Recent Developments in Consumer Credit and Default Literature

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Abstract

This paper discusses recent contributions on unsecured consumer debt and default, and some ongoing challenges for the literature. Key topics include the sources of the rise in personal bankruptcies, importance of asymmetric information and the effects of developments in information technologies on consumer credit markets, delinquency and informal bankruptcy, debt collection and restructuring of distressed debt, cyclical behaviour of consumer debt and default, and insurance role of household debt. Implications for welfare analysis and policy design are discussed. Several theoretical contributions and approaches to modelling the consumer credit markets are also highlighted.

Keywords: Consumer Credit; Default; Bankruptcy; Unsecured Debt; Delinquency

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1 Introduction

Last two decades of the 20th century witnessed a dramatic increase in personal bankruptcy filings, which continued into the new millennium. The phenomenon was not limited to the US, and was present in other countries where the institution of personal bankruptcy is present.\footnote{Moreover, some countries that had did not have personal bankruptcy system were compelled to introduce it in that period. Germany, for example, introduced personal bankruptcy in 1999. Until then, borrowers unable to repay their loans ("overindebted" borrowers) in Germany remained liable to the lenders indefinitely.} Annual bankruptcy filings in the US crossed the 1 million mark in the 2000s. That is, about 1% of American households file for bankruptcy every year.\footnote{See White (2007) for an excellent summary.} These rising bankruptcy trends in North America seem to have been broken only by the reforms of the bankruptcy system (BAPCPA in the US in 2005, and reforms of the 1990s in Canada). Not surprisingly, personal bankruptcy received attention not only from the policy makers concerned about the large number of filers, but also from economists seeking to better understand the key mechanisms of household debt and default, and the driving forces behind the dramatic rise in both debt and filings. The research in this area has been both very active and very fruitful in the last 10 years, and yet, the only survey of bankruptcy models, Athreya (2005), predates most of these contributions. The current survey aims to highlight the key questions and theoretical developments in this burgeoning literature.

In broad strokes, the basic modelling approach behind most of the recent theoretical literature is based on the seminal work of Eaton and Gersovitz (1981), and the most basic tradeoff associated with the design of bankruptcy systems has been understood since Zame (1993).\footnote{I should note that Zame (1993) attributed the basic model to Dubey, Geanakoplos, and Shubik (2005).} So, a lot of the recent contributions have been quantitative in nature, with quantitative models by Chatterjee, Corbae, Nakajima, and Ríos-Rull (2007) and Livshits, MacGee, and Tertilt (2007) being the standard references. But this quantitative research has in turn posed new theoretical questions, and has lead to development of new theoretical models. These developments are the subject of this survey. I will forego the discussion of the personal bankruptcy system and characteristics of a typical bankruptcy filer, referring the reader instead to White (2007) and Sullivan, Warren, and Westbrook (2000).\footnote{Fieldhouse, Livshits, and MacGee (2012) provide a rather detailed picture of the characteristics of filers (and how they change over a business cycle) using the administrative dataset of Canadian filers between 2007 and 2011.}

The survey is organized as follows: Before going into specific questions and agendas, the next section lays out the key mechanisms and tradeoffs associated with consumer credit and bankruptcy, and presents the key features of the standard models employed. Section 3 discusses the papers dedicated to explaining the rise in bankruptcies and debt over the last few decades. Improvement in information processing technology figures prominently in this literature, and thus, Section 4 follows up on the importance of
information in the consumer credit markets. Section 5 discusses welfare implications of various bankruptcy regimes (including the effects of personal bankruptcy rules on entrepreneurship), as well as those of the recent developments in consumer credit markets. Section 6 turns to papers that study delinquency and informal default, as well as debt restructuring and collection. Section 7 discusses papers on the cyclicality of debt and default. Lastly, Section 8 presents some challenges moving forward and some promising directions for addressing them.

2 Basic Models, Mechanisms and Tradeoffs

The starting point for a successful model of bankruptcy involves having default on debt occur with positive probability as part of (the equilibrium path) of the model outcome. This seemingly trivial statement rules out a large set of models that study debt under the threat of default (most standard references being Kehoe and Levine (1993), Kocherlakota (1996) and Alvarez and Jermann (2000)). The basic idea is exceedingly simple: No rational lender would advance a loan that would not be repaid. Thus, a complete market setting (where securities/loans are specific to each future state of the world) fails to generate a model of equilibrium default. However, if the markets are (exogenously) incomplete, and loans are not made contingent on realizations of (idiosyncratic) uncertainty, a lender may be willing to advance a loan that is sometimes not repaid — as long as they are compensated for the losses by a higher interest rate (when the loan is repaid). Thus, the standard approach in default literature has been to model the debt markets as maximally incomplete, where the only form of debt is a (borrower-specific) non-contingent one-period bond. Of course, the option of default generates some “state dependence” — the return on the bond

\[5\] Kehoe and Levine (2006) argue against this basic observation (and their own statements in Kehoe and Levine (2001)) and claim that “complete contingent claims [in Kehoe and Levine (2001)] are, in practice, . . . implemented not through Arrow securities, but rather through a combination of non-contingent assets and bankruptcy.”

\[6\] The assumption of the (exogenous) market incompleteness is often justified by referring to some underlying informational frictions, like costly state verification in Townsend (1979) and Gale and Hellwig (1985), which generate “standard debt contracts,” which basically amount to non-contingent debt with a “verification” or “punishment” (as in Diamond (1984)) regions of state space that loosely correspond to default or bankruptcy states. Grochulski (2010) explicitly demonstrates that bankruptcy which involves some discharge of unsecured debt is part of a market implementation of an optimal allocation that is subject to moral hazard on the part of the borrower. Hopenhayn and Werning (2008) show that optimal contract involves default in equilibrium when the value of default to the borrower is random and unobserved by the lender. Also along these lines is the finding of Krasa and Villamil (2000) that the optimal contract between an investor and an entrepreneur in a no-commitment environment with costly enforcement is a standard debt contract. The papers discussed in this survey do not explicitly model the underlying (informational) frictions, and simply take the incompleteness of the market as exogenous. Similarly, the bankruptcy option per se is also taken as an exogenously specified (institutional) alternative, and is not derived as part of an optimal arrangement.
is constant only across the states where the borrower does not default.

The basic model of equilibrium default goes back to Eaton and Gersovitz (1981). The key assumption in that model and in the literature that followed is that a borrower faces an interest rate schedule that makes the rate an explicit function of the amount borrowed. In a competitive setting with risk-neutral lenders, the interest rates include a risk premium, which reflects the probability of default as a function of the amount borrowed (and possibly, the expected recovery rate in the event of default). Such pricing makes the borrower fully take into account the effect of debt level on the probability of default, and generates an endogenous borrowing constraint — maximum amount a borrower can receive in exchange for a pledge of future income.

Unlike in models with complete markets, full enforcement is not necessarily ex-ante optimal in the incomplete market models of default. Whereas in complete markets models ability to commit to future payments unequivocally expands the ex-ante choice set available to the borrower, commitment is associated with a meaningful ex-ante trade-off in incomplete market models. Ability to walk away from one’s debt in some states of the world introduces some (partial) insurance into the setting where no other insurance is available. Of course, on the other hand, risk of default makes borrowing more expensive (and this is not just a matter of shifting payments from one state of the world to the others — at least, not as long as there is some deadweight loss associated with bankruptcy); and the lack of commitment makes certain debt levels simply unattainable. This basic trade-off was first clearly laid out in Zame (1993), and of course, has been central to the welfare analysis in most subsequent papers (see, for example, Chatterjee, Corbae, Nakajima, and Ríos-Rull (2007) and Livshits, MacGee, and Tertilt (2007), where commitment is basically equated to the severity of the bankruptcy “punishment”).

Another way of formulating this key tradeoff is as a choice between greater ability to smooth consumption over time, which is supported by greater commitment (equivalently, greater cost of bankruptcy to the borrower), and greater ability to smooth across states of the world, which is facilitated by the ability to walk away from debts (i.e., lower bankruptcy cost). Phrasing the tradeoff this way helps understand, for example, the finding in Livshits, MacGee, and Tertilt (2007) that the implications of income uncertainty for the choice of optimal bankruptcy system depends on the exact nature of the income uncertainty. While greater variance of persistent income shocks makes lower bankruptcy costs more attractive (as the demand for smoothing across states increases), the same does not hold for transitory income shocks. Households can quite effectively smooth transitory income shocks over time, as long as they are able to borrow (sufficient amounts and at good interest rates). Thus, greater variance of transitory income shocks makes lower bankruptcy costs less attractive,

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7One additional assumption that is key to generating this result is the exclusivity of the borrower-lender relation. If a borrower is able to borrow from multiple lenders at the same time (or sequentially), an externality arises, that I will refer to as debt dilution, and which is discussed in Section 8.
as they limit the borrowers’ ability to commit to repayment and make intertemporal smoothing more difficult.

Before discussing specific research topics, I think it is useful to highlight several key mechanisms that embedded in bankruptcy models, and thus come up in the discussions of a number of topics. The first of these recurrent themes is precautionary savings. The concept, which dates back to Leland (1968), is a very intuitive one — in the absence of perfect insurance markets, risk-averse households “save for a rainy day” (i.e., accumulate more savings than they would if perfect insurance were available). Precautionary savings arise not only in incomplete market settings (Aiyagari (1994) is the most standard reference for this point), but also in models with complete but imperfect markets. That is, when markets are subject to enforcement (or other) frictions, perfect insurance may not be attainable, and thus there is the need to save for the rainy day. This mechanism is present, for example, in the Kehoe and Levine (1993) economy. And naturally, these forces arise in models which have both frictions — both market incompleteness and inability of borrowers to commit to repaying their loans. One example of why precautionary savings are important to keep in mind is that an increase in the frequency or size of adverse shocks doesn’t simply translate into a greater frequency of default in this class of models, as households respond by accumulating precautionary savings (and reducing their debts).

One consequence of this phenomenon is that a typical quantitative model with a realistic income shock process struggles to generate the observed frequency of defaults. Thus, most models introduce additional idiosyncratic uncertainty that drives some households into bankruptcy. Livshits, MacGee, and Tertilt (2007) introduce what they call “expense shocks,” which affect households’ balance sheets directly and are meant to capture out-of-pocket medical expenses and costs of family shocks, such as divorce and unwanted children. Chatterjee, Corbae, Nakajima, and Ríos-Rull (2007) add a preference shock which makes households particularly “hungry” in some periods and serves the same basic purpose. These assumptions of additional shocks are not only useful, but also quite realistic, as a large fraction of filers report expense shocks as (part of) the reason they ended up in bankruptcy (see Sullivan, Warren, and Westbrook (2000), Domowitz and Sartain (1999), Jacoby, Sullivan, and Warren (2000)).

Another model ingredient necessary to reconcile a typical bankruptcy model with the data is some transaction cost of making loans. The gap between the average interest rates charged on unsecured debt and the (risk-free) savings rate in the economy is just too large to be attributed solely to the risk-premium on unsecured debt. Again, these transaction costs are not only useful from the model perspective, but also quite realistic (and several recent papers study mechanisms that comprise such

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8The mechanism is also present in Krueger and Perri (2003), who offer a quantitative assessment of an increase in income uncertainty in both incomplete market economy, and an economy with enforcement frictions.

9A notable exception is Nakajima (2012) model with temptation preferences.
transaction costs — see for example, Drozd and Nosal (2008), Livshits, MacGee, and Tertilt (2011), Sanchez (2010), Drozd and Serrano-Padial (2014)). Furthermore, in a setting that has nothing to do with default, Mehra, Piguillem, and Prescott (2011) argue that such transaction costs are both realistic and important.

One other common theme in the literature is what Livshits, MacGee, and Tertilt (2014) call “democratization of credit” and what Drozd and Serrano-Padial (2014) call “revolving revolution” — the extension of credit to new (and seemingly riskier) borrowers in the recent decades. This phenomenon is clearly present in the data, and arises quiet naturally in many different models, both in response to various improvements in information technologies (e.g., Narajabad (2012), Sanchez (2010), Athreya, Sanchez, Tam, and Young (2012), Livshits, MacGee, and Tertilt (2014), Drozd and Serrano-Padial (2014)) and even in response to lower cost of advancing loans (Livshits, MacGee, and Tertilt (2014), Drozd and Nosal (2008)). The mechanism is usually quite intuitive — lending to the best (safest) borrowers generates the largest surplus, and thus, takes place even when (information) technology is underdeveloped. As lending technology improves, it makes lending to riskier types (associated with greater expected dead-weight losses from default) profitable. Note that this increased average riskiness of the debt is associated with higher welfare in all these models, as it arises from realizing new gains from trade (and comes from the newly realized trades being the relatively risky ones).

To conclude this section, I will use the comparison of the two key quantitative models, Chatterjee, Corbae, Nakajima, and Ríos-Rull (2007) and Livshits, MacGee, and Tertilt (2007), to highlight the basic modelling approaches and their respective benefits. First of all, Chatterjee, Corbae, Nakajima, and Ríos-Rull (2007) is a full general equilibrium model, where the risk-free interest rate (as well as individual borrowing rates) are determined endogenously. Livshits, MacGee, and Tertilt (2007) argue that, since unsecured consumer credit are just a small part of the overall financial market, a partial equilibrium approach is justified. That is, while individuals’ borrowing rates are determined endogenously (as in Eaton and Gersovitz (1981)), the risk-free rate is taken as given. Partial equilibrium approach makes computation of the model less demanding; but it is not be appropriate, of course, if one thinks that general equilibrium effects may be important (and that financial markets are closed to international capital movement). Second important distinction between the two models concerns the life-cycle of borrowers. Whereas Chatterjee, Corbae, Nakajima, and Ríos-Rull (2007) model individuals as (potentially) infinitely-lived, Livshits, MacGee, and Tertilt (2007) have overlapping generations of households with an explicit life-cycle both in their earnings and in their family size, which allows them to explicitly study the age profile of both unsecured debt and bankruptcy filings. But again, the additional richness comes with a computational cost, though instead of looking for a fixed point of a stationary value function (as in Chatterjee, Corbae, Nakajima, and Ríos-Rull (2007)) the model of Livshits, MacGee, and Tertilt (2007) can be simply solved by backward induction. Last important distinction I will point to is the choice of a key target for calibration — debt. Chatterjee, Corbae, Nakajima, and Ríos-Rull (2007)
map debt in the model to negative net worth in the data, while Livshits, MacGee, and Tertilt (2007) interpret it as gross unsecured debt in the data. Of course, the distinction is absent in the model as it has just a single asset (and thus, no distinction between gross and net debt). On the one hand, the negative net worth is the more natural measure of households’ indebtedness. But on the other hand, it is the gross unsecured debt that can be discharged in bankruptcy (while some assets are exempt from seizure by the lenders). The literature has not really settled on which data moment is the right target for a model to match; but fortunately, most key findings seem robust to the alternative mappings of debt to the data.

3 Rise in Consumer Credit and Personal Bankruptcies

The rise in bankruptcy filings has been almost uniformly cited as motivation for studying default in the consumer debt markets, even in papers that did not address the issue directly. It is not surprising, as in the US, for example, personal bankruptcy rate has increased more than three-fold in the last two decades of the last millennium. And while there has been no shortage of proposed explanations for this phenomenon, this is still a very active area of research. As Livshits, MacGee, and Tertilt (2010) argue, the mechanisms that are easy to quantify (increases in uncertainty, demographic changes, etc.) account for just a fraction of the rise in filings (and a smaller increase in debt), and one is left with explanations that are much harder to quantify, such as a fall in the “stigma” of bankruptcy and a fall in intermediation costs. Thus, this quantitative paper helps set the stage for future research more than provide specific answer(s). And a number of subsequent papers have offered specific stories that are consistent with the key observations.

The proposed explanations can be loosely categorized into four types: increased risk exposure of borrowers (i.e., existing borrowers face more adverse shocks), increased risk exposure of lenders (i.e., lenders advance loans to riskier borrowers), compositional changes in the population (population of borrowers can thus become riskier without any change in lending standards), and lastly, greater willingness of borrowers to file for bankruptcy. The first category includes both increase in household income risk (as suggested, for example, by Barron, Elliehausen, and Staten (2000) and Hacker (2006)), and increase in out-of-pocket medical spending (pointed to by Warren and Warren Tyagi (2003)). The increased willingness of lenders to advance riskier loans may have also come from several sources. It could have been a consequence of change in the regulation — specifically, the US Supreme Court’s 1978 Marquette decision, which effectively lifted interest rate ceilings, is most often cited (e.g., Ellis (1998)) as being critical in enabling lenders to go after riskier borrower pools (and be appropriately compensated for it with higher interest rates). Additionally, credit market innovations (such as the development and spread of credit scoring and
securitization) may have lowered the cost of lending and/or improved accuracy of tar-
geting specific groups of borrowers, thereby leading to more borrowing and potentially
more defaults (Barron and Staten (2003), Ellis (1998)). Many of the specific mech-
anisms that have recently been suggested along these lines are rooted in improvements
in information technologies (Narajabad (2012), Sanchez (2010), Livshits, MacGee,
and Tertilt (2011), Athreya, Tam, and Young (2012), and Drozd and Serrano-Padial
(2014)) and I will come back to them in the next section. Dick and Lehnert (2010)
combine the last two channels, arguing that banking deregulation (lower barriers to
inter-state banking) had led banks to adopt information-intensive technologies, facil-
itating greater extension of credit both existing and new customers. The importance
of the composition changes in the population (such as passing of the baby-boomers
through the prime bankruptcy ages, and a larger share of unmarried borrowers who
have higher default probabilities) was highlighted by Sullivan, Warren, and West-
brook (2000). Possibly the most commonly suggested explanation is that the cost
of filing for bankruptcy has declined (e.g., Gross and Souleles (2002)). This can be
a result of amendments to the U.S. bankruptcy code, which had made bankruptcy
more attractive to borrowers (Shepard (1984) and Boyes and Faith (1986)). The more
common version of this explanation is that the “stigma” attached to bankrupts has
weakened (e.g., Buckley and Brinig (1998) and Fay, Hurst, and White (2002)), or
as the then Chairman of the Federal Reserve Board Alan Greenspan had put it in
his testimony before Congress in 1999, “personal bankruptcies are soaring because
Americans have lost their sense of shame.”

Several papers, including Moss and Johnson (1999), Athreya (2004), and Gross
and Souleles (2002), have analyzed several alternative explanations at the same time.
Livshits, MacGee, and Tertilt (2010) attempt to combine all these mechanism in a sin-
gle quantitative model in an attempt to assess the importance of individual channels.
They found that increased uncertainty faced by households (emphasized in Warren
and Warren Tyagi (2003) and the SMR study summarized in Luckett (2002)) played
a relatively small role in explaining the rise in bankruptcies. Changes in expense
uncertainty (due primarily to medical expenses) account for at most 20% of the in-
crease in filings (and likely less than 10%). Changes in income risk faced by borrowers
do not lead to a significant increase in bankruptcies either, primarily because more
uncertainty leads to an increase in precautionary savings, or conversely, a decrease in
debt. In their quantitative model, an increase in the variance of the transitory income
shock has practically no effect on the bankruptcy rate, while increase in the variance
of the persistent shocks leads to a very modest increase in filings, accompanied by a
dramatic fall in debt levels. Livshits, MacGee, and Tertilt (2010) also find that the
demographic changes contribute very little to the rise in bankruptcy rate.\footnote{One \textit{reason why Sullivan, Warren, and Westbrook (2000) found demographics important is that they included effect of the overall population growth in their calculation.}} In fact,
all four studies examining multiple explanations (Moss and Johnson (1999), Gross
and Souleles (2002), Athreya (2004), and Livshits, MacGee, and Tertilt (2010)) come
to much of the same conclusion — the rise in bankruptcies is not primarily driven by
the increase in uncertainty, but rather by changes in the consumer credit market.

There is less consensus on the exact changes in the consumer debt market that drove the rise in filings. Moss and Johnson (1999) argue that changes in regulation (both of bankruptcy and of lending) were the critical factor, while Athreya (2004) argues that a decline in the transactions cost of borrowing alone could have been responsible for the increase in filings. On the other hand, Gross and Souleles (2002) find the dramatic increase in the default rate in their data set (of credit card accounts from 1995 to 1997) is consistent with a decline in the cost of bankruptcy. Finally, Livshits, MacGee, and Tertilt (2010) argue that, in order to match the key observations (large increase in filings, smaller increase in debt, and roughly constant average real interest rates on unsecured loans), one needs a combination of these stories. Specifically, a combination of decline in the cost of bankruptcy with a decline in the cost of lending (accompanied by the interest rate deregulation) is capable of reproducing the observations in the US unsecured credit market between the late 1970’s and the late 1990’s. The reason why a combination of stories in needed is intuitive — a reduction in the “stigma” of bankruptcy by itself does increase the default rate, but leads to an increase in borrowing interest rates (to compensate the lenders for the default losses) and a decline in debt levels. Lower lending costs (either due to a reduction in transaction costs or simply due to lower prevailing interest rates) can offset the latter effects, inducing households to borrow more, and thus further contribute to the rise in filings. Admittedly, these “stories” are not deeply rooted in a specific microeconomic theory and are more of a black box (or “reduced-form proxies” as Livshits, MacGee, and Tertilt (2010) referred to them). Thus, one result of this quantitative research has been a call for more formal modelling of changes in the consumer debt markets, with a particular emphasis on the impact of the improvements in information technology (IT). And the very active research program that followed (Narajabad (2012), Sanchez (2010), Livshits, MacGee, and Tertilt (2011), Drozd and Nosal (2008), Athreya, Tam, and Young (2012), and Drozd and Serrano-Padial (2014)) is the subject of the next section.

Before moving on to discuss the specifics of these information-related mechanisms proposed, it is worth highlighting one more key empirical distinction related to the rise in unsecured debt and bankruptcies — that between the intensive margin of existing borrowers carrying larger debt balances (or being more prone to default on their existing balances) on the one hand, and the extensive margin of new borrowers gaining access to unsecured credit on the other hand. Both channels are clearly present in the data (the extensive margin of debt expansion is cited, for example, in Bird, Hagstrom, and Wild (1999), Black and Morgan (1999), Durkin (2000), Moss and Johnson (1999), Sullivan, Warren, and Westbrook (2000)), but sorting through them requires not trivial. Livshits, MacGee, and Tertilt (2014) do a decomposition exercise, which attributes about a quarter to a third of the rise in bankruptcies to the extensive margin (which they call “democratization of credit”), while the remainder is attributed to the “existing” borrowers. Interestingly, a further decomposition of the intensive margin yield a result similar to that of Gross and Souleles (2002) — most
of the intensive margin portion is due to a greater propensity of existing borrowers to file for bankruptcy, rather than greater debt burdens.

4 Importance of Information

While complete information models of bankruptcy discussed thus far are useful benchmarks for quantitative analysis, informational frictions definitely play an important role in the unsecured debt market — it is easy, for example, to think of situations where a borrower is more informed of their risk profile (probability of default) than a lender, leading to an adverse selection problem (Ausubel (1999) and Agarwal, Chomsisengphet, and Liu (2010) provide systematic empirical evidence of the presence and importance of adverse selection in the credit card market)\(^\text{11}\). A number of recent papers incorporate such information frictions and explore the implications of the improved information technology for the credit market. But before highlighting the papers dealing with the changes in the IT and their impact, I think it is important to highlight the paper by Chatterjee, Corbae, and Ríos-Rull (2007), which provides a basic model of credit scoring. Credit score in this context is a borrower-specific summary statistic, based on the borrower’s repayment history, which captures the likelihood that the borrower is of a low-risk type.\(^\text{12}\) The model is intuitive, captures the basic idea of the credit score quite nicely, and is able to generate the relevant empirical phenomena, like that documented by Musto (2004).

Dealing with asymmetric information (adverse selection, specifically) is notoriously tricky technically — think of non-existence of equilibrium in the screening environment Rothschild and Stiglitz (1976) (arising from inability to support pooling allocations as competitive equilibria) or the multiplicity of equilibria in a signalling environment. Some of the ways to get around these problems include discretizing the space of possible asset holdings in Chatterjee, Corbae, and Ríos-Rull (2007) and borrowing an additional timing assumption from Hellwig (1987) in Livshits, MacGee, and Tertilt (2011) to support the pooling equilibria in a screening economy,\(^\text{13}\) to intro-

\(^{11}\)Note however, that Dobbie and Skiba (2013) do not find evidence of adverse selection in their study of payday lending.

\(^{12}\)I think that this type of a model can actually serve as a basis for modeling endogenous stigma of bankruptcy. In the absence of other information, an of default is given a lot of weight in the calculation of the credit score, and the informational cost (stigma) of default is high. As other sources of information become available, a single event of default becomes less important in lenders’ calculations, and the stigma of default falls. This is further amplified by the fact that more “low-risk type” borrowers now choose to file for bankruptcy, further diluting the default signal. Alternative, though related, idea of “stigma” is present in Chatterjee, Corbae, and Ríos-Rull (2008), where a default on unsecured loan reveals something about the borrower’s type in an insurance market.

\(^{13}\)The challenge here is to prevent a “cream skimming” deviation by a competing lender, which would only be preferred to the pooling allocation for the “good” type of borrower, thus destroying pooling as an equilibrium. Hellwig (1987) introduced a timing assumption, which allows a lender offering a pooling contract to exit if a cream-skimming contract is observed (it nicely formalizes the
roducing a refinement in Athreya, Tam, and Young (2012) to pick a specific equilibrium in a signalling setting.

The progress in IT impacts consumer credit market in several distinct ways — improving availability and accuracy (timeliness) of information about individual borrowers, dramatically reducing the cost of processing such information, lowering the cost of both identifying and targeting pools of borrowers based on their (risk) characteristics (see, for example, Mann (2006) and Baird (2007)). And the specific mechanisms suggested by the recent papers are quite distinct as well. Narajabad (2012) points to an improved accuracy of signals received by lenders regarding their potential borrowers’ types (their idiosyncratic default costs). Greater signal accuracy leads to more favourable interest rates for the “good” type borrowers, which in turn leads to them taking on larger loans, and increases the probability of default among these “good” borrowers. The mechanism is somewhat similar to that in Athreya, Tam, and Young (2012), who highlight the effects of the informational frictions in a signalling model by comparing it to a full information benchmark. In the presence of adverse selection, “good” borrowers signal their type by taking on smaller loans. Getting rid of the informational asymmetry increases “good” type’s borrowing, and thus default rate. The screening contracts in Sanchez (2010), while technically quite different, tell a similar story — relaxing informational asymmetries increases borrowing by “good” type borrowers, exposing them to a higher risk of default. Mechanics are quite different in Sanchez (2010) though — the lenders have a choice of paying a cost for “screening” technology which reveals a borrower’s type or designing a separating contract to deal with the adverse selection. As the cost of the information technology falls, more lenders switch to technological screening (away from contractual screening), thus generating more (risky) borrowing by the good type of borrowers. In all three of these papers, the key mechanism works along a similar intensive margin — some of the existing (good) borrowers take on larger loans, which increases their probability of default.

The mechanism presented in Livshits, MacGee, and Tertilt (2014) is quite different and emphasizes the extensive margin of extending credit to new (and riskier) borrowers. Unlike the paper discussed above, which model improvements in information quality and lower cost of obtaining such information, Livshits, MacGee, and Tertilt (2014) emphasize technological improvements in lenders’ ability to process such information. They highlight the spread of credit score cards and other statistical tools lenders employ to assess riskiness of potential borrowers (see Barron and Staten (2003), Berger (2003) and Evans and Schmalensee (1999) for a deeper discussion).\footnote{A similar development in the auto financing market is documented by Einav, Jenkins, and Levin (2013).} These new technologies have been enabled by the rapidly declining costs of computing and data storage. Livshits, MacGee, and Tertilt (2014) model the costs of processing information as a cost of designing a contract in the model (corresponding to developing a specific credit card product, for example). This mechanism (as well as the idea of Wilson (1977) to put some added discipline on the potential deviations).
ones discussed above, as a matter of fact) is thus consistent not only with the basic macro-level observations of higher debt and bankruptcy rate, but also with additional empirical evidence of greater dispersion of interest rates (see Livshits, MacGee, and Tertilt (2011) and Athreya, Tam, and Young (2012)) and more accurate risk-based pricing of unsecured debt (see Edelberg (2006)). While the basic story may have implications for the intensive margin of borrowing, Livshits, MacGee, and Tertilt (2014) choose to concentrate on the extensive margin, the “democratization of credit,” which arises from lenders’ choosing to develop credit products for higher risk categories of borrowers, the credit products that generate relatively little surplus and were not profitable when the cost of designing contracts were high. Another paper where the extensive margin of the expansion of borrowing is present is Drozd and Nosal (2008), who consider a fall in the lenders’ costs of reaching a specific type of potential borrower, both in the data and in the context of a search model. A decline in the search friction leads to greater competition amongst the lenders, smaller transaction wedge in interest rates, and more borrowers getting loans.

Another information-based explanation has recently been advanced by Drozd and Serrano-Padial (2014) — they point to the IT advancements in the debt collection industry. Unlike the previous studies, which mostly focus on the improvement in the ex-ante information available to lenders (based on which loans are advanced), this paper suggests that improvements in the ex-post information regarding delinquent borrowers can have similar aggregate implications. Having better information (signals) about reasons for delinquency allows lenders to better target their collection efforts ex-post, while still providing both the insurance against “distress” shocks to affected borrowers and the right incentives to repay the loans to the non-distressed borrowers. This greater ex-post efficiency in collections improves ex-ante contractual environment and supports more loans ex-ante (while still being consistent with greater ex-post bankruptcy rate).

5 Welfare Implications

One important commonality amongst all of these papers on the effects of IT improvements in the consumer credit market is that all of these information improvements lead to greater average welfare in the model economies, despite the fact that they all (by construction) lead to greater bankruptcy rates (see Livshits, MacGee, and Tertilt (2014) and Athreya, Tam, and Young (2012) for an explicit discussion of welfare gains). How can more frequent default (typically thought of as failure) be associated with welfare improvements? This somewhat counter-intuitive result comes from model with rational (and sophisticated) borrowers and lenders realizing newly accessible gain from trade; and the ex-post default is a foreseen consequence of the ex-ante
desirable arrangement in an incomplete market environment.\textsuperscript{15} Deviating from the standard assumption can easily change the welfare assessment of these recent changes in the debt market — Nakajima (2012) shows that in a model with temptation preferences the rise in debt (and bankruptcy) can be driven by consumers’ over-borrowing, and can thus be associated with welfare losses (and the calibrated version of the model does indeed imply a welfare loss arising from the relaxation of borrowing constraints).

More generally, the welfare analysis in models of bankruptcy goes back to Zame (1993), which points out another key and possibly counter-intuitive result — more commitment does not necessarily make borrowers ex-ante better off in models with incomplete markets. More severe bankruptcy punishment, which provides borrowers with greater level of commitment to future repayment, does lower their cost of borrowing and expand their endogenous credit limit, but it comes at a cost — it takes away from the bankruptcy’s role as partial insurance against bad otherwise uninsurable shocks. The key tradeoff associated with bankruptcy regimes is then that between intertemporal consumption smoothing, which is improved under strict bankruptcy regime, and intratemporal smoothing, which is facilitated somewhat by a lax bankruptcy code. Any policy recommendations have to come from a quantitative assessment of this tradeoff.

Not surprisingly then, the welfare assessments of bankruptcy regimes and reforms have been quite wide-ranging: In an Aiyagari (1994)-like endowment economy, Athreya (2002) finds “only modest” effects of mens-testing in bankruptcy, but finds that eliminating the bankruptcy option altogether leads to a large welfare gain. On the other hand, Li and Sarte (2006) argue that accounting for general equilibrium effects in a model with production reverses this finding — they find that completely eliminating bankruptcy would lead to a significant welfare loss (though the effect of means-testing are also found to be small). Livshits, MacGee, and Tertilt (2007) reformulate the question from entirely eliminating the default option to the choice of the basic bankruptcy regime — eliminating default altogether is simply not plausible in their model, since they introduce “expense shocks” that some borrowers are simply incapable of paying. Livshits, MacGee, and Tertilt (2007) thus compare a “Fresh Start regime” representing the US Chapter 7 bankruptcy with a European-style “No Fresh Start regime,” in which defaulting borrowers cannot discharge their loans and remain liable for the debts indefinitely. They find that the welfare comparison between the two regimes is very sensitive to the exact nature and magnitude of the uncertainty faced by households. When the model is calibrated to the US economy, Livshits, MacGee, and Tertilt (2007) thus compare a “Fresh Start regime” representing the US Chapter 7 bankruptcy with a European-style “No Fresh Start regime,” in which defaulting borrowers cannot discharge their loans and remain liable for the debts indefinitely. They find that the welfare comparison between the two regimes is very sensitive to the exact nature and magnitude of the uncertainty faced by households. When the model is calibrated to the US economy,

\textsuperscript{15}Athreya (2001) is one of the few papers to argue that the rise in debt and bankruptcy are associated with welfare losses, based on the premise that the bankruptcy code was too lax, and having access to the debt market made low-income people worse off due to their inability to commit to repaying the loans. More recently, MacGee (2012) has made a point that, while larger consumer debt balances (in Canada) are not detrimental per se, they may make borrowers (and the financial system) more vulnerable to aggregate shocks, especially ones associated with sharp increases in interest rates.
the Fresh Start regime is (slightly) preferred from the ex-ante perspective.\footnote{In an earlier version of the paper, Livshits, MacGee, and Tertilt (2003), the authors also an alternative calibration of the model that matched key observations in Germany, and found that No Fresh Start regime was (slightly) preferred in that environment.} Chatterjee and Gordon (2012) do a similar exercise in a model with explicit garnishment and come to the opposite conclusion — they find that eliminating the Fresh Start option would be welfare improving. Chatterjee, Corbae, Nakajima, and Ríos-Rull (2007) evaluate a bankruptcy reform that basically amounts to means-testing in their quantitative model and find that it can generate large welfare gains. Gordon (2014) also argues that a simple means-tested bankruptcy system is capable of generating large welfare gains. The reason for the large dispersion of findings comes not so much from the differences in the underlying exercise, but rather from the different parameterizations of the economies, as discussed in detail Livshits, MacGee, and Tertilt (2007). The findings are very sensitive to not just the relative magnitudes of the income uncertainty, the expense shocks, and the life-cycle borrowing motive, but also to the nature of income uncertainty — while greater volatility of persistent income shocks makes the easy discharge option more attractive, greater transitory income uncertainty swings the welfare comparison the other way, making loose bankruptcy regime less attractive (since, unlike persistent income shocks, transitory shocks can be quite effectively smoothed across time).

The discussion of the welfare implications of personal bankruptcy regimes would be incomplete without mentioning the effects they have on entrepreneurs. Since the entrepreneurs rely quite heavily on using personal wealth and personal loans to finance their businesses, the availability of personal bankruptcy is quite important to them (as is evidenced by self-employed being over-represented among the personal bankruptcy filers).\footnote{Key empirical papers documenting the relation between bankruptcy codes and levels of entrepreneurship include Fan and White (2003), Berkowitz and White (2004), and Armour and Cumming (2008).} In fact, in what was probably the first quantitative assessment of a bankruptcy regime in a heterogeneous-agent macro model, Zha (2001) analyzed the effects of exemption levels on entrepreneurial financing (finding that some exemption can be welfare improving). More recently, key empirical contributions by Fan and White (2003), Berkowitz and White (2004), and Armour and Cumming (2008) have documented a positive relationship between leniency of the bankruptcy code and the level of entrepreneurial activity. This spurred a number of macroeconomics models which analyze the effect of bankruptcy code on occupational choice (of whether to become an entrepreneur), including Akyol and Athreya (2011), Jia (forthcoming), Meh and Terajima (2008), and Mankart and Rodano (2012). In these papers, the familiar tradeoff (between partial insurance ex-post and inability to commit to repayment that hampers borrowing ex-ante) takes on a new dimension — it now affects an individual’s decision to become an entrepreneur. The partial insurance provided by lax bankruptcy law makes entrepreneurship more attractive to the riskiest potential entrants (marginal entrepreneurs), thus generating an extensive margin effect. On
the other hand, generous bankruptcy exemptions limit ability of all entrepreneurs to commit to repaying their loans, thus possibly hampering financing of many inframarginal projects. The welfare evaluation can then depend not only on the assessment of the risk factors faced both by workers and entrepreneurs, but also on the relative importance of these extensive and intensive margin of entrepreneurial activity.

6 Delinquency, Collections, and Debt Restructuring

Formal bankruptcy (Chapter 7 filings in the US, more specifically) has been the focus of most of the papers discussed so far. Considering this subset of defaults has big advantages — the institutional framework is well-defined and rather well-understood, measurement is clear and rather precise (since filers have to inform the court about all their assets and income), and the event of default itself is very binary (the filing either took place or it didn’t). But restricting attention to this formal bankruptcy procedure (and a specific chapter) misses a large share of defaults, as well as important part of the interaction between lenders and distressed borrowers. Dawsey and Ausubel (2004) report that about half of all defaults (charge-offs, or credit losses) in their sample occurred without a bankruptcy being filed (and point to several surveys that put this estimate even higher). Eraslan, Li, and Sarte (2007) highlight the importance of Chapter 13 filings (which can be thought of as court-approved debt restructuring) in the US, and paint a picture that is quite different from the binary nature of Chapter 7 filings — about a fifth of all proposals are not approved by the court, and of those approved, more than half fail (that is, they do not ultimately lead to a discharge, typically due to borrowers missing their prescribed payments). Again, this formal institutional debt restructuring mechanism is just one of a number of avenues available to distressed borrowers (debt settlement, debt counselling, and debt consolidation being the main alternatives, all arranged without involvement of a bankruptcy court). Last, but not least, debt collection (which is basically abstracted from in most of the papers discussed above) is a big industry — third-party collection agency employ about 150,000 people, and that does not include those involved in the “in-house” collection efforts. Fortunately, these important finer details of default are now subject of active and fruitful research.

Dawsey and Ausubel (2004) should probably get the credit for bringing what they called “informal bankruptcy” to the forefront of bankruptcy research. They study the choice between the formal and informal bankruptcy, arguing that the two should be thought of as substitutes from the borrowers’ perspective (they nicely utilize cross-state variation in garnishment and exemption laws to make that point). Dawsey and Ausubel (2004) think of the informal bankruptcy as an absorbing state; and Drozd and Serrano-Padial (2014) find some support for that view in their analysis of data from Experian — default state appears very persistent, with almost 80% of defaulters
neither recovering nor filing for bankruptcy in a 2 year window.\textsuperscript{18} Thus, I think it is important to make a distinction between the persistent informal bankruptcy and the often transitory state of delinquency, defined as borrower being late on a payment by $X$ days, where $X$ is typically 60, 90, or 120 days. In fact, Herkenhoff (2012) makes a compelling case that a delinquency can sometimes be thought of as a substitute to new loans, especially when such new loans are not available when they are needed most (following a job loss, for example, as discussed in Sullivan (2008)). This transitory view of delinquency is well captured in Chatterjee (2010), where “financial distress” is explicitly modelled as a period when the delinquent debtor is actively pursued by creditors, and when the debtor is choosing between the form of default (formal or informal) or repayment.

Once we take delinquency into account, we are immediately led to consider the actions of lenders in response to this (possibly temporary) non-repayment. The two natural avenues available to the lenders are debt collection and debt restructuring.\textsuperscript{19} The importance of debt collection is emphasized both in Dawsey, Hynes, and Ansuel (2009) and in Chatterjee and Gordon (2012); and debt collection itself is studied in detail by Fedaseyeu (2011), Fedaseyeu and Hunt (2014) and Drozd and Serrano-Padial (2014). This detailed analysis leads to the same basic conclusion in all three papers — more effective debt collection practices lead to greater ex-ante credit supply and higher welfare, as more gains from trade are realized.

Debt restructuring has also been a subject of recent research. Kovrijnykh and Livshits (2013) offer a theoretical model where delinquency, debt restructuring and bankruptcy all arise with positive probability in an optimal screening mechanism that deals with a single adverse selection friction — the lender cannot observe the (distressed) borrower’s idiosyncratic bankruptcy cost (or in the case of mortgages, the borrower’s personal valuation of the house). Benjamin and Mateos-Planas (2012) and Athreya, Sanchez, Tam, and Young (2012) propose quantitative models (with symmetric information) where delinquency, debt renegotiation and bankruptcy are also present. In Benjamin and Mateos-Planas (2012), renegotiation occurs with an exogenously given probability upon delinquency, and this possibility of renegotiation leads to an endogenous distinction between delinquency and bankruptcy. In Athreya, Sanchez, Tam, and Young (2012), delinquency also triggers debt restructuring, but deterministically so. The coexistence of bankruptcy and delinquency in Athreya, Sanchez, Tam, and Young (2012) arises from the fact that, unlike bankruptcy filers, delinquent borrowers are subject to income garnishment. Athreya, Sanchez, Tam,

\textsuperscript{18}By “defaulter” I am referring to those who have already been in default for two years, as opposed to newly delinquent borrowers. Though notably, in the data reported in Drozd and Serrano-Padial (2014), almost two thirds of delinquent borrowers end up in this persistent default state (with the rest roughly equally split between formal bankruptcy and recovery) after 2 years.

\textsuperscript{19}Another option, of course, is to do nothing, in the hope of collecting both the principal and the penalties. Somewhat surprisingly, Adelino, Gerardi, and Willen (2013) report that the “self-cure” in the case of (60-day delinquent) mortgages was in excess of 60% in 2005-2006. See also Herkenhoff and Ohanian (2012) for a nice summary of empirical facts regarding transitions of mortgages into and out of delinquencies.
and Young (2012) can thus study how borrowers select into the two forms of default, and find that delinquency is often used by borrowers with the worst labour income shocks (which is very consistent with the basic idea in Herkenhoff (2012)).

7 Cyclical Behavior of Credit and Bankruptcy

One aspect of bankruptcy and consumer debt that has received relatively little attention until recently is their cyclical properties. Yet, the cyclicity of bankruptcy is very pronounced — filings are strongly counter-cyclical (go up during recessions) and volatile. The same holds true for the charge-off rate. The picture is less clear-cut when it comes to consumer debt in the US. Until 1990s, consumer debt exhibited a clearly pro-cyclical behaviour — it increased in expansions and contracted during recessions. That pattern was broken in the 1990s, when debt did not decline during recessions. But the pattern seems to have resumed in the new millennium, with debt rising during the expansion and shrinking during the Great Recession. See Fieldhouse, Livshits, and MacGee (2014) for a detailed macro-level data discussion. Exploiting regional variation, Agarwal and Liu (2003), Garrett and Wall (2014), Fieldhouse, Livshits, and MacGee (2012) document similar trends — bankruptcies and delinquencies increase during recessions and, more specifically, increase with unemployment rates.20

The standard quantitative models of bankruptcy with the usual parameterizations of income shocks over the cycle have struggle to reproduce the key macro observations. The model in Nakajima and Ríos-Rull (2005) generates pro-cyclical filings (and pro-cyclical debt), while the model in Fieldhouse, Livshits, and MacGee (2014) generates counter-cyclical debt (but pro-cyclical filings). Both models fail to reproduce the large volatility of filings observed in the data.

A very recent paper by Nakajima and Ríos-Rull (2014) seems to have overcome this most basic challenge — the model generates counter-cyclical and volatile filings, as well as pro-cyclical debt. I believe there are two key forces are key to this success. The first is the assumption about the income process over the business cycle, which the authors refer to as “counter-cyclical earnings risk” — recession are associated with increased risk of very bad earnings shocks. The second key force is the response of the pricing of debt (the lending standards) to the recession. Increased earnings risk in a recession leads to much higher risk-premia demanded by the lenders, and thus to a contraction of consumer debt (and yet greater filing volatility due to inability of some borrowers to roll over their existing loans).

Alternative explanation for the pro-cyclicality of consumer debt is that it could be

20 Using the administrative dataset of Canadian filers between 2007 and 2011, Fieldhouse, Livshits, and MacGee (2012) provide additional evidence about the changing characteristics of filers during the last recession — there are more filers with “middle class characteristics” during the economic downturn. That is, filers during the recession were slightly older, more educated, more likely to own a home.
used to finance (pro-cyclical) purchases of consumer durables. For example, Iacoviello (2008) and Iacoviello and Pavan (2013) generate pro-cyclical debt in a model with housing. But that mechanism should mostly affect secured, rather than unsecured debt; but unsecured debt seems to have the same pro-cyclical pattern. Lastly, a rather mechanical alternative resorted to in Fieldhouse, Livshits, and MacGee (2014) is a “financial intermediation shock,” which increases the risk-free interest rate (e.g., through increase in transaction cost of making loans) during recessions. Needless to say, endogenous responses of lending standards to economic uncertainty (as in Nakajima and Ríos-Rull (2014)) is a much more satisfactory explanation.

8 Challenges Going Forward

In closing, I want highlight what I see as the key challenges and promising directions of research related to personal bankruptcy and credit.

One key challenge that I don’t think has been successfully addressed yet is modelling a consumer credit market where borrowers deal with multiple lenders. All of the papers discussed in this survey assume exclusive relation in debt, i.e., that a borrower can only accept credit from a single lender. There is a very good technical reason for this assumption — the alternative generates very unpleasant (and rather unsatisfactory) prediction of debt dilution. As Bizer and DeMarzo (1992) clearly establish, in the absence of exclusivity, equilibrium allocation involves sub-optimally large levels of borrowing and very high default rates, as any other allocation with actuarially fair pricing would be diluted by an additional loan with an additional lender. Some of the debt dilution is clearly present — pay-day loans are a prime example of a diluting lender (see Skiba and Tobacman (2011)). Yet, the reality is hardly as gloomy as the theory (Bizer and DeMarzo (1992)) would suggest. Cooperation of lenders (facilitated by credit reporting agencies) could certainly be a factor, but it would presumably require a deal of cartel-like behaviour. Of course, borrowers would be happy to avoid the debt dilution problem by committing to dealing with a single lender, but such commitment is hardly available.

One possible approach to model borrowers’ interactions with multiple lenders could be a search model, like the one used in Drozd and Nosal (2008). Though admittedly, pay-day loans and other ways of diluting one’s debt are not that hard to find; and it could be argued that search frictions are becoming less relevant. On the other hand, the search model of Drozd and Nosal (2008) has another nice feature — it generates a meaningful distinction between credit lines (limits on how much can be borrowed) and amounts of outstanding debt. Most models in this literature forego this distinction entirely. Notably, the search model is not the only way to model this distinction. One can think of the credit lines as commitments on the part of the lender — see Mateos-Planas (2013) and Mateos-Planas and Ríos-Rull (2009). Note also that either way of modelling the longer-term relations between borrowers and lenders (which is essential
for thinking about credit lines) could have major implications for the analysis of unsecured credit market. One important example is the thesis of Athreya, Tam, and Young (2009) that unsecured credit market is not very effective at smoothing income shocks as borrowing terms are at their worst exactly when a borrower needs the loan the most. Credit lines (or other commitments of a lender) could thus drastically alter the way we think of the consumer credit market.\footnote{It could also change the way we think of the welfare implications of increased competition amongst the lenders or simply lower entry cost for lenders. Rather than increasing efficiency, it could undermine these important long-term relationships, especially if borrowers lack commitment not to exploit newly arriving opportunities to take on additional loans.}

Lastly, I want to point to yet another promising direction of research — explicitly combining secured and unsecured debt in a quantitative model. It is certainly more computationally demanding than modelling the two types of debt separately, but I think the interaction between the two forms of debt are important and informative. Several papers, including Pavan (2008), Li and White (2009), Li, White, and Zhu (2011), and Luzzetti and Neumuller (2014) have already made steps in this direction; and I think that recent work by Mitman (2014) shows just the kind of potential these models can have in answering important and relevant questions.

References


