

Replicating the Results of: Price Discrimination by Negotiation: a Field Experiment in Retail Electricity

Jerry Hong

October 11, 2024

Abstract

This paper is an attempt to replicate the findings that are carried out in the study of price discrimination by negotiation. The premise of this study is to study price discrimination in a market with price posting and negotiation. The motivation stems from the concerns that low-income consumers do poorly in markets with privately negotiated prices ([DPB22]). As such, the authors carried out a call center with actors engaging with the electricity and utility service vendors throughout Victoria, Australia. With different scripts characterizing people of various income status, the goal of the study is seeing if there are differences in the outcomes of price invoices between low and high-income individuals. We will attempt to replicate the findings from their research through the provided replication package.

1 Introduction

The purpose of the study is to explore how price discrimination occurs in markets where prices are not fixed but are instead negotiated. The researchers were motivated by concerns that low-income consumers might fare poorly in markets where prices are privately negotiated. To investigate this, they set up a call center staffed with actors who used bargaining scripts to simulate real negotiations with electricity retailers. These actors engaged in sequential bargaining games under conditions of incomplete information, allowing the researchers to observe how different factors influenced the negotiated prices. The main findings of this study are that customers who were more informed about reference prices or had lower switching costs were offered lower prices. This suggests that price discrimination in negotiations can be influenced by the perceived knowledge and flexibility of consumers.

2 Data Replication

The process to replicate the author's findings are rather straightforward. In the package are three files: a csv file for the data, a .do script for STATA, and a README file as a guide to the process as well as a data dictionary. The overall process is relatively straightforward throughout. We had to utilize a workstation that has STATA 15 pre-installed, so we would not have to purchase a separate license. Next, we had to set up the directory with all the files for STATA to reference. Since the .do file contains the code needed to create the figures and tables, we simply just ran the script. However, there was a package that was not installed in our version of STATA in the workstation. After installing the right package, the script was able to fully run and create all the figures and tables, concluding the replication process.

3 Figures and Tables

This section showcases the figures and tables that were presented in the original study. Because we ran the exact STATA script from the exact data source, these figures and tables came out identical. We will provide our interpretations that can be similar as the authors' or providing a different viewpoint on the findings.

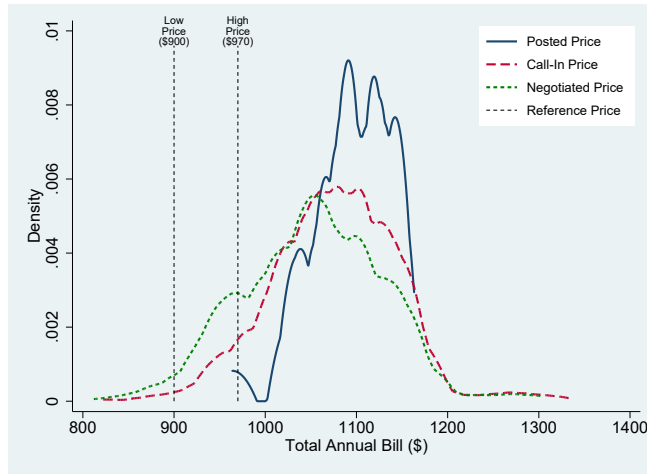


Figure 1: Distribution of Total Annual Bill by Posted, Call-In, Negotiated, and Reference Prices, with Low Price (\$900) and High Price (\$970) thresholds.

The figure 1 above illustrates the distribution of total annual bills across different pricing strategies, including Posted Price, Call-In Price, Negotiated Price, and Reference Price. The densities of these pricing categories are plotted against the total annual bill amount, which ranges from approximately \$800 to \$1,400. The Call-In and Negotiated prices display higher densities at lower bill amounts compared to the Posted Price, indicating that customers using Call-In or Negotiated strategies tend to pay less. Two vertical lines mark Low Price (\$900) and High Price (\$970), which may represent threshold values relevant for pricing policies or customer segments. The overall interpretation suggests that the Negotiated and Call-In prices are more effective at reducing the total annual bill, as reflected in the shift of their distributions towards lower amounts.

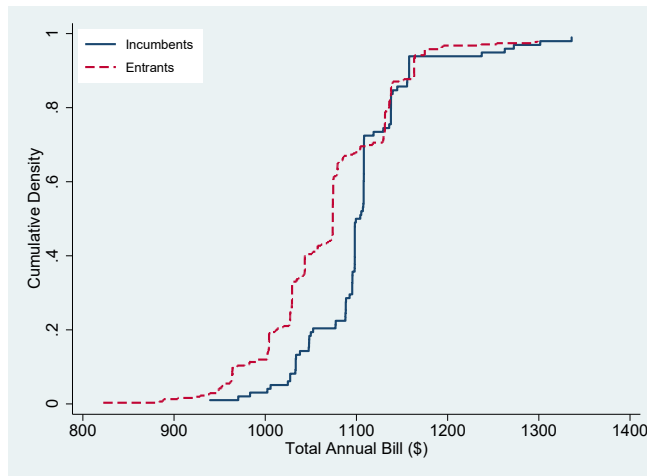


Figure 2: Cumulative Distribution of Total Annual Bill for Incumbents and Entrants.

The figure 2 presents the cumulative distribution of total annual bills for two groups: Incumbents and Entrants. The cumulative density increases more rapidly for incumbents compared to entrants, indicating that a larger proportion of incumbents face lower total annual bills. In contrast, entrants tend to experience higher bills, as seen by their more gradual cumulative density curve. This suggests that incumbents, who may have established relationships or long-standing service contracts, benefit from lower pricing, while entrants, potentially new customers, face higher costs. The disparity between the two curves highlights differences in pricing structures or negotiation power between these two customer groups.

	Log Bill (1)	Bill (2)
Call-In	-0.014*** (0.003)	-13.242*** (3.746)
Negotiated	-0.040*** (0.004)	-39.830*** (4.197)
R-Squared	0.502	0.479
Observations	1221	1221

Table 1: Regression results for the effect of Call-In and Negotiated rates on Log Bill and Bill amounts, showing the significant reductions in both outcomes.

The regression results in table 1 show that both Call-In and Negotiated rates lead to significant reductions in the total bill. The Call-In rate is associated with a 1.4% reduction in the log of the bill and a decrease of approximately \$13.24 in the actual bill amount. Negotiated rates show an even stronger effect, reducing the log of the bill by 4% and the actual bill by around \$39.83. These results suggest that customers who either call in for pricing or negotiate their rates experience notable savings compared to the baseline. The R-squared values indicate that the models explain 50.2% of the variance in the log-transformed bill and 47.9% of the variance in the actual bill.

	Log Bill				
	(1)	(2)	(3)	(4)	(5)
Call-In	-0.014*** (0.003)	-0.008* (0.005)	-0.010** (0.004)	-0.008* (0.005)	-0.008* (0.005)
Call-In × Switcher		-0.014** (0.007)	-0.009* (0.005)	-0.014** (0.007)	-0.014** (0.007)
Negotiated	-0.040*** (0.004)	-0.032*** (0.005)	-0.033*** (0.005)	-0.025*** (0.006)	-0.022*** (0.007)
Negotiated × Switcher		-0.019** (0.008)		-0.019** (0.008)	-0.025** (0.010)
Negotiated × Low Res. Price			-0.014** (0.006)	-0.015** (0.006)	-0.020** (0.008)
Negotiated × Switcher × Low Res. Price					0.013 (0.012)
R-Squared	0.490	0.507	0.506	0.510	0.510
Observations	1221	1221	1221	1221	1221

	Bill				
	(1)	(2)	(3)	(4)	(5)
Call-In	-13.24*** (3.71)	-6.17 (5.47)	-8.54* (4.92)	-6.15 (5.48)	-6.09 (5.49)
Call-In × Switcher		-15.99** (7.90)	-10.62* (6.30)	-16.03** (7.88)	-16.18** (7.91)
Negotiated	-39.83*** (4.15)	-30.43*** (6.07)	-32.60*** (5.69)	-22.45*** (7.31)	-19.28** (8.52)
Negotiated × Switcher		-21.25** (8.48)		-22.07*** (8.43)	-28.87** (11.75)
Negotiated × Low Res. Price			-15.74** (6.44)	-16.58** (6.42)	-23.06** (9.30)
Negotiated × Switcher × Low Res. Price					14.67 (12.51)
R-Squared	0.466	0.485	0.483	0.488	0.488
Observations	1221	1221	1221	1221	1221

Table 2: Regression results for the impact of Call-In and Negotiated rates on the logarithm of the bill and the bill amount, including interaction effects with Switcher and Low Reservation Price.

Table 2 shows the regression results for the effect of Call-In and Negotiated rates on Log Bill and actual Bill amounts. Both Call-In and Negotiated rates lead to significant reductions in billing, with stronger effects for customers who switch services (switchers) and for those with low reservation prices. Call-In reduces the Log Bill by 1.4%, while negotiating rates results in a 4% reduction. In terms of actual bill amounts, Call-In customers save around \$13.24, and those who negotiate save approximately \$39.83. Interaction effects suggest that switchers benefit more from both pricing strategies, and low reservation price customers see further reductions when negotiating. The models explain 46% to 51% of the variance in the dependent variables.

- **Call-In (Log Bill):** -0.014***
- **Negotiated (Log Bill):** -0.040***
- **Call-In (Bill):** -13.24***

- **Negotiated (Bill):** -39.83***
- **Call-In \times Switcher (Bill):** -15.99**
- **Negotiated \times Switcher (Bill):** -21.25**
- **R-Squared (Log Bill models):** 0.490 to 0.510
- **R-Squared (Bill models):** 0.466 to 0.488

	Log Bill	Bill
	(1)	(2)
Call-In	-0.013*** (0.005)	-11.558** (5.258)
Call-In \times Subsidy	-0.003 (0.005)	-3.463 (6.296)
Negotiated	-0.040*** (0.005)	-39.609*** (5.299)
Negotiated \times Subsidy	-0.000 (0.006)	-0.452 (6.767)
R-Squared	0.501	0.479
Observations	1221	1221

Table 3: Regression results for the impact of Call-In and Negotiated rates on Log Bill and Bill, with interaction effects between Call-In and Subsidy, and Negotiated and Subsidy.

The table 3 above presents the regression results for the impact of Call-In and Negotiated rates on both the Log Bill and the actual Bill, including interaction effects with Subsidy. The Call-In rate leads to a significant reduction of 1.3% in the Log Bill and approximately \$11.56 in the actual Bill. However, the interaction between Call-In and Subsidy is not statistically significant, indicating that the presence of a Subsidy does not further reduce the bill for Call-In customers. Similarly, the Negotiated rate results in a significant 4% reduction in the Log Bill and a \$39.61 reduction in the actual Bill. The interaction between Negotiated rates and Subsidy is also

4 Overall Conclusions

We were able to successfully replicate the tables and figures the authors developed in their study. Given the replication package provided was not as in-depth, the overall process was seamless. After setting the appropriate directory in STATA, we simply ran the provided script to create the tables and figures. We think there are no additional suggestions to improve the replication process as this is presumably the ideal case in terms of a seamless procedure. In terms of the overarching study, it analyzes the impact of Call-In and Negotiated pricing strategies on total annual bills, revealing significant reductions for customers using these methods compared to posted prices. The findings highlight that while both strategies offer substantial savings, negotiated rates yield the largest reductions, particularly benefiting switchers and customers with low reservation prices.

References

- [DPB22] Jia Sheen Nah David P. Byrne, Leslie A. Martin. Price discrimination by negotiation: A field experiment in retail electricity. *The Quarterly Journal of Economics*, 137(4):2499–2537, 2022.