankrupt individuals belong to one of two groups, *participants* or *non-participants* of financial markets, which may lead to a potential selection bias problem. Previous studies do not explore the potential endogeneity (Fay, Hurst, and White, 2002), or do so only for the strategic behaviour (Zhang, Sabarwal, and Gan, 2015). By applying zero-inflated ordered probit (ZIOP) model, we alleviate the potential endogeneity for both the bankruptcy decision and the different bankruptcy types.

Third, the literature on the consumer bankruptcy mostly relates to US households under the US laws and there is no empirical study on the consumer bankruptcy decision in Great Britain.⁷ We contribute to the literature by providing the first evidence for Great Britain and its consumer bankruptcy procedures.

The rest of the paper is organised as follows. The next section discusses the consumer bankruptcy procedures in Great Britain. Then, the related existing literature on the consumer

⁶ There are four different types of bankruptcy procedures in Great Britain. These types can be categorised into two parts as the discharge of debts (fresh start) and reorganisation of debts (income gleaning). Similarly, there are two types of bankruptcy in the US. One is liquidation under Chapter 7 and the other one is reorganisation under Chapter 13.

⁷ Great Britain includes England, Scotland and Wales, but excludes Northern Ireland and 97.2% of the UK's population live in Great Britain. Since our dataset includes representative households from Great Britain, we use 'Great Britain' rather than the 'UK' even though some sources use them interchangeably.

bankruptcy is summarised in Section 3. Section 4 briefly discusses the theoretical framework and Section 5 explains the data and variables. Section 2.6 discusses the econometric approach applied and Section 7 presents empirical results. Section 8 concludes.

2. Background of Consumer Bankruptcy Procedures in Great Britain

Bankruptcy is the legal mechanism involving firms and individuals that cannot pay their debts.⁸ Bankruptcy procedures can be divided into two parts as ‘corporate bankruptcy’ and ‘consumer bankruptcy’.⁹ The corporate bankruptcy refers to the bankruptcy of firms, while the consumer bankruptcy refers to the bankruptcy of individuals. Great Britain has two legal jurisdictions: England and Wales, and Scotland. Even though the bankruptcy law is devolved to the Scottish Parliament by the Scotland Act 1998, consumer bankruptcy laws in both jurisdictions are similar.

Bankruptcy¹⁰ in England and Wales is a formal process for financially distressed individuals to discharge their eligible debts under the Insolvency Act 1986. To be made bankrupt, a court issues a bankruptcy order after applied by either the individual or a creditor who is owed £750 or more by the individual. Bankruptcy processes are administered by an official receiver who is an officer of the bankruptcy court. Also, a licensed insolvency practitioner as a trustee from the private sector can be appointed by the creditors. The debtor’s assets¹¹ are disposed to pay his or her debts. During the bankruptcy process, the debtor is subject to some restrictions such as the prohibition of credit use more than £500 and being the owner or the manager of a company. Restrictions last until the bankruptcy process ends and the debts are discharged which usually takes 12 months. There are very limited debt categories that cannot be discharged in bankruptcy, most importantly student loans.¹² The bankruptcy order in Scotland, sequestration, is the equivalent of the bankruptcy order in England and Wales and has the similar procedures. All sequestrations are administered by a trustee, who has similar functions with the official receiver in England and Wales, appointed by the court who is a public official. As in the bankruptcy order, the debtors surrender their eligible assets. In return,

⁸ There are also bankruptcy procedures for local governments and municipalities in some countries. However, there is no bankruptcy procedure at the international level for sovereign countries in financial distress.

⁹ In the literature, ‘consumer bankruptcy’, ‘household bankruptcy’, ‘individual bankruptcy’ and ‘personal bankruptcy’ are used interchangeably. We prefer to use ‘consumer bankruptcy’ throughout this study to avoid confusion.

¹⁰ In the UK context, bankruptcy only applies to individuals. Corporations that cannot pay their debts are called ‘insolvent’.

¹¹ The debtor can keep some job related or household items like tools, clothing and furniture. The debtor’s pension wealth is not subject to the bankruptcy either.

¹² Non-dischargeable debts also include criminal penalties, debts arising from fraud and liabilities arising from family or domestic court action like claims for child support.

they obtain a discharge of all debts and obligations for which they were liable at the date of sequestration.^{13,14}

A simpler and quicker form of the bankruptcy order is called ‘Debt Relief Order (DRO)’ which is introduced in April 2009 in England and Wales and Scotland. It aims to individuals who owe very little and have little or no income. To be eligible for a DRO, along with the other requirements¹⁵, the debtor’s total unsecured debt must not exceed £15,000 and the total gross assets must not exceed £300. Additionally, the debtor’s disposable income after deduction of normal household expenses must not exceed £50 per month. DROs are a simple form the bankruptcy orders for very low-wealth and low-income consumers. Since almost all of the debts are discharged under bankruptcy orders and DROs, these two bankruptcy types can be considered as ‘fresh start’.

A second form is the Individual Voluntary Arrangements (IVA), contractual arrangement between the financially distressed debtor and the creditors agreed to pay at least 75% of the debt under the new repayment plan negotiated by an insolvency practitioner. This new repayment plan usually takes five years and the return to creditors is usually higher than they would receive under bankruptcy orders. IVAs aim to individuals who have enough money left over after essential expenses. When an IVA is approved, it applies to all creditors, including any who disagreed to it. Protected Trust Deeds (PTDs) are the Scottish equivalent of IVAs. Like IVAs, PTDs bind all creditors and they generally provide for the debtor to make appropriate contributions from income, and in practice many PTDs are income-only because the debtor has no non-exempt assets. PTDs are an alternative to sequestration for the debtors with income. The debtor obtains debt relief and the creditors usually receive better returns than they would have in sequestration.

A third option is Debt Management Plans (DMP). DMPs are an agreement between the debtor and the creditors to pay all of the debts under a new repayment plan which is negotiated by a licensed debt management company. The debtor makes regular payments to the debt management company, and the company shares this money out between the creditors. DMPs are not legally binding, so the creditors do not have to agree on a plan and can pursue individual collections. Debt Arrangement Schemes (DASs), Scottish equivalent of DMPs, are an

¹³ For more information, please see Skene and Walters (2006).

¹⁴ Similar to Enterprise Act 2002, a major reform of bankruptcy is introduced with the Bankruptcy and Diligence etc. (Scotland) Act 2007 which reduced the required time for the discharge of debts.

¹⁵ The debtor has to live and work in the UK for the last three years and has not applied for a DRO within the last six years.

agreement between the debtor and the creditors to reorganise the debt repayment schedule. All creditors whose debts are included must consent to it. DASs are primarily an income-based debt management tool. Even though it is possible to include assets in DASs, many debtors have no assets or choose the DAS precisely because they wish to manage their debts without liquidating their assets. Based on the expected future income, the debts are mostly reorganised rather than discharged under IVAs and DMPs (PTDs and DASs in Scotland, respectively). Therefore, these two bankruptcy types can be considered as ‘income gleaning’.

3. Literature Review

Literature on the consumer bankruptcy are often published in economics, finance and legal journals. Legal literature mostly focuses on bankruptcy laws, procedures and their applications. Some legal studies rely on available survey data to analyse the bankruptcy decision, which is closely related to economically-oriented empirical literature. Economics and finance literature on consumer bankruptcy focus on both theoretical and empirical studies.

3.1 Theoretical Studies

Theoretical studies on the consumer bankruptcy studies typically discuss optimal consumer bankruptcy policies. They generally have partial or general equilibrium approach which include household maximisation problem with other equilibrium conditions such as competition (Athreya, 2002; 2006), resource constraints (Li and Sarte, 2006; Gross, Notowidigdo, and Wang, 2014) and market clearing (Livshits, MacGee, and Tertilt, 2007; Narajabad, 2012). Some of these studies have contractor conclusions. For example, modelling the trade-off between the consumption smoothing role of bankruptcy and the interest rates, Athreya (2002) argues that the elimination of bankruptcy altogether has substantial benefits. In contrast, Li and Sarte (2006), studying the implications of US personal bankruptcy rules for resource allocation and welfare, argue that the complete elimination of bankruptcy provisions causes significant declines in output and welfare.

Many models assume that if the consumers default on their debts, they always file for bankruptcy (Chatterjee et al., 2007; Livshits, MacGee, and Tertilt, 2007). However, some debtors default without filing for bankruptcy. In this case, the creditors may exercise collection efforts such as taking money from the debtors’ wages and accounts. The collection efforts are

sometimes risky, because the debtors may lose their jobs or file for bankruptcy in response. White (1998b) models the default option versus the bankruptcy choice and finds that both creditors and debtors play mixed strategies, which means some debtors may default without being pursued by the creditors. Another issue discussed in the literature is the trade-off between credit availability and work incentives after bankruptcy and the partial consumption insurance. In their model with two types of debtors, Wang and White (2000) show that the '*fresh start*' bankruptcy policy is optimal if the all debtors are non-opportunists. However, if the debtors have opportunistic behaviour, then the policy should require some payments from post-bankruptcy earnings, because the *fresh start* policy attracts opportunists to file for bankruptcy even if they are able to repay their debts. The more debtors file and benefit from bankruptcy, the less access to credit at higher interest rates.

The option value of the consumer bankruptcy is also discussed in the literature. If the debtors' ability to pay decreases in the future, they can exercise their option to file for bankruptcy and the creditors bear the burden of debts. The price of the performing the option is the debtor's eligible assets for liquidation. White (1998a) calculates the value of the option for households using a representative sample of US households and finds that many debtors who do not benefit from filing for bankruptcy immediately gain from having the option to file in the future.

3.2 Empirical Literature

The earlier empirical studies on consumer bankruptcy generally use aggregate level data due to the lack of suitable household level data (such as Shepard, 1984; Domowitz and Eovaldi, 1993; Buckley, 1994). There is relatively a small household level empirical literature on consumer bankruptcy. Hence, relatively fewer studies focus on demographics and behaviour of individuals who file for bankruptcy. Examining the demographics of bankruptcy, Sullivan, Warren, and Westbrook (1994) find that bankrupt individuals have less income and assets, and more debts compared to non-bankrupt individuals. Education level also affects the bankruptcy decision. Household heads with more years of education are found to be less likely to file for bankruptcy (Fay, Hurst, and White, 2002). Similarly, US postal codes with higher percentage of residents with undergraduate level education have significantly lower bankruptcy rates controlling for income, ethnicity, marital status, age, sex and employment among others (Lefgren and McIntyre, 2009).

A strand of the literature focuses on consumers' financial situation and their bankruptcy decision. Domowitz and Sartain (1999), based on US household data, find that consumers with more credit card debt are more likely to file for bankruptcy. Similarly, Gross and Souleles (2002) show that bankruptcy rates are associated with the delinquent debt. Furthermore, Zhu (2011) uses data from the consumer bankruptcy filers in the US state of Delaware and finds that the household expenditure on durable goods such as houses and vehicles contributes to the consumer bankruptcy significantly.

Some studies focus on the relationship between adverse events (such as unemployment, health problems and divorce) and the consumer bankruptcy decision in the US. Sullivan, Warren, and Westbrook (1989) find that adverse events lead to consumer bankruptcy by decreasing consumers' ability to repay in. Domowitz and Sartain (1999) show that households with medical debt of 2% or more of their income have more than twenty times higher probability of filing for bankruptcy than the overall probability. Himmelstein et al. (2005) find that 28.3% of the consumer bankruptcy filings were due to illness or injury and 46.2% of the filings were related to major medical causes. Similarly, Gross and Notowidigdo (2011) find that medical costs have crucial importance in roughly 26% of consumer bankruptcies among low-income households. Analysing both the effect of financial benefit and adverse events on the consumer bankruptcy, Fay, Hurst, and White (2002) find that the consumer bankruptcy is mostly related to consumers' financial benefit, which is the dischargeable debts minus non-exempt assets, from filing for bankruptcy.¹⁶ They find little support for the hypothesis that filings for bankruptcy increases when adverse events occur. Lefgren and McIntyre (2009) find that filing rates may also be affected by policies such as exemptions and garnishment procedures. Hence, an optimal consumer bankruptcy policy is needed to protect both the debtor and the creditors, which is one of the main questions in the literature on the consumer bankruptcy.

Another strand of the literature is devoted to the social stigma¹⁷ and information costs¹⁸ based on US data. Sullivan, Warren, and Westbrook (2006) find that increased filings result from increased financial distress rather than the declining bankruptcy stigma. Cohen-Cole and Duygan-Bump (2008) argue that the increase in consumer bankruptcy filings is more likely associated with the decreased information costs rather than the decreased social stigma. Fay,

¹⁶ They find that an increase of \$1,000 in financial benefit is associated with 7% increase in the probability of filing for bankruptcy.

¹⁷ Social stigma can be in different forms such as negative views of friends and family or inability in obtaining credit.

¹⁸ Knowledge of eligibility, application procedures, bureaucratic details, etc. may matter on the bankruptcy decision.

Hurst, and White (2002) also show that households live in districts which have higher bankruptcy rates are more likely to file for bankruptcy, which implies that the locality is an important determinant on the bankruptcy decision. Other studies in the literature also include the relationship between the consumer bankruptcy and credit markets (Gropp, Scholz, and White, 1997; Dick and Lehnert, 2010) and the relationship between the consumer bankruptcy the labour supply (Han and Li, 2007; Chen and Zhao, 2017).

Due to the lack of suitable individual level data, the literature on the consumer bankruptcy specifically devoted to Great Britain is mostly limited to legal studies regarding the bankruptcy procedures and reforms (Skene and Walters, 2006; Ramsay, 2007). This study aims to investigate the consumer bankruptcy decision using individual level longitudinal data from representative households in Great Britain in order to fill the gap in this area by contributing to the empirical literature.

4. Methodology and Data

4.1 Theoretical Framework

4.1.1 Strategic Behaviour Theory

The strategic behaviour theory suggests that consumers are more likely to file for bankruptcy when their benefit from bankruptcy is higher, regardless of their ability to repay. This view states that consumers act strategically and plan to file in advance. The bankruptcy benefit is defined as the financial benefit of the consumers under the bankruptcy procedures. The benefit from filing for bankruptcy for individual i , which is mainly drawn from earlier studies such as Fay, Hurst, and White (2002), Li, White, and Zhu (2011) and Darolia and Ritter (2015), can be calculated as follows:

$$Bankruptcy\ Benefit_{i,t} = \max[d_{i,t} - w_{i,t} - Court_t, 0] \quad (1)$$

where $Bankruptcy\ Benefit_{i,t}$ is the bankruptcy benefit for individual i at time t , which is non-negative because consumers file for bankruptcy strategically if their benefit from bankruptcy is non-negative. $d_{i,t}$ and $w_{i,t}$ are the individual i 's dischargeable debts in bankruptcy and eligible assets for liquidation at time t , respectively. $Court_t$ is court costs and administrative fees for bankruptcy at time t . $d_{i,t}$ is calculated as total net debts of individual i , excluding non-dischargeable debts such as student loans at time t , similarly $w_{i,t}$ is calculated

as the total net wealth of individual i , excluding the non-eligible wealth such as the pension wealth and some household items at time t . Dischargeable debts and eligible assets follow the bankruptcy procedures as explained in Section 2.

In this paper, we modify the theoretical model introduced by Zhang, Sabarwal, and Gan (2015). Consider a standard, two-period decision-making framework. In the first period, the consumer borrows money. In the second period, one of the two states prevails: a good state or a bad state. The good state represents the planned state without any adverse event, while the bad state represents the occurrence of adverse events. Each state corresponds to a decision node, and the probability of each state is π_g and π_b , respectively, with $\pi_g + \pi_b = 1$.

As usual, a consumer has to decide how much to consume at each state; her consumption is denoted as c_t , $c_{g,t+1}$ and $c_{b,t+1}$ where c_t represents the consumption in the first period, $c_{g,t+1}$ the consumption in the good state and $c_{b,t+1}$ the consumption in the bad state in the next period. The consumer has a twice continuously differentiable utility function with the following conditions:

$$u'(c) > 0, u''(c) < 0 \quad (2)$$

$$\lim_{c \rightarrow 0} u'(c) = \infty, \quad \lim_{c \rightarrow \infty} u'(c) = 0 \quad (3)$$

and the consumer has the following expected utility:

$$U = u(c_t) + \delta [\pi_g u(c_{g,t+1}) + \pi_b u(c_{b,t+1})] \quad (4)$$

The endowment in consumption units at each node is denoted as w_t , $w_{g,t+1}$ and $w_{b,t+1}$. We normalise the endowment to zero in the first period. Therefore, we assume that $w_t = 0 \leq w_{b,t+1} < w_{g,t+1}$ for convenience. Moreover, credit markets are available to the consumer at the market interest rate r . As usual, a single consumer takes interest rates as given. The consumer decides how much debt to take subject to a debt limit which is exogenously determined by the creditor; so it is assumed that $0 < d_t \leq \bar{d}$ where d_t denotes the debt the consumer takes at time t and \bar{d} the debt limit. The debt in the next period denoted as $d_{t+1} = (1 + r) d_t$.

The strategic behaviour consumer is a rational consumer who includes the bankruptcy option in her maximisation problem. In the first period, she takes the debt to consume. In the next period, she considers the bankruptcy option no matter whether the outcome is good or bad. If she files for bankruptcy, her eligible assets will be liquidated but in return, her debts will be discharged. Therefore, the strategic behaviour consumer solves the following problem:

$$\max_{c_t, c_{g,t+1}, c_{b,t+1}} u(c_t) + \delta [\pi_g u(c_{g,t+1}) + \pi_b u(c_{b,t+1})] \quad (5)$$

subject to

$$\begin{aligned} c_t &= d_t \\ c_{g,t+1} &= \max[w_{g,t+1} - d_{t+1}, \max[d_{t+1} - w_{g,t+1} - Court_{t+1}, 0]] \\ c_{b,t+1} &= \max[w_{b,t+1} - d_{t+1}, \max[d_{t+1} - w_{b,t+1} - Court_{t+1}, 0]] \\ 0 &< d_t \leq \bar{d} \end{aligned}$$

The maximum operator in the constraints corresponds the bankruptcy decision. If the consumer, for example, decides not to file for bankruptcy in the good state, the constraint becomes $w_{g,t+1} - d_{t+1}$. If she files for bankruptcy, the constraint becomes $\max[d_{t+1} - w_{g,t+1} - Court_{t+1}, 0]$ which is the bankruptcy benefit. The strategic behaviour consumer chooses the most profitable option in any case.

4.1.2 Adverse Events Theory

The adverse events theory suggests that consumers file for bankruptcy due to adverse events such as job loss, divorce and health problems, which reduce their income, hence ability to repay their debts, dramatically. Sullivan, Warren, and Westbrook (1989, 2006) support this theory empirically, concluding that while some cases of strategic behaviour may exist, the bankruptcy is predominantly due to adverse events and they state that no one plans to go bankrupt. The theory assumes that consumers do not plan to file for bankruptcy. If an adverse event occurs, they may be compelled to file for bankruptcy. If such an event does not occur, they do not consider filing for bankruptcy. An important question arises from this assumption: ‘why do not they include a bankruptcy option in the good state?’ One explanation can be utility penalties arising from future reputation losses from filing (Dubey, Geanakoplos, and Shubik, 2005). Such losses can be the restricted future access to credit markets and the negative impact on credit score (Musto, 2004). For example, a bankruptcy flag on a consumer credit report stays there for ten years which affects the access to credit in the future negatively. If these losses are high enough, they may deter consumers to file in the good state even if it is financially practical. Therefore, consumers may optimally decide not to consider a bankruptcy option (Zhang, Sabarwal, and Gan, 2015).

The adverse events consumer takes decisions sequentially. In the first period, she takes the debt to consume and plans accordingly. In the next period, if the planned events occur, she consumes as planned and she does not consider the bankruptcy option. If an adverse event

occurs, she includes the bankruptcy option in her maximisation problem. If she files for bankruptcy, her eligible assets will be liquidated but in return, her debts will be discharged.

The adverse events theory has the same model with the strategic behaviour theory. They have the same assumptions regarding decision nodes, debts, endowments, utility functions and the expected utilities. The only difference is the optimisation problem. The adverse events consumer solves the following optimisation problem:

$$\max_{c_t, c_{g,t+1}, c_{b,t+1}} u(c_t) + \delta [\pi_g u(c_{g,t+1}) + \pi_b u(c_{b,t+1})] \quad (6)$$

subject to

$$c_t = d_t$$

$$c_{g,t+1} = w_{g,t+1} - d_{t+1}$$

$$c_{b,t+1} = \max[w_{b,t+1} - d_{t+1}, \max[d_{t+1} - w_{b,t+1} - Court_{t+1}, 0]]$$

$$0 < d_t \leq \bar{d}$$

The model suggests that the adverse events consumer only files for bankruptcy in the bad state, while the strategic behaviour consumer may file for bankruptcy in any state.¹⁹

4.2 Data

We use data from the Wealth and Assets Survey (WAS) which is provided by the Office for National Statistics.²⁰ WAS is a longitudinal survey which focuses on the economic well-being of individuals in Great Britain by collecting data on assets, savings, income, and debts of individuals and private households. The first wave (Wave 1) interviews were carried out from July 2006 to June 2008, covering about 53,300 adult individuals²¹ and 30,500 households. For the second wave (Wave 2), same households were interviewed again from July 2008 to July 2010. Due to the attrition, interviews were achieved with approximately 34,500 adults and 20,000 households. In the third wave (Wave 3), addition to follow-up respondents at Wave 1 and Wave 2, a new cohort was introduced, which is a new random sample of around 12,000 addresses. Wave 3 covered July 2010-June 2012 and was achieved with about 40,400 adults and 21,400 households. Finally, the fourth wave (Wave 4) interviewed 38,300 adults and

¹⁹ The models presented in this section are simplified models to represent the main aspects of the bankruptcy decision. As the case for all models, these models have some limitations and do not capture all the relevant aspects of the consumer bankruptcy such as the role of social stigma, information, bankruptcy types, access to credit in the future, entrepreneurial activities and work incentives. Some of these aspects are not possible to capture in the data, though. For further studies, it is possible to modify the models to address some of these issues in a reduced form by including parameters for access to credit markets in the future, or utility penalties in case of bankruptcy, but it is unclear whether such additions would yield tractable models.

²⁰ Legal access to the special use data under the Approved Researcher Scheme.

²¹ 'Adult' is defined as the respondents aged 16 and over.

20,200 households in July 2013-June 2014.

The survey estimates are designed to be representative of the population of Great Britain, therefore the WAS uses a ‘probability proportional to size’ (PPS) method of sampling cases.²² In addition to the geographical distribution, the WAS sample is also designed to be representative of the population in terms of characteristics of individuals and households such as age, sex, marital status, employment status and education level. All interviews have a two-yearly interval between waves, therefore providing estimates of change in relation to the same period of time.²³ The WAS estimates physical wealth, property wealth, financial wealth, and private pension wealth by asking households about their assets, liabilities and pension schemes. It also includes household and individual demographics, socioeconomic characteristics, and measures of financial attitudes, behaviours, and difficulties.

Related to financial difficulties, the WAS asks individuals two specific questions about the consumer bankruptcy. All adult respondents are asked the following question:

“Have you entered into any formal insolvency proceedings or into a Debt Management Plan (DMP) in the last year?”

Respondents are required to choose “Yes or No”. If they choose ‘Yes’, then they are asked:

“What type of insolvency proceedings have you entered into?”

Respondents are required to choose one of the following options:

1. *Bankruptcy*
2. *An Individual Voluntary Arrangement*
3. *A Debt Management Plan*
4. *A Debt Relief Order*

We identify respondents who choose (1) or (4) from the list above as ‘fresh start’ bankrupts, while respondents who choose (2) or (3) are identified as ‘income gleaning’ bankrupts.

The strategic behaviour theory suggests that consumers are more likely to file for bankruptcy when their benefit from bankruptcy is higher, regardless of their ability to repay. We calculate (as per Equation 1) the bankruptcy benefit for each individual by using their eligible assets and dischargeable debts following the bankruptcy procedures. We present information on bankruptcy benefits in Table 1. We observe that 6.3% of the individuals have

²² This means that the probability of an address being selected is proportional to the number of addresses within a given geographic area, with a higher number of addresses being selected from densely populated areas.

²³ For example, Wave 1 interviews conducted during July 2006 would be repeated for Wave 2 in July 2008. It is important that this gap remains constant so that estimates of change are comparable from wave to wave.

a positive bankruptcy benefit, but only 1.4% of them have a sizable benefit (more than £10,000). These rates are substantially higher than the actual bankruptcy rates.²⁴ The mean and median values of the bankruptcy benefit is negative, but some financially distressed consumers have positive benefit values.

Another view on the consumer bankruptcy is that individuals file for bankruptcy due to adverse events such as *unemployment*, *divorce* and *health problems* which reduce their income, hence ability to repay their debts dramatically. The WAS keeps track of characteristics of the individuals. The panel structure of data allows us to observe the adverse events between waves for each individual. We specify three adverse events based on the literature (e.g. Domowitz and Sartain, 1999; Fay, Hurst, and White, 2002; and Himmelstein et al., 2005): *unemployment*, *divorce* and *health problems*. Since we focus on adverse events as negative shocks, we observe each individual two periods and note any change in these characteristics. Therefore, the adverse events are *becoming unemployed* (job loss), *getting divorced* or *separated* and the onset of a *serious health problem* which limits the physical activity.

4.3 Bankruptcy Decision Models

At the outset, we test the strategic behaviour theory by examining the impact of the financial benefit on the consumer bankruptcy decision using the framework developed by Fay, Hurst, and White (2002). Each individual i is observed over two periods, t and $t + 1$. The financial situation and the characteristics of individuals are observed at time t and their bankruptcy decision at time $t + 1$ to examine whether or not the financial situation and the characteristics lead to bankruptcy the next period. The general form of the strategic behaviour model, which explains a dichotomous variable as a function of the financial benefit and other characteristics, is given by:

$$Bankruptcy_{i,t+1} = \beta Bankruptcy\ Benefit_{i,t} + \gamma \mathbf{X}_{i,t} + \varepsilon_{i,t} \quad (9)$$

where $Bankruptcy_{i,t+1}$ denotes a binary variable indicating whether the individual i have filed for consumer bankruptcy at time $t + 1$, or not. If the individual files for any type of bankruptcy, $Bankruptcy$ takes the value of 1, otherwise 0. $Bankruptcy\ Benefit_{i,t}$ represents the bankruptcy benefit if the individual files for bankruptcy. The bankruptcy benefit is calculated as explained in Equation 1. *Eligible Assets* and *Dischargeable Debts* are also tested as explanatory variables in a variant of the strategic behaviour model. $\mathbf{X}_{i,t}$ is the vector of

²⁴ For a discussion on why the actual rate is considerably low compared to bankruptcy benefits suggest, see White (1998a).

control variables, and $\varepsilon_{i,t}$ the error term, all at time t . Control variables are mainly drawn from the empirical studies on the consumer bankruptcy such as Domowitz and Sartain (1999), Gross and Souleles (2002) and Zhu (2011). *Annual Net Income* indicates the annual income of the individual. *Age* represents the age of the consumer.²⁵ *Education* is the educational attainment of the consumer. It takes the value of 1 if the consumer has a bachelor's degree or above, 0 otherwise. *Family Size* indicates the number of persons in the household. *White* is the racial origin of the individual and it takes the value of 1 if the individual's racial origin is white, 0 otherwise. *Female* indicates the sex of the individual and it takes the value of 1 if the individual is female or 0 if the individual is male.

Since the aforementioned bankruptcy benefit model imposes the restriction that two components of $Bankruptcy\ Benefit_{i,t}$, which are dischargeable debts and eligible assets, must have the same absolute value but opposite sign coefficients. This restriction can be relaxed by slightly modifying the model as follows:

$$Bankruptcy_{i,t+1} = \beta_1 Dischargeable\ Debts_{i,t} + \beta_2 Eligible\ Assets_{i,t} + \gamma X_{i,t} + \varepsilon_{i,t} \quad (10)$$

where $Bankruptcy\ Benefit_{i,t}$ is replaced by $Dischargeable\ Debts_{i,t}$ and $Eligible\ Assets_{i,t}$ denoted at time t for the individuals who have positive financial benefits or else zero as stated in Equation 1. This allows us to compare the impacts of the two main components of the bankruptcy benefit separately.

We also investigate the role of adverse events on the bankruptcy decision. We derive the adverse events from the previous studies on bankruptcy decision such as Sullivan, Warren, and Westbrook (1989), Domowitz and Sartain (1999), Himmelstein et al. (2005) and Gross and Notowidigdo (2011) and estimate the following model:

$$Bankruptcy_{i,t+1} = \beta_1 Divorced\ or\ Separated_{i,t,t+1} + \beta_2 Unemployed_{i,t,t+1} + \beta_3 Health\ Problems_{i,t,t+1} + \gamma X_{i,t} + \varepsilon_{i,t} \quad (11)$$

where $Divorced\ or\ Separated_{i,t,t+1}$ denotes getting divorced or separated. It takes the value of 1 if the individual gets divorced or separated, otherwise 0. $Unemployed_{i,t,t+1}$ denotes becoming unemployed and takes the value of 1 if the individual gets unemployed, otherwise 0. $Health\ Problems_{i,t,t+1}$ denotes the onset of a serious health problem that limits the physical activity. If the individual experiences the onset of serious health problem, it takes the value of

²⁵ Since the study only analyses the adult individuals, this variable takes the minimum value of 16 which the defined minimum age for an adult by the ONS.

1, otherwise 0. All variables are denoted between time t and $t + 1$. $\mathbf{X}_{i,t}$ indicates the vector of covariates which are the explanatory and control variables explained previously.

4.4 Bankruptcy Type Models

In addition to the bankruptcy decision, we also investigate the impact of the financial benefit and adverse events on the bankruptcy types which are classified as ‘*income gleaning*’ and ‘*fresh start*’. We slightly modify the aforementioned bankruptcy decision models by replacing the main dependent variable, the bankruptcy decision with the bankruptcy type. The first model to test the role of the bankruptcy benefit on the bankruptcy type is follows:

$$Bankruptcy\ Type_{i,t+1} = \beta Bankruptcy\ Benefit_{i,t} + \gamma \mathbf{X}_{i,t} + \varepsilon_{i,t} \quad (12)$$

where $Bankruptcy\ Type_{i,t+1}$ denotes the bankruptcy type of individual i at time $t + 1$. It is a categorical variable which takes three values (0 for non-bankrupts, 1 for income gleaners, 2 for fresh starters). As in Equation 9, $Bankruptcy\ Benefit_{i,t}$ denotes the bankruptcy benefit, $\mathbf{X}_{i,t}$ the vector of control variables as explained in Section 4.3, and $\varepsilon_{i,t}$ the error term, all at time t .

We also examine the impact of dischargeable debts and eligible assets instead of the bankruptcy benefit on the choice of bankruptcy type. The slightly modified debts and assets model becomes as follows:

$$Bankruptcy\ Type_{i,t+1} = \beta_1 Dischargeable\ Debts_{i,t} + \beta_2 Eligible\ Assets_{i,t} + \gamma \mathbf{X}_{i,t} + \varepsilon_{i,t} \quad (13)$$

where we replace $Bankruptcy\ Benefit_{i,t}$ with $Dischargeable\ Debts_{i,t}$ and $Eligible\ Assets_{i,t}$.

Moreover, we investigate the role of adverse events on the choice of bankruptcy type. We derive the same adverse events from the previous section on the bankruptcy decision. We slightly modify the adverse events model by replacing the main dependent variable, the bankruptcy decision with the bankruptcy type as follows:

$$Bankruptcy\ Type_{i,t+1} = \beta_1 Divorced\ or\ Separated_{i,t,t+1} + \beta_2 Unemployed_{i,t,t+1} + \beta_3 Health\ Problems_{i,t,t+1} + \gamma \mathbf{X}_{i,t} + \varepsilon_{i,t} \quad (14)$$

where, all variables and $\mathbf{X}_{i,t}$ vector of covariates are as explained above.

4.5 Estimation Methodology

When using survey data to gather information on the bankruptcy decision, two questions are asked: whether filed for bankruptcy and if so, the bankruptcy type. Two types of consumer prevail: bankrupts and non-bankrupts. However, in reality, three types of consumer exist: non-participants (who never participate in the credit markets, thus are not technically able to file for bankruptcy²⁶), participant non-bankrupts (who participate in the credit markets, but never filed for bankruptcy) and bankrupts (who filed for bankruptcy). Even though both the non-participants and the participant non-bankrupts are reported as non-bankrupts, they are driven by different factors. In previous studies, probit models have been combined with Heckman models to deal with sample selection and instrumental variables to deal with endogeneity to solve this problem (Zhang, Sabarwal, and Gan 2015). As in all such studies, it is difficult to identify variables which affect selection but not the outcome.²⁷

As an alternative method to deal with these problems, Harris and Zhao (2007) propose the zero-inflated ordered probit (ZIOP) model. Furthermore, ZIOP model also fits well when the data exhibit a high fraction of observations in the lowest category, what we refer as zero. In our case even though there is a dramatic increase in the number of the consumer bankruptcy in the recent decades, it is naturally a rare event. Less than one per cent of households go bankrupt each year in Great Britain, therefore our data include high fraction of non-bankrupts. In the context of ZIOP models, zero is an actual 0 value or the lowest outcome category (non-bankrupts in this case).

Harris and Zhao (2007) derive the ZIOP model in two steps. First, the participation group (participants versus non-participants in the credit markets) can be modelled using a probit model. Let $s_j = 1$ if individual j belongs to the participation group or let $s_j = 0$ otherwise. With the probit model, the probability of participation is given by

$$\Pr(s_j = 1 | \mathbf{z}_j) = \Phi(\mathbf{z}_j \gamma) \quad (7)$$

where \mathbf{z}_j is a vector of covariates that determines group membership, γ is a vector of coefficients that have to be estimated, and $\Phi(\cdot)$ is the standard normal distribution function. Next, conditioning on $s_j = 1$, participation levels \tilde{y}_j are modelled using an ordered probit model; these levels may also include 0.

²⁶ It is possible that some individuals are excluded from financial market voluntarily or involuntarily. On the one hand, some individuals may have informal debts from friends or relatives and do not use any formal credit options voluntarily. On the other hand, some individuals may be rejected by financial institutions even though they apply for credit, hence are excluded from the market involuntarily. These individuals are not technically able to file for bankruptcy even though they have positive financial benefits or have experienced adverse events. Since the consumer bankruptcy is a legal process, bankruptcy filers must have formal debts from financial intermediaries in the form of a consumer loan or a credit card loan.

²⁷ For more information, see Sartori (2003).

The corresponding probabilities are given by

$$\Pr(\tilde{y}_j = h | x_j, s_j = 1) = \Phi(\kappa_h - x_j \beta) - \Phi(\kappa_{h-1} - x_j \beta), h = 0, 1, \dots, H \quad (8)$$

where $\kappa_{-1} = -\infty$, $\kappa_H = +\infty$ and x_j is a vector of covariates that could be different from z_j . In this analysis, z_j includes the control variables in Section **Error! Reference source not found.**3, while x_j includes both explanatory and control variables. κ_h are boundary parameters that need to be estimated in addition to the coefficients vector β . The intercept β_0 is set equal to 0 in Equation 8 for identification. Note that s_j and \tilde{y}_j are both unobservable in terms of the zeros. The observed response variable is $y_j = s_j \tilde{y}_j$. Thus, the zero outcome occurs when $s_j = 0$ (the individual is a non-participant in the credit markets) or occurs when $s_j = 1$ and $\tilde{y}_j = 0$ (the individual is a participant non-bankrupt). To observe a positive y_j , it is a joint requirement that $s_j = 1$ and $\tilde{y}_j > 0$.

Traditional ordered probit models treat all observations with zero-valued outcomes as a homogeneous group. By contrast, the ZIOP models assume that zeros could occur in the data as members of two unobservable groups. Individuals in the non-participant group have outcome 0 as the only possible value. The second group, in addition to 0, may also assume any of the other values, $0, 1, \dots, H$. In our study, the outcome is an ordered discrete response with three levels coded as 0 for ‘non-bankrupts’, 1 for ‘income gleaning’, 2 for ‘fresh start’. To be able to file for bankruptcy, an individual must participate in credit markets. Conditional on participating, they can decide whether to file for bankruptcy or not. The first decision is a binary choice and is modelled using a probit model, while the second is an ordered choice and is modelled using an ordered probit model. In other terms, to account for the excess of zeros, the ZIOP model allows for zero observations to occur in two ways: as a realisation of the probit model (non-participants) and as a realisation of the ordered probit model when the binary random variable in the probit model is 1 (participant non-bankrupts).

5. Results

5.1 Summary Statistics

Summary statistics that compares bankrupts versus non-bankrupts are presented in

Table 1: Consumers That Would Benefit from Filing for Bankruptcy

Bankruptcy Benefit	Wave 1	Wave 2	Wave 3	Wave 4	Total Sample
Greater than £0	6.30%	6.10%	6.50%	6.40%	6.30%

Greater than £1,000	4.80%	4.60%	4.90%	4.80%	4.80%
Greater than £10,000	1.40%	1.40%	1.50%	1.40%	1.40%
Median (£)	-67,421	-74,483	-70,923	-70,654	-70,500
Mean (£)	-127,388	-134,530	-140,425	-133,897	-133,273
Observations	53,092	34,362	37,643	36,857	161,954

Source: Wealth and Assets Survey

Table 0. The total sample includes 66,050 adult individuals. 485 of them are bankrupts, who have entered into a type of insolvency proceedings. Since bankrupts are less than 1% of the total sample, summary statistics for total sample and non-bankrupts are very close to each other, whereas summary statistics for bankrupts differ substantially from the non-bankrupts.

On average, the non-bankrupts have greater annual income, more assets and less debts than the bankrupts have. The bankruptcy benefit from filing is calculated as described in Equation 1, and the mean value for non-bankrupts is considerably less than that for bankrupts. A typical non-bankrupt's bankruptcy benefit is £453, while a typical bankrupt's benefit is £6,163 from filing for bankruptcy. Bankruptcy filers have significantly higher debts. Bankruptcy filers in the total sample have £7,436 dischargeable debts on average, compared to £1,684 for the non-bankrupts. Additionally, bankruptcy filers have lower assets for liquidation in case of bankruptcy. The value of assets of a typical bankrupt is £2,126, while a typical non-bankrupt's assets are worth £42,390. Bankruptcy filers are also younger and less educated. Both bankrupts and non-bankrupt individuals are similar in term of ethnic origin and gender.

In terms of adverse events, 1.3% of non-bankrupts get divorced or separated, while it is 3.1% for bankrupts. Bankrupt individuals have higher job loss percentage. 5.4% of bankrupts become unemployed, whereas it is only 1.8% for non-bankrupts. 10.9% of bankrupts experience a serious health problem, this ratio is 4.1% for non-bankrupts.

In Table 3, we give divide the bankrupt sample into two as income gleaners and fresh starters. 382 of bankrupts are identified as income gleaners, while only 103 of them are identified as fresh start bankrupts. Differences are observed in the characteristics of the two groups. Fresh starters have lower incomes than the income gleaners. The annual income of a typical income gleaner is £14,915 which is very close to a typical non-bankrupt, whereas on average, it is just £8,074 for a fresh starter. The income gleaners have slightly more debts than the fresh starters both before and after bankruptcy. On average, an income gleaner has £7,739 of dischargeable debts before bankruptcy, while a typical fresh starter has £6,308 of formal debt before bankruptcy. The value of assets of a typical income gleaner is £2,306, while a typical non-bankrupt's assets are worth only £1,459. As expected, it seems that having a regular income plays an important role in the choice bankruptcy type. The fresh starters and the income gleaners have similar age categories. The fresh starters are less educated than the income gleaners. The fresh starters and the income gleaners are similar in terms of ethnic origin.

Related to adverse events, 4.9% of the fresh starters get divorced or separated, while it is only 2.6% for the income gleaners. Job loss rate is similar for both types, which is 5.5% for the income gleaners and 5.1% for fresh starters. Health problem as an adverse event differ according to the bankruptcy types. 11.9% of the income gleaners experience a serious health problem, this ratio is lower for the fresh starters which 7.6%.

5.2. Results of Bankruptcy Decision Estimations

Results for the bankruptcy decision is presented in Table 4. We find a positive relationship between the *Bankruptcy Benefit* and the bankruptcy decision, significant at 1% confidence level. In other words, individuals are more likely to file for bankruptcy strategically when they financially benefit from it. The coefficients of *Annual Net Income*, *Age* and *Education* are all negative and significant (at 1% level), as expected. Individuals are less likely to file bankruptcy if they have a higher income, are older and more educated.

The bankruptcy benefit model imposes the restriction that dischargeable debts and eligible assets must have the same absolute value but opposite sign coefficients. This restriction can be relaxed, and these two variables can be tested separately. If the dischargeable debts and eligible assets affect the bankruptcy decision equally, then their coefficients will be equal in absolute value but opposite in sign. The results, presented in Table 5, indicate that the coefficient of the *Dischargeable Debts* is positive while the coefficient of the *Eligible Assets* is negative. Both coefficients are statistically significant at 1% level. However, the margin value of the dischargeable debts is considerably greater than the margin value of the eligible assets in magnitude. These results suggest that the discharge of debts is the dominant factor in the bankruptcy decision when it is compared to the assets liquidated under the bankruptcy procedures.

We also estimate the effect of adverse events on bankruptcy decision and present results in Table 6. We find that all of the adverse event variables are all statistically significant (at 1% level) and have positive signs, as expected. The margin value of the unemployment variable is slightly greater than the coefficients of the other two adverse events. The coefficient of the bankruptcy benefit remains almost the same as in the bankruptcy benefit model. These results suggest that adverse events affect the bankruptcy filings and becoming unemployed is the dominant factor among adverse events in the bankruptcy decision. Age and education level remain statistically significant at 1% level, while the family size becomes insignificant. These

results complement earlier works such as Fay, Hurst, and White (2002) and Zhang, Sabarwal, and Gan (2015).

5.3. Results of Bankruptcy Types Estimations

We present the results of the Bankruptcy Types (i.e. *income gleaning* and *fresh start*) estimations in Table 7. We find that both *Bankruptcy Benefit* and *Annual Net Income* are statistically significant at 1% level for both bankruptcy types. However, the margin value of the income for fresh start bankrupts is noticeably greater than the margin value of the income for income gleaning bankrupts. This result suggests that income is a more important factor for the fresh starters. We find that age and education level are also significant with negative signs. Overall the results for the bankruptcy type model seems to be similar to results in the bankruptcy decision model.

The results for the debts and assets model are shown in Table 88. We find that the coefficient of the *Dischargeable Debt* is positive, and the coefficient of the *Eligible Assets* is negative for both bankruptcy types. However, the margin value of the dischargeable debts for fresh starters is considerably greater than the margin value of the dischargeable debts for the income gleaners. These results suggest that discharge of debts is more important for the fresh starters than it is for the income gleaners. On the contrary, we find that the margin value of the eligible assets for income gleaners is considerably greater than the margin value of the eligible assets for the fresh starters. These results suggest that the assets liquidated under the bankruptcy procedures is more important for the income gleaners than it is for the fresh starters. Our results show that debts and assets play different roles in different bankruptcy types.

We present the estimates for the effect of adverse events in the consumers' decision on the bankruptcy types in Table . We find that becoming unemployed and the onset of a serious health problem are statistically significant for income gleaners, while getting divorced or separated is insignificant. On the other hand, for fresh starters, becoming unemployed and getting divorced or separated are statistically significant, but the onset of a serious health problem is not. These results suggest that adverse events affect the choice of bankruptcy type and becoming unemployed is an important factor in both bankruptcy types. Individuals who become unemployed are more likely to file for bankruptcy regardless of their choice of the bankruptcy type. The margin value of becoming unemployed for income gleaning is greater than that of the fresh start. It suggests that becoming unemployed is more important in income

gleaning. Individuals who get divorced or separated are more likely to choose the fresh start bankruptcy type. Individuals who experience the onset of a serious health problem are more likely to choose the income gleaning bankruptcy type. The coefficients of the bankruptcy benefit for both types remain statistically significant as in the bankruptcy benefit model. These results show that even though adverse events may affect the bankruptcy decision, their effects may differ widely on the bankruptcy types.

6. Conclusion

We examine the effect of the bankruptcy benefit and adverse events on the consumer bankruptcy decision in Great Britain using a unique longitudinal survey covering over 60,000 individuals. We find that consumers are more likely to enter into bankruptcy proceedings when the bankruptcy benefit increases. However, separating the effect into two components as dischargeable debts and eligible assets, our findings suggests that the dischargeable debt is the dominant factor in the consumer bankruptcy decision in Great Britain. We also examine the effects of adverse events on bankruptcy decision and find that becoming unemployed is the dominant factor among adverse events.

We also test whether consumer behave strategically and examine whether bankruptcy benefit and adverse events matter for the choice of bankruptcy type [i.e. the discharge (*fresh start*) or the reorganisation (*income gleaning*) of debts]. We find that debts and assets play different roles in different bankruptcy types. Bankruptcy benefit effect on bankruptcy decision is significant regardless of the bankruptcy type. However, our findings show that discharge of debts component of bankruptcy benefit is a more important for the fresh starters, while assets liquidated under the bankruptcy procedures is more important for the income gleaners. We find that becoming unemployed is a major determinant of consumer bankruptcy, regardless of type. Individuals facing serious health problems prefer income gleaning, whereas individuals who get divorced or separated are more likely to choose the fresh start.

Our findings may inform policy makers to weigh the trade-off between the strategic behaviour and the adverse events. A fair consumer bankruptcy system is often necessary to smooth the consumption after adverse events; however, it should also deter the strategically oriented individuals. Otherwise, the bankruptcy system may harm the credit markets and cause interest rates to increase. The models presented in this study are simplified to represent the main aspects of the bankruptcy decision. As it is case for all models, our models have some

limitations. They do not capture all relevant aspects of the consumer bankruptcy such as the role of social stigma, information, access to credit after bankruptcy, entrepreneurial activities and work incentives. However, data limitations prevent to analyse all these related aspects. For further studies, additional research on the access to consumer credit after bankruptcy and the role of the entrepreneurial activity would help understand the consumer bankruptcy in a more detailed manner.

Tables

Table 1: Consumers That Would Benefit from Filing for Bankruptcy

Bankruptcy Benefit	Wave 1	Wave 2	Wave 3	Wave 4	Total Sample
Greater than £0	6.30%	6.10%	6.50%	6.40%	6.30%
Greater than £1,000	4.80%	4.60%	4.90%	4.80%	4.80%
Greater than £10,000	1.40%	1.40%	1.50%	1.40%	1.40%
Median (£)	-67,421	-74,483	-70,923	-70,654	-70,500
Mean (£)	-127,388	-134,530	-140,425	-133,897	-133,273
Observations	53,092	34,362	37,643	36,857	161,954

Source: Wealth and Assets Survey

Table 0: Summary Statistics - Bankruptcy Decision

Variables	Total Sample (t + 1)		Non-bankrupts (t + 1)		Bankrupts (t + 1)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Bankrupt (= 1)(t + 1)	0.007	0.085	0	0	1	0
Bankruptcy benefit (£)(t)	-41,268	159,735	-41,606	160,269	4,409	16,718
Bankruptcy benefit (if <i>bbenefit</i> > 0)(£)(t)	975	5,410	453	936	6,163	12,603
Dischargeable debts (£)(t)	1,726	6,554	1,684	6,465	7,436	12,921
Dischargeable debts (if <i>bbenefit</i> > 0)(£)(t)	1,270	6,294	1,228	6,198	7,005	12,985
Eligible assets (£)(t)	42,095	159,377	42,390	159,926	2,126	10,751
Eligible assets (if <i>bbenefit</i> > 0)(£)(t)	178	1,402	177	1,403	335	1,256
Annual net income (£)(t)	16,397	22,258	16,418	22,311	13,412	13,047
Age (t)	53.19	16.699	53.27	16.704	42.99	12.364
Education (degree or above) (= 1)(t)	0.232	0.422	0.233	0.423	0.088	0.284
Family size (t)	2.55	1.244	2.54	1.242	2.97	1.425
White (= 1)(t)	0.938	0.239	0.939	0.239	0.927	0.259
Female (= 1)(t)	0.527	0.499	0.527	0.499	0.538	0.499
<i>Adverse events</i>						
Get divorced or separated (= 1)(t;t + 1)	0.014	0.116	0.013	0.115	0.031	0.173
Get unemployed (= 1)(t;t + 1)	0.018	0.134	0.018	0.133	0.054	0.225
Get health problems (= 1)(t;t + 1)	0.081	0.274	0.041	0.273	0.109	0.312
<i>Number of observations</i>	66,050		65,565		485	

Source: Wealth and Assets Survey

Table 3: Summary Statistics - Bankruptcy Types

Variables	Total Sample (t + 1)		Non-bankrupts (t + 1)		Bankrupts (t + 1)			
	Mean	S.D.	Mean	S.D.	Income Gleaning		Fresh Start	
					Mean	S.D.	Mean	S.D.
Bankrupt (= 1)(t + 1)	0.007	0.085	0	0	1	0	1	0
Bankruptcy benefit (£)(t)	-41,268	159,735	-41,606	160,269	4,533	17,438	3,949	13,787
Bankruptcy benefit (if bbenefit > 0)(£)(t)	975	5,410	453	936	6,343	12,963	5,495	11,198
Dischargeable debts (£)(t)	1,726	6,554	1,684	6,465	7,739	13,295	6,308	11,418
Dischargeable debts (if bbenefit > 0)(£)(t)	1,270	6,294	1,228	6,198	7,256	13,359	6,076	11,504
Eligible assets (£)(t)	42,095	159,377	42,390	159,926	2,306	11,487	1,459	7,421
Eligible assets (if bbenefit > 0)(£)(t)	178	1,402	177	1,403	391	1,386	1,267	5,071
Annual net income (£)(t)	16,397	22,258	16,418	22,311	14,915	13,123	8,074	11,260
Age (t)	53.19	16.699	53.27	16.704	42.59	12.613	44.42	11.228
Education (degree or above) (= 1)(t)	0.232	0.422	0.233	0.423	0.099	0.299	0.049	0.216
Family size (t)	2.55	1.244	2.54	1.242	3.05	1.421	2.67	1.409
White (= 1)(t)	0.938	0.239	0.939	0.239	0.929	0.256	0.922	0.269
Female (= 1)(t)	0.527	0.499	0.527	0.499	0.531	0.499	0.563	0.498
<i>Adverse events</i>								
Get divorced or separated (= 1)(t;t + 1)	0.014	0.116	0.013	0.115	0.026	0.159	0.049	0.215
Get unemployed (= 1)(t;t + 1)	0.018	0.134	0.018	0.133	0.055	0.228	0.051	0.216
Get health problems (= 1)(t;t + 1)	0.081	0.274	0.041	0.273	0.119	0.313	0.076	0.311
Number of observations	66,050		65,565		382		103	

Source: Wealth and Assets Survey

Table 4: Bankruptcy Benefit Model - Bankruptcy Decision

Variables	Bankruptcy		
	Coef.	(Std. Err.)	Margin
Bankruptcy Benefit	0.142***	(0.025)	0.269***
Annual Net Income	-0.109***	(0.018)	-0.175***
Age	-0.017***	(0.001)	-0.003***
Education (degree or above)(=1)	-0.283***	(0.056)	-0.387***
Family Size	0.030*	(0.016)	0.032*
White (=1)	0.005	(0.076)	0.001
Female (=1)	-0.008	(0.056)	-0.000
Number of Observations		66,050	
Wald		454.92	
Prob ² >		0.0000	
Pseudo		0.0794	

Notes: The numbers reported are the coefficients estimated using probit model.

Robust standard errors, which are corrected by allowing error terms for the same individual to be correlated over time, are reported in parentheses. We use the usual convention *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ to indicate whether independent variables are statistically significant. All pound values are in £10,000 increments.

Table 5: Debts and Assets Model - Bankruptcy Decision

Variables	Bankruptcy		
	Coef.	(Std. Err.)	Margin
Dischargeable Debts	0.183***	(0.024)	0.343***
Eligible Assets	-0.047***	(0.011)	-0.088***
Annual Net Income	-0.103***	(0.011)	-0.177***
Age	-0.017***	(0.001)	-0.003***
Education (degree or above)(=1)	-0.281***	(0.059)	-0.385***
Family Size	0.027*	(0.016)	0.001*
White (=1)	0.006	(0.076)	0.001
Female (=1)	-0.009	(0.037)	-0.000
Number of Observations		66,050	
Wald χ^2		501.22	
Prob >		0.0000	
Pseudo R^2		0.0850	

Notes: The numbers reported are the coefficients estimated using probit model.

Robust standard errors, which are corrected by allowing error terms for the same individual to be correlated over time, are reported in parentheses. We use the usual convention *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ to indicate whether independent variables are statistically significant. All pound values are in £10,000 increments.

Table 6: Adverse Events Model - Bankruptcy Decision

Variables	Bankruptcy		
	Coef.	(Std. Err.)	Margin
Bankruptcy Benefit	0.141***	(0.025)	0.268***
Age	-0.014***	(0.001)	-0.002***
Education (degree or above)(=1)	-0.265***	(0.058)	-0.324***
Family size	0.009	(0.016)	0.001
White (=1)	0.012	(0.073)	0.002
Female (=1)	0.009	(0.037)	0.001
<i>Adverse Events</i>			
Get Divorced or Separated (=1)	0.243***	(0.087)	0.461***
Get Unemployed (=1)	0.338***	(0.106)	0.543***
Get Health Problems (=1)	0.211***	(0.056)	0.400***
Number of Observations		66,050	
Wald		383.64	
Prob >		0.0000	
Pseudo		0.0733	

Notes: The numbers reported are the coefficients estimated using probit model. Robust standard errors, which are corrected by allowing error terms for the same individual to be correlated over time, are reported in parentheses. We use the usual convention *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ to indicate whether independent variables are statistically significant. All pound values are in £10,000 increments.

Table 7: Bankruptcy Benefit Model - Bankruptcy Types

Variables	Income Gleaning		Fresh Start	
	Coef./ (Std. Err.)	Margin	Coef./ (Std. Err.)	Margin
Bankruptcy Benefit	0.196*** (0.036)	0.178***	0.171*** (0.035)	0.145***
Annual Net Income	-0.102*** (0.017)	-0.166***	-0.246*** (0.042)	-0.359***
Age	-0.022*** (0.001)	-0.001***	-0.024*** (0.001)	-0.001***
Education (degree or above)(=1)	-0.301*** (0.088)	-0.367***	-0.412*** (0.101)	-0.468***
Family Size	0.016 (0.057)	0.001	0.024 (0.038)	0.001
White (=1)	0.011 (0.056)	0.001	0.009 (0.076)	0.001
Female (=1)	-0.016 (0.057)	-0.000	0.007 (0.089)	0.000
Number of Observations	66,050		66,050	
Wald χ^2	472.26		472.26	
Prob > χ^2	0.0000		0.0000	

Notes: The numbers reported are the coefficients estimated using zero-inflated ordered probit model. Robust standard errors, which are corrected by allowing error terms for the same individual to be correlated over time, are reported in parentheses. We use the usual convention *** p < 0.01, ** p < 0.05, * p < 0.1 to indicate whether independent variables are statistically significant. All pound values are in £10,000 increments.

Table 8: Debts and Assets Model - Bankruptcy Types

Variables	Income Gleaning		Fresh Start	
	Coef./ (Std. Err.)	Margin	Coef./ (Std. Err.)	Margin
Dischargeable Debts	0.148*** (0.037)	0.165***	0.235*** (0.035)	0.247***
Eligible Assets	-0.055*** (0.025)	-0.059***	-0.011*** (0.001)	-0.165***
Annual Net Income	-0.103*** (0.017)	-0.106***	-0.250*** (0.042)	-0.259***
Age	-0.022*** (0.001)	-0.001***	-0.024*** (0.002)	-0.001***
Education (degree or above)(=1)	-0.295*** (0.068)	-0.315***	-0.397*** (0.198)	-0.418***
Family Size	0.056 (0.043)	0.001	0.029 (0.039)	0.001
White (=1)	0.010 (0.062)	0.001	0.017 (0.088)	0.001
Female (=1)	-0.017 (0.057)	-0.000	0.004 (0.089)	0.000
Number of Observations	66,050		66,050	
Wald χ^2	533.54		533.64	
Prob > χ^2	0.0000		0.0000	

Notes: The numbers reported are the coefficients estimated using zero-inflated ordered probit model. Robust standard errors, which are corrected by allowing error terms for the same individual to be correlated over time, are reported in parentheses. We use the usual convention *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ to indicate whether independent variables are statistically significant. All pound values are in £10,000 increments.

Table 9: Adverse Events Model - Bankruptcy Types

Variables	Income Gleaning		Fresh Start	
	Coef./ (Std. Err.)	Margin	Coef./ (Std. Err.)	Margin
Bankruptcy Benefit	0.195*** (0.034)	0.210***	0.166*** (0.031)	0.247***
Age	-0.020*** (0.002)	-0.001***	-0.018*** (0.002)	-0.001***
Education (degree or above)(=1)	-0.285*** (0.087)	-0.357***	-0.358*** (0.193)	-0.418***
Family Size	0.036 (0.024)	0.001	0.077 (0.041)	0.001
White (=1)	0.055 (0.113)	0.001	0.100 (0.170)	0.001
Female (=1)	0.002 (0.056)	-0.000	0.050 (0.089)	0.000
<i>Adverse Events</i>				
Get Divorced or Separated (=1)	0.182 (0.272)	0.142	0.657*** (0.223)	0.220***
Get Unemployed (=1)	0.353*** (0.133)	0.282***	0.252*** (0.088)	0.184***
Get Health Problems (=1)	0.306*** (0.085)	0.315***	0.120 (0.145)	0.083
Number of Observations	66,050		66,050	
χ^2_{Wald}	402.72		402.72	
$\text{Prob} >$	0.0000		0.0000	

Notes: The numbers reported are the coefficients estimated using zero-inflated ordered probit model. Robust standard errors, which are corrected by allowing error terms for the same individual to be correlated over time, are reported in parentheses. We use the usual convention *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ to indicate whether independent variables are statistically significant. All pound values are in £10,000 increments.

Figures

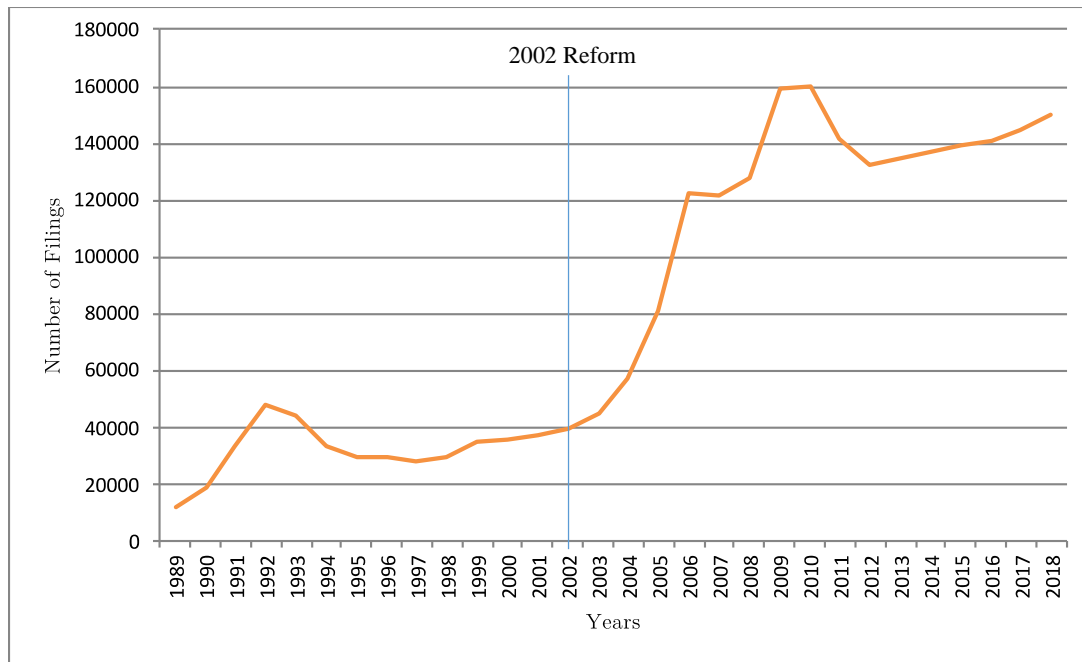


Figure 1: Consumer Bankruptcy Filings in Great Britain

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