Essays in Alternative Financial Services

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Abstract

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“Alternative financial services” is a term often used to describe the array of financial services offered by providers that operate outside of federally insured banks. More than one in four households in the United States are either unbanked or underbanked, a number that has been growing steadily since 2009, according to the FDIC. These households conduct some or all of their financial transactions outside of the mainstream banking system. Many rely on alternative financial services providers. Rent-to-own stores, pawn shops, and payday lenders are the largest providers of credit within the alternative financial services world. This dissertation studies the rent-to-own industry.

The rent-to-own agreement provides consumers immediate access to durable goods without a credit check or down payment. In a typical transaction, an agreement is written for a period of 12 to 24 months. The item is delivered immediately and rental payments are made monthly. At the end of each month, a consumer can continue to rent by paying for an additional period, or can return the good to the store without further obligation. Consumers obtain ownership of the good by renting to term or through early payment of a pre-specified cash price. What makes the study of rent-to-own contracts interesting is the unique nature of the agreement. Neither a credit sale nor a pure lease, this contract is the cornerstone of an industry that serves more than six million Americans each year, operates 9,800 storefronts in all 50 U.S. states and Canada, generates over US$ 8.5 billion in revenues a year, and employs more than 50,000 individuals. The industry has drawn attention from regulators and consumer advocacy groups. At the heart of the debate is the ostensibly high price of the transaction, and the allegedly overwhelming profitability of the firms in the industry.

The first chapter of this dissertation introduces and motivates my dissertation research. It is followed by a chapter containing an overview of the different literatures my works builds on. I contribute to these literatures in several ways. To begin with, I develop the most detailed and comprehensive analysis of the rent-to-own contract, the industry’s institutional details and its regulatory framework. It is also the first fully independent study of rent-to-own using micro-level data. To the best of my knowledge, there is no other study based on transaction-level data that has not been commissioned by the industry. This dissertation also
contains the first piece of work on the rent-to-own industry to employ structural estimation techniques, and therefore the first to credibly analyze the consequences of contract changes, regulatory changes and other counterfactual exercises on social welfare.

Chapter 3 analyzes the characteristics of rent-to-own contracts and key components of the industry. Some of the questions I answer along the way are: What is rent-to-own? What makes the contract unique? Is rent-to-own expensive to consumers? Who are the main market participants? What do customers look like and how do they behave? What do firms look like and how do they perform? A proper understanding of the rent-to-owned market is essential to assess the value of the transaction to consumers and firms, as well as to design sensible regulatory frameworks.

I find that while rent-to-owned looks expensive compared to cash retail and credit sale transactions, it does not when benchmarked against pure leases. And those unbanked or underbanked U.S. households wanting to access durable goods may have nowhere else to turn to. There is no evidence that the rent-to-owned activity is overwhelmingly profitable. The industry seems to be competitive and the performance of rent-to-owned firms stands roughly in the median of the distribution of profitability across industries in the U.S.

In chapter 4 I use proprietary micro-level data from a medium-sized rent-to-owned chain in Ohio to analyze the behavior of consumers and the transaction-level performance of firms. The reduced-form analysis carried out in this chapter helps us understand contract use in the context of rent-to-owned. I address the controversy regarding the proportion of rent-to-owned customers that rent items to term. Consumer advocates say the great majority of them do; the industry association states 75% return the rented item within the first four months of the contract. The analysis of micro-level data shows that the truth lies somewhere in the middle. The data also reveal that consumers respond to the incentives and trade-offs presented to them by the contract. During the first half of the rent-to-owned agreement, consumers mostly make rental payments or return the item. During the second half, as the early purchase option becomes more affordable, an increasing amount of consumers exercise it. Many of them just stop making payments and do not return the item. Delinquency is a serious problem in the industry that significantly affects the performance of rent-to-owned firms. Furniture items and appliances, items that suffer the least from delinquency, are the most profitable product categories.

The data description chapter motivates the development of a dynamic structural model of consumer behavior and firm performance. Chapter 5 presents the model, describes the estimation procedure and lists the challenges I had to be overcome along the way.

I present the results of estimating the model using transaction-level data of rent-to-owned contracts, as well as a series of robustness tests in chapter 6. The model does a very good job at fitting observed consumer behavior and the robustness tests yield favorable results, which increases my confidence in the estimation
procedure and results. I use these demand estimates to analyze contract design, that is, how the different dimensions of the rent-to-own contract affect consumer satisfaction and firm performance. The counterfactual exercises suggest there exist potential changes to the contract terms that can make both consumers and firms better off. I find that reducing the flexibility of the rent-to-own contract in terms of the return option, while simultaneously decreasing the monthly rental rate, yields higher social welfare. Also, if regulation restricting the shape of the early purchase option schedule was lifted, the rent-to-own firm could alter the schedule in such a way as to make both consumers and the firm better off. This would entail a higher early purchase option price at the beginning of the rent-to-own contract, but this price would decrease faster over time than what the current regulation dictates. Finally, I show that better theft prevention measures could improve the performance of rent-to-own firms significantly. Rent-to-own operators could then transfer part of their increased revenue to consumers in the form of lower monthly rental rates.
# Contents

**Chapter 1: Introduction** .................................................. 1

**Chapter 2: Literature Review** ........................................... 6

2.1 Pioneering studies of alternative financial services ................. 6
2.2 Studies of consumer characteristics and demand for rent-to-own contracts using survey data .................................................. 7
2.3 Reduced-form studies of rent-to-own demand with micro-level data ................................................................. 9
2.4 Structural models with micro-level data .................................. 11
   2.4.1 Structural models in the context of alternative financial services ............................................................... 12
2.5 Summary of contributions .................................................... 14

**Chapter 3: Understanding Rent-to-Own: A Descriptive Analysis of the Contract and the Industry** .................................................... 16

3.1 Introduction ........................................................................... 16
3.2 What is Rent-to-Own? .......................................................... 18
   3.2.1 The rent-to-own process and contract terms .......................... 19
   3.2.2 Interpreting the rent-to-own contract ................................ 21
   3.2.3 Consumer alternatives to rent-to-own contracts .......................... 21
   3.2.4 A discussion on pricing and implicit interest rates .................. 23
3.3 The Market ........................................................................... 25
   3.3.1 Demand side ..................................................................... 25
   3.3.2 Supply side ...................................................................... 26
3.4 Regulation ............................................................................. 29
   3.4.1 Regulation at the federal level ............................................ 30
   3.4.2 Regulation at the state level .............................................. 31
   3.4.3 Ohio regulation: The Ohio statute (1988) ............................... 31
   3.4.4 Unfavorable court rulings .................................................. 32
3.5 Conclusion ............................................................................. 33
Chapter 7: Conclusion and Future Work
List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Implicit APR computation</td>
<td>25</td>
</tr>
<tr>
<td>3.2</td>
<td>Net profit margins comparison</td>
<td>29</td>
</tr>
<tr>
<td>3.3</td>
<td>Return on equity comparison</td>
<td>29</td>
</tr>
<tr>
<td>3.4</td>
<td>Images of RTO stores and labels</td>
<td>35</td>
</tr>
<tr>
<td>A3.2</td>
<td>Rental order form</td>
<td>36</td>
</tr>
<tr>
<td>A3.3</td>
<td>Rental order form - Internal use</td>
<td>37</td>
</tr>
<tr>
<td>A3.4</td>
<td>RTO contract</td>
<td>38</td>
</tr>
<tr>
<td>A3.5</td>
<td>RTO contract (cont.)</td>
<td>39</td>
</tr>
<tr>
<td>A3.6</td>
<td>RTO consumer receipt</td>
<td>40</td>
</tr>
<tr>
<td>A3.7</td>
<td>Profile of the RTO customer</td>
<td>41</td>
</tr>
<tr>
<td>A3.8</td>
<td>Market share of independent firms and publicly traded companies.</td>
<td>42</td>
</tr>
<tr>
<td>A3.9</td>
<td>Location of Independent Chain, Aaron’s and Rent-A-Center.</td>
<td>42</td>
</tr>
<tr>
<td>A3.10</td>
<td>Evolution of state and federal legislation.</td>
<td>43</td>
</tr>
<tr>
<td>4.1</td>
<td>Monthly rate of return distribution across inventory items</td>
<td>51</td>
</tr>
<tr>
<td>4.2</td>
<td>Monthly rate of return distribution across inventory items - Delinquent Items</td>
<td>51</td>
</tr>
<tr>
<td>4.3</td>
<td>Monthly rate of return distribution across inventory items - Non-Delinquent Items</td>
<td>51</td>
</tr>
<tr>
<td>4.4</td>
<td>Timing of the exercise of the early return and early purchase options</td>
<td>57</td>
</tr>
<tr>
<td>A4.1</td>
<td>Empirical patterns in real data for all product categories.</td>
<td>60</td>
</tr>
<tr>
<td>5.1</td>
<td>Choices the consumer faces over time</td>
<td>65</td>
</tr>
<tr>
<td>5.2</td>
<td>Choices the consumer faces over time including outside option</td>
<td>67</td>
</tr>
<tr>
<td>6.1</td>
<td>Results of robustness tests</td>
<td>83</td>
</tr>
<tr>
<td>6.2</td>
<td>Return option counterfactual behavior</td>
<td>86</td>
</tr>
<tr>
<td>6.3</td>
<td>Counterfactual - Steeper EPO Schedule</td>
<td>88</td>
</tr>
<tr>
<td>6.4</td>
<td>Early purchase option counterfactual behavior</td>
<td>89</td>
</tr>
<tr>
<td>6.5</td>
<td>Counterfactual - Non-linear EPO Schedule</td>
<td>90</td>
</tr>
</tbody>
</table>
List of Tables

<table>
<thead>
<tr>
<th>Table Number</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Cost Comparison: RTO versus pure retail, credit card purchase, and pure lease.</td>
<td>22</td>
</tr>
<tr>
<td>A3.1</td>
<td>List of interview questions to industry participants - Demand side questions.</td>
<td>44</td>
</tr>
<tr>
<td>A3.2</td>
<td>List of interview questions to industry participants - Supply side questions.</td>
<td>45</td>
</tr>
<tr>
<td>A3.3</td>
<td>Summary statistics of the economic impact of the RTO industry in the US.</td>
<td>46</td>
</tr>
<tr>
<td>A3.4</td>
<td>Economic impact of the RTO industry by state</td>
<td>46</td>
</tr>
<tr>
<td>4.1</td>
<td>Item Categories</td>
<td>49</td>
</tr>
<tr>
<td>4.2</td>
<td>Mean value of variables in item-level data across product categories.</td>
<td>50</td>
</tr>
<tr>
<td>4.3</td>
<td>Rate of return by category</td>
<td>52</td>
</tr>
<tr>
<td>4.4</td>
<td>Rate of return regression results</td>
<td>53</td>
</tr>
<tr>
<td>4.5</td>
<td>Dataset description by category</td>
<td>54</td>
</tr>
<tr>
<td>4.6</td>
<td>Agreement Outcomes</td>
<td>55</td>
</tr>
<tr>
<td>4.7</td>
<td>Empirical delinquency (STL) proportions over time by category</td>
<td>58</td>
</tr>
<tr>
<td>4.8</td>
<td>Cumulative effect of delinquency (STL) at the agreement and item levels</td>
<td>58</td>
</tr>
<tr>
<td>5.1</td>
<td>Dataset description by category</td>
<td>63</td>
</tr>
<tr>
<td>5.2</td>
<td>Market share of RTO computation</td>
<td>71</td>
</tr>
<tr>
<td>A5.1</td>
<td>Estimates by education group</td>
<td>74</td>
</tr>
<tr>
<td>A5.2</td>
<td>Adjusted Estimates by education group</td>
<td>76</td>
</tr>
<tr>
<td>6.1</td>
<td>Estimates and standard errors by category</td>
<td>80</td>
</tr>
<tr>
<td>A6.1</td>
<td>Counterfactual analysis</td>
<td>96</td>
</tr>
</tbody>
</table>
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To my parents, my brother and my sister
Chapter 1

Introduction

More than one in four households in the United States are either unbanked or underbanked, a number that has been growing steadily since 2009, according to the FDIC\(^1\). Many low and middle income households face a number of barriers to bank account ownership. First, regular checking accounts may not make economic sense for some lower income families. Consumers who cannot meet account balance minimums pay high monthly fees, and most banks levy high charges for bounced checks, which families living paycheck to paycheck cannot afford. Second, there may be cultural reasons, like mistrust of banks or dislike of dealing with banks. Third, many unbanked persons may not qualify for conventional bank accounts because of poor credit history or prior problems with managing a bank account\(^2\). Finally, lack of financial literacy has also been suggested as a reason\(^3\).

These households therefore conduct some or all of their financial transactions outside of the mainstream banking system. Many rely on alternative financial services (AFS) providers. This is a term often used to describe the array of financial services offered by providers that operate outside of federally insured banks. One-quarter of U.S. households have used at least one AFS product in the last year, and almost one in ten households have used two or more types of AFS products\(^4\). The total transaction volume of AFS is estimated at more than $320 billion annually\(^5\).

AFS can be categorized as transactional financial services, and those that provide credit. The most widely used transaction products and services are check cashing services and money orders. Financial Service Centers of America (FiSCA), the national trade association that represents nonbank financial service centers, estimates that financial service centers process more than 170 million checks per year, with a face value of

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\(^1\) FDIC (2012).
\(^2\) Barr (2004).
\(^3\) Shtauber (2011).
\(^4\) FDIC (2012).
\(^5\) FDIC (2009).
more than $58 billion. FiSCA also estimates that its members sell money orders with a face value of $17.6 billion per year. Another AFS under the transaction category is that of stored value (prepaid) cards, which work as a replacement for cash and checks. This sector has grown tremendously in recent years. Finally, remittances are also a big part of transactional AFS. The United States is the leading remittance-sending country. During 2007, U.S. remittances to other countries totaled $46 billion.

Large national retailers are increasingly recognizing the revenue generating potential of transactional AFS. Walmart, for example, the world’s largest retailer, has been providing check-cashing, money orders and bill payment services since 2002. In collaboration with American Express, it has also launched a stored value card in late 2012 that by January 2013 had over 575,000 account holders and $275 million in funds loaded onto the card.

Pawn shops, payday lenders, buy-here-pay-here auto dealers, and rent-to-own stores are the largest providers of credit within the alternative financial services world. Lusardi and Scheresberg (2013) document that borrowing through these channels has become common in the United States: about one in four Americans has used one of these methods in the past five years.

Pawn loans are small, short-term, collateralized loans. They have a median size of $70, and a median term of 60 days. Consumers pawn mostly pieces of jewelry and tradesman’s tools, as well as various types of electronics. Pawns do not require a credit check and can never negatively affect a customer’s credit. This also means loans can be made quickly because verification of credit history or background information are not required. Interest rates on the loan are heavily influenced by regulation, and vary widely from 2% to 25% monthly rates in different states. The industry operated close to 10,000 storefronts in the U.S. in 2012, serving over 30 million Americans.

As a form of short-term lending, a payday loan involves the borrower receiving certain cash advance from the lender by authorizing her the right to deposit a personal check in typically two weeks, with the check’s face value equal to the principal loan amount plus a charge. This charge typically lies between $15 and $20 for every $100 borrowed. Applicants can normally roll over the debt, but the law caps the loan duration at 40 days. A one-time borrower who arrives with the necessary information (a check, recent pay stub, copies of recent banks statements, and identification) can receive a loan in less than 30 minutes. These loans offer convenience and discreetness. In 2006, these outlets generated about $42 billion in payday loans, with internet lenders adding another $5.65 billion.

Buy-here-pay-here (BHPH) firms operate used car dealership. These companies sell to individuals with  

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6FDIC (2009).  
8Czerwonko and Sun (2013).  
9Wu (2008).  
10FDIC (2009).
low incomes or poor credit histories. Customers who arrive at a dealership fill out a loan application and are matched to a car that fits their needs. Most customers finance a large fraction of the purchase and financing options are adjusted to reflect credit-worthiness. The loans are risky and defaults are pervasive. BHPH is a fractured industry with few large or publicly traded participants. Transaction volume was estimated at $80 billion per year in 2004.

This dissertation studies the rent-to-own industry. The agreement provides consumers immediate access to durable goods without a credit check or down payment. In a typical transaction, an agreement is written for a period of 12 to 24 months. The item is delivered immediately and rental payments are made monthly. At the end of each month, a consumer can continue to rent by paying for an additional period, or can return the good to the store without further obligation. Consumers obtain ownership of the good by renting to term or through early payment of a pre-specified cash price.

What makes the study of rent-to-own contracts interesting is the unique nature of the agreement. Neither a credit sale nor a pure lease, this contract is the cornerstone of an industry that serves more than six million Americans each year, operates 9,800 store fronts in all 50 U.S. states and Canada, generates over US$ 8.5 billion in revenues a year, and employs more than 50,000 individuals.

The industry has drawn attention from regulators and consumer advocacy groups. At the heart of the debate is the ostensibly high price of the transaction, and the allegedly overwhelming profitability of the firms in the industry. Rent-to-own is not well understood and my work will give the reader deep knowledge of the industry. This will help assess whether consumer advocates’ concerns and accusation are supported by the data. I provide facts on the cost of rent-to-own to consumer and compare this cost to that of competing contractual arrangements. I also examine the performance of rent-to-own companies and contrast it to that of firms in other industries and competing companies.

My dissertation mainly concerns with the behavior of consumers in the context of rent-to-own. I want to understand the incentives and trade-offs individuals face, and how contract changes can affect behavior and ultimately impact social welfare in the industry. Using a proprietary dataset of rent-to-own agreements, I estimate a dynamic structural model of consumer choice. The estimated model is used to run counterfactual exercises to analyze contract design: I introduce contract changes and test whether these can increase welfare.

One aspect of the rent-to-own contract that stands out is its high degree of flexibility. The agreement emerged around 40 years ago as a highly flexible contract. Terms have not changed significantly over time, with the Association of Progressive Rental Organizations (APRO), the industry association, taking a de-

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11 Einav et Al. (2012).
12 FDIC (2009).
facto role of educating new entrants to the industry and transmitting best practices.\textsuperscript{14} APRO’s website states: “The unique rent-to-own transaction sprang up in the 1970s in response to a growing consumer need for acquiring the use of household products without incurring debt or jeopardizing the family’s credit. Rent-to-own customers [...] desire consumer durable goods in their homes without the long-term financial obligations associated with credit sales. There is no interest charged to consumers, no credit checks involved and customers can return the merchandise at any time for any reason without penalty. This no-obligation, no-debt feature is the cornerstone of rental-purchase\textsuperscript{15}. When analyzing transaction-level data, I observe that some customers seem to be taking advantage of the flexibility in the option to return items early. At the same time, a large group of consumers does not seem to be making use of this lack of long-term commitment at all. These observations motivate me to ask whether we can alter the rent-to-own contract terms in the direction of reduced return flexibility to improve welfare.

Another research question is motivated by the observation that industry participants are highly exposed to regulatory risk. An average of 25 bills that directly affect the rent-to-own industry are introduced per year at the state and federal levels of government\textsuperscript{16}. The latest example of federal regulation attempts is the Consumer Rental Purchase Agreement Act which was assigned to a congressional committee on April 15, 2013 and intends to assure meaningful disclosures of the terms of rental-purchase agreements and to provide certain substantive rights to consumers under these agreements\textsuperscript{17}. In Ohio, the state where the dataset used in this study is from, regulation already imposes significant contract disclosures. The state also introduced restrictions on the early purchase option price schedule. The chosen formula to dictate the shape of this schedule does not seem to follow an economic rationale. I am therefore interested in understanding the welfare cost of rent-to-own regulation in terms of restrictions on the early purchase option schedule.

Looking at micro-level data, I find that the number of items involved in rent-to-own agreements that are stolen is considerably high. Almost 20% of TVs, 19% of electronics and 16% of computers end up in delinquency. Delinquency is a serious problem in the industry. This seems to indicate that firms should invest in better delinquency control and implement more stringent rental initiation conditions. I also explore whether these investments could increase overall welfare if part of the potential savings from lower delinquency levels is transferred to consumers.

This dissertation is structured as follows. Chapter 2 presents an overview of the different literatures my

\begin{itemize}
\item \textsuperscript{14} Evidence of this can be found in APRO’s website which has a whole section dedicated to RTO education for RTO chains. This includes links to a virtual university, with courses including “Introduction to Rent-To-Own” and “Account Management in Rent-To-Own”, their seminar schedule, and a Rent-to-Own code of ethics. (http://www.rtohq.org/ (last visited May 17, 2013) [hereinafter APRO (2013))].
\item \textsuperscript{15} APRO (2013)
\item \textsuperscript{16} APRO (2013).
\item \textsuperscript{17} More information on the Consumer Rental Purchase Agreement Act can be accessed at: http://www.govtrack.us/congress/bills/113/hr1551.
\end{itemize}
works builds on and points out my contribution to these literatures. An in-depth study of the characteristics of rent-to-own contracts and key components of the industry is contained in chapter 3. Chapter 4 consists of the analysis of proprietary microdata on rent-to-own transactions. The reduced-form analysis carried out in that chapter helps understand consumer behavior and contract use, as well as the transaction-level performance of rent-to-own firms. This analysis motivates the development of the dynamic structural model of consumer behavior and firm performance presented in chapter 5. The results of estimating this model are contained in chapter 6 where I also perform a series of robustness tests to increase the confidence in the estimation procedure, and present a wide variety of counterfactual exercises. Chapter 7 concludes and presents directions of future work.
Chapter 2

Literature Review

As was described in the introduction to this dissertation, it is by now well documented that a significant fraction of American households are unbanked or underbanked and that there is widespread use among these of alternative financial services (AFS). More than one in four households in the U.S. are either unbanked or underbanked, one-quarter of households have used at least one AFS product in the last year, and almost one in ten households have used two or more types of AFS products (FDIC (2012)).

Low income Americans seem to lack sufficient access to credit and for the most part do not save. For example, 57% of Americans earning less than $20,000 a year report that they would not be able to come up with $2,000 in 30 days, compared to 10%-27% of those earning above $50,000 (Lusardi et al. (2011)). According to the 2010 Survey of Consumer Finances, only 32% of American families in the lowest income quintile reported “saving over the past year”, compared to 60%-80% in the top two quintiles (Bricker et al. (2012)).

These numbers give the reader a sense of the relevance of fringe banking. Despite its size, the AFS have been severely overlooked by economists for many years. It was not until the 1990s that some researchers became interested in studying the AFS world. No serious study of AFS in the United States had been made since the 1930s.

2.1 Pioneering studies of alternative financial services

John Caskey’s book on fringe banking is widely considered the foundational study of the alternative financial services industry (Caskey (1994)). In his work, Caskey describes the institutional details, customer bases and growth of various AFS, with a strong focus on pawnbroking stores and check-cashing outlets.

Ten years after Caskey’s work, Barr (2004) and Bolton and Rosenthal (2005) provide a comprehensive
introduction to credit markets for individuals in the fringe of mainstream financial services. This work explores the dual financial services market in which insured depository institutions largely serve middle- and upper-income persons, and AFS providers largely serve low- and moderate-income households. They provide evidence that credit markets for the poor operate largely apart from the mainstream credit markets and are mostly invisible to the wealthier borrowers. They argue that the efficiency and competitiveness of many AFS could conceivably be improved along different dimensions. The authors conclude that better access to financial services is critical for low-income persons seeking to enter the economic mainstream. Their work therefore calls for governments to provide incentives for mainstream financial services to lower the barriers for currently unbanked and underbanked individuals.

This work has motivated significant policy efforts to “bank the poor”. These efforts have concentrated on both the supply and the demand sides. Incentives for banks to serve the unbanked and in particular to offer accounts that are more suitable for their needs were provided. The unbanked were encouraged to open accounts, through financial literacy programs among other ways. Success of these efforts has been limited (Lyons and Scherpf (2004), Cole et al. (2011)). And while “banking the poor” is a fairly uncontroversial policy goal, some have argued that its benefits are often overstated (i.e. Prescott and Tatar (1999)).

The pioneering work on AFS presented in Caskey (1994), Barr (2004) and Bolton and Rosenthal (2005) also highlight the importance of financial literacy in understanding AFS use. Lusardi and Scheresberg (2013) document that most high-cost borrowers display very low levels of financial literacy, that is, they lack numeracy and do not possess knowledge of basic financial concepts. They conclude that the level of financial literacy plays a role in explaining why so many individuals have made use of high-cost borrowing methods. While these conclusions might be calling for increased efforts to provide financial education, the efficacy of financial literacy programs has not yet been demonstrated convincingly (Cole et al. (2011)).

2.2 Studies of consumer characteristics and demand for rent-to-own contracts using survey data

While studying AFS, the literature just described covers but does not really focus on the rent-to-own (RTO) industry. Swagler and Wheeler (1989), and Zikmund-Fisher and Parker (1999) are the first papers to examine the contract characteristics, consumer experience within the RTO contract, and motivation for entering into such agreements.

Swagler and Wheeler (1989) present a description of the contract and are the first to perform an analysis of the cost of RTO to consumers and report the high price of the transaction. They note that, although RTO
transactions offer immediate access to goods for a relatively low periodic payment, the total amount consumers must pay to obtain ownership is high, usually two to three times the retail price of comparable goods. They also employ survey data from 61 individuals in the West Palm Beach, Florida who had participated in rental-purchase agreements. They conclude customers are predominantly female, with lower income and high school education. Regarding reported reasons for going into RTO, seven out of ten survey respondents indicated that being able to get the product right away was one of the most important reasons for participation. The fact that no credit check was involved was also frequently listed among respondents. The low monthly payments and the ability to quit at any time were also listed as attractive contract characteristics.

Zikmund-Fisher and Parker (1999) performed 153 interview surveys in Pittsburgh, Pennsylvania, to explore in more detail the determinants of rent-to-own demand. They consider RTO demand an anomaly taking “the exorbitant cost of using rental-purchase methods” into account. They conclude households are more likely to use rent-to-own contracts when they face uncertain or unstable levels of disposable income and when they report difficulties managing their finances over the longer term.

The two early studies of RTO just described are drawn exclusively from low-income populations, which is not necessarily representative of the population making use of RTO contracts at large. Sample size is also a serious consideration in both studies. Sixty one and 153 observations are used in these papers. Their survey data is also of questionable quality: the reader of these papers has no idea of the extent of the bias generated by nonresponse. This is a problem for almost every survey as it arises from the fact that there are usually differences between the ideal sample pool of respondents and the sample that actually responds to a survey. According to Weisberg, Krosnick and Bowen (1989), in the 1950s it was not unusual for survey researchers to obtain response rates of 90 percent. Now, however, people are not as trusting of interviewers and response rates are much lower. Nonresponse bias usually cannot be avoided and so inevitably negatively affects most survey research by creating errors in a statistical measurement. Researchers must therefore account for nonresponse either during the planning of their survey or during the analysis of their survey results. Swagler and Wheeler (1989) do not even give the reader an idea of the magnitude of this problem in their work, they simply state that people were “asked to take part in the survey” and that their final sample consisted of 61 individuals. The same issue is present in Zikmund-Fisher and Parker (1999), who report 153 interviews were successfully conducted but do no reveal the number of individuals who where initially approached. Finally, another problem present in many surveys is that it may be hard for participants to recall information or to tell the truth about a controversial question. Respondents may not feel comfortable providing answers that present themselves in an unfavorable way. This is particularly important in the context of alternative financial services. Some individuals may be reluctant to admit to potential embarrassments, such as having been denied credit or having signed a contract he or she did not understand.
The Federal Trade Commission, on the other hand, performed the largest and most representative survey of RTO customers. Most of the issues present in survey studies were carefully addressed in this project. In this nationwide, individual-level survey, the data were collected from December 1998 to February 1999. Twelve thousand randomly selected households were interviewed of which 532 had used RTO within the last five years. Lacko, McKernan and Hastak (2002) study these interviews and conclude RTO customers are more likely to be African American, younger, less educated, have lower incomes, have children, rent their residence, live in the South, and live in nonsuburban areas. Surprisingly, they find that 85% of rent-to-own customer households owned a car or truck, 44% had a credit card, 49% had a savings account, and 64% had a checking account. On reported contract use, they find that most (67%) RTO customers entered the transaction intending to purchase and most (70%) purchased indeed. As a result, the authors suggest that total cost and other terms of the purchase should be provided on product labels and in agreements. The authors also suggest that careful analysis should be undertaken before adopting policies that would substantially limit availability of RTO transactions because 75% of RTO customers are satisfied with their experience. Nineteen percent of RTO customers were dissatisfied, with the major complaint being about high prices.

Despite being the most comprehensive study of RTO consumer characteristics, intentions and behavior, Lacko, McKernan and Hastak (2002) still rely on survey data. Reported behavior and intentions very often differ from actual decisions. Subsequent work using micro-level data help paint a clearer picture of actual consumer behavior in the context of RTO.

### 2.3 Reduced-form studies of rent-to-own demand with micro-level data

The first two articles to make use of store transaction-level data are Anderson and Jackson (2004) and Anderson and Jaggia (2009). The former collected transactional data from 100 stores in 46 states in the United States including 57 Rent-A-Centers and 43 other RTO stores. They work with 352,646 raw transactional records, 95 percent of which correspond to the period 1998-2001. In the case of the latter, the dataset was drawn from four stores of a small RTO chain with stores in Alabama, Louisiana and Mississippi. They work with 7,517 observations, which originated between the years 2000 and 2002. Both datasets were gathered with the cooperation of the Association of Progressive Rental Organizations (APRO), the industry trade group.

In their paper, Anderson and Jackson (2004) present descriptive statistics of RTO contract outcomes to
try to derive conclusions on contract use. They find that over 51% of the agreements in their data result in the merchandise being returned and 48% with the goods remaining with the customer. Most of the purchases (56%) come through early purchase. Because only 12% of all agreements end with the customer paying to term, the authors conclude that the interest rate consumers are charged when renting to term is not the most useful information for customers. Instead, RTO contracts should provide the purchase price at different points in time, that is, the price resulting from exercising the early purchase option. The authors reject the scenario that a significant number of RTO customers are forced to return merchandise despite making scheduled payments nearly to the term of the RTO contract. They find that 90% of returns occur with less than 36% of the scheduled weekly payments made.

Anderson and Jaggia (2009), in turn, estimate a simple regression. They attempt to explain the proportion of rent paid relative to total rent if the RTO contract went to term. The authors find that, in line with Anderson and Jackson (2004), actual rent paid by RTO customers is far lower (with a median of 14.7% of total) than the total rent customers would have paid if the contract went to term. They conclude that this reflects, in part, that many customers either return or purchase early. While some of these returns are “failed purchases,” others reflect short-term need. The authors state that the data also highlight significant business risk. Unfavorable charge-offs, that is, merchandise written off as unrecoverable, are pervasive. They represent almost 13% of total charge-offs.

Part of the work presented in chapter 4 of this dissertation consists of a study of contract outcomes based on transaction-level data, very similar in spirit to the analysis contained in Anderson and Jackson (2004) and Anderson and Jaggia (2009). The data for my study consists of proprietary information from a medium-sized independent RTO chain in Ohio, with 15 stores across the state. This information was gathered without the cooperation of the Association of Progressive Rental Organizations. For the analysis I consider 10,103 items purchased by the firm in a one year period around April 2008.

I exploit the data to study aspects of RTO that have not been analyzed before, including the transaction-level performance of RTO firms. I think of the firm as investing in various durable goods and selling contracts on them to consumers to understand what the rate of return on this activity is and what the factors that affect this rate of return are.

Most importantly, the analysis contained in chapters 4 and 6 of this dissertation is also the first piece of work on the RTO industry to employ structural estimation techniques, and therefore the first to credibly analyze the consequences of contract changes, regulatory changes and other counterfactual exercises on social welfare.

The structural methodology I employ allows me to account for various factors that affect consumer behavior in the context of RTO that simply cannot be controlled for in static regression models. To begin
with, the model I develop and estimate is dynamic, a very important assumption considering RTO consumers make decisions multiple times during the life of the contract, and taking into account the fact that the agreement contains several financial options with a value that changes with time. A dynamic model is an adequate tool to reveal time-dependent patterns of consumer behavior. Consumers in my model, for instance, each period can decide whether to make a rental payment, exercise the early payout option, return the item to the store, or run away with the good. This way of modeling consumer choice leads to much richer predictions than simple summary statistics or OLS regressions. In addition, I account for the high degree of labor income risk faced by RTO customers by allowing their income process to be subject to shocks and evolve stochastically.

It becomes clear, then, that estimating a structural model is helpful to answer a broader set of questions than those addressed in the existing literature. Instead of describing contract outcomes, I attempt to understand the incentives and trade-offs individuals face, and how these lead to contract outcomes. This way of thinking about the problem allows me to understand how contract changes can ultimately impact social welfare in the industry.

### 2.4 Structural models with micro-level data

In structural models, agents are forward looking and maximize expected intertemporal payoffs. The parameters to be estimated are structural in the sense that they describe agents' preferences and beliefs about technological and institutional constraints. Under the principle of revealed preference, these parameters are estimated using microdata on individuals’ choices and outcomes. Thus an attractive feature of this literature is that structural parameters have a transparent interpretation within the theoretical model that frames the empirical investigation. Moreover, econometric models in this class are useful tools for the evaluation of counterfactual policies.


This is a growing field due to the increased availability of detailed microdata in recent years. These data provide a good input to test and apply the large theoretical literature on pricing and contract design. Another well-known impediment to the development of this literature has been the computational complexity of estimation. With the fast increase in computer power in the last thirty years, there have been a growing
number of interesting applications of these models to different areas in economics.

In chapter [5], I estimate a single-agent, finite-horizon, dynamic discrete choice model with persistent unobserved heterogeneity. I found motivation in models of retirement from the labor force such as Rust and Phelan (1997) and Karlstrom, Palmer and Svensson (2004). In these models, the individual makes the choice of whether to retire each year for a finite number of years, say from age 50 to age 70, when retirement is mandatory.


Another problem encountered during the estimation of the structural discrete choice model in the context of RTO was one of initial conditions. Simple solutions to the initial conditions problem in dynamic, nonlinear panel data models with unobserved heterogeneity are presented in Heckman (1981) and more recently in Wooldridge (2005).

Finally, I rely on the work of Magnac and Thesmar (2002). The authors analyze the identification of dynamic discrete choice models. Using Bellman equations as moment conditions (based on the insight of Hotz and Miller (1993)), they show that in general dynamic discrete choice models are nonparametrically underidentified, without knowledge of the discount factor and the distribution of the unobserved shocks.

### 2.4.1 Structural models in the context of alternative financial services

My work naturally relates to the literature applying structural estimation techniques in the context of various alternative financial services industries. No paper, however, has been written to date on rent-to-own.

In the context of payday loans, Skiba and Tobacman (2008) estimate a structural dynamic programming model that includes features like liquidity constraints and stochastic income, and incorporate institutionally realistic payday loans, default opportunities, and generalizations of the discount function. They recover deep parameters using the method of simulated moments. They conclude the estimates provide suggestive evidence that quasi-hyperbolic discounting models perform better than the exponential model at explaining payday borrowing, repayment, and default. They do not run, however, any counterfactual simulations in their paper.

A structural supply side model to study the competitiveness of the payday lending market in Colorado is

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1Pakes’ paper was also one of the first econometric applications to use Monte Carlo simulation techniques to approximate high-dimensional integrals, methodology I also employ in my work.
developed by Wu (2008). He shows that while lenders enjoy large profit margins at the loan level, this may be driven away when store- and business-level fixed costs are spread onto individual transactions.

Ruiz (2010) builds a dynamic model of household choices to study how the entry of a mainstream bank into municipalities that were previously unserved by this type of institution changes consumers’ saving, credit and consumption patterns. She finds that in the regions where the bank entered, households were better able to smooth their consumption, even though the overall proportion of households who save went down. These results suggest that the use of savings as a buffer on income fluctuations declines once formal credit is available.

Finally, Einav, Jenkins and Levine (2012) develop an empirical model of the demand for automobile financed purchases that incorporates both adverse selection and repayment incentives. The model is estimated using detailed transaction-level data on subprime auto loans from the buy-here-pay-here industry. The goal of their exercise is to show how different elements of loan contracts affect the quality of the borrower pool and subsequent loan performance. One of their main findings is the central role that down payment requirements play in limiting loan originations and constraining borrower leverage. Their estimates show that even modestly relaxing these requirements can greatly expand and increase the riskiness of the borrower pool. Their estimates also reveal a high value to innovations in credit scoring that allow offers to be based on the observed riskiness of loan applicants.

Einav, Jenkins and Levine (2012) has become one of the most cited papers in recent years studying subprime credit markets. Their work has inspired me to dive into the alternative financial services world. For that reason I will now take a moment to compare their paper to the work presented in chapters 5 and 6 of this dissertation.

It is clear that both Einav, Jenkins and Levine (2012) and myself study two financial services industries that target low-income customers, with poor to no credit history and little access to savings. We both study contract design and are ultimately interested in understanding the impact of contract changes on outcomes and welfare. With that goal in mind, however, we exploit differences sources of variation and employ different econometric techniques.

The main source of heterogeneity used in Einav, Jenkins and Levine (2012) is the presence of risk-based pricing in subprime auto loan contracts, that is, the variation in contract terms across consumers. They assess the role of contract pricing in screening high-risk borrowers and limiting defaults. In the context of RTO, on the other hand, contract terms are identical across consumers, that is, pricing is independent of creditworthiness. I instead exploit the existent heterogeneity in product categories and the time variation in consumer behavior generated by the flexibility of the RTO contract in terms of the of the early return and early purchase options.
Regarding methodology, the central empirical approach employed in Einav, Jenkins and Levine (2012) is not strictly structural. They do not parameterize and estimate the primitive elements of a consumer optimization model. Instead, they make functional form assumptions they state are more closely related to the observed outcomes and derive a set of linear estimating equations from a specific model of consumer optimization. My approach is, on the other hand, to try to recover the primitive elements of a consumer optimization model, which is computationally intensive. The techniques presented in chapters 5 and 6 of this dissertation resemble those contained in Appendix A to their paper.

2.5 Summary of contributions

As is evident from the discussion presented in this chapter, my work on rent-to-own ties together with several literatures in industrial organization, starting with pioneering studies of alternative financial services, analyses of consumer characteristics and demand for rent-to-own contracts using survey data, reduced-form studies of rent-to-own demand with micro-level data, and structural models with transaction-level data, especially those in the context of alternative financial services.

In terms of the contributions to these literatures, this dissertation contains the most detailed analysis of the RTO contract, the industry’s institutional details and its regulatory framework. I build on the analysis presented in previous papers and combine it with multiple new sources of information. I include data from the industry’s official trade association, and regulatory bodies from different states. I have also performed visits to several RTO stores, conducted interviews with industry participants, and got access to relevant proprietary documentation, including forms used to perform customer screening, actual RTO contract sheets and payment receipts. I answer questions that have not been addressed in previous papers. For instance, I provide facts on the cost of RTO to consumer and compare this cost to that of competing contractual arrangements to understand whether RTO is expensive in a relative sense and for the particular population making use of the contract. I also examine the performance of RTO companies and contrast it to that of firms in other industries and competing companies to study whether firms in the industry are overwhelmingly profitable.

This dissertation also includes the first study of RTO using micro-level data that has not been commissioned by the industry. I not only analyze contract outcomes, as previous papers using micro-level data have done. I also study aspects of RTO that have not been analyzed before, including the transaction-level performance of RTO firms. For example, I think of the firm as investing in various durable goods and selling contracts on them to consumers to understand what the rate of return on this activity is and what the factors that affect this rate of return are.
This dissertation also contains the first piece of work on the RTO industry to employ structural estimation techniques, and therefore the first to credibly analyze the consequences of contract changes, regulatory changes and other counterfactual exercises on social welfare. This is the main contribution of my dissertation, which helps fill an important gap in the literature. I develop and estimate a structural model that helps us understand the incentives and trade-offs individuals face in the context of RTO, and how these impact contract outcomes. The estimated model is used to run “what if” scenarios to analyze contract design. I show that there are a number of contract changes RTO firms can introduce to increase consumer satisfaction and firm performance simultaneously. In particular, I perform various experiments based upon the estimated model to answer three central research questions involving the early return option, the early purchase option and the delinquency option.

A proper understanding of the RTO market is essential to assess the value of the transaction to consumers and firms, as well as to design sensible regulatory frameworks. I hope my dissertation helps resolve the controversies surrounding the industry, acts as a guide to the RTO world, and promotes constructive policy discussions.

As much as I intend to contribute to the literature with a much better understanding of the RTO marketplace, there are many more questions on the industry that still need to be addressed, as listed in chapter 7. Many questions remain in the context of a large, interesting, and severely under studied industry. I hope this study motivates future researchers to contribute to our understanding of rent-to-own and other alternative financial services.
Chapter 3

Understanding Rent-to-Own: A Descriptive Analysis of the Contract and the Industry

3.1 Introduction

The focus of this dissertation is on rent-to-own (RTO) stores. Due to its unique nature, the RTO agreement is a very attractive contract to study. It is a lease-purchase agreement different from a plain rental contract and a credit sale. As will become clear in this chapter, what distinguishes the RTO agreement from a plain rental contract is that the customer has the option to purchase the item, either through renting to term or exercising an early buyout option. Customers can also terminate the contract at any time, for any reason, without further obligation, therefore not being subject to a fixed-term lease contract. What distinguishes the RTO agreement from a credit sale is, in fact, the absence of traditional credit. No credit check is performed at the initiation of the contract, and the agreement can be terminated by the customer without credit consequences.

The industry serves more than six million Americans each year and operates 9,800 storefronts in all 50 U.S. states and Canada, generating over US$ 8.5 billion in revenues and employing more than 50,000 individuals\footnote{Association of Progressive Rental Organization, http://www.rtohq.org/ (last visited May 17, 2013) [hereinafter APRO (2013)].} It has grown considerably since its inception in the early 1960s and has drawn significant attention recently from regulators and consumer advocacy groups. At the heart of the debate is the ostensibly high price of...
the RTO transaction, and the allegedly overwhelming profitability of RTO stores. Studying RTO contracts is particularly relevant at a time when the United States Consumer Financial Protection Bureau is being established and assigned increasing levels of responsibility by the Obama administration and when the number of unbanked or underbanked Americans, who rely on alternative financial services providers, is steadily growing.

By reading this chapter, the reader will acquire a deep understanding of the characteristics of rent-to-own contracts and the key components of the industry. Some of the questions I answer along the way are: What is RTO? What makes the contract unique? Is RTO expensive to consumers? Who are the main market participants? What do customers look like and how do they behave? What do firms look like and how do they perform?

As described in chapter the RTO industry has been relatively unexplored in academic settings. Every academic article on RTO contains a brief description of the contract and the industry. In this chapter, I build on the analysis presented in these papers and combine it with multiple other sources of information. I include data from the industry’s official trade association, and regulatory bodies from different states. I have also performed visits to several RTO stores, conducted interviews with industry participants, and got access to relevant documentation, including forms used to perform customer screening, actual RTO contract sheets and payment receipts. To the best of my knowledge, this chapter contains the most detailed analysis of the rent-to-own contract, the industry’s institutional details and its regulatory framework to date.

A brief discussion on the interviews with industry participants is due at this point. These were conducted between March 21st and March 23rd of 2011, at five different RTO stores belonging to both Aaron’s, one of the two publicly traded firms in the industry, and a medium-sized independent chain in Ohio. For confidentiality purposes, I will keep the names of the interviewees anonymous. I interviewed the president and founder, the marketing manager, an account manager and a district manager of the independent chain, as well as a sales manager of Aaron’s. The structure of the interviews was based on the McKinsey interviewing methodology, as presented in Rasiel (1999), technique developed for consultants who need to get up to speed on unfamiliar industries. My interview plan consisted of a set of open-ended questions on the demand and supply sides of the industry. The list of questions can be found in tables A3.1 and A3.2 in the appendix.

This chapter is structured as follows. I start by studying the characteristics of the RTO agreement.

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3The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank Act) established the Consumer Financial Protection Bureau (CFPB). In January of 2012, President Barack Obama appointed Richard Cordray to be the first Director of the CFPB. The agency’s role is to give consumers the information they need to understand the terms of their agreements with financial companies. They work to make regulations and guidance as clear and streamlined as possible so providers of consumer financial products and services can follow the rules on their own. For more information the reader is referred to: http://www.consumerfinance.gov/the-bureau/.

4FDIC (2012).
in section 3.2 the different contract terms and the various services and financial options included in the contract. From the point of view of a consumer who wants to access durable goods, I compare the cost of RTO to that of competing contractual arrangements to address the question of whether RTO is expensive. I present a discussion on how appropriate the use of implicit interest rates to assess the cost of RTO to consumers is.

The structure of the RTO industry is characterized in section 3.3 where I describe in detail the characteristics of the consumers and the firms involved in this market. The industry is heavily exposed to regulatory risk, and is currently subject to restrictions imposed at the federal and state levels. Section 3.4 presents a comprehensive account of RTO legislation. Concluding remarks can be found in section 3.5

3.2 What is Rent-to-Own?

The RTO agreement provides consumers immediate access to new or second-hand goods such as home electronics, personal computers, furniture, appliances and even car wheels and tires, without a credit check or down payment. In a typical RTO transaction, an agreement is written for a period of 6 to 36 months, with the most common maturities lying between 12 and 24 months. The merchandise is delivered immediately and rental payments are made weekly, bi-weekly or monthly. At the end of each period, a consumer can continue to rent by paying for an additional period, or can return the good to the store without further obligation. The product can be returned at any time for any reason. Consumers obtain ownership of the good by renting to term or through early payment of a pre-specified cash price. The latter is called the early buyout option. If the customer returns the product during payments, some RTO chains offer her the possibility reinstate her payment history within a specific time period. The rental fee includes delivery, setup and service.

Interviews with the president and founder of the independent chain revealed that some RTO firms allow customers to modify the terms of the agreement in response to changes in their financial situation. If money gets tighter, the customer can arrange to lower payments and extend the payment period. A customer with a positive income shock can purchase the item outright before the agreement terminates. The consumer can sometimes also upgrade the good, by altering the terms of the agreement without losing already-invested equity.

The Association of Progressive Rental Organizations (APRO) is the nonprofit trade association that represents the industry. According to them, 39% of all RTO transaction in 2007 involved furniture items.

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6 According to their website: “The Association of Progressive Rental Organizations is the international voice for the rent-to-own industry founded in 1980. APRO is the nonprofit trade association advocating and representing the rent-to-own industry.
21% electronics, 20% appliances and 9% computers. The rental of computer items has experienced impressive growth since 2007, probably reaching today 20% of all RTO transactions. A new product category, tires and wheels, has also been expanding rapidly, but statistics on these items are not yet available.

3.2.1 The rent-to-own process and contract terms

A typical customer hears about the RTO transaction from a friend or relative, or by means of advertising through direct mailing or “marriage” mailing[7] according to the marketing manager of the independent store. The customer decides to walk into a RTO store that looks like a traditional furniture store. The first piece of information the consumer encounters is the label attached to the items being offered. This provides basic information on the terms of the lease-purchase agreement. Eighteen of the 47 U.S. states that have passed RTO legislation regulate label content[8]. Most of these states require the disclosure of the term of the contract, the rental rate and the cash price. Images of RTO stores in Ohio, as well as labels, can be found in figure A3.1 in the appendix.

Once she has made the decision on which item she intends to take home, the consumer needs to fill in a Lease Order Form. Based on the information contained in the latter, the RTO store decides to approve or reject the customer. This form is therefore the main screening mechanism employed by RTO stores. All first-time customers are required to fill out this form, including personal information, and contact information of a number of personal references. The account manager of the independent chain I interviewed revealed that customers who cannot provide at least two personal references able to verify the customer’s address are not approved. Finally, prospective customers must disclose employment information, such as contact information of employer, hire date, and the frequency of arrival of paychecks. A copy of the lease order form can be found in figures A3.2 and A3.3 in the appendix, where the name of the chain has been hidden where necessary for confidentiality purpose.

Conditional on approval, a Lease Purchase Agreement is signed and the customer makes the first payment. This document is the most important record of the transaction and is considerably regulated by state laws, as described in section 3.4 Without the use of small print and in straightforward language, it specifies the terms of the agreement, describing what the consumer is entitled to by making the periodic payments, contingent fees, and some restrictions on what the customer can do with the item. The different terms laid down in this contract are:

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[7]“Marriage” mailing, also known as pizza mailing due to its widespread use by pizza restaurants, refers to group commercial mailing. Different retailers mail together to reduce costs.

[8] Association of Progressive Rental Organizations Legal Update Legal Update (2013). The reader is referred to section 3.4 in this chapter for an in depth discussion of RTO regulation.
• Ownership option: The firm will transfer ownership of the property to the customer if the item is rented to term or if the early purchase option is exercised. The formula governing the cost of exercising the early purchase option is specified.

• Termination: This is a no-obligation agreement. The customer can terminate the contract at any time, for any reason, without penalty.

• Maintenance and warranty: The firm will perform all maintenance and repairs to the property while payments are being made. It will also provide a replacement product while the item is being repaired. The manufacturer’s warranty will be passed on to the consumer if she purchases the property.

• Restrictions: The customer is not allowed to pledge or pawn the item, or move it from the address listed in the contract without written authorization from the RTO firm.

• Payment frequency: Usually weekly, bi-weekly or monthly. Chosen by the customer when the contract is originated.

• Reinstatement: The customer may reinstate the agreement without losing any right or option under certain conditions. Some stores offer lifetime reinstatement rights.

• Additional charges and fees: Late fees, in-home collection fees, reinstatement fees and optional damage waiver fees are disclosed.

• Risk of loss and damage: The contract specifies who bears the cost of item misuse and damage due to unexpected events.

Figures A3.4 and A3.5 in the appendix show a copy of the RTO contract obtained from the independent firm in 2012, where the name of the chain has been hidden where necessary for confidentiality purpose.

At every subsequent rental payment, a receipt specifying when the next payment is due, the number of payments made up to that date, and the number of payments remaining, is provided to the customer. Some RTO chains also report the amount due to exercise the early purchase option in this receipt. A copy of this receipt can also be found in the appendix, in figure A3.6.

Some customers stop making payments and refuse to return the item. Most RTO stores deal with these issues in house, with store account managers in charge of the collection practices. Lacko, McKernan and Hastak (2002) report that most customers are satisfied with the transactions and are treated well if they are late making a payment. Only a small minority report abusive collection practices though some RTO firms.

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9The value of this service exceeds that of the typical manufacturer’s warranty. It is comparable to the optional services contract offered by traditional retailers for an additional fee at the time of purchase; plus the value of being provided a loaner during repairs.
3.2.2 Interpreting the rent-to-own contract

The debate in policy circles has often been centered on the question of whether the RTO contract should be considered a lease or a credit sale. There is no point in trying to force it into either of these two definitions since the RTO contract has a unique nature. It can be understood as a bundle of services and financial options, each of which has stand-alone value to the consumer.

1. Services: Delivery, set-up of the item and service; absence of credit check and credit consequences of terminating the agreement; absence of down payment; adjustable contract terms.

2. Financial Options:

(a) A put option with a zero strike price expiring at the end of each rental period.

(b) Various options to acquire a call option with a positive strike price equal to the early purchase price.

(c) An option to acquire a call option with a zero strike price when the final payment is made.

(d) An option to re-enter the contract even after the put option described in (a) had been exercised.

(e) An option to upgrade the merchandise.

Pure lease contracts require a credit check, carry large down payments and, most importantly, lack financial option (a) above, that is the return option. Credit sale contracts, in turn, also require a credit check, do not include delivery and set-up costs, and lack all the financial options listed above. It should be clear, therefore, that RTO should be interpreted and treated as a distinct contractual arrangement given its unique nature.

3.2.3 Consumer alternatives to rent-to-own contracts

A consumer who wants to get access to a durable good has a number of alternatives to choose from. The goal of this section is to describe these alternatives and compare their cost to that of initiating a rent-to-own contract.

The customer could walk into a retail store like Walmart or Target and pay in cash. She could also use a credit card to make the purchase at the same retail store. Alternatively, the consumer could initiate a lease contract. Firms like Cort and several computer manufacturers offer these contracts. Finally, the customer

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11 This way of decomposing the RTO contract into services and financial options was first proposed by Anderson and Jackson (2001). Here I adopt their interpretation and extend it.

12 Leases are usually subject to a fixed term of six to twelve months and require monthly payments. The reader is referred to Cort’s website for more information on this contractual arrangement: http://www.cort.com/
could turn to a RTO store to start a lease-purchase agreement. For those consumers with the intention to access the durable good only temporarily, leases and RTO contracts are their best option.\(^\text{13}\)

When comparing RTO against pure retail transactions, the total amount of money needed to rent to term in a RTO transaction is compared to the cash price at retail stores.\(^\text{14}\) This comparison assumes a RTO customer rents to term, which is not always the case as has been repeatedly pointed out in the literature and as will be shown in section \(^\text{1.2.2}\). Customers returning the item early or exercising the early payout option would be disbursing significantly less to access the good.

When comparing RTO to credit card purchases, annual percentage rates (APRs) of both transactions are used. However, as will be discussed in section \(^\text{3.2.4}\) of this chapter, implicit APRs represent an upper bound on the cost of RTO to consumers. Due to the unique nature of the RTO contract, APRs could be misleading.

Finally, monthly payment amounts are used to weight RTO against pure lease transactions.

Table 3.1 compares the cost to consumers of accessing different items via pure retail purchases, credit card purchases, leases and RTO contracts.\(^\text{16}\) For the reasons stated before, the reader should be careful when interpreting the results presented in the table for the pure retail and credit card cases.

<table>
<thead>
<tr>
<th>Category</th>
<th>Item</th>
<th>RTO vs Pure Retail</th>
<th>RTO vs Credit Card Purchase</th>
<th>RTO vs Pure Lease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total of Payments</td>
<td>Cash Price Pure</td>
<td>APR RTO</td>
<td>Monthly Payment</td>
</tr>
<tr>
<td></td>
<td>RTO (1)</td>
<td>Retail (2)</td>
<td>(1)/(2)</td>
<td>RTO</td>
</tr>
<tr>
<td>Appliances</td>
<td>Estate Washer</td>
<td>$839.79</td>
<td>$414.88</td>
<td>2.0</td>
</tr>
<tr>
<td>Furniture</td>
<td>2-piece Sectional</td>
<td>$1,439.82</td>
<td>$880.00</td>
<td>1.6</td>
</tr>
<tr>
<td>TVs</td>
<td>TV: 42&quot; Plasma</td>
<td>$1,679.79</td>
<td>$599.00</td>
<td>2.8</td>
</tr>
<tr>
<td>Computers</td>
<td>1525 Dell Laptop</td>
<td>$839.88</td>
<td>$457.82</td>
<td>1.8</td>
</tr>
<tr>
<td>Electronics</td>
<td>Playstation 3</td>
<td>$719.88</td>
<td>$262.87</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Table 3.1: Cost Comparison: RTO versus pure retail, credit card purchase, and pure lease. All data from the year 2010.

The table seems to indicate that RTO agreements are more expensive than credit card purchases and pure retail transactions. APRs implicit in RTO agreements are three to four times larger than those charged by credit cards. And, as consumer advocate groups have repeatedly pointed out in the past, the total amount consumers must pay to obtain ownership of an item though RTO transactions is one and a half to

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\(^{13}\) These are the options RTO customers usually consider as alternative to RTO contracts, according to the president and founder of the independent chain.

\(^{14}\) The total amount of money needed to rent to term in a RTO contract is simply the periodic rental rate times the number of periods the agreement is subject to.

\(^{15}\) Lacko, McKernan and Hastak (2002), Anderson and Jackson (2004), APRO (2013).

\(^{16}\) RTO information was obtained from a medium-sized independent chain in Ohio. Credit card APRs were taken from the contract terms of the simplest credit card offered by Citibank. Pure lease costs were obtained from CORT, a Berkshire Hathaway Company and the world’s largest provider of rental furniture; and from PCWord Magazine for the case of computers. Finally, pure retail prices were obtained either from local discount retailers (Sears and Kmart) or online retailers (Amazon and Best Buy). All data corresponds to the May 2011.

\(^{17}\) Saunders (1997), Martin and Huckins (1997).
three times the retail price of comparable goods\footnote{These numbers are in line with those presented in a other papers claiming to document the high costs of the RTO transaction to consumers. See Zikmund-Fisher and Parker (1999), Kolodinsky et al. (2005).}. Credit card and cash purchases, however, are not nearly as flexible and convenient as RTO contracts are.

Monthly RTO payments are very close to those charged by pure lease firms. This is surprising considering the additional flexibility offered by RTO contract, where customers can return items at any time without penalty. In addition, lease services require a credit check and very often a credit card.

Note that the comparison assumes consumers have the necessary cash to purchase the item outright or access to a credit card. As mentioned earlier in the paper, almost 30\% of U.S. households are unbanked or underbanked. Consumers without available funds to purchase items outright, and those without credit or with bad credit history, may have nowhere else to turn to but RTO.

\subsection{A discussion on pricing and implicit interest rates}

As pointed out in the introduction to this chapter, the RTO industry has drawn significant attention from regulators and consumer advocacy groups. At the heart of the debate is the apparent high price of the RTO transaction, usually measured by the implicit APR customers pay if they rent to term. Academic papers with a critical view towards RTO use this measure to document the high cost of the transaction as well\footnote{See footnote \ref{footnote:18}.}

The implicit APR a consumer pays when renting to term does not seem to be a good measure of the cost of RTO contracts for a number of reasons:

1. Not all consumers rent to term. A large proportion of them exercise the early purchase option and many turn to RTO to fulfill a short-term need and therefore return the item early\footnote{There is a strong debate as to what is the proportion of consumers that end up owning the good and the fraction of them that end up just renting it. APRO argues that approximately 75\% of customers return the rented item within the first four months, 17\% exercise the early purchase option and 8\% rent to full term. The FTC survey revealed that 71\% of individuals reported having purchased the item and 25\% having returned it to the store. It is nonetheless clear that not all RTO customers rent to term. Section 4.2.2 in this chapter throws light on this questions by looking at micro-level data.}. Figure \ref{fig:3.1} shows the APR consumers pay when acquiring the ownership of the item at different points in time by exercising the early buyout option\footnote{To arrive at an APR measure, I first compute the monthly internal rate of return (IRR) from acquiring an item via the early purchase option as follows: \( \text{Cash Price} = \frac{p}{(1+IRR)^1} + \frac{pEPO}{(1+IRR)^2} + \frac{pEPO}{(1+IRR)^3} + \cdots + \frac{pEPO}{(1+IRR)^t} \), where “Cash Price” is the cash price of the item, \( p \) is the monthly rental rate, \( pEPO \) is the early purchase option price, and \( t \) is the month at which the option is exercised. I then translate monthly IRRs into yearly APRs as follows: \( APR = (1 + IRR)^{12} - 1 \). I have performed the same exercise for a variety of goods, ranging from electronics to furniture, to obtain the same qualitative results. These results are available upon request.}. The example focuses on a 42" LG plasma TV offered by the independent chain in Ohio\footnote{I have performed the same exercise for a variety of goods, ranging from electronics to furniture, to obtain the same qualitative results. These results are available upon request.}. Early purchase option prices have been computed according to equation \ref{eq:3.1} specified in Ohio state regulation (see section \ref{sec:3.4.3} of this chapter). It is clear that the implicit APR a consumer pays to acquire ownership of the good decreases the earlier the purchase option is exercised. The APR increases as we approach the rent to term case. In this sense, APRs represent a worst-case scenario.}
analysis.

2. The RTO agreement includes a bundle of services, such delivery, set-up and servicing. The value of these should be taken into account when computing the implicit rate consumers pay for the transaction. Figure 3.1 also shows APR computations including the value of these services. In this example, it is assumed that the delivery of a 42" Plasma TV has a value of $50, and its set-up a value of $30. The value of the service agreement included in the RTO contract, which exceeds that of the typical manufacturer's warranty, was also added to the computation. This value was calculated based on the price of a one-year extended warranty program offered by LG. Using this analysis, APRs are still high, but have a more reasonable level than the 229.7% reported by Zikmund-Fisher and Parker (1999) for a comparable item.

3. The flexibility of the RTO transaction and the lack of credit check are not taken into account in implicit APR computations. RTO contracts are no-obligation, no-penalty return transactions. This has value to most consumers. Put differently, the no-penalty return option is not usually available without additional payment in a credit purchase. In addition, no credit check is performed on prospective RTO customers, which is also valuable to many individuals with bad or no credit history.

4. On the other hand, the cash price used in the computation of APRs is the one charged by RTO stores. Customers can get lower prices for the items at discount department stores such as Walmart or Target. And as is mentioned in section 3.4 later in this chapter, dealers may have incentives to inflate cash prices to comply with state regulation. APRs computed using RTO chain cash prices would be underestimating the real cost of the transaction to consumers.

It is should be clear, however, that simple APRs are not the perfect measure to assess the costs of RTO agreements. Presenting consumers with a single APR number is very deceiving, especially if the number provided is the APR of renting to term, the worst case scenario APR. If regulators were to require RTO firms to present APRs to consumers, some of the adjustments described above should be implemented to overcome the limitations of this cost metric. And many APRs should be disclosed, at different points in time, not only the rent to term APR.

\footnote{LG TVs include a one-year manufacturer warranty. I split the cost of the extended warranty evenly across the remaining 9 months of the RTO contract. When an item breaks down, the customer has to contact the RTO store instead of the manufacturer, and loaners are provided during repairs. In the computations, I assumed this additional convenience has a value of $5 a month to customers.}
Figure 3.1: Implicit APR of acquiring an item through RTO.

3.3 The Market

3.3.1 Demand side

RTO companies target individuals at the base of the socioeconomic pyramid. Low income and financially distressed consumers are attracted by the immediate access to goods for a small periodic fee and no credit check or down payment that RTO offers. These are consumers facing a large degree of financial uncertainty.

The Federal Trade Commission (FTC) conducted the most comprehensive survey on the characteristics of the RTO customer. Between December 1998 and February 1999, 12,000 randomly selected U.S. households were surveyed. Slightly over 500 RTO customers were identified and interviewed about their experience with RTO stores.

The data from the survey was analyzed in Lacko, McKernan and Hastak (2002). The authors concluded that, compared to surveyed households that had not used RTO transactions, RTO customers were more likely to be African American, younger, less educated, have lower incomes, have children in the household, rent their residence, live in the South, and live in non-suburban areas.

They also found that 84% of RTO customer households owned a car, 44% had a credit card, 49% had a savings account, and 64% had a checking account.

Interesting evidence was found on payment behavior of the surveyed RTO customers. Nearly half of them had been late making payments. And 64% of late customers reported that the treatment they received from the store when they were late was either “very good” or “good”. High levels of customer satisfaction were documented in the FTC survey, with 75% of customers reporting being satisfied with their RTO experience. Among the 19% of RTO customers reporting being dissatisfied with their experience, most cited RTO prices
as the reason.

I combine and compare the results of the FTC survey with 1999 and 2009 RTO customer information provided by APRO\(^{24}\) in figure A3.7 in the appendix. This gives the reader a comprehensive portrait of the RTO customer.

### 3.3.2 Supply side

The number of RTO storefronts in the U.S. and Canada has been increasing steadily since 1997 to cross the 9,800 threshold in the year 2013. The average store has annual revenue of $736,000 and serves 360 customers each year.

Texas, Florida, Ohio, Georgia and California have the largest number of stores and employees, and consequently the highest value of annual wages and payroll taxes paid. Table A3.3 in the appendix shows summary statistics for the variables mentioned above, as well as for annual revenues generated by RTO stores across the 50 U.S. states. Table A3.4 in the appendix shows disaggregated numbers for each U.S. state\(^{25}\).

**Market participants: Publicly held firms and independent operators**

Two large public companies, Rent-A-Center (NASDAQ:RCII, 2.10B market capitalization) and Aaron’s (NYSE:AAN, 2.115B market capitalization), together operate almost 55% of the stores in the market. They compete, however, with an army of small and medium independent operators that has been gaining market share. Figure A3.8 in the appendix shows the evolution of the market share of publicly traded companies and independent operators in terms of number of stores according to APRO.

A medium-sized RTO chain operating 15 stores in Ohio has granted me access to its data. Figure A3.9 in the appendix shows the location of these 15 stores and is some evidence of the high level of competition the firm faces from the two industry giants. The chain has been in business for almost 30 years and employs around 100 individuals.

By December 2012, Aaron’s had 2,073 sales and lease ownership stores, comprised of 1,324 company-operated stores and 749 independently owned franchised stores. Annual revenues totaled $2.223 billion in 2012\(^{26}\).

Rent-A-Center (RAC) is the largest player in the RTO market. By December 2012, the company operated 2,990 company-owned stores in the U.S., including 41 pure retail installment store\(^{27}\). The company also provides financial services such as short-term secured and unsecured loans, debit cards, check-cashing and

\(^{24}\) APRO (2013).

\(^{25}\) APRO (2013).

\(^{26}\) Aaron’s (2013)

\(^{27}\) see Wisconsin court ruling in section 3.4.4 of this chapter.
money transfer services in certain existing stores. Annual revenues totaled $3.08 billion in 2012. In 2006 RAC’s market share increased significantly due to the acquisition of Rent-Way, which had previously been the third largest publicly held company. The Federal Trade Commission approved RAC’s acquisition of Rent-Way chain, indicating that under antitrust rules, the market was competitive.25

**Competition**

**From within the industry:** Competition forces from inside the industry are strong. In each city, independents compete for customers with stores owned by the two industry giants.

Firms seem to compete for business in a variety of ways. In an interview with the district manager of the independent firm it was emphasized that personal relationships are of paramount importance in this business. Most transactions are performed in-store, so firms gain or lose significant business through the relationship they develop with customers. Evidence on this is that large firms like RAC impose non-compete agreements on store employees, fearing they will take customers with them as they go to work elsewhere. Even while employing these mechanisms, RAC seems to be having trouble retaining talent at the store level. This may be an explanation for why independents are gaining market share and are standing up to the power of RAC and Aaron’s.

Other variables that drive competition are the variety of goods available, as well as the refurbishing standards of previously leased merchandise. Last but not least, firms compete in price and their ability to adjust payment plans to consumer needs.

**From outside the industry:** RTO firms also face competitive forces from outside the industry.

As mentioned earlier in the chapter, for some RTO customers, credit card purchases are an option. The founder of the independent chain mentioned that long periods of loose credit standards could have a negative impact on their business. When credit was expanded during the late 1990s and the 2000s, with interest rates on the 15%-25% range, the RTO industry was negatively affected.

Different types of retailers are also natural competitors to RTO stores. Discount department stores such as Walmart and Target represent a good alternative for many RTO consumers. Both those in a better socioeconomic situation and those who benefit from a positive income shock, including a tax refund, will probably choose to buy from discount retailers over RTO stores.

Retail establishments run by charitable organizations to raise money, commonly known as thrift stores - examples are the Salvation Army and Volunteers of America - also compete with RTO firms. Despite being in decline, credit furniture houses also impose some threat to the industry under study.

Finally, since they target the same population of consumers, other fringe products such as payday loans,

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check-cashing outlets and pawn shops are natural competitors to RTO contracts. An individual without enough cash to purchase a household item at a standard retail store could, for instance, obtain a payday loan and use the proceeds to acquire the merchandise. The reader is referred to Czerwonko and Sun (2013) for a comparison of the cost of various alternative financial services.

**Industry profitability**

Consumer advocates repeatedly characterize the RTO activity as “overwhelmingly profitable”\(^{29}\). This section attempts to give the reader an idea of how profitable RTO firms are. For that purpose I compare the performance of publicly traded RTO companies with that of firms in other industries and companies that could be considered competitors. I focus the analysis on publicly traded firms due to the difficulty to obtain and unreliability of private firm records.

I will employ two widely used measures of firm performance to carry out the described comparison. All numbers in this section correspond to end of year 2012. The first measure is net profit margin, which allows us to gain insight into how well a company generates and retains money. It is computed as the amount of net income generated by a company as a percentage of revenue. This ratio enables profitability to be compared across companies with significant differences in size and scale, and even across different industries.

An alternative ratio, return on equity, is also presented. This is the amount of net income returned as a percentage of shareholders equity; it measures a corporation’s profitability by revealing how much profit a company generates with the money shareholders have invested. It is generally used to assess the performance of financial firms. Since the RTO activity certainly has a financial component, it is worth presenting this measure as well.

In figure 3.2 I present the distribution of the average net profit margin across U.S. industries. The vertical red lines illustrate the profit margin of the two RTO publicly traded firms: Aaron’s and RAC. Of all U.S. industries, 52.80% of them have higher profit margins than RAC and 41.70% larger than Aaron’s. The figure also compares RTO firms to a list of competitors. Firms like Bed Bath and Beyond or The Home Depot present profit margins at least as high as those of the publicly traded RTO firms. A very similar picture emerges when I present the analysis using return on equity in figure 3.3.

I conclude that, at least for publicly traded firms, there is no evidence that the RTO activity is overwhelmingly profitable. The performance of the RTO firms evaluated stands roughly in the median of the distribution of performance across industries. And firms that could be considered competitors perform significantly better than RTO firms.

### 3.4 Regulation

Industry participants are highly exposed to regulatory risk. According to the industry association, an average of 25 bills that directly affect the RTO industry are introduced per year at the state and federal levels of government\(^{[30]}\). Different consumer groups, such as the National Consumer Law Center, joined the regulatory initiative and have targeted the RTO sector by endorsing specific legislation and conducting consumer awareness campaigns\(^{[31]}\).

Different aspects of the RTO agreement are currently subject to regulation. Examples are laws regulating the disclosure of certain pieces of information by rental-purchase dealers, price restrictions, regulation of collection practices and regulation of reinstatement rights.

In order to provide the reader with a comprehensive account of the current state of RTO legislation, a description of federal and state level regulation is presented next.

\(^{[30]}\) Association of Progressive Rental Organizations Legal Update Legal Update (2013).

3.4.1 Regulation at the federal level

The RTO transaction is one of the most widely used consumer transactions undefined at the federal level. In particular, it is not considered a credit transaction or a lease, and therefore it is not subject to laws such as the Truth-in-Lending Act (TILA)\(^{32}\), Consumer Leasing Act (CLA)\(^{33}\), Equal Credit Opportunity Act, Fair Debt Collection Practices Act and Fair Credit Reporting Act.

As was pointed out earlier in the chapter, the debate in policy circles has often been centered on the question of whether the RTO contract should be considered a lease or a credit sale. Proposed anti-RTO regulation has attempted to define the RTO agreement as a credit sale. This would subject RTO contracts to any limit states place on interest, fees or finance charges in connection with a credit sale or retail installment sale\(^{34}\).

To give the reader an idea of how binding this would be, 29 states currently impose finance charge limits that fall somewhere between 8% and 30%\(^{35}\). Section 3.2.4 showed how implicit APRs on RTO transactions are almost always above that level.

Naturally, the industry association, which represents RTO stores before the U.S. Congress and state legislatures, wants to prevent states from applying their credit laws and usury limits to RTO transactions. APRO has endorsed regulation that would require disclosures in advertising, in store price tags, in catalogues, and in contracts; as well as regulation that protects consumers’ right to reinstate an agreement after failing to make a timely payment. Legislation prohibiting certain provisions in rental-purchase contracts, such as confession-of-judgment clauses that prevent consumers from defending any legal action brought under the contract, has also been supported by APRO\(^{36}\).

The evolution of federal regulation over time is presented in figure A3.10 in the appendix. It becomes clear from the graph that attempts to regulate the industry at the federal level date back to as early as 1979. The latest anti-RTO regulatory attempt was a Senate bill called the Rent-to-Own Reform Act of

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\(^{32}\)Under the Truth in Lending Act, consumers must receive disclosure of the key costs and terms of credit transactions before they become obligated for the extension of credit. Consumers receive disclosures that include the amount of credit extended (known as the amount financed), the cost of credit expressed as a dollar amount (the finance charge) and as an annual percentage rate (APR), the total amount the consumer will pay, and a payment schedule showing the timing and amount of each payment. For more information the reader is referred to http://www.fdic.gov/regulations/laws/rules/6500-200.html

\(^{33}\)Under the Consumer Leasing Act, consumers receive federally mandated disclosures concerning the cost of the transaction prior to entering into the lease. These disclosures include a description of the leased property, an itemization of any up-front payments, a payment schedule showing the amount of each periodic payment, a listing of any other charges the consumer will have to pay, and the total of payments that the consumer will have paid by the end of the lease. There are also disclosures regarding early termination charges, late payment fees, property maintenance responsibilities, and the consumer’s options for purchasing the property. For more information the reader is referred to http://www.fdic.gov/regulations/laws/rules/6500-2000.html

\(^{34}\)More recent regulatory attempts have tried to make RTO agreements subject to these same limits but defining the RTO transaction as a unique transaction and not a credit sale. This is because by 1993, 35 states (see figure A3.10) had enacted RTO status that distinguished RTO from credit or installment sales, and overruling all these enactments would have made the federal government look heavy-handed.

\(^{35}\)Skiba, Bos and Carter (2012).

\(^{36}\)APRO (2013).
2007, promoted by New York Senator Charles Schumer, that did not take off\textsuperscript{37} The industry, represented by APRO, continually seeks federal legislation. The latest APRO endorsed RTO regulation is the Consumer Rental Purchase Agreement Act which was assigned to a congressional committee on April 15, 2013 and intends to assure meaningful disclosures of the terms of rental-purchase agreements and to provide certain substantive rights to consumers under these agreements\textsuperscript{38}.

3.4.2 Regulation at the state level

There has been a dichotomy between federal and state RTO regulation. At the same time that attempts to legislate the RTO industry out of business took place in the U.S. Congress, states were passing regulation that defined the RTO contract in a manner similar to a lease and not a credit sale. It is for this reason that state laws have generally been supported by the industry.

Forty-seven states currently have RTO laws that regulate the RTO transaction\textsuperscript{39}. The statutes corresponding to the different states are reasonably similar to each other. Most of them specify contract disclosures, advertising disclosures, in-store price tag disclosures, restrictions on fees, and reinstatement rights. Vermont does not regulate RTO transactions as credit sales, but does require disclosure of the effective APR. For a very thorough and clear listing of the specific rules and regulations in place in the 47 states, the reader is referred to the Association of Progressive Rental Organizations Legal Update Legal Update (2013). Figure A3.10 in the appendix shows the evolution in the number of states with RTO laws. This number has been rapidly increasing from 1993 to 2001.

3.4.3 Ohio regulation: The Ohio statute (1988)

Since the dataset was drawn from a medium RTO chain in Ohio, the paper now characterizes existing regulation in that state.

In Ohio, the definition of a “Lease-Purchase Agreement” applies only to personal property used for personal, family or household purposes. It does not include a lease for agricultural, business, or commercial purposes, a lease of a motor vehicle, money or intangible property, or a lease made to an organization.

The statute puts forth the following restrictions\textsuperscript{40}.

**Contract disclosures:** Agreements must include a description of the leased property, emphasizing whether the property is new, used or previously leased. It must be mentioned that the consumer is not required to purchase insurance for the property from any insurer owned or controlled by the lease-purchase

\textsuperscript{37}http://www.opencongress.org/bill/110-s1530
\textsuperscript{38}http://www.govtrack.us/congress/bills/113/hr1551.
\textsuperscript{39}Exceptions are Wisconsin, New Jersey and North Carolina (APRO (2013)).
\textsuperscript{40}http://codes.ohio.gov/orc/1351
firm. The following notice must also be placed in the contract: “Notice: This lease-purchase agreement is regulated by state law and may be enforced by the attorney general or by private legal action.”

**In-store price tag disclosures:** All property displayed or offered under a lease-purchase agreement must carry a tag displaying the cash price of the property, the amount of the lease payment and the total number of lease payments necessary to acquire ownership of the property.

**Advertisement disclosures:** Pieces of advertising must lay down the same information as in-store price tag disclosures.

**Restriction on payments:** Total lease payments cannot exceed twice the cash price

\[
\frac{\sum_{i=1}^{n} p_i}{2} = \frac{np_i}{2} \leq \text{Cash Price}
\]

where \(i\) indexes the monthly or weekly payments, \(n\) refers to the number of those identical payments, and “Cash Price” is the price the RTO store would charge for the same item in a pure retail transaction.\(^{41}\)

**Restrictions on early buyout option:** At any time after the initial payment, a lessee may acquire ownership of the property by paying an amount equal to the sum by which the cash price of the leased property exceeds fifty percent of all lease payments made by the lessee

\[
p_{EPOt} = \text{Cash Price} - \frac{\sum_{i=1}^{t} p_i}{2}
\]

where \(t\) denotes the number of payments made by the lessee and \(p_{EPOt}\) denotes the early purchase option price.

**Reinstatement rights and grace period:** A consumer who fails to make timely payments has the right to reinstate the original lease-purchase agreement within three lease terms after the expiration of the lease term. The RTO firm has to provide the customer with either the same property leased prior to reinstatement or substitute property that is of comparable quality and condition. In addition, the statute defines a grace period of two days for weekly payments and five days for monthly payments.

3.4.4 Unfavorable court rulings

Courts in Wisconsin, Minnesota, and New Jersey have ruled that RTO transactions are credit sales and should therefore be subject to state laws governing credit sales.\(^{42}\)

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\(^{41}\) This restriction may not be excessively binding since dealers are able to inflate cash prices to comply with it. As long as the proportion of RTO store revenue that comes from pure retail transactions is small, dealers would have incentives to do so. This is also an argument against APR disclosures: APRs would become unreliable if dealers could inflate cash prices in order to understate the disclosed APR. On the other hand, RTO chains generally try to avoid setting high cash prices since that may generate a feeling of mistrust on consumers towards the whole RTO transaction.

Minnesota: Although Minnesota has a state RTO statute, the Minnesota Supreme Court ruled that RTO transactions are credit sales and should be governed by the state’s usury cap, which has been set at an annual percentage rate of 8%.

New Jersey: In 2006, the New Jersey Supreme Court concluded that RTO products are really credit sales. The state’s 30% criminal usury cap on interest rates, for instance, would apply to RTO transactions. The court made several critical empirical assumptions about the RTO industry: that customers always intend to obtain ownership of goods, that customers do not value the ability to cancel their rental agreements, and that the goods that RTO stores rent out are necessities of life.


3.5 Conclusion

What makes the study of RTO contracts interesting is the unique nature of the agreement. Neither a credit sale nor a pure lease, this contract is the cornerstone of a market that is large in size.

Consumer advocacy groups are skeptical about the value to consumers of RTO, at the very least. They have emphasized the high cost of RTO merchandise to consumers, and the disproportionate profitability of RTO stores. The industry association, in turn, points out that RTO is one of the most flexible transactions in the marketplace and fervently denies consumer advocates’ accusations. It states that only RTO contracts offer the consumer the flexibility of a no-obligation, no-penalty return transaction that provides an ownership option.

A proper understanding of the RTO market is essential to assess the value of the transaction to consumers and firms, as well as to design sensible regulatory frameworks. The study of RTO becomes especially relevant at a time where regulators are increasing their scrutiny over financial services providers, and the United States Consumer Financial Protection Bureau is being established and assigned increasing levels of responsibility under the Obama administration. In addition, the use of lease-purchase agreements has been growing rapidly in the real estate sector after the housing crash. Understanding RTO agreements in the current setting may help us understand the advantages and disadvantages of employing this type of contract in real estate contexts.

This chapter analyzes the characteristics of RTO contracts and key components of the industry. I describe the nature of the agreement and present it as a unique bundle of services and financial options, not available
together in other contractual arrangements. I find that while RTO looks expensive compared to cash retail and credit sale transactions, it does not when benchmarked against pure leases. One has to be very careful, however, when making these cost comparisons since they implicitly assume the RTO consumers intends to own the item. A large proportion of RTO consumers do not end up owning the item and use the contract to satisfy a short-term need. For similar reasons I show that simple APRs are not the perfect measure to assess the costs of RTO agreements and should be interpreted very carefully. I present evidence that the RTO activity does not seem to be overwhelmingly profitable; the performance of publicly traded RTO firms stands roughly in the median of the distribution of performance across industries in the U.S.

This chapter also describes the existing RTO regulation. I conclude there is an apparent dichotomy between federal and state RTO regulation. At the same time that attempts to legislate the RTO industry out of business took place in the U.S. Congress, states were passing regulation that defined the RTO contract in a manner similar to a lease and not a credit sale, that is, relatively “friendly” RTO legislation.

The reader is encouraged to turn to chapter 4 where I analyze proprietary microdata of RTO transactions to understand the behavior of consumers within the agreement and the performance of RTO firms at the transaction level.
3.6 Appendix

3.6.1 Figures

(a) Images of RTO stores. Ohio, March 2011.

(b) RTO contract label. Obtained from Aaron’s store in Ohio, March 2011. It displays the contract term, the rental rate, and the cash price. In big bold letters the label also clarifies the item being offered is new.

Figure A3.1: Images of RTO stores and labels.
Figure A3.2: Example of rental order form obtained from independent store in 2011. The name of the chain has been hidden where necessary for confidentiality reasons.
NEW CUSTOMER VERIFICATION

Customer Name: ________________________________
Copy of picture ID ______________

Residency verified ______________ Spoke to ________________________
Length of occupancy? ______________ Lease or M2M? ______________
Any notice to vacate by either party? _____ Been reliable/responsible? ______________

Employment verified ______________ Spoke to ________________________
Length of employment? ______________ Shift? ________________________
Permanent or temporary? ______________ Notes: ________________________

1st Reference: Can verify residence and place of employment? ______________
How often do they see them? ______________ Any problems? ______________
OK to leave messages? ______________ Sales attempt? ______________

2nd Reference: Can verify residence and place of employment? ______________
How often do they see them? ______________ Any problems? ______________
OK to leave messages? ______________ Sales attempt? ______________

3rd Reference: Can verify residence and place of employment? ______________
How often do they see them? ______________ Any problems? ______________
OK to leave messages? ______________ Sales attempt? ______________

4th Reference: Can verify residence and place of employment? ______________
How often do they see them? ______________ Any problems? ______________
OK to leave messages? ______________ Sales attempt? ______________

Other notable information? ______________

______________________________

Verified by: _____________________ Date: ________________________

Figure A3.3: Example of rental order form obtained from independent store in 2011 (cont.). The name of the chain has been hidden where necessary for confidentiality reasons.
Figure A3.4: Example of RTO contract obtained from independent store in 2011. The name of the chain has been hidden where necessary for confidentiality reasons.
TERMS OF THE AGREEMENT

5 METHOD OF PAYMENTS: All lease renewal payments are to be made on or before the next renewal date. Payments can be made by cash, check, or money order, in person at the store, in the night drop slot, or by mail. _____ will not be responsible for cash sent through the mail, or left in night drop slot.

6 ADDITIONAL CHARGES: The total of payments does not include other charges which may be assessed:

   LATE FEE: A fee of $2.00 per day will be charged if our lease payment is received past the renewal date. This fee will begin to accrue after two days if you pay weekly and after five days if you pay monthly.

   IN-HOME COLLECTION FEE: Any time we have to make a trip to your home, other than to service, you will be charged a fee of $5.00.

   REINSTATEMENT FEE: A $5.00 fee for the right to reinstate the Agreement after the Agreement has expired.

   DELIVERY FEE: There is no charge for the original delivery. However, there will be a $25.00 fee for redelivery and set up at the time of reinstatement.

   DAMAGE WAIVER (Optional): You can choose this waiver to cover some of your liability for loss of or damage to the property (#8 below). The waiver is explained in our DAMAGE WAIVER attachment.

7 LOCATION OF PROPERTY: You agree to keep the property at the address shown on the front of this Agreement. If you remove the property without our written permission, we have the right to terminate this Agreement immediately.

8 DAMAGE OR LOSS: You are fully responsible for the loss, theft, damage, in excess of normal wear and tear, or destruction of the leased property from all causes. If such loss or damage occurs you are liable for the fair market value at the time of loss or destruction. You are not required to purchase insurance on the property from us or from any insurer owned or controlled by us.

9 MAINTENANCE: For the term of this Agreement we will perform all maintenance and repairs to the property. We will not be responsible for the cost of repairs done by others.

10 WARRANTY: The manufacturer's warranty will be passed on to you if you purchase the property, provided there is a transferable warranty still in effect.

11 TERMINATION: You may terminate this agreement at the end of any lease term. We can terminate this Agreement if you fail to make a timely renewal payment or breach any other term of this Agreement. If the Agreement is terminated you must return the property immediately to this store. Also, you owe all lease payments up to the date of termination and the expenses for returning the property if you fail to surrender it.

Your failure to surrender the leased property to us, or falsifying information on this Agreement may be subject to criminal prosecution under Ohio law.

This Lease-Purchase Agreement is specifically excluded from the definition of a retail installment sale by Section 1317.01 of the Ohio Revised Code. Therefore, the item(s) listed in the Lease-Purchase Agreement cannot be listed as your property in any type of bankruptcy proceedings.

12 REINSTATEMENT: If you fail to make a timely lease payment you have the right to reinstate this Agreement by paying all past due lease payments and applicable charges provided:

   A) You voluntarily return the property to us and

   B) No more than three consecutive lease payments have passed since you have paid a timely renewal payment.

13 RIGHT TO ASSIGN: We may sell, transfer, or assign this Agreement. However, you have no right to sell, transfer, assign, pawn, or sub-lease the property.

14 MISCELLANEOUS PROVISIONS: You understand that no changes may be made in this Agreement except by us in writing. You understand that this property may be new or previously leased. The rental property may have an automatic shut-off device installed in it. If you fail to make a timely renewal payment, we may render the Property inoperable.

Figure A3.5: Example of RTO contract obtained from independent store in 2011 (cont.). The name of the
chain has been hidden where necessary for confidentiality reasons.
Figure A3.6: Example of RTO receipt obtained from independent store in 2011. The name of the chain and the customer has been hidden where necessary for confidentiality reasons.
Figure A3.7: Profile of the RTO customer. Data obtained from APRO (2013) and FTC (2002).
Figure A3.8: Market share in terms of number of stores. Source: APRO (2013).

Figure A3.9: Location of Independent Chain (RED), Aaron’s (BLUE) and Rent-A-Center (GREEN), near Columbus, OH.
Landmarks in the history of Federal RTO Legislation

Number of States that Passed RTO Regulation
Total in 2011: 47

Ohio

<table>
<thead>
<tr>
<th>Year</th>
<th>Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>Annunzio</td>
</tr>
<tr>
<td>1984</td>
<td>Morrison</td>
</tr>
<tr>
<td>1993</td>
<td>Gonzalez/Metzenbaum</td>
</tr>
<tr>
<td>2002</td>
<td>APRO</td>
</tr>
<tr>
<td>2007</td>
<td>Schumer</td>
</tr>
</tbody>
</table>

Figure A3.10: Evolution of state and federal legislation. (-) means anti-RTO legislation. (+) means pro-RTO legislation. Data obtained from APRO (2010).
### 3.6.2 Tables

<table>
<thead>
<tr>
<th>Category</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>How would you describe your customer base? Age, gender, race, location.</td>
</tr>
<tr>
<td>(2)</td>
<td>What are the alternatives people consider when deciding to come to your store? Cash purchases at department store/Installment purchases/Purchase with credit card.</td>
</tr>
<tr>
<td>(3)</td>
<td>How does the rental initiation process work? How does the paperwork look like? What screening tools do you use? Do you use a scoring model? Personal References: Do you just check that these are real people or you also consider implicit financial guarantees? (His/her mother is going to pay for it) Do you reject applicants? How? Are you able to tell ex-ante who will default?</td>
</tr>
<tr>
<td>Demand / Side</td>
<td>(4) How do customer make the periodic payments? Cash in store/Deposit in some bank account/On-line?</td>
</tr>
<tr>
<td>Consumer</td>
<td>(5) Do you face a lot of late payments/customers skipping? How do you deal with these non-payments? In house/Outsource? Do late payment/skipping vary across product type, as well as the money/product collection process?</td>
</tr>
<tr>
<td>Behavior</td>
<td>(6) Do most people rent temporarily or to term? Does this vary across product type? What do you think motivates people to rent temporarily? Seasonal workers/people needing to try things out before actual purchase.</td>
</tr>
<tr>
<td></td>
<td>(7) What threshold do you use to perform a credit check? What kinds of customers go above this threshold? Do you change contract terms for these customers? Does the purpose of the rental change, with more temporary rentals than rentals to term?</td>
</tr>
<tr>
<td></td>
<td>(8) What are your thoughts on the complementarities between AFS? How did your offering of Tax Preparation Services and RALs work out? Do you observe that these services cluster themselves?</td>
</tr>
<tr>
<td></td>
<td>(9) What can you say about returning customers?</td>
</tr>
</tbody>
</table>

Table A3.1: List of interview questions to industry participants - Demand side questions.
<table>
<thead>
<tr>
<th>Category</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Where does most of your revenue come from? Which type of customer? Which product?</td>
</tr>
<tr>
<td></td>
<td>(2) How can your costs be explained? I would like to understand your cost structure. Good purchases/Payroll/Store expenses/Inventory costs.</td>
</tr>
<tr>
<td>Supply Side</td>
<td>(3) Who do you buy from? How do you choose what to buy? Do you offer a lot of brands for each product? Do you take advantage of good buying opportunities and stock up? Or you make regular purchases?</td>
</tr>
<tr>
<td></td>
<td>(4) How do you set cash/weekly/monthly prices? Dishwashers seem to be priced lower than laptops maybe due to a lower probability of default and loss of merchandise/lower resale value after stolen. Do you follow competitor’s prices? Which competitors?</td>
</tr>
<tr>
<td></td>
<td>(5) Who do you feel are your closest competitors? Do you compete in price? Do you compete in quality? Consumer satisfaction in store/better products or brands.</td>
</tr>
<tr>
<td></td>
<td>(6) How do you advertise? Print/Rely on word of mouth/TV/Radio.</td>
</tr>
<tr>
<td></td>
<td>(7) What motivated you to sell 10 stores to Aaron’s?</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Question</td>
</tr>
<tr>
<td></td>
<td>(1) If I have follow up questions, whom do I contact?</td>
</tr>
<tr>
<td>General Questions</td>
<td>(2) If you approve the data that I request, can there be any complication with High Touch?</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>(4)</td>
</tr>
<tr>
<td></td>
<td>(5)</td>
</tr>
</tbody>
</table>

Table A3.2: List of interview questions to industry participants - Supply side questions.
<table>
<thead>
<tr>
<th>State</th>
<th>Stores</th>
<th>Employees</th>
<th>Annual Wages (Millions)</th>
<th>Annual Payroll Taxes (Millions)</th>
<th>Annual Revenues (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td>10</td>
<td>60</td>
<td>$2.1</td>
<td>$0.3</td>
<td>$7.4</td>
</tr>
<tr>
<td>P25</td>
<td>43.5</td>
<td>261</td>
<td>$9.1</td>
<td>$1.4</td>
<td>$34.1</td>
</tr>
<tr>
<td>P50</td>
<td>113</td>
<td>678</td>
<td>$23.8</td>
<td>$3.6</td>
<td>$96.2</td>
</tr>
<tr>
<td>P75</td>
<td>239.5</td>
<td>1437</td>
<td>$50.3</td>
<td>$7.7</td>
<td>$186.6</td>
</tr>
<tr>
<td>Max</td>
<td>973</td>
<td>5838</td>
<td>$204.3</td>
<td>$31.0</td>
<td>$716.0</td>
</tr>
<tr>
<td>Mean</td>
<td>162.84</td>
<td>977.04</td>
<td>$34.2</td>
<td>$5.2</td>
<td>$125.5</td>
</tr>
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</table>

Table A3.3: Summary statistics of the economic impact of the RTO industry in the US. Data for the 50 U.S. states. Data obtained from APRO (2013).

<table>
<thead>
<tr>
<th>State</th>
<th>Stores</th>
<th>Employees</th>
<th>Annual Wages (Millions)</th>
<th>Annual Payroll Taxes (Millions)</th>
<th>Annual Revenues (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas</td>
<td>973</td>
<td>5838</td>
<td>$294.3</td>
<td>$31.0</td>
<td>$776.0</td>
</tr>
<tr>
<td>Florida</td>
<td>558</td>
<td>3348</td>
<td>$117.0</td>
<td>$18.0</td>
<td>$411.0</td>
</tr>
<tr>
<td>Ohio</td>
<td>388</td>
<td>2328</td>
<td>$81.5</td>
<td>$12.5</td>
<td>$285.5</td>
</tr>
<tr>
<td>Georgia</td>
<td>364</td>
<td>2184</td>
<td>$76.4</td>
<td>$11.7</td>
<td>$268.0</td>
</tr>
<tr>
<td>California</td>
<td>341</td>
<td>2046</td>
<td>$71.6</td>
<td>$11.0</td>
<td>$251.0</td>
</tr>
<tr>
<td>North Carolina</td>
<td>334</td>
<td>2004</td>
<td>$70.0</td>
<td>$10.7</td>
<td>$245.7</td>
</tr>
<tr>
<td>Tennessee</td>
<td>309</td>
<td>1854</td>
<td>$63.0</td>
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<td>Missouri</td>
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<td>1104</td>
<td>$58.2</td>
<td>$8.9</td>
<td>$204.0</td>
</tr>
<tr>
<td>New York</td>
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<td>$57.0</td>
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</tr>
<tr>
<td>Indiana</td>
<td>263</td>
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<td>Pennsylvania</td>
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<td>Virginia</td>
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<tr>
<td>Michigan</td>
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<tr>
<td>South Carolina</td>
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<td>$6.5</td>
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</tr>
<tr>
<td>Alabama</td>
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<td>1218</td>
<td>$42.6</td>
<td>$6.5</td>
<td>$149.0</td>
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<tr>
<td>Kentucky</td>
<td>185</td>
<td>1110</td>
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<td>$5.9</td>
<td>$136.0</td>
</tr>
<tr>
<td>Mississippi</td>
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<tr>
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<td>$104.0</td>
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<tr>
<td>Arizona</td>
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<td>Washington</td>
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<tr>
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<tr>
<td>Iowa</td>
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<td>$2.8</td>
<td>$63.3</td>
</tr>
<tr>
<td>New Mexico</td>
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<td>$56.7</td>
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<tr>
<td>Oregon</td>
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</tr>
<tr>
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<td>$52.0</td>
</tr>
<tr>
<td>New Jersey</td>
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<tr>
<td>Nebraska</td>
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<td>$10.0</td>
<td>$1.7</td>
<td>$38.3</td>
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<td>West Virginia</td>
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<td>$1.6</td>
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<td>$1.4</td>
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<td>$0.6</td>
<td>$14.0</td>
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<td>$2.3</td>
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<td>Minnesota</td>
<td>10</td>
<td>60</td>
<td>$2.1</td>
<td>$0.3</td>
<td>$7.4</td>
</tr>
</tbody>
</table>

Table A3.4: Economic impact of the RTO industry by state. Data obtained from APRO (2013).
Chapter 4

The Data: Item- and Agreement-level Information

4.1 Introduction

In this chapter I use proprietary micro-level data from a medium-sized RTO chain in Ohio to analyze the behavior of consumers and the transaction-level performance of RTO firms. This section paves the way for the estimation of a dynamic model of consumer behavior and firm profitability in chapter 5 and chapter 6, since these data are going to be used in the estimation of such structural model.

The RTO industry has been relatively unexplored in academic settings. The review of the literature presented in chapter 2 revealed that early papers studying consumer behavior in RTO contracts, including Swagler and Wheeler (1989) and and Zikmund-Fisher and Parker (1999), relied on survey data and a small number of observations. Survey data introduces serious limitations since reported behavior and intentions very often differ from actual decisions. As a result of the increased availability of detailed microdata in recent years, two papers tried to analyze consumer behavior using transaction-level information: Anderson and Jackson (2004) and Anderson and Jaggia (2009). A quote from the later paper exposes the problem with the work presented in them: “the information was gathered with the cooperation of the Association of Progressive Rental Organizations (APRO), the industry trade group”. This gives rise to a clear conflict of interest and questions the objectivity of the presented analysis.

This chapter contains the first fully independent study of RTO using micro-level data. To the best of my knowledge, there is no other study based on transaction-level data that has not been commissioned by the industry. The data was gathered without the cooperation of the industry association, which enables me to
perform purely objective research.

Section 4.2 describes the dataset and performs reduced-form analysis. First, the study of item-level data will help the reader understand the performance of the firm at the micro-level. I think of the firm as investing in various durable goods and selling contracts on them to consumers. I am interested in understanding what the rate of return on this activity is and what are the factors that affect this rate of return. Second, the data at the agreement-level reveal patterns of behavior of those consumers who choose to go into RTO contracts. The data help resolve the existing controversy regarding contract use, in particular, regarding the proportion of RTO customers that rent items to term. The empirical patterns of consumer behavior presented in section 4.2.2 will provide the identifying variation for the estimation of the model later in this dissertation. This behavior also motivates some of the questions and counterfactuals presented in chapter 6.

4.2 The Data

The dataset consists of proprietary information from a medium-sized independent RTO chain in Ohio. It contains information from its 15 stores until close of business Monday, April 4th, 2011. To ensure the confidentiality of the data, the software firm has delivered de-identified information. Variables, such as name, address, Social Security number, driver’s license number, and phone numbers of customers involved in the RTO agreements, have been stripped out.

The dataset includes inventory items purchased by the RTO chain as early as 1997 and as late as the date the data were gathered in April 2011. I make use of a subset of all the items included in this dataset. I include items purchased early enough to allow them to get charged off, that is, to allow them to be rented to term, acquired through the early payout option, acquired through a cash sale or stolen, by the time the data were gathered. Charged off inventory items are purged and removed from the data set three years after their charge off date. To avoid problems related to the purging practice employed by the data management firm, I also include items purchased late enough. As a result, and after the filtering of spoiled records and transactions with missing information, for the analysis I consider 10,103 items purchased by the firm in a one year period around April 2008. Almost 95% of these items had been charged off by the time of the data gathering in April 2011.

---

1 This research project has been approved by the Institutional Review Board at Columbia University.
2 To illustrate why the purging practice represents a problem, assume we have two items bought by the store in January 2007, but one is charged off in March of 2008, while the other one is charged off in May of the same year. Since the data were gathered in April of 2011, and information on charged off items is kept for only three years after the charge off date, we would observe information on the later item but not on the former. For some product categories, for instance, items charged off earlier are less profitable than items charged off later in their lives. For those categories, neglecting the fact that information on some items charged off early has been purged would result in an overestimation of firm performance at the item level. It is to mitigate this problem that I only include items purchased by the firm at most six months before April 2008 in the sample. In this way I significantly reduce the bias introduced by the purging practice.
Detailed information on the firm’s inventory items is contained in the data, including a full description of the product, cost and original purchase date, the cash flow it generated, and data on past agreement activity in terms of the number of RTO contracts the item was involved in. The information at the item level will be analyzed in this chapter to give the reader a flavor of the micro-level financial performance of RTO firms. The dataset spans items in various product categories including appliances, furniture, TVs, computers and electronics.

Inventory items are usually involved in more than one RTO agreement before they are charged off. In addition to data on inventory items, the dataset also contains detailed information of the last RTO agreement an item participated in. The data at the agreement level consist of a description of the terms of the agreement and the decisions of the individual signing the agreement at every point in time. It provides insight into the incentives and trade-offs RTO consumers face and will be employed to estimate the structural model in chapter 5. To estimate this model, I need to observe the behavior of multiple consumers facing the same contract terms. For this reason I will focus the analysis on the the most popular items within each product category. I therefore work with a panel dataset of 5,226 RTO agreements across the five product categories: appliances, furniture, TVs, computers and electronics, involving washers and dryers, mattresses and living room sets, flat-screen TVs, video game consoles and laptop computers, respectively.

4.2.1 Item-level data: Firm performance

Detailed information on inventory items is contained in the data, including a full description of the product, cost and original purchase date, the cash flow it generated, and data on past agreement activity in terms of the number of RTO contracts the item was involved in.

The dataset spans various product categories listed in table 4.1. The largest number of items corresponds to furniture, followed by appliances, TVs, electronics and computers. Within each category, the items most frequently observed in the data are washers and dryers, mattresses and living room sets, flat-screen TVs, video game consoles and laptop computers, respectively. The “Other” category is a very heterogeneous group of items including toys, jewelry, loan equipment and even hot tubs.

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage of RTO Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliances</td>
<td>18.82</td>
</tr>
<tr>
<td>Furniture</td>
<td>36.16</td>
</tr>
<tr>
<td>TVs</td>
<td>17.50</td>
</tr>
<tr>
<td>Computers</td>
<td>11.34</td>
</tr>
<tr>
<td>Electronics</td>
<td>12.85</td>
</tr>
<tr>
<td>Other</td>
<td>3.14</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.1: Item Categories.
The mean value of the different variables available across product categories is presented in table 4.2 below. We observe the cost of the items the firm commercializes ranges between $200 and $700, the least expensive items being electronics, and the most expensive TVs. Items participate in between two and three rental purchase agreements before they end up in the hands of the consumer permanently. The variables percentage_time_rent and months_until_first_rent give the reader a sense of the total shelf time and initial shelf time, respectively. If we interpret these as a measure of the relative attractiveness of the item, we see that computers and appliances seem to be the most attractive items since they rent off fast, and electronics the least since they wait in shelf the longest. Regarding the terms of the RTO agreement, that is the monthly rental rate and the contract length, items that depreciate faster and require more servicing carry shorter terms and larger monthly rates. All else equal, higher-cost items carry larger rates than lower cost ones.

Further discussion on the terms of the RTO agreements can be found in sections 4.2.2 in this chapter. The second to last column of table 4.2 shows that a significant amount of items display unfavorable charge-offs to the firm, that is, participate in agreements where the customer stops making rental payments and refuses to return the item to the store.

<table>
<thead>
<tr>
<th>Category</th>
<th>orig_cost</th>
<th>times_rent</th>
<th>percentage_time_rent</th>
<th>months_until_first_rent</th>
<th>monthly_rate</th>
<th>monthly_term</th>
<th>stolen_dummy</th>
<th>monthly_rate_of_return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliances</td>
<td>$356.79</td>
<td>2.05</td>
<td>81%</td>
<td>2.47</td>
<td>$56.04</td>
<td>22.95</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Furniture</td>
<td>$265.15</td>
<td>2.52</td>
<td>70%</td>
<td>3.52</td>
<td>$56.67</td>
<td>14.98</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>TVs</td>
<td>$695.87</td>
<td>2.53</td>
<td>74%</td>
<td>2.89</td>
<td>$73.56</td>
<td>18.98</td>
<td>18%</td>
<td>2%</td>
</tr>
<tr>
<td>Computers</td>
<td>$509.73</td>
<td>2.24</td>
<td>75%</td>
<td>1.68</td>
<td>$68.99</td>
<td>12.22</td>
<td>15%</td>
<td>3%</td>
</tr>
<tr>
<td>Electronics</td>
<td>$205.37</td>
<td>3.11</td>
<td>54%</td>
<td>3.83</td>
<td>$43.11</td>
<td>10.98</td>
<td>16%</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>$254.86</td>
<td>2.61</td>
<td>94%</td>
<td>2.16</td>
<td>$52.23</td>
<td>8.99</td>
<td>5%</td>
<td>11%</td>
</tr>
<tr>
<td>Total</td>
<td>$377.99</td>
<td>3.14</td>
<td>72%</td>
<td>3.00</td>
<td>$59.09</td>
<td>16.18</td>
<td>8%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Table 4.2: Mean value of variables in item-level data across product categories.

It is in the last column of table 4.2 that I am most interested in. This variable gives us an idea of the performance of the RTO firm at the item level. If we think of the firm as investing in various durable goods and selling contracts on them to consumers, we are interested in the following questions: What is the rate of return on this activity? What item characteristics affect these rates of return the most?

The measure of profitability presented in the table, monthly_rate_of_return, is computed using the following formula:

\[
\text{monthly\_rate\_of\_return} = \left( \frac{\text{Revenue from item}}{\text{Cost of item}} \right)^{\frac{1}{\text{months until charged off}}} - 1
\]

This is the effective monthly rate the shop obtains from offering RTO contracts to consumers. “Revenue from item” is the total dollar amount the shop obtains from renting out the item, it includes rental and early purchase option payments. “Cost of item” is simply the amount the shop paid for the durable good, and “#
of months until charged off" is the number of months the item generated cash flows until it got charged off.

Figure 4.1 presents the rate of return distribution for all items in the data. The mean (median) monthly return is 4.99% (5.21%). Two very different pictures become visible when I separate items into two groups: the 8.4% of items that were stolen and those that were not. Items that end up being stolen yield a much smaller rate of return of 1.6% (-5.07%), as can be seen in figure 4.2. A significant amount of agreements end up with customers neither making the contractual payments nor returning the item, which dents the profits of the firm. This expands into the delinquency discussion in section 4.2.2 above.

![Figure 4.1: Monthly rate of return distribution across inventory items.](image1)

![Figure 4.2: Monthly rate of return distribution across inventory items - Delinquent Items.](image2)

![Figure 4.3: Monthly rate of return distribution across inventory items - Non-Delinquent Items.](image3)

When looking at rates of return by product category, we observe that these are negatively correlated.
<table>
<thead>
<tr>
<th>Category</th>
<th>Mean return</th>
<th>Median return</th>
<th>Percentage Skip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliances</td>
<td>5.5%</td>
<td>5.2%</td>
<td>5.7%</td>
</tr>
<tr>
<td>Furniture</td>
<td>6.7%</td>
<td>6.1%</td>
<td>6.5%</td>
</tr>
<tr>
<td>TVs</td>
<td>2.3%</td>
<td>4.2%</td>
<td>18.0%</td>
</tr>
<tr>
<td>Computers</td>
<td>3.5%</td>
<td>4.9%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Electronics</td>
<td>2.9%</td>
<td>5.3%</td>
<td>16.0%</td>
</tr>
<tr>
<td>Other</td>
<td>10.8%</td>
<td>9.6%</td>
<td>4.7%</td>
</tr>
</tbody>
</table>

Table 4.3: Rate of return by category.

with the proportion of items that end up being stolen. As table 4.3 shows, furniture and appliances are the highest yielding product categories, and also the categories with the lowest proportion of items ending up in delinquency. TVs, computers and electronics yield lower rates of return, and have also the largest probability of ending up stolen.

I run a simple OLS regression of the rate of return on a series of covariates that confirms the findings presented so far. The predictor variables are the product categories, the cost of the item, the number of times the item was rented out, the proportion of time the item was on rent with respect to the time until charge off, the initial “shelf time” or number of months until first rental, the monthly rental rate, the monthly term of a RTO agreement on the item, and a dummy indicating whether the item was stolen. I also control for the store where the item is located.

The regression results presented in table 4.4 confirms that furniture and appliances are the most profitable product categories, and that stolen items are significantly less profitable than non-stolen ones. It is surprising that the cost variable is not statistically significant. Nor is the monthly rental rate variable. Variables including the initial shelf time, and the term of the agreement, are statistically but not economically significant. The variable “percentage_time_rented” is statistically significant, indicating that shelf time in between rentals hurts profitability.
Even after delinquency affects the performance of the RTO firm at the transaction level, the monthly rate of return derived from the RTO activity is quite high, ranging from 2%-11% a month, or 25%-250% a year. On the other hand, we saw in section 3.3.2 in chapter 3 that the profit margin and return on equity of publicly traded RTO firms stand roughly in the median of all U.S. industries. How can we reconcile these two facts? This questions certainly deserves further work. My hypothesis is that the seemingly large margin of profit shown on the transaction level is be driven away when store- and business-level fixed costs are spread onto individual transactions. In the context of the payday industry, Wu (2008) reaches very similar conclusions.

4.2.2 Agreement-level data: Consumer behavior

In this section I analyze information at the RTO agreement level. I focus on RTO contracts of new items since I have reliable information on the pricing of only such agreements. These data will be used to estimate the model presented in chapter 5 for which I need to observe the behavior of multiple consumers facing the same contract terms. For this reason I will focus the analysis on the the most popular items within product categories. I therefore work with a panel dataset of 5,226 RTO agreements across five product categories: appliances, furniture, TVs, computers and electronics. For each agreement, I have detailed information on the characteristics of the underlying item, as well as detailed contract pricing and term information. Also, for each RTO contract, I observe the decisions of the individual at every point in time. Table 4.5 describes the

Table 4.4: Rate of return regression results. Store number fixed effects were included but are not reported in the table.

<table>
<thead>
<tr>
<th>Category (Base=Appliances)</th>
<th>b</th>
<th>se</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture</td>
<td>0.003</td>
<td>0.006</td>
</tr>
<tr>
<td>TVs</td>
<td>-0.014</td>
<td>0.008</td>
</tr>
<tr>
<td>Computers</td>
<td>-0.033***</td>
<td>0.009</td>
</tr>
<tr>
<td>Electronics</td>
<td>-0.025**</td>
<td>0.008</td>
</tr>
<tr>
<td>Other</td>
<td>0.024</td>
<td>0.012</td>
</tr>
<tr>
<td>orig_cost</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>times_rented</td>
<td>-0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>percentage_time_rent</td>
<td>0.095***</td>
<td>0.01</td>
</tr>
<tr>
<td>months_until_first_rent</td>
<td>-0.003***</td>
<td>0.001</td>
</tr>
<tr>
<td>monthly_rate</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>monthly_term</td>
<td>-0.003***</td>
<td>0.000</td>
</tr>
<tr>
<td>stolen_dummy (Base=Non-stolen)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stolen</td>
<td>-0.105***</td>
<td>0.006</td>
</tr>
<tr>
<td>_cons</td>
<td>0.071***</td>
<td>0.015</td>
</tr>
</tbody>
</table>

r2    0.074
N     9842

The performance of the independent chain is also in line with that of the publicly traded RTO firms. For confidentiality reasons, I cannot reveal the exact numbers.
number of observations, gives an example of the item underlying the RTO contract, and presents contract term information for the five product categories I work with.

<table>
<thead>
<tr>
<th></th>
<th>Observations (N)</th>
<th>Example of Item</th>
<th>Contract Term (T)</th>
<th>Monthly Rental Rate (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliances</td>
<td>1,438</td>
<td>Washer/Dryer</td>
<td>21</td>
<td>$39</td>
</tr>
<tr>
<td>Furniture</td>
<td>1,161</td>
<td>Mattress</td>
<td>12</td>
<td>$84</td>
</tr>
<tr>
<td>TVs</td>
<td>815</td>
<td>42&quot; Plasma TV</td>
<td>21</td>
<td>$94</td>
</tr>
<tr>
<td>Computers</td>
<td>1,225</td>
<td>15&quot; Laptop Computer</td>
<td>12</td>
<td>$79</td>
</tr>
<tr>
<td>Electronics</td>
<td>587</td>
<td>PlayStation 3</td>
<td>12</td>
<td>$62</td>
</tr>
</tbody>
</table>

Table 4.5: Dataset description by category.

The main contract terms in a RTO agreement are the contract length and the monthly rental rate. According to the president of the independent chain, there are two main item characteristics that influence the terms of the RTO agreement: the depreciation suffered and the amount of servicing typically required by the item. Items that depreciate faster and require more servicing carry shorter terms and larger monthly rates. Everything else equal, higher-cost items also carry larger rates than lower cost ones. In table 4.5, we see that, on the one end, computers and quickly depreciating furniture items are available with relatively short term agreements and high monthly rates. These items depreciate very fast. Computers become promptly obsolete due to high levels of innovation in the industry. RTO customers are inexperienced computer users that require significant customer service. Mattresses and sofas are very personal items. The store has no option but to increase the monthly rate and decrease the agreement term to front load the cash flows it can obtain from the item. On the opposite side of the spectrum lie appliances. Consumers can access these with relatively long contracts and low monthly rates. These items depreciate much slower and require less servicing. The store has no need to front load the cash it expects to receive from the agreement.

To better understand how consumers make use of RTO agreements, table 4.6 presents some statistics on contract outcomes. The second column allows us to address the controversy regarding the proportion of RTO customers that rent items to term, that is, that make all periodic rental payments until completion of the contract to acquire the good. Data from the industry association indicate that only 8% of all transactions nationwide are carried to completion\(^4\), while a recent study based on data of the FTC survey found that close to 70% of consumers reported their installments resulted in a purchase\(^5\). Analysis of micro-level data indicates that the actual number of consumers that rent to term might stand somewhere in the middle. I observe that the proportion of agreements that end up in a rental to term stand between 5% and 14% depending on the product category. As reflected in table 4.6, a large fraction of consumers, between 43%

---

\(^4\)APRO (2013).
and 48% of them, exercise the early return option. The early purchase option is also greatly exercised, in between 20% and 39% of the contracts.

<table>
<thead>
<tr>
<th></th>
<th>Early Return</th>
<th>Rent to Term</th>
<th>Early Purchase Option</th>
<th>Stolen</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliances</td>
<td>43%</td>
<td>14%</td>
<td>39%</td>
<td>3%</td>
<td>100%</td>
</tr>
<tr>
<td>Furniture</td>
<td>49%</td>
<td>12%</td>
<td>34%</td>
<td>4%</td>
<td>100%</td>
</tr>
<tr>
<td>TVs</td>
<td>54%</td>
<td>5%</td>
<td>31%</td>
<td>10%</td>
<td>100%</td>
</tr>
<tr>
<td>Computers</td>
<td>55%</td>
<td>9%</td>
<td>27%</td>
<td>9%</td>
<td>100%</td>
</tr>
<tr>
<td>Electronics</td>
<td>58%</td>
<td>13%</td>
<td>20%</td>
<td>9%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.6: Agreement Outcomes.

Table 4.6 provides clear evidence that consumers are making full use of the non-standard features of RTO contracts, those features that differentiate RTO contracts from credit sales, pure retail and lease transactions. For this reason, and picking up on the discussion presented in section 3.2.3 in chapter 3, it is very hard to compare the cost to consumers of RTO with that of alternative contractual arrangements. More often than not, consumers drop off the RTO contract before reaching the full maturity of the contract, via the early return and early purchase options. Employing total of payments to compare RTO to pure retail, or the implicit APR of renting to term to compare RTO to a credit sale, would imply overestimating the cost of RTO. The reason is simple: not many consumers that initiate an agreement rent to term.

The timing of the different consumer decisions is of particular interest in the context of RTO. I analyze consumer behavior over time in detail in the next subsection.

**Empirical patterns of consumer behavior**

Consumers that are part of a RTO contract each period can decide to make a rental payment (PAY), exercise the early payout option and obtain ownership of the good (EPO), return the item to the store without further obligation (RET), or steal the good (STL). I observe each of these consumer decisions in the panel dataset of RTO agreements I work with in this sections. Figure A4.1 in the appendix depicts the proportion of customers that choose each of these four options, at each point in time, for consumers remaining in the contract, and for all product categories. Figure A4.1e, for instance, focuses on consumer decisions under contracts that involve electronics. The blue dots represent the proportion of customers that decide to make a rental payment each month, starting on month one, until the end of the contract. Green, red and turquoise dots present the proportion of consumers who exercise the early payout option, the early return option and steal the item, respectively.

As is evident from the graphs, the incentives and trade-offs consumer face when renting to own appliances,
furniture, TVs, computers and electronics, change over time. Two areas can be distinguished in each graph. In the first area, which lasts roughly half the contract length, the consumer has not built too much equity in the contract and exercising the early payout option remains prohibitively expensive. I observe most consumers decide to make a rental payment, while some of them decide to return, presumably those who are not satisfied with the item or suffered from a low income draw. In the second area, roughly equal to the second half of the contract, the EPO price has decreased to a level consumers can afford. I therefore observe a sharp increase in the proportion of individuals who exercise the EPO, with a consequent decrease in that of payment and returns.

A slightly different pattern is present in figure A4.1a for the case of appliances. The first and second areas described above are still present. Appliances display a third area toward the end of the contract, where it seems like the attractiveness of the EPO as an option to consumers decreases since ownership through renting to term is just around the corner. The percentage of consumers making a rental payment, therefore, gains ground vis-a-vis the percentage choosing to exercise the EPO. The proportion of consumers returning the item goes down over time as a result of the consumer building equity into the item. It is possible this third area is present in the case of appliances since the RTO contract length for this category is relatively long and monthly rates are relatively low, making renting to term attractive towards the end of the contract. This behavior does not arise in TV agreements, which are also long, but involve large monthly rental rates. It is hard to rationalize, though, why for this product category the relative attractiveness of the EPO decreases as the contract approaches an end. With the EPO price going down over time, the relative attractiveness of the EPO should only increase. The industry participants I interviewed could not provide an explanation for the behavior observed in the case of appliances.

The consumer behavior depicted in figure A4.1 will provide the identifying variation for the estimation of the model presented in chapter 5. This behavior also motivates some of the questions and counterfactuals presented in chapter 6.

One question is related to the early return option. An aspect of the rent-to-own contract that stands out is its high degree of flexibility. The information presented in table 4.6 and figure A4.1 seems to indicate that some customers are taking advantage of the flexibility in the option to return items early. At the same time, other consumers do not seem to be making use of this lack of long-term commitment at all. These two groups of consumers can be clearly distinguished based on the data presented in table A4.4a. The table shows the proportion of agreements that end up with the item returned during the first third of the contract.

\[ p_{EPO} = \text{CashPrice} - \frac{t \times \text{PP}}{2} \]

\(^6\)Remember that, as was described in section 2.4.3, the early purchase option price is dictated by state regulation: “At any time after the initial payment, a lessee may acquire ownership of the property by paying an amount equal to the sum by which the cash price of the leased property exceeds fifty percent of all lease payments made by the lessee”. This means \( p_{EPO} = \text{CashPrice} - \frac{t \times \text{PP}}{2} \) where \( t \) represents the number of payments made so far.
During the first half of the contract, and the proportion of agreements that do not conclude with a return. Around 50% of the contracts end up with a return during the first half of the agreement and close to 50% of the contracts do not culminate with a return (the EPO is exercised, the agreement is carried to term or the items is stolen). Those consumers who return items do so very early: between 36% and 50% of contracts, depending on the product category, end with early returns during the first third of the contract. These early returns drive up the RTO firm’s costs. Returned items have suffered depreciation, and need to undergo a reconditioning process in order to be re-rented. High RTO costs are likely to be passed on to RTO consumers. Those consumers that do not exercise the early return option could be subsidizing the cost of the RTO contract to those who do. I therefore want to understand what the welfare implications of reducing the return flexibility in RTO contracts are.

A second question has to do with the early purchase option. In Ohio, the state where the dataset used in this study is from, regulation imposes restrictions on the early purchase option schedule. The formula chosen to dictate the shape of this schedule does not seem to follow an economic rationale. In chapter 5, I therefore study the welfare cost of RTO regulation in terms of restrictions on the early purchase option schedule. The current schedule does not seem to be promoting the exercise of the early purchase option early in the life of the contract. Only between 3% and 12% of contracts end through the early purchase option during first half of the agreement, as can be seen in table 4.4b. Most consumers who exercise the option do so during the last third of the contract, as is evident from the numbers presented in the last two columns of table 4.4b. Alternative early purchase options price schedules might induce different patterns of behavior that could make both consumers and RTO firms better off. These counterfactual exercises will be explored in chapter 6.
A discussion on delinquency

Table 4.7 shows the proportion of agreements in the data that end up with an item being stolen over time, by product category. Two main observations arise. First, stealing occurs relatively infrequently, with the per period empirical probability of STL being very small. Second, STL remains relatively stable over time, lacking any dynamic behavior. This goes against the intuition that people who are planning to steal an item would do so as early as possible in the life of the contract.

<table>
<thead>
<tr>
<th>Mean</th>
<th>t=1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>t=21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliance</td>
<td>0.3%</td>
<td>0.7%</td>
<td>0.2%</td>
<td>0.5%</td>
<td>0.8%</td>
<td>0.1%</td>
<td>0.5%</td>
<td>0.1%</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.0%</td>
<td>0.8%</td>
<td>0.0%</td>
<td>0.3%</td>
<td>0.0%</td>
<td>1.6%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Furniture</td>
<td>0.6%</td>
<td>0.9%</td>
<td>0.6%</td>
<td>1.0%</td>
<td>1.3%</td>
<td>0.7%</td>
<td>0.2%</td>
<td>1.0%</td>
<td>0.9%</td>
<td>0.2%</td>
<td>0.6%</td>
<td>0.0%</td>
<td>0.6%</td>
<td>1.6%</td>
<td>0.4%</td>
<td>0.4%</td>
<td>1.0%</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.0%</td>
<td>2.2%</td>
</tr>
<tr>
<td>TVs</td>
<td>1.0%</td>
<td>2.1%</td>
<td>1.3%</td>
<td>1.0%</td>
<td>0.8%</td>
<td>1.3%</td>
<td>1.9%</td>
<td>1.6%</td>
<td>1.1%</td>
<td>1.2%</td>
<td>1.0%</td>
<td>0.4%</td>
<td>0.4%</td>
<td>0.8%</td>
<td>1.6%</td>
<td>0.4%</td>
<td>0.4%</td>
<td>1.0%</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Computers</td>
<td>1.3%</td>
<td>2.1%</td>
<td>1.0%</td>
<td>1.8%</td>
<td>1.3%</td>
<td>1.6%</td>
<td>0.7%</td>
<td>1.3%</td>
<td>0.8%</td>
<td>0.4%</td>
<td>0.4%</td>
<td>0.5%</td>
<td>4.7%</td>
<td>1.3%</td>
<td>1.6%</td>
<td>0.4%</td>
<td>0.4%</td>
<td>1.0%</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Electronics</td>
<td>1.3%</td>
<td>3.1%</td>
<td>1.9%</td>
<td>2.6%</td>
<td>2.2%</td>
<td>1.3%</td>
<td>1.0%</td>
<td>0.0%</td>
<td>0.6%</td>
<td>1.2%</td>
<td>1.3%</td>
<td>1.5%</td>
<td>0.0%</td>
<td>1.3%</td>
<td>1.6%</td>
<td>0.4%</td>
<td>0.4%</td>
<td>1.0%</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Table 4.7: Empirical delinquency (STL) proportions over time by category.

This does not mean, however, that stealing does not affect the firm’s performance. While stealing represents a drop in the bucket each period, its effect piles up over time and can significantly erode the profitability of RTO agreements.

Table 4.8 shows the cumulative effect of stealing for different categories. The proportion of agreements that end up with the item being stolen reaches non-negligible levels. I also present the same number at the inventory item level, taking into account that items are typically involved in more than one RTO agreement. The percentage of items that end up in delinquency is considerably high, reaching almost 20% for TVs, 19% for electronics and 16% for computers. Delinquency is a serious problem in this industry.

<table>
<thead>
<tr>
<th></th>
<th>Appliances</th>
<th>Furniture</th>
<th>TVs</th>
<th>Computers</th>
<th>Electronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreements ending with STL</td>
<td>3.50%</td>
<td>4.40%</td>
<td>10.30%</td>
<td>8.80%</td>
<td>8.90%</td>
</tr>
<tr>
<td>Agreements per Item</td>
<td>1.73</td>
<td>1.83</td>
<td>1.93</td>
<td>1.85</td>
<td>2.12</td>
</tr>
<tr>
<td>Items ending with STL</td>
<td>6.00%</td>
<td>8.10%</td>
<td>19.90%</td>
<td>16.30%</td>
<td>18.80%</td>
</tr>
</tbody>
</table>

Table 4.8: Cumulative effect of delinquency (STL) at the agreement and item levels.

These observations related to delinquency motivate another set of counterfactuals presented in chapter 6. These exercises will attempt to answer the question of whether firms should invest in better delinquency control and implement more stringent rental initiation conditions. And also whether these investments could increase overall welfare if part of the potential savings from lower delinquency levels are transferred to consumers.
4.3 Conclusion

In this chapter I presented a description of the proprietary dataset that motivates the development and estimation of a dynamic structural model of consumer behavior and firm performance in the next two chapters of this dissertation. The model will help us understand the incentives and trade-offs consumers face, and how they impact firm profitability.

The reduced-form analysis carried out helps understand consumer behavior and contract use in RTO. I addressed the controversy regarding the proportion of RTO customers that rent items to term. Consumer advocates report the great majority of them do; the industry association states 75% return the rented item within the first four months of the contract. The analysis of micro-level data shows that the truth lies somewhere in the middle. The data also reveal that consumers respond to the incentives and trade-offs presented to them by the contract. During the first half of the RTO agreement, the consumer has not built too much equity in the contract and exercising the early payout option remains prohibitively expensive. I observe most consumers decide to make a rental payment, while some of them decide to return the item, presumably those who are not satisfied with the item or suffered a low income shock. During the second half, the EPO price has decreased to a level consumers can afford. I therefore observe a sharp increase in the proportion of individuals who exercise the EPO, with a consequent decrease in that of payment and returns. Many consumers just stop making payments and do not return the item. Delinquency is a serious problem in the industry that significantly affects the performance of RTO firms. Furniture items and appliances, items that suffer the least from delinquency, are the most profitable product categories.

The central research questions I address via counterfactual exercises in chapter 6 are also motivated by the reduced-form analysis presented in this chapter. The fact that around 50% of the contracts end up with a return during the first half of the agreement, while close to 50% of the contracts do not culminate with a return motivates the questions of what would happen to welfare if the return flexibility embedded in RTO contracts was to be reduced. I also showed that the current early purchase option price schedule, dictated by Ohio state regulation, only incentivizes consumers to exercise the option towards the very end of the contract. This leads to an analysis of the welfare cost of RTO regulation in terms of restrictions on the early purchase option schedule.

The reader is encouraged to turn to the next two chapter of this dissertation. These present a more formal analysis of consumer behavior and firm performance.
4.4 Appendix

4.4.1 Figures

Figure A4.1: Empirical patterns in real data for all product categories. Proportion of consumers that decide to make a rental payment (PAY), exercise the early payout option (EPO), return the item to the store (RET), and steal the good (STL).
Chapter 5

Dynamic Discrete Choice Model of Consumer Behavior and Firm Profitability in the Context of Rent-to-Own

5.1 Introduction

In this chapter I attempt to reveal patterns of consumer behavior and firm profitability in the context of the rent-to-own (RTO) industry. To understand the incentives and trade-offs consumers face when making RTO decisions, and how these impact firm profitability, I employ a dynamic structural model of consumer choice. This model will be leveraged in the next chapter to show that there are a number of contract changes RTO firms can introduce to increase consumer satisfaction and firm revenue simultaneously.

Understanding the behavior of consumers and the effect of contract changes is relevant since the RTO agreement is the cornerstone of a large industry. It serves more than six million Americans each year, operates 9,800 storefronts in all 50 U.S. states and Canada, generates over US$ 8.5 billion in revenues a year, and employs more than 50,000 individuals.\textsuperscript{1} Due to its unique nature, the RTO agreement is a very interesting contract to study. It is a lease-purchase agreement different from a plain rental contract and a credit sale. What distinguishes the RTO agreement from a plain rental contract is that the customer has the

\textsuperscript{1}APRO (2013).
option to purchase the item, either through renting to term or exercising an early buyout option. Customers can also terminate the contract at any time, for any reason, without further obligation, therefore not being subject to a fixed-term rental contract. What distinguishes the RTO agreement from a credit sale is, in fact, the absence of traditional credit. No credit check is performed at the initiation of the contract and the agreement can be terminated by the customer without credit consequences.

This chapter contains the first piece of work on the RTO industry to employ structural estimation techniques. An attractive feature of this approach is that structural parameters have a transparent interpretation within the theoretical model that frames the empirical investigation. Structural models therefore allow us to credibly analyze the consequences of contract changes, regulatory changes and other counterfactual exercises on social welfare. This analysis cannot be done on the basis of reduced-form work alone.

I begin by presenting a brief review of the main aspects of the RTO contract and the proprietary dataset used in this study in section 5.2. I outline the theoretical model in section 5.3. Along the way, I describe the challenges I faced during the estimation process and how I addressed these issues. A detailed description of the parameter estimation procedure, which is done via simulated Maximum Likelihood, is described in section 5.4. Section 5.5 concludes.

5.2 Overview of the rent-to-own contract and the data

As described in detail in section 3.2 in chapter 3, the RTO agreement provides consumers immediate access to durable goods including appliances, furniture, TVs, computers and electronics, without a credit check or down payment. In a typical RTO transaction, an agreement is written for a period of 6 to 36 months, with the most common maturities lying between 12 and 24 months. The merchandise is delivered immediately and rental payments are due monthly. At the beginning of each month, a consumer can continue to rent by paying for an additional period, or can return the good to the store without further obligation. The product can be returned at any time for any reason. Consumers obtain ownership of the good by renting to term or through early payment of a pre-specified cash price. The latter is called the early payout option. The rental fee includes delivery, setup and service.

The dataset

The dataset consists of proprietary information from a medium-sized independent RTO chain in Ohio. The data were gathered without the cooperation of the industry association, which enables me to perform

\footnote{I focus on monthly payment frequency contracts in this study. Many RTO stores also offer customers the possibility to pay on a weekly or bi-weekly basis.}
purely independent research with transaction-level data. Also, to ensure the confidentiality of the data, the software firm has delivered de-identified information. Variables, such as name, address, Social Security number, driver’s license number, and phone numbers of customers involved in the RTO agreements, have been stripped out.

To estimate the dynamic model in this chapter, I work with a panel dataset of 5,226 RTO agreements involving items purchased by the firm in a one year period around April 2008. These agreements involve the most popular items across five product categories: appliances, furniture, TVs, computers and electronics. I work with the most popular items since for the estimation of the model I need to observe the behavior of multiple consumers facing the same contract terms. For each RTO contract I observe the decisions of the individual at every point in time, as well as detailed information on the characteristics of the underlying item and contract pricing and term information.

Table 5.1 describes the number of observations, gives an example of the item underlying the RTO contract, and presents contract term information for the five product categories I work with.

<table>
<thead>
<tr>
<th></th>
<th>Observations (N)</th>
<th>Example of Item</th>
<th>Contract Term (T)</th>
<th>Monthly Rental Rate (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliances</td>
<td>1,438</td>
<td>Washer, Dryer</td>
<td>21</td>
<td>839</td>
</tr>
<tr>
<td>Furniture</td>
<td>1,161</td>
<td>Mattress</td>
<td>12</td>
<td>884</td>
</tr>
<tr>
<td>TVs</td>
<td>815</td>
<td>42′ Plasma TV</td>
<td>21</td>
<td>894</td>
</tr>
<tr>
<td>Computers</td>
<td>1,225</td>
<td>15′ Laptop Computer</td>
<td>12</td>
<td>870</td>
</tr>
<tr>
<td>Electronics</td>
<td>587</td>
<td>PlayStation 3</td>
<td>12</td>
<td>862</td>
</tr>
</tbody>
</table>

Table 5.1: Dataset description by category.

A brief description of the contract terms in table 5.1 is due. According to the president of the independent chain, there are two main item characteristics that influence the terms of the RTO agreement: the depreciation suffered and the amount of servicing typically required by the item. Items that depreciate faster and require more servicing carry shorter terms. Everything else equal, higher cost items also carry larger rates than lower cost ones. These observations are consistent with the contract terms presented in table 5.1.

The reader is referred to chapter 4 for a detailed description of the dataset, the environment and more detailed reduced-form analysis. Of particular interest is the analysis presented in section 4.2.2 studying the data at the agreement level and explaining the patterns of observed consumer behavior.

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3 This research project has been approved by the Institutional Review Board at Columbia University.
5.3 Description of the model

The trade-offs I want to capture using the model are the following. Consumers that are part of a rent-to-own contract each period can decide to make a rental payment, exercise the early payout option and obtain ownership of the good, return the item to the store without further obligation, or steal the good. If the consumer decides to make a rental payment, she will derive utility from usage of the good, which can be understood as the sum of the value of accessing the good, plus an additional value of the servicing included in the contract. She also has the possibility to acquire the item in the future by either renting to term or exercising the early payout option, which carries an option value. She faces, however, the risk of losing access to the item altogether if she cannot afford rental payments in the future. If she decides to obtain ownership by exercising the early payout option, she will derive utility from owning the good. This comes both from the value of accessing the good and an additional satisfaction of becoming the owner of an item. She assumes, however, all responsibility in case of malfunctioning. If the item is returned, the consumer neither derives utility from usage, nor from ownership. Finally, when an item is stolen the individual suffers a disutility from bad reputation, but gets the benefit of owning the good immediately. Before entering a RTO contract, the consumer can decide whether to initiate such a contract or choose an outside option, such as going to Walmart to purchase the item.

I work with a single-agent, finite horizon, dynamic discrete choice model. The horizon will be equal to the rent-to-own contract length. The agent faces uncertainty regarding income and maximizes expected discounted utility.

Consumers who are part of a rent-to-own contract each period have to decide whether to make a rental payment and continue in the contract (PAY), or to drop out of the contract either by exercising the early payout option (EPO) or returning the item (RET). They also have the option to run away with the item without paying (STL). Therefore the consumer’s decision set is \( d_t = \{PAY, EPO, RET, STL\} \) if the individual is in the contract \( (d_0 = RTO) \). RET, EPO and STL are terminating actions that bring the model to an absorbing state. A consumer staying in the contract until the end obtains ownership of the good. Figure 5.1 illustrates the choices faced by consumers over time.

\footnote{I found motivation in models of retirement from the labor force such as Rust and Phelan (1997) & Karlstrom, and Palme & Svensson (2004). In these models, the individual makes the choice of whether to retire each year for a finite number of years, say from age 50 to age 70. At age 70 retirement is mandatory.}
Instantaneous utility is given by

\[
u(y_t, p, p_{EPO_t}, d_t) = \begin{cases} 
\varphi + \log(y_t - p) & d_t = PAY \\
\delta^{t-1} \Gamma + \log(y_t - p_{EPO_t}) & d_t = EPO \\
\log(y_t) & d_t = RET \\
\kappa + \log(y_t) & d_t = STL 
\end{cases}
\]

where \(p\) is the monthly rental rate, \(p_{EPO_t}\) is the early purchase option price specified in the RTO contract, \(y_t\) is the individual income and \(d_t\) is the consumer’s decision. The utility parameter \(\varphi\) represents the per period utility from usage, while \(\Gamma\) indicates the total utility of ownership. The depreciation rate of the ownership value is represented by \(\delta\) and the net utility of stealing an item is characterized by \(\kappa\).

Section 4.2.2 in chapter 3 provides background on the modeling choice of the consumer’s stealing option. There I show that stealing occurs relatively infrequently in the data, with the per period empirical probability of \(STL\) being very small. In addition, \(STL\) remains relatively stable over time, lacking any dynamic behavior. This goes against the intuition that people who are planning to steal an item would do so as early as possible in the life of the contract. Given the stable and non-dynamic nature of stealing behavior, this option is modeled with a constant net (dis)utility from stealing.

The main state variables of the model are \(\{t, y_t\}\), time and income. Income will be assumed to evolve stochastically according to a persistent process which will be described in section 5.3.1. Unobserved state variables \(\varepsilon_{dt}\), assumed to be additively separable with respect to instantaneous utility and to follow an \(iid\)
type I extreme value distribution, complete the set of state variables. The Bellman equation will be given by the following formula

\[
V(y_t, t) = \max_{d_t} \begin{cases} 
    u(y_t, p, p, \text{PAY}, d_t) + \beta EV[y_{t+1}, t+1] + \varepsilon_t & d_t = \text{PAY} \\
    u(y_t, p, p, \text{EPO}, d_t) + \beta EDV(y_t) + \varepsilon_{2t} & d_t = \text{EPO} \\
    u(y_t, p, p, \text{RET}, d_t) + \beta EDV(y_t) + \varepsilon_{3t} & d_t = \text{RET} \\
    u(y_t, p, p, \text{STL}, d_t) + \beta EDV(y_t) + \varepsilon_{4t} & d_t = \text{STL} 
\end{cases}
\]

where \( EDV(y_t) = \sum_{\tau=1}^{\infty} \beta^{\tau-1} E[\log(y_{\tau+t}) | y_t] \), that is, the expected discounted value of future income.

A consumer that rents to term, that is someone who makes all monthly rental payments until the end of the contract to obtain ownership of the item, in the last period \( (t = T) \) gets utility

\[
u(y_t, p, p, \text{PAY}, d_t = \text{PAY}) + \beta [\delta^T \Gamma] + \beta EDV(y_t)\]

I am ultimately interested in estimating \( \theta_1 = \{\varphi, \Gamma, \delta, \kappa\} \). In these models, the discount factor \( \beta \) is typically not estimated. Magnac and Thesmar (2002) shows that in general dynamic discrete choice models are nonparametrically underidentified, without knowledge of the discount factor and the distribution of the \( \varepsilon \) shocks. I will assume \( \beta = .99 \), but estimation results are robust to changes in the assumed discount factor.

I close the model by allowing the consumer to make an initial static decision of whether to enter a RTO contract or choose an outside option \( (\text{OUT}) \). This can be understood as the customer having the option to go to Walmart. In reality, the consumer has many options to choose from at \( t = 0 \) including going to a retailer to purchase the item in cash, using a credit card to buy the item, initiating a pure lease transaction, or using the cash to go on vacations, among others. I decided to model the outside option in the simplest possible way. This is because I found little data on the consumers’ availability and choice regarding the outside option; it would be very difficult to estimate a model with a more complex initial choice structure. Since I mostly care about the dynamic behavior of consumers once inside a RTO agreement, giving up complexity in the way I model the outside option choice does not come at a great cost. This initial choice \( d_t = \{\text{RTO}, \text{OUT}\} \) is represented in figure 5.2

\(^7\)See section 3.2.3 in chapter 3.
Mathematically, consumer’s utility form choosing to go into a RTO contract and from choosing the outside option at $t = 0$ would be given by

$$u(y_0, d_0) = \begin{cases} 
EV_{t=0}(\theta_1, y_0) + \epsilon_{RTO} & d_0 = RTO \\
\chi_0 + \epsilon_{OUT} & d_0 = OUT 
\end{cases} \quad (5.1)$$

where $EV_{t=0}(\theta_1, y_0)$ is the expected value to the consumer of getting into the RTO contract, and $\chi_0$ is the utility value of the outside option. Unobserved state variables $\epsilon_{d_0}$ are also assumed to be additively separable with respect to instantaneous utility and to follow an iid type I extreme value distribution. $\chi_0$ is an additional parameter to be recovered, the parameter set becomes $\theta = \{\varphi, \Gamma, \delta, \kappa, \chi_0\}$.

### 5.3.1 Stochastic evolution of income

**Calibrating the income process using exogenous measures of labor income risk**

As described earlier, to estimate the model, I make use of a proprietary panel dataset containing consumer decisions. Unfortunately, the dataset does not contain information on the evolution of consumer income. I therefore calibrate the model using estimates from the existing literature estimating labor income risk processes in the U.S.\footnote{Note that what matters in my model is the evolution of disposable income. The literature estimating income risk processes focuses on labor income, not including expenditures. While I am aware this will not perfectly reflect the evolution of disposable income, it is the best I can do at this point given the scarcity of studies focusing on the evolution of disposable income.}

Some examples of papers in this literature are Hubbard et al. (1994), Carroll and Samwick (1997) and Guvenen (2009). The Panel Study of Income Dynamics (PSID) has become the preferred choice of data source in these studies thanks to it being the income panel dataset with the longest time dimension that is publicly available.

The most suitable estimates for my application are found in Guvenen (2009), where evidence on labor
income risk is presented for different educational groups. I will work with estimates corresponding to the educational group that most closely represents RTO customers, that is, high school graduates.[9]

Regarding the specific modeling assumptions, uncertain income evolves stochastically according to a persistent AR(1) process

\[
\log (y_{t+1}) = \rho \log (y_t) + \varepsilon_t
\]

\[|\rho| < 1 \quad \text{and} \quad \varepsilon_t \sim N\left(0, \sigma^2\right)\]

As mentioned above, the process parameters \((\rho, \sigma^2)\) will be obtained from Guvenen (2009). These estimates of the persistence and variance of the income process are based on low-frequency annual data from the PSID. For my particular application, where RTO customers make decisions on a monthly basis, I need to convert them into monthly frequency. I perform this yearly to monthly conversion using theoretical results from Amemiya and Wu (1972). To make this transformation I need the annual process to be stationary, which is satisfied in this application. Further details on the estimation of income processes in the literature and their frequency conversion are presented in section 5.6.1 in the appendix.

After selecting the most relevant estimates from the literature and applying the annual to monthly conversion, the persistence of the monthly process is set at a value of \(\rho = 0.99\), while the variance of the shock is set at \(\sigma^2 = 0.0474\).

**Discretization of income process**

When solving the model numerically, I need to replace the continuous-valued autoregressive income process by a discrete state-space Markov chain. A variety of methods for approximating stationary AR(1) processes are used in the literature. These methods basically differ in they way they choose the two ingredients we need to approximate a continuous process: the points on the state space and the transition probabilities. Researchers typically employ the method presented in Tauchen (1986). However, Kopecky and Suen (2010) show that the performance of this approximation method suffers for processes with high serial correlation. They propose the use of the Rouwenhorst method (Rouwenhorst (1995)) and show it is more reliable than other approaches in approximating highly persistent processes since it can match five important statistics of any stationary AR(1) process: the conditional and unconditional mean, the conditional and unconditional variance, and the first-order autocorrelation. The Rouwenhorst method is therefore the method of choice in this study.

---

[9] The reader is referred to section 3.3.1 in chapter 3 for a description of the socio-economic characteristics of RTO consumers.
The distribution of initial income

Before proceeding to estimate the model, I make additional assumptions about the initial income distribution. To allow for heterogeneity across individuals, I assume initial income $y_0$ has a lognormal distribution. This same assumption is found in Einav, Jenkins and Levine (2012), which estimates a consumer optimization model in the context of the subprime auto loan market.

The moments of the distribution are calibrated using micro-level data. The relevant measure of income in the model described in this section is disposable income; we need information on income as well as expenditures. Using data at the household level from the U.S. census 2010 for the relevant geographical area in Ohio, we can obtain information on income for the bottom income quartile of the population. The Census data do not contain comprehensive expenditure data. For this reason, we complement the analysis using household expenditure data from the Basic Family Budget Calculator (Economic Policy Institute), also for the relevant geographical area in Ohio in 2010. Sources of expenditures included in these data are housing, gas, electricity, water, transport and food. Only mean levels of household expenditures, however, are reported by the Economic Policy Institute.

Using data from these two sources, I find that the approximate expected value of disposable income for the relevant population is $336^{11}$ with a standard deviation equal to $22^{12}$. I have tested the robustness of the estimation results to changes in the parametrization of the initial income distribution. Results remain quantitatively similar.

5.4  Estimation procedure

Estimates of the model parameters will be obtained via simulated Maximum Likelihood. Due to the existence of unobservable and persistent state variables (the income chains of consumers), deriving the log-likelihood function that I need to maximize is not a trivial task.

5.4.1  Deriving and computing the likelihood

The full log-likelihood function is given by $L(\theta) = \sum_{n=1}^{N} L_n(\theta) = \sum_{n=1}^{N} \ln \left[ l_n(\theta) \right]$, where $l_n(\theta)$ is the contribution to the likelihood of each individual in the dataset. Conditional on deciding to enter a RTO contract at $t = 0$, that is conditional on $d_0 = RTO$, $l_n(\theta)$ is given by

---

10 As discussed in section 3.3.1 in chapter 3, the bottom income quartile is the most representative income bracket of RTO customers.
11 This mean comes from subtracting expenditure mean levels from income mean levels.
12 This number is just the standard deviation measure obtained from income data.
\[ l_n(\theta) = P(d_1, \ldots, d_T \mid d_0 = \text{RTO}, z_0, \ldots, z_T) \]

\[ = \int \ldots \int_{y_0, y_1, \ldots, y_T} P(d_1, \ldots, d_T \mid d_0 = \text{RTO}, z_1, \ldots, z_T, y_0, y_1, \ldots, y_T) f(y_0, y_1, \ldots, y_T \mid d_0 = \text{RTO}) dy_0 dy_1 \ldots dy_T \]

\[ = \int \ldots \int_{y_0, y_1, \ldots, y_T} \left[ \prod_{t=1}^{T} P(d_t \mid d_{t-1}, z_t, y_t) \right] \prod_{t=2}^{T} f(y_t \mid y_{t-1}) f(y_1 \mid y_0) f(y_0 \mid d_0 = \text{RTO}) dy_0 dy_1 \ldots dy_T \]

\[ = \int_{y_0} \left[ \int \ldots \int_{y_1, \ldots, y_T} \left[ \prod_{t=1}^{T} P(d_t \mid d_{t-1}, z_t, y_t) \right] \prod_{t=2}^{T} f(y_t \mid y_{t-1}) f(y_1 \mid y_0) dy_1 \ldots dy_T \right] f(y_0 \mid d_0 = \text{RTO}) dy_0 \]

(5.2)

where \( d_t \) represents the decision of the individual, \( z_t \) are strictly exogenous variables such as the rental rate and the early payout option price, and \( y_t \) is the income of the consumer.

This likelihood specification handles the initial conditions problem in dynamic, nonlinear, unobserved effects models as described in Wooldridge (2005). Rather than attempting to obtain the joint distribution of all outcomes of the endogenous variables, Wooldridge suggests finding the distribution conditional on the initial value (and the observed history of strictly exogenous explanatory variables).

The second line in equation 5.2 shows that to obtain the likelihood of observed consumer decisions, I need to integrate out the persistent unobservables \((y_0, y_1, \ldots, y_T)\). The third line arises from the Markovian feature of the problem, and from the fact that the unobservables follow an AR(1) process. Finally, the fourth line shows that I can evaluate the likelihood for a single individual by first computing \((*)\), that is, by first integrating out \((y_1 \ldots y_T)\) conditional on \(y_0\); and then computing the integral corresponding to \(y_0\).

To compute \((*)\) in equation 5.2, I need to apply numerical integration techniques. The simplest way to compute the integral is to simulate NSIM number of income chains conditional on \(y_0\), and to then compute the mean of \(\prod_{t=1}^{T} P(d_t \mid d_{t-1}, z_t, y_t)\) across simulated income chains. For estimation, I use NSIM=1000. Section 6.3 presents evidence that there is no need to work with a larger number of simulated income chains per consumer.

To perform the integral corresponding to \(y_0\), in turn, I need to find \(f(y_0 \mid d_0 = \text{RTO})\), which by Bayes’ rule and discretizing is equal to

\[
P(Y_0 = y_0 \mid D_0 = \text{RTO}) = \frac{P(D_0 = \text{RTO} \mid Y_0 = y_0, \chi_0) P(Y_0 = y_0)}{P(D_0 = \text{RTO})}
\]

In addition, I will assume that the model probability of choosing to go into RTO at \(t = 0\) should be equal to the observed market share of RTO, that is, the following should be satisfied.
\[
P(D_0 = RTO) = \sum_{y_0} P(D_0 = RTO \mid Y_0 = y_0, \chi_0) P(Y_0 = y_0) = s_0
\]

where \( s_0 \) corresponds to the empirical share of individuals that decide to go into a RTO contract.

**Computing empirical rent-to-own market shares**

The approximate value of the market share of RTO \((s_0)\) will be based on store count. To compute such a number, I collect data on the number of stores RTO firms and competitors have in the relevant Ohio counties and arrive at market share numbers that are allowed to vary across categories. Table 5.2 shows the store count data and the market share numbers used for estimation.

<table>
<thead>
<tr>
<th># of Stores</th>
<th>Appliances</th>
<th>Furniture</th>
<th>TVs</th>
<th>Computers</th>
<th>Electronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walmart</td>
<td>144</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Target</td>
<td>61</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Sears</td>
<td>19</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Kmart</td>
<td>61</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Best Buy</td>
<td>39</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Radio Shack</td>
<td>212</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Costco</td>
<td>7</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Game Club</td>
<td>130</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Sam’s Club</td>
<td>28</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>F.y.e.</td>
<td>20</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Total # of Competitors</td>
<td>726</td>
<td>575</td>
<td>363</td>
<td>575</td>
<td>726</td>
</tr>
<tr>
<td>RTO Stores</td>
<td>428</td>
<td>428</td>
<td>428</td>
<td>428</td>
<td>428</td>
</tr>
</tbody>
</table>

**Table 5.2**: Market share of RTO computation.

### 5.4.2 Conditional choice probabilities

The conditional choice probabilities \( P(d_t \mid d_{t-1}, z_t, y_t) \) in equation 5.2 above are standard dynamic logit probabilities. Given a value of \( \theta = \{ \varphi, \Gamma, \delta, \kappa, \chi_0 \} \), I can solve the model by backward induction and compute these probabilities for every income state and every time period.

\[
P(d_t = PAY \mid y_t, z_t, \theta), \quad P(d_t = EPO \mid y_t, z_t, \theta), \quad P(d_t = RET \mid y_t, z_t, \theta), \quad P(d_t = STL \mid y_t, z_t, \theta)
\]

for \( t = 1 \ldots T \) and

---

\(^{13}\)I am aware this is an approximate number and that there are many alternative ways to estimate such a measure. One option would be to substitute number of stores by square footage of stores. It could be argued that one Walmart store should account for more traffic than one RTO store. But it is also true that Walmart offers many more items and product categories than RTO stores do, thus making the need for such adjustment unclear. The outside option choice is modeled very simply in this paper and I am really interested in the direction of the change in market share while performing counterfactual exercises, rather than in the resulting new level of market share. This is why I decided not to add complexity to the method of computing empirical market shares.
\[ P(d_0 = RTO \mid y_0, z_0, \theta), P(d_0 = OUT \mid y_0, z_0, \theta) \]

for \( t = 0 \).

For instance, the probability of making a rental payment at time \( t \) is

\[ \text{Prob}(d_t = PAY \mid y_t, z_t, \theta) = \frac{\exp(u(y_t, p, p_{EPO_t}, d_t = PAY) + \beta EV[d_t = PAY, y_{t+1}, t+1])}{\sum_{\tilde{d}_t = PAY, EPO, RET} \exp(u(y_t, p, p_{EPO_t}, \tilde{d}_t) + \beta EV[d_t = PAY, y_{t+1}, t+1])} \]

and the probability of choosing to go into a RTO contract at \( t = 0 \) is

\[ P(d_0 = RTO \mid y_0, \theta) = \frac{e^{EV_{t=0}(\theta, y_0)}}{e^{X_0} + e^{EV_{t=0}(\theta, y_0)}} \quad (5.3) \]

5.5 Conclusion

To analyze the incentives and trade-offs consumers face in the context of rent-to-own, in this chapter I develop and describe the estimation procedure of a structural model of consumer behavior using proprietary transaction-level data. Several challenges had to be overcome along the way.

The central problem came from the fact that the data I use for the estimation does not contain information on the evolution of consumer income. I solved this problem by calibrating the income process using exogenous measures of labor income risk, obtained from the macroeconomic literature estimating labor income risk processes in the U.S. For my particular application, where RTO customers make decisions on a monthly basis, I also needed to convert these estimates into monthly frequency. To be able to solve the model numerically, I replaced the continuous-valued income process by a discrete state-space Markov chain. Finally, I had to adopt assumptions regarding the distribution of initial income and calibrate the moments of this distribution using micro-level data.

Due to the existence of unobservable and persistent state variables, deriving the log-likelihood function that I needed to maximize was not a trivial task. I also had to deal with initial conditions problem present in dynamic, nonlinear, unobserved effects models.

Finally, I had to address the lack of information on the value of the market share of RTO. To compute such a number, I collected data on the number of stores RTO firms and competitors have in the relevant Ohio counties.

The resulting models is fairly sophisticated and captures the incentives and trade-offs faced by consumers very well. The reader is now invited to turn to the next chapter of this dissertation where I present the
results of the model estimation and provide evidence towards the robustness of these results. I also outline and address the central research questions of this dissertation by performing a whole range of counterfactual scenarios.
5.6 Appendix

5.6.1 Calibration of the income process and parameter frequency conversion

Modeling assumptions and results

The vast majority of the papers in the literature estimating labor income risk decompose log labor income $y_t^i$ into a permanent and a transitory component:

\[ y_t^i = z_t^i + \varepsilon_t^i \]
\[ z_t^i = \rho z_{t-1}^i + \eta_t^i \]

where the permanent component is traditionally modeled as an AR(1) process or a random walk process ($\rho = 1$), the transitory and permanent innovations are distributed $\varepsilon_t^i \sim N(0, \sigma^2)$. $\eta_t^i \sim N(0, \sigma^2)$, and serially uncorrelated and independent at all leads and lags.

Table A5.1 summarizes estimation results of this model by educational group obtained by Guvenen (2009), which makes use labor earnings data covering the period 1968-1993. This study is the latest and most complete in a long series of papers to estimate labor income risk processes. It is the chosen study to calibrate the model in this paper.

<table>
<thead>
<tr>
<th>Source</th>
<th>Educ. group</th>
<th>$\rho$</th>
<th>$\sigma^2_{\varepsilon}$</th>
<th>$\sigma^2_{\eta}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guvenen (2009)</td>
<td>College</td>
<td>0.97</td>
<td>0.009</td>
<td>0.047</td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>0.97</td>
<td>0.011</td>
<td>0.052</td>
</tr>
</tbody>
</table>

Table A5.1: Estimates by education group.

We observe that the estimated persistence of the income shock is very high. Also, the standard deviations of the annual permanent and transitory innovations is estimated to be in the 0.095-0.22 range. Interpreted literally, this would mean that every year, about one-third of consumers experience positive or negative shocks to their permanent income of greater than 15-38 percent. Similarly, each year about one-third (but not the same one-third) of consumers experience transitory shocks of more than 15-38 percent in each year.

Parameter frequency conversion

The estimates obtained in the literature are based on annual data. I therefore need to make the frequency conversion to obtain monthly parameter values. The steps employed in this conversion are based on results presented in an early paper by Amemiya and Wu (1972) studying the effect of aggregation on autoregressive
models. They show that for disaggregated time series following an AR(p) process, the process for the aggregated series over m periods is an ARMA(p,q), with p = q when m is large enough, which is the case for yearly-monthly and yearly-quarterly conversions.

To illustrate how the conversion is performed, I now present an analytical example of the effects of aggregation when dealing with yearly and quarterly data. The extension to yearly and monthly data is straightforward.

Family non-capital income in the PSID is defined as annual hourly earnings (annual labor incomes divided by annual hours). Annual labor income in the PSID are annual averages as the following formula indicates

\[ \tilde{y}_t = \frac{y_{t,4} + y_{t,3} + y_{t,2} + y_{t,1}}{4} \]  
(5.6)

I assume the quarterly process follows an AR(1) process, where the second equality in each line is derived by successive recursion:

\[
\begin{align*}
y_{t,4} &= \rho y_{t,3} + u_{t,4} = \rho^4 y_{t-1,4} + u_{t,4} + \rho u_{t,3} + \rho^2 u_{t,2} + \rho^3 u_{t,1} \\
y_{t,3} &= \rho y_{t,2} + u_{t,3} = \rho^4 y_{t-1,3} + u_{t,3} + \rho^2 u_{t,2} + \rho^3 u_{t-1,4} \\
y_{t,2} &= \rho y_{t,1} + u_{t,2} = \rho^4 y_{t-1,2} + u_{t,2} + \rho^2 u_{t,1} + \rho^3 u_{t-1,4} + \rho^3 u_{t-1,3} \\
y_{t,1} &= \rho y_{t-1,4} + u_{t,1} = \rho^4 y_{t-1,1} + u_{t,1} + \rho^2 u_{t-1,4} + \rho^3 u_{t-1,3} + \rho^3 u_{t-1,2}
\end{align*}
\]  
(5.7)  
(5.8)  
(5.9)  
(5.10)

By plugging equations [5.7] to [5.10] into the definition of yearly income [5.6] we obtain:

\[
\begin{align*}
\tilde{y}_t &= \rho^4 \tilde{y}_{t-1} + \frac{1}{4} \left[ u_{t,4} + (1 + \rho) u_{t,3} + (1 + \rho + \rho^2) u_{t,2} + (1 + \rho + \rho^2 + \rho^3) u_{t,1} \\
&\quad + (\rho + \rho^2 + \rho^3) u_{t-1,4} + (\rho + \rho^2 + \rho^3) u_{t-1,3} + \rho^3 u_{t-1,2} \right] \\
\tilde{u}_t &= \rho^4 \tilde{y}_{t-1} + \tilde{u}_t - \theta \tilde{u}_{t-1} \quad \text{where} \\
u_{t,4} &= (1 + \rho) u_{t,3} + (1 + \rho + \rho^2) u_{t,2} + (1 + \rho + \rho^2 + \rho^3) u_{t,1}
\end{align*}
\]

The quarterly values \( \rho \) and \( \text{Var}(u_{t,q}) = \sigma^2 \) can therefore be computed from the annual estimates using the following mapping:

\[ \frac{1}{4} \sum_{q=1}^{4} \ln Y_{t,q} \text{ can be interpreted as a log-linear approximation of the arithmetic average } \ln \tilde{Y}_t = \ln \left[ \frac{1}{4} \sum_{q=1}^{4} Y_{t,q} \right]. \]
\[ \bar{\rho} = \rho^4 \]

\[ \text{Var}(\tilde{u}_t) = \sigma^2 \left( \frac{1}{4} \right)^2 \left[ \sum_{j=1}^{4} \left( \sum_{k=0}^{4-j} \rho^k \right)^2 \right] \]

Table A5.2 applies these transformations to the annual estimates obtained in the literature to convert them into monthly frequency, taking into account that \( \text{Var}(\tilde{u}_t) = \text{Var}(\eta_t + \varepsilon_t) = \sigma^2_{\eta} + \sigma^2_{\varepsilon} \), that is, the innovation to log annual income is the sum of permanent and transitory innovations to income.

<table>
<thead>
<tr>
<th>Source</th>
<th>Educ. group</th>
<th>Annual</th>
<th>Monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guvenen (2009)</td>
<td>College</td>
<td>0.9700</td>
<td>0.0560</td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>0.9700</td>
<td>0.0630</td>
</tr>
</tbody>
</table>

Table A5.2: Adjusted Estimates by education group.

To see why \( \text{Var}(\tilde{u}_t) = \text{Var}(\eta_t + \varepsilon_t) = \sigma^2_{\eta} + \sigma^2_{\varepsilon} \), note that as mentioned above the parametrized income process generally adopted in the literature, given by equations 5.4 and 5.5, can be understood as an ARMA(1,1) process.

Using the fact the \( y^i_{t-1} = z^i_{t-1} + \varepsilon^i_{t-1} \Rightarrow z^i_{t-1} = y^i_{t-1} - \varepsilon^i_{t-1} \), I can express the permanent component of income as

\[ z^i_t = \rho (y^i_{t-1} - \varepsilon^i_{t-1}) + \eta^i_t = \rho y^i_{t-1} - \rho \varepsilon^i_{t-1} + \eta^i_t \]

I can therefore write the process for income as

\[ y^i_t = \rho y^i_{t-1} - \rho \varepsilon^i_{t-1} + \eta^i_t + \varepsilon^i_t \]

or

\[ y^i_t = \rho y^i_{t-1} + \zeta^i_t - \theta_t \zeta^i_{t-1} \quad \text{where} \]

\[ \zeta^i_t = \eta^i_t + \varepsilon^i_t \quad \text{and} \]

\[ \theta_t = \frac{\rho \varepsilon^i_{t-1}}{\varepsilon^i_{t-1} + \eta^i_{t-1}} \]
Here we observe how the innovation to log annual income ($\zeta_t^i$) is the sum of permanent and transitory innovations to income ($\eta^i_t + \varepsilon^i_t$).

The evolution of $\theta_t$ can be directly related to the evolution of the transitory and permanent innovations to income.
Chapter 6

Implications of the Model and Counterfactual Analysis

6.1 Introduction and Research Questions

In this chapter, I present the results of estimating the model developed in chapter 5 using transaction-level data of RTO contracts. I also perform a series of robustness tests to increase the confidence in the estimation procedure and results.

One of the greatest benefits of structural models is that they allow for broad possibilities in terms of counterfactual exercises. The estimated model in this chapter is used to run “what if” scenarios to analyze contract design. I show that there are a number of contract changes RTO firms can introduce to increase consumer satisfaction and firm performance simultaneously. In particular, I perform various experiments based upon the estimated model to answer three central research questions:

The early return option

This first question is related to the early return option embedded in RTO contracts. One aspect of the rent-to-own contract that stands out is its high degree of flexibility. The agreement emerged around 40 years ago as a highly flexible contract. Terms have not changed significantly over time, with the Association of Progressive Rental Organizations (APRO), the industry association, taking a de-facto role of educating new entrants to the industry and transmitting best practices. APRO’s website states: “The unique rent-

1 Evidence of this can be found in APRO’s website which has a whole section dedicated to RTO education for RTO chains. This includes links to a virtual university, with courses including ‘Introduction to Rent-To-Own’ and ‘Account Management in Rent-To-Own’, their seminar schedule, and a Rent-to-Own code of ethics.
to-own transaction sprang up in the 1970s in response to a growing consumer need for acquiring the use of household products without incurring debt or jeopardizing the family’s credit. Rent-to-own customers [...] desire consumer durable goods in their homes without the long-term financial obligations associated with credit sales. There is no interest charged to consumers, no credit checks involved and customers can return the merchandise at any time for any reason without penalty. This no-obligation, no-debt feature is the cornerstone of rental-purchase”. When analyzing transaction-level data in chapter 4, I observed that some customers seem to be taking advantage of the flexibility in the option to return items early. At the same time, a large group of consumers does not seem to be making use of this lack of long-term commitment at all.

This motivates the following research questions: What are the welfare implications of reducing the return flexibility in RTO contracts? Could we improve the situation of consumers and firms offering the contract? Can we find an optimal level of reduced flexibility that maximizes welfare?

The early purchase option

Industry participants are highly exposed to regulatory risk. An average of 25 bills that directly affect the RTO industry are introduced per year at the state and federal levels of government. The latest example of federal regulation is the Consumer Rental Purchase Agreement Act which was assigned to a congressional committee on April 15, 2013 and intends to assure meaningful disclosures of the terms of rental-purchase agreements and to provide certain substantive rights to consumers under these agreements. In Ohio, the state where the dataset used in this study is from, regulation already imposes significant contract disclosures. The state also introduced restrictions on the early purchase option schedule. The formula chosen to dictate the shape of this schedule does not seem to follow an economic rationale, as indicated in section 3.3 in chapter 5.

The current state of the early purchase option schedule regulation inspires the following questions: What is the welfare cost of RTO regulation in terms of restrictions on the early purchase option price schedule? What are the welfare implications of implementing a non-linear schedule, similar to the loan amortization schedule found in typical mortgage contracts?

Delinquency

When looking at micro-level data in chapter 4, I find that the number of items involved in RTO agreements that are stolen is considerably high. Almost 20% of TVs, 19% of electronics and 16% of computers end up

\[2\text{See chapter 7 for a full coverage of the status of regulation in the industry.}\]

\[3\text{http://www.govtrack.us/congress/bills/113/hr1551.}\]
in delinquency. This is a serious problem in the industry. These findings immediately prompt the question of whether firms should invest in better delinquency control and implement more stringent rental initiation conditions. And whether these investments could increase overall welfare if part of the potential savings from lower delinquency levels are transferred to consumers.

This chapter is structured as follows: the results of estimating the model using transaction-level data of RTO contracts is presented in section 6.2. Evidence pointing towards the robustness of the results is shown in section 6.3. I analyze the consequences of a whole range of “what if” scenarios and present the results of these exercises in section 6.4. Section 6.5 concludes.

### 6.2 Estimation results

This section describes the results of estimating the model parameters with real data of rent-to-own transactions. I present results for five different product categories: appliances, furniture, TVs, computers and electronics. Information on the contract terms for each of these categories is presented in table 5.1.

The results of estimating $\theta_1$ are presented in table 6.1, standard errors between parenthesis. The reader is referred to section 6.6.1 in the appendix for a description of how these standard errors were computed.

<table>
<thead>
<tr>
<th></th>
<th>$N$</th>
<th>$\varphi$</th>
<th>$\Gamma$</th>
<th>$\delta$</th>
<th>$\kappa$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliances</td>
<td>1438</td>
<td>0.15 (0.08)</td>
<td>21.10 (1.29)</td>
<td>0.9995 (0.0041)</td>
<td>-2.52 (0.15)</td>
</tr>
<tr>
<td>Furniture</td>
<td>1161</td>
<td>2.06 (0.21)</td>
<td>57.67 (11.48)</td>
<td>0.8706 (0.0332)</td>
<td>-2.42 (0.15)</td>
</tr>
<tr>
<td>TVs</td>
<td>815</td>
<td>1.37 (0.11)</td>
<td>53.59 (7.30)</td>
<td>0.9357 (0.0175)</td>
<td>-1.65 (0.12)</td>
</tr>
<tr>
<td>Computers</td>
<td>1225</td>
<td>1.71 (0.06)</td>
<td>21.95 (1.07)</td>
<td>0.8925 (0.0093)</td>
<td>-1.83 (0.10)</td>
</tr>
<tr>
<td>Electronics</td>
<td>587</td>
<td>0.79 (0.09)</td>
<td>11.43 (0.85)</td>
<td>0.9556 (0.0141)</td>
<td>-1.88 (0.15)</td>
</tr>
</tbody>
</table>

Table 6.1: Estimates and standard errors by category.

Standard errors are low for this type of model, which indicates parameters estimates have been recovered with high precision.

To interpret these point estimates, I simulate the behavior of 10,000 consumers according to the estimated
model, for each product category. The left column of figure A6.1 in the appendix presents the results of this exercise, where I aggregate the behavior of simulated consumers; I plot the proportion of customers who decide to RET, PAY, EPO and STL at each point in time, for consumers remaining in the contract. The model is capturing the incentives and trade-offs I was hoping it captured. During the first half of the contract, the consumer has not built too much equity into the item and exercising the EPO remains prohibitively expensive. Most consumers in the model decide to make a rental payment, while some of them decide to return, those who are not satisfied with the item or suffered a low income draw. In the second half of the contract, the EPO price has decreased to a level consumers can afford. I therefore observe a sharp increase in the proportion of consumers that choose to exercise the EPO, with a consequent decrease in the choice of making a rental payment or return the item.

A good way to evaluate the goodness of fit of the model is to look at its in-sample performance, that is, how well the model fits observed consumer behavior. The right column in figure A6.1 in the appendix presents the empirical proportions in the real data, computed in relation to individuals remaining in the contract. These empirical proportions provide the identifying variation I need to estimate the model; these are what we are trying to fit with the structural model[^1].

The model fits the consumer behavior observed in the rent-to-own transaction-level data very well. When I simulate behavior based on the model and the estimated parameter vector, the patterns of behavior I obtain are very close to the empirical ones. The model captures the levels of the different decisions as well as the change in levels over time. The fit is really good for furniture, TVs, computers and electronics. The model does not capture very well the behavior observed in appliances late in the life of the RTO contract. It is hard to rationalize why for this product category the relative attractiveness of the EPO option decreases as the contract approaches an end. With the EPO price going down over time, the relative attractiveness of EPO should only increase. The industry participants I interviewed could not provide an explanation for the behavior observed in the case of appliances.

### 6.2.1 Measures of consumer utility, firm revenue and market share

Using the behavior of 10,000 simulated consumers based on the calibrated model, I can obtain simulated values of expected consumer utility for consumers who decide to go into RTO (“EVAL”), values of expected revenue to the firm from these consumers (“EREV”), and values of the expected probability of RTO (“EPRTO”) - a proxy for market share. These metrics will be helpful to analyze the effect of contract term changes on consumers and firms in section 6.4. They are computed as follows:

[^1]: The observed patterns of consumer behavior in these figures deserve a discussion which is presented in section 1.2.2 in chapter 3.
• EVAL - Simulated expected consumer utility: As a measure of consumer satisfaction under the RTO contract, I will take the simulated $EV_{t=0} \left( \theta, y_0, d_0 = RTO \right)$ - the expected value to the consumer of getting into the RTO contract described in section 5.3 - and average it for the 10,000 simulated consumers.

• EREV - Simulated expected firm revenue: I first compute the revenue a RTO agreement generates by discounting the revenue stream that each simulated consumer brings to the store, at a rate that reflects the cost of capital to the firm. However, as explained in section 4.2.2 in chapter 4, revenue should be computed at the item level. Items are usually rented out more than once, that is, they participate in more than one agreement. Items that are returned to the store are therefore capable of generating future revenue. To account for this possibility, I adjust the revenue number for those simulated agreements that end up in return to arrive at the revenue measure at the item level. I then average across simulated items to obtain the expected discounted revenue from RTO to the firm, or EREV.

• EPRT0 - Simulated expected probability of RTO: Obtained by computing the proportion of simulated consumers that decide to enter the RTO contract. The consumer’s probability of choosing to go into a RTO contract at $t = 0$ increases as the value to the consumer of entering a RTO contract goes up, a result observed in equations 5.1 and 5.3. For that reason, EPRT0 will move in the same direction as EVAL. EPRT0 can be thought of as a proxy for market share.

These numbers have been computed for the base case across the five different categories and are presented in table A6.1 in the appendix, under the column “base case”.

### 6.3 Testing the robustness of the estimation procedure

The log-likelihood function of the dynamic problem under study is a highly non-linear multivariate function. This function is maximized using the solver for nonlinear optimization KNITRO. Its state-of-the-art algorithms tend to do a good job at finding global maxima.

Using the CAPM, with $\beta = 0.85$ (the average of the $\beta$s of Rent-A-Center and Aaron’s, the only two publicly traded RTO firms), $r_f = 1\%$ and $r_m = 4.93\%$ (arithmetic average return for equities for the period 2002-2011, data from Aswath Damodaran at NYU), the resulting $r$ is equal to 4.3%.

I assume that returned items are rented out again according to the patterns observed in the data, presented in table 4.8 in chapter 3. Appliances are involved in 1.73 agreements on average; furniture items in 1.83; TVs in 1.93; computers in 1.85; and electronics in 2.12. When an item is returned, I assume it is re-rented and the fate of this subsequent agreement is determined by the consumer behavior predicted by the model.

Byrd et al. (2006).
First, I test whether the estimation algorithm displays some sort of starting value dependence. For that purpose, I perform the estimation procedure fifty times, using fifty randomly selected starting points. Figure 6.1a shows the results of this exercise for the case of electronics; very similar pictures emerge for the rest of the categories. This figure supports the statement that the estimated parameter set corresponds to a global maximum rather than to a local maximum.

Second, I test whether the parameter vector which maximizes the log-likelihood function is sensitive to the utilization of different sets of simulated income chains. As was mentioned in section 5.4.1, evaluating the log-likelihood function involves a numerical integration step for which I need to simulate 7200 number of income chains for each individual in the dataset. Here I test whether drawing different sets of NSIM=1000 income chains affects the maximum likelihood estimate. Figure 6.1b shows evidence of this exercise for ten different sets of simulated income chains, again for the case of electronics, with very similar results for all other categories. I see that the maximum likelihood estimate remains the same across simulation sets. These results gives us confidence that the numerical integration step of the estimation procedure is not affecting point estimates.

![Figure 6.1: Results of robustness tests.](image)

Lastly, I also checked whether increasing the number of simulations from NSIM=1000 to NSIM=5000 has any effect on the maximum likelihood estimate. There was no change in the estimate, which leads us to conclude that one thousand income chains per consumer is a large enough number of simulations to perform the integration.
6.4 Counterfactual exercises

Structural econometric models are useful tools for the evaluation of counterfactual policies. In this section, I describe several of these experiments based upon the estimated model. I will alter contract terms and present the predictions of the calibrated model under the new scenarios. I use the demand estimates to analyze contract design, that is, how the different dimensions of the RTO contract affect consumer satisfaction and firm profitability. The goal of the counterfactual exercises is to check whether there exist potential changes to the contract terms that make both consumers and firms better off.

I study the effect of changes in each of the four options consumers face at each point in time - the return option, the rental payment option, the early purchase option and the stealing option - in order to address the research questions outlined in the introduction to this chapter.

The outcomes of various experiments are compared to a benchmark, which is simply simulated consumer behavior based on the estimates obtained in section 6.2. I call this the “base case”. For each counterfactual I simulate the behavior of 10,000 consumers.

Table [A6.1] in the appendix summarizes the results of these exercises in terms of expected consumer utility, firm revenue and the probability of RTO, as defined in section 6.2.1. I also present plots depicting the dynamic behavior of simulated consumers under the new scenarios. For the sake of space, I include graphs for the case of electronics, all other categories displaying strikingly similar patterns.

6.4.1 The return option

The RTO contract has a very flexible item return policy. Once the contract is initiated, the consumer has the right to return the item to the store without penalty, at any point in time. This feature is not present in any other contractual arrangement that competes with the RTO contract, and has been a central characteristic of the contract since it emerged around 40 years ago.

The industry association repeatedly states that RTO customers highly value the convenience of the contract, the early return option adding to the convenience of the arrangement. This degree of flexibility, however, may be driving up the cost of the RTO transaction to consumers and affecting firm performance. In the data I observe many customers exercise this return option early in the life of the contract; I also note that a significant number of consumers rent to term or exercise the EPO towards the end of the contract. The data presented in table [4.4] are particularly revealing. There we can see that around 50% of the contracts end up with a return during the first half of the agreement, and close to 50% of the contracts do not culminate with a return (the EPO is exercised, the agreement is carried to term or the items is stolen).

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8APRO (2013).
9The reader is referred to section 4.2.2 in chapter 5 for a detailed presentation of observed contract outcomes.
The latter consumers may be subsidizing the cost of the RTO contracts to the former.

In this section I therefore explore two counterfactuals:

- **No RET:** I eliminate the return option. Once the contract has begun, consumers are not allowed to return the item to the store. This change makes the RTO contract look more similar to a credit sale or a pure lease transaction.

- **Costly RET:** I impose a penalty on early returns. The consumer must pay a fee equal to half the monthly rental rate if she wants to return the item to the store during the first half of the contract. Simultaneously, a 5% reduction in the monthly rental rate is introduced. These two changes in the contract intend to revert the cross-subsidy mentioned above. For the case of electronics, for instance, with a contract length of 12 months and rental rate of $62 per month, a consumer returning the item in months 1 to 5 would have to pay a $31 fee, and the monthly rental rate would now be slightly under $59.

The results of these exercises are presented in figure 6.2 and table A6.1.

We observe that under counterfactual “No RET”, firm revenue decreases substantially, consumers are worse off, and the expected probability of RTO, our proxy for market share, decreases with respect to the base case. It is clear from figures 6.2a and 6.2b that consumers substitute away from the return choice into the delinquency option.

Counterfactual “Costly RET” shows very interesting results. Imposing a small dollar penalty on consumers who return items early and reducing the monthly rate by 5% seems to give consumers the right incentives. Consumers avoid the delinquency option and stay longer in the RTO contract as seen in figure 6.2c. Consumers receive on average higher utility from the RTO contract for all item categories. Firms offering the contract are better off, with higher expected revenue across all categories. Market share increases as a result of the higher mean value of entering a RTO contract.

This early return penalty seems to be eliminating the externality that early returners were imposing on consumers who wished to stay longer in the contract. I conclude a small penalty on early returns could improve the RTO experience for both consumers and firms offering the contract.

It is not surprising, then, that some industry participants are already offering contracts with reduced flexibility in terms of early returns. One example comes from the firm Why Not Lease It. This company offers lease terms for durable goods purchased at retailers around the country. Contrary to a typical RTO contract, they require a minimum lease term of five months, after which the consumer has the option to renew the lease, return the item, or purchase the item by exercising an early buyout option. The model in

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10 Remember EVAL is an average across simulated consumers. Some customers are better off, some are worse off.
this paper predicts that such a contractual arrangement could work better for consumers and firms than the traditional RTO contract.

Figure 6.2: Return option counterfactual behavior.

Welfare maximizing reduction in flexibility

Counterfactual “Costly RET” has shown that imposing a small dollar penalty on consumers who return items early and simultaneously reducing the monthly rate, can be welfare increasing. The natural next step is to find the welfare maximizing policy involving a reduction in the flexibility of return of the RTO contract.

To find such a policy, I first need to define a welfare function. This will be given by the following formula:

\[
W = \sum_{i=\{\text{Appliances},...,\text{Electronics}\}} w_i (\alpha EV AL_i + (1 - \alpha) EREV_i)
\]  

(6.1)

where \(w_i\) is the weight assigned to each product category, computed as the ratio of the number of observed agreements for that category over the total number of RTO agreements, and \(\alpha\) is the weight assigned to consumer surplus, which I assume adopts a value 0.5. The defined welfare function is simply the weighted average of welfare across product categories.

I then assume that the penalty for early return remains constant at half the monthly rental rate and search for the length of the contract the penalty is to remain in place, and for the monthly rental rate reduction coefficient, that maximize welfare. The maximization procedure I perform is therefore \(\max_{\{n,d\}} W\), where \(n\) is the proportion of the contract the return penalty is kept in place, and \(d\) is the rental rate discount percentage.

I find that welfare is maximized when returning the item is made costlier only during the first third of the agreement, and consumers enjoy a reduction of 10% in the monthly rental rate. Consumer behavior under this policy is qualitatively similar to that presented in figure 6.2c. Column “Welfare Max RET” in table A6.1 contains the levels of consumer and producer surplus achieved by this contract change.
Instead of charging customers the penalty for early return when they walk into the store to return the item, RTO firms could introduce a security deposit system. Each month, the firm could collect a security deposit from the client consisting of a fixed dollar amount on top of the monthly rental rate. This deposit would accumulate in an account under the customer’s name and would be returned in full after a third of the contract length has passed. If the customer wants to return the item before that time, she would have to give up on the security deposit.

6.4.2 The early purchase option

Consumers entering a RTO contract have the option to become owners of the item through payment of a pre-specified cash amount. The early payout option price is regulated in many states, including Ohio, the state the data in this paper comes from. The formula chosen by Ohio regulators to dictate the shape of the EPO price schedule does not seem to follow an economic rationale.

In this section I therefore explore the following counterfactuals:

- **No EPO**: I eliminate the early purchase option. The only path to ownership available to consumers is renting to term. Under this scenario, the RTO contract looks more similar to a pure lease arrangement.

- **Steeper EPO**: The early purchase option price starts at a higher level than under the base case, but decreases faster over time. As depicted in figure 6.3, under current regulation\(^\text{11}\) represented by the blue line, the EPO price schedule has a negative slope of one half times the rental rate. In the counterfactual scenario, represented by the red line, the EPO price is higher at \(t = 0\) than under the current regulation, but the schedule presents a steeper slope of negative two thirds times the rental rate\(^\text{12}\). Once the EPO price reaches the monthly rental rate, it remains at that level thereafter.

\(^{11}\)The reader is referred to section 3.4.3 in chapter for a detailed discussion of different aspects of RTO regulation in Ohio, including EPO regulation.

\(^{12}\)The intercept of new the schedule has been chosen so that it crosses the line dictated by regulation at exactly half of the contract duration. For the case of electronics with twelve-month contracts, the two lines cross at month number six.
The results of these exercises are presented in figure 6.4 and table A6.1.

We see that under counterfactual “No EPO”, consumers are worse off across the board. Those consumers who relied heavily on the early purchase option during the second half of the contract are forced to make rental payments and acquire the item by renting to term. This substitution presents itself clearly when we compare figures 6.4a and 6.4b. The effect on firm revenue of shutting down the EPO possibility is unclear. Revenue goes down slightly for appliances, TVs and electronics. It increases for furniture and computers. Some consumers substitute away from EPO to PAY, which would increase revenue to the firm. But some decide to RET or STL instead, which would bring revenue down. The simulated probability of going into RTO decreases with respect to the base case. Overall, it does not seem to be a good idea to shut down the EPO channel: consumers, who reportedly value the convenience of the RTO contract, are clearly worse off. And there is no clear evidence that the situation would improve for RTO firms.

The “NO EPO” counterfactual could be interpreted as a scenario where the EPO price is set at a constant, very high level. I have run a series of counterfactual exercises where I set the EPO price at a constant, but lower level. Examples are constant EPO prices at two, four and six times the monthly rental rate of the item. What I find is that you cannot increase EVAL and increase EREV from consumers who decide to go into RTO simultaneously. To make consumers better off, the constant EPO price has to be set at a level so low that it reduces expected revenue. To increase expected revenue from consumers entering RTO, the constant EPO price has to be set at a level so high that it reduces EVAL and the expected probability of going into RTO significantly. Results of these exercises are available upon request.

Finally, counterfactual “Steeper EPO” shows that pivoting the EPO schedule in the manner presented in figure 6.3 such that the early purchase options starts off being more expensive but becomes cheaper faster, can simultaneously improve the experience of producers and consumers. Under the example under consideration, consumers are better off. We observe in figure 6.4c that they tend to exercise the EPO earlier.

Figure 6.3: Counterfactual - Steeper EPO Schedule.
in the contract. The firm has higher expected revenue from RTO for appliances and electronics. While under this particular example furniture, TVs and computers yield lower EREV, the objective of higher EVAL and higher EREV can be achieved by doing some fine tuning in terms of the intercept and the slope of the EPO curve.

The reason consumers and the firm can simultaneously be made better off is that the new EPO schedule disincentivizes EPO in the beginning of the contract, that is when EPO is relatively unattractive to consumers anyways, and incentivizes EPO later in the contract, when the EPO is relatively more attractive. This is also when items are worth less to the firm since they have suffered depreciation.

![Figure 6.4: Early purchase option counterfactual behavior.](image)

**Welfare maximizing EPO price schedule**

The natural extension of the “Steeper EPO” counterfactual is to find the linear EPO price schedule that maximizes welfare. The goal is to maximize equation [6.1] with respect to the intercept and the slope of the early purchase option price schedule. That is \( \max_{a,b} W \), where \( a \) is the intercept and \( b \) is the slope of the schedule.

I find that the welfare maximizing EPO schedule has a negative slope of 0.75 and crosses the schedule dictated by regulation at exactly half the duration of the RTO contract. Consumer behavior under this policy is qualitatively similar to that presented in figure 6.3c where we observed agents tend to exercise the EPO earlier in the contract. Column “Welfare Max Linear EPO” in table A6.1 contains the levels of consumer and producer surplus achieved by this contract change.

There is no real reason, however, why the EPO price schedule should be confined to have a linear form. Counterfactuals show that the adoption of a simple quadratic schedule can perform better in terms of welfare than the optimal linear schedule. One simple example is given by a schedule with the following functional form: \( pepo_t = a (t - T)^2 + p \), where \( T \) is the length of the RTO contract, \( p \) is the monthly rental rate, and
the parameter \( a \) is chosen so that the proposed schedule crosses the price function dictated by regulation at exactly half the duration of the RTO contract, as shown in figure 6.5. This functional form is preferred to the linear one since it does a better job at disincentivizing EPO during the first half of the contract and incentivizing it during the second half. The numerical results of this counterfactual can be found in table A6.1 under the column “Non-linear EPO”.

![Figure 6.5: Counterfactual - Non-linear EPO Schedule](image)

To summarize, the model indicates that the early purchase option schedule currently imposed by regulation is not welfare maximizing. This is not surprising since there is no economic analysis behind its choice. The choice seems to be motivated by the simplicity of a linear form, and with the goal of protecting consumers by guaranteeing a maximum price at which they can exercise the option at various points in time. I hope this section motivates further discussion regarding the optimality of the chosen schedule in Ohio as well as in other states.

### 6.4.3 The stealing option

In chapter I have shown that RTO stores face a serious delinquency problem. The percentage of items that end up being charged off because the customer stops making payments and refuses to return the item is considerably high. Almost 20% of TVs, 19% of electronics and 16% of computers undergo unfavorable charge-offs at the item level.

The fact that RTO firms are highly exposed to delinquency motivates the following research questions: Should firms invest in better delinquency control and implement more stringent rental initiation conditions? Could these investments increase overall welfare if part of the potential savings from lower delinquency levels are transferred to consumers?
To address these questions I begin by running a counterfactual exercise that assumes the RTO store could fully prevent customers from running away with items. I run this exercise - the “No STL” counterfactual - and observe that under the new scenario consumers substitute away from STL into RET, as can be seen by comparing figures 6.6a and 6.6b. Table A6.1 shows that while consumer utility and market shares decrease only slightly, the revenue the store derives from the contract increases significantly. The store could transfer part of its increased revenue to consumers in the form of a lower monthly rental rate.

Taking this into account, I run a counterfactual exercise where I assume STL can be fully prevented and monthly rental rates are decreased by 5% simultaneously - the “No STL 2” counterfactual. In this situation, both the firm and the consumers are better off. Numerical results are presented in table A6.1. The dynamic behavior of consumers is very similar to that presented in figure 6.6b which displays behavior before the introduction of the 5% discount.

In fact, the model predicts that if the firm could perfectly prevent delinquency, it could offer contracts with a 13% reduction in the monthly rental rate and still obtain the same revenue as in the base case. Delinquency control is not costless, however. Either through investment in technology or larger customer screening efforts, the firm would have to allocate funds to achieve a reduction in unfavorable charge-offs. This means that the maximum reduction in the monthly rental rate the firm could offer would be lower than 13%. The exact number depends on how costly bringing delinquency to control is.

The screening mechanism currently in place consists of the submission by the customer of a “Lease Order Form” containing personal information and contact information of three personal references. Interviews with a store manager of the independent firm revealed that customers who cannot provide at least two personal references able to verify the customer’s address are not approved.

The analysis in this section points towards the need for a better screening mechanism oriented towards theft prevention. More stringent rental initiation conditions should be put in place. Given the state of development of the electronic payment system, those banked consumers could be asked to sign an ACH authorization, which would allow the RTO store to electronically withdraw a specified amount of money from the customer’s bank account on an agreed upon day each payment period. RTO stores should also consider investing in technology to locate their priciest items should the customer stop paying and refuse to return the item.

An alternative way for RTO firms to hedge themselves against harmful delinquency is to introduce a security deposit system similar to the one suggested earlier in the chapter. Each month the firm could collect a fixed dollar amount from the client, on top of the monthly rental rate. This dollar amount would be

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13 See section 3.2.1 of chapter [3] for a detailed description of the RTO process.
14 ACH stands for Automated Clearing House.
put in escrow under the customer’s name and would be returned in full if the item is returned or purchased. The store would keep the funds in the event of delinquency. This system would make delinquency costlier.

Whatever the chosen path to reduce delinquency is, the results from this section indicate that taking steps in that direction can be a profitable investment for the firm and can also make the average consumer better off.

![Figure 6.6: Delinquency counterfactual behavior.](image)

6.5 Conclusion

To analyze the incentives and trade-offs consumers face in the context of rent-to-own, I estimate a structural model of consumer behavior using proprietary transaction-level data. The model does a very good job at fitting consumer behavior observed in the data. It displays great in sample performance.

The set of robustness tests I perform also yield favorable results, which increases my confidence in the estimation procedure and estimation results. In particular, I find that the estimation algorithm does not suffer from starting value dependence and that the numerical integration step of the estimation procedure is not affecting point estimates.

The results of the counterfactual exercises show that certain terms of the RTO contract can be altered to improve the situation of consumers and firms offering the contract.

Regarding the very flexible item return policy, I observe that customers deciding to rent to term or to exercise the EPO late in the life of the contract might be cross-subsidizing those consumers who return items early at no cost. Counterfactuals show that imposing a small dollar penalty on consumers who return items early and simultaneously reducing the monthly rate by 10% seems to give consumers the right incentives. Customers cut down on early returns, avoid the delinquency option and stay longer in the RTO contract. This makes both consumers and RTO stores better off since the early return penalty seems to be eliminating the externality that early returners were imposing on consumers who wished to stay longer into the contract.
I also observe that lifting restrictions on the EPO price schedule could also lead to improved consumer and firm experience. Counterfactual “Steeper EPO” shows that pivoting the EPO schedule such that the early purchase options starts off being more expensive but becomes cheaper faster, can simultaneously improve the experience of producers and consumers. The reason for this is that the new EPO schedule disincentivizes EPO in the beginning of the contract, that is when EPO is relatively unattractive to consumers anyways, and incentivizes EPO later in the contract, when the EPO is relatively more attractive. This is also when items are worth less to the firm since they have suffered depreciation. Counterfactuals show that the adoption of a simple quadratic schedule can perform even better than the optimal linear schedule. I hope these results motivate policy discussion regarding the optimality of the early purchase option price schedule imposed by state regulators.

Finally, counterfactuals show that a tighter screening and delinquency control could generate savings to the RTO stores, part of which could then be transferred to consumers in the form of lower rental rates. In chapter 8, I had observed that item delinquency was hurting firm performance. The model in this chapter confirms these findings and proposes changes to contract terms to improve the experience of agents. Results indicate that taking steps towards controlling delinquency can be a good investment for the firm and can also make the average consumer better off.

The counterfactuals analyzed in this chapter represent a small sample of the myriad of exercises that could be run. I hope the ones I chose promote constructive policy discussions, and that this discussion in turn motivates the use of my model to run further exercises.
6.6 Appendix

6.6.1 Computing standard errors

The asymptotic distribution of the maximum likelihood estimator is given by

$$\hat{\theta} \xrightarrow{a} N \left( \theta_0, I(\theta_0)^{-1} \right)$$

In practice, the covariance matrix of the maximum likelihood estimator is computed by replacing $\theta_0$ by $\hat{\theta}$ and inverting the information matrix

$$Var(\hat{\theta}) = I(\hat{\theta})^{-1} = \left( -E \left[ \frac{\partial^2 L(\theta)}{\partial \theta \partial \theta'} \right]_{\theta = \hat{\theta}} \right)^{-1}$$

$$= \left( E \left[ \frac{\partial L(\theta)}{\partial \theta} \frac{\partial L(\theta)}{\partial \theta'} \right]_{\theta = \hat{\theta}} \right)^{-1}$$

(6.2)

where the second line results from applying the information matrix equality.

Standard deviations are obtained by the BHHH method\footnote{For more information the reader is referred to Davidson and MacKinnon (1993). BHHH is an acronym of the four originators of the method: Berndt, B. Hall, R. Hall, and Jerry Hausman.} which replaces the expectation in the second line of equation 6.2 by the sample average of the outer product of gradients

$$J(\theta) = \sum_{n=1}^{N} \frac{\partial L_n(\theta)}{\partial \theta} \frac{\partial L_n(\theta)}{\partial \theta'}$$

The matrix $J(\theta)$ can be expressed as $X'X$ where

$$X = \begin{bmatrix}
\frac{\partial L_1(\theta)}{\partial \theta_1} & \frac{\partial L_1(\theta)}{\partial \theta_2} & \cdots & \frac{\partial L_1(\theta)}{\partial \theta_K} \\
\frac{\partial L_2(\theta)}{\partial \theta_1} & \frac{\partial L_2(\theta)}{\partial \theta_2} & \cdots & \frac{\partial L_2(\theta)}{\partial \theta_K} \\
\vdots & \vdots & \ddots & \vdots \\
\frac{\partial L_N(\theta)}{\partial \theta_1} & \frac{\partial L_N(\theta)}{\partial \theta_2} & \cdots & \frac{\partial L_N(\theta)}{\partial \theta_K}
\end{bmatrix}$$

To compute the elements of $X$, I follow the centered finite difference approximation approach, which replaces the derivatives in $X$ by appropriate numerical differentiation formulae.

The standard error of each element of $\hat{\theta}$ is therefore given by the square root of the main-diagonal entries of the matrix $(X'X)^{-1}$. 
Figure A6.1: Empirical patterns in real data vs. behavior of simulated consumers.
### 6.6.3 Tables

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(a) EVAL

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<tr>
<td><strong>Computers</strong></td>
<td>$651.8</td>
<td>$477.3</td>
<td>$757.8</td>
<td>$784.6</td>
<td>$664.5</td>
<td>$652.4</td>
<td>$654.3</td>
<td>$668.7</td>
<td>$675.7</td>
<td>$675.7</td>
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<tr>
<td><strong>Electronics</strong></td>
<td>$502.9</td>
<td>$344.7</td>
<td>$670.2</td>
<td>$681.4</td>
<td>$499.7</td>
<td>$506.7</td>
<td>$508.3</td>
<td>$510.7</td>
<td>$524.4</td>
<td>$524.4</td>
</tr>
</tbody>
</table>

(b) EREV

<table>
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<tr>
<th></th>
<th>No RET</th>
<th>Costly RET</th>
<th>Welfare Max RET</th>
<th>No EPO</th>
<th>Steeper EPO</th>
<th>Welfare Max Linear EPO</th>
<th>Non-linear EPO</th>
<th>No STL</th>
<th>No STL 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appliances</strong></td>
<td>-1.6%</td>
<td>7.6%</td>
<td>7.6%</td>
<td>-0.3%</td>
<td>0.4%</td>
<td>0.2%</td>
<td>0.2%</td>
<td>-0.1%</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Furniture</strong></td>
<td>-1.6%</td>
<td>0.5%</td>
<td>0.6%</td>
<td>-0.6%</td>
<td>0.7%</td>
<td>0.5%</td>
<td>0.6%</td>
<td>-0.6%</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>TVs</strong></td>
<td>-3.4%</td>
<td>5.2%</td>
<td>5.2%</td>
<td>-0.6%</td>
<td>0.7%</td>
<td>0.5%</td>
<td>0.6%</td>
<td>-0.6%</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Computers</strong></td>
<td>-1.6%</td>
<td>8.9%</td>
<td>9.1%</td>
<td>-0.1%</td>
<td>0.1%</td>
<td>0.2%</td>
<td>0.2%</td>
<td>-0.2%</td>
<td>0.1%</td>
</tr>
<tr>
<td><strong>Electronics</strong></td>
<td>-1.6%</td>
<td>0.7%</td>
<td>0.8%</td>
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<td>0.0%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>-0.2%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

(c) EPRTO - Percentage change with respect to the base case

Table A6.1: Counterfactual analysis.
Chapter 7

Conclusion and Future Work

This dissertation develops the most detailed analysis of the RTO contract, the industry’s institutional details and its regulatory framework. It is also the first fully independent study of RTO using micro-level data. It additionally contains the first piece of work on the RTO industry to employ structural estimation techniques, and therefore the first to credibly analyze the consequences of contract changes, regulatory changes and other counterfactual exercises on social welfare.

The RTO industry, as many other alternative financial services, is subject to significant debate. Consumer advocacy groups are critical of the value of RTO to consumers. The high cost of RTO merchandise to consumers, and the disproportionate profitability of RTO stores are repeatedly pointed out by these groups. The industry association, in turn, highlights that RTO is one of the most flexible transactions in the marketplace and fervently denies consumer advocates’ accusations. It states that only RTO contracts offer the consumer the flexibility of a no-obligation, no-penalty return transaction that provides an ownership option.

RTO has not, however, drawn much attention in academic circles. In this dissertation, I build on past papers on RTO and suplement the analysis presented in them with multiple other sources of information. I include data from the industry’s official trade association, and regulatory bodies from different states. I have also performed visits to several RTO stores, conducted interviews with industry participants, and got access to relevant documentation, including forms used to perform customer screening, actual RTO contract sheets and payment receipts. Most importantly, I got access to and studied a proprietary micro-level dataset of RTO agreements. A proper understanding of the RTO market is essential to assess the value of the transaction to consumers and firms, as well as to design sensible regulatory frameworks. I hope my dissertation helps resolve the controversies surrounding the industry, acts as a guide to the RTO world, and promotes constructive policy discussions.
In this thesis I describe the nature of the agreement and present it as a unique bundle of services and financial options, not available together in other contractual arrangements. My analysis shows that while rent-to-own looks expensive compared to cash retail and credit sale transactions, it does not when benchmarked against pure leases. And those unbanked or underbanked U.S. households wanting to access durable goods may have nowhere else to turn to. There is no evidence that the rent-to-own activity is overwhelmingly profitable. The industry seems to be competitive and the performance of rent-to-own firms stands roughly in the median of the distribution of profitability across industries in the U.S.

The reduced-form analysis carried out using proprietary micro-level data from a medium-sized rent-to-own chain in Ohio helps understand consumer behavior and contract use in RTO. I addressed the controversy regarding the proportion of RTO customers that rent items to term. Consumer advocates report the great majority of them do; the industry association states 75% return the rented item within the first four months of the contract. The analysis of micro-level data shows that the truth lies somewhere in the middle. The data also reveal that consumers respond to the incentives and trade-offs presented to them by the contract. During the first half of the RTO agreement, the consumer has not built too much equity in the contract and exercising the early payout option remains prohibitively expensive. I observe most consumers decide to make a rental payment, while some of them decide to return the item, presumably those who are not satisfied with the item or suffered a low income shock. During the second half, the EPO price has decreased to a level consumers can afford. I therefore observe a sharp increase in the proportion of individuals who exercise the EPO, with a consequent decrease in that of payment and returns. Many consumers just stop making payments and do not return the item. Delinquency is a serious problem in the industry that significantly affects the performance of RTO firms. Furniture items and appliances, items that suffer the least from delinquency, are the most profitable product categories.

Counterfactual exercises indicate the industry as a whole could benefit from changes in the RTO agreement. The flexibility of the contract in terms of the early return option should be revisited. Such flexibility appears to remain from the early days of the industry and firms should analyze whether reducing it could improve performance and consumer experience. Firms should also consider investing in tighter screening and delinquency control. The model indicates these measures could generate savings to the RTO stores, part of which could then be transferred to consumers in the form of lower rental rates. Finally, regulation restricting the shape of the early purchase option schedule should be modified. The model shows that the schedule could be altered in such a way as to make both consumers and the firm better off.

As much as I intend to give the reader a much better understanding of the RTO marketplace, there are many more questions on the industry that still need to be addressed.
Directions of future work

The following represents a list of what in my opinion are the most interesting questions that remain unanswered:

- **Screening and pricing:** Why is there no risk-based pricing in this industry? Does this lead to harmful cross-subsidization across high and low risk customers? How can we improve the screening mechanisms RTO firms use to isolate good from bad risks?

- **Consumer attention and rationality:** The RTO agreement is not a simple contract and there is always the question of whether consumers really understand it. There is evidence in other markets that the understanding of contract terms by consumers can be very limited. Woodward and Hall (2010) shows that in the mortgage market, where a 2x1 vector represents the charges associated with a transaction, borrowers treat the two charges independently, failing to recognize their interrelation. This would lead to an analysis of optimal advertisement, price tag and contract disclosure regulation. How can we tailor regulation to address cognitive defects from which customers are most likely to suffer? In addition, it could be argued that the assumptions used in the model of this chapter, i.e. that consumers are rational intertemporal optimizers, might not hold. Can we better understand the deviations from rational behavior RTO consumers suffer from?

- **Repeat business and the value of relationships:** Do relationships matter? Do consumers with more than one outstanding rental, or with past rentals, act differently from first-time consumers?

- **Competition and industry dynamics:** Is the aggressive expansion of the two industry giant publicly traded firms good or bad for consumers? How are independent chains reacting to this phenomenon? Can we model the entry and exit dynamics of this market?

- **Inventory management and bargaining:** How do independent chains and the two public firms procure merchandise? How does this affect price competition? Can we model the bargaining process between wholesalers and independent chains / large public firms? Interviews with the president of the independent chain revealed that independents have formed a nationwide buying cooperative specifically for the RTO industry, with over 150 member companies representing more than 2,800 store locations. Has the creation of this cooperative improved the situation of independent operators?

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1 I thank Michael Grubb for this suggestion.

2 This cooperative is called TRIB Group [http://tribgroup.com/]. Members gather twice a year to determine buying policies for that period. After prices have been negotiated with suppliers, each member of the group makes its own buying decisions. Purchases are made in trade shows, for the most part.
This list is not intended to be exhaustive. Many questions remain in the context of a large, interesting, and severely under studied industry. I hope this study motivates future researchers to contribute to our understanding of rent-to-own and other alternative financial services.
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