Online Appendix of "Product Turnover and the Cost of Living Index: Quality vs. Fashion Effects"

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1 Other Stylized Facts

Further Evidence of Stylized Fact 2

In the main analysis, we linked products at the 3-digit product category. However, we recognize that products can vary massively in their quality even within the same 3-digit product category. We therefore check the robustness of our result by linking products only if the successor product appeared in the market one month after the predecessor product exited from the market and if these predecessor and successor products were produced *by the same manufacturer*. However, we allow predecessor and successor products to belong to different 3-digit product categories in order to ensure a sufficient number of observations. Figure 1 shows developments in prices and quantities at product turnover, which is very similar to that we reported in Figure 6 in the main paper.

Stylized Fact 4:
The turnover rate is procyclical, as in the United States.

We investigate the relationship between product turnover rates and business cycles. Broda and Weinstein (2010) examine the cyclicality of creation and destruction rates at the product category level by regressing them with the growth rate of consumption in each product group. They find that net creation is procyclical. We apply their method by using the growth rate of sales, instead of consumption, at the 3-digit product category level.

Table 1 shows the estimation result. Coefficients are all significant at the one percent level, suggesting that net creation is procyclical, while creation is strongly procyclical and destruction is countercyclical. This result is consistent with that reported by Broda and Weinstein (2010).

Stylized Fact 5:
The fraction of products whose price declined over their life span increased as deflation became more ingrained.

We compare the prices of each product between two points in time: when it enters and when it exits the market. Figure 2 shows developments during our observation period in the fractions of products that experienced a price increase ($dp > 0$ in the graph), a price decrease ($dp < 0$), or no price change ($dp = 0$). The horizontal axis represents the year

in which products exited. For example, the values for 2000 are for products that were destroyed in 2000 and created before (or in) 2000.

The figure shows that even in the period of inflation in the early 1990s, many products experienced a price decline over their life span. The early 1990s were a period when the overall CPI inflation rate was still relatively high at around 3 percent. In this period, the fraction of products experiencing a price decline or increase was very similar at around 20 percent.

However, from around the early 1990s, the fraction of products that experienced a price decline started to increase, while that of products that experienced an increase started to decline, so that the former began to exceed the latter. While the latter settled down at about 15 percent from 1995 onward, the fraction of products whose price declined continued to rise until the 2000s and since then has been in the range of 30 percent. Developments in the latter fraction closely mirror developments in the aggregate CPI: CPI inflation fell below 1 percent in 1994 and turned negative in 2000. Meanwhile, the fraction of products whose price at exit was unchanged from the price at entry gradually declined from about 70 percent to 50 percent over the roughly two decades.

Next, we look at the size of price changes over products' lives. Figure 3 shows the probability density function (PDF) of price changes over products' lives. The horizontal axis represents the size of the price change from entry to exit in logarithm. A positive value indicates that a product experienced a price increase over its life span and vice versa.

There is a sharp peak at zero, indicating that for a large number products the price at exit is the same as it was at entry. Of course, this does not necessarily mean that the prices of such products remained unchanged throughout their lives. However, it is unlikely that the prices of all these products experience a large number of revisions and then happen to revert to their original level. From this perspective, the observed pattern implies strong price stickiness. In fact, this result is in line with Nakamura and Steinsson's (2011) finding that 40 percent of products do not experience a single price change during their life span.

Taking a closer look, we further find that the PDF is asymmetric. The left tail of the PDF is much thicker than the right tail, suggesting that many products end their lives at a lower price. The second highest mode is observed at $\log(0.5) = -0.69$, indicating

that over their life span the price of many products falls to half of their initial price, which partly reflects stock clearance sales.[1]

Stylized Fact 6:
The size of price changes over products' lives is independent of their life span. The speed of price decline over products' lives is higher the shorter their life span.

To examine whether products' life span affects their price, we calculate the correlation between a product's life span and the following two variables that are associated with the price change over a product's life. The first variable is the price change over the product's life, while the second variable is the first variable divided by a product's life span, which indicates the monthly speed of price change over the product's life.

Figure 4 presents developments in the correlation over time. Specifically, the line with circles shows the correlation between the life span and the price change over the product's life, while the line with triangles shows the correlation between the life span and the monthly speed of price change over the product's life. The horizontal axis represents the year when a product exited the market.

In the figure, the line with circles is not significantly different from zero, suggesting that how much the price of a product changes over its life is independent of its life span. By contrast, the line with triangles is significantly negative, that is, the speed of price change over a product's life is negatively correlated with its life span. This suggests that products with a shorter life span tend to experience a faster price decline over their life.

This creates heterogeneous inflation developments across products with different life spans. To illustrate this, Figure 5 plots developments in price changes for products categorized in terms of their life span. We find that the shortest-lived products with a life span of 16 to 31 months experience the highest speed of price decline. What is more, the speed of price decline of such products accelerated during the 1990s, exceeding 5 percent from the second half of the decade onward. On the other hand, the speed of price decline of longer-lived products has been milder and more stable. As a result, the

[1]We also find that the size of price declines increased as deflation became more entrenched, as indicated by the fact that for 2005 the left tail is thicker than for 1995. Thus, taken together the results indicate that more products experienced a price decline and that the size of the price decline over products' life span increased.

difference in the speed of price decline between short- and long-lived products increased under deflation. Together with the steady increase in the exit rate, this result suggests that deflation at the aggregate level may have accelerated due to the increase in short-lived products in the late 1990s and early 2000s.

2 The COLI

The inflation rate for the matched sample corresponds to the second term of equation (7) for the common set of $I_{t-\tau-1} \cap I_{t-1} \cap I_t$. Even for this common set, observations are sometimes missing when no product is sold in a month, that is, $s_i(t) = 0$. We exclude such cases because we cannot apply the Sato–Vartia method to calculate the inflation rate for the matched sample.

In the main part of the paper, we did not show the figure of the COLI based on Redding and Weinstein (2016) and the price based on the 12-month matched sample, although we provided their means and standard deviations in Table 4. Figure 6 shows the annual change in their price index over time.

3 Quality and Fashion Effects

Table 2 shows how the estimated quality and fashion effects change when we change the duration of the fashion effect, τ. We calculate the cross-section (3-digit product category) median of quality and fashion effects for each month and then take its time-series mean and standard deviation (shown in parenthesis in the table).

The table shows, first, that the rate of change in quality, $b_i/b_{i'}$, is around 1.5 and increases with τ, while the standard deviation also increases with τ. Because we limit products' life span to τ or longer when estimating the rate of change in quality, if such products have greater quality improvement compared to their predecessors, it is not surprising to have this relationship between $b_i/b_{i'}$ and τ.

Second, the fashion effect, $\phi_i(0)$, is around 2.5, which is almost unchanged for $\tau \geq 4$. This result is consistent with our previous finding that the COLI is almost unchanged for $\tau \geq 4$. When $\tau = 1$, the fashion effect decreases to 1.8 but is still above one.

Table 3 provides the full list of creation and destruction rates as well as the estimated quality and fashion effects for each 3-digit product category. It is shown in the descending

order with respect to the creation rate. The 3-digit product of "chocolate," which embeds "Kit Kat" shown in Figure 3 in the main paper, has the second highest creation rate. It also has a relatively high fashion effect, $\phi_i(0) = 6.9$. The 3-digit product of "electric storage media" has relatively high rates of not only creation but also change in quality, which is 14.16. On the other hand, "salt" has a relatively low rate of creation as well as change in quality, which is less than one.

Table 1: Cyclicality at the 3-digit Product Category Level

	Net creation	Creation	Destruction
Sales growth	0.427***	0.285***	-0.142***
(Standard errors)	(0.008)	(0.007)	(0.007)
Observations	4968	4968	4968
3-digit codes	207	207	207
R^2	0.383	0.259	0.074

Note: *** represents significance at the 1 percent level.

Table 2: Quality and Fashion Effects for Different τ

τ	$b_i/b_{i'}$	$\phi_i(0)$
1	1.406 (0.336)	1.761 (0.088)
4	1.451 (0.463)	2.305 (0.324)
7	1.488 (0.551)	2.525 (0.390)
14	1.655 (1.073)	2.356 (0.307)

Note: Standard deviation in parentheses.

Table 3: Full List of Creation and Destruction Rates and Quality and Fashion Effects at the 3-digit Product Category Level

3-digit product	Creation rate	Destruction rate	Sales share	$b_i/b_{i'}$	$\phi_i(0)$
Steamed bread and pastry	0.741	0.712	0.020	0.945	2.677
Assortments of sweets	0.712	0.724	0.001	0.229	2.934
Chocolate	0.712	0.702	0.014	1.144	6.939
Gift certificates, gift sets	0.687	0.632	0.024	0.115	3.426
Delicatessen, lunch boxes	0.682	0.666	0.016	0.981	1.599
Chilled cake	0.678	0.651	0.004	0.976	2.257
Painting supplies	0.667	0.601	0.000	-	-
Wine	0.655	0.540	0.004	1.688	3.644
Fragrances	0.642	0.604	0.001	8.802	5.936
Instant cup noodles	0.617	0.600	0.011	1.060	2.932
Japanese-style confectionery	0.601	0.614	0.010	0.953	2.646
Confectionery with toys	0.585	0.599	0.003	1.208	18.149
Writing utensils	0.576	0.556	0.003	1.044	4.174
Leisure food products	0.575	0.548	0.002	2.794	4.674
Baked western confectionery	0.574	0.566	0.009	1.246	3.982
Dessert cake	0.571	0.581	0.007	0.830	3.629
Instant cup raw noodles	0.566	0.570	0.000	1.469	2.971
Consumable houseware gift sets	0.565	0.535	0.002	0.890	3.681
Candy, candy confections	0.563	0.562	0.007	1.462	3.255
Cocktail drinks	0.555	0.446	0.004	1.095	2.588
Tea beverages	0.548	0.521	0.002	1.609	2.333
Fruit juice beverages	0.547	0.538	0.006	1.560	3.207
Prepared bread meals	0.545	0.534	0.002	0.891	1.478
Special dietary requirement food	0.545	0.411	0.000	-	-
Snack foods	0.541	0.529	0.009	1.384	2.953
Nutrition supplement foods	0.529	0.490	0.003	9.416	3.662
Shampoo	0.524	0.520	0.009	2.759	2.865
Chilled dessert	0.524	0.547	0.007	2.189	2.399
Herbal tea beverages	0.511	0.459	0.003	1.805	2.009
Ice cream	0.505	0.498	0.012	0.999	3.782
Cosmetics for women	0.498	0.493	0.021	2.963	6.720
Washing and drying equipment	0.495	0.508	0.001	1.441	2.157
Processed seafood	0.493	0.467	0.007	1.030	2.438
Japanese traditional treats	0.492	0.499	0.004	1.084	2.932
Green tea beverages	0.490	0.409	0.004	1.248	2.268
Office paperwork organization supplies	0.481	0.488	0.001	0.430	3.954
Meat products	0.475	0.434	0.010	1.616	2.652
Fried fish paste products	0.475	0.489	0.005	0.762	2.031
Electronic storage media	0.473	0.442	0.002	14.156	2.618
Toilet and bath products	0.473	0.534	0.001	4.091	2.934
Carbonated beverages	0.463	0.467	0.009	3.272	2.989
Cocoa and chocolate beverages	0.458	0.479	0.000	-	-
Frozen staple foods	0.458	0.453	0.005	1.311	2.330
Bottled meat	0.456	0.299	0.000	-	-
Sink accessories	0.456	0.514	0.000	0.619	2.008

Table 3: Full List of Creation and Destruction Rates and Quality and Fashion Effects at the 3-digit Product Category Level

3-digit product	Creation rate	Destruction rate	Sales share	$b_i/b_{i'}$	$\phi_i(0)$
Premium ice cream	0.448	0.426	0.003	1.057	3.303
Bath salts	0.442	0.418	0.002	1.500	5.333
Coffee beverages	0.426	0.416	0.005	1.316	2.641
Whiskey, brandy (liquors)	0.419	0.403	0.003	2.207	2.639
Cosmetic accessories	0.415	0.407	0.004	2.523	4.851
Simmered soy beans and sweetened mash	0.413	0.399	0.003	0.440	1.772
Food containers	0.412	0.398	0.000	-	-
Disposable diapers	0.412	0.420	0.007	0.875	1.946
Rice crackers	0.411	0.421	0.009	0.906	2.032
Diluted beverages	0.411	0.375	0.001	5.273	7.642
Meat delicacies	0.410	0.379	0.000	0.855	1.555
Stationery and paper products	0.408	0.408	0.001	1.171	3.390
Bread (croissant, baguette, muffin, etc.)	0.405	0.418	0.006	0.789	1.501
Dried fruit	0.404	0.386	0.001	0.762	2.100
Soap	0.404	0.375	0.006	3.343	2.958
Barley tea beverages	0.402	0.328	0.001	-	-
Office automation supplies	0.398	0.287	0.002	6.496	2.403
Marine delicacies	0.395	0.421	0.003	0.916	1.710
Yogurt	0.395	0.366	0.017	1.268	2.009
Etiquette products	0.389	0.378	0.002	0.573	5.067
Instant soup cups	0.387	0.300	0.000	0.794	2.635
Sports drinks, isotonic drinks	0.386	0.314	0.005	0.712	2.221
Low-malt beer	0.383	0.359	0.024	0.922	2.230
100% fruit juice beverages	0.383	0.355	0.005	2.066	1.988
Toilet cleaning supplies	0.383	0.399	0.000	0.432	2.606
Nuts	0.382	0.384	0.002	1.309	1.603
Cereal grains	0.381	0.329	0.037	1.382	1.350
Chilled semi-finished products	0.378	0.396	0.017	1.070	3.108
Bean snacks	0.374	0.366	0.002	0.627	1.741
Nutrition support drinks	0.369	0.344	0.005	8.539	3.111
Instant foods	0.368	0.307	0.004	0.535	3.667
Tsukudani (small seafood)	0.367	0.356	0.004	1.282	1.865
Deodorant, odor neutralizer, disinfectant	0.366	0.336	0.003	2.293	4.123
Frozen meals	0.364	0.350	0.027	1.153	2.517
Basic skin care for women	0.363	0.323	0.028	8.604	3.958
Portable sanitary sets	0.361	0.409	0.000	1.756	2.569
Dog food	0.361	0.336	0.003	3.001	2.363
Pickled vegetables	0.358	0.369	0.022	1.215	1.717
Canned side dishes	0.358	0.369	0.000	0.454	1.245
Low alcohol drinks	0.354	0.360	0.000	-	-
Vegetable juice	0.354	0.322	0.005	4.452	1.870
Japanese sake	0.348	0.264	0.006	2.423	2.287
Rice cakes	0.344	0.389	0.004	0.495	1.895
Beer	0.343	0.312	0.013	3.538	3.763
Sanitary feminine products	0.343	0.366	0.006	0.807	2.034
Batteries	0.341	0.277	0.002	3.248	1.934

Table 3: Full List of Creation and Destruction Rates and Quality and Fashion Effects at the 3-digit Product Category Level

3-digit product	Creation rate	Destruction rate	Sales share	$b_i/b_{i'}$	$\phi_i(0)$
Liqueur	0.340	0.308	0.001	0.246	2.531
Mops	0.340	0.423	0.000	0.123	2.591
Water	0.339	0.234	0.003	0.545	1.594
Lactic acid bacteria beverages	0.334	0.329	0.005	0.813	2.025
Cereals	0.334	0.322	0.002	2.703	1.765
Ham, bacon	0.334	0.359	0.013	1.197	1.742
Egg products	0.330	0.354	0.003	0.969	1.854
Fresh noodles, boiled noodles	0.328	0.344	0.016	0.971	2.306
Sausages	0.324	0.349	0.016	1.343	1.968
Laundry detergent	0.321	0.282	0.010	1.283	2.064
Women's hair care products	0.319	0.295	0.006	3.537	3.119
Cat food	0.316	0.308	0.003	2.110	1.821
Paper products for daily use	0.315	0.317	0.010	1.632	2.514
Natural cheese	0.315	0.284	0.004	0.457	2.429
Chewing gum	0.314	0.289	0.004	3.995	2.770
Toothbrushes	0.313	0.312	0.003	5.430	2.748
Regular coffee	0.308	0.331	0.003	1.280	2.543
Pet sanitary products	0.306	0.298	0.001	1.314	2.241
Insecticides, rodenticides	0.303	0.326	0.002	1.359	3.359
Cake and bread ingredients	0.301	0.286	0.001	1.923	2.714
Chikuwa (tube-like food product made from fish)	0.300	0.349	0.004	0.441	1.727
Flour mixes	0.299	0.275	0.001	0.689	3.992
Care, hygiene products	0.298	0.264	0.001	8.674	2.702
Hanging hooks	0.296	0.307	0.000	4.249	2.532
Milk beverages	0.295	0.275	0.007	1.420	1.463
Instant seasoning for rice dishes	0.291	0.286	0.003	1.350	2.844
Toothpaste	0.291	0.248	0.003	3.870	2.602
Household cleaner	0.291	0.240	0.003	1.706	2.833
Mouth freshener	0.290	0.251	0.000	2.074	2.623
Kamaboko (fish cake)	0.290	0.345	0.006	0.636	1.877
Maternity, baby food	0.285	0.220	0.002	1.474	2.264
iackaged instant noodles	0.283	0.288	0.006	0.943	2.474
Kitchen detergent	0.280	0.277	0.003	1.966	2.429
Home medical supplies	0.279	0.243	0.002	3.519	4.191
Dessert mixes	0.275	0.267	0.000	7.516	11.134
Cocoa, milk for drink mixes	0.271	0.251	0.001	5.843	6.529
Dried vegetable products	0.271	0.308	0.003	0.695	1.955
Ochazuke, furikake seasoning	0.270	0.260	0.004	1.448	2.200
Instant soup	0.268	0.251	0.004	1.531	2.811
Tea	0.266	0.262	0.002	2.086	2.621
De-humidifier	0.265	0.259	0.000	0.873	1.328
Sausages stuffed with fish paste products	0.263	0.265	0.002	0.741	1.721
Jam	0.263	0.282	0.002	0.800	1.912
Pasta sauce	0.259	0.237	0.003	1.241	2.075
Dried marine products	0.253	0.270	0.007	1.252	1.641
Oolong tea beverages	0.253	0.243	0.003	1.484	1.687

Table 3: Full List of Creation and Destruction Rates and Quality and Fashion Effects at the 3-digit Product Category Level

3-digit product	Creation rate	Destruction rate	Sales share	$b_i/b_{i'}$	$\phi_i(0)$
Cosmetics for men	0.253	0.224	0.001	0.744	2.747
Home cleaning products	0.252	0.259	0.002	2.144	2.718
Natto (fermented soybeans)	0.249	0.257	0.008	2.082	1.364
Honey, syrup	0.249	0.236	0.001	1.677	1.837
Instant miso soup, Japanese style soup	0.247	0.213	0.002	1.631	1.648
Canned meat	0.247	0.230	0.000	0.783	1.368
Shochu	0.247	0.116	0.006	1.426	2.305
Boiled fish paste products	0.245	0.264	0.003	0.590	2.810
Salad dressing	0.243	0.205	0.004	1.803	2.592
Instant coffee	0.243	0.240	0.007	0.929	3.238
Processed cheese	0.242	0.218	0.006	0.980	1.843
Dried noodles	0.241	0.254	0.003	1.800	3.032
Bread loafs	0.238	0.243	0.012	0.829	1.290
Disposable tableware	0.238	0.252	0.001	1.319	2.385
Kitchen sink accessories	0.237	0.228	0.003	1.742	1.967
Oolong tea, herbal tea	0.235	0.283	0.001	0.720	3.054
Curry	0.231	0.220	0.007	1.131	3.005
Pet food (except for dogs and cats)	0.230	0.230	0.000	3.379	1.675
Baby food products	0.229	0.309	0.000	0.886	4.464
Miscellaneous liquors	0.229	0.252	0.000	-	-
Cooking, kitchen supplies	0.227	0.230	0.007	1.461	2.368
Bottled seafood	0.224	0.258	0.001	1.385	2.060
Dried pasta	0.223	0.197	0.002	0.933	2.305
Packaged instant raw noodles	0.218	0.236	0.001	0.695	5.309
Daily use stationery	0.217	0.236	0.001	1.584	2.814
Canned seafood	0.212	0.262	0.005	0.440	2.342
Tofu, soy products	0.211	0.196	0.019	1.094	1.234
Mothballs	0.208	0.248	0.002	3.178	2.233
Konjac (amorphophallus konjac)	0.208	0.233	0.005	0.486	1.719
Barley tea	0.203	0.234	0.001	-	-
Tomato flavored seasonings	0.202	0.147	0.002	0.646	1.717
Canned fruit	0.201	0.311	0.001	0.810	2.193
Men's hair care products	0.194	0.186	0.002	1.920	3.294
Green tea	0.190	0.210	0.005	1.195	1.854
Mixed seasonings, spices and condiments	0.189	0.173	0.001	0.680	1.764
Miscellaneous goods	0.182	0.158	0.001	1.681	2.730
Canned agricultural product	0.182	0.226	0.001	0.478	1.463
Fresh eggs	0.182	0.085	0.014	0.337	1.041
Soy milk	0.180	0.156	0.001	0.837	2.183
Instant seasoning for cooking	0.177	0.161	0.004	0.749	2.626
Spirits	0.177	0.164	0.000	-	-
Bottled agriculture product	0.176	0.171	0.001	1.897	2.809
Spreads	0.176	0.180	0.001	1.684	2.102
Birth control supplies	0.175	0.206	0.000	5.325	4.421
Margarine, fat spread	0.174	0.147	0.002	1.072	1.050
Butter	0.171	0.174	0.002	-	-

Table 3: Full List of Creation and Destruction Rates and Quality and Fashion Effects at the 3-digit Product Category Level

3-digit product	Creation rate	Destruction rate	Sales share	$b_i/b_{i'}$	$\phi_i(0)$
Cooking base	0.168	0.150	0.006	1.380	3.861
Cooking oil	0.166	0.196	0.006	3.433	1.785
Denture care products	0.165	0.079	0.000	0.156	3.013
Seaweed	0.165	0.203	0.004	1.788	1.644
Stew, hashed beef	0.164	0.148	0.002	0.764	2.316
Razors	0.159	0.145	0.001	1.711	2.235
Sesame seeds	0.155	0.124	0.001	9.573	0.954
Dried beans	0.153	0.203	0.001	3.179	1.324
Seasoning sauce	0.151	0.154	0.005	1.688	2.743
Canned desserts	0.148	0.172	0.000	2.165	1.968
Chilled condiments	0.135	0.131	0.001	1.239	1.981
Milk	0.134	0.134	0.024	0.434	0.993
Alcohol-related beverages	0.123	0.116	0.000	-	-
Spices	0.118	0.111	0.004	1.464	2.297
Miso paste (soybean paste)	0.117	0.140	0.005	1.909	1.797
Vinegar, vinegar-related seasonings	0.117	0.096	0.002	0.414	3.906
Non-fat powdered milk, powdered cream	0.116	0.144	0.003	0.474	1.633
Flour, dry mixtures	0.115	0.140	0.003	2.609	1.599
Tobacco, smoking accessories	0.113	0.076	0.011	67.137	1.893
Mirin, cooking sake	0.107	0.114	0.002	6.083	1.321
Instant bouillon	0.103	0.119	0.004	1.187	1.849
Chinese liquor	0.101	0.142	0.000	-	-
Soy sauce	0.097	0.082	0.004	0.944	1.612
Mayonnaise	0.093	0.074	0.003	-	-
Fresh cream	0.093	0.123	0.001	-	-
Sugar, sweeteners	0.092	0.107	0.004	1.747	1.649
Umami seasonings (flavor enhancer)	0.088	0.033	0.001	-	-
Table sauces (okonomiyaki, tonkatsu)	0.080	0.098	0.002	4.981	2.015
Ice	0.070	0.054	0.001	-	-
Salt	0.067	0.082	0.001	0.636	1.636
Koji (rice malt)	0.064	0.114	0.000	-	-

Note: It is difficult to calculate the quality and fashion effects especially, $b_i/b_{i'}$ and $\phi_i(0)$, if the number of products in a category is small or the entry/exit rate is low. We report their median values if there are over 20 month observations from 1988 to 2013.

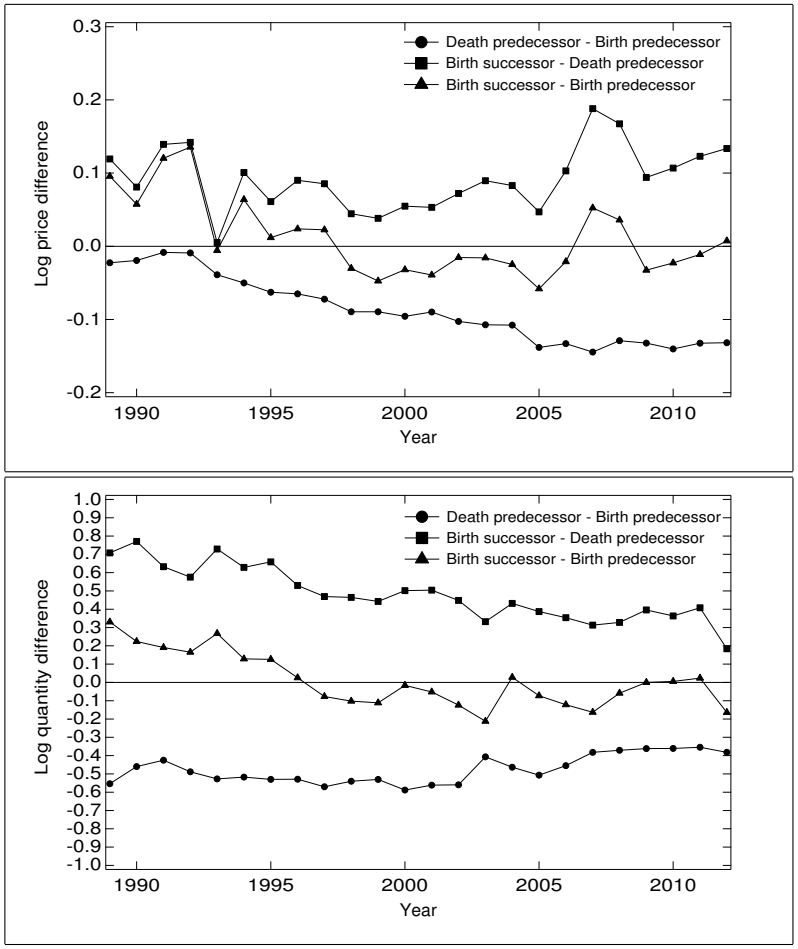

Figure 1: Price and Quantity Changes over the Product Cycle for the Products Produced by the Same Manufacturer

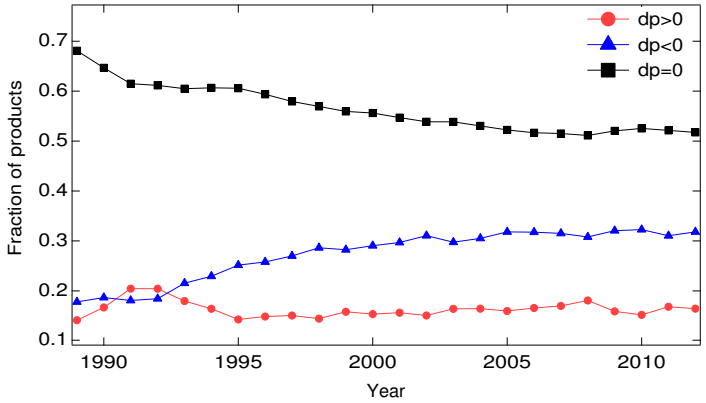

Figure 2: Fractions of Products whose Price Increases, Decreases, or Does Not Change Over their Life Span

The horizontal axis represents a year when the product was discontinued.

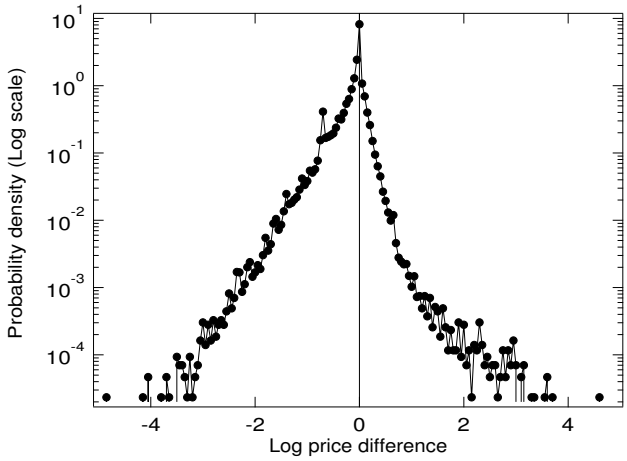

Figure 3: Probability Density Function of Price Changes over Product Life

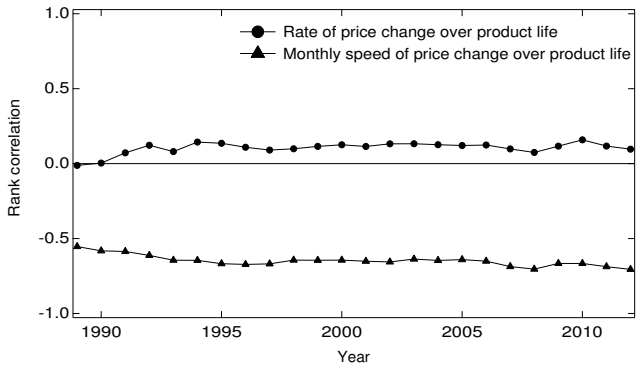

Figure 4: Correlation between the Life Span and the Rate of Price Change over Product Life

Note: The line with circles represents the correlation between the life span and the price change over the product's life in each year. The line with triangles represents the correlation between the life span and the monthly speed of price change over the product's life in each year. The horizontal axis represents a year when the product was discontinued.

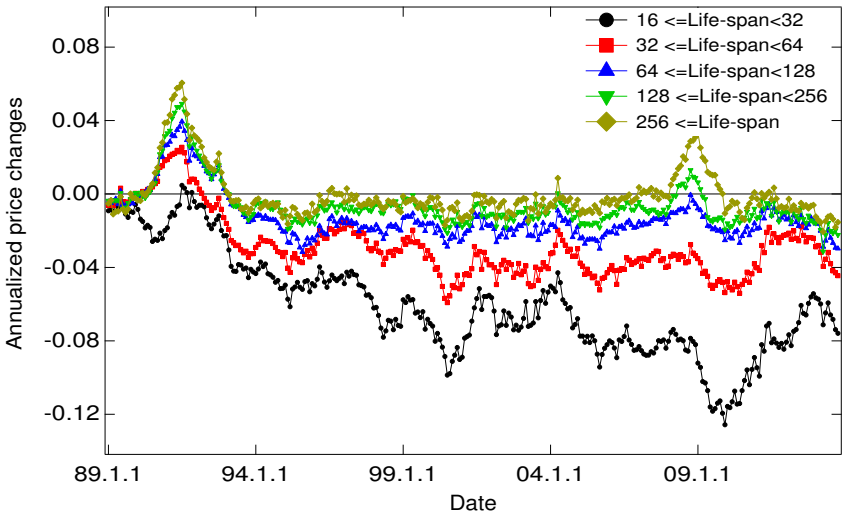

Figure 5: Annual Price Changes by Life Span

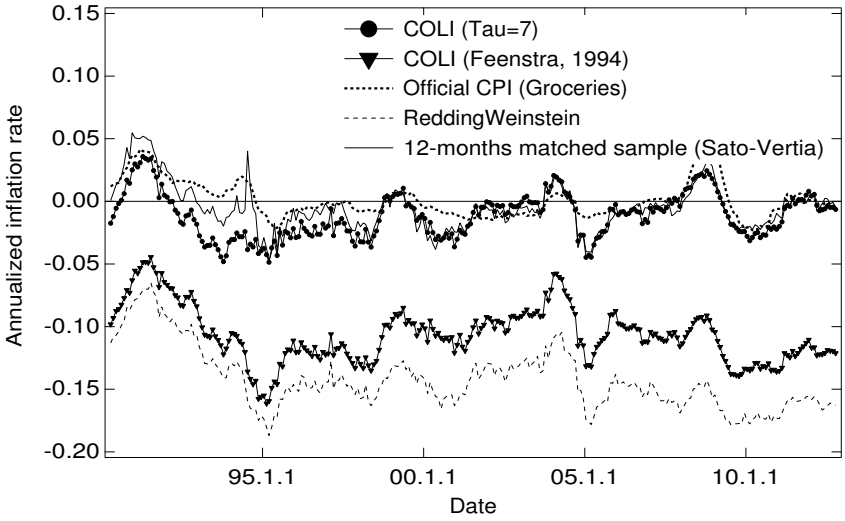

Figure 6: Inflation Estimates Based on Different Indexes