

Are Low-Price Guarantees Anti-Competitive? An Analysis Through a Natural Experiment*

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Abstract

We study both theoretically and empirically the impact of a policy change on price competition among five major online retailers. Our data span the periods before and after Best Buy added a "most-favored-customer" clause (MFCC) to its low-price guarantee policy between April 2003 and March 2004. After controlling for a number of factors (including product life-cycle effects), we find that Best Buy lowers its average prices by 6.5% after the policy change. The competing stores also lower their prices. Specifically, Buy.com decreases its average prices by 8.3%, Circuit City by 6.8%, CompUSA by 6.9%, and Sears by 3.4%. This result is consistent with the prediction of our stylized theoretical model, indicating the adoption of the MFCC by Best Buy is pro-competitive. In addition, we find that the policy change leads to greater disparity, or an increase of 1.9% (measured by percent price range). These findings are robust to a variety of measures and controls.

JEL Classification Numbers: D43, L13, L81

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1 Introduction

Retailers often advertise low-price guarantees (LPGs) to encourage store patronage. While all LPGs promise consumers the best price offered by competing stores, some LPGs appear more competitive than others, such as price beating rather than price matching, or allowing 30 days of post-sale search rather than 3 days. Sometimes, stores may offer other add-ons to their LPGs. For example, in July 2003, Best Buy began to allow consumers to match its own sale prices, in addition to those of its competitors'.¹ By including such a “most-favored-customer” clause (MFCC) in its LPG, Best Buy promises a consumer that it will not be undersold by others or itself.^{2,3}

According to a recent Forrest survey, attractive LPGs can substantially increase store value.⁴ Obviously, the enhanced LPG helps Best Buy appear to be more appealing to consumers. How would Best Buy’s close competitors respond to this changeover? In this paper, we explore the strategic effects of LPGs through the aforementioned “natural” experiment when Best Buy added an MFCC to its LPG.

Despite an extensive literature of theoretical studies on LPGs, empirical studies are still limited.⁵ Among them, the most relevant to ours are Hess and Gerstner (1991) and Manez (2006), both of which document LPGs-related changeovers in supermarkets. These two studies arrive at somewhat different conclusions. On the one hand, Hess and Gerstner (1991) show that the announce of a price-matching (PM) policy leads to a higher degree of price coordination among competing stores. More importantly, it helps soften the competition and raises prices in the entire market. Hess and Gerstner thus conclude that price-matching (PM) guarantees act as a facilitation device for collusion. Manez (2006) observes the adoption

¹The following statement was added to Best Buy’s LPG offering, “our price-matching policy applies to the current week’s prices compared to the previous week’s prices, ...” (Source: www.bestbuy.com)

²“Most-favored-customer clauses insure a buyer purchasing today against the possibility that the seller may lower its price in the future. If the seller does so, the buyer purchasing today is entitled to a refund of at least the difference.” (see Arbatskaya et al., 2004, footnote 7)

³We use the terms MFCC and “own price-matching” (OPM) interchangeably throughout the paper.

⁴Source: “Continental sets new low-price guarantee,” by Dan Reed, USA TODAY (http://www.usatoday.com/travel/news/2004-08-18-continental_x.htm).

⁵We refer the readers to Arbatskaya et. al. (2004) for a description of various LPGs, and to Manez (2006) and Chen and Liu (2006) for a survey of literature on LPGs.

of a price-beating (PB) policy in the UK supermarkets. He notices that the store with LPG allows PB for products that it enjoys price advantage over its rivals. He concludes that the adoption of the LPG is not a collusive device, but rather an advertising tool to signal its already low prices.

The major difference between these two studies and ours is different types of LPG policy changes. In Hess and Gerstner, the store with LPG promises to change its store prices once notified by consumers that other stores' prices are lower. In Manez, if the store with LPG lists higher prices, it would refund (double) the price differences only to the consumer requesting PM, and it has no obligation to adjust its listed prices. But in both studies the PMP analyzed concerns a store's price vs. its rival's prices. In this paper, the LPG concerns a store's current price vs. its future prices, i.e., whether a store matches its own prices.

Apart from the existing studies, this paper studies the market of consumer electronics. First, the average price of the durable products in our sample is \$474.93. In contrast, the existing studies often use less expensive or perishable goods such as automobile tires (e.g., Arbatskaya et al., 2004; *forthcoming*) or groceries (e.g., Hess and Gerstner, 1991; Manez, 2006). The fact that products in our sample are more expensive entails a higher likelihood of price-matching requests. In addition, we expect that the demographics of frequenters to electronics stores be different from that of, say, supermarkets. Second, prices of consumer electronics fall over time, as newer models are introduced. This makes OPM an important factor in consumers' purchase decisions. LPGs encourage consumers to "buy now and search later", which enhances cash flow. Third, LPGs offered by consumer electronics retailers often apply to the entire stock, as opposed to only a subset of products in other markets.⁶ Taken together, this product selection allows us to examine the motives and effects of LPG offerings from a different perspective.

Our analysis takes two approaches. First, we develop a two-stage Hotelling model in which one of the two firms changes its LPG policy – by adding a MFCC in stage 2. In the model, we identify various different consumer groups and examine their price-matching

⁶For example, LPGs are applied to all products except for cellular, digital, and PCS phones and pagers at Best Buy in California, and cellular phones or clearance items at Buy.com.

decisions both before and after the policy change. Based on firms' optimal pricing decisions, we find that average price declines and price dispersion (both scale-variant and scale-invariant) increases after the policy change. However, one cannot conclude from our findings that adding the MFCC to LPG offerings is necessarily pro-competitive. Notice that this changeover is undertaken by a firm with a *store* premium in our model. If instead the firm that does not change its LPG has a store premium, such policy change may be anti-competitive. Thus, our theoretical model contributes to the existing literature by illustrating that store asymmetry plays an important role in determining the competitiveness of LPGs.⁷

Second, we empirically test the predictions of our stylized theoretical model. We collect a sample of 7,100 weekly price quotes for 125 popular consumer electronics products sold during April 1, 2003 and March 31, 2004, and biweekly store LPG policy information during the same period. Our sample includes three large national retail chains (Best Buy, Circuit City, and CompUSA), a large department store (Sears), and a Web-only retailer (Buy.com). We believe this is one of the first studies on LPGs using Internet retailing data. While the existing research often include firms with and without LPGs, we choose stores only with LPGs to focus on the effects of the policy change.

After controlling for various factors including product, month, and product life-cycle fixed effects, we find that the introduction of a MFCC in its LPG by Best Buy leads to lower average prices among competing online retailers. Consistent with the theoretical prediction, Best Buy reduces its average prices by 6.5% after the policy change. In response to Best Buy's policy changeover, Buy.com lowers its average prices by 8.3%, Circuit City by 6.8%, CompUSA by 6.9%, and Sears by 3.4%, respectively. Finally, this policy change increases price dispersion by 1.9% (measured by percent price range), consistent with our theoretical prediction. Thus, the introduction of a more competitive LPG by Best Buy has a price-reducing effect. Our empirical results are robust to a variety of measures and controls (see Section 4.2). It has been well documented that price dispersion is a persistent equilibrium

⁷Hviid and Sheffer (1999) find that when stores are asymmetric, price-matching policies may not lead to collusive prices. Our analysis takes a step further. If stores are significantly asymmetric and the disadvantaged firm starts adopting OPM, this adoption is not anti-competitive, but pro-competitive.

phenomenon in the online market of consumer electronics (c.f., Baye et al., 2006; Baye et al., *forthcoming*).⁸ Our analysis attempts to establish a connection between LPGs and price dispersion.

The paper proceeds as follows. We develop a theoretical model and explain its predictions in section 2. In section 3, we describe the data we use and provide some summary statistics. Predictions of our theoretical model are tested in section 4, and we conclude in section 5.

2 Theoretical Model

Consider a Hotelling’s model with two firms located at the two end points of an interval $[0, 1]$.⁹ Firm 1 is located at 0 and Firm 2 is located at 1. Both firms’ marginal costs are normalized to be zero. To capture the observed policy change in the sample, we let Firm 1 resemble Best Buy and Firm 2 Circuit City. Both firms employ a LPG with 10% PB.¹⁰ In addition, Firm 2 has a MFCC in its LPG during the entire game, while Firm 1 offers the MFCC later in the game.¹¹ Thus, we divide the game into two independent *stages*, where stage 1 is the time before the policy change and Firm 1 does not adopt OPM, while in stage 2 it does. Each stage consists of three *periods*: prices are announced in Period 0 and “new” (“old”) products are sold in Period 1 (Period 2).¹² We solve the three-period game for each stage independently. Our goal is to examine the strategic effects of the policy change on firms’ prices.

A unit mass of consumers are uniformly distributed on the interval $[0, 1]$. Per unit transportation cost is t_1 in Period 1 and t_2 in Period 2. Thus, in Period 1, a consumer located at x derives a utility of $V_1 - p_{1n} - t_1x$ if she purchases a new product from Firm

⁸There is a growing literature examining whether the “law of one price” holds in the online marketplaces, including Brynjolfsson and Smith (2000), Clay et al. (2001) and Morton et al. (2001).

⁹We choose the Hotelling model in that we assume consumers have different preferences towards different stores. For example, for the same produce and price, some consumers might prefer to buy from Best Buy while others may prefer Circuit City.

¹⁰Firms will refund 110% of a price difference within 30 days of purchase upon request.

¹¹We also analyzed the case where Firm 2 never adopts the MFCC in both stages. Results are qualitatively the same. Details are available upon request.

¹²For example, we may interpret PlayStation 3 as a new product now and it becomes an old one a few months later. Our analysis can be easily extended to a model with an infinite horizon, where each period has a new product that lasts for two periods.

1 at p_{1n} ; similarly, she derives a utility of $V_2 - p_{2n} - t_1(1 - x)$ if she purchases from Firm 2 at p_{2n} . If the consumer chooses to purchase an old product from Firm 1 in Period 2 at p_{1o} , her utility becomes $V_1 - p_{1o} - t_2x$; similarly, she derives a utility of $V_2 - p_{2o} - t_2(1 - x)$ if she purchases from Firm 2 at p_{2o} . Each consumer buys the product which gives her the highest positive surplus, but not both products. We assume that V_1 and V_2 are sufficiently high to guarantee that each consumer will buy (covered market).¹³ In addition, we assert the following:

Assumption 1: $V_1 - V_2 = k > 0$, so that Firm 1 enjoys a significant premium of k .¹⁴

Assumption 2: $t_1 > t_2$, so that products offered by the two firms becomes less differentiated in Period 2 than in Period 1. Equivalently, prices in Period 2 are lower.

Under these assumptions, in equilibrium, it follows that $p_{1n} > p_{2n} > p_{1o} > p_{2o}$.¹⁵

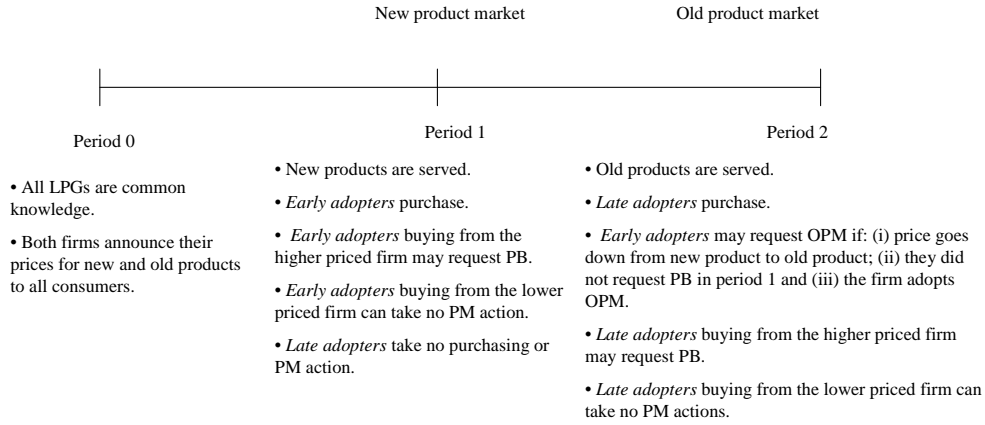


Figure 1. The Three-Period Game

The nature and timing of the game are as follows (also see Figure 1). We begin with Stage

¹³Note that in Hotelling models with full market coverage, the price level is independent of the level of V_1 and V_2 . Instead it is decided by the level of product differentiation (how differently consumers view the two firms' products), which is represented by the unit transportation cost. Therefore we use the same consumer valuations V_1 and V_2 for both new and old products, and rely on $t_2 < t_1$ to guarantee lower prices for old products than new ones so that OPM may be triggered.

¹⁴For instance, Firm 1 may have a more friendly shopping environment and helpful sales force, which leads to the store premium it enjoys. We consider the case of asymmetric firms ($k > 0$) to determine the ranking of prices. Figure 6 clearly indicates that Best Buy (Firm 1) has had a much larger consumer base than Circuit City (Firm 2) since 2001. Our empirical analysis also suggests that Best Buy commands higher prices than other stores.

¹⁵This ranking is preserved in equilibrium when k takes intermediate values (not too small or too large).

1. In Period 0, firms simultaneously and independently announce prices for both new and old products (i.e., p_{1n} , p_{2n} , p_{1o} , and p_{2o}). Depending on their preferences, consumers make purchase decisions. Some consumers buy new products in Period 1 and some buy old ones in Period 2. Finally, consumers can submit price-matching requests. Those who purchase from Firm 1 may request a PB (since $p_{1n} > p_{2n}$ and $p_{1o} > p_{2o}$) at the time of purchase, and those who purchase from Firm 2 may request an OPM (since $p_{2n} > p_{2o}$) in Period 2.¹⁶ At the beginning of Stage 2, Firm 1 announces a policy change – to offer OPMs. The game then proceeds in the same fashion as in Stage 1, except that those who purchase new from Firm 1 now have the option of requesting either an OPM (since $p_{1n} > p_{1o}$) or a PB.

Next, we discuss all possible consumer types.¹⁷ First, depending on (non-monetary) preference, a fraction α of them are early-adopters, who purchase in Period 1 or new products, and the remaining $1 - \alpha$ are late-adopters, who purchase in Period 2, or old products.¹⁸ Second, consumers incur different hassle costs when requesting a price-matching. A fraction γ have a low hassle cost s_l , who always submit *one price-matching* request, and $1 - \gamma$ have a high hassle cost s_h , who never submit a request. Finally, a fraction β of consumers have a low discount factor δ_l , and prefer PB (refunded at the time of purchase) to OPM (refunded when price is reduced in the future), and $1 - \beta$ have a high discount factor δ_h , and prefer OPM to PB.¹⁹ For simplicity we let $s_l = 0$, $s_h = \infty$, $\delta_h = 1$, and $\delta_l \rightarrow 0$.

¹⁶Consumers can submit up to one price-matching request in each stage.

¹⁷In our model, consumers differ in (1) their tastes towards a new product; (2) their hassle costs of submitting a request; and (3) their discount factors. Consequently, our analysis focuses on the price discrimination theory. The setting of our model rules out the possibilities of collusion and signaling.

¹⁸We make this restrictive assumption that decisions to buy new products are based on nonmonetary preferences. With this assumption, we avoid the situation where we have to rely on discount factor to sort out both purchasing and price-matching decisions. For example, some consumers may be impatient so they would buy new products, but they are patient enough to wait and request an OPM later, while others may be so impatient that they would buy new products and request a PB at the time of purchase.

¹⁹Note that consumers can request an OPM only if a firm offers a MFCC in its LPG.

consumer group	fraction	price-matching decision	
		Stage 1	Stage 2
a) buy new, s_h	$\alpha(1 - \gamma)$	do nothing	do nothing
b) buy new, (δ_h, s_l)	$\alpha(1 - \beta)\gamma$	F1 PB, F2 OPM	F1 OPM, F2 OPM
c) buy new, (δ_l, s_l)	$\alpha\beta\gamma$	F1 PB, F2 OPM	F1 PB, F2 OPM
d) buy old, s_h	$(1 - \alpha)(1 - \gamma)$	do nothing	do nothing
e) buy old, s_l	$(1 - \alpha)\gamma$	F1 PB	F1 PB

Table A. Consumer Decisions Before and After the Policy Change

Table A summarizes five consumer groups and their optimal price-matching decisions, given $p_{1n} > p_{2n} > p_{1o} > p_{2o}$. First, consumers with high hassle costs, i.e., groups a) and d) do not submit any request. Next, let's consider the remaining groups in turn. The discount factor helps separate groups b) from c). Group b) consumers are patient and prefer OPM to PB, while group c) consumers are impatient and prefer PB to OPM. However, these first choices are not available to all consumers in these groups. Specifically, within group c), those who purchase from Firm 2 request an OPM, as Firm 2 is the low-price firm. However, within group b), those who purchase from Firm 1 request a PB, as OPM is unavailable in Stage 1. They are able to switch to their first choice (OPM) in Stage 2 when Firm 1 offers OPM. Notice that in Table A, only these consumers have changed their price-matching decisions from Stage 1 to Stage 2. Finally, group e) consumers are late-adopters with low hassle costs. Those who purchase from Firm 1 request a PB, and those who purchase from Firm 2 take no actions.

As shown in Appendix A, we have established the following:

Proposition 1 *When a firm with larger loyal customer base adds a MFCC to its LPG, average prices decline and price dispersion (both scale-variant and scale-invariant) rises.*

Prior to the policy change, Firm 1 has a *store* premium and Firm 2 has a *policy* premium. Notice that Firm 1's premium persists in the entire game, while Firm 2's premium disappears in Stage 2. The policy change has a first-order effect on the new product market and a

second-order effect on the old product market. Let's first consider the new product market, or Period 1 in each stage. Three opposite effects result from Firm 1's policy change. First, Firm 1 has an incentive to raise its price since its policy disadvantage disappears now (a positive effect). Second, this changeover induces Firm 2 to be more aggressively, which in turn forces Firm 1 to lower its prices (a negative effect). Third, recall that, in Stage 2, some consumers in group b) switch from requesting a PB to an OPM. Thus, Firm 1 has an incentive to charge a lower p_{1n} to minimize OPM refunds (negative effect). Overall, the negative effects dominate in our model.²⁰ Obviously, facing a lower p_{1n} and the lost policy premium, Firm 2 has to lower p_{2n} even further than Firm 1 in Stage 2.

Next we turn to the old product market, which entails no change in neither store premium nor policy premium. Notice that the price that Firm 2 charges (p_{2o}) is constrained by the fact that those who buy new products from Firm 2 might request an OPM if $p_{2o} < p_{2n}$. With a lower p_{2n} , Firm 2 can afford to be more aggressive in the old product market, which leads to a lower p_{2o} . This in turn forces Firm 1 to lower p_{1o} in Stage 2. Since Firm 2 lowers its prices relatively more (due to the loss of the policy premium) and its prices are lower than Firm 1's, price dispersion increases after the policy change.²¹

In the following sections, we test the predictions of the model.

3 Data

3.1 Data Collection

To conduct the empirical analysis, we have assembled a data set consisting of 7,100 weekly price quotes collected during April 1, 2003 and March 31, 2004. This data set includes 125 popular consumer electronics products sold at Best Buy, Buy.com, Circuit City, CompUSA, and Sears.²² Best Buy resembles Firm 1 in our theoretical model. All products were carried

²⁰Note that the third effect disappears if Firm 2 enjoys a store premium. Firm 1 actually raises p_{1n} in Stage 2.

²¹See Table B and Figure 2 in Appendix A for a numerical example.

²²These five stores are among the largest consumer electronics retailers, and their 2003 sales (in \$million) are: Best Buy 24547; Circuitcity 9745.4; CompUSA 8221.8; Sears 41124; Buy.com 238.2.

by at least two stores during the sample period, and all price quotes exclude taxes, and shipping and handling charges.²³

We gathered information from these stores' websites by running a so-called "spider" program written in the PEARL, which downloaded all relevant web pages. The entire downloading process lasted for about 5 minutes every day. Price information on the saved web pages was then extracted into a usable text file, along with store and product information. We chose to use weekly data (i.e., Sunday) in that retailers such as Best Buy and Circuit City typically update their price information once a week on Sunday (i.e., store's weekly ads).²⁴ Items in our sample fall into ten categories, including CD Binders, Camcords, DVD players, Digital Cameras, Home Theater Systems, Monitors, Printers, and TVs. The average prices of these products range from \$6.74 to \$2,999.99.

In addition, store LPG information was recorded biweekly. During the sample period, all surveyed LPGs only applied to advertised prices of new, unopened, identical products, excluding any forms of special offers. To capture a complete picture of the LPGs in our sample, both authors carefully read through all downloaded store policies. LPGs vary from store to store and usually remain unchanged throughout the entire sample period.²⁵ However, we notice that during Weeks 13 and 14, Best Buy added a MFCC to its LPG policy by allowing customers to match its own sale prices. This observation thus offers a natural experiment in which we can examine the effects of the policy change.

Before we turn to the analysis, it is useful to discuss potential caveats in our sample. The primary limitation of our sample is lack of store variety.²⁶ Therefore, we are unable to assess the impact of the observed policy change on a larger scale. The reasons that we choose to focus on these five stores are two-fold. First, compared to hundreds of no-name online vendors, these well-established major retailers are more trustworthy in terms of their prices

²³Previous studies in the literature (see Baye et al., 2004, footnote 19) find including such charges have a negligible impact on the analysis.

²⁴We expect Buy.com to adjust its prices more frequently due to the nature of its store type. However, our results are robust to various days of the week.

²⁵We study different LPGs across stores in a companion paper (Chen and Liu, 2006).

²⁶Manez (2006) uses data from three supermarkets and Hess and Gerstner (1991) also studies a handful of stores.

or LPGs. For large purchases – the average price is \$474.93 in our sample, one would expect consumers to be more confident shopping at a reputable retailer. In addition, consumers are also likely to take into consideration post-sale services such as easy exchanges and returns. In fact, four of the surveyed stores have brick-and-mortar presences. Second, these five stores consist of a much balanced panel with which each store carries a significant fraction of the selected products in the sample.

Another limitation of the paper is that prices used in our analysis are always pre-rebate and pre-discount. In our sample, stores sometimes offer promotions such as mail-in rebates and instant store discounts.²⁷ For instance, occasionally, at Best Buy and Circuit City, one has to select a product to the cart to obtain a final price quote, which entails an instant store discount. Unfortunately, our electronic agent was unable to perform such a task. However, our sample does have the information indicating whether a promotion was offered. Thus, we construct two dummy variables, *Instant Store Discount* and *Mail-in Rebate* to measure the qualitative effects of these offers.²⁸

3.2 Summary Statistics

To examine the effects of Best Buy’s policy change, we divide the entire sample period into two parts.²⁹ *Stage 1* refers to weeks 1 through 13, or before the policy change, and *Stage 2* weeks 14 through 52, or after the policy change. Figure 5 illustrates relative differences (scaled by average prices across all stores) in average prices between Best Buy and the other four stores. Broadly, the figure suggests that Best Buy has a store premium over its competitors.

Would this pricing pattern persist after controlling for heterogeneities in product? Table 1 compares average prices for matched products sold between two stages at each store.³⁰ As

²⁷The snapshots from Circuitcity.com on March 27, 2006 in Figures 3&4 illustrate an example of such offers.

²⁸Eliminating these observations from our analysis does not change our main findings.

²⁹Our biweekly policy data show that week 14 was the first time that Best Buy added a MFCC to its LPG. Based on the Chow test, we use week 14, rather than week 13, as the change point.

³⁰Given the nature of consumer electronics, a product existed, on average, in our sample for approximately eight weeks.

expected, product prices decline over time, and the differences are statistically significant. On average, Buy.com has the smallest price reduction with \$10, followed by CompUSA with \$22.05, while Sears has the largest with \$37.9. One would speculate that these price reductions stem in part from product life-cycle effects. We will return to this point later in the regression analysis.

Using four different measures of price dispersion, Table 2 presents how the levels of price dispersion vary before and after the policy change. We choose both absolute and relative measures, including price range, percent price range (defined as the ratio of price range to the minimum price), standard deviation, and coefficient of variation (defined as the ratio of standard deviation to mean). In general, there is a trend of increased price dispersion after the policy change.

Taken together, results in Tables 1&2 suggest that product prices decline and the levels of price dispersion rise when Best Buy added a MFCC to its LPG policy.

4 Analysis

4.1 Regression Models

In the section, we formally examine the impact of Best Buy’s policy changeover on the competition (measured by price level and price dispersion). Our primary objective is to test whether empirical evidence is consistent with the theoretical predictions concluded in Section 2. Recall that Proposition 1 states that both firms lower their average prices and price dispersion arises when the firm with a store premium adds a MFCC to its LPG.

For the price level analysis, we first estimate the following regression model

$$\begin{aligned} \ln(P_{ijt}) = & \alpha_0 + \alpha_1 * Stage\ 2 + \beta_1 * Buy + \beta_2 * Circuit\ City + \beta_3 * CompUSA + \beta_4 * Sears \\ & + \gamma_1 * Buy * Stage\ 2 + \gamma_2 * Circuit\ City * Stage\ 2 + \gamma_3 * CompUSA * Stage\ 2 \\ & + \gamma_4 * Sears * Stage\ 2 + \theta_1 * Discount_{ijt} + \theta_2 * Rebate_{ijt} + \delta * \mathbb{X}_{ijt} + \varepsilon_{ijt} \end{aligned}$$

The left-hand-side of the above equation is the natural logarithm of a price quote for product i sold at store j at week t . Dummy variable *Stage 2* is a policy change indicator. It equals one if t is greater than or equal to week 14 and zero otherwise. Recall that our theoretical model predicts that $\alpha_1 < 0$. *Buy* is defined as one if product i is sold at Buy.com at week t and zero otherwise. Following the same fashion, we define the other three store dummies (*Circuit City*, *CompUSA* and *Sears*). *Best Buy* is omitted in the regression. β_1 captures the average difference in prices between Buy and Best Buy, β_2 between Circuit City and Best Buy, and so on. $(\alpha_1 + \gamma_1)$ indicates the average price change at Buy before and after the policy change, and is negative, according to Proposition 1. Similarly, we expect $(\alpha_1 + \gamma_2)$, $(\alpha_1 + \gamma_3)$, and $(\alpha_1 + \gamma_4)$ to be negative. $Discount_{ijt}$ ($Rebate_{ijt}$) is defined as one if store j offers an instant store discount (a mail-in rebate) for product i at week t and zero otherwise.

Following Baye et al. (2006), we define vector \mathbb{X}_{ijt} to control for: (1) number of competing stores; (2) product fixed effects; (3) month fixed effects (i.e., seasonality effect); and (4) product life-cycle fixed effects (i.e., interactions between product and month fixed effects). Finally, ε_{ijt} is the error term in the regression.

For the price dispersion analysis, we estimate the following equation using four different measures of price dispersion as dependent variables.

$$PD_{it} = \beta_0 + \beta_1 * Stage\ 2 + \beta_2 * \psi_{it} + \beta_3 * \varsigma_{it} + \theta_1 * Discount_{ijt} + \theta_2 * Rebate_{ijt} + \delta_i + \eta_t + \varepsilon_{it}$$

The left-hand-side of the above equation is one of the four measures (price range, percent price range, standard deviation, and coefficient of variation) of price dispersion for product i sold during week t . Thus, observations for this analysis is at the product-week level. In Section 2, our model predicts that the coefficient associated with Stage 2 is positive, i.e., $\beta_1 > 0$. Recall that different stores have different LPGs. Vector ψ_{it} is a set of store dummies to control for LPG policy variations in each product-week market. Each store dummy equals one if it offers product i at week t , and zero otherwise.³¹ Vectors δ_i control for product fixed

³¹For example, if both Best Buy and Sears sell product i at week t , both dummy variables equal one.

effects and η_t month fixed effects (i.e., seasonality effect). Other variables are defined in the similar fashion as previously.

Finally, to test the robustness of our main findings, we estimate the following store-pair price difference regression model

$$P_{ijt} - P_{ikt} = \gamma_0 + \gamma_1 * Stage\ 2 + \varepsilon_{it}$$

The left-hand-side of the above equation is the price difference for product i sold at week t between stores j and k ($j \neq k$) where store j refers to Best Buy and k another store. According to Proposition 1, a positive γ_1 indicates greater price dispersion in *Stage 2*. ε_{it} is the error term.

For all regression estimations, we report Huber-White robust standard errors to control for potential heteroskedasticity. Next, we discuss the regression results.

4.2 Regression Results and Discussion

Table 3 reports the results for price level regressions.³² Model 1 controls for the number of firms, product, and seasonality fixed effects. It shows that average product prices decline by 8.4% after Best Buy’s policy change. As expected, Best Buy has a store premium up to 4.1% compared to the other four stores. Note that the coefficients difference between Best Buy and Circuit City (CompUSA) is not statistically significant. This model specification also allows us to examine the strategic effects of the policy change. Consistent with the predictions of our model, average prices decline by 8.4% in *Stage 2*. In response to Best Buy’s policy change, its competitors aggressively cut their prices. Specifically, CompUSA lowers its average prices by 11.2% (or $\alpha_1 + \gamma_3$), Buy.com by 9.7% (or $\alpha_1 + \gamma_1$), Circuit City by 7.2% (or $\alpha_1 + \gamma_2$), and Sears by 5.1% (or $\alpha_1 + \gamma_4$), respectively in *Stage 2*. Our results strongly support Proposition 1.

Model 1 also includes two store promotion variables, *Instant Store Discount* and *Mail-*

³²In the analysis below, our findings are robust to whether we use the full sample or various subsamples which include periods immediately before and after Best Buys’ policy change. Here we report the results based on the full sample.

in Rebate. As discussed earlier, these two variables measure qualitatively the effects of these store promotions. Everything else equal, our analysis indicates that having a mail-in rebate raises average prices by 2.7%, while having a store discount lowers average prices (though statistically insignificant) by 0.5%.³³

One may argue that the observed declining prices may be due to larger number of cheaper products during period 2 than period 1, and/or simply the nature of electronics products. To control for these factors, we use the interactions between product and month dummy variables (c.f., Baye et al., 2006). Notice that Model 2 paints a very similar picture when we use a set of store dummies to control for any store-specific factors. In Model 2, the coefficient of *Stage 2* becomes -6.5% . The reduction in the magnitude of this estimate indicates that the need of this additional control in the regression. This finding is again supportive of Proposition 1, indicating that Best Buy lowers its prices after the changeover. In response, its competitors Buy.com, CompUSA, Circuit City, and Sears also lower their average prices by 8.3%, 6.9%, 6.8%, and 3.4%, respectively.

Recall that there are three effects of Best Buy's policy change (see the discussion in Section 2). The price reduction by Best Buy suggests that the two negative effects outweigh the positive one of its policy change, as the theoretical model concludes. Meanwhile, Best Buy's policy change also leads to lower average prices at competing stores. Prior to the policy change, Best Buy has well proven to be the nation's largest consumer electronics retailer. With the MFCC, Best Buy's LPG appears to be more attractive than before. This further puts Best Buy's rivals at disadvantage. To attract customers, those stores respond by offering better deals. In other words, Best Buy's policy change is pro-competitive in our sample.

The estimated store promotion variables are similar to the ones in Model 1. Everything else equal, our analysis indicates that having a mail-in rebate raises average prices by 3.3%, while having an instant store discount raises average prices (though statistically insignificant) by 0.3%.

³³The minimal statistical significance we consider in this study is the 10% level.

Table 4 reports the results for price dispersion regressions. Using each of the four measures as dependent variables, we examine the impact of the policy change on price dispersion. We use the same set of model specifications for all four measures. After controlling for a number of factors, the estimated coefficients of *Stage 2* are positive in all model specifications, although the one with price range is statistically insignificant. This finding is consistent with Proposition 1. When Best Buy added the MFCC to its LPG, it led to greater price dispersion in the market.

To test the robustness of the above findings, Table 5 reports the results for store-pair price difference regressions. Model 1 only includes a constant term in the regression. A positive sign indicates that average prices are higher at Best Buy than the other store, when both stores carry a same product. Model 2 adds the policy change indicator, *Stage 2* as well as a set of controls for product fixed effects. A positive estimate of *Stage 2* indicates a larger difference between the store pair after the policy change. Consistent with the results in Table 3, the estimates in Model 1 in each store pair are all positive, indicating that Best Buy indeed enjoys a store premium. After the changeover, price differences between Best Buy and Buy and Circuit City become larger and those between Best Buy and the other two stores becomes smaller, but statistically insignificant.

In conclusion, our analysis suggests that the introduction of the MFCC by Best Buy in its LPG enhances the competition among online retailers. Such a policy revision makes Best Buy's LPG more attractive. To respond, its competitors aggressively undercut its prices. This in turn leads to a greater price dispersion.

5 Conclusion

In this study, we document a LPG policy change in the market of consumer electronics. Our analysis suggests that the introduction of a MFCC by Best Buy enhances the competition. We arrive at this conclusion by two different approaches. First, we develop a theoretical model in which five consumer groups are considered. Once the store with a premium begins to offer OPM, the competition becomes more intense. As a result, we find that average price

declines and price dispersion (using both absolute and relative measures) increases after the policy change. Second, we empirically study a sample spanning the periods before and after the policy change between April 2003 and March 2004. After controlling for a number of factors (including product life-cycle effects), we find that consistent with the theoretical predictions, Best Buy (i.e., Firm 1) lowers its average prices by 6.5% after the policy change. The competing stores also lower their prices. Specifically, Buy.com decreases its average prices by 8.3%, Circuit City by 6.8%, CompUSA by 6.9%, and Sears by 3.4%, respectively. In addition, we find that the policy change leads to greater disparity, using four different measures of price dispersion. These findings are robust to a variety of measures and controls.

While this paper documents a permanent LPG policy change, retailers sometimes introduce temporary ones. For example, during the 2006-2007 holiday season, Best Buy offered an “improved” LPG for a limited time. It allows longer post-search period (60 instead of 30 days) for high-definition TV purchases from November 26, 2006 through February 5, 2007.³⁴ Whether this temporary policy change has a significant impact on the competition may be of interest. Also for future directions, it may be interesting to examine the incentives of different types of policy changes.

6 Appendix

6.1 Appendix A. Equilibrium Results

First, we derive the demand for each firm. For each group, let x_j denote the marginal consumer in group j ($j = a, b, c, d$, or e) who is indifferent between purchasing from either firm. Thus, the demand for Firm 1 is $d_{1j} = x_j$, and for Firm 2 $d_{2j} = 1 - x_j$.³⁵

First, consider Group a). Let x_a denote the marginal consumer who is indifferent between buying a new product from either firm. That is,

$$\begin{aligned} v_1 - p_{1n} - t_1 x_a &= v_2 - p_{2n} - t_1(1 - x_a) \\ x_a &= \frac{k - p_{1n} + p_{2n} + t_1}{2t_1}. \end{aligned}$$

³⁴Source: “Wal-Mart vs. the rest, round 2,” by Grace Wong (http://money.cnn.com/2006/11/29/news/companies/best_buy/index.htm).

³⁵We incorporate the fraction of each consumer group when computing the overall profits of each firm.

Firms' profits are

$$\pi_{1a} = p_{1n}d_{1a}, \quad \pi_{2a} = p_{2n}d_{2a}.$$

Second, Group b). A consumer located at x who buys from Firm 1 pays p_{1n} in Period 1. According to Table I, she immediately requests a PB, and receives a refund of $(p_{1n} - p_{2n}) \times 110\%$. Thus, her utility from the purchase at Firm 1 is

$$u_1 = v_1 - p_{1n} + (p_{1n} - p_{2n}) \times 110\% - t_1x.$$

Alternatively, if she buys from Firm 2, she pays p_{2n} in Period 1. However, she can get a refund of $(p_{2n} - p_{2o})$ in Period 2, and thus enjoys a utility of

$$u_2 = v_2 - p_{2n} + \delta_h(p_{2n} - p_{2o}) - t_1(1 - x).$$

Setting $u_1 = u_2$, we solve for x_b

$$x_b = \frac{10k + p_{1n} - p_{2n} - 10\delta_h p_{2n} + 10\delta_h p_{2o} + 10t_1}{20t_1}$$

Demand for Firm 1 is $d_{1b} = x_b$ and for Firm 2 $d_{2b} = 1 - x_b$, and firms' profits are,

$$\pi_{1b} = [p_{1n} - (p_{1n} - p_{2n}) \times 110\%]d_{1b}$$

$$\pi_{2b} = [p_{2n} - \delta(p_{2n} - p_{2o})]d_{2b}$$

For the marginal consumer in group c), the demands and profits are the same as those for group b).

The marginal consumer in group d) is defined as

$$\begin{aligned} v_1 - p_{1o} - t_2x_d &= v_2 - p_{2o} - t_2(1 - x_d) \\ x_d &= \frac{k - p_{1o} + p_{2o} + t_2}{2t_2}. \end{aligned}$$

Incorporating the discount factor, firms' profits are

$$\pi_{1d} = \delta p_{1o}d_{1d}, \quad \pi_{2d} = \delta p_{2o}d_{2d}.$$

Finally, the marginal consumer in group e) is defined as

$$\begin{aligned} v_1 - p_{1o} + (p_{1o} - p_{2o}) \times 110\% - t_2x_e &= v_2 - p_{2o} - t_2(1 - x_e) \\ x_e &= \frac{10k + p_{1o} - p_{2o} + 10t_2}{20t_2}, \end{aligned}$$

and firms' profits are given by

$$\pi_{1e} = \delta[p_{1o} - (p_{1o} - p_{2o}) \times 110\%]d_{1e}, \quad \pi_{2e} = \delta p_{2o}d_{2e}.$$

Suppose $t_1 = 1$, $t_2 = \frac{1}{2}$, $\alpha = \beta = \gamma = \frac{1}{4}$, $\delta_h = 1$, $\delta_l = 0$, $\delta = \frac{4}{5}$.³⁶

Next, we solve for the profit-maximization problems for both firms in Stage 1. Aggregat-

³⁶Without assigning parameter values, the expressions are too lengthy.

ing across the five groups, we obtain the total firms profits

$$\begin{aligned}\pi_1 = & 33/400p_{2o} + 87/400p_{1o} + 29/320p_{1n}k - 301/3200p_{1n}^2 + 639/6400p_{1n}p_{2n} + 11/320p_{2n}k \\ & -187/6400p_{2n}^2 + 29/320p_{1n} + 87/200p_{1o}k - 903/2000p_{1o}^2 + 117/250p_{1o}p_{2o} + 33/200p_{2o}k \\ & -33/2000p_{2o}^2 - 3/1280p_{1n}p_{2o} + 33/1280p_{2n}p_{2o} + 11/320p_{2n},\end{aligned}$$

$$\begin{aligned}\pi_2 = & 13/40p_{2o} + 149/1600p_{1n}p_{2n} - 1/10p_{2n}k - 283/3200p_{2n}^2 + 87/200p_{1o}p_{2o} \\ & -5/8p_{2o}k - 363/800p_{2o}^2 + 53/3200p_{2n}p_{2o} - 1/400p_{2o}p_{1n} + 1/10p_{2n}.\end{aligned}$$

Firm i 's problem is

$$\max_{p_{in}, p_{io}} \pi_i, i = 1, 2.$$

First order conditions (FOCs) imply

$$\frac{\partial \pi_1}{\partial p_{1n}} = 0 \Rightarrow 29/320k - 301/1600p_{1n} + 639/6400p_{2n} - 3/1280p_{2o} + 29/320 = 0.$$

$$\frac{\partial \pi_1}{\partial p_{1o}} = 0 \Rightarrow 87/200k - 903/1000p_{1o} + 117/250p_{2o} + 87/400 = 0.$$

$$\frac{\partial \pi_2}{\partial p_{2n}} = 0 \Rightarrow 53/3200p_{2o} + 1/10 + 149/1600p_{1n} - 1/10k - 283/1600p_{2n} = 0.$$

$$\frac{\partial \pi_2}{\partial p_{2o}} = 0 \Rightarrow -1/400p_{1n} + 53/3200p_{2n} + 13/40 + 87/200p_{1o} - 5/8k - 363/400p_{2o} = 0.$$

Solving the above four equations, we obtain $p_{1n}, p_{2n}, p_{1o}, p_{2o}$

$$p_{1n} = 1.118 + .2199k, p_{2n} = -.507k + 1.215, p_{1o} = .580 + .159k, p_{2o} = .655 - .622k.$$

Given $k \in (.133, .470)$,³⁷ the average price (P_{before}) and two measures (absolute and relative, respectively) of price dispersion ($PD_{before1}$ and $PD_{before2}$) before the policy change are:

$$\begin{aligned}P_{before} &= \frac{p_{1n} + p_{2n} + p_{1o} + p_{2o}}{4} \\ &= -.187k + .892\end{aligned}\tag{1}$$

$$\begin{aligned}PD_{before1} &= \frac{p_{1n} - p_{2n}}{p_{1n} + p_{2n}} + \frac{p_{1o} - p_{2o}}{p_{1o} + p_{2o}} \\ &= -4.215 \frac{(k - .107)(k - 4.858)}{(k - 2.669)(k - 8.110)}\end{aligned}\tag{2}$$

$$\begin{aligned}PD_{before2} &= (p_{1n} - p_{2n}) + (p_{1o} - p_{2o}) \\ &= 1.509k - .171.\end{aligned}\tag{3}$$

³⁷Notice that for the price ranking $p_{1n} > p_{2n} > p_{1o} > p_{2o}$ to hold, we must have $k \in (.133, .952)$. Moreover, for the marginal consumer in each consumer groups to be within the interval $[0, 1]$, we must have $k < .470$.

In Stage 2, only group b) consumers have changed their demand. Recall that these consumers prefer OPM to PB, and those who purchase from Firm 1 now request an OPM. It follows that the marginal consumer x'_b is defined as

$$\begin{aligned} v_1 - p_{1n} + \delta_h(p_{1n} - p_{1o}) - t_1 x'_b &= v_2 - p_{2n} + \delta_h(p_{2n} - p_{2o}) - t_1(1 - x'_b) \\ \Rightarrow x'_b &= \frac{k - p_{1n} + \delta_h p_{1n} - \delta_h p_{1o} + p_{2n} - \delta_h p_{2n} + \delta_h p_{2o} + t_1}{2t_1} \end{aligned}$$

Thus, the new demand in group b) for Firm 1 is $d'_{1b} = x'_b$ and for Firm 2 $d'_{2b} = 1 - x'_b$, and firms' profits become

$$\begin{aligned} \pi'_{1b} &= [p_{1n} - \delta(p_{1n} - p_{1o})]d'_{1b} \\ \pi'_{2b} &= [p_{2n} - \delta(p_{2n} - p_{2o})]d'_{2b} \end{aligned}$$

Next, we solve for the profit-maximization problems for both firms in Stage 2. Aggregating across the five consumer groups, we obtain the total firms profits

$$\begin{aligned} \pi'_1 &= 25/256p_{1n} + 11/1280p_{2n} - 11/12800p_{2n}^2 + 303/3200p_{2n}p_{1n} + 11/1280p_{2n}k \\ &\quad + 189/800p_{1o} + 33/400p_{2o} + 25/256p_{1n}k + 1947/4000p_{1o}p_{2o} + 33/200p_{2o}k - 3/640p_{1n}p_{1o} \\ &\quad + 3/640p_{1n}p_{2o} - 1881/4000p_{1o}^2 - 33/2000p_{2o}^2 + 363/800p_{1o}k - 1201/12800p_{1n}^2, \end{aligned}$$

$$\begin{aligned} \pi'_2 &= 1/10p_{2n} + 13/40p_{2o} - 1/10p_{2n}k - 599/6400p_{2n}^2 + 363/800p_{1o}p_{2o} - 5/8p_{2o}k \\ &\quad - 363/800p_{2o}^2 - 1/1600p_{1n}p_{2o} - 13/3200p_{2n}p_{2o} + 599/6400p_{1n}p_{2n} + 3/640p_{1o}p_{2n} \end{aligned}$$

Using the FOCs, we obtain the following prices,

$$p'_{1n} = 1.058 + .321k, p'_{2n} = 1.064 - .356k, p'_{1o} = .577 + .168k, p'_{2o} = .641 - .602k.$$

Given $k \in (.082, .470)$,³⁸ the average price (P_{after}) and two measures of price dispersion (PD_{after1} and PD_{after2}) after the policy change are:

$$P_{after} = -.117k + .835 \quad (4)$$

$$PD_{after1} = \frac{.677k - .005}{-.034k + 2.123} + \frac{-.063 + .771k}{1.219 - .434k} \quad (5)$$

$$PD_{after2} = 1.449k - .068 \quad (6)$$

Comparing equations (1) through (6), we obtain the following

$$P_{after} - P_{before} < 0, PD_{after1} - PD_{before1} > 0, PD_{after2} - PD_{before2} > 0.$$

The result is shown in Figure 2. We also compare the individual prices between the two stages.³⁹

³⁸This is required for the marginal consumer in all groups to be within the interval $[0, 1]$, and for the price ranking to hold.

³⁹Our results show that p_{1n}, p_{2n}, p_{2o} always go down after the policy change. p_{1o} go down only when k is small.

Table B illustrate a numerical example when $k = \frac{1}{5}$.

Table B. An Example of Prices when $k = \frac{1}{5}$

Prices	P_{1n}	P_{2n}	P_{1o}	P_{2o}
Stage 1	1.162	1.114	.612	.531
Stage 2	1.123	.993	.611	.521

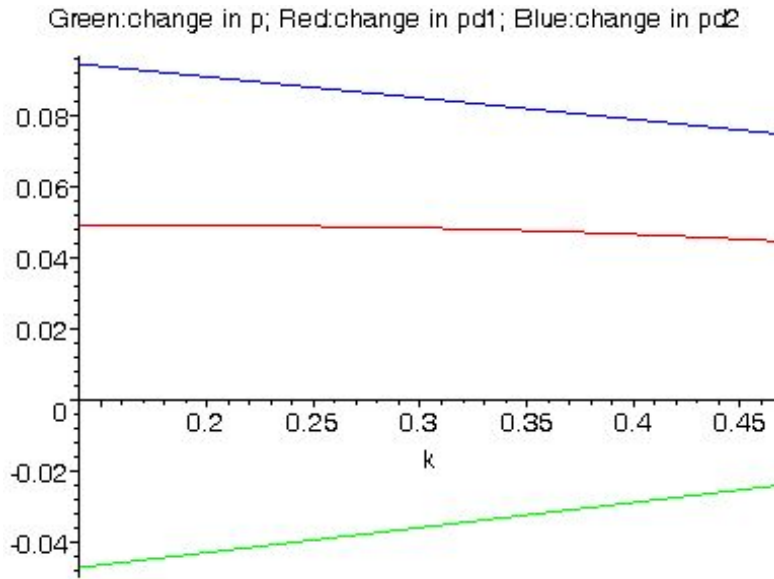


Figure 2. An Example of Changes in Average Price and Price Dispersion




Figure 3. An Example of Instant Store-Discount and Mail-in Rebate (before click-through)

Shopping Cart Close window

This item has been placed in your cart to show you our low sale price. Manufacturers occasionally suggest that products be advertised at their suggested retail price. If we decide to sell items for less than the suggested price, the sale price is shown in your cart.

Please choose "keep in my cart" to purchase this item or "remove from my cart" to continue shopping.

	Toshiba Satellite	Price was:	\$1299.99
	Notebook PC (A105-S2716)	You save:	-\$50.00
	TOS A105S2716	You pay:	\$1249.99
		Mail-in rebate (s):	-\$250.00
		Price after rebate(s):	\$999.99

See the Rebates tab on the product details page for any additional rebates associated with this item.

[Close window](#)

Figure 4. An Example of Instant Store Discount and Mail-in Rebate (after click-through)

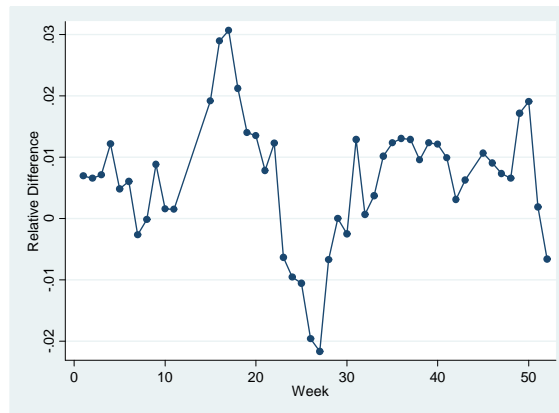


Figure 5. Relative Differences in Prices between Best Buy and Other Stores

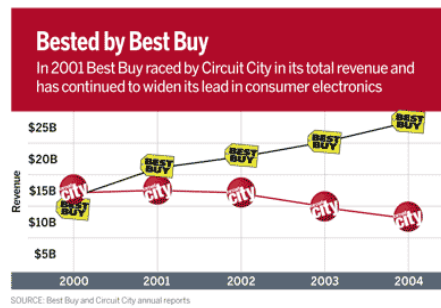


Figure 6. Evolution of Revenues at Best Buy and Circuit City in 2000-2004⁴⁰

⁴⁰Source: "Circuit City Rewires" by Meredith Levinson, CIO Magazine, July 1, 2005

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Table 1. Price level comparison for matched products

Store	# Obs	Stage 1	Stage 2	t-value	p-value
Best Buy	27	622.31	591.61	3.022	0.006
Buy	35	423.55	413.55	1.650	0.108
Circuit City	57	539.34	506.81	3.873	0.000
CompUSA	27	312.28	290.23	4.173	0.000
Sears	22	757.49	719.59	3.253	0.004
Overall	168	520.63	494.07	6.714	0.000

*These results are based on observations at the store-product level

Table 2. Price Dispersion and Policy Change

	Stage 1		Stage 2	
	Obs	Mean	Obs	Mean
Price Range	1114	15.872	2330	21.104
Percent Price Range	1114	0.049	2330	0.053
Standard Deviation	710	15.360	1689	17.391
Coefficient of Variation	710	0.043	1689	0.041

Table 3. Effects of Best Buy's Policy Change on Average Prices

Dependent Var: Ln(Price)	(1)	(2)
Stage 2 (Weeks 14 through 52)	-0.084 (0.006)***	-0.065 (0.008)***
Buy	-0.025 (0.007)***	-0.014 (0.006)**
Circuit City	-0.004 (0.005)	0.009 (0.004)**
CompUSA	-0.009 (0.007)	-0.02 (0.007)***
Sears	-0.041 (0.006)***	-0.036 (0.006)***
Buy * Stage 2	-0.013 (0.008)*	-0.018 (0.008)**
Circuit City * Stage 2	0.012 (0.006)**	-0.003 (0.004)
CompUSA * Stage 2	-0.028 (0.008)***	-0.004 (0.008)
Sears * Stage 2	0.033 (0.007)***	0.031 (0.007)***
<i>Store Promotion Activities</i>		
Instant Store Discount	-0.005 (0.004)	0.003 (0.003)
Mail-in Rebate	0.027 (0.005)***	0.033 (0.004)***
Number of Firms	Yes	Yes
Monthly Fixed Effects	Yes	Yes
Product Fixed Effects	Yes	Yes
Life-Cycle Fixed Effects: Month*Product	No	Yes
Constant	3.936 (0.023)***	3.908 (0.006)***
Observations	7100	7100
Adjusted R-squared	0.9961	0.9977

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4. Effects of Best Buy's Policy Change on Price Dispersion

	(1)	(2)	(3)	(4)
Dependent Var:	Range	Percent Range	Standard Deviation	Coefficient of Variation
Stage 2 (Weeks 14 through 52)	0.253 (3.635)	0.019 (0.007)**	8.844 (3.580)**	0.036 (0.006)***
<i>Store Promotion Activities</i>				
Mail-in Rebate	-1.04 (3.113)	0.008 (0.008)	-10.277 (4.056)**	-0.008 (0.008)
Instant Store Discount	9.664 (2.478)***	0.019 (0.005)***	0.228 (2.815)	-0.002 (0.005)
Market-Level Policy Dummy	Yes	Yes	Yes	Yes
Number of Firms	Yes	Yes	Yes	Yes
Monthly Fixed Effects	Yes	Yes	Yes	Yes
Product Fixed Effects	Yes	Yes	Yes	Yes
Constant	-19.229 (5.245)***	-0.001 (0.040)	18.722 (7.090)***	0.117 (0.056)**
Observations	3444	3444	2399	2399
Adjusted R-squared	0.5761	0.4836	0.6252	0.5933

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Difference in Prices Regressions by Store-Pair

Dependent Var: $P_{\text{Best Buy}} - P_{\text{Another Store}}$	Best Buy vs. Buy		Best Buy vs. Circuit City		Best Buy vs. CompUSA		Best Buy vs. Sears	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Stage 2 (Weeks 14 through 52)		36.073 (9.365)***		1.758 (1.422)		-6.059 (6.020)		-3.781 (3.718)
Constant	40.546 (4.837)***	17.275 (6.842)**	1.251 (0.963)	-0.127 (0.742)	12.377 (2.534)***	16.12 (5.610)***	3.848 (1.609)**	6.345 (3.275)*
Observations	572	572	1122	1122	518	518	409	409
Adjusted R-squared	0.0000	0.0206	0.0000	-0.0004	0.0000	0.0007	0.0000	0.0006

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%