



Estimating interest rate elasticities in consumer credit



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HIGHLIGHTS

- Interest rate elasticities of consumer credit differ across credit types.
- Borrower heterogeneity regarding elasticities varies across credit types.
- Policy measures should be informed by these results.

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ABSTRACT

Based on a unique dataset with monthly loan account data for three types of consumer credit, I estimate the interest rate elasticity of the demand for credit across credit types. The main result shows that elasticities vary depending on the credit type used in the estimation. Moreover, borrower heterogeneity with respect to interest rate elasticities differs across credit types, too. These results have important implications for policy measures aimed at stimulating borrowing and consumption.

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1. Introduction

Understanding the response of the demand for consumer credit to changes in interest rates is of prime importance for policy-makers; the effectiveness of monetary policy and policy measures to stimulate borrowing and consumption of individuals crucially depends on precise estimates of interest rate elasticities in this segment (Alan and Loranth, 2013; Gross and Souleles, 2002). However, since borrowers in different types of consumer credit might react differently to interest rate changes, it is important to understand whether and how interest rate elasticities vary across different credit types.

Previous related studies are based on various types of consumer credit to derive elasticities, and each study is usually restricted to one specific type of credit. General purpose consumer credit is investigated in Alessie et al. (2005), Gross and Souleles (2002), Alan and Loranth (2013), Bertrand et al. (2010), Karlan and Zinman (2008), and Cho and Rust (2015). Attanasio et al. (2008) and Phillips et al. (2015) analyze elasticities in auto loans. DeFusco and Paciorek (2017) examine elasticities of mortgage demand. The studies differ also with respect to context (e.g., Karlan and Zinman (2008) focus on less-developed economies) or target population (e.g., Alan and Loranth (2013) focus on subprime borrowers).

Moreover, while some analyses are cross-sectional, others are based on panel data. Finally, some studies use randomized trials, whereas others can be classified as observational. While some studies report significantly negative elasticities, others estimate credit demand as inelastic; in addition, the estimates vary considerably in size. Such inconsistencies occur even within the same credit type.

In this study, I estimate elasticities for three different types of consumer credit offered by the same lender during the same time period. The key finding is that interest rate elasticities derived from consumer credit vary with the loan type under consideration.

2. Data

My dataset is provided by one of the 20 largest universal banks in the German market and contains data on the individual loan account level. The sample records all loan accounts opened between January 2009 and December 2012. The key advantage of the dataset is the simultaneous offering of three different types of fixed-rate installment consumer credit for comparable maturities and with comparable amounts over the four-year observation period. Borrowers in all three loan types are exposed to the same macroeconomic conditions, and I am able to measure elasticities with the same empirical specification across all credit types.

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Table 1
Summary statistics by credit type.

	Auto		Housing		General purpose	
	Mean	Median	Mean	Median	Mean	Median
Initial loan amount (EUR)	12,670	11,000	15,530	12,000	15,433	11,000
Monthly debt (EUR)	10,109	8,693	12,805	9,662	13,266	9,530
Maturity (months)	53	53	58	67	55	61
Interest rate (% per year)	5.57	5.55	5.60	5.54	6.06	5.95
Monthly household income (EUR, net of expenses)	1,248	1,070	1,338	1,162	1,013	851
Accounts	61,888		22,430		70,270	

The dataset contains (1) auto loans, (2) housing loans,¹ and (3) general purpose installment loans. In contrast to many other studies, my dataset has the advantage that the interest rate is the same for all borrowers within each loan type, i.e., exogenous and independent of individual creditworthiness or repayment behavior. All three loan types are available for amounts ranging between €5,000 and €50,000. No subprime borrowers are included in the sample.

Table 1 shows that the dataset contains more than 154,000 loans. While the average initial loan amount is about €12,700 for auto loans, housing and general purpose loans have average initial amounts of about €15,500 and €15,400, respectively. During the observation period, auto loans have the lowest average annual interest rate (5.57%) while general purpose credit exhibits the highest average rate (6.06%).

In several months of the observation period, the interest rate is exogenously changed by the lender for all borrowers in the same credit type alike; in such situations, the new interest rate is valid for borrowers opening their accounts after the interest rate change. Importantly, interest rate changes occur multiple times in all three types. Fig. 1 displays the development of the annual interest rates on the three loan types and the corresponding initial loan amounts on a monthly basis over the observation period.

3. Empirical strategy

I estimate the model in Eq. (1) separately for each of the three credit types as would be done in studies focusing on one credit type only.

$$D_{i,t} = \alpha + \beta r_{i,t} + \gamma X_{i,t} + \varepsilon_{i,t} \quad (1)$$

i denotes the borrower; t represents the month in which a loan is taken out. The dependent variable $D_{i,t}$ denotes the log initial loan amount, and $r_{i,t}$ represents the log interest rate on the respective loan in the month in which a loan is taken out. $X_{i,t}$ denotes a vector of control variables including borrower-related variables such as gender and household income as well as month-of-the-year and year dummy variables. The estimation is specified as OLS.²

4. Results

4.1. Cross-section

Table 2 records the estimation results and shows findings on two levels: First, the significance of the impact of the interest rate differs across credit types. While the coefficients of the interest

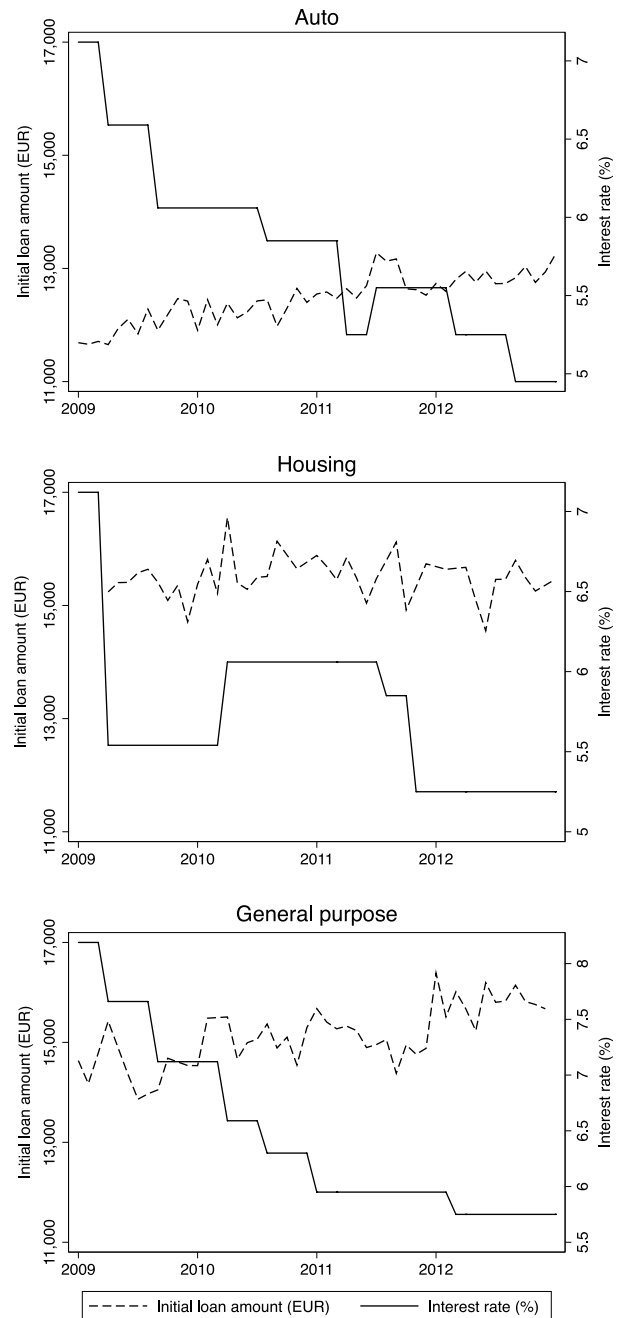


Fig. 1. Development of interest rates and loan amounts during observation period.

¹ The cooperating lender offers housing loans for the renovation or modernization of residential real estate. Only homeowners are eligible for housing loans. Since the creditworthiness of homeowners is usually assumed to be higher than the creditworthiness of individuals not owning a house, the interest rate on housing loans is lower than the interest rate on general purpose consumer credit.

² This specification is comparable to the log–log specification of Karlan and Zinman (2008).

rate on auto loans and general purpose loans are significantly negative (Columns 1 and 3), the coefficient of the interest rate of housing loans is insignificant (Column 2). This suggests that negative interest rate elasticities are observed for the first two

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