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THE ECONOMICS OF DEBT COLLECTION:
ENFORCEMENT OF CONSUMER CREDIT CONTRACTS**

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The Economics of Debt Collection: Enforcement of Consumer Credit Contracts

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Abstract

In the U.S., creditors often outsource the task of obtaining repayment from defaulting borrowers to third-party debt collection agencies. This paper argues that an important incentive for this is creditors' concerns about their reputations. Using a model along the lines of the common agency framework, we show that, under certain conditions, debt collection agencies use harsher debt collection practices than original creditors would use on their own. This appears to be consistent with empirical evidence. The model also fits several other empirical facts about the structure of the debt collection industry and its evolution over time. We show that the existence of third-party debt collectors may improve consumer welfare if credit markets contain a sufficiently large share of opportunistic borrowers who would not repay their debts unless faced with "harsh" debt collection practices. In other cases, the presence of third-party debt collectors can result in lower consumer welfare. The model provides insight into which policy interventions may improve the functioning of the collections market.

Keywords: debt collection, contract enforcement, consumer credit markets, regulation of credit markets, credit cards, Fair Debt Collections Practices Act
JEL Classification: D18, G28, L24

1. Introduction

In the U.S., creditors often try to obtain repayment from defaulting borrowers by hiring third-party debt collection agencies instead of doing it themselves. Such third-party debt collection affects millions of borrowers. In 2013, the proportion of American consumers with at least one account in third-party collections stood at 14 percent,[1] and the total amount collected from them by third-party debt collectors was approximately $55 billion (Ernst & Young, 2014).

The available empirical evidence suggests that third-party debt collectors use harsher debt collection practices than those used by creditors when they collect on their own.[2] As we show in Section 2, a debt collector employed by a third-party firm generates, on average, about 10 times more complaints from consumers than a debt collector employed directly by creditors. Further, American consumers file more complaints about third-party debt collectors than about any other industry, which led the Consumer Financial Protection Bureau (CFPB) to state that "debt collection constitutes one of today's most important consumer financial concerns" (Consumer Financial Protection Bureau, 2014, p. 2). Title X of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 gave the CFPB broad powers to regulate and supervise third-party debt collectors, and the CFPB is currently in the process of preparing new rules for the debt collection industry (Consumer Financial Protection Bureau, 2013). Given the regulators' increased focus on debt collection and the potentially large impact that it may have on borrowers, it is important to understand the economic forces that affect the decision to outsource debt collection to third-party firms and the implications of this decision for consumer welfare.

In this paper, we argue that a key factor behind the outsourcing of debt collection is creditors' concerns about their reputations. This factor complements other reasons that may play an important role in creditors' decision to hire third-party debt collec-

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[1] Source: *The Quarterly Report on Household Debt and Credit*, Federal Reserve Bank of New York, various editions. *The Quarterly Report on Household Debt and Credit* is based on a 5 percent random sample of all individuals with a credit report. These figures reflect stocks and not flows; accounts may remain in debt collection for several years. The share of consumers with at least one account in third-party collections has not fallen below 9 percent since the end of 2001, which is the earliest date for which the corresponding data are available.

[2] Unless otherwise stated, we use the terms "lenient" and "harsh" in this paper to characterize the intensity of collection efforts that are used. In our notation, harsh does not necessarily imply the use of illegal, unfair, or deceptive practices. It might simply reflect a higher propensity to make phone calls or to obtain garnishments, for example.

tors, such as the benefits of specialization that third-party firms may enjoy.[3] While an argument based on creditors' reputational concerns need not be the only explanation behind the existence of third-party debt collection, we show that this argument can explain why third-party debt collectors might use harsher debt collection practices than creditors would use. This argument can also explain the common practice of creditors outsourcing debt collection to multiple debt collection agencies, which, in turn, collect on behalf of multiple creditors. We further show that creditors' reputational concerns have implications for the market structure of the debt collection industry and consumer welfare.

To analyze the economics of third-party debt collection, we build a model along the lines of the common agency framework (e.g., Bernheim and Whinston, 1985, 1986; Prat and Rustichini, 2003). In the model, banks compete for customers, who choose which bank to borrow from based on the interest rates they offer and the debt collection practices they use. These practices can be either harsh or lenient. Relative to lenient debt collection practices, harsh debt collection practices generate higher nonpecuniary costs for borrowers. Because of these nonpecuniary costs, and in the absence of asymmetric information, consumers prefer to borrow from banks that use lenient debt collection practices, whenever possible. As a result, if there are no third-party agencies, then all banks use lenient debt collection practices in equilibrium.

We introduce third-party debt collectors into the model by assuming that banks have a choice of whether to collect on their own or to outsource debt collection to a third-party agency. This agency, in turn, decides whether to use harsh or lenient debt collection practices after having been hired (or not) by the banks. Thus, unlike the banks that collect on their own, the debt collection agency can condition its choice of debt collection practices on the set of banks that hired it.[4] If all banks hire the same debt collection agency, then there is no bank collecting on its own,

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[3]As we discuss in Section 2, the available evidence on the efficiency of third-party debt collectors relative to original creditors is mixed. Therefore, our model setup is agnostic about the relative efficiency of third-party debt collection. However, as we will show here, this relative efficiency is one of the factors that affect the welfare implications of our model and the nature of the equilibrium that prevails in the credit market.

[4]Contractual arrangements between creditors and debt collectors generally enable the latter to predict which creditors will hire them, even *before* borrowers of those creditors default on their loans. See Section 2 for details.

and the debt collection agency can, therefore, use harsh debt collection practices without the risk of its clients losing borrowers. Under certain conditions, there exists an equilibrium in which all banks delegate their debt collection to the third-party agency, and the agency uses harsh debt collection practices. This generates the first empirical prediction of the model (i.e., that third-party debt collectors use harsher debt collection practices than creditors collecting on their own).

We then extend the model to derive its implications for the structure of the debt collection industry. We show that, under certain conditions, there is no equilibrium in which there is a single debt collection agency that collects on behalf of all banks. Instead, there is an equilibrium with multiple debt collection agencies, each collecting on behalf of multiple banks. This is consistent with empirical evidence: The debt collection industry is large and yet relatively unconcentrated, and it is customary for creditors to hire multiple debt collection agencies at the same time, with each agency collecting on behalf of multiple creditors. We also show that concentration in the debt collection industry is related to the concentration in the banking industry, with the debt collection industry becoming more concentrated as the banking industry becomes more concentrated. This is consistent with the recent evolution of the two industries, in which consolidation in the debt collection industry followed consolidation in the banking industry. Our model also predicts that the debt collection industry will become more concentrated as consumers become better informed about the debt collection practices that different banks and debt collection agencies use.

Finally, we introduce asymmetric information in the model and analyze its implications for consumer welfare. We assume that some consumers are prone to moral hazard and will not repay their debts unless they face the threat of harsh debt collection practices. We also assume that lenders cannot identify such opportunistic consumers. In this setting, borrower moral hazard creates an adverse selection problem for banks that use lenient debt collection practices, since opportunistic borrowers will be willing to borrow from such banks at any interest rate and will not repay their debt. If this problem is sufficiently severe, the lending market can function only with harsh collections.[5] If creditors are relatively more efficient in collecting on their

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[5]In the absence of harsh collections, the interest rate that banks charge has to compensate them for the expected losses from opportunistic borrowers. If the share of such borrowers is high, then nonopportunistic borrowers will not be willing to accept the interest rate that banks charge. Realizing that only opportunistic consumers are willing to borrow, banks will not lend in equilibrium.

debts than third-party debt collection firms, then there will be no outsourcing of debt collection in equilibrium, which will involve harsh debt collection practices used by creditors. If the opposite is true, so that third-party firms are relatively more efficient, then the equilibrium entails creditors allocating debt collection to these firms, which will also use harsh debt collection practices.

Thus, when the adverse selection problem is sufficiently severe, the market selects the equilibrium that uses the most efficient debt collection technology. This produces more consumer welfare than a market without lending or one in which the less efficient type of firms (creditors or third-party debt collectors) engages in collections. In this case, the scope for possible policy intervention is limited. Welfare improvements may be achieved by lowering the pecuniary and nonpecuniary costs of debt collection. However, we show that, even in this simple case, some policy interventions may have unintended consequences for consumer welfare.

The model's welfare implications are different if the share of opportunistic borrowers in the credit market is not too large. In this case, multiple equilibria can exist. In one of them, creditors collect on their own and use lenient debt collection practices, and in the other, they hire third-party debt collectors that use harsh debt collection practices. When multiple equilibria exist, consumer welfare in our model is greater if creditors collect on their own. Since the market itself will not necessarily select the welfare-maximizing equilibrium in this case, policy interventions that shift debt collection back to creditors can improve consumer welfare.

An important caution follows from these results. Welfare-improving policy interventions in a credit market with a low share of opportunistic borrowers may hurt consumer welfare if the share of opportunistic borrowers is sufficiently large. This makes regulating the debt collection market a complex issue that requires a clear understanding of the nature of the equilibrium and the relative efficiency of third-party debt collectors vis-à-vis creditors.

By pointing out the parameters that can affect consumer welfare, our model can inform policymakers about the tools they can use to influence the behavior of creditors and collection agencies. For example, the choice of debt collection practices and the feasibility of lending in equilibrium are determined, in part, by the difference between the efficacy of harsh versus lenient collection practices. This difference can be influenced by regulations that specify what conduct is unfair, deceptive, or abusive. Licensing and liability costs established by regulation will be reflected in the fees

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charged by third-party debt collectors, which, in turn, will affect creditors' willingness to outsource debt collection. The government and other organizations can promote consumer education about available consumer protections and increase borrowers' awareness of the debt collection practices that creditors and debt collectors use; this may influence consumers' choices over which banks to borrow from or the intensity of their search for the best terms. This will, in turn, intensify creditors' concerns about their reputations. Improvements in information availability or technology may reduce the nonpecuniary costs of debt collection, thus improving the efficacy of collections without necessarily increasing disutility to consumers.

Our paper contributes to the literature on creditor remedies, reviewed in Hynes and Posner (2002), Athreya (2005), and Livshits (2014). The earliest paper we are aware of that focuses on debt collection is by Krumbein (1924), and it provides a detailed description of the debt collection market as it existed nearly 100 years ago.[6] More recently, a number of papers have established that a significant proportion of borrowers may be exposed to collections activity. Dawsey and Ausubel (2001) report that, in one large bank's portfolio, about half of the individuals who defaulted on their credit cards had not filed for bankruptcy at the time of their default or shortly thereafter, a behavior they describe as "informal bankruptcy." Hynes (2008) examines the process of debt collection in state courts and finds that debt collection litigation is pervasive, that consumers who are sued by creditors and debt collectors are drawn predominantly from lower-income areas, and that very few consumers file for bankruptcy once they are sued.

The literature has also explored the relationship among collections, bankruptcy, and credit supply. White (1998) argues that many households default without filing for bankruptcy because creditors may decide not to collect on defaulting borrowers since they lack the ability to differentiate between borrowers who will repay and those who will file for formal bankruptcy. Dawsey, Hynes, and Ausubel (2013) document that informal bankruptcy is more prevalent in states that grant consumers a private right of action against creditors who violate debt collection laws. Athreya, Sanchez, Tam, and Young (2014) develop a model with formal bankruptcy and informal default (with renegotiation) and examine borrowers' choice between the two. Drozd

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[6] A more recent review of the institutional detail and regulation of collections is found in Hunt (2007), Federal Trade Commission (2009, 2011a), and Zywicki (2015).

and Serrano-Padial (2013) show that improvements in methods of screening defaulting borrowers can reconcile some paradoxical trends in the pricing and supply of revolving credit. Fedaseyeu (2015) shows that regulations of third-party debt collection affect credit supply, with more stringent regulations leading to fewer openings of new revolving lines of credit. Our paper complements this research by focusing on creditors' choice of whether to collect on their own or to hire third-party agencies and the implications of this choice for consumer welfare and policy-making.

Apart from debt collection, extensive literature has studied other contract enforcement mechanisms in consumer credit markets, such as personal bankruptcy and garnishment. For example, Gropp, Scholz, and White (1997) show that high levels of bankruptcy exemptions reduce credit availability and redistribute credit toward high-asset households. White (2007) argues that the growth in revolving debt is the primary reason for the rise in bankruptcy filings and that bankruptcy policies that favor creditors must be accompanied by changes in credit market regulations designed to prevent overborrowing. Barth, Gorur, Manage, and Yezer (1983) show that restrictions on garnishment reduce the availability of personal loans, while Dawsey and Ausubel (2001) and Agarwal, Liu, and Mielnicki (2003) document that creditor-friendly garnishment laws increase the likelihood that borrowers will file for bankruptcy. Chatterjee, Corbae, Nakajima, and Ríos-Rull (2007) and Livshits, MacGee, and Tertilt (2007) develop rich quantitative models to study the impact of consumer bankruptcy on household debt and default and analyze welfare implications of various bankruptcy regimes. Since consumer bankruptcy provides borrowers with a protection mechanism, it restricts creditors' ability to demand repayment from borrowers. The existence of third-party debt collectors acts in the opposite direction by increasing repayment that creditors can obtain from defaulting borrowers.

While no work that we are aware of studies creditors' decision to hire third-party debt collectors, Coffman (2011) provides experimental evidence that the mere act of employing intermediaries may reduce punishment for undesirable behavior. Along these lines, hiring third-party debt collectors may help creditors distance themselves from harsh debt collection practices if consumers do not fully realize that harsh debt collection practices can benefit the creditors. While this argument is consistent with debt collection agencies using harsher debt collection practices than creditors, it is not sufficient, on its own, to explain the practice of banks hiring multiple debt collection agencies, the structure of the debt collection industry, or the joint evolution of the

banking and collections industries. The model that we develop here shows that harsh debt collection practices may be implemented in equilibrium even if consumers fully realize that these practices may benefit the creditors. Further, this model can explain a range of empirical facts about third-party debt collection.

The rest of this paper is organized as follows. Section 2 presents several stylized facts about the debt collection industry. Section 3 develops a theory of third-party debt collection based on the common agency framework and relates it to empirical evidence about the debt collection market. Section 4 contains a welfare analysis. In Section 5, we discuss policy implications of the framework developed in this paper. Section 6 concludes. Proofs of propositions are found in the Appendix.

2. Stylized facts

In this section, we present several stylized facts about the debt collection industry. Some of these facts describe prevalent contractual arrangements between creditors and debt collectors. The understanding of these arrangements informs the assumptions that we make in the model developed here. Other facts describe empirical regularities observed in the debt collection market, and the model developed in this paper will rationalize these empirical regularities.

2.1. Third-party debt collectors use harsher debt collection practices than original creditors.

For credit cards, and many other consumer debts, creditors often conduct their own initial collection efforts (typically termed *first-party or in-house collections*), usually through the early stages of delinquency. Loans that are not being repaid are eventually removed from the balance sheet because they no longer qualify as earning assets. At this point, the account is usually placed for collection by third-party agencies. There are two ways in which a creditor can outsource debt collection to a third-party agency. Most often, the creditor retains the legal ownership of the debt and hires an agency that works on commission, receiving a percentage of the proceeds it collects for the creditor. Such agencies are termed *contingency collectors*. Sometimes, however, the creditor may sell the legal ownership of previously defaulted debt to a third-party agency, termed a *debt buyer*. Debt buyers purchase debt at a discount, and this discount is the analog of the commission that creditors pay to contingency collectors. The same law regulates debt collection practices of both types of

debt collectors. Further, the agencies that regulate and supervise debt collection (the Federal Trade Commission (FTC) and the CFPB) customarily refer to both contingency collectors and debt buyers when they use the term *third-party debt collection*, as opposed to first-party debt collection. Our focus in this paper is on the choice between first- and third-party collection and not between contingency collectors and debt buyers. We believe that our results apply to both types of third-party debt collectors.

We analyze the relative harshness of collections activity used by first-party and third-party collectors by examining two data sets on consumer complaints collected by the FTC. The first data set is assembled from a congressionally mandated annual report on the FTC's enforcement of the main federal law that regulates debt collection activity in the U.S., the Fair Debt Collection Practices Act (FDCPA).[7] It includes statistics on consumer complaints filed only with the FTC (Federal Trade Commission, 2011b).[8] The second data set, called Sentinel, includes consumer complaints filed with the FTC, other state and federal agencies, Better Business Bureaus, and a number of nonprofit consumer protection organizations (Federal Trade Commission, 2013a).

The evidence we assemble is indirect, which we recognize is imperfect. However, since there are no direct measures that compare the harshness of collections activity used by first-party and third-party collectors, any comparison between the two has to rely on indirect evidence. This evidence suggests that third-party debt collectors are more likely to use harsher debt collection practices than original creditors.[9]

In Figure 1, we plot the time series of the relative intensity of complaints against first-party collectors versus third-party collectors. To construct the intensity of com-

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[7]Complaints against third-party debt collectors include complaints against both contingency collectors and debt buyers.

[8]While the FTC uses information in these complaints to inform its surveillance and enforcement efforts, it does not have the resources to verify the accuracy of the complaints that are filed. In July 2013, the CFPB began accepting consumer complaints about debt collection. The FTC continues to receive complaints as well.

[9]Since third-party debt collectors typically collect on charged-off accounts, it may be the case that the difference in harshness of debt collection practices used by first-party and third-party debt collectors is due in part to the difference in the types of borrowers from whom they collect. However, lenders *choose* to allocate charged-off accounts to third-party debt collectors. Therefore, it is likely that lenders allocate debt collection of charged-off accounts to third-party agencies because those agencies can use harsher debt collection practices and not that debt collection agencies use harsher debt collection practices because they collect on charged-off accounts.
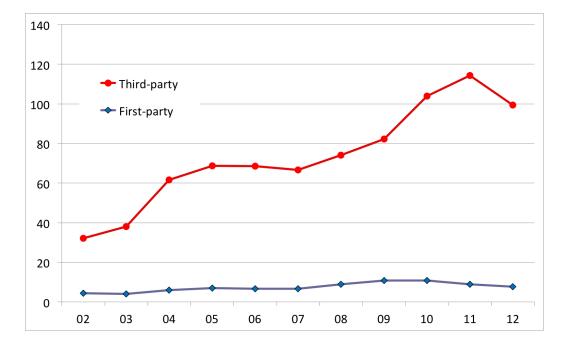
Figure 1: Consumer complaints against first-party and third-party debt collectors. The number of complaints per 100 collectors is depicted on the vertical axis. Year is depicted on the horizontal axis.

Sources: Federal Trade Commission Annual FDCPA Reports; U.S. Bureau of Labor Statistics, Occupational Employment Survey

plaints against first-party collectors, we normalize the total number of complaints attributed to first-party collectors in the FTC database by the total employment of bill and account collectors in the U.S. The intensity of complaints against third-party collectors is computed similarly, by using complaints attributed to third-party collectors and the employment of bill and account collectors in the Business Support Services Sector (which includes the third-party collections industry). Roughly speaking, there are 10 times more complaints per collector in the third-party collections industry than for the economy as a whole.[10]

Other, more indirect measures also suggest that third-party collectors use harsher practices than first-party collectors. The FTC receives more complaints about the debt collection industry than about any other specific industry. From 2006 to 2012, complaints about collections activity accounted for about 9 percent of all complaints

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[10]The debt collection industry does not agree with the FTC's classification of first- versus third-party collections or its measurement of collections complaints. See, for example, InsideArm (2012).

in the Sentinel database.[11] According to the FTC's annual FDCPA reports, since 1999, about three-quarters of all complaints about collections activity were associated with third-party collections firms.

2.2. Creditors tend to allocate debt collection across many third-party agencies, and each third-party agency usually collects on behalf of several creditors.

The average collection firm, which is fairly small, serves 422 clients.[12] Even the smaller agencies have more than 100 clients (ACA International, 2012). Creditors, in turn, tend to allocate their accounts across multiple collection agencies. Credit card issuers place accounts with as many as 50 agencies (Government Accountability Office, 2009).

2.3. Contracts between creditors and debt collectors are customarily forward-looking.

It is not uncommon for creditors and collection firms to enter into long-term contracts. Such "servicing contracts" may last anywhere from a few months to several years, with the creditor transferring delinquent debt to the agency at regular intervals. Many contracts include an automatic renewal provision. These contracts set general terms such as pricing and the amount of time (typically six to nine months) that the agency will collect on the debt before it is returned to the creditor.[13]

A similar long-term arrangement exists for defaulted debts that creditors sell outright. In that case, it is very common for debt buyers and creditors to enter into "forward flow" contracts (Fitzgerald, 1999). This commits the creditor to deliver newly charged-off debt to the agency at a certain frequency, often with pricing fixed at the time of the contract. This gives the debt buyer some assurance of future supply and lets both parties avoid the volatility of the "spot" market for bad debt (Federal Trade Commission, 2013b).

In sum, existing contractual arrangements enable both debt buyers and contin-

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[11]In the Sentinel data, the number of recorded consumer complaints of all sorts has grown rapidly during the last decade, in part because the maturation of the Internet has reduced the costs of filing complaints. The total number of complaints increased 11 percent a year during the decade ending in 2012. Collections complaints increased slightly more rapidly at about 12 percent per year.

[12]Not all clients of third-party debt collectors are financial firms. Other major users of third-party debt collectors are hospitals and utilities.

[13]This description is based on the authors' discussions with representatives of several banks, collection agencies, and a trade association.

gency collectors to anticipate which creditors will transfer their defaulted debt to them.

2.4. The debt collection industry is large and yet relatively unconcentrated.

The debt collection industry is large. In 2012, there were about 4,000 active third-party debt collection agencies in the U.S., which employed about 130,000 people (Table 1). The industry collected approximately $55 billion in 2013 and returned about 80 percent of this amount to creditors (Ernst & Young, 2014).

[INSERT TABLE 1 ABOUT HERE]

Despite the large size of the debt collection industry as a whole, most collection agencies are small. In 2012, three-quarters of collections firms had fewer than 20 employees; 61 percent had fewer than 10 (Table 1). In addition, concentration ratios in this industry are low. In 2007, the eight largest firms accounted for less than 25 percent of industry revenues, while the eight largest credit card issuers accounted for 87 percent of revenues.[14]

2.5. Consolidation in the debt collection industry followed consolidation in the banking industry.

While the collections industry remains relatively unconcentrated, its market structure has been changing over time. Between 1987 and 2007, the eight-firm concentration ratio in the debt collection industry increased from 17.2 percent to 23.1 percent. At the same time, the share of industry employment attributable to very small firms (fewer than nine employees) decreased from 20.2 percent in 1987 to 6.1 percent in 2007. These changes occurred when the banking industry experienced a period of rapid consolidation, with the eight-firm concentration ratio for the banks (as measured by credit card balances) increasing from 34.5 percent in 1987 to 78.1 percent in 2007. Thus, the moderate increase in the concentration of the debt collection industry corresponded to a period of increased concentration of consumer lending among the largest banks.

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[14]As of the time of this writing, 2007 is the most recent year of data on concentration ratios for most service industries published by the U.S. Census Bureau.

2.6. Evidence on the relative efficiency of in-house versus third-party collections is mixed.

It is likely that relative efficiency plays an important role in the decision to collect in-house or through a third-party agency. However, delegating debt collection to a third party is costly for creditors. The most obvious cost that creditors have to bear when they place accounts with a third-party collection firm is that they have to share any recoveries with it.[15] At the same time, outsourcing collections saves labor and other costs that would otherwise be devoted to collections in-house. All else equal, a creditor will be better off outsourcing collections if third-party firms are either more productive or less expensive than an internal collections process.

While the benefits to specialization for third-party collectors are certainly important, there are a number of reasons to think that, in the absence of reputational concerns, in-house collections may be more efficient for many creditors. To begin with, creditors generally have more information about their borrowers in their databases than third-party agencies, and this information advantage can be important for the collections process.[16] Even though the degree of information loss is difficult to quantify, it does raise the question of why a creditor would attempt to transfer an account to a third party when any information loss can be avoided by collecting in-house.

It is also possible that many original creditors enjoy an absolute technological advantage over most collections firms. This is because large lenders enjoy the scale necessary to invest in sophisticated computers and models, which may be prohibitively expensive for most collections firms. While it is true that the cost of information technology has decreased over time, widespread adoption of these technologies among smaller collection firms is a relatively recent phenomenon.

In addition, in the U.S., first-party collectors are generally less constrained by regulation than are third-party collectors. This is because federal law, and many state laws, pertaining to debt collection explicitly exclude from their jurisdiction the activities of the original creditors collecting on debts owed to them. In particular, the FDCPA explicitly excludes original creditors from its definition of debt collectors. Among the state laws, approximately half (26) do not apply to the original creditors.

While this evidence suggests that creditors may potentially enjoy a cost advan-

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[15]According to the ACA International's 2012 Benchmarking Survey, the median commission rate charged by third-party debt collectors was 26 percent (ACA International, 2012).

[16]See Thomas, Matuszyk, and Moore (2012).

tage relative to third-party agencies, other factors also may be important. Arguments in favor of outsourcing include the advantages of specialization and localized knowledge.[17] Further, the fact that third-party firms are generally smaller than creditors suggests that they may incur smaller costs associated with litigation compared with creditors. In other words, third-party debt collectors may be relatively more "judgment proof" than many lenders.[18] These lower expected losses from litigation may, in turn, give a cost advantage to third-party firms.

This paper does not take a stand on the relative efficiency of third-party debt collectors compared with lenders. Our model allows for the possibility that either banks or third-party collection firms may have a cost advantage in collecting consumer debts. Indeed, in many instances, the efficiency of third-party debt collectors relative to lenders plays an important role in determining which equilibrium exists in our model and whether it produces as much consumer welfare as is feasible. It also affects the scope for potentially welfare-improving policy interventions. However, as we show in the extensions of the model, relative efficiency does not always determine whether collections are conducted in-house or through third parties, nor does it explain why, when collections are outsourced, harsher tactics are more likely to be used than when creditors collect on their own.

3. The model

3.1. The basic model without debt collection agencies

Our basic model consists of three dates. It starts at date 0 with a continuum of consumers of mass 1 and with N competing banks. The banks are Bertrand competitors, and their cost of funds is normalized to 0. At date 0, the banks simultaneously decide which debt collection practices they will use (with details specified shortly). After these debt collection practices have been chosen, all banks simultaneously choose the interest rate they will charge on their loans to consumers. Consumers are endowed with one unit of illiquid assets that they can't consume until date 2. To be able to consume at date 1, consumers need to borrow one unit of consumption good from one of the banks. Thus, at date 1, consumers decide whether to borrow and from which

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[17]For example, there is variation in collections law across states. See Fedaseyeu (2015).

[18]This does not imply that third-party debt collection agencies are not sued; rather, they, compared with banks, have lower net worth that can be used to satisfy plaintiffs.

bank. Before making their decision, consumers observe the debt collection practices chosen by each bank as well as the interest rate offered by each bank.

All loans obtained at date 1 have to be repaid (with interest) at date 2. Before the loan is due at date 2, with probability γ, a consumer receives labor income y (with probability $1 - \gamma$, she receives no labor income). Consumers who receive labor income use it to repay their loans.[19] To obtain repayment from consumers who borrowed at date 1 but who did not receive labor income at date 2, the banks need to persuade such consumers to liquidate their illiquid assets. The degree to which the banks can do this depends on the debt collection practices they use. These practices can be either harsh or lenient. The recoveries from lenient debt collection practices are normalized to zero (i.e., consumers without labor income do not repay anything), while harsh debt collection practices generate recoveries of $h < 1$ (i.e., consumers without labor income repay proportion h of their illiquid assets).

After the debts are repaid or collected, consumers consume all of their remaining labor income and/or illiquid assets, and the game ends. There is no asymmetric information in the basic model (we will relax this assumption later). Banks and consumers are risk neutral. The discount factor between date 1 and date 2 is $\beta < 1$; β reflects consumers' impatience and therefore their desire to borrow.

To collect from defaulting consumers, the banks need to invest in a debt collection technology.[20] If a bank decides to implement lenient debt collection practices, this investment is normalized to zero. If a bank decides to implement harsh debt collection practices, the amount of this investment is $c > 0$.

The bank i's break-even condition is given by

$$\gamma(1 + r_i)\mu + (1 - \gamma)\lambda_i\mu - \mathbb{1}_{\{\lambda_i = h\}}c = \mu, \tag{1}$$

where μ is the share of consumers that borrow from bank i, r_i is the interest rate charged by the bank i, $\lambda_i \in \{0, h\}$ represents the debt collection practices that the bank uses, and $\mathbb{1}_{\{\lambda_i = h\}}$ is the indicator function for whether bank i uses harsh debt collection practices (in which case the bank has to invest c). Thus, the break-even

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[19]There is no uncertainty about the amount of labor income a consumer might receive, and we assume that this amount is sufficient for consumers to repay their debt with interest.

[20]See Chin and Kotak (2006) for a case study that describes the substantial costs involved in setting up debt collection operations.

interest rate for a bank that uses debt collection practices λ is given by (for notational simplicity, we omit subscripts i)

$$r_\lambda = \frac{(1-\gamma)(1-\lambda) + \mathbb{1}_{\{\lambda=h\}}c/\mu}{\gamma}. \tag{2}$$

In making their decision about whether to borrow or not, consumers maximize their expected lifetime utility of consumption, net of pecuniary and nonpecuniary costs of debt collection. The nonpecuniary costs that arise in the process of debt collection represent consumers' utility loss over and above the amount collected by the bank.[21] We use the parameter $\theta > 0$ to quantify these nonpecuniary costs. In particular, let $\lambda \in \{0, h\}$ represent the harshness of debt collection practices. Then, the total cost to consumers from debt collection is $\lambda(1+\theta)$, which includes the direct financial cost (λ) and the nonpecuniary costs ($\theta\lambda$).

Given the assumption of risk-neutrality, the date 1 expected utility for a consumer who borrows from a bank that charges interest rate r and uses debt collection practices $\lambda \in \{0, h\}$ is given by

$$
\begin{aligned}
E(u|\text{borrow}, \lambda, r) &= 1 + \beta\Big(\gamma\big(1 + y - (1+r)\big) + (1-\gamma)\big(1 - \lambda(1+\theta)\big)\Big) \\
&= 1 + \beta\Big(1 + \gamma\big(y - (1+r)\big) - (1-\gamma)\lambda(1+\theta)\Big).
\end{aligned} \tag{3}
$$

The intuition behind expression (3) is as follows. If the consumer borrows, then she will consume 1 unit of consumption good at date 1 and will, therefore, obtain utility 1 at date 1. At date 2, if she receives labor income (which happens with probability γ), her total financial wealth will be $1 + y$. She will use her labor income toward debt repayment (recall that y is sufficiently high to repay both the principal and interest) and will consume the remainder of her labor income and all of her illiquid assets. Consumers who receive labor income are not collected upon (since they use their labor income to repay the debt in full). With probability $1 - \gamma$, the consumer receives no labor income at date 2 and will have to repay the debt out of her illiquid assets. The amount of this repayment is given by λ, which depends on the harshness of the debt collection practices used by the bank (zero if lenient debt

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[21]The notion that the process of debt collection imposes nonpecuniary costs for consumers is consistent with the large number of consumer complaints against debt collectors. Also, see Leff (1970) for an account of such nonpecuniary costs.

collection practices are used and h if harsh debt collection practices are used). Her overall utility loss from being exposed to debt collection is given by $\lambda(1 + \theta)$ that includes both pecuniary (λ) and nonpecuniary ($\theta\lambda$) costs.

If the consumer doesn't borrow at date 1, then she doesn't consume at date 1. At date 2, she doesn't owe any debt. In this case, her date 1 expected utility of lifetime consumption is given by

$$E(u|\text{abstain}) = \beta(1 + \gamma y). \tag{4}$$

Clearly, the consumer will borrow if and only if $E(u|\text{borrow}, \lambda, r) \geq E(u|\text{abstain})$, or

$$1 + \beta\Big(1 + \gamma\big(y - (1 + r)\big) - (1 - \gamma)\lambda(1 + \theta)\Big) \geq \beta(1 + \gamma y) \Leftrightarrow$$
$$\frac{1}{\beta} \geq \gamma(1 + r) + (1 - \gamma)\lambda(1 + \theta). \tag{5}$$

Intuitively, when deciding whether to borrow, consumers compare the benefits of immediate consumption (weighted by their discount rate) with the costs associated with borrowing. The latter include the pecuniary costs (given by the interest rate that the borrowers have to pay and the amount of assets they have to transfer after debt collection) and the nonpecuniary costs associated with having to face debt collection (captured by the parameter θ).

We look for symmetric pure strategy subgame perfect Nash equilibria of this game. Our first result is to show that the only such equilibrium of this game involves all banks choosing lenient debt collection practices.[22]

Proposition 1. *If there are no debt collection agencies (i.e., all banks collect on their own), then all banks use lenient debt collection practices.*

The intuition behind Proposition 1 is straightforward and follows from the assumption that harsh debt collection practices generate nonpecuniary costs for borrowers. These costs imply that every dollar borrowed from a bank that uses lenient debt collection practices is associated with lower expected welfare losses than a dollar bor-

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[22]For each equilibrium that we describe in propositions that follow, there are parameter values under which that equilibrium exists. Table A.1 in the Appendix provides examples of such parameter values for each equilibrium.

rowed from a bank that uses harsh debt collection practices. These welfare losses are not borne by the banks and, therefore, are not reflected in the interest rates that they charge. Thus, consumers prefer to borrow from banks that use lenient debt collection practices, whenever possible. As a result, all borrowers will switch to banks that use lenient debt collection practices, as long as there is at least one such bank. If all but one bank use harsh debt collection practices, then the bank that uses lenient debt collection practices can charge an interest rate above its break-even point and still attract borrowers from the other banks, thus generating positive profits. It follows that having all banks collecting on their own and using harsh debt collection practices cannot be an equilibrium. If, on the other hand, all banks but one use lenient debt collection practices, then the bank that uses harsh debt collection practices will not be able to attract any borrowers. Thus, all banks collecting on their own and using lenient debt collection practices is the unique [symmetric] equilibrium of this game. From now on we will refer to this equilibrium as the *undelegated equilibrium*.

3.2. The model with a single debt collection agency

In this section, we modify our basic model by introducing a debt collection agency. We start by assuming that there is only one such agency (we will relax this assumption in the next section). To accommodate the actions of the debt collection agency, the timeline of the game needs to be modified slightly. As before, there are three dates (0, 1, and 2), but date 0 now has a morning subperiod and an evening subperiod. In the morning of date 0, banks decide whether to collect on their own or to delegate debt collection to the third-party agency. For simplicity, we assume that a bank either delegates all of its accounts to the debt collection agency or does not delegate any of its accounts to the debt collection agency (there is no partial delegation). This implies that a bank that hires the debt collection agency effectively outsources the choice of debt collection practices to this agency.

In the evening of date 0, debt collection practices are chosen, and interest rates are set in the following manner. All banks that decided to collect on their own choose their debt collection practices simultaneously with the debt collection agency. Similar to the basic model, after the banks and the agency choose their debt collection practices, all banks simultaneously set the interest rates they will charge. From date 1 onward, the game is analogous to the basic model; the only difference is that debt collection on behalf of the banks that hired the agency is performed by the agency and not the banks.

The banks that hired the debt collection agency no longer need to invest in the debt collection technology. Instead, they pay the agency a fee proportional to the amount collected.[23] We denote this fee by f, where $1 > f > 0$. If the agency decides to implement lenient debt practices, its investment in the debt collection technology is normalized to zero (just as was the case for banks). If the agency decides to implement harsh debt collection practices, it needs to invest $q > 0$. In order for the agency to make non-negative profits, it must be that $(1 - \gamma)hf \geq q$.[24]

In general, q (the cost of implementing harsh debt collection practices by the debt collection agency) can be different from c (the cost of implementing harsh debt collection practices by the banks that collect on their own). As we discussed previously, some factors suggest that q should be greater than c, while other factors suggest that the opposite may be true. All of the results in our basic model will go through even if third-party debt collection agencies are less efficient than banks (as long these inefficiencies are not so large that the interest rate that banks have to charge when they hire a debt collection agency is prohibitively high for consumers to be willing to borrow). The magnitude of q relative to c will, however, have important implications for consumer welfare.

We will now show that, under certain conditions, the game with a debt collection agency has an equilibrium in which all banks delegate their debt collection to the agency, and the agency uses harsh debt collection practices on behalf of all banks.

Proposition 2. *Assume that there exists a third-party debt collection agency to which banks can delegate their debt collection. Also assume that $(1 - \gamma)hf \geq q$ and that $\frac{1}{\beta} \geq 1 + (1-\gamma)h(f+\theta)$. Then, there exists a symmetric pure strategy Nash equilibrium in which all banks delegate their debt collection to the debt collection agency, and the agency uses harsh debt collection practices.*

The intuition behind Proposition 2 is as follows. When the debt collection agency chooses its debt collection practices, it knows which banks allocated their debt collection to it.[25] Furthermore, since the agency obtains a commission that depends on

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[23]This assumption reflects the prevalent industry practice, in which most debt collection agencies work on commission.

[24]$(1 - \gamma)hf$ is the total amount the agency will collect if all banks hire the agency and it uses harsh debt collection practices.

[25]Recall that prevalent contractual arrangements between creditors and debt collectors enable the

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the amount it collected, it generates no profits unless the banks that hired it provide credit to at least some borrowers. If at least one of the banks deviated and chose to collect on its own, the agency realizes that the banks that hired it will lose all their customers to the deviating bank, unless the agency uses lenient debt collection practices. Additionally, investing in the debt collection technology requires a fixed upfront cost, and hence the agency will generate negative profits if it decides to use harsh debt collection practices when one of the banks deviates and collects on its own. If, on the other hand, all banks hired the agency, then it can use harsh debt collection practices without the risk of its clients losing borrowers. In this case and as long as $(1-\gamma)hf \geq q$, using harsh debt collection practices generates non-negative profits for the agency. It follows that the debt collection agency will use harsh debt collection practices if all banks hired it and will use lenient debt collection practices if at least one bank decided to collect on its own. Given this strategy, banks have no incentive to deviate from an equilibrium in which all of them hire the debt collection agency. This is because any such deviation will induce the agency to switch to lenient debt collection practices and will, therefore, preclude the deviating bank from being able to attract borrowers from other banks.

Thus, there exists an equilibrium in which all banks delegate their debt collection to the debt collection agency, and the agency uses harsh debt collection practices.[26] From now on, we will refer to this equilibrium as the *delegated equilibrium*. This equilibrium is not unique; the undelegated equilibrium (in which all banks collect on their own and use lenient debt collection practices) also exists. Note, however, that the delegated equilibrium exists only if there is a third-party debt collection agency. Thus, the presence of a third-party agency collecting on behalf of all banks makes it possible to sustain an equilibrium with harsher debt collection practices than the banks use when they collect on their own. This is consistent with empirical evidence presented previously, showing that third-party debt collectors indeed appear to use harsher debt collection practices than creditors that collect on their own.

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latter to predict which creditors will hire them before specific consumers default.

[26]A final requirement for this equilibrium to exist is that consumers are willing to borrow if all banks delegate debt collection to a third-party agency. The necessary and sufficient condition for this is that $\frac{1}{\beta} \geq 1 + (1-\gamma)h(f+\theta)$, i.e., that the benefits of borrowing outweigh the expected costs resulting from harsh debt collection practices.

3.3. Multiple debt collection agencies

While a single debt collection agency was sufficient to sustain the delegated equilibrium in Proposition 2, in reality, there are multiple debt collection agencies. Further, it is customary for creditors to use several debt collection agencies at the same time, while a typical debt collection agency usually collects on behalf of multiple creditors. In this section, we will show that this market structure can arise endogenously in a theory based on common agency. This theory, therefore, can potentially provide a unified framework to analyze the collections market.

We relax the assumption that all consumers observe and compare debt collection practices and interest rate offers of all banks, since it is unlikely that every consumer can compare offers from all competing banks. It seems more realistic that a consumer compares offers of several national banks and a few smaller banks in her geographical area. Formally, we assume that each consumer compares the offers from m (with $N \geq m \geq 2$) randomly chosen banks and chooses the bank that maximizes her expected utility from borrowing. For now, we retain the assumption that there is only one debt collection agency that collects on behalf of all banks. The following proposition shows that the delegated equilibrium may not always exist if there is only one debt collection agency and consumers are imperfectly informed.

Proposition 3. *Assume that there exists one third-party debt collection agency to which banks can delegate their debt collection. As before, assume that $(1 - \gamma)hf \geq q$ and that $\frac{1}{\beta} \geq 1 + (1 - \gamma)h(f + \theta)$. Additionally, assume that $\frac{N-m}{N}(1 - \gamma)hf - q > 0$ (which implies that $m < N$). Then, the delegated equilibrium does not exist. In this case, lenient debt collection practices are used in equilibrium.*

When consumers are perfectly informed $(m = N)$, then the delegated equilibrium can always be sustained with a monopoly debt collection agency. The reason for this is that, if all consumers compare debt collection practices and interest rates of all banks, then a monopoly debt collection agency has very strong incentives to switch to lenient debt collection practices if one of the banks decides to deviate from the delegated equilibrium and collect on its own. This is because the agency realizes that the deviating bank will potentially be able to attract all consumers, since all consumers will be able to observe the debt collection practices and the interest rate chosen by this bank. In this case, if the agency decides to use harsh debt collection practices, then the banks that hired it will not be able to attract any borrowers.

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Therefore, the agency will make negative expected profits, since it needs to spend $q > 0$ to implement harsh debt collection practices. This ensures that the agency has incentives to maintain the delegated equilibrium.

In contrast, when consumers are imperfectly informed $(m < N)$, then the delegated equilibrium does not always exist, as Proposition 3 shows. This is because, when consumers are not perfectly informed, some of them may not observe that a bank decided to collect on its own. As a result, not all consumers will switch to the deviating bank. This, in turn, lessens the incentives of the debt collection agency to resort to lenient debt collection practices after a bank deviates and decides to collect on its own. As the debt collection agency keeps using harsh debt collection practices, banks will have an incentive to deviate and collect on their own, since by doing so they will be able to attract borrowers from the nondeviating banks and make positive profits. Somewhat surprisingly, when there is only one debt collection agency, the delegated equilibrium will be more difficult to sustain with imperfectly informed consumers.[27]

The reason why a monopoly debt collection agency will not always switch to lenient debt collection practices after one of the banks decides to collect on its own is that, with imperfectly informed consumers, the impact of this bank's switching on the share of consumers who borrow from the nondeviating banks is not as large as in the case when consumers are perfectly informed. Deviations by individual banks may be insufficiently important for the debt collection agency to change its debt collection practices. This logic suggests that a possible way to ensure that the delegated equilibrium can be sustained is to have multiple debt collection agencies, as long as these agencies are sufficiently small, so that deviations by individual banks

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[27]Note that there is no equilibrium in which all banks hire the agency, and the agency's strategy is to switch to lenient debt collection practices only after k banks deviate by collecting on their own, where $k > 1$. Since $k > 1$, the agency will use harsh debt collection practices if a bank deviates unilaterally. However, unilateral deviations are profitable if the agency uses harsh debt collection practices, and hence, all banks will have incentives to deviate. Also note that if only a subset of banks hires the agency, then unless the agency uses lenient debt collection practices, no consumer would borrow from the banks that hired it. Finally, it may seem that, with imperfectly informed consumers, banks will be able to start using harsh debt collection practices on their own, in which case the existence of a third-party agency may no longer be necessary to sustain harsh debt collection practices in equilibrium. This is, however, not the case. Under Bertrand competition, as long as each consumer compares debt collection practices and interest rate offers from at least two banks, all banks will have an incentive to use lenient debt collection practices to attract consumers away from competing banks. Thus, lenient debt collection practices will be used in equilibrium.

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are sufficiently important to induce them to change their debt collection practices.

Notice that when consumers observe offers from m randomly chosen banks, then the entire credit market can always be divided into a finite number of segments in such a way that borrowers in each segment observe offers from the same set of m banks.[28] Denote the number of such segments by $g > 1$. We will now show that there exists an equilibrium with g third-party debt collection agencies, in which all banks delegate their debt collection to the agencies (the same bank may use several agencies) and all agencies use harsh debt collection practices.

Proposition 4. *Assume that the credit market is divided into g segments in such a way that borrowers in each segment observe offers from the same set of banks. As before, assume that $\frac{1}{\beta} \geq 1 + (1 - \gamma)h(f + \theta)$. Further, assume that $(1 - \gamma)\frac{hf}{g} \geq q$ and that there exist g distinct third-party debt collection agencies. Then, there exists a symmetric pure strategy Nash equilibrium in which all banks delegate their debt collection to debt collection agencies (one bank may delegate debt collection to several agencies), and all agencies use harsh debt collection practices.*

Intuitively, Proposition 4 holds because each segment of the credit market, considered separately, is essentially equivalent to the case in which all consumers observe interest rates and debt collection practices of all banks. Therefore, a debt collection agency that collects from consumers in that segment will have strong incentives to maintain the delegated equilibrium, just as in our basic model.[29]

Proposition 4 provides a rationale for the existence of multiple debt collection agencies in a credit market in which consumers are not perfectly informed about the offers and debt collection practices of all the banks. Notice that this proposition is consistent with the empirical fact that banks hire multiple debt collection agencies, which in turn collect on debts from multiple banks.

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[28]There is a finite number of possible combinations of m banks out of a total of N banks, given by $\binom{N}{m} = \frac{N!}{m!(N-m)!}$. Of course, in practice, borrower segmentation can be based on geography or other factors that restrict the set of banks that they use.

[29]Restriction $(1-\gamma)\frac{hf}{g} \geq q$ of Proposition 4 is the analog of restriction $(1-\gamma)hf \geq q$ of Proposition 2 and Proposition 3; it implies that each of the g debt collection agencies will make non-negative profits if they collect from all of the consumers in a particular credit market segment. Also note that when $(1-\gamma)\frac{hf}{g} \geq q$ holds, then $(1-\gamma)hf \geq q$ also holds (since $g > 1$), so that all assumptions of Proposition 3 are satisfied and, therefore, the delegated equilibrium does not exist if there is only one debt collection agency.

Notice further that the number of debt collection agencies needed to sustain the delegated equilibrium decreases as consumers become better informed (which leads to less market segmentation) and as the banking industry becomes more concentrated. To sustain the delegated equilibrium, there must be at least as many debt collection agencies as the number of segments in which borrowers observe offers from the same set of banks. As noted previously, the maximum number of such segments is given by $\binom{N}{m} = \frac{N!}{m!(N-m)!}$, and $\binom{N}{m}$ is increasing in N and decreasing in m. Hence, when the banking industry is more concentrated (lower N), the delegated equilibrium can be sustained with fewer debt collection agencies. Also, when borrowers are better informed and compare offers from a greater number of banks (greater m), the delegated equilibrium can be sustained with fewer debt collection agencies.

4. Welfare analysis

In this section, we explore welfare implications of the model developed in this paper. As we will show, these implications depend crucially on the technological efficiency of third-party debt collectors relative to banks and on the degree of information asymmetry between banks and consumers.

4.1. Welfare in the basic model without asymmetric information

We start with the basic model developed so far. For expositional simplicity, we revert to the case of a single debt collection agency and of all consumers observing offers and debt collection practices of all banks (the case with multiple debt collection agencies and imperfectly informed consumers is analogous to the one described in Section 3.3).

As we showed previously (in the proof of Proposition 1), there can exist two equilibria in the basic model. In the undelegated equilibrium, banks collect on their own and use lenient debt collection practices. In the delegated equilibrium, all banks hire the debt collection agency, which uses harsh debt collection practices. In both of these equilibria, banks charge break-even interest rates. However, in the delegated equilibrium, consumers suffer nonpecuniary costs associated with harsh debt collection practices. These costs do not affect the interest rates that the banks charge and therefore lower consumer utility without a corresponding decrease in the interest rate.

This implies that, in the basic model, total consumer welfare is lower in the delegated equilibrium than in the undelegated equilibrium.[30]

Proposition 5. *In the basic model, total consumer welfare is always lower in the delegated equilibrium compared with the undelegated equilibrium.*

This stark result follows from the simple structure of our basic model, which (for the purpose of expositional simplicity) is abstracted from the issues of asymmetric in-formation and heterogeneity among consumers. These issues, however, are likely to be important.[31] We introduce borrower heterogeneity and asymmetric information into our model by assuming that some consumers may be tempted to default on their debts unless they are faced with the threat of harsh debt collection practices and that banks cannot identify which consumers have this propensity. In this more general set-ting, the pecuniary and nonpecuniary costs of debt collection may be counterbalanced by the fact that it mitigates moral hazard. This, in turn, may increase the welfare of at least some borrowers.

4.2. Welfare in the presence of asymmetric information

Assume that proportion $\omega \leq 1$ of consumers will not repay their debt even if they receive labor income, unless they face the threat of harsh debt collection practices. We label such opportunistic consumers "bad" consumers. Such consumers do not repay anything if lenient debt collection practices are used. If harsh debt collection practices are used, then bad consumers repay their debt when they receive labor income and are collected upon (with recoveries h) when they do not receive labor income. The remaining share $1 - \omega$ of consumers are the same as consumers in the basic model, and we label them "good" consumers.

In this setting, it is not always the case that all banks use lenient debt collection practices if they collect on their own. There may exist an undelegated equilibrium in which all banks use harsh debt collection practices. This occurs when lenient

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[30]Notice that we do not need to consider the undelegated equilibrium in which all banks use harsh debt collection practices because we showed that it does not exist in our basic model. This may not always be the case if there are information asymmetries between banks and consumers, as we will discuss later.

[31]Karlan and Zinman (2009), for example, find evidence of substantial moral hazard in the market for personal loans and estimate that roughly 13 percent to 21 percent of default is due to moral hazard. Calem, Gordy, and Mester (2006) and Agarwal, Chomsisengphet, and Liu (2010) also document adverse selection in the market for credit cards.

collection practices result in so much default (ω is relatively high) that the interest rate that the banks demand is too high for good consumers to borrow, and the lending market shuts down as a result. By reducing the default rate, harsh debt collection practices can induce good consumers to borrow and implement an interior equilibrium. The following proposition formalizes this intuition.

Proposition 6. *Assume that debt collection agencies do not exist. Then,*

(i) *If $\frac{1}{1-\omega} \geq 1 + (1-\gamma)h\theta + cN$ and $\frac{1}{\beta} \geq 1 + (1-\gamma)h\theta + cN$, then all banks use harsh debt collection practices and all consumers borrow in equilibrium.*

(ii) *If $\frac{1}{1-\omega} \geq 1 + (1-\gamma)h\theta + cN$ and $\frac{1}{\beta} < 1 + (1-\gamma)h\theta + cN$, then there is no borrowing in equilibrium.*

(iii) *If $\frac{1}{1-\omega} < 1 + (1-\gamma)h\theta + cN$ and $\beta \leq 1 - \omega$, then all banks use lenient debt collection practices and all consumers borrow in equilibrium.*

(iv) *If $\frac{1}{1-\omega} < 1 + (1-\gamma)h\theta + cN$ and $\beta > 1 - \omega$, then there is no borrowing in equilibrium.*

Bad consumers always prefer to borrow from banks that use lenient debt collection practices (because they never intend to repay if lenient debt collection practices are used). As a result, banks that use lenient debt collection practices must charge an interest rate that compensates them for the losses from these opportunistic borrowers. Banks that use harsh debt collection practices, on the other hand, do not suffer from bad borrowers' opportunistic behavior (since bad borrowers repay if they are faced with the threat of harsh debt collection practices). These banks, therefore, can charge lower interest rates compared with banks that use lenient debt collection practices. These lower interest rates, however, are accompanied by nonpecuniary costs associated with harsh collection practices. Thus, when choosing between lenient banks and harsh banks, consumers will find the harsh banks more attractive if the lower interest rates they offer are sufficient to outweigh the nonpecuniary costs of collections. This occurs if the share of bad borrowers is relatively large, so that $\frac{1}{1-\omega} \geq 1 + (1-\gamma)h\theta + cN$, as in parts ($i$) and ($ii$) of Proposition 6.

Note, however, that even if consumers find offers of harsh banks more attractive than offers of lenient banks, the former may still be not attractive enough to induce consumers to borrow. If $\frac{1}{\beta} \geq 1 + (1-\gamma)h\theta + cN$, as in part ($i$), then consumers are

willing to borrow if they face harsh collections, and there will, therefore, be borrowing in equilibrium in this case. If $\frac{1}{\beta} < 1 + (1 - \gamma)h\theta + cN$, as in part (ii), then there will be no borrowing in equilibrium. In this case, even though consumers prefer the offers of harsh banks relative to the offers of lenient banks, these offers are not attractive enough to induce consumers to borrow.

Parts (iii) and (iv) of Proposition 6 describe the cases in which the share of bad borrowers is relatively small, so that $\frac{1}{1-\omega} < 1 + (1 - \gamma)h\theta + cN$. If this is the case, then the increase in the interest rates that lenient banks require due to the presence of bad borrowers is relatively small. As a result, both good and bad consumers will find the offers of lenient banks more attractive than the offers of harsh banks. When $\beta \le 1 - \omega$, as in part (iii), then consumers are also sufficiently impatient to be willing to borrow from lenient banks. If $\beta > 1 - \omega$, then good consumers will not be willing to borrow when banks use lenient debt collection practices. Since only bad consumers will be willing to borrow in this case and since such consumers do not repay when lenient debt collection practices are used, banks will be unwilling to lend. Thus, there will be no borrowing in equilibrium.[32]

We will now introduce third-party debt collectors into the model. Because the nature of debt collection practices chosen by banks when they collect on their own is determined by the magnitude of $\frac{1}{1-\omega}$ relative to $1 + (1-\gamma)h\theta + cN$, we will separately consider the case when $\frac{1}{1-\omega} \ge 1 + (1 - \gamma)h\theta + cN$ and the case when $\frac{1}{1-\omega} < 1 + (1 - \gamma)h\theta + cN$. To ensure that third-party debt collection is feasible in the first place, we will impose the restriction $(1 - \gamma)hf \ge q$ throughout (i.e., that the debt collection agency can make non-negative profits if all banks hired it).

4.2.1. Equilibrium and welfare when the share of bad consumers is relatively large

When ω is relatively large, so that $\frac{1}{1-\omega} \ge 1 + (1 - \gamma)h\theta + cN$, then all banks use harsh debt collection practices even if there are no debt collection agencies. Thus, the presence of debt collection agencies does not change the debt collection practices that are used in equilibrium. However, consumer welfare may change in the presence of third-party debt collectors, depending on whether they have higher or lower costs

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[32]Note that in this case, there is no equilibrium in which banks use harsh debt collection practices either. To see this, notice that $\beta > 1 - \omega$ together with $\frac{1}{1-\omega} \le 1 + (1 - \gamma)h\theta + cN$ implies that $\frac{1}{\beta} < 1 + (1 - \gamma)h\theta + cN$, and hence, neither good nor bad consumers are willing to borrow from banks that use harsh debt collection practices.

of implementing harsh debt collection practices relative to banks. If third-party debt collection has a significant cost advantage relative to first-party debt collection, then hiring the debt collection agency may enable banks to reduce interest rates they offer to consumers, relative to the interest rates they would have offered if they had to collect on their own. This, in turn, may increase consumer welfare. The following proposition formalizes this intuition.

Proposition 7. *Assume that $\frac{1}{1-\omega} \geq 1 + (1-\gamma)h\theta + cN$ and that banks can choose whether to collect on their own or to hire a third-party debt collection agency. Then,*

(i) *If $\frac{1}{\beta} \geq 1 + (1-\gamma)h\theta + cN$ and $(1-\gamma)hf \leq cN$, then all banks delegate debt collection to the third-party agency, and the agency uses harsh debt collection practices. All consumers borrow in equilibrium. In this case, all consumers borrow both in the delegated equilibrium and in the undelegated equilibrium that would have prevailed without third-party debt collectors. However, the delegated equilibrium generates higher consumer welfare than the undelegated equilibrium.*

(ii) *If $\frac{1}{\beta} \geq 1 + (1-\gamma)h\theta + cN$ and $(1-\gamma)hf > cN$, then all banks collect on their own and use harsh debt collection practices. All consumers borrow in equilibrium. In this case, the presence of third-party debt collectors does not change the equilibrium outcome or consumer welfare.*

(iii) *If $\frac{1}{\beta} < 1 + (1-\gamma)h\theta + cN$ and $\frac{1}{\beta} \geq 1 + (1-\gamma)h(\theta+f)$ — which implies that $(1-\gamma)hf \leq cN$ — then all banks delegate debt collection to the third-party agency, and the agency uses harsh debt collection practices. All consumers borrow in equilibrium. In this case, there is borrowing in the delegated equilibrium, but there is no borrowing in the undelegated equilibrium that would have prevailed without third-party debt collectors. The delegated equilibrium generates higher consumer welfare than the no-borrowing undelegated equilibrium.*

(iv) *If $\frac{1}{\beta} < 1 + (1-\gamma)h\theta + cN$ and $\frac{1}{\beta} < 1 + (1-\gamma)h(\theta+f)$, then there is no borrowing in equilibrium. In this case, the presence of third-party debt collectors does not change the equilibrium outcome or consumer welfare.*

Each part of Proposition 7 contains two conditions. The first condition determines whether there is borrowing in the equilibrium that prevails without third-party debt collectors (see Proposition 6). The second condition in parts (i) and (ii) has

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a different economic meaning from the second condition in parts (iii) and (iv). In parts (i) and (ii), the second condition determines whether the fee charged by debt collection agencies is smaller or larger than the banks' costs of implementing harsh debt collection practices on their own. Because parts (i) and (ii) describe cases in which consumers are willing to borrow in the undelegated equilibrium, the size of the fee that third-party debt collectors charge relative to banks is sufficient to determine whether consumers will be willing to borrow in the delegated equilibrium. Consider part (i) of Proposition 7, in which the fee charged by the third-party debt collection agency is small relative to banks' costs of implementing harsh debt collection practices in-house. Because consumers are willing to borrow in the undelegated equilibrium, this implies that they are willing to face harsh debt collection practices when the banks charge interest rates that account for the costs of in-house debt collection. Since the fee charged by the debt collection agency is lower than these costs, banks that use the agency will be able to lower the interest rates they offer to consumers, while the debt collection practices that consumers have to face do not change. It follows that consumers will be willing to borrow also in the delegated equilibrium. Because the costs of debt collection are lower in this equilibrium, it implies that consumer welfare rises when banks hire third-party debt collectors. By the same logic, if the fee charged by third-party agency is large relative to banks' costs of in-house debt collection, as in part (ii) of Proposition 7, then consumers prefer to borrow from banks that collect on their own. Thus, no bank hires third-party debt collectors, and consumer welfare does not change.

Parts (iii) and (iv) describe cases in which consumers are unwilling to borrow in the undelegated equilibrium. To induce consumers to borrow in this case, it must be that the fee charged by the debt collection agency is not only smaller than the costs of collecting in-house but also is sufficiently small to induce consumers to borrow. If this fee is small enough to induce consumers to borrow, then there will be borrowing in the delegated equilibrium even though there is no borrowing in the undelegated equilibrium (part (iii) of Proposition 7). Since consumers willingly choose to borrow in the delegated equilibrium, this implies that their welfare is higher in this equilibrium relative to the no-borrowing undelegated equilibrium. Finally, part (iv) of Proposition 7 describes the case in which, even though the agency is relatively more efficient than the banks, this relative efficiency is not sufficient to make the interest rate low enough for consumers to be willing to borrow. In this case, there will be no

borrowing regardless of whether third-party debt collection agencies exist or not, and consumer welfare does not change.

4.2.2. Equilibrium and welfare when the share of bad consumers is not too large

The following proposition characterizes equilibrium and welfare when ω is sufficiently low, so that $\frac{1}{1-\omega} < 1 + (1-\gamma)h\theta + cN$.

Proposition 8. *Assume that $\frac{1}{1-\omega} < 1 + (1-\gamma)h\theta + cN$ and that banks can choose whether to collect on their own or to hire a third-party debt collection agency. Then,*

(i) *If $\beta \leq 1 - \omega$ and $\frac{1}{\beta} \geq 1 + (1-\gamma)h(\theta + f)$, then two possible equilibria exist. Either all banks collect on their own and use lenient debt collection practices, or all banks delegate debt collection to the third-party agency, which uses harsh debt collection practices. All consumers borrow in either equilibrium. In this case, consumer welfare is always greater in the undelegated equilibrium than in the delegated equilibrium.*

(ii) *If $\beta \leq 1 - \omega$ and $\frac{1}{\beta} < 1 + (1-\gamma)h(\theta + f)$, then all banks collect on their own and use lenient debt collection practices. All consumers borrow in equilibrium. In this case, the presence of third-party debt collectors does not change the equilibrium outcome or consumer welfare.*

(iii) *If $\beta > 1 - \omega$ and $\frac{1}{\beta} \geq 1 + (1-\gamma)h(\theta + f)$, then all banks hire the debt collection agency, which uses harsh debt collection practices. All consumers borrow in equilibrium. In this case, there is borrowing in the delegated equilibrium, but there is no borrowing in the undelegated equilibrium that would have prevailed without third-party debt collectors. The delegated equilibrium generates higher consumer welfare than the no-borrowing undelegated equilibrium.*

(iv) *If $\beta > 1 - \omega$ and $\frac{1}{\beta} < 1 + (1-\gamma)h(\theta + f)$, then there is no borrowing in equilibrium. In this case, the presence of third-party debt collectors does not change the equilibrium outcome or consumer welfare.*

Each part of Proposition 8 contains two conditions. The first condition determines whether there is borrowing in the equilibrium that prevails without third-party debt collectors (see Proposition 6). The second one determines whether consumers are willing to borrow if banks delegate debt collection to third-party debt collectors.

Parts (i) and (ii) describe cases in which there is borrowing in the undelegated equilibrium. In part (i), consumers are willing to borrow also in the delegated equilibrium, and therefore, both the undelegated equilibrium and the delegated equilibrium exist. Since banks charge break-even interest rates in either equilibrium, consumer welfare is higher if there are no nonpecuniary costs stemming from harsh debt collection practices. Thus, consumer welfare is greater in the undelegated equilibrium in this case. If borrowing is feasible only in the undelegated equilibrium (as is the case in part (ii) of Proposition 8), then the presence of debt collection agencies does not change the equilibrium outcome, since consumers never borrow from the banks that hire the agency.

Parts (iii) and (iv) of Proposition 8 describe cases in which there is no borrowing in the undelegated equilibrium. This is because, even though the share of bad borrowers is sufficiently small to make offers of harsh banks less attractive than offers of lenient banks, it is at the same time sufficiently large to prevent consumers from borrowing from lenient banks. It may be, however, that consumers will be willing to borrow in the delegated equilibrium in this case. This is possible if third-party debt collection agencies are substantially more efficient relative to banks,[33] and this relative efficiency enables banks that use the agency to offer interest rates that are low enough to attract borrowers (part (iii) of Proposition 8). Since consumers willingly choose to borrow in the delegated equilibrium in this case, having third-party debt collec-tion agencies improves consumer welfare relative to the no-borrowing undelegated equilibrium. Finally, if borrowing is not feasible in either delegated or undelegated equilibrium (as in part (iv) of Proposition 8), then the existence of third-party debt collectors does not change the equilibrium outcome (since consumers do not borrow in either case), and therefore, it does not affect consumer welfare either.

[INSERT TABLE 2 ABOUT HERE]

For ease of exposition, Table 2 describes the equilibria that prevail under different combinations of parameter values as well as consumer welfare in those equilibria. In summary, the impact of debt collection agencies on the debt collection practices used in equilibrium and on consumer welfare depends on the share of bad borrowers (the

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[33]Note that $\beta > 1 - \omega$, along with $\frac{1}{1-\omega} \leq 1 + (1-\gamma)h\theta + cN$ and $\frac{1}{\beta} \geq 1 + (1-\gamma)h(\theta + f)$ implies that $(1-\gamma)hf < cN$ (i.e., that third-party debt collectors are more efficient than banks).

magnitude of ω) and the relative efficiency of third-party debt collectors compared with banks $((1 - \gamma)hf$ relative to $cN)$. If ω is relatively large, then harsh debt collection practices would be used in equilibrium regardless of whether third-party debt collectors exist or not. In this case, the only motivation for banks to hire third-party debt collectors is the cost advantages of the latter. Since the costs of debt collection are ultimately borne by consumers through interest rates, hiring third-party agencies may improve consumer welfare if these agencies are more efficient relative to banks.

If ω is not too large, on the other hand, then all banks use lenient debt collection practices when they collect on their own. In the presence of debt collection agencies, the equilibrium may involve banks hiring these agencies, which use harsh debt collection practices. This may improve consumer welfare (if $\beta > 1 - \omega$, so that there would be no lending without debt collection agencies) or may reduce consumer welfare (if $\beta \leq 1 - \omega$, so that there would be lending even without debt collection agencies).

5. Discussion and policy implications

The policy implications of our model depend on the nature of the equilibrium that prevails (delegated or undelegated) and the ability of policymakers to influence the parameters that affect consumer welfare. These parameters include h (the recovery rate that harsh debt collection practices generate), f (the fee charged by the debt collection agencies), c and q (the costs of implementing harsh debt collection practices by banks and debt collection firms, respectively), and θ (the nonpecuniary costs stemming from harsh debt collection practices).[34] For example, the efficacy of collection practices can be influenced by regulations that specify what conduct is unfair, deceptive, or abusive, as well as by bankruptcy and garnishment laws that restrict the ability of creditor and debt collectors to access borrowers' assets. Licensing and liability costs established by regulation will affect the operating costs of debt collection agencies and the fees that they charge. Improvements in information availability or technology may improve the efficacy of collections without necessarily increasing disutility to consumers, by ensuring, for example, that debt collectors have the correct

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[34]The other parameters of the model, namely, β, γ, and ω, also affect the equilibrium and welfare. However, these parameters reflect consumer preferences and the intrinsic riskiness of the pool of borrowers and are, therefore, unlikely to be within the power of the regulators to change.

information when they contact borrowers.

We assume that the goal of policy intervention is to maximize consumer welfare. Our discussion, therefore, will focus on whether welfare-improving policy interventions are possible and how they might be implemented. We start with Panel A of Table 2, which describes equilibria and welfare when the mass of "bad" consumers (who, when faced with lenient collections, will default with certainty regardless of the realization of their income) is relatively large. In this case, the interest rate that is charged if lenient debt collection practices are used is so high that "good" consumers (who repay whenever they receive income) would prefer to be exposed to harsh collections and benefit from the lower interest rates associated with them.

There are several ways in which harsh collections might be implemented in this case, which depend on whether consumers are willing to borrow if faced with harsh collections by lenders, by third-party collectors, or both. If consumers are sufficiently patient (so that their willingness to borrow is low), then they will be unwilling to borrow regardless of how harsh debt collection practices implemented, and there will be no borrowing in equilibrium (part (iv) of Proposition 7). Otherwise (if consumers are sufficiently impatient), there will be an equilibrium in which all consumers borrow, and harsh collections will be implemented by the organization (lenders or third-party debt collectors) that is relatively more efficient (parts (i), (ii), and (iii) of Proposition 7). Further, when there is an interior equilibrium, it is unique. This implies that, so long as good consumers prefer to pay interest rates associated with harsh collections rather than lenient collections, the most efficient mechanism for engaging in those collections will be selected by the market itself.

In this environment, the only potential role for policy is to reduce the losses associated with harsh collections. In the model developed here, this can be accomplished by lowering pecuniary and nonpecuniary costs associated with collections, i.e., by reducing h, f, θ, c, and q. Such policy interventions, however, will be effective only as long as they do not violate the conditions necessary to ensure the existence of an equilibrium in which borrowing can occur. To illustrate, assume that the following conditions hold (the "delegated harsh" cell in Panel A of Table 2):

- the share of bad borrowers is relatively large: $\frac{1}{1-\omega} \geq 1 + (1-\gamma)h\theta + cN$;

- consumers are not willing to borrow if they face harsh debt collection practices by creditors: $1 < \beta(1 + (1-\gamma)h\theta + cN)$;

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- third-party debt collectors are more efficient than creditors, so that consumers are willing to borrow if they face harsh debt collection practices by third-party debt collectors: $(1 - \gamma)hf < cN$ and $1 > \beta(1 + (1 - \gamma)h(f + \theta))$.

In this case, the equilibrium entails creditors outsourcing their debt collection to third-party agencies, which use harsh debt collection practices (part (iii) of Proposition 8). Consumer welfare in this equilibrium equals $1 + \beta\gamma y - \beta h(1 - \gamma)(f + \theta)$. It is decreasing in h, which is why the regulators may want to intervene and reduce h (by limiting the amount of income that can be garnished, for example). However, decreasing h may violate the participation constraint of third-party debt collectors, so that $(1 - \gamma)hf > q$ no longer holds. If this is the case, then there will be no borrowing in equilibrium, and consumer welfare will equal $\beta(1 + \gamma y)$. This is lower than the welfare before the policy intervention took place, since $1 > \beta(1 + (1 - \gamma)h(f + \theta))$ by assumption (at the initial level of h that prevailed before the policy intervention took place). Thus, even in this simple environment, policy interventions may have unintended consequences and may lower consumer welfare.

Now, consider the case when the share of bad borrowers is relatively small (described in Panel B of Table 2). In this case, all consumers prefer interest rates associated with lenient collections when banks collect on their own, which implies that banks cannot implement harsh collections in an undelegated equilibrium. If consumers are relatively patient ($\beta > 1 - \omega$), then there would be no borrowing if banks collect on their own, since good consumers are unwilling to borrow at interest rates that allow for bad borrowers to opportunistically default. If, additionally, consumers are also unwilling to borrow when they face harsh collection practices by third-party collectors, then the lending market shuts down (part (iv) of Proposition 8). If, on the other hand, consumers are willing to face exposure to harsh collection practices by third-party firms, there is a unique interior equilibrium in which collections are delegated to these firms, which engage in harsh practices (part (iii) of Proposition 8). In this instance, the market selects the most efficient means of collections that leads to lending in equilibrium. As Table 2 demonstrates, this outcome is possible if banks have the ability to delegate debt collection to third-party firms and these firms are relatively more efficient than banks.[35]

The most interesting cases occur when consumers are relatively impatient ($\beta <$

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[35]The intuition here is similar to Panel A.

$1 - \omega$). If consumers are unwilling to borrow at interest rates associated with harsh collections by third-party firms, there is a unique equilibrium in which lenders collect for themselves, and they employ lenient collection tactics (part (ii) of Proposition 8). If consumers are willing to borrow when exposed to harsh collection tactics by third-party firms, then there can be multiple equilibria (part (i) of Proposition 8). In one of these, lenders collect for themselves and employ lenient tactics. In the other, collections are delegated to third-party firms, which employ harsh tactics.

There are two important observations about this particular case. First, sufficiently small differences in the relative efficiency of first- versus third-party collections will not determine which of the two equilibria prevails. As a result, collections might be delegated to firms that do not enjoy an absolute advantage in productivity. Second, consumer welfare is higher in the undelegated (lenient) equilibrium than in the delegated (harsh) equilibrium. In our model, this is the only instance in which the market might select an outcome that produces lower consumer welfare than other feasible outcomes. Here, policy intervention might result in a potentially discontinuous increase in consumer welfare by making third-party collections uncompetitive relative to first-party collections.[36]

An important caution follows from these results. Policy interventions that improve welfare in a credit market with a low share of opportunistic borrowers may hurt consumer welfare if the share of opportunistic borrowers is sufficiently large. For example, regulations that make third-party debt collection agencies uncompetitive relative to banks may improve consumer welfare if the share of opportunistic borrowers is small but may hurt consumer welfare if the share of opportunistic borrowers is large. Thus, regulating the debt collection market is a complex issue that requires a clear understanding of the nature of the equilibrium and the relative efficiency of third-party debt collectors vis-`a-vis creditors.

The results we derive in this paper are subject to some caveats. The first is that the assumption of Bertrand competition among lenders implies that recoveries from defaulted borrowers are passed entirely to consumers in the form of lower interest

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[36]Holding θ constant, if regulation increased q (third-party agencies' costs of implementing harsh collections), then the fees charged by the agencies to remain profitable (f) may also have to increase. If these fees rise sufficiently, consumers will no longer be willing to borrow if exposed to harsh collections by third-party firms. In this case, the only equilibrium would be the one in which lenders collect on their own, and they would use lenient practices.

rates. If this pass-through is smaller, and consumers are perfectly rational, then the set of parameters for which consumers will be willing to borrow when faced with harsh collections will be smaller.

Second, the model we develop assumes that consumers are fully rational. Therefore, it provides a baseline for understanding the economics of third-party debt collection and its welfare implications. Of course, it can be argued that consumers do not (or cannot) fully recognize the consequences of collections strategies at the time they select their lender and contract. This may be due to, among other things, incomplete information, lack of salience, overoptimism, or time-inconsistent preferences.[37] If consumers do not fully internalize the effect of harsh collections or do not retaliate against banks that use them, then their willingness to borrow under harsh debt collection practices would be higher than in our model. As a result, ex post, some consumers may regret the borrowing decisions they made ex ante. Harsh debt collection practices may, therefore, affect consumer welfare to a larger extent than in the fully rational model developed here. If this is indeed the case, there could be more scope for improving consumer welfare through careful regulation of collections.

Our model suggests that a credit market with informed consumers is often capable of selecting the equilibrium with higher consumer welfare than other feasible equilibria. This indicates that good policy should assist consumers entering into credit contracts to better understand the implications of their exposure to potential collections activity. For instance, the government and other organizations can promote consumer education — better disclosures — about available consumer protections and increase borrowers' awareness of the debt collection practices that creditors and debt collectors use; this may influence consumers' choices over which banks to borrow from or the intensity of their search for the best terms. This will, in turn, intensify creditors' concerns about their reputations.

6. Conclusion

In the U.S., creditors often outsource the task of recovering debts from defaulting borrowers to third-party debt collection agencies. In this paper, we argue that an important incentive for this is creditors' concerns about their reputations. We develop

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[37]See for example, Laibson (1997); DellaVigna and Malmendier (2004), and Gabaix and Laibson (2006).

a model along the lines of the common agency framework and show that it implies that debt collection agencies use harsher debt collection practices than original creditors, which is consistent with empirical evidence. The model is also consistent with empirical facts about the structure of the debt collection industry and its evolution over time. We show that the existence of third-party debt collectors may improve consumer welfare if credit markets contain a sufficiently large share of opportunistic borrowers who would not repay their debts unless faced with "harsh" debt collection practices. In other cases, the presence of third-party debt collectors can result in lower consumer welfare. The model provides insight into which policy interventions may improve the functioning of the collections market.

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Table 1: Some Descriptive Statistics About the Debt Collection, Credit Card, and Banking Industries

	1972	1977	1982	1987	1992	1997	2002	2007	2012
Collections Industry (NAICS 56144)									
Receipts ($2012, millions)	400	422	657	1,157	2,146	3,700	5,083	8,852	12,265
Employment	30,415	34,596	37,978	52,644	71,867	84,333	129,822	143,879	129,392
firms	n/a	n/a	n/a	4,530	5,178	4,658	4,547	4,506	3,994
Establishments	4,201	4,246	4,363	5,204	5,814	5,250	5,265	5,179	4,652
Concentration ratio (%)									
4 firms	n/a	n/a	n/a	11.4	9.9	14.0	19.2	14.9	n/a
8 firms	n/a	n/a	n/a	17.2	14.3	17.9	25.6	23.1	n/a
20 firms	n/a	n/a	n/a	24.7	22.1	24.9	35.2	34.3	n/a
Share of firms by size (%)									
9 or fewer employees	n/a	n/a	n/a	68.8	64.7	61.4	58.3	57.7	61.3
20 or fewer employees	n/a	n/a	n/a	86.6	83.4	80.0	76.4	75.4	76.0
Share of industry employment (%)									
firms with 9 or fewer employees	n/a	n/a	n/a	20.2	15.9	12.1	7.0	6.1	6.0
firms with 20 or fewer employees	n/a	n/a	n/a	38.6	32.1	24.6	14.5	12.9	12.2
Credit Card Industry (NAICS 52221)									
Receipts ($2005, millions)	n/a	n/a	n/a	n/a	n/a	24,503	35,856	56,596	106,343
Concentration ratio (% of receipts, Census of Services)									
4 firms	n/a	n/a	n/a	n/a	n/a	53.8	75.8	79.2	n/a
8 firms	n/a	n/a	n/a	n/a	n/a	74.5	87.0	87.4	n/a
20 firms	n/a	n/a	n/a	n/a	n/a	93.4	96.6	96.5	n/a
Concentration ratio (% of credit card balances, Call Reports)									
4 firms	15.7	16.7	23.5	24.1	21.0	24.0	52.4	53.2	54.1
8 firms	24.0	25.7	31.2	34.5	34.6	39.7	74.3	78.1	79.2
20 firms	35.3	39.7	45.7	50.6	56.8	65.2	92.3	95.5	97.0

Sources: U.S. Census Bureau of the Census; Census of Services and Annual Services Survey; FDIC Quarterly Banking Profiles; Call Reports;
U.S. Bureau of Labor Statistics, Occupational Employment Survey

Table 2: Equilibria in the Extended Model

Panel A: The share of "bad" borrowers is relatively large $\left[\frac{1}{1-\omega} \geq 1 + (1-\gamma)h\theta + cN\right]$

Are consumers willing to borrow if they face harsh first-party collections?

Are consumers willing to borrow if they face harsh third-party collections?

	Yes $\left[\frac{1}{\beta} \geq 1 + (1-\gamma)h\theta + cN\right]$		No $\left[\frac{1}{\beta} < 1 + (1-\gamma)h\theta + cN\right]$	
	Yes $\left[\frac{1}{\beta} \geq 1 + (1-\gamma)h(\theta + f)\right]$	No $\left[\frac{1}{\beta} < 1 + (1-\gamma)h(\theta + f)\right]$	Yes $\left[\frac{1}{\beta} \geq 1 + (1-\gamma)h(\theta + f)\right]$	No $\left[\frac{1}{\beta} < 1 + (1-\gamma)h(\theta + f)\right]$
Third-party more efficient $\left[(1-\gamma)hf \leq cN\right]$	Delegated harsh (7.i); $W = 1 + \beta\gamma y - \beta h(1-\gamma)(f+\theta)$	N/A	Delegated harsh (7.iii); $W = 1 + \beta\gamma y - \beta h(1-\gamma)(f+\theta)$	No borrowing (7.iv); $W = \beta(1+\gamma y)$
First-party more efficient $\left[(1-\gamma)hf > cN\right]$	Undelegated harsh (7.ii); $W = 1 + \beta\gamma y - \beta\{(1-\gamma)h\theta + cN\}$		N/A	

Panel B: The share of "bad" borrowers is relatively small $\left[\frac{1}{1-\omega} < 1 + (1-\gamma)h\theta + cN\right]$

Are "good" consumers willing to borrow at the pooling interest rates?

Are consumers willing to borrow if they face harsh third-party collections?

	Yes $\left[\beta \leq 1 - \omega\right]$		No $\left[\beta > 1 - \omega\right]$	
	Yes $\left[\frac{1}{\beta} \geq 1 + (1-\gamma)h(\theta + f)\right]$	No $\left[\frac{1}{\beta} < 1 + (1-\gamma)h(\theta + f)\right]$	Yes $\left[\frac{1}{\beta} \geq 1 + (1-\gamma)h(\theta + f)\right]$	No $\left[\frac{1}{\beta} < 1 + (1-\gamma)h(\theta + f)\right]$
Third-party more efficient $\left[(1-\gamma)hf \leq cN\right]$	Multiple equilibria (8.i): Delegated harsh; $W = 1 + \beta\gamma y - \beta h(1-\gamma)(f+\theta)$	Undelegated lenient (8.ii); $W = 1 + \beta\gamma y$	Delegated harsh (8.iii); $W = 1 + \beta\gamma y - \beta h(1-\gamma)(f+\theta)$	No borrowing (8.iv); $W = \beta(1+\gamma y)$
First-party more efficient $\left[(1-\gamma)hf > cN\right]$	Undelegated lenient; $W = 1 + \beta\gamma y$		N/A	

Note: For each set of restrictions, this table shows the equilibrium that prevails and total consumer welfare in that equilibrium. N/A identifies cells for which there exist no parameter values that can satisfy all corresponding restrictions. We assume throughout that third-party debt collectors, if hired, can make non-negative profits (i.e., $(1-\gamma)hf \geq q$) and that banks can choose whether to collect on their own or to delegate debt collection to a third-party agency.

Appendix A: Proofs of Propositions

Proof of Proposition 1. Consider a candidate equilibrium in which all banks use harsh debt collection practices. If such an equilibrium were to exist, then the interest rate that all banks charge their borrowers would be given by (recall that banks are Bertrand competitors):

$$r_h = \frac{(1-\gamma)(1-h) + c/\mu}{\gamma}. \tag{A.1}$$

Consider a bank that deviates by using lenient debt collection practices. This bank will break even if it charges its borrowers:

$$r_l = \frac{1-\gamma}{\gamma}. \tag{A.2}$$

Notice that:

$$E(u|\text{borrow}, \lambda = 0, r_l) \geq E(u|\text{borrow}, \lambda = h, r_h) \Leftrightarrow$$
$$1 + \beta\left(1 + \gamma\big(y - (1 + r_l)\big)\right) \geq 1 + \beta\left(1 + \gamma\big(y - (1 + r_h)\big) - (1-\gamma)h(1+\theta)\right) \Leftrightarrow \tag{A.3}$$
$$(1-\gamma)h\theta + c/\mu \geq 0.$$

Since $\gamma < 1$, $h > 0$, $\theta > 0$, $\mu \geq 0$, and $c > 0$ by assumption, it follows that $(1-\gamma)h\theta + c/\mu > 0$. Thus, $E(u|\text{borrow}, \lambda = 0, r_l) \geq E(u|\text{borrow}, \lambda = h, r_h)$, and hence, consumers are always better off by borrowing from the deviating bank that charges r_l and uses lenient debt collection practices than from a nondeviating bank that charges r_h and uses harsh debt collection practices. Denote by r_{sw} the interest rate that would make consumers indifferent between the deviating bank and the nondeviating banks. For consumers to be indifferent between the banks, it must be that:

$$E(u|\text{borrow}, \lambda = 0, r_{sw}) = E(u|\text{borrow}, \lambda = h, r_h) \Leftrightarrow$$
$$1 + \beta\left(1 + \gamma\big(y - (1 + r_{sw})\big)\right) = 1 + \beta\left(1 + \gamma\big(y - (1 + r_h)\big) - (1-\gamma)h(1+\theta)\right) \Leftrightarrow \tag{A.4}$$
$$r_{sw} = \frac{(1-\gamma)(1 + h\theta) + c/\mu}{\gamma}.$$

Clearly, $r_{sw} \geq r_l$ (since $h > 0$, $c > 0$, $\mu \geq 0$, and $\theta > 0$). Thus, a deviating bank that uses lenient debt collection practices can charge an interest rate that is higher than its break-even rate. It will therefore generate positive profits, which are higher than the zero profits in the conjectured equilibrium. It follows that the equilibrium in which all banks use harsh debt collection practices does not exist.

We now verify that the equilibrium in which all banks use lenient debt collection practices does exist. In this equilibrium, all banks will charge the interest rate r_l. Any bank that deviates and uses harsh debt collection practices will have to charge at least r_h in order to break even. However, as we showed in (A.3), consumers prefer to borrow from a bank that uses lenient debt collection practices and charges r_l than from a bank that uses harsh debt collection practices and charges r_h. Thus, the deviating bank will not be able to attract any consumers. Hence, there is no incentive for any bank to deviate and use harsh debt collection practices.

To verify that consumers will be willing to borrow when all banks use lenient debt collection practices, substitute $r_l = \frac{1-\gamma}{\gamma}$ and $\lambda = 0$ into (5) to obtain:

$$\frac{1}{\beta} \geq \gamma\left(1 + \frac{1-\gamma}{\gamma}\right) + (1-\gamma) \times 0 \times (1+\theta) \Leftrightarrow \frac{1}{\beta} \geq 1. \tag{A.5}$$

Since $\beta < 1$ by assumption, (A.5) holds, and therefore, consumers choose to borrow when all banks use lenient debt collection practices. Because only two symmetric pure strategy equilibria are possible when banks collect on their own, the equilibrium in which all banks use lenient debt collection practices is unique. ∎

Proof of Proposition 2. The conjectured equilibrium involves the following strategies for the banks and the agency. All banks delegate their debt collection to the agency. The agency uses harsh debt collection practices if all banks hired it and uses lenient debt collection practices otherwise. Thus, there are four possible unilateral deviations from the conjectured equilibrium, which we will consider in turn:

1. A bank collects on its own and uses lenient debt collection practices;

2. A bank collects on its own and uses harsh debt collection practices;

3. The agency uses lenient debt collection practices even if all banks hired it;

4. The agency uses harsh debt collecting practices even if not all banks hired it.

Consider the first possible deviation, in which a bank decides to collect on its own and uses lenient debt collection practices. Since the agency and all other banks are assumed to follow their equilibrium strategies, it implies that all other banks have delegated their debt collection to the agency and that the agency uses lenient debt collection practices. To break even, the deviating bank needs to charge its borrowers at least r_l (derived in (A.2)). Since the agency also uses lenient debt collection practices, the nondeviating banks will also need to charge their borrowers r_l to break even. Thus, all banks charge their borrowers

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the same interest rate, and all borrowers face the same (lenient) debt collection practices, either from the debt collection agency or from the deviating bank collecting on its own. All banks, including the deviating bank, will make zero profits in this case, just as in the conjectured equilibrium. Hence, banks have no incentives to deviate by collecting on their own and using lenient debt collection practices.

Now, consider the deviation in which a bank collects on its own and uses harsh debt collection practices. This bank will have to charge its borrowers at least r_h (derived in (A.1)) to break even. The agency, following its equilibrium strategy, switches to lenient debt collection practices. Thus, the banks that hired the agency charge their borrowers r_l. As we have shown in (A.3), consumers prefer to borrow from a bank that uses lenient debt collection practices and charges r_l than from a bank that uses harsh debt collection practices and charges r_h. As a result, the deviating bank will not be able to attract any consumers. Thus, banks have no incentives to deviate by collecting on their own and using harsh debt collection practices.

Now, consider the debt collection agency. If all banks hired it, then the agency makes non-negative profits if it uses harsh debt collection practices (since $(1 - \gamma)hf - q \geq 0$ by assumption). If the agency deviates and uses lenient debt collection practices, its profits are zero. Thus, it has no incentives to deviate by using lenient debt collection practices.

Finally, consider the case in which not all banks hired the debt collection agency. Since the agency and the deviating bank(s) choose their debt collection practices simultaneously, the subgame that starts after at least one bank decides to collect on its own is analogous to our basic model. By a logic similar to the proof of Proposition 1, the only equilibrium in this subgame is for both the agency and the deviating bank(s) to use lenient debt collection practices. To see this, note that, if the agency uses harsh debt collection practices, then the break-even rate for the banks that hired it is given by:

$$r_d = \frac{(1 - \gamma)(1 - h(1 - f))}{\gamma}. \tag{A.6}$$

At this interest rate, the nondeviating banks (those that hired the agency) will not be able to compete with a deviating bank that uses lenient debt collection practices:

$$E(u|\text{borrow}, \lambda = 0, r_l) \geq E(u|\text{borrow}, \lambda = h, r_d) \Leftrightarrow$$
$$(1 - \gamma)h(1 + \theta) \geq \gamma(r_l - r_h) \Leftrightarrow \tag{A.7}$$
$$(1 - \gamma)h(\theta + f) \geq 0,$$

since $\gamma < 1$, $h > 0$, $\theta > 0$, and $f > 0$ by assumption. This results in zero revenues for the nondeviating banks and agency. Since the agency needs to invest $q > 0$ to implement harsh

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debt collection practices, its profits are negative in this case. The agency therefore has no incentives to deviate from its equilibrium strategy. Since the agency's threat to switch to lenient debt collection practices after at least one of the banks deviates by collecting on its own is credible, the conjectured equilibrium is subgame perfect.

To verify that consumers choose to borrow if all banks delegate their debt collection to the agency and the agency uses harsh debt collection practices, substitute $r_d = \frac{(1-\gamma)(1-h(1-f))}{\gamma}$ and $\lambda = h$ into (5) to obtain:

$$
\frac{1}{\beta} \geq \gamma\Big(1 + \frac{(1-\gamma)(1 - h(1-f))}{\gamma}\Big) + (1-\gamma)h(1+\theta) \Leftrightarrow
$$
$$
\frac{1}{\beta} \geq 1 + (1-\gamma)h(f+\theta). \tag{A.8}
$$

Recall that $\frac{1}{\beta} \geq 1 + (1-\gamma)h(f+\theta)$ by assumption. ∎

Proof of Proposition 3. Consider the case when one of the banks decides to collect on its own. If the debt collection agency switches to lenient debt collection practices (as in the delegated equilibrium), it will make zero profits. If this agency does not switch to lenient debt collection practices, then the maximum share of consumers that the deviating bank can attract from the nondeviating banks is given by m/N (since each consumer observes the offers of only m banks out of a total of N banks). Therefore, the minimum share of consumers borrowing from the nondeviating banks will be $(N-m)/N$. If the agency uses harsh debt collection practices, then its minimum expected profit is given by:

$$
\frac{N-m}{N}(1-\gamma)hf - q > 0. \tag{A.9}
$$

Since $\frac{N-m}{N}(1-\gamma)hf - q > 0$ by assumption of this proposition, it follows that the debt collection agency generates positive expected profits if it uses harsh debt collection practices when one bank deviates and collects on its own. Since the agency uses harsh debt collection practices, the deviating bank can charge its borrowers r_{sw} (derived in (A.4)) and generate positive expected profits. Thus, every bank will have an incentive to deviate and collect on its own. Therefore, the delegated equilibrium does not exist.

We will now show that lenient debt collection practices are used in equilibrium. First, note that there is no equilibrium in which all banks hire the agency, and the agency's strategy is to switch to lenient debt collection practices if k banks deviate by collecting on their own, where $k > 1$. Since $k > 1$, the agency will use harsh debt collection practices if a bank deviates unilaterally. As we have shown, unilateral deviations are profitable if the agency uses harsh debt collection practices.

Now, consider a candidate equilibrium in which only a subset of banks hires the agency. By a logic similar to the proof of Proposition 2, no consumer would borrow from the banks that hired the agency, unless the agency uses lenient debt collection practices.

Finally, consider the case in which all banks collect on their own. By a logic analogous to the proof of Proposition 1, all banks use lenient debt collection practices in this case: Since $m \geq 2$ by assumption, each bank that uses lenient debt collection practices will be able to attract consumers from at least one other competing bank, unless that bank also uses lenient debt collection practices. ∎

Proof of Proposition 4. In the conjectured equilibrium, each of the g debt collection agencies collects from consumers in one and only one of the g credit market segments. Further, all banks operating in a given credit market segment hire the agency from that segment, and each agency uses harsh debt collection practices if all of the banks that operate in its segment hired it and uses lenient debt collection practices otherwise. If a bank operates in several credit market segments, it hires the debt collection agency from each segment in which it operates, so that consumers from a particular segment are collected upon by the debt collection agency from that segment.

Consider a debt collection agency operating in a particular segment. By a logic similar to that of Proposition 2, if any of the banks operating in this agency's segment deviates from the conjectured equilibrium, then the agency will switch to lenient debt collection practices. This is because all consumers from a particular segment observe the debt collection practices of the deviating bank, and hence, this bank will be able to attract all borrowers from the nondeviating banks unless the agency switches to lenient debt collection practices. If all of the banks from a particular credit market segment do hire the agency from that segment, then this agency will generate positive profits by using harsh debt collection practices and zero profits by using lenient debt collection practices. This is because consumers from a particular segment do not observe debt collection practices used by banks in other segments, and hence, these consumers will not switch to other banks as long as all of the banks in their segment use the same debt collection agency.

Now, consider the incentives of banks. We need to consider two cases: one for a bank that operates in a single credit market segment and another for a bank that operates in multiple credit market segments. Consider a bank that operates in a single credit market segment first. If this bank decides to deviate and use lenient debt collection practices, then the agency operating in this bank's credit market segment will also switch to lenient debt collection practices, and the deviating bank will not be able to attract consumers away from the nondeviating banks. Thus, this bank has no incentives to deviate from the conjectured

equilibrium. Now, consider a bank that operates in several credit market segments. If this bank decides to collect on its own in any of the credit market segments, then the agencies operating on those segments will switch to lenient debt collection practices. Hence, the deviating bank will not be able to make positive profits in any of the segments in which it collects on its own. Thus, this bank has no incentives to deviate from the conjectured equilibrium either. It follows that the conjectured equilibrium exists. ∎

Proof of Proposition 5. Let W_u denote total consumer welfare in the undelegated equilibrium and let W_d denote total consumer welfare in the delegated equilibrium. In the undelegated equilibrium, all consumers borrow and are charged $r_l = \frac{1-\gamma}{\gamma}$. We have:

$$W_u = 1 + \beta(1 + \gamma(y - (1 + r_l))) = 1 + \beta\gamma y. \tag{A.10}$$

Now, consider the delegated equilibrium. If $\frac{1}{\beta} < 1 + (1 - \gamma)h(f + \theta)$, then there will be no borrowing in this equilibrium, and therefore $W_d = \beta(1 + \gamma y)$. It is easy to see that in this case $W_u > W_d$, since $1 + \beta\gamma y > \beta(1 + \gamma y)$ as long as $\beta < 1$.

If $\frac{1}{\beta} \geq 1 + (1 - \gamma)h(f + \theta)$, then all consumers borrow in the delegated equilibrium and are charged $r_d = \frac{(1-\gamma)(1-h(1-f))}{\gamma}$. In this case,

$$W_d = 1 + \beta\Big\{1 + \gamma(y - (1 + r_d) - (1 - \gamma)h(1 + \theta)\Big\} = 1 + \beta\gamma y - \beta h(1 - \gamma)(f + \theta). \tag{A.11}$$

Since $\beta h(1 - \gamma)(f + \theta) > 0$, it follows that $W_u > W_d$ also in this case. ∎

Proof of Proposition 6. Parts (i) and (ii). Since bad consumers do not repay anything if lenient debt collection practices are used, the banks that use lenient debt collection practices have to account for the presence of bad borrowers in the interest rates they charge. If all banks use lenient debt collection practices, then their break-even rate (we use superscript ω to make it clear that this interest rate is charged when there is share ω of bad borrowers) is given by:

$$\gamma(1 - \omega)(1 + r_l^\omega) = 1 \Rightarrow r_l^\omega = \frac{1 - \gamma(1 - \omega)}{\gamma(1 - \omega)}. \tag{A.12}$$

Banks that use harsh debt collection collection practices do obtain repayment from bad borrowers, as long as they receive labor income. If all banks use harsh debt collection practices, then they need to charge $r_h = \frac{(1-\gamma)(1-h)+cN}{\gamma}$ to break even. Note that if all banks use harsh debt collection practices, then each bank receives $\frac{1}{N}$ share of borrowers (hence the term cN).

Consider a candidate equilibrium in which all banks use lenient debt collection practices. If a bank deviates and uses harsh debt collection practices, then bad consumers will keep borrowing from the nondeviating banks. Conditional on borrowing, good consumers will prefer the offer of the deviating bank as long as:

$$E(u|\text{borrow}, \lambda = 0, r_l^\omega) \leq E(u|\text{borrow}, \lambda = h, r_h) \Leftrightarrow$$

$$(1 - \gamma)h(1 + \theta) \leq \gamma(r_l^\omega - r_h) \Leftrightarrow \tag{A.13}$$

$$1 + (1 - \gamma)h\theta + cN \leq \frac{1}{1 - \omega}.$$

Thus, all banks will have incentives to deviate and use harsh debt collection practices if $\frac{1}{1-\omega} \geq 1 + (1 - \gamma)h\theta + cN$. In this case, the equilibrium in which all banks use lenient debt collection practices does not exist. Similarly, no bank will have incentives to deviate and use lenient debt collection practices if all banks use harsh debt collection practices, and hence, there exists an equilibrium in which all banks use harsh debt collection practices.

For consumers to be willing to borrow when all banks use harsh debt collection practices, it must be that (by substituting $r_h = \frac{(1-\gamma)(1-h)+cN}{\gamma}$ and $\lambda = h$ into (5)):

$$\frac{1}{\beta} \geq \gamma\left(1 + \frac{(1 - \gamma)(1 - h) + cN}{\gamma}\right) + (1 - \gamma)h(1 + \theta) \Leftrightarrow \frac{1}{\beta} \geq 1 + (1 - \gamma)h\theta + cN. \quad \text{(A.14)}$$

Thus, all banks use harsh debt collection practices and all consumers borrow if $\frac{1}{\beta} \geq 1 + (1 - \gamma)h\theta + cN$. There is no borrowing if $\frac{1}{\beta} < 1 + (1 - \gamma)h\theta + cN$.

Parts (iii) and (iv). The proof is analogous to parts (i) and (ii). Good consumers borrow in the undelegated lenient equilibrium as long as:

$$\frac{1}{\beta} \geq \gamma\left(1 + \frac{1 - \gamma(1 - \omega)}{\gamma(1 - \omega)}\right) + (1 - \gamma) \times 0 \times (1 + \theta) \Leftrightarrow \beta \leq 1 - \omega. \tag{A.15}$$

Thus, all banks use lenient debt collection practices and all consumers borrow if $\beta \leq 1 - \omega$. If $\beta > 1 - \omega$, then only bad consumers will be willing to borrow. Since these consumers do not repay anything in this case, the banks will not lend to them. ∎

Proof of Proposition 7. Part (i). Consider a candidate equilibrium in which all banks delegate debt collection to the third-party agency. Banks that hire the debt collection agency charge $r_d = \frac{(1-\gamma)(1-h(1-f))}{\gamma}$ to break even. The condition $\frac{1}{1-\omega} \geq 1 + (1 - \gamma)h\theta + cN$ implies that, when a bank collects on its own, then consumers prefer to borrow from a bank that uses harsh debt collection practices than from a bank that uses lenient debt collection practices. Thus, if a single bank deviates and decides to collect on its own, it will use harsh

debt collection practices and will, therefore, charge $r_h = \frac{(1-\gamma)(1-h)+cN}{\gamma}$ to break even.

If the agency uses lenient debt collection practices after observing a deviation, then all borrowers will switch to the deviating bank (because $\frac{1}{1-\omega} \geq 1 + (1-\gamma)h\theta + cN$ implies that consumers prefer banks that use harsh debt collection practices to banks that use lenient debt collection practices). Thus, the agency will use harsh debt collection practices even if it observes a deviation by one of the banks. The banks that hired the agency will, therefore, charge r_d. Consumers will prefer to borrow from banks that use the debt collection agency as long as $r_d \leq r_h$, which implies that:

$$(1-\gamma)(1 - h(1-f)) \leq (1-\gamma)(1-h) + cN \Leftrightarrow (1-\gamma)hf \leq cN. \qquad (A.16)$$

Hence, when $(1-\gamma)hf \leq cN$, then there are no incentives for a bank to deviate from the delegated equilibrium. Similarly, there is no equilibrium in which banks collect on their own because hiring the agency enables banks to reduce the interest rate they charge to consumers without changing the debt collection practices. Consumers face lower interest rates in the delegated equilibrium than in the undelegated equilibrium, which would have prevailed in the absence of the debt collection agency. Since the debt collection practices are the same in both equilibria, it follows that the delegated equilibrium generates higher consumer welfare than the undelegated equilibrium.

Part (ii). (A.16) implies that $r_d < r_h$ if $(1-\gamma)hf > cN$, and hence, banks that hire the agency have to charge higher interest rates than banks that do not hire the agency. Thus, no bank will hire the agency in this case.

Part (iii). In this case, there is no borrowing in the undelegated equilibrium that would have prevailed in the absence of the agency (by Proposition 6). Since $\frac{1}{\beta} \geq 1+(1-\gamma)h(\theta+f)$, consumers borrow in the delegated equilibrium. $\frac{1}{\beta} < 1 + (1-\gamma)h\theta + cN$ together with $\frac{1}{\beta} \geq 1+(1-\gamma)h(\theta+f)$ imply that $1+(1-\gamma)h\theta+cN > 1+(1-\gamma)h(\theta+f)$, or $(1-\gamma)hf < cN$.

Since there is no borrowing in the undelegated equilibrium, total consumer welfare in this equilibrium is given by (A.10): $W_u = \beta(1+\gamma y)$. Total consumer welfare in the delegated equilibrium is is given by (A.11): $W_d = 1 + \beta\gamma y - \beta h(1-\gamma)(f+\theta)$.

$W_d \geq W_u$ if and only if:

$$1 + \beta\gamma y - \beta h(1-\gamma)(f+\theta) \geq \beta(1+\gamma y) \Leftrightarrow \frac{1}{\beta} \geq 1 + (1-\gamma)h(f+\theta), \qquad (A.17)$$

which is true by assumption.

Part (iv). There is no borrowing in either the delegated or the undelegated equilibrium, which, therefore, generate the same consumer welfare. ∎

Proof of Proposition 8. Part (i). By Proposition 6, all banks use lenient debt collection practices, and all consumers borrow in the undelegated equilibrium. By a logic analogous to Proposition 2, the delegated equilibrium in which all banks hire the debt collection agency and the debt collection agency uses harsh debt collection practices exists as long as $\frac{1}{\beta} \geq 1 + (1 - \gamma)h(\theta + f)$. Thus, two equilibria are possible in this case. Either all banks collect on their own and use lenient debt collection practices or all of them hire the debt collection agency, which uses harsh debt collection practices.

All consumers borrow in the undelegated lenient equilibrium, but only good consumers repay their debt if they have labor income. The total consumer welfare in this case is, therefore, given by:

$$W_u = (1 - \omega)\Big[1 + \beta(1 + \gamma(y - (1 + r_l^\omega)))\Big] + \omega(1 + \beta(1 + \gamma y)) = 1 + \beta\gamma y. \qquad \text{(A.18)}$$

The total consumer welfare in the delegated equilibrium is given by (A.11):

$$W_d = 1 + \beta\gamma y - \beta h(1 - \gamma)(f + \theta). \qquad \text{(A.19)}$$

Since $\beta h(1 - \gamma)(f + \theta) > 0$, it follows that $W_u > W_d$.

Part (ii). There is no borrowing in the delegated equilibrium in this case, and hence, the presence of the debt collection agency does not change the equilibrium outcome or consumer welfare.

Part (iii). Since $\beta > 1 - \omega$, there is no borrowing if all banks collect on their own (by Proposition 6). $\frac{1}{\beta} \geq 1 + (1 - \gamma)h(\theta + f)$ implies that there exists a delegated equilibrium in which the agency uses harsh debt collection practices.

Since consumers do not borrow when banks collect on their own, total consumer welfare in the absence of the debt collection agency is given by (A.10): $W_u = \beta(1 + \gamma y)$. Total consumer welfare in the delegated equilibrium is is given by (A.11): $W_d = 1 + \beta\gamma y - \beta h(1 - \gamma)(f + \theta)$.

$W_d \geq W_u$ if and only if:

$$1 + \beta\gamma y - \beta h(1 - \gamma)(f + \theta) > \beta(1 + \gamma y) \Leftrightarrow \frac{1}{\beta} \geq 1 + (1 - \gamma)h(f + \theta), \qquad \text{(A.20)}$$

which is true by assumption.

Part (iv). There is no borrowing in either the delegated or the undelegated equilibrium, which, therefore, generate the same consumer welfare. ∎

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Table A.1: Existence of Equilibria in the Extended Model

Panel A: The share of "bad" borrowers is relatively large $\left[\frac{1}{1-\omega} \geq 1 + (1-\gamma)h\theta + cN\right]$

Are consumers willing to borrow if they face harsh first-party collections?

	Yes $\left[\frac{1}{\beta} \geq 1 + (1-\gamma)h\theta + cN\right]$		No $\left[\frac{1}{\beta} < 1 + (1-\gamma)h\theta + cN\right]$	
	Are consumers willing to borrow if they face harsh third-party collections?			
	Yes $\left[\frac{1}{\beta} \geq 1 + (1-\gamma)h(\theta+f)\right]$	No $\left[\frac{1}{\beta} < 1 + (1-\gamma)h(\theta+f)\right]$	Yes $\left[\frac{1}{\beta} \geq 1 + (1-\gamma)h(\theta+f)\right]$	No $\left[\frac{1}{\beta} < 1 + (1-\gamma)h(\theta+f)\right]$
Third-party more efficient $\left[(1-\gamma)hf \leq cN\right]$	ω=0.6; γ=0.5; β=0.4; θ=0.1; h=0.6; f=0.2; c=0.1; q=0.05; N=10.	N/A	ω=0.6; γ=0.5; β=0.5; θ=0.1; h=0.6; f=0.2; c=0.1; q=0.05; N=10.	ω=0.6; γ=0.5; β=0.95; θ=0.1; h=0.6; f=0.2; c=0.1; q=0.05; N=10.
First-party more efficient $\left[(1-\gamma)hf > cN\right]$	ω=0.6; γ=0.5; β=0.4; θ=0.1; h=0.6; f=0.6; c=0.01; q=0.05; N=10.	ω=0.6; γ=0.5; β=0.85; θ=0.1; h=0.6; f=0.6; c=0.01; q=0.05; N=10.	N/A	ω=0.6; γ=0.5; β=0.95; θ=0.1; h=0.6; f=0.6; c=0.01; q=0.05; N=10.

Panel B: The share of "bad" borrowers is relatively small $\left[\frac{1}{1-\omega} < 1 + (1-\gamma)h\theta + cN\right]$

Are "good" consumers willing to borrow at the pooling interest rates?

	Yes $[\beta \leq 1-\omega]$		No $[\beta > 1-\omega]$	
	Are consumers willing to borrow if they face harsh third-party collections?			
	Yes $\left[\frac{1}{\beta} \geq 1 + (1-\gamma)h(\theta+f)\right]$	No $\left[\frac{1}{\beta} < 1 + (1-\gamma)h(\theta+f)\right]$	Yes $\left[\frac{1}{\beta} \geq 1 + (1-\gamma)h(\theta+f)\right]$	No $\left[\frac{1}{\beta} < 1 + (1-\gamma)h(\theta+f)\right]$
Third-party more efficient $\left[(1-\gamma)hf \leq cN\right]$	ω=0.1; γ=0.5; β=0.4; θ=0.1; h=0.6; f=0.2; c=0.1; q=0.05; N=10.	ω=0.1; γ=0.5; β=0.9; θ=0.1; h=0.6; f=0.3; c=0.1; q=0.05; N=10.	ω=0.2; γ=0.5; β=0.9; θ=0.1; h=0.6; f=0.2; c=0.1; q=0.05; N=10.	ω=0.2; γ=0.5; β=0.95; θ=0.1; h=0.6; f=0.2; c=0.1; q=0.05; N=10.
First-party more efficient $\left[(1-\gamma)hf > cN\right]$	ω=0.1; γ=0.5; β=0.4; θ=0.1; h=0.6; f=0.6; c=0.01; q=0.05; N=10.	ω=0.1; γ=0.5; β=0.9; θ=0.1; h=0.6; f=0.6; c=0.01; q=0.05; N=10.	N/A	ω=0.1; γ=0.5; β=0.95; θ=0.1; h=0.6; f=0.6; c=0.01; q=0.05; N=10.

Note: For each set of restrictions, this table shows one set of parameter values that satisfy all corresponding restrictions. *N/A* identifies cells for which there exist no parameter values that can satisfy all corresponding restrictions. Throughout, we impose the restriction that third-party debt collectors, if hired, can make non-negative profits (i.e., $(1-\gamma)hf \geq q$).