

# THE CYCLICALITY OF ADD-ON PRICING

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## Abstract

Prices and economic activity have exhibited an unstable relationship for more than 60 years. During the same period, the retail sector has seen the rise of add-ons, quality-enhancing goods or services with hidden prices. We show that inflation and unemployment rate display a much stronger relationship than previously thought, once add-on prices are accounted for in aggregate price indices. Using data on extended warranties from a nationwide Canadian retailer of household durables, we show that their prices respond strongly to changes in local economic activity, whereas prices of base goods do not. Their cyclical properties survive aggregation. Warranty-adjusted inflation moves in tandem with aggregate unemployment rate growth, whereas its unadjusted counterparts exhibit moderate business cycle fluctuations. We argue that extended-warranty prices are more cyclical because of unofficial promotions carried out by local stores during downturns.

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Prices and economic activity have exhibited an unstable relationship for more than 60 years. Some decades imply the presence of a trade-off between price inflation and unemployment rate. Others imply that no such trade off exists. In this paper, we show that the trade off between consumer prices and economic activity is stronger than previously thought, once add-on prices are accounted for in aggregate price dynamics. We argue that this is the case because the prices of add-ons are more cyclical than the prices of base goods.

Add-ons improve quality of the base good or service and “their prices are not advertised and would be costly or difficult to learn before one arrives at the point of sale” (Ellison, 2005). Their growing prevalence has been one of the most salient developments in retail over recent decades. They are widespread in the sales of airline tickets, hotel rooms, and durable goods, where retailers can add baggage fees on to airline tickets, the mini-bar on to hotel rates, and extended warranties on to durable goods. In spite of their growing importance for revenues and profits in the retail and services sectors,<sup>1</sup> they are unaccounted for in most consumer price indices, and therefore in macroeconomic studies of price dynamics.

To help fill the gap, we use 10 years of transactions data from a nationwide Canadian retailer of household durable goods, data on every one of the more than 6 million customer purchases that took place between December of 1999 and December 2009. The data includes information on the prices of the base durable and extended warranties, a service that can be added on to most of durable goods. The data puts us in a unique position to study the cyclicity of add-on prices for three reasons: first, add-on prices are generally difficult, if not impossible, to observe by definition; second, our sample period includes the Great Recession; third, our data covers the entire country, which is useful because there are substantial differences in how regions were impacted by the Great Recession.

Our baseline analysis investigates the relationship between regional (sub-provincial) prices

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<sup>1</sup>For instance, airline revenues from baggage fees increased from 543 million to 4.2 billion dollars in the U.S. between 2007 and 2016 (Bureau of Transportation Statistics).

and economic activity at the monthly level. We show that a one percentage point increase in the local unemployment rate is followed by a \$2.15 drop in the extended-warranty price in the next month. The long-run cumulative effect of local unemployment rate on extended warranty price is large: a one percentage point increase in the unemployment rate decreases the price of the extended warranty over the following year by \$6.89 ( $p < 0.01$ ). There are no significant changes in the prices of durables in the following month, 6 months, or 1 year, after changes in the local unemployment rate.

We investigate the nature of the mechanism driving the pro-cyclicality of extended-warranty prices, based on their large and discrete shifts, taking place outside of official promotions. When the demand for the base good drops and their prices are already set very close to the costs, the retailer is likely to decrease the extended warranty price to boost base good sales. In fact, during recession prices of extended warranties are often zero or very close to zero. We construct a variable that measures the degree to which stores are holding these unofficial promotions, where extended warranty prices are largely reduced. Using the IV approach, we present direct evidence that warranty price reductions help local sellers boost sales of base goods. A one standard deviation increase in unofficial promotions increases the number of base goods sold by 0.56 units.

Local price cyclicality may be uninformative for cyclicality at the national level if regional differences in economic structures imply asymmetric responses to the same shocks, if the impact of aggregate shocks is attenuated by inter-regional factor mobility (Beraja, Hurst, Ospina, 2018), or if the shocks are attenuated by responses of the Bank of Canada (BoC). Accordingly, the second part of our analysis investigates the implications of price cyclicality on aggregate.

Specifically, we study the cyclicality characteristics of a warranty-adjusted consumer price index (CPI) and compare to their counterparts for the BoC CPI and to an unadjusted price index that is based solely on the prices of durables sold by the retailer. Our adjusted and

unadjusted indices combine BoC data with our own, where only the durable goods price index is constructed from the retailer's price series, and the remaining components (semi-durables and non-durables) and weights are taken directly from the BoC. This construction ensures that our indices are as close as possible to standard aggregate measures of consumer prices.

We show that all three measures of inflation are pro-cyclical. In case of inflation measures unadjusted for extended warranty prices, this impact is however very short-lived as only one lag of monthly unemployment rate growth is significant. The long-run cumulative over a year cyclical coefficient is significant only for our extended warranty adjusted inflation rate.

We zoom in on the dynamics of adjusted and unadjusted inflation rates during the Great Recession, computing the difference between adjusted and unadjusted series for the entire sample period, and testing for the existence of structural breaks. We find a structural break in the difference between two inflation rates in July of 2008, the middle of the Great Recession and shortly before the collapse of Lehman's Brothers. Before the break, during the boom that preceded the Great Recession, the warranty-adjusted rate exceeded the unadjusted rate on average. After the break, but still during the Great Recession, there was no difference in the adjusted and unadjusted rates, implying that the prices of extended warranties were very low on average. These results further support the idea that the add-ons are the margin of adjustment for the retailer over the business cycle.

## 1 Add-ons

Following Ellison (2005), we define the add-on as a vertical quality improvement and a good or service for which "[the] prices are not advertised and would be costly or difficult to learn before one arrives at the point of sale". The increase in use of add-ons by retailers is driven

by the idea that prices for base goods act simply as a tool for drawing the customer in. Low or loss-leader prices on base goods encourage customers to incur the time or travel cost of visiting a business. These sunk costs make it costly for the customer to visit competing businesses, and allow for higher markups on (add-on) goods that are only sold at the point of sale. These markups can provide businesses with the incentives to continue to produce even though they operate in markets where competition is notoriously fierce. There has been an explosion of retail price data, and of its use for learning about the price setting of the firm and resulting price dynamics at the aggregate level. This however includes information on base goods' prices only, and excludes information that allows one to identify add-on goods and their behavior. More importantly, in spite of the growing importance of add-ons for retail and services sectors, current Consumer Price Indexes do not account for them. <sup>2</sup>

## 2 Data

**2.1. Extended warranty.** Our analysis is based on the data of a nationwide Canadian retail chain that specializes in the sale of household durables (furniture, appliances, and electronics). Almost all goods are offered with the option to extend the lifetime of the warranty beyond what the manufacturer offers. We follow the retailer, and other retailers, in referring to the extension as an extended warranty.

The data covers the universe of transactions between January 1 1999 and December 31 2009, involving more than 6 million transactions, more than 3 million consumers, and nearly 35,000 products. The data includes the prices paid for durables and extended warranties, whether an extended warranty was purchased, the *suggested* warranty price, as well as the cost of servicing claims made under the extended warranty. The suggested warranty price is the benchmark price set by the chain for different stores.

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<sup>2</sup>Both Statistics Canada and U.S. Bureau of Labour Statistics provided us with the information that the respective CPIs do not include add-ons and extended warranty prices specifically.

**Table 1: Summary statistics.**

Base good	Extended Warranty				
Price paid	Take Up	Suggested price	Price paid	Average cost	Price - Cost
610.90	0.37	134.21	88.65	23.49	65.16
(1727.80)	(0.48)	(109.28 )	(93.40)	(164.34)	(0.12)

All prices are in Canadian (CAD) dollars. Column 6 uses a t-statistic that allows for unequal variances to test for a difference between the mean price and expected cost of the extended warranty. The standard error of the difference is in parentheses.

Summary statistics are found in Table 1.<sup>3</sup> On average, customers pay 611 dollars for the durable, extend the warranty 37 percent of the time, and pay 88.65 dollars to do so. Note that the suggested exceeds the realized warranty price by about 50 percent.

Servicing covers 100 percent of the costs of a repair, including the costs of parts and labour, services that require a home visit by a technician, and in some cases the costs of replacement. The fifth column of Table 1 shows that the expected cost of servicing an extended warranty claim is less than 24 dollars. The last column reports the difference between the price paid and the service cost for extended warranty when it is claimed, a measure of the markup on extended warranties. The markup is just over 65 dollars ( $p < 0.01$ ), amounting to just under 75 percent of the extended warranty price. The markup suggests extended warranties are highly profitable and, importantly, that the room for adjusting the extended warranty price is substantial.

It is important to note that, to learn the extended-warranty price, consumers must speak directly with store representatives and that, once a consumer has visited one of the 200 or so stores in the chain, it becomes costly for them to visit another store in the same chain or a store in a competing chain.<sup>4</sup> The stores are usually located in stand-alone buildings, in

<sup>3</sup>A more detailed breakdown, by the more than 140 product categories, is found at the end of the paper in Table 6.

<sup>4</sup>Consumers and salespersons can interact in a number of ways. Salespersons can help consumers settle on a good. Alternatively, they can help them process the good after the consumer has settled on what they want. It is therefore difficult to know when precisely the salesperson makes the offer of the extended warranty (Jindal, 2015). Later we will see, however, that our data lets us investigate whether the extended

regions with sprawl (where the consumers usually need a car to visit a store), and in places that are somewhat isolated from competing retailers. This, and the enormous land mass of Canada, implies the consumer would have to travel far to learn the extended warranty prices at competing retailers. These sunk travel and time costs, together with the hidden nature of the price, allow for markups over the costs of extending the warranty.<sup>5</sup>

The commission structure reinforces the notion that the chain has market power over the extended warranty price. The chain pays salespersons commissions for the sales of base goods and extended warranties. The commission on the extended warranty is 15 percent,<sup>6</sup> whereas the commission on the base good is 4 percent (on average, depending on the product).

Note that stores and salespersons have substantial discretion over extended-warranty pricing. A comparison of the third and fourth columns of Table 1 suggests this price-setting discretion is exploited by salespersons, as the columns show that the realized price is more than 45 dollars lower than the suggested price.

Their discretion, along with fact that extended-warranty prices are typically hidden, helps us emphasize the importance of transactions data for our purposes. Most other data sets, like list-price data collected by representatives of a statistical agency or by web-scraping will exclude add-on prices. The inherent unobservability of add-on prices therefore makes it generally difficult, if not impossible, to draw reliable conclusions about the cyclical properties of add-on prices.<sup>7</sup>

**2.2. Economic Activity and Inflation.** Our baseline measure of economic activity is the unemployment rate from Statistics Canada (STATSCAN), which is seasonally-adjusted

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warranty is being used by salespersons to sell base durables.

<sup>5</sup>The monopoly power is *ex post* because consumers who visit the retailer have already paid this travel and time cost. Consumers can avoid the costs *ex ante* by not visiting the store at all. See Ellison (2005) and Ellison and Ellison (2009) for more details.

<sup>6</sup>The commission was 15 percent for almost the entirety of our sample, up until May of 2009 when it was reduced to 10 percent.

<sup>7</sup>This data issue is exacerbated by the fact that other goods typically have several different add ons, all of makes a large-scale analysis more difficult.

for each of 58 predefined Employment Insurance (EI) regions. Each region contains several cities, and is almost always smaller than any one province.<sup>8</sup> The regional unemployment rates are provided at the monthly frequency and computed as 3-month moving averages. We use the data between January of 2000 (2000M1) and December of 2009 (2009M12) for 55 regions. We dropped Yukon, Northwest Territories, and Nunavut because for these 3 regions unemployment rates are constant at 25 percent.

Our macroeconomic analysis uses STATSCAN's aggregate monthly unemployment rates for the same period. It uses different inflation measures in combination with aggregated series from our own dataset. The inflation measures include the consumer price index (CPI) for all-goods, for semi-durables and non-durables, as well as the weights STATSCAN attributes to each of the sub-indices. We will provide more details on the construction of our aggregate prices later on in Section 4.1.

The CPI is a sample survey that tracks a large sample of representative goods and services to derive a robust estimate of average price change facing consumers. Extended-warranty prices are not currently collected by the statistical offices and central banks and therefore are not included in the CPI.

## 3 Descriptive Evidence

**3.1. Prices and Costs for Base Goods and Add Ons.** Costs for the base good include the manufacturer's price, commissions to salespersons for base durable sales, and the costs of keeping inventories. The costs of the extended warranty includes commissions on extended warranties, as well as the costs from servicing claims on the extended warranty, such as parts, repair, and shipping. We observe the costs of base durable for the majority of customer

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<sup>8</sup>The unemployment rate for the EI region is used to determine the EI benefits an unemployed worker is eligible for.



purchases,<sup>9</sup> and observe the claim costs for all claims made within our sample. Figure 1 shows the relationship between the (variable) costs paid by the retailer and the price it charged for the base durable (top panel) and the extended warranty (bottom panel).

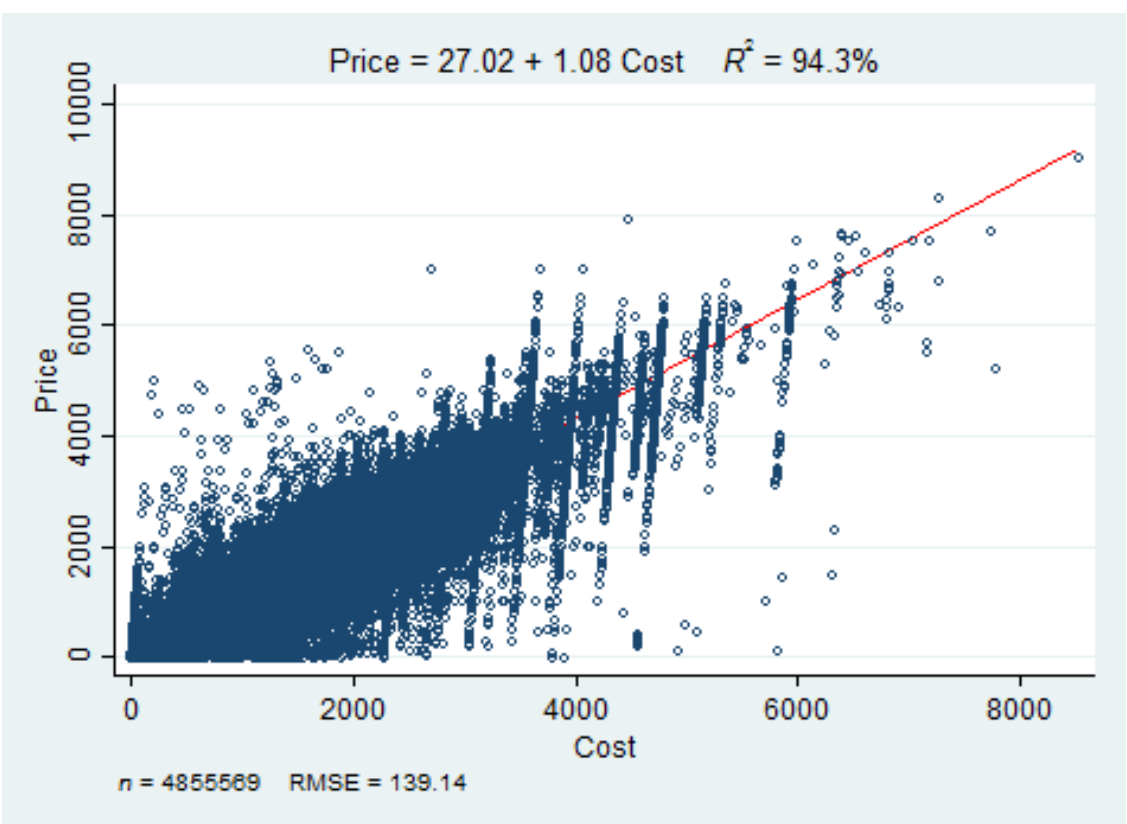
The fitted line in Figure 1(a) shows that a 1 dollar increase in the variable cost of the base durable is associated with an approximately 1 dollar increase in the price. The fitted line in Figure 1(b) shows that a 1 dollar increase in the variable cost of the extended warranty is associated with a 4 cent increase in its price. The  $R^2$  for the regression of the price on the cost of the durable is 95 percent, whereas its counterpart for extended warranties is 1.3 percent. Altogether, the figures are consistent with a highly competitive market for the base good, local discretion in extended-warranty pricing, as well as opportunities for marking up extended-warranty prices.

**3.1.1. Unemployment and Prices over Space.** Figure 2 presents the spatial distributions of the unemployment rates (2(a)), prices for the base good (2(b)) and extended warranty (2(c)). Warranty prices are lower in poorer regions where unemployment rates are high. In the northern territories, Northern Manitoba, parts of Quebec and Eastern Canada, the unemployment rate hovers between 19 and 26 percent. Consumers in these areas pay relatively low prices for the base good and extended warranty. In Alberta and Southern Ontario, particularly around Toronto, the unemployment rate hovers around 4.5 to 7.3 percent. Consumers in these areas pay relatively high prices.

**3.1.2. Prices over Time.** We study the dynamics of base-good and extended-warranty prices for broad categories of goods. We use the product categorization of the retailer, which includes categories such as Color TV (14 inch or less), Color TV (15-17 inch), Fax Machine, etc. The categories and summary statistics for each can be found in Online Appendix Table

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<sup>9</sup>The chain has franchise as well as corporate stores. Franchises get the base durable at cost (the price of the manufacturer) plus the cost of keeping the base durable in inventory. We observe these transfer prices and use them to construct costs for all goods sold at both corporate and franchise stores.

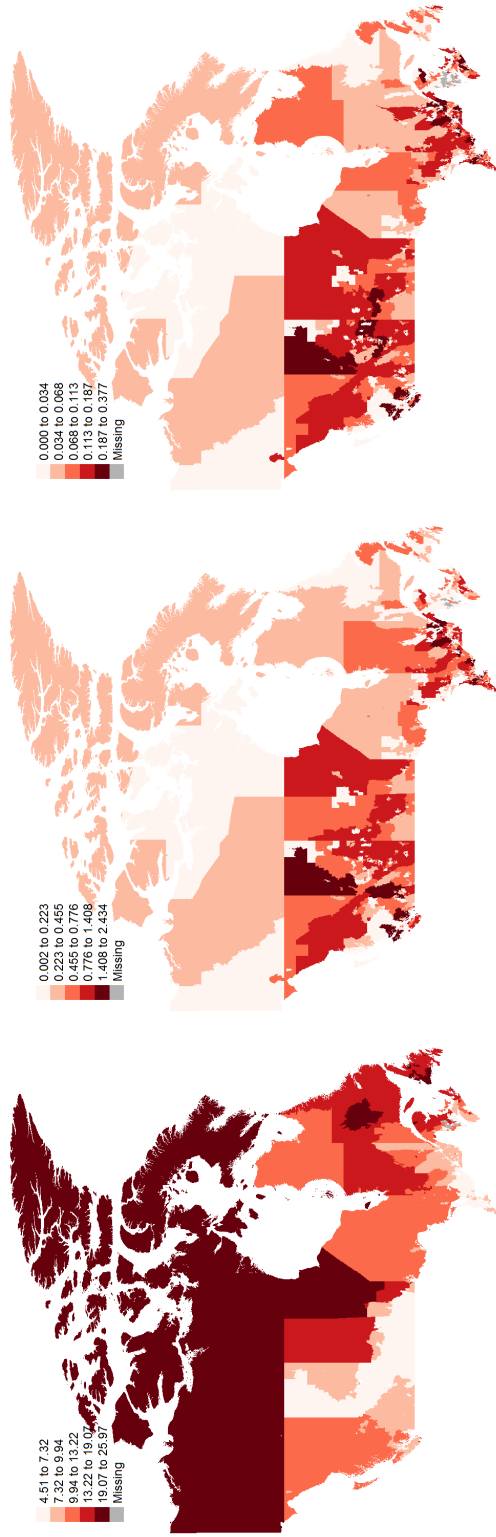


(a) Base Durable



(b) Extended Warranty

Figure 1: Prices and Costs of Base Durables and Extended Warranties.

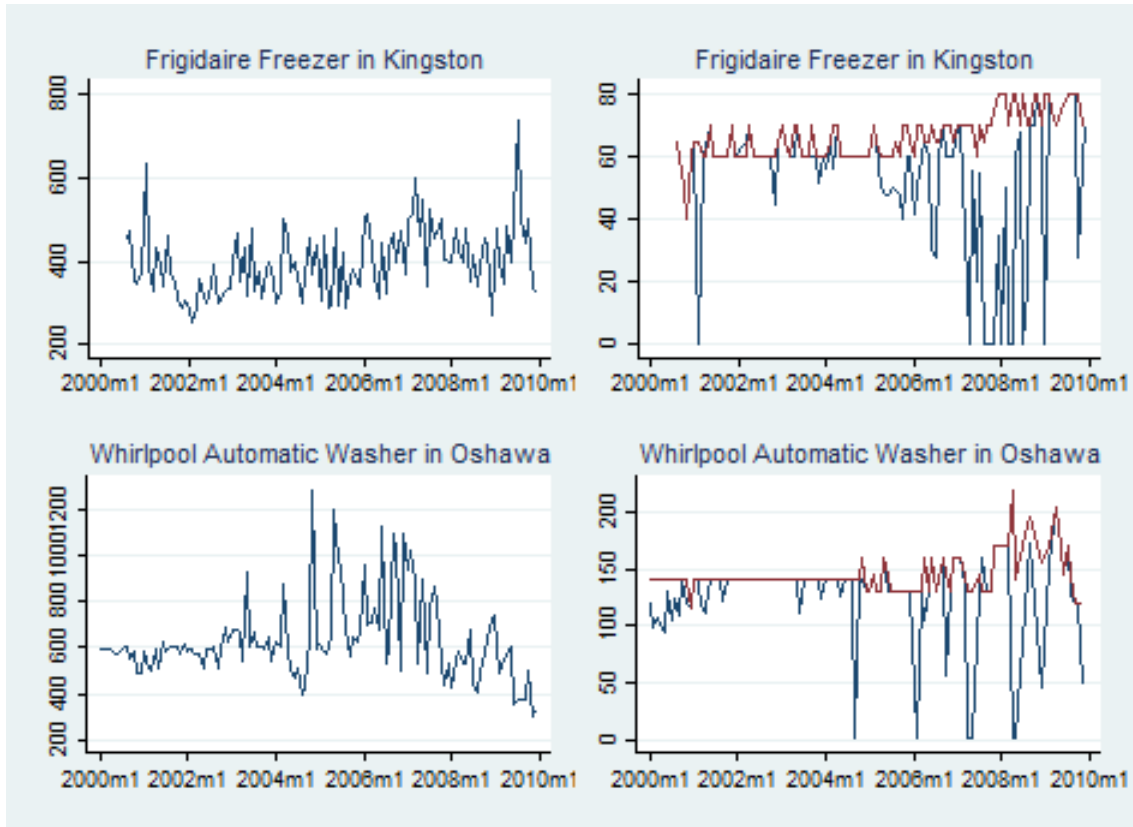


(a) Unemployment Rates

(b) Base-Good Prices

(c) Warranty Prices

**Figure 2: Regional Differences in Unemployment Rates, Base-Good Prices, and Extended-Warranty Prices.** The figures are generated as follows. We first grouped consumers by the first three characters of their postal code. Postal codes in Canada have 6 characters. The first three characters refer to the forward sortation area. The first defines the province or a city in cases where the city has a large population. The second indicates whether the area is urban or rural. The third points to a specific rural region, city of medium size, or to a segment of a large metropolitan area. In all, there are about 1600 of these areas. In what follows, to keep things simple, we refer to these geographic identifiers as the postal code. For each group, we averaged the unemployment rate over the 130 plus months in our sample. We averaged prices over the 4000 plus days in our sample. We weighted prices by the population share of the group.



**Figure 3: Base-good Prices and Suggested and Actual Prices of Extended Warranties.** The left panels plot base-good prices. The right panels plot extended-warranty prices. The red line plots the suggested extended-warranty price and the blue line corresponds to the realized warranty price (WP).

OA1. We aggregate the data to the month, product category and manufacturer for each store in the sample. Figure 3 presents examples of these series.

The top left panel of Figure 3 depicts base-good price dynamics for Frigidaire freezers in Kingston, Ontario. The bottom left panel depicts base-good price dynamics for the Whirlpool automatic washers in Oshawa, Ontario. The panels on the right depict extended-warranty price dynamics for these same product categories. The red and blue lines depict price dynamics for suggested and realized prices, respectively. Because suggested prices are set by the chain, the difference between suggested and realized prices describes the extent to which stores exploit discretion over prices.

The panels on the right show suggested extended-warranty prices are higher than realized

extended-warranty prices most of the time. In fact, in our entire sample the realized exceed the suggested prices 96.5 % of the time, in line with the mean differences for the entire sample (Table 1). There are several dips in realized extended-warranty prices, most notably during the Great Recession, when realized prices were often close or equal to zero. There were no obvious and systematic dips in base-good prices during the Great Recession, despite the fact that they exhibit greater month-to-month variation than realized extended-warranty prices.

**3.2. Price Responses to Economic Activity.** We investigate how base good prices and extended warranty prices respond to changes in local economic activity. We aggregate the transactions data to the monthly level to match the regional unemployment rate series, such that the unit of observation in our data is defined by the month, product category, manufacturer, and store. Our aggregated data has 421,741 observations.

We test for cyclicity of prices of extended warranties and base goods,  $p_{tscm}$ , using a following specification:

$$p_{tscm} = \beta u_{t-\ell, r(s)} + \rho p_{t-\ell, scm} + \alpha_{r(s)} + \gamma_{tcm} + \varepsilon_{tscm} \quad (1)$$

where  $t$  is the calendar month,  $s$  is the store,  $c$  is the product category, and  $m$  is the manufacturer.  $u_{t-\ell, r(s)}$  is the unemployment rate at time  $t - \ell$ , in the region  $r$  to which store  $s$  belongs. We consider alternative lags  $\ell$  of the unemployment rate, 1, 6, and 12 months, because changes in economic conditions impact prices with lags of several months. We also compute long-run (cumulative) impact of local unemployment rate on prices where we include 12 lags for both prices and unemployment rate in the specification (1).  $\alpha_{r(s)}$  and  $\gamma_{tcm}$  are fixed effects for region and month-category-manufacturer combination.  $\varepsilon_{tscm}$  is a random variable reflecting idiosyncratic price changes. Our interest is in the parameter  $\beta$ , which measures the cyclicity of prices with respect to lagged unemployment rate, our proxy for local economic activity.

Cyclical estimates can be interpreted causally if  $E[\varepsilon_{tscm} | u_{t-\ell, r(s)}, p_{t-1scm}, r(s), tcm] = 0$ . It is rather straightforward that lagged warranty prices or base good prices at the level of product category, store and manufacturer do not have influence on the local unemployment rates. Unobserved heterogeneity generated, for instance, by the sector of production is taken care of by region fixed effects. Month-category dummies help with unobserved time-varying heterogeneity in the category-manufacturer combination, such as differential propensities for obsolescence or shifting demands across products and manufacturers. The month-category-manufacturer fixed effects implicitly reflect movements in the national business cycle, implying, among other things, that our cyclical estimates reflect response to the movements in local economic conditions and partial out the impact of aggregate business cycle. <sup>10</sup>

Estimates of the baseline specification are reported in the first two panels of Table 2. The leftmost and middle panel report estimates of  $\beta$  for extended-warranty and base-good prices, respectively. In addition, the third panel reports results of estimation of the specification with warranty price reduction as dependent variable. Warranty price reduction is the difference between price suggested by retailer and price at which the extended warranty was purchased. We call it a reduction because 96.5 % of the time the realized warranty price is below the suggested price. Moving left to right within each panel shows how the estimates differ depending on the lag length for the unemployment rate. The lower half of the table puts the estimates into context, reporting: the effects of a one standard deviation increase in the unemployment rate; long-run effects, in regressions with 12 lags of the unemployment rate and 12 lags of the dependent variable; the mean of the dependent variable.

The estimate in the first column of the left panel implies that a one percentage point increase in the local unemployment rate is followed by a \$2.15 drop in the extended-warranty

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<sup>10</sup>The assumption  $E[\varepsilon_{tsc} | u_{t-\ell, r(s)}, p_{t-1sc}, r(s), tc] = 0$  can fail if differential developments, such as the diffusion of broadband, across regions correlates with unemployment and prices. For this reason, Appendix Table X (TBD) shows that our estimates are robust to the inclusion of differential trends across regions. Note that standard errors are clustered at the level of the employment insurance region.

**Table 2: Pricing Responses to Local Economic Activity.** The unit of observation is defined by the calendar month, store, product category, and manufacturer. Regressions include fixed effects for the month-category-manufacturer combination, fixed effects for the employment insurance region, as well as lags of the dependent variable. The variable Warranty Price Reduction equals the absolute value of the difference between the realized and suggested extended-warranty price.  $\sigma$  denotes the standard deviations for lags of the local unemployment rate (UR), which for 1 lag is 2.72. Long run effects are cumulative effects in regressions with 12 lags of the unemployment rate and 12 lags of the dependent variable. Standard errors for long run effects are computed via the Delta Method. All standard errors (in parentheses) are clustered at the level of the employment insurance region. \* \* \* and \*\* denote statistical significance at the 1 and 5 percent levels.

	(1)	Warranty Price (2)	(3)	Base Good Price (4)	(5)	(6)	Warranty Price Reduction (7)	(8)	(9)
Local Unemployment Rate at									
$t - 1$	-2.152*** (0.595)			-0.711 (0.641)			1.795*** (0.565)		
$t - 6$		-2.161*** (0.604)			-0.627 (0.769)			1.810*** (0.570)	
$t - 12$			-2.186*** (0.584)			-0.462 (0.812)			1.789*** (0.547)
Implied effect of a $1\sigma$ increase in Lagged UR Rate	-5.851*** (1.618)	-5.876*** (1.642)	-5.944*** (1.588)	-1.933 (1.743)	-1.705 (2.091)	-1.256 (2.208)	4.881*** (1.536)	4.921*** (1.550)	4.864*** (1.487)
Long-Run Effect		-6.894*** (1.950)			-0.155 (1.380)			5.694*** (1.926)	
Mean of Dependent Variable		79.869			582.176			36.456	
Observations	530615	511142	490949	1156770	1123359	1085902	530615	511142	490949
$R^2$	0.565	0.560	0.554	0.879	0.878	0.877	0.457	0.453	0.450

price in the next month. The estimated effects are similar if we use 6 and 12 month lags of the unemployment rate. The lower half of the table shows that a one standard deviation increase in local unemployment rate (2.72) decreases the extended warranty price by \$5.85, or 7.6 percent of the mean extended warranty price. The long-run effect of local unemployment rate on extended warranty price is large: a one percentage point increase in the unemployment rate decreases the price of the extended warranty over the following year by \$6.89 ( $p < 0.01$ ). All the estimates for extended warranty prices are statistically significant at the one percent level.

The estimates in the middle panel present the cyclical coefficients estimates for the base good prices. None of them is statistically significant at conventional significance levels.

**3.3. Cyclicalilty of Unofficial Promotions.** Because the prices of the base goods are already set very close to the costs, the retailer is likely to use the extended warranties to boost the sales of the base goods.<sup>11</sup> In fact, the patterns in Figure 3, namely that the prices of extended warranties often approach zero during the Great Recession, suggest stores may be “throwing in” extended warranties for the purposes of boosting sales of base goods.

Appendix Figure 5 shows that a disproportionate share of extended warranties are sold with a price close to zero. These patterns arise outside of official promotions on extended warranties, which happen rarely, in only 0.1 percent of all transactions. Accordingly, we construct a variable that measures the degree to which stores are holding unofficial promotions, where extended warranty prices are reduced relative to the suggested prices, and evaluate how this variable varies depending on the unemployment rate fluctuations.

Our measure of unofficial local promotions  $pm_{tscm}$  is given by:

$$pm_{tscm} = |wp_{tscm} - swp_{tscm}|$$

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<sup>11</sup>Figure 1 shows that the correlation between prices and costs of base goods are close to one.



where  $|\cdot|$  denotes the absolute value,  $wp_{tscm}$  is the median of the realized extended warranty price, and  $swp_{tscm}$  is the median of the suggested extended warranty price in month  $t$ , store  $s$ , product category  $c$ , and the manufacturer  $m$ . Because the suggested price is larger than the realized price in 96.5 percent of all transactions,  $pm_{tscm}$  generally measures the extent to which stores are discounting the realized relative to the suggested price. Estimates of the effect of the unemployment rate on  $pm_{tscm}$  are found in the rightmost panel of Table 2.

The estimates align with the results for realized extended warranty prices presented in the left panel of Table 2, although the cyclical coefficients are smaller implying that the retailer’s suggested prices account, to a certain extent, for business cycle fluctuations. Note however that the differences between the coefficients in the left and right panels of Table 2 are small implying that most of the cyclical price adjustment comes from the individual stores.

**3.4. Unofficial Promotions and Sales.** We present direct evidence that warranty price reductions help local sellers boost sales of base goods. We estimate a demand system that allows for unofficial promotions:

$$Q_{tscm} = \beta_1 pm_{tscm} + \beta_2 wp_{tscm} + \beta_3 bgp_{tscm} + \mathbf{X}_{tscm}\mathbf{\Gamma} + \alpha_{r(s)} + \gamma_{tcm} + \varepsilon_{tscm} \quad (2)$$

where  $Q_{tscm}$  is either the number of extended warranties or base goods sold in month  $t$ , store  $s$ , product category  $c$ , and the manufacturer  $m$  and  $bgp_{tscm}$  is the median price of base goods,  $pm_{tscm}$  as before measures unofficial local promotions and  $wp_{tscm}$  extended warranty prices.  $\mathbf{X}_{tscm}$  is a vector of controls that includes the unemployment rate lagged one month, number of extended warranties sold, and number of base goods sold. We seek to identify whether an increased effort of the stores in form of unofficial promotions on extended warranties boosts sales of corresponding base goods, controlling for business cycle fluctuation. Our main interest lies thus in  $\beta_1$ , which measures the effect of unofficial promotions on quantities

for extended warranties and base goods.

To obtain plausibly unbiased estimates of  $\beta_1$ , we adopt an instrumental variables strategy. We instrument unofficial promotions  $pm_{tscm}$  using its lag  $pm_{t-1scm}$ , for the realized extended warranty price  $wp_{tscm}$  using the suggested extended warranty price, and finally we use the cost of the base good as instrument for the base good price.

Estimates of the demand system (2), together with the first stage results, are found in Table 3. IV estimates of the effects of promotions and prices on extended warranty quantities are found in Column 1. IV estimates of the effects on base good quantities are found in Column 2. Columns 3 to 5 report estimates from the first stage. Note that the *Kleibergen – Paap rk Wald F statistic* is 41.116, suggesting that the first stage is powerful and thus relevant.

The main estimates of our interest are found in the top rows of Columns 1 and 2. A one standard deviation increase in unofficial promotions increases the number of warranties sold by 0.183 units. More importantly, it increases the number of base goods sold by 0.56 units. The effect on sales of the base goods suggests that unofficial promotions are indeed used to boost base good sales.

The IV and first stage estimates are also intuitive. The IV results in Column 1 show that a one standard deviation increase in the median extended-warranty price decreases the number of warranties sold by about 0.42 units. A one standard deviation increase in the median base-good price increases the number of warranties sold by about 0.25 units, probably because consumers are more likely to insure more expensive products. The IV estimates in Column 4 show, by contrast, that both prices decrease sold quantities of the base good. A one standard deviation increase in the median extended warranty price decreases the number of base goods sold by about 0.35 units. A one standard deviation increase in the median base-good price decreases the number of base goods sold by about 0.37 units.

The first stage results are reported in the right panel of Table 3. Column 7 shows that

**Table 3: Unofficial Promotions and Sales of Extended Warranties and Base Goods.** The unit of observation is defined by the calendar month, store, product category, and manufacturer. The variable Warranty Price Reduction equals the absolute value of the difference between the realized and suggested extended-warranty price. Standardized variables are standardized using means and standard deviations for the entire sample. Regressions include fixed effects for the month-category-manufacturer combination, fixed effects for the employment insurance region, as well as lags of the unemployment, extended-warranty quantity, and base-good quantity. Standard errors are clustered at the level of the employment insurance region and are in parentheses. The *Kleibergen – Paap rk Wald F statistic* is 41.116, suggesting that the first stage is relevant. \*\*\* and \*\* denote statistical significance at the 1 and 5 percent levels.

	IV Estimates		First Stage		
	Extended Warranty Quantity (1)	Base Good Quantity (2)	Warranty Price Reduction (3)	Extended Warranty Price (4)	Base Good Price (5)
Warranty Price Reduction (Standardized)	0.183*** (0.046)	0.564*** (0.088)			
Median Warranty Price (Standardized)	-0.416*** (0.061)	-0.345*** (0.089)			
Median Base-Good Price (Standardized)	0.252*** (0.077)	-0.373*** (0.097)			
Warranty Price Reduction ( $t - 1$ )			0.208*** (0.017)	-0.212*** (0.017)	0.024*** (0.007)
Median Suggested Warranty Price			0.534*** (0.031)	0.433*** (0.031)	0.898*** (0.082)
Median Base Good Cost			-0.005 (0.003)	0.009*** (0.003)	0.797*** (0.027)
Observations	421741	421741	421741	421741	421741
$R^2$	0.619	0.625	0.495	0.574	0.955

the distance between realized and suggested warranty prices (warranty price reductions) is increasing in the distance in the previous month, increasing in the median suggested warranty price, and unrelated to the median cost of the base good. Column 8 shows that the extended warranty price is negatively correlated with warranty price reductions in the previous month, increasing in the suggested warranty price, and increasing in the cost of the base good. The reason is that more expansive extended warranties usually come with more expensive goods.<sup>12</sup> Column 9 suggests that warranty price reductions are more common with high-priced base goods, that suggested warranty and base good prices are highly (positively) correlated, and, unsurprisingly, that base good prices and costs are highly correlated.

## 4 Price Cyclicity at the Aggregate Level.

In this section, we investigate whether the local cyclicity of extended-warranty prices fades with aggregation. As noted in our introduction, local cyclicity can disappear if regions respond differently to the same shocks on the basis of their differential economic structures. Imagine a sudden increase in oil prices. For Alberta, which is a large oil producer, an increase in its price would be a positive demand shock while for Ontario's economy mainly based on manufacturing industry, this would be a negative demand shock. Clearly, if the impact is of the same magnitude in these two regions, on aggregate, it will cancel out. In addition to asymmetric impact, the aggregate shocks can be attenuated by inter-regional factor mobility or responses by the BoC.

To investigate aggregate cyclicity, we create an extended warranty adjusted, durable goods price index and a price index without extended warranties for our retailer. Because our dataset includes only one retailer of durable goods, we also study cyclicity of the durable goods price index provided by the Bank of Canada which collects the data from

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<sup>12</sup>The correlation between base good costs and prices is close to one as demonstrated in Figure 1.

multiple retailers. Finally, we construct the all-goods CPI index where the non-durable and semi-durable goods indexes are directly taken from the Bank of Canada.

**4.1. Price Aggregation.** We construct price indices based on the data of the retailer. Our first index is given by:

$$P_t^{1*} = \frac{P_t^1}{P_0} = \frac{1}{N_{cr}} \sum_{c,r}^{N_{cr}} \left( p_{trc}^{bg} + p_{trc}^w \right)$$

where  $p_{trc}^{bg}$  and  $p_{trc}^w$  are the base-good and extended-warranty prices, and  $N_{cr}$  is the number of category-region combinations. Because this index weighs all product categories and economic regions equally, we also consider a weighted index, given by:

$$P_t^{2*} = \frac{P_t^2}{P_0} = \frac{1}{N_{cr}} \sum_{c,r}^{N_{cr}} \omega_r \left( p_{trc}^{bg} + p_{trc}^w \right)$$

where the weights  $\omega_r$  are based on the populations of the 55 economic regions in either 2000 or 2010. The base month is January of 2000,  $P_0 = 2000M1$ , for both indices. We use these indices to construct monthly year-on-year inflation rates for durable goods:

$$\pi_t^1 = \ln P_t^{1*} - \ln P_{t-12}^{1*}$$

and:

$$\pi_t^2 = \ln P_t^{2*} - \ln P_{t-12}^{2*}.$$

where  $t - 12$  indicates a lag of one year.

We also construct our own “all-goods” consumer price index, combining the durable goods data of the retailer with the semi- and non-durables series of STATSCAN. Our warranty-

adjusted goods price index in each month  $t$  is given by:

$$P_t^* = \sum_{i=1}^3 \omega_i P_t^i$$

where  $P_t^i$  is the price index for goods of type  $i$ , and the weights  $\omega_i$  are taken from STATSCAN for the year 2009.<sup>13</sup> Because we compare the cyclicity of the retailer's inflation rate to the official one used by the Bank of Canada, we remain as close as possible to their definitions and divide goods into three types  $i$ : durables, semi-durables and non-durables. The durable goods' index is then taken either from the BoC or from our retailer dataset. Since the product categories that the BoC uses to compute the price index for durable goods are different from categories of our retailer, it is impossible to match the individual product categories weights. Instead, we create a separate, representative durable goods index for our retailer and attach to it the weight that the BoC uses in the all-goods CPI.

Year-on-year inflation is computed as before:

$$\pi_t^* = \ln P_t^* - \ln P_{t-12}^*$$

Table 4 reports descriptive statistics for inflation rates which are based on the retailer's data as well as for the Bank of Canada series. The top panel of Table 4 displays statistics for durable goods inflation only and the lower panel for all goods. The adjusted measures take into account extended-warranty prices. The column indicated with retailer title includes inflation measures computed with the retailer's data but without extended warranty prices.

Both durable-goods inflation rates based on our retailer's prices are higher than the one calculated by the Bank of Canada. Given that we account for extended warranty prices, it is unsurprising that the average adjusted inflation rate is higher. It is however unclear why

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<sup>13</sup>Consumer basket weights change little from year to year, are consequently adjusted occasionally, only a few times per decade. See the STATSCAN website for details.

**Table 4: Summary Statistics of Various Inflation Measures.** The table shows the summary statistics of the year on year inflation measures. Top panel shows inflations for durable goods only and the lower panels displays figures for inflation for all goods. Adjusted inflation is computed using population weights for 55 Canadian economic regions. The weights for computation of the goods inflation are for 2009 and are taken from the Statistics Canada website. StDev indicates standard deviation and Skew skewness.

Moment	Durable Goods		
	Adjusted inflation	Unadjusted Retailer	Unadjusted BoC
Mean	0.9%	-0.3%	-1.6%
StDev	5%	6%	2%
Skew	-0.03	-0.01	-0.97
All Goods			
Mean	1.9%	1.5%	1.3%
StDev	2.3%	2.3%	1.8%
Skew	-0.34	-.64	-0.50

its unadjusted inflation rate is higher than in case of the Bank of Canada series.

The volatility of durable-goods inflation of the retailer is 2.5 times higher than the one computed by the Bank of Canada. This is as expected since we use actual transaction data.

In aggregation, we attach the weight of 13% to the durable goods prices and the impact of the higher mean and volatility of our retailer’s measures decreases. The lower panel of Table 4 shows that the adjusted inflation is still higher than the one computed by the Bank of Canada but the magnitude of volatility of both measures is similar.

**4.2. Cyclicalilty** We asses the extent of the cyclicalilty of inflation by estimating the time-series specification:

$$\pi_t^{*i} = \alpha + \beta_i u_t + \varepsilon_t$$

where  $\pi_t^{*i}$  is the year-on-year inflation rate for all goods, computed either for the retailer ( $i = 1, 2$ ) or calculated by the Bank of Canada ( $i = 3$ ).  $u_t$  is the year-on-year change in

the unemployment rate.<sup>14</sup> Negative and significant  $\beta_t$  indicates that the inflation rate is procyclical.

Table 5 shows the cyclical coefficients  $\beta_t$  for the time-series regressions of various inflation measures on the growth rate for the unemployment rate. Columns 1,2 and 3, titled 'Adjusted Inflation' refer to regressions with inflation that includes warranty prices, whereas columns 4:9 refer to the specifications which excludes them. The 'Unadjusted Inflation' columns indicate that inflation in the regression used durable goods' index computed from our retailer dataset. The column BoC indicates that all prices are based on data from the Bank of Canada.

Table 5 shows that all the three measures of inflation respond significantly to one-month lagged unemployment rate growth. In case of inflation measures unadjusted for extended warranty prices, this impact is very short-lived. The six months lag of the unemployment rate growth affects significantly only the extended warranty adjusted inflation and the long-run estimates confirm the temporary impact. The bottom panel of Table 5 indicates that cumulative cyclical coefficient of neither the inflation constructed by the Bank of Canada nor the one using transaction data of our retailer is significant. The persistent procyclicality found in the adjusted inflation must be therefore driven by extended warranty prices rather than the specificities of the retailers' data.

It is important to note that although the cyclical coefficients seem small, they result from including the price of one add-on only to one category of goods. Because in reality, we observe multiple add-ons being important for all durable goods and services, we would expect the coefficients to be much higher.

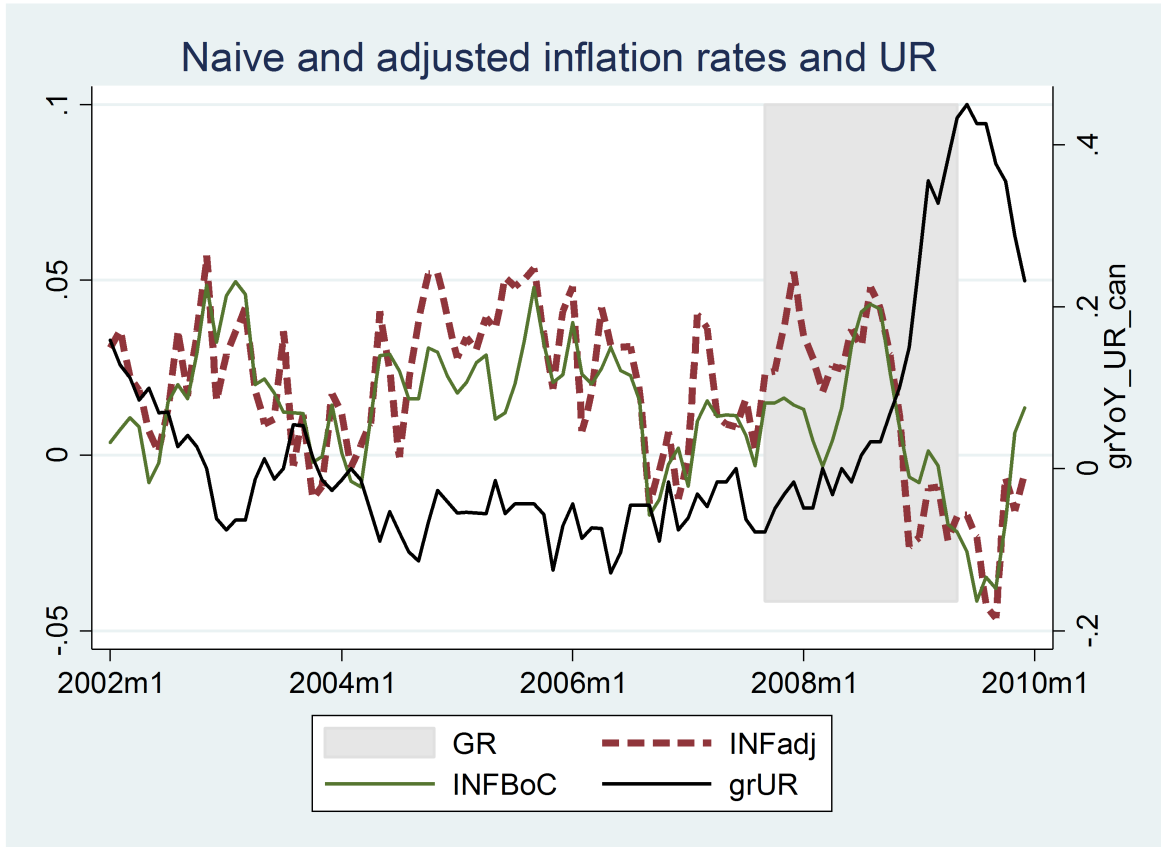
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<sup>14</sup>Note that the specification at the aggregate level is different from the one at the micro-level. Specifically, here we take the first differences of both dependent and independent variables. While there were no non-stationarity issues with the data at the micro level, once aggregated, both prices and Canadian unemployment rate series contain unit roots.



**Table 5: Cyclicalilty of Aggregate Inflation.** The table shows cyclicalilty coefficients of year-on-year inflation rate on the year-on-year unemployment rate growth. In addition to the coefficients presented in the table each regression includes one month lagged dependent variable. Standard errors are computed using Newey-West correction. Long-term effects are computed as a cumulative effects obtained from the specification with twelve lags of dependent and independent variables. For the long-run coefficients delta method is used to compute standard errors. \* \* \*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels.

	Adjusted Inflation			Unadjusted Inflation			BoC Inflation		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Growth in National Unemployment Rate at									
$t - 1$	-0.044*** (0.007)			-0.039** (0.012)			-0.023** (0.009)		
$t - 6$		-0.021* (0.009)			-0.014 (0.009)			0.004 (0.010)	
$t - 12$			-0.014 (0.015)			-0.002 (0.014)			0.015 (0.013)
Long-Run Effect									
		-0.094** (0.041)			-0.078 (0.050)			-0.034 (0.032)	
Mean of Dependent Variable									
	101	96	90	101	96	90	101	96	90
Observations									



**Figure 4: Great Recession and Adjusted and Unadjusted Inflation.** The green solid line depicts unadjusted inflation rate (INFBoc), computed from the Bank of Canada price series, which formally excludes add-on goods and services. The dotted brown line depicts an adjusted inflation rate, using the durables' price index from our retailer, and inclusive of extended-warranty prices. The black solid line depicts Canadian unemployment rate growth. All series are calculated as year-on-year changes. The left axis enumerates the inflation measures. The right axis enumerates unemployment rate growth. GR stands for Great Recession.

**4.3. Add-ons adjusted inflation and Great Recession** Figure 4 plots adjusted inflation rate (dotted line) and the Bank of Canada inflation rate (solid green line) and growth rate in Canadian unemployment rate (black line). The grey area corresponds to the Great Recession in Canada which lasted between July 2007 and June 2009.

The figure suggests that the adjusted inflation is higher than the naive one during booms, when the unemployment rate growth decreases. In contrast, during the Great Recession, the difference between two inflation rates seems negligible. We formally test if there was a change in the mean of difference between adjusted and unadjusted inflations using structural break

tests. We compute the difference between the two inflation rates:

$$d\pi_t = \pi_t^{*i} - \pi_t^{*3}, i = 1, 2$$

where  $\pi_t^{*i}$  is inflation rate computed for our retailer with either equal ( $i = 1$ ) or population weights ( $i = 2$ ), and  $\pi_t^{*3}$  is the Bank of Canada inflation rate.

**Table 6: Estimated structural breaks**

Inflation difference		Unemployment rate growth	
Mean: 2000M1-2009m12	0.6%*** (0.001)	Mean: 2000M1-2009m12	3% (0.3)
Estimated break date	2008M7	Estimated break dates	2002M12, 2008M10
Mean: 2000M1-2008M7	0.8%*** (0.002)	Mean: 2002M12-2008M10	-4%*** (0.004)
Mean: 2008M8-2009M12	-0.3% (0.003)	Mean: 2008M11-2009M12	25%*** (0.03)

The table shows results of the multiple structural break tests by Bai and Perron (1998, 2003) applied to the mean of the difference between adjusted and unadjusted inflation rates  $d\pi_t$  and the mean of the unemployment rate growth  $u_t$ .

We test for structural breaks in the difference between the inflation rates  $d\pi_t$  and in growth of unemployment rate. We implement the procedure proposed by Bai and Perron (1998, 2003). The results are reported in Table 6.

The right panel of Table 6 reports the results of structural break tests for unemployment rate growth. We find two structural breaks in the mean Canadian unemployment rate growth. The first one occurs in December 2002 and corresponds to a short-lived recession dated by the OECD. It is worth noting that the Bank of Canada does not date this period as a recession.

The second break found in the unemployment rate growth occurs in the middle of the Great Recession, in October 2008. Before the second break, the unemployment rate was actually decreasing at the annual rate of 4%. After the break, we find that the unemployment rate grew at the dramatic average rate of 25%. This is also visible in Figure 4.

The difference between adjusted and unadjusted inflation rates displays similar time-series dynamics. The left panel of Table 6 shows that we find a structural break in the mean of inflation difference in July 2008. Before that break, the adjusted inflation rate is significantly higher by 0.6% on average, than the naive inflation. This finding shows that the retailer exploited the boom and raised considerably the prices of extended warranties. After the break and during the Great Recession the difference between the two inflation measures is not significantly different from zero.

## 5 Conclusion

This paper shows inflation and unemployment rate display a much stronger relationship than previously thought, once add-on prices are accounted for. We first demonstrate this finding at the micro-level, using 10 years of transactions data from a nationwide Canadian retailer of household durable goods, and focusing on extended warranties, a service that can be added on to most any durable good. We show that local unemployment rates have strong effects on the prices of extended warranties, but have little no effect on the prices of base goods. From this evidence, we conclude that the prices of extended warranties respond strongly to changes in local economic activity while prices of the base goods do not react to these changes.

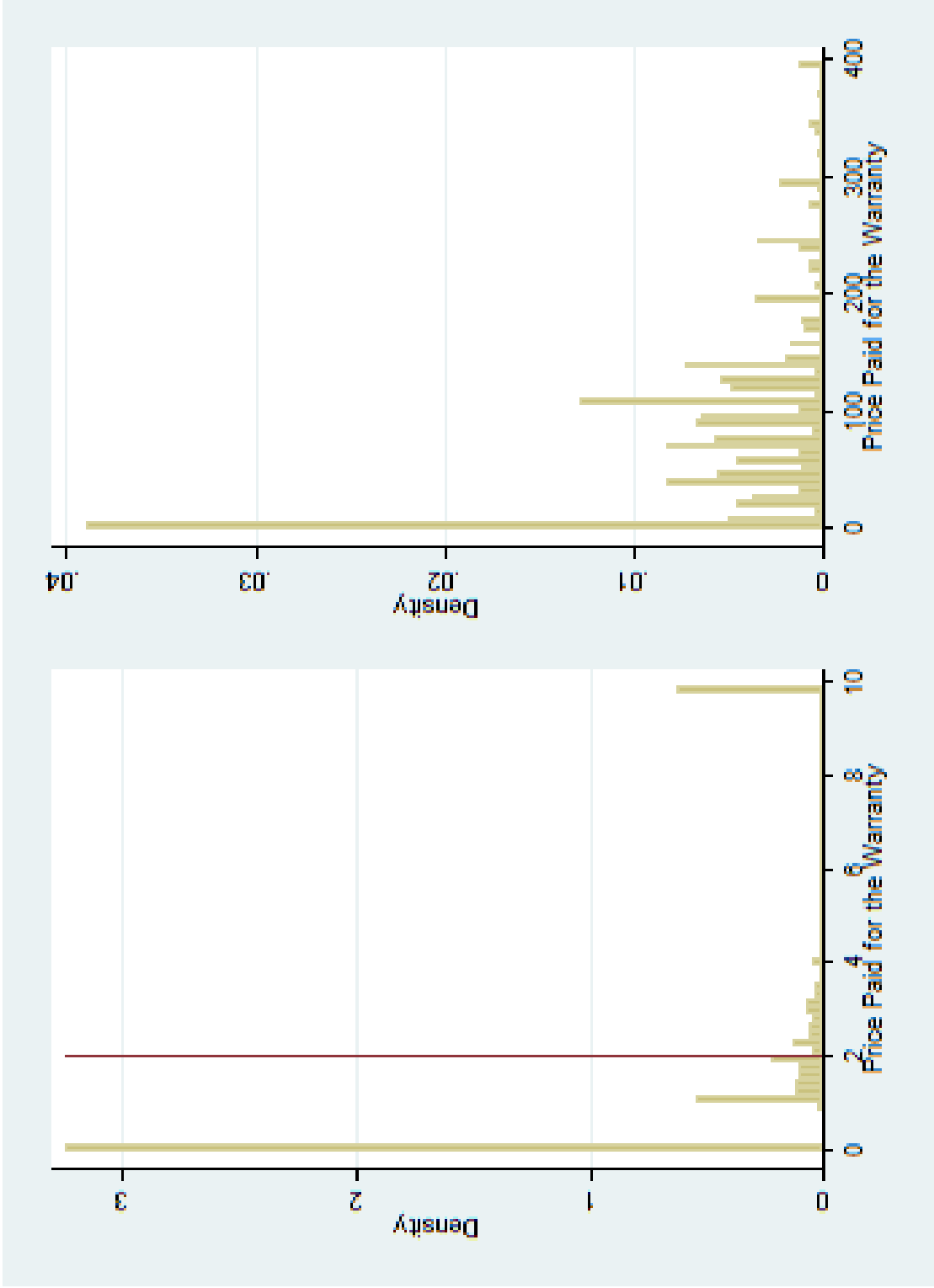
We then show that the cyclical properties of extended warranties survive aggregation. Warranties-adjusted inflation moves in tandem with Canadian unemployment rate growth while its unadjusted counterparts do not display significant business cycle fluctuations. We

investigate a natural mechanism behind the strong procyclicality of warranty prices, namely unofficial promotions and their behaviour over the business cycle. We find that the unofficial promotions increase during recessions and that they are successful in boosting sales of base goods.

## References

- [1] Bai J, and Perron P. (1998). Estimating and testing linear models with multiple structural changes. *Econometrica* 66, pp. 47–78.
- [2] Bai J, and Perron P. (2003). Computation and analysis of multiple structural change models. *Journal of Applied Econometrics* 18, pp.1–22.
- [3] Beraja M, Hurst E, Ospina J. (2018) The Aggregate Implications of Regional Business Cycles, manuscript.
- [4] Ellison G. (2005) A model of add-on pricing. *Quarterly Journal of Economics* 120, pp. 585-637.
- [5] Ellison G. and Ellison S. (2009) Search, obfuscation, and price elasticities on the internet. *Econometrica* 77, pp. 427-452.

## Appendix A.1 Additional Tables and Robustness



**Figure 5: Extended-Warranty Prices and Unofficial Promotions.** The left panel plots the histogram for prices between 0 and 10 dollars. The right panel plots the histogram for prices between 0 and 400 dollars, which is essentially the full support, less outliers. The vertical red line in the left panel defines our threshold for unofficial promotions. Our results are robust to the choice of threshold.

**Table A1: Unofficial Promotions and Sales of Extended Warranties and Base Goods.** The table reports OLS and reduced form (RF) estimates of the relationships between quantities and the endogenous and excluded instrumental variables discussed in Table A1. The unit of observation is defined by the calendar month, store, product category, and manufacturer. The variable Warranty Price Reduction equals the absolute value of the difference between the realized and suggested extended-warranty price. Standardized variables are standardized using means and standard deviations for the entire sample. Regressions include fixed effects for the month-category-manufacturer combination, fixed effects for the employment insurance region, as well as lags of the unemployment, extended-warranty quantity, and base-good quantity. Standard errors are clustered at the level of the employment insurance region and are in parentheses. \*\*\* and \*\* denote statistical significance at the 1 and 5 percent levels.

	Extended-Warranty Quantity		Base-Good Quantity	
	OLS	RF	OLS	RF
	(1)	(2)	(3)	(4)
Warranty Price Reduction (Standardized)	-0.107*** (0.015)		0.071 (0.051)	
Median Warranty Price (Standardized)	-0.206*** (0.028)		-0.066 (0.053)	
Median Base-Good Price (Standardized)	0.373*** (0.075)		-0.124 (0.092)	
Warranty Price Reduction ( $t - 1$ ) (Standardized)		0.115*** (0.021)		0.179*** (0.027)
Median Suggested Warranty Price (Standardized)		-0.042 (0.035)		0.178 (0.092)
Median Base Good Cost (Standardized)		0.138** (0.059)		-0.285*** (0.073)
Unemployment Rate ( $t - 1$ )	0.011 (0.026)	0.009 (0.026)	-0.033 (0.046)	-0.035 (0.045)
Observations	421741	421741	421741	421741
$R^2$	0.625	0.625	0.655	0.655

# THE CYCLICALITY OF ADD-ON PRICING

## **Online Appendix** (Not for Publication)

May 8, 2018



**Table OA1: Expected Markups on the Add on, by Product.** Products are defined by the retailer.  
The statistics are ordered by expected markups.

Base Good	Count	Base Good		Extended Warranty			
		Price Paid	Take Up	Price Paid	Expected Cost	Price-Cost	Expected Markup
External DR/Burner	77	215.61	0.08	29.17	0.00	29.17	1.00
WebTV Receiver	71	222.89	0.27	29.62	0.00	29.62	1.00
Copier	71	204.56	0.30	48.09	0.00	48.09	1.00
Cell Phone	2606	88.16	0.01	17.99	0.00	17.99	1.00
Modem	4	491.54	0.50	24.99	0.00	24.99	1.00
Black and White Mini-TV	2	28.00	1.00	9.99	0.00	9.99	1.00
Micro-Cassette	1288	99.64	0.11	30.94	0.00	30.94	1.00
Clock Radio	11149	24.16	0.01	20.75	0.00	20.75	1.00
Vacuum Electric Hose	112	131.37	0.01	39.99	0.00	39.99	1.00
Vacuum Powerhead	331	239.12	0.01	39.99	0.00	39.99	1.00
WebTV Keyboard	64	78.21	0.06	23.10	0.00	23.10	1.00
Icemaker	5401	118.30	0.00	19.99	0.00	19.99	1.00
Amplifier	29	122.12	0.17	35.96	0.00	35.96	1.00
Sewing Machine	1669	219.29	0.01	29.10	0.00	29.10	1.00
Hi-Fi VCR/Receiver	21	321.01	0.38	42.49	0.00	42.49	1.00
Humidifier	388	65.93	0.06	32.90	0.00	32.90	1.00
C.A.S. Equalizer	246	230.70	0.35	33.87	0.00	33.87	1.00
Garburator	686	192.10	0.08	31.51	0.00	31.51	1.00
Converter	138	319.14	0.27	39.88	0.00	39.88	1.00
Satellite Radio	1172	45.12	0.06	29.56	0.00	29.56	1.00
C.A.S. Recorder/Amp/Tuner	11	346.40	0.27	79.32	0.00	79.32	1.00
Small Appliance	1587	153.02	0.00	24.28	0.00	24.28	1.00
Headphone	3093	36.24	0.01	25.87	0.00	25.87	1.00
DVD Player/Receiver	154	599.24	0.20	43.62	0.00	43.62	1.00
Coffee Maker	453	111.36	0.01	11.49	0.00	11.49	1.00
Computer Speakers	983	18.81	0.01	31.22	0.00	31.22	1.00
N/A	303	337.49	0.39	63.41	0.00	63.41	1.00
Digital Recorder	98	183.92	0.32	25.51	0.00	25.51	1.00
Breadmaker	30	105.25	0.17	9.99	0.00	9.99	1.00
FRS Radio	1094	68.49	0.04	14.57	0.00	14.57	1.00
Equalizer	753	161.29	0.23	32.68	0.08	32.60	1.00
Cooktop Cartridge	1631	271.19	0.10	38.41	0.15	38.26	1.00
Gas Range	306	2614.89	0.67	144.37	0.63	143.74	1.00

Continued on next page

Table OA1 – continued from previous page

Base Good	Observations	Base Good		Extended Warranty			Expected Markup
		Price Paid	Take Up	Price Paid	Expected Cost	Price-Cost	
MP3/IPOD Player	31100	118.58	0.07	20.83	0.10	20.74	1.00
Colour TV, 15-17 inch	1802	146.16	0.23	29.18	0.14	29.05	1.00
Fireplace	21389	521.22	0.17	48.41	0.33	48.08	0.99
Speaker	75741	388.31	0.28	41.15	0.33	40.82	0.99
Colour TV, 14 inch or less	39484	120.68	0.18	25.36	0.22	25.14	0.99
Digital Picture Frame	2952	101.82	0.04	30.48	0.28	30.20	0.99
Colour TV, 20-21 inch	72801	209.17	0.10	29.45	0.27	29.18	0.99
Digital Satellite Receiver	85122	203.27	0.12	35.78	0.43	35.35	0.99
Colour 20 inch Monitor	48265	223.74	0.11	44.78	0.56	44.21	0.99
Black and White TV/Radio/Deck	5122	47.68	0.15	12.20	0.21	11.99	0.98
Gas Wall Oven	62	933.29	0.39	71.78	1.24	70.54	0.98
Turntable	497	157.31	0.24	31.53	0.57	30.96	0.98
Fax Machine	3286	193.26	0.22	55.18	0.99	54.19	0.98
Colour TV, 20-21 inch	31974	255.67	0.29	46.41	0.85	45.57	0.98
Scanner	8469	114.45	0.17	34.90	0.67	34.23	0.98
Sealed Speaker	7483	333.90	0.29	33.67	0.72	32.95	0.98
Bookshelf Speaker	3622	217.11	0.23	41.33	0.95	40.38	0.98
Colour TV, 21-29 inch	83789	349.09	0.13	75.35	1.78	73.57	0.98
Speaker with Amplifier	390	619.15	0.21	66.88	1.72	65.16	0.97
Compact Refrigerator	57361	210.78	0.20	30.57	0.81	29.76	0.97
Satellite Dish Antenna	8319	181.05	0.14	37.78	1.00	36.78	0.97
N/A	438	252.76	0.20	68.87	2.05	66.82	0.97
Video Projector	64	1578.27	0.48	165.05	5.05	159.99	0.97
Colour TV, 6 inch or less	582	184.69	0.07	24.33	0.78	23.55	0.97
Printer	48259	124.62	0.19	35.83	1.28	34.55	0.96
Hoodfan/Vent	33314	250.82	0.21	18.55	0.70	17.86	0.96
GPS Unit	6488	236.03	0.15	40.45	1.53	38.92	0.96
Freezer	210451	361.63	0.36	50.78	2.03	48.75	0.96
Walkman	3103	113.84	0.23	23.66	0.97	22.69	0.96
Portable Air Conditioner	11651	395.33	0.33	57.08	2.63	54.44	0.95
C.A.S. Cassette	2141	192.08	0.53	33.54	1.57	31.97	0.95
DVD Player	627496	133.09	0.19	30.45	1.50	28.96	0.95
TV/VCR Combination	29072	333.74	0.28	66.82	3.43	63.40	0.95
Digital Camera	220612	189.11	0.19	40.95	2.12	38.83	0.95
Window Air Conditioner	50773	269.59	0.29	50.93	2.71	48.23	0.95

Continued on next page

Table OA1 – continued from previous page

Base Good	Base Good			Extended Warranty			
	Observations	Price Paid	Take Up	Price Paid	Expected Cost	Price-Cost	Expected Markup
Car Stereo	3752	166.52	0.34	30.43	1.63	28.80	0.95
Cassette Deck	6064	223.33	0.48	35.89	1.96	33.94	0.95
LCD TV	496076	1079.36	0.38	176.37	9.96	166.41	0.94
Digital Camcorder	13025	440.22	0.38	62.08	3.58	58.49	0.94
CD Player	27007	199.41	0.42	33.44	2.03	31.41	0.94
Barbeque	54983	243.47	0.27	25.85	1.57	24.28	0.94
Coin-Op Dryer	737	620.18	0.12	55.75	3.42	52.33	0.94
Telephone	29568	119.84	0.19	26.21	1.73	24.48	0.93
SubWoofers	1936	265.62	0.29	35.14	2.33	32.81	0.93
DVD/VCR Combination	73826	166.25	0.29	29.03	2.00	27.04	0.93
Vacuum Cleaner	81216	218.63	0.19	36.58	2.54	34.04	0.93
Wine Cooler	5790	271.73	0.24	30.80	2.26	28.54	0.93
Steam Cleaner	3824	249.43	0.34	35.81	2.66	33.15	0.93
Coin-Op Washer	887	760.21	0.11	86.19	6.65	79.54	0.92
Dehumidifier	1819	203.71	0.24	31.26	2.48	28.79	0.92
VCR	133897	135.71	0.30	29.16	2.43	26.72	0.92
Printer/Fax/Copier	97	227.14	0.39	43.48	3.68	39.80	0.92
Portable CD Player	26126	103.67	0.21	23.88	2.02	21.86	0.92
Home Theater Receiver/Speaker	255000	446.46	0.31	55.79	4.73	51.05	0.92
Receiver	53860	387.55	0.48	39.06	3.52	35.54	0.91
Colour 21-29 inch Monitor	198087	463.94	0.39	80.18	7.79	72.38	0.90
Portable Stereo	31414	105.33	0.24	25.22	2.60	22.62	0.90
TV/DVD/VCR Combination	30197	412.60	0.28	72.82	7.69	65.14	0.89
Wringer Washer	100	467.11	0.36	80.26	10.12	70.14	0.87
LCD Monitor	5709	459.74	0.36	25.34	3.33	22.00	0.87
Plasma TV	128752	1505.09	0.44	206.44	28.81	177.63	0.86
Microwave Oven	329525	207.42	0.23	34.06	5.00	29.06	0.85
Music System	31779	432.98	0.39	53.22	8.34	44.88	0.84
Camcorder	83382	681.87	0.57	81.70	13.63	68.07	0.83
Compact Washer	524	667.64	0.52	78.43	13.54	64.89	0.83
Compact Audio System	54086	229.16	0.40	39.39	6.99	32.40	0.82
Trash Compactor	610	450.17	0.30	41.53	9.05	32.48	0.78
Front Load Washer	192379	960.10	0.63	140.75	33.80	106.95	0.76
Palm Organizer	836	297.93	0.19	44.53	12.25	32.28	0.72
Answering Machine	457	97.67	0.22	22.41	6.41	16.00	0.71

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Base Good	Observations	Base Good		Extended Warranty			
		Price Paid	Take Up	Price Paid	Expected Cost	Price-Cost	Expected Markup
Portable Dishwasher	20590	500.76	0.48	81.74	23.85	57.89	0.71
Colour TV, 30-37 inch	143536	1014.22	0.55	120.33	35.43	84.90	0.71
Mini CD Recorder	472	284.38	0.46	52.21	15.55	36.66	0.70
Gas Cooktop	3778	1054.40	0.46	60.33	17.97	42.36	0.70
Notebook	8147	1295.25	0.30	220.84	74.28	146.56	0.66
C.A.S. CD Player	1136	331.11	0.60	42.76	15.34	27.42	0.64
Electric Dryer	475560	516.52	0.49	37.29	13.41	23.88	0.64
Electric Cooktop	8492	664.13	0.44	54.87	20.34	34.53	0.63
Hard Drive CPU	31883	1041.07	0.58	158.70	62.64	96.05	0.61
Stack Washer/Dryer	21352	1050.77	0.41	130.81	55.09	75.73	0.58
Computer/CPU	18443	1188.18	0.60	174.86	77.32	97.54	0.56
Cooktop-Downdraft	1576	1031.78	0.51	74.24	33.29	40.96	0.55
Gas Dryer	15920	649.66	0.54	45.10	22.48	22.62	0.50
Automatic Washer	370333	611.27	0.49	107.27	57.07	50.19	0.47
Electric Range	412605	808.25	0.46	71.98	38.61	33.37	0.46
Built-in Dishwasher	331419	555.79	0.43	70.31	37.86	32.45	0.46
Refrigerator	579798	1000.48	0.49	80.69	45.86	34.83	0.43
Cooktop-Solid Element	817	989.68	0.62	61.28	35.82	25.46	0.42
Colour Monitor	40023	338.98	0.52	4.67	2.91	1.76	0.38
Range-Mod/Downdraft	2042	2067.16	0.65	88.13	61.73	26.39	0.30
Projection Colour TV	259836	2140.08	0.64	212.79	151.51	61.28	0.29
LCD Projector	477	1953.86	0.44	183.32	137.36	45.96	0.25
Digital Colour TV	274	1015.03	0.68	121.65	97.22	24.43	0.20
Colour TV, 40-42 inch	204	4336.01	0.56	353.78	290.05	63.73	0.18
Electric Wall Oven	12674	1393.49	0.58	73.62	61.15	12.47	0.17
Compact Dryer	6775	685.97	0.59	29.27	27.00	2.27	0.08
DLP Projection TV	11978	2136.66	0.68	209.49	200.87	8.62	0.04
Range-Solid Element	31955	1291.44	0.58	73.14	79.13	-5.99	-0.08
Wall Oven/Microwave	498	3541.03	0.77	90.78	270.16	-179.39	-1.98
Video Player Only	3	48.67	0.00	.	0.00	.	.
Espresso Maker	102	73.98	0.00	.	0.00	.	.
Microphone	3	154.50	0.00	.	0.00	.	.
Warming Drawer	21	795.09	0.00	.	0.00	.	.
Range-Modular	3	1650.99	0.00	.	0.00	.	.
Vacuum Accessory	27	67.08	0.00	.	0.00	.	.

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**Table OA1 – continued from previous page**

Base Good	Observations	Base Good		Extended Warranty			
		Price Paid	Take Up	Price Paid	Expected Cost	Price-Cost	Expected Markup
Video Printer	38	192.14	0.00	.	0.00	.	.
20-29 inch TV for Hotel	16	436.60	0.00	.	0.00	.	.
Black and White TV with Radio	26	40.46	0.00	.	0.00	.	.