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Gain From Consumer's Information Searching and Price Dispersion

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Abstract

Consumer information influences purchasing behavior; however, less is known about the relationship in the credit market. Credit markets offer consumers a complex array of different products when choosing mortgages. The current study examines whether borrowers search for the very best terms when making major decisions about borrowing money or obtaining credit as well as explores the relation between consumer information seeking and the cost of credit. This study demonstrates the existence of price dispersion between those who made an extensive information seeking and those who did not. When controlling for the proxies of creditworthiness and demographics of the respondents, it is found that those who made a great deal of information seeking tend to have lower mortgage rates than those who made almost no information seeking. This study offers financial educators and policy makers suggestions on how to help consumers make better financial decisions.

Keywords

Information Searching, Cost of Credit, Price Dispersion

Introduction

The financial service industry has become increasing complex and continues to change, revolutionizing the financial markets (Mandell & Klein, 2007). Recent credit products often have several interest rates for different types of activities with interest rates fluctuating for many reasons. Given the complexity of interest rate of loans, it is important to have a better understanding of factors related to the actual cost of credit offered to borrowers. Rising interest rates are considered a cause of increased mortgage delinquencies that accelerated in mid-2007 (Mayer et al., 2008). Borrowers unprepared for higher payments and cannot lower payments through refinancing may end up with reduced spending or a mortgage default. When borrowers apply for loans, the cost of credit or line of credit is determined by the interest rate the lender charges, arrangement fees, additional charges, and the duration of the loan. Even a small difference in interest rate that borrowers are charged at the origination of the loan can have a significant impact on the amount they eventually pay.

Empirical evidence indicates that the price dispersion among consumers derives from informational

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asymmetries. The relationship of consumer's information seeking and price dispersion has been studied in previous studies. Numerous researchers have investigated consumer's information search behavior for goods or services; however, there is little work on consumer's credit product information searches. A majority of studies on mortgage loan prices have focused on consumer's financial perspectives to explain the dispersion of prices paid by different consumers. Barrutia and Espinosa (2012) studied mortgage loan prices using mortgage loan price data from 1,055 households and found that consumer expertise-related differences were significantly related to mortgage loan prices.

This study explores if consumers search for the best terms when making major decisions about borrowing money or obtaining credit. The credit market has a wide variety of price differences and consumer's searching behaviors are assumed to payoff in terms of choosing credit products with lower interest rates. The current study follows the study by Barrutia and Espinosa (2012). It assumes that heterogeneity in consumer's shopping can be related two mortgage loan prices. This study examines the relationship between the degree of searching activities for borrowing information and the return to behavior as measured by the mortgage interest rate of the primary residence that the borrower holds. Findings can help consumer educators and government policy makers inform potential borrowers on how to choose proper credit products.

Theoretical Background

Rationale Behind Mortgage Price

Lenders have traditionally used an evaluation framework known as the five C's of credit when making decision on a credit application (Loo, 1998). First, the credit applicant's capacity to pay off the credit is considered. For example, present and expected future earning capacity against existing debts can be considered. Second, the credit applicant's character is considered. Lenders determine who is creditworthy with a willingness to pay and meet financial obligations. For example, whether the borrower has made previous debt payment in a timely fashion can be examined. Third, capital such as borrower's cash or assets to weather financial troubles as a financial buffer can be assessed. Fourth, conditions affected by the economic cycle or overall environment that the lenders are operating in can be considered. For example, regulatory conditions apply to the lender's circumstances and economic conditions influence the lender's general policy towards a loan. Finally, the collateral pledged by the borrower to secure the loan is considered. For example, savings, stocks, or real estate can be assessed. Additionally, a lien position can be related with the interest rate. Obviously, the first mortgage is considered less risk compared to a second mortgage (Reed Mortgage Corporation, 1999). The loan term is also related to the interest rate. For example, a borrower tends to be offered high interest rate if they chooselong term loans (Economy Watch, 2010).

Information Seeking and Price Dispersion

A consumer moves through a decision making process when they purchases goods or services that satisfy their needs and wants. The consumer's decision making process starts by recognizing needs. After identifying needs, they begin to search for information, evaluate alternatives, and purchase goods or services (Blackwell et al., 2001). The consumer's information search behavior can be an important step in the consumer's decision making process. This step requires that a consumer search for information to make better decisions (Solomon et al., 2002) and increase the probability of satisfaction with purchase outcome (Shaver, 2007).

Stigler's book (1961) *The Economics of Information* is the cornerstone of information search theories. He demonstrated the price dispersion of goods or services for consumers to involve in an include information search (Lee and Hogarth, 1999). This book empirically explains price dispersion and suggests a variety of theories that can be applied to price dispersion. Stigler suggested those who wishes to purchase at a favorable price must canvass various sellers and argued that dispersion is a biased measure of ignorance in the market because there is no absolute homogeneity in commodity. Grossman and Stiglitz (1980) argued that prices play a role in conveying information from informed consumers to uninformed consumers. They concluded that there is no competitive equilibrium and an informationally efficient market is impossible. Price dispersion is ubiquitous even for homogeneous goods or services.

Stigler (1961) explained the optimal level of a consumer's information search in the context of search costs and benefits theory where a consumer will search for information until the expected marginal returns of additional searches exceed the expected marginal costs of a search (Lee and Hogarth, 1999). Consumers reduce price gaps by searching for price information at cost in terms of time and effort. Inexperienced consumers might pay higher prices for the same goods and services than experienced ones. It might be because inexperienced consumers have inadequate knowledge on price assessment. The variance of the expected minimum price decreases with additional searches and inexperienced consumers will have a large price variance. They document that this lack of basic financial literacy results in poor financial decision making. (Mandell & Klein, 2007). However, the amount of a search will vary by consumers because their expenditures on a commodity or cost of search differ. For example, time might be more important for those with higher incomes. The same story can be applied to consumer's decision making on a credit product. This study assumes the dominant role of consumer's information searches and examines individuals involved in extensive information searching who are more likely to have a lower cost of credit, even after controlling for a variety of variables related two borrowers' creditworthiness.

Literature Review

Previous studies have shown homogeneous products sold at different prices by different sellers. The relationship of consumer's information searches and price dispersion has also been empirically studied in previous studies. Previous studies (e.g. Kang and Lee,1998; Feldstein, 2011; Anania and Nisticò, 2012) show that consumer's information is strongly related with price dispersion deriving from informational asymmetries. They have investigated consumer information search behavior for some goods or services; however, there is little work on borrowers' information searches for credit products such as information on contract terms and debt conditions at the national level. The following findings presented provide some insight about why some consumers select unaffordable credit terms.

Consumers' Information Search Activities

Bucks and Pence (2008) examined the characteristics of those who reported not knowing contract terms by using the Survey of Consumer Finances (SCF). They showed that most borrowers know basic mortgage terms; however, borrowers with adjustable rate of mortgage appear to underestimate interest rates or know how much interest rates could change.

Feldstein (2011) demonstrated that patients had a greater financial incentive to search for lower prices when private and public medical insurance was limited. Patients who place a high value on time are less likely to search and are more likely to pay higher prices; however, doctors had little information on prices and non-prices factors such as quality and accessibility by competing doctors. Lack of information for patients on competing doctors made other providers poor substitutes for current doctors. Doctors demand curves were less price elastic than if such information were more readily accessible.

Gain from Consumers' Information Search Behavior

Chang and Hanna (1992) discussed the cost and benefit of the search for credit. They considered a lower interest rate and finance charge as immediate information searching benefits. They also indicated the indirect benefits of better money management, greater savings, convenience from using appropriate credit, financial knowledge and experience. The opportunity cost of time and physical/mental effort spent in information searches were considered as search costs. Lee and Hogarth (1999) examined the returns from consumer's information searches using SCF. The measure of potential savings was calculated by the range of credit card interest rates. The relationship between consumer information searches and returns was measured by the annual percentage rate and dollar savings in interest payments. Kang and Lee (1998) investigated how consumers search for information and the relationship between consumer satisfaction and information searches. This study used individuals who purchased cars two years prior to the survey for the sample. Consumers can gather significant information from a conversation with friends, neighbors, colleagues, experienced persons, salespersons and advertising. Perceived risk, the number of search activities, and financial pressure had a direct influence on consumer satisfaction. Anania and Nisticò (2012) assessed the extent and determinants of spatial price dispersion for perfectly homogeneous food products in various retailers. The extent of observed price dispersion was high. They concluded that consumer heterogeneity and services offered resulted in monopolistic competition. Retailers are found to have different pricing strategies; in addition, the contemporaneous heterogeneity of retailers' services and consumers' search and shopping preferences were price dispersion determinants.

Research Methods

Research Questions

Interest rate competition and risk-based pricing have created wide dispersions in interest rates for credit and price information on credit can be critical for credit applicants. This study assumes that consumer information searching behavior is rewarded in terms of choosing credit products with lower interest rates in a credit market with a wide variety of prices. This study examines if borrowers search for the best terms when making major decisions about borrowing money or obtaining credit. This study also investigates the relationship between the degree of searching activities for borrowers and gain from their behavior. In particular, this study examines if those engaged in extensive information seeking behavior are more likely to have lower interest rate. This study relies in part on concepts derived from economic-based search models (e.g., Stigler, 1961).

Data and Questionnaires

This study uses data from the 2010 SCF to estimate the relationship between the degree of searching activities for borrowers and the return on their behavior. The data is from a triennial interview survey of U.S. households sponsored by the Board of Governors of the Federal Reserve System with the cooperation of the U.S. Department of the Treasury (Bucks et al., 2009). It provides detailed information on household finances in U.S. It allows for the examination of household credit issues by drawing from the extensive reporting of household balance sheets, households credit usage, and demographic characteristics. It includes several questionnaires that ask if a respondent searches for information when making major decisions about borrowing money or obtaining credit. Mortgage interest rates that a respondent has and a variety of factors related to an individuals' creditworthiness on lending decisions are also included in the dataset.

The mortgage rate offered to a borrower is critical and this study uses only participants with a mortgage. This study used 2,293 completed interviews from the 6,492 respondents of the 2 010 SCF survey.

Variables Identification

To provide evidence on the impact of respondent's information seeking for credit and the cost of credit, this study uses the SCF questionnaire as: "*When making major decisions about borrowing money or obtaining credit, some people shop around for the very best terms while others don't. What number would (you/your family) be on the scale*?" The possible answer to this questionnaire is on a scale from 1 to 5, where 1 indicated they had done almost no shopping for the very best terms when making major decisions about borrowing money or obtaining credit. In this study, 3 is moderate shopping and 5 is a great deal of shopping; those who answered 1 or 2 are merged as "almost no shopping" and those who answered 4 or 5 are merged as "a great deal of shopping".

This study uses the interest rate of the mortgage they hold to measure gain from consumer's information searching activities. This study only focuses on obtaining the first mortgage on their principal residence because a first mortgage and a second mortgage have some differences in terms of interest rate. A first mortgage is often considered less risk than a second mortgage; therefore, borrowers are more likely to get a lower interest rate.

To limit respondents to those with a mortgage, this study uses the questionnaire, "*Is there a mortgage or land contract on this (home/home and land/apartment/property)*?" If a respondent answers "Yes, mortgage", the respondent is then included in the research sample. The questionnaire, "*What was the interest rate on this (land contract/mortgage/loan) when you took it out*?" is also used to examine the mortgage rate of the respondent.

The following variables are included as controls for credit-related variables, demographic variables, and financial variables. First, the research model includes credit history such as payment performance, ever filing for bankruptcy, the value of a residence with a mortgage, the duration of loan which the respondent agreed upon at time of issue or when refinanced. Second, demographic factors such as age, race, family composition, employment status, marital status, and educational attainment are included. Third, household income and net worth are included as financial variables.

Empirical Model

A statistical technique used to explain the relationship of individual's information seeking and the return to the behavior is multiple regression method. The regression equation takes the form of Y=a+bx+c, where Y is a dependent variable. It represents the rate of mortgage a respondent was offered: X is the group of independent variables that includes credit-related variables, demographic variables, and financial variables to predict Y, a is the Y-intercept of the line, and c is an error term.

Results

Descriptive Analyses

Among the 2,293 households, the average mortgage rate is 5.58% and the median mortgage rate is 5.50% in 2010 SCF. Table 1 presents descriptive statistics of respondents used in this study. First, there exists a diversity in the information search behavior across respondents. When making major decisions about borrowing or obtaining credit, about 18% of respondents report almost no shopping for the very best terms, while 29% did significant shopping. The majority (53%) of respondents report a moderate amount of shopping.

Credit-related variables include credit payment performance, filing for bankruptcy, value of house with mortgage, and duration of mortgage. About 9% of respondents answered that they made late payments for 2 months (or more) and about 15% of respondent answers that they had previously filed for bankruptcy. The mean and median value of a residence with a mortgage are $276,119 and $180,000 respectively. The mean and median value of the duration of a mortgage term are 25 years and 30 years.

Demographic variables include job status, age, educational attainment, marital status, and race. The majority of respondents are salary earners (about 68%), from 45 to 65 years of age (about 47%), have a college degree or more (about 47%), and are married (About 66%). Financial variables include the level of income and net worth. The mean of income and net worth are $104,384 and $557,603 respectively.

Table 1. Selected Independent Variables

Variables	Categories	Proportion
Information Searching	Almost no shopping	17.54%
	Moderate shopping	53.16%
	A great deal of shopping	29.30%
Credit Related Variables		
Late payment by 2 months or more	Yes	9.37%
	No	90.63%
Previously filed for bankruptcy	Yes	15.28%
	No	84.72%
Value of a residence with a mortgage	Mean	$276,119
	Median	$180,000
Duration of a mortgage	Mean	25 years
	Median	30years
Demographic Variables		
Job status	Salary earner	67.97%
	Self employed	13.82%
	Not working	18.21%
Age	Age <35	16.00%
	35≤Age<45	23.50%
	45≤age<65	47.20%
	65 ≤age	13.10%
Educational attainment	Less than high school	6.72%
	High school	28.09%
	Less than College	17.81%
	College or more	47.38%
Marital status	Married	66.47%
	Single, divorced, separated, widowed	33.53%
Ethnicity	Non-Hispanic white	75.25%
	Others	24.75%
Financial Variables		
Income	Mean	$104,384
	Median	$69,122
Net worth	Mean	$557,603
	Median	$128,600

Figure 1 shows mortgage rates across people having diverse information searching level from almost no shopping for information, moderate shopping, and a great deal of shopping. The cumulative probabilities show how likely it is that the output value will be less than some value. This figure represents those who have made a significant efforts to shop for information are more likely

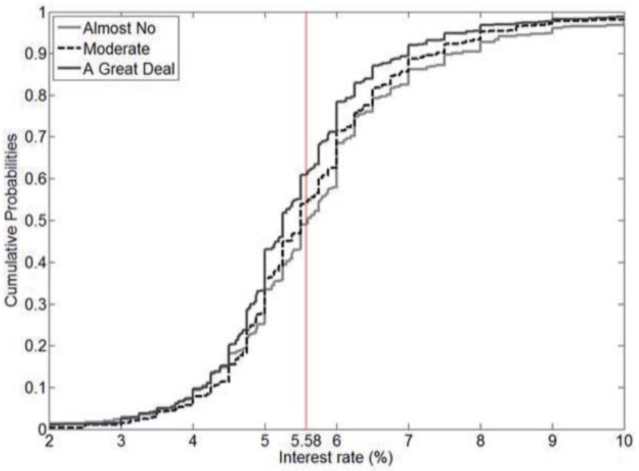

Figure 1. Mortgage rate across the diverse information searching levels.

to have a lower mortgage rate compared to the other two groups. The mean mortgage rate, 5.58%, are indicated on the graph. Those who have done significant information searching have a 60% chance that they have 5.58% mortgage rate; however, those who have made almost no information searching have a less than 50% chance. These statistics are not derived after controlling for a series of independent variables, they provide some insight about the relationship between borrower' s information searching and the cost of a mortgage.

Multivariate Analyses

This study uses a multivariate analysis to verify the robustness of the relationship discussed above. Consistent with the theoretical background, research findings show that the borrower's information seeking behavior is an important mortgage rate factor. Those who put forward a significant effort to shop for information are more likely to have a lower interest rate, after controlling for the effect of the a variety of variables related to a borrowers' creditworthiness. Those who make a significant effort to shop for information when making decision on borrowing tend to have lower interest rates by about 1.1% compared to those who do not shop for information.

The effects for credit related variables are statistically significant. This finding reflects that credit-related variables play an important role in the mortgage rate offered to borrowers. Those who have a bad credit history are more likely to have a higher interest rate offered. Those who have previously filed for bankruptcy in the past are more likely to be offered higher interest rates by about 0.28% compared to those who have not. A one year increase in the duration of the mortgage increases the mortgage rate by about 0.02%; however, the value of a house with a mortgage decreases the mortgage rate.

The effects of demographics remain after accounting for other variables. The age of the respondent is related to the mortgage rate. Respondents over the age of 45 years are more likely to pay a higher mortgage rate compared to the reference group. Respondent's educational attainment is related to the mortgage rate. Those who have a higher educational attainment are more likely to have a lower mortgage rate compared to those who with a lower educational attainment. Race is also an important factor to explain the mortgage rate offered. Non-Hispanic whites tend to be offered lower interest rates compared to other groups. Among financial variables, the level of income is found to be related with a mortgage rate in a negative direction; however, the level of net worth is not significant after controlling for other variables.

The potential correlation between the independent variables in the research model are examined to obtain an unbiased estimate. Multicollinearity is not considered a serious issue for prediction.

Conclusions

This study explored the relationships among consumer's information searching and the cost of credit. This study examined the relationship between the degree of searching activities when making major decisions about borrowing money (or obtaining credit) and the gain from the behavior as measured by the interest rate of the mortgage of primary residences the borrower holds. Based upon Stigler's theory (1961) that argues a relationship between consumer's information asymmetry and the price dispersion of goods or services, this study hypothesized that individuals who search for the best terms when making major decisions about borrowing money or obtaining credit tend to have a lower mortgage rate. This study examined if those who are engaged in extensive information seeking behavior are more likely to have a lower interest rate after controlling for the effect of the a variety of variables related to the borrowers' creditworthiness

Table 2. Multivariate Analysis of mortgage price dispersion

Variables	Estimate	Standard Error
Information Searching		
Moderate shopping	-0.84	3.52
A great deal of shopping	-10.80***	3.35
Credit Related Variables		
Late credit payment by 2 months or more	54.17***	4.60
Previously filed for bankruptcy	27.66***	3.73
Value of a residence with a mortgage	-43.72***	1.45
Duration of mortgage	1.76***	0.16
Demographic Variables		
Job status (not working)[1]		
Salary earner	-0.13	3.67
Self employed	11.45**	4.15
Age (age <35)		
35≤Age<45	1.52	4.28
45≤age<65	14.18***	4.01
65 ≤age	15.30**	5.28
Educational attainment (less than high school)		
High school	-12.86*	5.65
Less than college	-20.65***	5.94
College or more	-25.41***	5.61
Race (Non-Hispanic black, others, and Hispanics)		
Non-Hispanic white	-17.81***	2.94
Marital status		
Marital status (single, divorced, separated, widowed)		
Married	6.43*	2.69
Financial Variables		
Log income	-1.32**	0.51
Log net worth	0.74	0.29
Intercept	1082.811***	17.23
F-value	11.74***	
R-sq	.17	
R-sq (adj)	.15	

[1]The reference group is in parenthesis.
*, **, *** Significantly different from zero at the 10%, 5%, and 1% levels respectively.

considered in the lending decision.

This study empirically showed that consumer information searching behavior for contract terms and conditions of the debt can payoff in terms of choosing mortgage products with lower interest rates in credit market with a wide variety of prices. This study suggested that those who want to obtain mortgage at a more favorable price (i.e. lower interest rate) must search for prices across various sellers. It also supported that price dispersion for a homogeneous product can be an indication of consumer ignorance in the market. In addition, elderly consumers and those who have a limited education are more likely to be offered mortgage loans at a higher price than otherwise similar counterparts. The results can be explained by previous findings that "financial sophistication" decreases with the age of the consumer (Agarwal et al., 2009) and financial illiteracy is pronounced among those with a low level of educational attainment (Lusardi & Mitchell, 2008). The lack of financial sophistication or financial illiteracy of elderly consumers and those who have limited education prevent them from making rational consumer decisions.

This study provides some suggestions for consumers, government policy makers, and future researchers. First, choosing a mortgage at a favorable term must be an important financial decision. When buying a house through a mortgage or refinancing and individual's existing mortgage, consumers need to be involved in extensive information searching. They should compare and contrast a variety of mortgage options (such as costs and terms) and find the best deal from several lenders. Second, government policy makers need to consider improving information disclosure to consumers in order to help them understand the differences in products and mitigate information asymmetry among consumers. Third, future research about this issue needs to estimate the robustness of interest rates indicated by respondents. A recent study by Frank (2011) examined credit card penalty pricing using data from the SCF. The results showed that respondents in the dataset underestimated credit card interest rates by 30% - 33%. Individuals who are overly optimistic are more likely to underestimate their interest rate. Therefore a future study needs to include and control attitudinal proxies for consumer optimism.

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