Seller Heterogeneity and Prices

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Abstract

The existence of price dispersion is one of the most well known principles of economic theory. Earlier studies concentrated on international purchasing power parity (PPP) deviations, and suggest that product heterogeneity, imperfect information, trade costs, markup differences and differences in taxes are important determinants of international price dispersion. In recent years several studies have examined price dispersion within a nation's borders. Intranational price dispersion may arise because of differences in the sellers' production cost, differences in consumer's search cost, differences in the repetitiveness of purchases and consumer loyalty, and differences in buyers' information about prices due to their random exposure to advertising (Lach, 2002).

In this article we analyze price dispersion among the districts of Istanbul by utilizing a data set containing microeconomic price levels from bazaars, convenience stores, and supermarkets. Results indicate that the prices of homogenous products vary less than the prices of differentiated goods as one might expect. However, fruits and vegetables are both homogenous goods with a relatively high price dispersion across the counties of Istanbul. Outcome of this work may provide a better understanding of existence, effects of demographic, economic and social factors on the characteristics and persistence of the price dispersion in Istanbul and provide us understanding of the similarities and differences among international, intranational and intercity price dispersion.

JEL code: D40,E31,F40

Key Words: price dispersion, differentiated goods, search cost

1. Introduction

As one of the cornerstone of international economics, purchasing power parity (PPP) states that the law of one price (LOP) (common currency prices for identical goods should be the same) should hold on the aggregate and both LOP and PPP have been subjected to many empirical investigations. According to Chen (2002), PPP and LOP studies have data problem since it is almost impossible to select identical (or very close substitute) goods in a group of countries. Therefore, most of these empirical studies utilize time-series technique and analyze change in PPP (relative PPP) instead of PPP itself (absolute PPP) and results of these works, indicate that deviations from the "law of one price" are the norm, not the exception. However Crucini, Telmer, and Zachariadis (2005) make the case that the Law-of-One-Price (LOP) and Purchasing Power Parity (PPP) are essentially about the cross-sectional distribution of relative prices rather than the time-series behavior of changes in these, and that "economic theory places much starker restrictions on LOP deviations than on their changes"; the implication being that the gap between theory and empirics can be bridged through the use of microeconomic price levels enabling exact comparisons across space. In line with this, in their theoretical model, Anderson and van Wincoop (2004) propose the use of price levels comparable across locations at a point in time as a promising route for inferring trade costs, arguing that "it is hard to see how information can be extracted about the level of trade costs from evidence on changes in relative prices."

According to Anderson and van Wincoop (2004), international price dispersion is determined by transport costs and local trade (distribution) costs, as well as by taxes, good-specific characteristics and differences in markups. Transport costs and broader trade costs are of central importance in many macroeconomic models, as in the recent examples of Bergin and Glick (2003) and Atkeson and Burstein (2004). However, assessing these at the macroeconomic level has proved problematic. Anderson and van Wincoop (2004) argue persuasively that "average price dispersion measures are not very informative about trade costs." In general, the impact of trade costs in segmenting individual product markets will be underestimated when considering aggregate prices or the average (over products) of price deviations. When aggregate prices or mean price deviations are considered, it is likely that countries both export and import to and from each other some of the goods that go into the construction of the composite price. As a result, the impact of trade costs on price differences could wash out on average even if trade costs were important in segmenting markets as

determinants of international price deviations for individual products. This is the "averaging-out property" put forth by Crucini, Telmer, and Zachariadis (2004).

Crucini, Telmer and Zachariadis, (2005) make an argument that the law-of-one-price and purchasing power parity are about the cross-sectional distribution of international relative prices. By utilizing microeconomic price levels for a broad set of range of goods and services in all European Union (EU) countries over five-year intervals between 1975 and 1990, they analyze the absolute law-of-one-price deviations. Their results demonstrate that good-by-good measures of cross-sectional price dispersion are negatively related to the tradeability of the goods and positively related to the share of the non-traded inputs.

Engel, Rogers and Wang (2003) estimate higher price elasticities with respect to distance using US-Canada actual retail price data. They consider absolute deviations from LOP which alleviates the "averaging-out" problem discussed in the previous paragraph. Ceglowski (2003) addressing the above concerns by considering relative distance from a "core location" (assumed to be Toronto) in addition to intercity distance. In adding distance from a "core location", she allows for the fact that "geography could play an additional role in price differentials when prices include freight costs from a central or core location" since "if shipping costs are a positive function of distance, this possibility implies a city's prices would be higher the further it is from the core location."

Rauch (1999) is the one of the most appreciated empirical works which considers the abovementioned issue. According to Rauch (1999), heterogeneity of products along with the dimensions of both characteristics and quality affect prices. Similarly, Cheung, Chinn and Fuji (1999) argue that, imperfect market structure plays a significant role in explaining purchasing power parity (PPP) deviations. In monopolistic competition with differentiated products, firm's pricing power is determined by the elasticity of demand which depends on the substitutability among varieties within the industry. Therefore, product differentiation creates more dispersed prices and it can be a sign of market power.

As it was mentioned above, according to the theoretical framework discussed in Anderson and van Wincoop (2004), differences in markups are one of the potential determinants of international price dispersion. Similarly, Goldberg and Verboven (2001) argue that differences in markups are one of the potential sources for the differences in car prices across Europe. Product market competition is a multidimensional process and markup over marginal cost can be a sign of the level of competition in the market.

Earlier studies concentrated on international PPP deviations, but in recent years several studies have examined price dispersion within a nation's border (intranational price dispersion). Intranational price dispersion may arise because of differences in the sellers' production cost, differences in consumer's search cost or in their beliefs about the price distribution, differences in the repetitiveness of purchases and consumer loyalty, and differences in buyers' information about prices due to their random exposure to advertising (Lach, 2002).

Çağlayan, Filiztekin and Rauh (2008) re-examine the relationship between price dispersion and inflation in Istanbul by using product-specific dataset. The data consist of monthly price observations for individual products sold by individual sellers in Istanbul during the period 1992:10 to 2000:06, and was collected by the Istanbul Chamber of Commerce. Data includes prices for 58 distinct product that are collected from different sources (convenience stores (bakkal), bazaar (pazar) and supermarket) in 15 different counties in Istanbul. Çağlayan, Filiztekin and Rauh (2008) find positive and significant relationship in Istanbul for the period covered by data. Similarly, results in Debelle and Lamont (1997) indicates that cities in the US that have higher than average inflation also have higher than average price dispersion.

According to Ceglowski (2003), research on intranational prices has focused primarily on the US but the results are mixed: By using aggregated data for US cities, Culver and Papell (1999) and Cecchetti, Mark and Sonora (2000) find extremely slow or no convergence, on the other hand Parsley and Wei (1996) and O'Connell and Wei(2002) utilize disaggregated data and find evidence of long-run price convergence.

On the other hand, Van Hoomissen (1988) considers the question whether observed price differentials reflect perceived differences in quality, service agreements, or location or whether information imperfections can explain this phenomenon and proposes a basis for rejecting the "multiple characteristics" hypothesis as the sole determinant of price dispersion. He uses theoretical argument which links inflation and price distribution. If inflation rate increases, it will decrease the information stock held by agent agents and thus leads to greater price dispersion. By utilizing monthly price data for 13 uniquely defined goods sold in Israel between 1971 and 1984,Van Hoomissen (1988) concludes that price dispersion is positively related to the rate of market price inflation, so, since inflation is an unlikely proxy for changes

in perceived characteristics, findings support price dispersion theories based on optimally imperfect decision making.

Lach (2002) uses a unique data set on store-level prices of four homogenous products sold in Israel to study the existence, characteristics and persistence of the dispersion of prices across stores. The departure point of the work is the theoretical literature outcome that rationalize the observed price dispersion as an equilibrium phenomena. Main results show that price dispersion across stores is prevalent and differs across products in reasonable ways and preavails even after controlling for observed and unobserved product heterogeneity, so lack of full information and some heterogeneity in buyers and/or sellers, which may be passed on to the products, is necessary for price dispersion to exist. In addition, stores move up and down the cross sectional price distribution and, therefore consumers cannot learn about which stores have consistently low prices.

Stores may charge different prices for the same homogeneous good. However, even products that are otherwise homogeneous are sold by different sellers and some of this heterogeneity is passed on to the goods and products can be classifed as "differentiated products". In the models of Hotelling (1929) and Chamberlin(1933), products only differ in their seller's location and differences in seller's geographic location leads to monopolistic competition and, consequently, to price dispersion.

In this article we analyze price dispersion among the districts of Istanbul by utilizing a data set containing microeconomic price levels from bazaars, convenience stores, and supermarkets and we investigate the

2. Data, Methodology an Results

Dataset contains monthly price observations of different consumer goods and services from bazaars, supermarkets and small grocery stores (bakkal) in 15 different counties in Istanbul, and collected by the Istanbul Chamber of Commerce from 1992:10 to 2000:06. [1] The 15 districts of Istanbul are Aksaray, Bahcelievler, Bakirkoy, Besiktas, Beyoglu, Eminonu, Eyup, Fatih, Kadikoy, Kartal, Kasimpasa, Levent, Pendik, Sariyer, and Sisli. The dataset covers a wide variety of products including basic household items such as bread, milk, yogurt, sugar, coffee, and textile products, durable goods, as well as service items such as rent,

[1] This data set was also used by Çağlayan, Filiztekin and Rauh (2008) in order to assess the relation between inflation and price dispersion in Istanbul

hairdresser, taxi fair, restaurant meals. Grocery category is the largest with 236 different products (37 of which are service items). Bazaar category has price information for 50 products in total while supermarket category has for 46.

Data has been scrutinized in detail and products with insufficient data points has been excluded.[2] The remaining dataset comprises 140 products for grocery group, 34 for bazaar group, and 50 for supermarket group.

Then, an ISIC (Rev.2) code has been appointed to each product in the dataset. Products in the grocery, bazaar, and supermarket datasets belong to following industry groups respectively:

Table 2.1. Data collected from grocery stores

ISIC code	Industry Definition	No.of Products
31	MANUFACTURE OF FOOD,BEVERAGES AND TOBACCO	73
311	Food products	72
313	Beverages	1
32	TEXTİLE, WEARİNG APPAREL AND LEATHER INDUSTRİES	51
321	Textiles	9
322	Wearing apparel except footwear	34
323	Leather products	2
324	Footwear except rubber or plastic	6
34	MANUFACTURE OF PAPER AND PAPER PRODUCTS, PRİNTİNG AND PUBLISHING	2
341	Manufacture of paper and paper products	2
35	MANUFACTURE OF CHEMİCALS AND CHEMİCAL, PETROLEUM, COAL, RUBBER AND PLASTIC PRODUCTS	8
352	Manufacture of other chemical products	7
354	Manufacture of miscellaneous products of petroleum and coal	1
38	MANUFACTURE OF FABRİCATED METAL PRODUCTS, MACHİNERY AND EQUIPMENT	5
381	Manufacture of fabricated metal products, except machinery and equipment	4
383	Manufacture of electrical machinery apparatus, appliances and supplies	1
39	OTHER MANUFACTURİNG INDUSTRİES	1
390	Other Manufacturing Industries	1

[2] The products with price information in 10 districts or more were kept.

Table 2.2. Data collected from supermarkets

ISIC code	Industry Definition	No.of Products
31	MANUFACTURE OF FOOD,BEVERAGES AND TOBACCO	26
311	Food products	26
34	MANUFACTURE OF PAPER AND PAPER PRODUCTS, PRİNTİNG AND PUBLISHING	1
341	Manufacture of paper and paper products	1
35	MANUFACTURE OF CHEMİCALS AND CHEMİCAL, PETROLEUM, COAL, RUBBER AND PLASTIC PRODUCTS	5
352	Manufacture of other chemical products	4
354	Manufacture of miscellaneous products of petroleum and coal	1
38	MANUFACTURE OF FABRİCATED METAL PRODUCTS, MACHİNERY AND EQUIPMENT	2
381	Manufacture of fabricated metal products, except machinery and equipment	1
383	Manufacture of electrical machinery apparatus, appliances and supplies	1

Table 2.3. Data collected from bazaars

ISIC code	Industry Definition	No.of Products
31	MANUFACTURE OF FOOD,BEVERAGES AND TOBACCO	50
311	Food products	50

As it was mentioned above, power of sellers over price determination in imperfect markets is also articulated to be a source of price dispersion. Thus, it is useful to examine data for homogeneous and heterogeneous products separately. In order to achieve that, the products in the data set are classified into three categories as suggested by Rauch (1999); products traded on an organized exchange, reference priced products (Rauch (1999) classified these categories as "homogeneous products"), and differentiated products. In order to associate Rauch classification and price data, using the matching information of codes, a standard international trade classification (STIC) code has been appointed to each product.[3] Accordingly, classifications that involve product characteristics are as follows:

[3] Rauch data and information about matching ISIC-SITC codes have been obtained from Haveman's web page www.macalester.edu/econdata/page/haveman

TABLE 2.4. Rauch classified grocery stores data

Rauch Classification	*ISIC Code*	*No.of Product*
Differentiated Products	311	12
	313	1
	321	8
	322	34
	323	2
	324	6
	352	7
	354	1
	381	4
	383	1
	390	1
Total:		**77**
Homogeneous Products		
A) Products sold in organized exchanges	311	9
	321	1
Total		10
B) Products with reference price	311	51
	341	2
Total		53
Total		**63**

TABLE 2.5. Rauch classified supermarket data

Rauch Classification	*ISIC Code*	*No.of Product*
Differentiated Products	311	9
	352	4
	354	1
	381	1
	383	1
Total:		**16**
Homogeneous Products		
A) Products sold in organized exchanges	311	3
Total		3
B) Products with reference price	311	14
	341	1
Total		15
Total:		**18**

TABLE 2.6. Rauch classified bazaars data

Rauch Classification	*ISIC Code*	*No.of Product*
Differentiated Products	311	5
Total:		**5**
Homogeneous Products		
A) Products sold in organized exchanges	311	2
Total		2
B) Products with reference price	311	43
Total		43
Total:		**45**

In the study, price dispersion was measured by coefficient of variation (COV). Expressed as a percentage, COV is defined as the ratio of the sample standard deviation to the sample mean and calculated using the following formula:

$$COV = \left(S \big/ \mu \right) * 100$$

where S represents standard deviation and μ, mean.[4]

Evaluation of the dataset as a whole revealed that there was significant price dispersion across Istanbul's different districts, in both product and industry levels. In the focus period, the measure of price dispersion, coefficient of variation, is measured for 140 products. Salt and giblets have the minimum values with 4.81% and 4.83%, and maximum values are 36.64% for slipperies, 35.36% for socks, and 34.65 % for coat. Morover, COV values for products fluctuate throughout the period. When compared to the first period, 1993, in the last period, 1999, coefficient of variation for 54 of 140 products diminished (e.g. 69% for instant soup, 47% for lentil, and 6% for green onions), while it increased for the rest of the products. Maximum increase was near 290% for slippers and peas have the minimum with 0.68%. Average COV of the whole dataset is 15.47% in 1993, 15.42% in 1994, 13.48% in 1995, 15.18% in 1996, 14.87% in 1997, 15.14% in 1998, and 17.06% in 1999. These values can be accepted as a strong indicator of price dispersion in Istanbul.

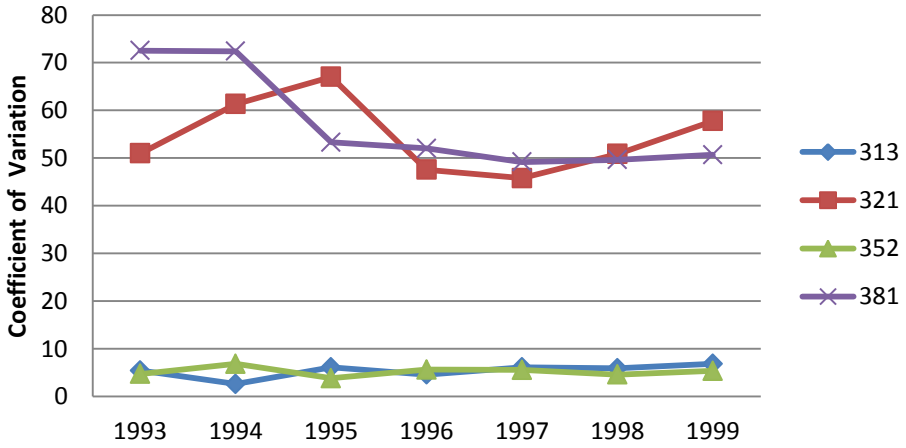
[4] In other words, coefficient of variation indicates the percentage change in standard deviation with respect to mean. A small coefficient of variation means small variation across units in the group, which means that the group is more homogeneously distributed.

The literature on the link between price dispersion and price level offers different results. Some studies have found the relationship to be positive, while others have found a negative link (or no link at all). Opponents of the negative relation claim that buyers tend to shop from less expensive locations because search cost-product price ratio of buyers for expensive products is relatively low, therefore prices converge as the law of demand suggests. Positive relation argument depends on the idea that buyers do not spend much time for the products which are less frequently bought (have less share in the budget), therefore different prices occur. When the link between average prices and coefficient of variation is examined in the entire dataset, it is observed that the relationship is positive in 1993 (28%) and 1995 (40%) and negative for the years 1997,1998 and 1999 (-40%, -42%, and -38% respectively).

On the product-level, the ratio of maximum-minimum prices lay between 1.18% and 6.81%. These values indicate that there are differences in pricing across sellers, especially in some products.

Examination of industry-level data points out that the industries with the largest average coefficient of variation value are “fabricated metal products” coded 381 (55.11%), “textile” coded 321 (54.46%), whereas “beverages” coded 313 (5.37%) and “other chemicals” coded 352 (5.22%) are the industries which has the smallest values. A small but positive relation is observed between average prices and average coefficient of variation (21.12%). As the average price increase in an industry, the difference between maximum and minimum prices also increases.

Figure1. Industries with Lowest and Highest Coefficient of Variation



In accordance with the discussion above, product features have also significant role in pricing. Mentioned differences can be observed when products are divided into homogeneous and differentiated product categories in order to investigate this point. There is a strong negative correlation (-42.6%) between average price and coefficient of variation for differentiated products between 1993 and 1999. The same correlation is found to be 40% for homogeneous products. When items in the categories are examined, it can be seen that homogeneous product category include mostly food products (such as meat, milk, eggs, vegetables, fruits), which are consumed frequently in daily life, whereas differentiated product category covers various products such as textiles, clothing, cleaners in addition to some food products (chocolate, coffee). According to the findings, it can be articulated that costumers in Istanbul do not search extensively for daily consumption due to the search cost, and as a result of the search undergone for other products, the prices across districts converged to each other.

In analysis above, the prices collected from groceries, bazaars, and supermarkets have been studied concurrently in the same dataset. Since examining price dispersion for different seller groups is one of the research steps in the study, a similar analysis has been conducted within grocery, bazaar, and supermarket categories separately. Next, grocery-supermarket, supermarket-bazaar, grocery-bazaar, and grocery-bazaar-supermarket comparisons have been studied. First, price dispersion across groceries will be discussed.

2.1. Analysis of price data collected from groceries

The data collected from groceries is the most detailed part of the ITO dataset on basis of both product diversity and size. As shown in Table 2.1, after the organization of the data, there are prices of 140 products from 12 industries.

When prices are examined, it has been seen that Eminonu district had the cheapest prices for most of products in the dataset for the time period. Presence of locations like Spice Bazaar is the reason why this district is cheapest in products such as cheese, olives, and snacks. In 1993, Eminonu district where 79 out of 140 products in the data set were cheapest was followed by Kasimpasa district where the cheapest 41 products were found. In the 1994-1998 period, almost 40% of the dataset was cheapest in Eminonu. The number of products increased in Pendik after 1994 and in Kartal after 1997. In 1999, Eminonu is the cheapest district for the half of the dataset, and is followed by Pendik, Kartal, and Kasimpasa respectively. Bakırkoy, Beyoglu, and Bahcelievler in European side and, Kadikoy in Asian side of Istanbul are the districts that had the cheapest prices in the least number of products.

In 1993, Sisli district, where nearly half of the products in the dataset were cheapest, left its position to Bakirkoy and Beyoglu in the later years. In the late years of the analysis, number of products in Fatih district increased. Kadikoy was the most expensive district in the asianside. In the dataset, other two districts in asianside, Kartal and Pendik were the districts that had the most expensive prices in the least number of products, while in euroside Sariyer and Kasimpasa had a similar tendency.

Price dispersion across districts has been confirmed by the data collected from groceries. It has been observed that coefficient of variation differs across products. The smallest (average) coefficients of variation are 4.33% for chicken and 4.81% for salt. The coefficients of variation measured deploying the entire dataset for these products were 6.36% and 4.80% respectively; therefore it can be observed that there were no differences among sellers in determination of, especially, salt's price. Average price dispersion in food products (industry coded 311) has been calculated to be 5.33%. But this value was 34% when measured using the entire dataset. Dispersion in prices of vegetable and fruits were higher than the industry average. For example, coefficients of dispersion were 10.6% for apples and oranges, 16.84% for cherries, 15% for strawberries and quinces, and 18% for apricots. The coefficients of dispersion measured using the entire dataset were 22.5% for apples, 23.26% for cherries, 19% for oranges, 22.19 for strawberries, and 23.65 for apricots. The differences in values measured using different data levels points out that there are significant differences in prices determined by different groups of sellers (groceries and bazaars). The values calculated for meat, offal, and cheese were on level with or just less than the industry average. It is thought that it would be fruitful to add quarterly and/or monthly data to the analysis in the last part of the project in order to evaluate seasonal effects.

The largest average coefficients of variation were calculated for textiles coded 321 (16.78%), clothing coded 322 (20.61%), leather and leather products coded 323 (12.87%), and shoes coded 324 (14.27%) all of which are under "textiles, clothing and leather products" industry coded 32. The average coefficient of variation for the industry coded 32 calculated to be 16.13%. The values measured using the entire dataset were also high for textiles.

Finally, in the time period, calculated coefficients of variation were relatively larger in differentiated products, namely that different grocery stores in districts determined different prices for differentiated products. The impact of the textiles industry was very significant. Average price-coefficient of variation link varies between product categories. The correlation is found to be 0.80 for homogeneous products whereas it is -0.78 for differentiated products.

The argument on search costs that was discussed for the total dataset can be said to be valid for groceries, too.

2.2. Analysis of price data collected from supermarkets

After organizing the data collected by ICOC from supermarkets, a new dataset comprising 34 products has been constructed. Compared to groceries, supermarkets have more homogeneous price distribution. There were no products in Bakirkoy and Sisli that had the cheapest price among districts in the time period of the study, while Beyoglu had one only in 1998, and Levent had one in 1998 and 1999. Kartal in Asian-side, and Kasimpasa in European-side of Istanbul are the districts that had the cheapest prices in the most products. Eminonu, where had the cheapest prices for almost half of the products in grocery-level, was in the middle of the list for comparison among supermarkets. On the other hand, Bakirkoy, Beyoglu, and –in the last years of the period- Aksaray stand out as the districts with high prices for products in the dataset. Number of products in the Asian-side districts,namely Kadikoy, Kartal, and Pendik, with the most expensive price were much less than those in European-side.

When compared between supermarket-level and grocery-level data, coefficient of variation calculated for 30 common products out of 34 has been found to be higher in supermarkets. Only coefficients of variation for cleaning dust, detergents, margarine, and oil were greater in groceries, but the difference is less than 1%. However, for some products difference between coefficients of variation in supermarkets and groceries is much greater (for example, difference is 18% for eggs, 6% for wheat, and 5% for sausages). On the other hand average grocery prices were higher than supermarket prices for every product. The differences vary between 1% and 13%.

When supermarkets and bazaars were compared, it has been observed that for 14 products which are all common in both categories, supermarket sellers determined the highest price in the time period of the study. Most of the sellers with the cheapest prices were settled in bazaars. Only in 1994, supermarket category offered the cheapest prices for 64.29% of the products, whereas this ratio was 28.57 in 1993, 21.43% in 1995, and 42.86% in 1996. Subsequently, the ratio has fallen to 14.29 in 1997, and has been calculated to be 21.43 in 1998 and 1999.

Finally, for supermarkets, contrary to the analysis for groceries, coefficients of variation for differentiated products were not higher. Although the relationship between average price and coefficient was positive as in the analysis of total dataset and grocery data,

calculated value was much smaller (-23.7% for differentiated products, and 10.1% for homogeneous products). However, it must be stressed that products related to textile industry which had a significant impact on grocery level (so on total dataset), are not comprised in supermarket-level data. Therefore, analysis has been repeated and interpreted only for common products.

2.3. Analysis of price data collected from bazaars

The dataset has information from 15 districts at grocery and supermarket level, whereas data is available only for 13 districts at bazaar level; for Levent and Pendik there is no price data. After organizing, the dataset comprises 50 products that is classified under industry coded 311. 35 of them are in vegetable and fruits category. Bazaar level data indicates that distribution of minimum prices is different from that of grocery and supermarkets. For example, bazaars in Bakirkoy district have no products while district has the cheapest prices for 23 products in 1999. As in grocery level, bazaars in Eminonu have the cheapest prices for most of the products. In the euroside, Kartal bazaars have the cheapest prices for a large number of products in the beginning of the time period of the study, whereas this feature is lost by the end.

Bakirkoy, Bahcelievler, and Beyoglu stand out as the districts having the highest prices for largest number of products. In the Asian-side, Kartal bazaars had no products with the highest price except for only one in 1993 and four in 1994 while in Kadikoy, there were only four products with the highest price among the bazaars in the time period. In Eminonu, no product was charged with the highest price.

A similar price dispersion pattern to those across groceries and supermarkets has been observed across bazaars and the dispersion in vegetables and fruits was a little less than that calculated across groceries. For example, in bazaar dataset, the largest dispersion is observed for apricots with coefficient of variation being 17.56%. The same ratio across groceries has been calculated to be 16.84%. Across the bazaars the coefficients of variation are 7.90% for oranges (10.6% across groceries), 7.77% for apples (10.6% across groceries), and 15.85% for cherries (16.84% across groceries). The coefficient for more than half of the products has increased between 1993 and 1999.

When groceries and bazaars are compared (using the common products sold), it is observed that almost all of 50 products were cheaper in bazaars. The same conclusion can be observed with supermarkets. In the time period of the study, the products with the highest prices could be found in grocery category which was followed by supermarkets.

3.Conclusion

In the analysis above, the descriptive statics measured indicate that prices across districts in Istanbul were highly dispersed for all of the seller categories. The dispersion is calculated to be over 30% for some products. Further analysis will be focused on the development and estimation of the model that will help explaining the causes of the dispersion. As thoroughly explained in the literature survey of the first evaluation report, the possible factors causing the price dispersion are differences in product characteristics (homogeneous or differentiated, durable vs. non-durable, share in the budget, brand image), differences in seller characteristics (size, discount opportunities, grocery, bazaar, or supermarket distinction as in the dataset), differences in district characteristics (proximity to the center, transportation availabilities, size), differences in customer characteristics, and distance between districts. The search costs are also emphasized as a significant factor since they are mostly affected by the differences among customers. Population structure and income differences can be listed among factors that change search costs.

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