Online Appendix for Retail Prices in a City

Alon Eizenberg, Saul Lach and Merav Oren-Yiftach*

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A Robustness of demand estimates to the computation of the composite good price

As explained in Section 2.2, we perform robustness checks to verify that our results are not driven by the way we computed the price for the composite good. Estimation results appear in Table A1. Elasticities are reported in Table A2.

First, we add locations having at least 9 prices out of the 27 prices for the 27 products. This increases the number of destinations from 15 to 20 in the first period and 19 in the second and third periods and the number of observations used in the regression to 2,354. Doing this decreases the price coefficient and the coefficient of its interaction with housing prices at origin, although they are still both significant (column 2). This attenuation of the estimates could reflect increased measurement error in prices brought about by the inclusion of locations with a different composition of the composite good. This attenuation translates into a decrease in own prices elasticities from a median elasticity of 4.95 to a median price elasticity of 3.18 (see Table A2). Remarkably, the estimates of the parameters related to distance remain basically unchanged. This will also hold for the other robustness checks.

*Eizenberg: The Hebrew University of Jerusalem & CEPR, alon.eizenberg@mail.huji.ac.il. Lach: The Hebrew University of Jerusalem & CEPR, saul.lach@mail.huji.ac.il. Oren-Yiftach: Israel Central Bureau of Statistics, meravo@cbs.gov.il. We are grateful to the editor and anonymous referees for comments and suggestions which greatly improved the paper. We thank Eyal Meharian and Irit Mishali for their invaluable help with collecting the price data and with the provision of the geographic (distance) data. We also wish to thank a credit card company for graciously providing the expenditure data. We are also grateful to Daniel Felsenstein for providing the housing price data, and to Elka Gotfryd for mapping zipcodes into statistical subquarters. We thank Steve Berry, Pierre Dubois, Phil Haile, JF Houde, Gaston Illanes, Volker Nocke, Kathleen Nosal, Mark Rysman, Katja Seim, Avi Simhon, Konrad Stahl, Yuya Takashi, Ali Yurukoglu and Christine Zulehner for helpful comments, as well as seminar participants at Carlos III, CEMFI, DIW Berlin, Frankfurt, Harvard, Johns Hopkins, Penn State, Universidad de Vigo, UVA, Yale and Wharton, and participants at the Israeli IO day (2014), EARIE (2014), the Economic Workshop at IDC (2015), UTDT Conference (2016), CEPR-JIE IO Conference (2017), and IIOC (2017). This project was supported by the Israeli Science Foundation (ISF) grant 858/11, by the Wolfson Family Charitable Trust, and by the Maurice Falk Institue for Economic Research in Israel.

A second check is to use our socioeconomic data to impute prices of products in locations where they are missing. For each subquarter we compute the mean price (over stores) for each product and period. We then regress each of these (mean) prices separately on a set of socioeconomic variables at the neighborhood level, and compute predicted prices for each product and location.[1] In neighborhoods where prices of some products are missing we impute the predicted prices, and proceed as before to compute the price of the composite good for each of the destinations where some price data were available.[2] The price of the composite good is now a weighted average of all 27 products. Over all products and locations, the fraction of imputed prices is 31.5 percent. The imputation procedure generates higher mean prices of the composite good compared to the observed ones. But these differences are not statistically significant at the 5 percent significance level. In fact, the top half of the distribution of imputed prices dominates the top half of the distribution of observed prices implying a higher mean price and variance.

The estimated parameters are somewhat lower than in the baseline specification, again possibly consistent with attenuation bias due to the measurement error in prices brought about by the imputation exercise. The estimated own price elasticities are a bit smaller and more dispersed than in the baseline specification.

In a third robustness check, we estimate the baseline regression using fruits and vegetables only (11 items).[3] The estimated price elasticity is now about a half than in the baseline specification. This is not surprising since demand for fruits and vegetables is likely to be less price sensitive than for other products. Note, however, that the sensitivity to distance is about the same as for the full composite good. We also substitute a very small number (1 NIS) when expenditures are zero. We can now use the 2070 ($46 \times 15 \times 3$) observations. Results appear in column (5) of Table A1 and are a bit larger than in the baseline specification. The corresponding elasticities are shown in Table A2 and are somewhat larger than in the baseline case but, again, within the same order of magnitude. In a final check we use only price data from supermarkets

[1] The socioeconomic variables used to predict prices are a subset of the following: number of family households, median age, percentage of married people aged 15 and over, average number of persons per household, percentage of households with 7+ persons in the household, percentage of households with 5+ children up to age 17 in the household, dependency ratio, percentage of those aged 15 and over in the annual civilian labor force, percentage of those aged 15 and over who did not work in 2008, percentage of Jews born abroad who immigrated in 1990-2001, percentage of households residing in self-owned dwellings, percentage of Jews whose origin is Israel, percentage of Jews whose continents of origin are America and Oceania, percentage of Jews whose continent of origin is Europe, percentage of those aged 15 and over with up to 8 years of schooling, percentage of those aged 15 and over with 9-12 years of schooling, percentage of those aged 15 and over with 13-15 years of schooling, percentage of those aged 15 and over with 16 or more years of schooling. In addition, we added an indicator for a commercial district and period dummies. The $R^{2\prime}s$ of these 27 regressions are quite high, ranging from 0.45 to 0.93 with a median value of 0.70.

[2] In 16 observations with missing prices where the imputed price was negative it was substituted for by the minimum imputed price for each product. In neighborhoods that were not sampled in the three periods we imputed prices only for the periods for which we had some price data (these are the neighborhoods with zero number of sampled stores in Table D3). Thus, for example, in November 2008 we imputed prices for 23 out of the 26 neighborhoods.

[3] In a few locations, the basket is composed of nine or ten fruits and vegetables.

and we find that estimated coefficients (column 6 of Table A1) and elasticities are very similar to the baseline results.

We also estimate a version of our demand model with CPI weights that vary by socioeconomic standing, provided by the CBS. We thus assign differential weights to different origin neighborhoods. The CBS does not compute expenditure weights for different neighborhoods but it does compute weights by income level. Specifically, they compute expenditure weights for very detailed categories of expenditures (but not at the item level as we use in the paper) by income quintile. In addition, there is a socioeconomic ranking of statistical areas in Israel and we used this information to assign each of the 46 neighborhoods in Jerusalem to one of three socio-economic groups: low, middle and high.

We then used the expenditures weights for the first income quintile to compute the price index faced by residents in neighborhoods in the lowest socio-economic group, the weights of the third quintile for those in the middle group, and the weights of the fifth quintile for residents in neighborhoods in the highest socio-economic group. We therefore allow residents of different (by socio-economic ranking) neighborhoods to face different prices of the composite good even if they buy in the same destination. The simple correlation coefficient between the original composite good price and the price computed using income-varying weights is 0.85. Table A3 presents the demand estimates obtained using this approach, with the baseline estimates from column 6 of Table 6 in the first column.

Table A1: Robustness results

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline (Col 6 Table 6)	No. of products in composite >= 9	Imputed prices	Fruits & Vegetables	Including Zero exp.	Supermarkets only
ln (price at destination)	4.727	3.090	4.107	1.74	5.349	4.024
	(1.304)	(1.200)	(1.763)	(0.487)	(1.766)	(1.263)
ln (price) X housing prices	-0.232	-0.157	-0.176	-0.077	-0.219	-0.202
	(.078)	(0.064)	(0.127)	(0.036)	(0.132)	(.072)
Distance to destination	0.423	0.484	0.452	0.49	0.377	0.422
	(.12)	(0.097)	(0.090)	(0.098)	(0.170)	(.12)
Distance X senior citizen	0.004	0.004	0.004	0.005	0.004	0.004
	(.007)	(0.006)	(0.005)	(0.006)	(0.012)	(.007)
Distance X driving to work	-0.003	-0.004	-0.003	-0.004	0	-0.003
	(.002)	(0.001)	(0.001)	(0.001)	(0.002)	(.002)
Shopping at home	1.890	1.873	1.849	1.878	2.16	1.890
	(.426)	(0.294)	(0.259)	(0.298)	(0.485)	(.426)
# observations	1819	2354	2968	2297	2070	1819
R^2	0.784	0.767	0.769	0.765	0.704	0.784

Table A2: Robustness: distribution of estimated elasticities (absolute value)

	Own price elasticity									
Specification	mean	sd	min	p10	p25	p50	p75	p90	max	N
Baseline (col 6 Table 6) $\sigma = 0.7$	4.82	0.92	3.00	3.86	3.99	4.95	5.87	5.95	6.13	15
Baseline (col 6 Table 6) $\sigma = 0.8$	6.43	1.37	3.78	5.01	5.31	6.54	7.94	8.32	8.47	15
Composite with 9 or more products	3.08	0.77	1.67	1.91	2.51	3.18	3.54	4.12	4.21	19
Imputed prices	4.34	1.26	2.18	2.61	2.91	4.51	5.32	5.82	6.20	23
Fruits and Vegetables	2.46	0.48	1.48	1.65	2.20	2.55	2.80	3.12	3.12	19
Including zero Exp.	6.60	0.96	4.75	5.55	5.68	6.59	7.29	8.02	8.16	15
Supermarkets only	4.13	0.79	2.56	3.31	3.41	4.24	5.06	5.12	5.25	15

	Distance semi-elasticity									
Specification	mean	sd	min	p10	p25	p50	p75	p90	max	N
Baseline (col 6 Table 6)	0.35	0.06	0.06	0.28	0.31	0.35	0.39	0.42	0.45	690
Composite with 9 or more products	0.37	0.07	0.06	0.29	0.33	0.37	0.43	0.48	0.50	874
Imputed prices	0.37	0.06	0.06	0.30	0.33	0.37	0.42	0.45	0.47	1,058
Fruits and Vegetables	0.37	0.08	0.06	0.29	0.32	0.37	0.44	0.48	0.52	874
Including zero Exp.	0.40	0.05	0.09	0.36	0.39	0.40	0.42	0.44	0.48	690
Supermarkets only	0.35	0.06	0.06	0.28	0.31	0.35	0.39	0.42	0.45	690

Notes: Elasticities are computed for November 2008. $\sigma = 0.7$ is used except in row 2 of top panel. Price elasticities are computed for each destination. Prices were imputed for 23 out of the 26 neighborhoods in November 2008. Distance semi-elasticities are computed for each origin-destination pair (e.g., 46x15=690).

Table A3: Demand estimates with income-varying weights

	(1)	(2)
Variable	Baseline (Col 6 from Table 6)	Using income-varying weights
ln (price at destination)	4.727	5.138
	(1.304)	(1.940)
ln (price at destination) X housing prices	-0.232	-0.450
	(0.078)	(0.104)
Distance to destination	0.423	0.422
	(0.120)	(0.119)
Distance to destination X senior citizen	0.004	0.004
	(0.007)	(0.007)
Distance to destination X driving to work	-0.003	-0.003
	(0.002)	(0.002)
Shopping at home	1.890	1.888
	(0.426)	(0.423)
# observations	1819	1819
R^2	(0.784)	(0.784)

B Counterfactual analyses for $\sigma = 0.8$

Table B1: Counterfactual changes to posted prices, $\sigma = 0.8$

Retail location	Observed price	Reduced travel disutility		Improved amenities		Additional entry
		Distance	Distance & κ	CD1	CD1-CD2	
Average (all)	7.80	-0.6%	-1.0%	-0.1%	-0.2%	-2.3%
Median (all)	7.85	-0.4%	-0.8%	0.0%	-0.2%	-2.7%
Median CD1-CD2	6.98	-0.5%	-0.5%	0.2%	0.1%	0.0%
Median residential	7.87	-0.3%	-0.2%	-0.1%	-0.5%	-2.9%
NAP1	8.01	2.6%	3.7%	0.0%	-0.2%	-2.4%
NAP2	8.14	0.3%	0.7%	0.1%	0.0%	-1.1%
NAP3	8.19	-0.3%	-0.2%	-0.4%	-0.5%	-3.1%
AC1	8.52	-6.3%	-9.3%	-2.7%	-0.8%	-5.9%
AC2	7.85	-0.9%	-2.7%	0.2%	-0.5%	-1.6%
AC3	7.76	-0.2%	-0.2%	-0.1%	-0.1%	-2.7%

Notes: The table reports the corresponding values to those in Table 9, but using a value $\sigma = 0.8$ rather than $\sigma = 0.7$. See notes to table 9 for additional details.

Table B2: Counterfactual changes to the Average Price Paid (APP), $\sigma = 0.8$

Retail location	Observed price	Reduced travel disutility		Improved amenities		Additional entry
		Distance	Distance & κ	CD1	CD1-CD2	
Median residential	7.72	-1.6%	-3.0%	-4.8%	-5.7%	-1.4%
NAP1	7.86	0.6%	0.3%	-2.1%	-3.1%	-2.1%
NAP2	7.85	-3.4%	-5.4%	-6.8%	-7.3%	-0.6%
NAP3	7.72	-3.1%	-4.5%	-7.1%	-7.4%	-1.1%
AC1	7.98	-4.9%	-6.7%	-8.6%	-8.7%	-2.8%
AC2	7.67	-2.7%	-3.1%	-4.8%	-6.4%	-0.4%
AC3	7.28	-0.9%	-1.0%	-4.3%	-4.4%	-0.3%

Notes: The table reports the corresponding values to those in Table 10, but using a value $\sigma = 0.8$ rather than $\sigma = 0.7$. See notes to Table 10 for additional details.

C Neighborhoods, subquarters and demographics

While distinct neighborhoods with established identities are a key feature of Jerusalem, there is no formal statistical definition that precisely matches the notion of a "neighborhood." We therefore use the Central Bureau of Statistics's (CBS) closely-related concept of a *subquarter*. A subquarter includes several territorially-contiguous *statistical areas*.[4] We use the terms "neighborhood" and "subquarter" interchangeably.

We defined the six commercial districts (appearing in bold in Table C1 below) as collections of statistical areas that are predominantly commercial with minimal residential presence. These areas were typically carved out of a larger subquarter that was partitioned into primarily residential, and primarily non-residential collections of statistical areas. The two major commercial districts are Talpiot and Givat Shaul denoted by CD1 and CD2 in the text.

Thus, neighborhoods are identified with the subquarters defined by the CBS with some exceptions: 1) the commercial districts that were carved out from existing subquarters as mentioned above, and 2) four subquarters that were added to accommodate the expenditure data received from the credit card company. These additional subquarters share some of the statistical areas with other subquarters and are denoted in Table C1 with a star *. Although these four subquarters share the same statistical areas (and therefore the same demographics) they do have different zipcodes and therefore different expenditure data.

Table C1 presents our 46 subquarters (neighborhoods) and provides the statistical areas that are included in each neighborhood. Tables C2-C3 provide neighborhood-level statistics on demographics and distances.

[4]A statistical area is a small geographic unit as homogeneous as possible, generally including 3,000 — 4,000 persons in residential areas. http://www.cbs.gov.il/mifkad/mifkad_2008/hagdarot_e.pdf.

Table C1: Composition of residential and commercial neighborhoods

Subquarter (neighborhood)	**statistical areas**						
Neve Yaaqov	111	112	113	114	115	116	
Pisgat Zeev North	121	122	123	124	125		
Pisgat Zeev East	131	132	133	134	135	136	
Pisgat Zeev (North - West & West) *	135	136					
Ramat Shlomo	411	412	413				
Ramot Allon North	421	422	423	424	425	426	
Ramot Allon	431	432	433	434	435	436	
Ramot Allon South *	435						
Har Hahozvim, Sanhedria	511	512	513	514	515		
Ramat Eshkol, Givat-Mivtar	521	522	523				
Maalot Dafna, Shmuel Hanavi	531	532	533				
Givat Shapira	541	542	543				
Mamila, Morasha	811	812					
Geula, Mea Shearim	821	822	823	824	825	826	
Makor Baruch, Zichron Moshe	831	832	833	834	835	836	
City Center	841	842	843	844	845	846	847
Nahlaot, Zichronot	851	852	854	855	856	857	858
Rehavya	861	862	863	864			
Romema	911	912	913	915	916		
Givat Shaul	921	922	923	925			
Har Nof	931	932	933	934			
Qiryat Moshe, Bet HaKerem	1011	1012	1013	1014	1015	1016	
Nayot	1021	1022	1023	1024			
Bayit VaGan	1031	1032	1033	1034	1035		
Ramat Sharet, Ramat Denya	1041	1042	1043	1044			
Qiryat HaYovel North	1121	1122	1123	1124			
Qiryat HaYovel South	1131	1132	1133	1134			
Qiryat Menahem, Ir Gannim	1141	1142	1143	1144	1145	1146	1147
Manahat slopes *	1147						
Gonen (Qatamon)	1211	1212	1213	1214	1215	1216	1217
Rassco, Givat Mordekhay	1221	1222	1223				
German Colony, Gonen (Old Qatamon)	1311	1312	1313	1314			
Qomemiyyut (Talbiya), YMCA Compound	1321	1322					
Baqa, Abu Tor, Yemin Moshe	1331	1332	1333	1334	1335	1336	
Talpiot, Arnona, Mekor Haym	1341	1342	1343	1344	1346		
East Talpiot	1351	1352	1353	1354	1355		
East Talpiot (East) *	1355						
Homat Shmuel (Har Homa)	1621	1622	1623				
Gilo East	1631	1632	1633	1634			
Gilo West	1641	1642	1643	1644			
Talpiot CD	1345	Talpiot - Industrial & Commercial Area, Yad Haruzim st.					
Givat Shaul CD	924	Givat Shaul Industrial Area and "B", Menuhot Cemetery, Kanfei Nesharim					
Malcha CD	1146	Tedy Stadium, Biblical Zoo, Jerusalem Mall					
Romema CD	914	Romema, Industrial Area, Etz Haim,					
Central Bus Station CD							
Mahane Yehuda CD	853	Beit Yaakov, Clal Ctr., Mahane Yehuda Market					

Notes: The table presents our 46 subquarters (neighborhoods), and provides the statistical areas that are included in each neighborhood. For residential neighborhoods, the statistical areas included follow the CBS definitions. For commercial districts (in bold), the included statistical areas were determined by the authors and their explicit names are provided. Residential neighborhoods marked with an * mean that the neighborhood shares portions of the same statistical areas with preceding neighborhood. A common statistical area was divided into two subquarters according to the zipcodes of the expenditure data.

Table C2: Demographics, housing prices and number of supermarkets

Neighborhood	Population (000s)	Household size	Housing price	% driving to work	% car ownership	% senior citizens	No. of supermarkets
Neve Yaaqov	18.3	3.9	9.5	21.2	28.6	7.6	1
Pisgat Zeev North	17.7	3.3	8.8	48.3	66.5	10.4	1
Pisgat Zeev East	21.7	3.6	9.7	59.2	73.5	7.6	0
Pisgat Zeev (No.West & West)	21.7	3.6	9.2	59.2	73.5	7.6	0
Ramat Shlomo	14.1	6.1	12.2	23.8	35	1.1	0
Ramot Allon North	23.1	4.9	11.9	32.7	39.9	2.5	1
Ramot Allon	16.6	4.1	12.2	51.4	61.3	5.6	0
Ramot Allon South	16.6	4.1	12.0	51.4	61.3	5.6	0
Har Hahozvim, Sanhedria	15.8	5.3	15.7	9.9	14.7	4.6	0
Ramat Eshkol, Givat-Mivtar	10.2	3.9	15.2	27.5	34.4	12.1	0
Maalot Dafna, Shmuel Hanavi	8.7	4	13.3	17.1	21.8	7	0
Givat Shapira	9.3	2.3	10.7	56.3	65.9	10.6	2
Mamila, Morasha	13	3.3	15.6	9.9	12.4	10.7	0
Geula, Mea Shearim	28.7	4.6	13.9	7.5	6.9	5.9	0
Makor Baruch, Zichron Moshe	13	3.3	13.2	9.9	12.4	10.7	0
City Center	6.2	1.9	13.7	13.6	24	15.4	2
Nahlaot, Zichronot	9.1	2.1	15.5	27.4	35.7	12.5	0
Rehavya	7.5	2	21.1	42.5	57.6	25.6	1
Romema	21.1	4.5	15.8	11.4	10.7	7.5	1
Givat Shaul	10.5	4.2	13.0	33.8	40.6	7	0
Har Nof	15.8	4.3	13.8	36.1	49.2	6.4	1
Qiryat Moshe, Bet HaKerem	23.3	2.7	15.8	49.8	62.4	16.7	2
Nayot	23.3	2.7	15.1	49.8	62.4	16.7	1
Bayit VaGan	18.1	3.4	15.9	30.7	39.1	12.3	0
Ramat Sharet, Ramat Denya	8.5	3.3	14.9	68.1	85.4	8.9	0
Qiryat HaYovel North	10.6	2.7	11.9	46	54.6	16.9	0
Qiryat HaYovel South	10.6	2.4	11.5	44.8	49.4	16.3	1
Qiryat Menahem, Ir Gannim	17.5	3.3	11.8	57	62.5	10.2	1
Manahat slopes	17.5	3.3	14.9	57	62.5	10.2	0
Gonen (Qatamon)	23.5	2.8	11.7	39.7	50.7	11.9	0
Rassco, Givat Mordekhay	13.5	2.4	15.1	51.5	62.9	14.4	1
German Colony, Gonen	10	2.5	19.7	52	69.6	16.3	0
Qomemiyyut (Talbiya), YMCA	10	2.5	20.7	52	69.6	16.3	0
Baqa, Abu Tor, Yemin Moshe	11	2.9	15.0	51.7	67	16.4	1
Talpiot, Arnona, Mekor Haim	13.8	2.8	13.6	55.5	67.9	18	0
East Talpiot	13.9	2.9	9.5	55.3	60.8	9.5	0
East Talpiot (East)	13.9	2.9	9.5	55.3	60.8	9.5	0
Homat Shmuel (Har Homa)	9.8	4	10.4	66.7	89.3	2.3	0
Gilo East	18.7	3.1	9.4	53.2	65.5	11.6	0
Gilo West	10.4	3.4	9.3	63.7	77.6	8.9	0
Talpiot CD	11	2.9	9.5	51.7	67	16.4	5
Givat Shaul CD	10.5	4.2	13.0	33.8	40.6	7	3
Malcha CD	17.5	3.3	14.9	57	62.5	10.2	1
Romema CD	21.1	4.5	15.8	11.4	10.7	7.5	3
Central Bus Station CD	21.1	4.5	15.8	11.4	10.7	7.5	0
Mahane Yehuda CD	13	3.3	13.2	9.9	12.4	10.7	1

Notes: Commercial districts have associated demographics because they also contain a small residential neighborhood. Housing prices = the 2007-2008 average price per square meter in thousands of dollars. Driving to work = percentage of those aged 15 and over who used a private car or a commercial vehicle (as a driver) as their main means of getting to work in the determinant week. Car ownership = percentage of households using at least one car. Senior citizens = percentage of individuals above age 65. Source: CBS. The number of supermarkets includes all supermarkets in the neighborhood, not just those where prices were sampled.

Table C3: Distances (in km)

Neighborhood	Distance to: All neighborhoods (mean)	City center	Commercial Districts CD 1	CD 2
Neve Yaaqov	10.8	9.2	13.2	12.0
Pisgat Zeev North	9.3	7.5	11.6	10.6
Pisgat Zeev East	8.9	7.0	11.0	10.2
Pisgat Zeev (North - West & West)	8.1	6.1	10.2	9.4
Ramat Shlomo	7.0	5.1	9.4	6.9
Ramot Allon North	7.7	6.5	10.6	7.0
Ramot Allon	7.3	6.0	10.0	6.1
Ramot Allon South	7.3	6.1	10.2	6.6
Har Hahozvim, Sanhedria	4.9	2.4	6.7	4.6
Ramat Eshkol, Givat-Mivtar	5.5	3.0	7.2	5.7
Maalot Dafna, Shmuel Hanavi	4.9	2.0	6.1	5.1
Givat Shapira	6.4	3.7	7.8	7.1
Mamila, Morasha	4.6	0.9	4.3	5.1
Geula, Mea Shearim	4.5	1.2	5.5	4.5
Makor Baruch, Zichron Moshe	4.4	1.3	5.4	3.7
City Center	4.4	0.6	4.4	4.4
Nahlaot, Zichronot	4.3	1.1	4.5	3.7
Rehavya	4.4	1.5	3.6	4.5
Romema	5.0	3.0	6.6	3.4
Givat Shaul	5.8	4.1	7.5	2.8
Har Nof	6.6	5.1	8.1	2.8
Qiryat Moshe, Bet HaKerem	4.8	3.5	5.5	2.6
Nayot	4.8	2.9	4.6	3.8
Bayit VaGan	6.0	5.7	5.7	4.7
Ramat Sharet, Ramat Denya	6.5	6.5	4.8	5.9
Qiryat HaYovel North	6.1	6.1	5.4	5.0
Qiryat HaYovel South	6.5	6.6	5.0	5.9
Qiryat Menahem, Ir Gannim	8.3	8.5	7.0	7.6
Manahat slopes	6.0	5.6	3.6	6.5
Gonen (Qatamon)	5.2	4.0	1.9	6.1
Rassco, Givat Mordekhay	4.8	3.0	2.8	5.0
German Colony, Gonen (Old Qatamon)	4.7	2.5	2.3	5.6
Qomemiyyut (Talbiya), YMCA Compound	4.5	1.3	3.4	5.2
Baqa, Abu Tor, Yemin Moshe	5.2	2.8	2.1	6.5
Talpiot, Arnona, Mekor Haim	5.7	4.0	1.2	7.5
East Talpiot	6.9	5.0	3.0	8.8
East Talpiot (East)	6.9	4.9	3.3	8.8
Homat Shmuel (Har Homa)	8.3	7.2	3.4	10.4
Gilo East	7.6	7.2	3.6	9.0
Gilo West	8.8	8.4	4.9	10.2
Talpiot (CD 1)	5.7	4.4	0.0	7.5
Givat Shaul (CD 2)	6.0	4.4	7.5	0.0
Malcha CD	5.7	5.2	3.1	6.2
Romema CD	4.5	2.0	5.6	3.1
Central Bus Station CD	4.5	2.0	5.6	3.1
Mahane Yehuda CD	4.2	1.1	5.0	3.5
Average	6.1	4.3	5.7	6.0
Standard deviation	1.6	2.3	2.9	2.5
Median	5.8	4.3	5.4	5.8

Notes: Distances in kilometers between each neighborhood and 1) the city center, 2) the two prominent commercial centers CD1 and CD2, and 3) all other neighborhoods (mean distance). Source: CBS.

D Products, prices and expenditures

Table D1: Definition of products

1	**Waffles**	simple packed waffles, non-coated,same brand
2	**Mayonnaise**	low-fat mayonnaise, same brand
3	**Cottage cheese**	250 gr container of same brand
4	**Sugar**	packed sugar, same brand, 1kg
5	**Chocolate bar**	regular milk chocolate, same brand
6	**Mineral water**	in plastic bottle, 1.5 liter
7	**Coca cola**	in plastic bottle, 1.5 liter
8	**Ketchup**	same brand
9	**Tea**	regualr tea, teabags, same brand
10	**Turkish coffee**	packaged roasted and ground turkish coffee, same brand
11	**Cocoa powder**	instant chocolate powder, same brand
12	**Green peas (can)**	garden variety, same brand
13	**Hummus (salad)**	hummus salad, not fresh, same brand
14	**Cucumbers**	fresh standard cucumbers, type A, 1kg
15	**Onion**	dry onion, type A, 1kg
16	**Carrots**	medium size fresh carrots, type A, 1kg
17	**Eggplants**	medium size fresh eggplants, type A, 1kg
18	**Cabbage (white)**	white fresh cabbage, 1kg
19	**Cauliflower**	fresh cauliflower, type A, 1kg
20	**Potatoes**	fresh potatoes, type A, 1kg
21	**Tomatoes**	round tomatoes, type A, 1kg
22	**Apples**	granny smith apples, type A, 1kg
23	**Bananas**	type A, 1 kg
24	**Lemons**	fresh, type A, 1kg
25	**Fabric softener**	same brand
26	**Dishwasher detergent**	in plastic bottle, same brand
27	**Shaving cream/gel**	same brand

Table D2: Product-specific price distributions (NIS)

Product	Mean price	Coefficient of Variation	# stores	Product	Mean price	Coefficient of Variation	# stores	Product	Mean price	Coefficient of Variation	# stores
Waffles				**Turkish coffee**				**Cauliflower**			
Sep-07	10.4	0.14	24	Sep-07	5.8	0.09	23	Sep-07	7.3	0.32	25
Nov-07	10.2	0.18	22	Nov-07	5.7	0.11	23	Nov-07	5.9	0.19	22
Nov-08	11.1	0.24	20	Nov-08	7	0.07	23	Nov-08	6.6	0.24	23
Mayonnaise				**Cocoa powder**				**Potatoes**			
Sep-07	7.6	0.12	22	Sep-07	10.3	0.12	23	Sep-07	4	0.23	37
Nov-07	9	0.21	21	Nov-07	10.5	0.12	23	Nov-07	4.2	0.26	37
Nov-08	9.6	0.14	16	Nov-08	10.7	0.11	22	Nov-08	4.8	0.25	35
Cottage cheese				**Green peas (can)**				**Tomatoes**			
Sep-07	5.3	0.04	23	Sep-07	5.2	0.10	16	Sep-07	6.1	0.33	37
Nov-07	5.8	0.03	25	Nov-07	5.2	0.10	16	Nov-07	5	0.34	37
Nov-08	6	0.05	22	Nov-08	5.9	0.12	14	Nov-08	6.9	0.33	35
Sugar				**Hummus (salad)**				**Apples**			
Sep-07	3.6	0.22	24	Sep-07	9	0.11	17	Sep-07	9	0.20	36
Nov-07	3.6	0.22	23	Nov-07	9.2	0.05	18	Nov-07	9.1	0.12	34
Nov-08	3.4	0.26	24	Nov-08	10.6	0.10	14	Nov-08	9.6	0.18	33
Chocolate bar				**Cucumbers**				**Bananas**			
Sep-07	4.4	0.11	23	Sep-07	4.6	0.28	37	Sep-07	6.3	0.13	35
Nov-07	4.5	0.11	23	Nov-07	5.8	0.17	37	Nov-07	5.6	0.30	35
Nov-08	5.1	0.12	23	Nov-08	4.8	0.29	35	Nov-08	7.8	0.23	33
Mineral water				**Onion**				**Lemons**			
Sep-07	12.8	0.11	21	Sep-07	2.8	0.32	37	Sep-07	11.7	0.22	38
Nov-07	12.7	0.15	20	Nov-07	3.2	0.34	36	Nov-07	8.1	0.25	36
Nov-08	12.3	0.28	20	Nov-08	3.7	0.35	35	Nov-08	10.4	0.37	35
Coca cola				**Carrots**				**Fabric s.**			
Sep-07	5.5	0.18	25	Sep-07	4.9	0.18	37	Sep-07	20.8	0.08	21
Nov-07	5.5	0.18	25	Nov-07	5.1	0.18	36	Nov-07	19.9	0.16	25
Nov-08	5.9	0.17	24	Nov-08	5.6	0.38	32	Nov-08	22.1	0.07	22
Ketchup				**Eggplants**				**Dishwasher d.**			
Sep-07	11.1	0.14	24	Sep-07	4	0.40	38	Sep-07	10.8	0.12	16
Nov-07	10.9	0.14	24	Nov-07	3.7	0.41	35	Nov-07	11.9	0.10	19
Nov-08	11	0.15	23	Nov-08	4.7	0.34	33	Nov-08	11.1	0.20	23
Tea				**Cabbage (white)**				**Shaving c/g**			
Sep-07	15.8	0.15	22	Sep-07	4.7	0.51	33	Sep-07	22.1	0.20	22
Nov-07	16.2	0.15	23	Nov-07	3.7	0.57	32	Nov-07	23.2	0.22	16
Nov-08	17.1	0.15	20	Nov-08	5.1	0.61	31	Nov-08	23.5	0.16	18

Table D3: Number of sampled stores and of observed products

Neigborhood	# sampled stores Sep2007	Nov2007	Nov2008	# observed products Sep2007	Nov2007	Nov2008	# supermarkets
Neve Yaaqov	**1**	**1**	**1**	**27**	**27**	**27**	**1**
Pisgat Zeev North	**1**	**1**	**1**	**26**	**26**	**27**	**1**
Ramot Allon North	**2**	**2**	**2**	**24**	**25**	**25**	**1**
Ramat Eshkol, G. Mivtar	1	1	1	11	10	9	0
M. Dafna, S. Hanavi	1	0	0	10	0	0	0
Givat Shapira	**2**	**2**	**2**	**27**	**27**	**27**	**2**
Geula, Mea Shearim	3	4	3	12	12	13	0
City Center	1	2	2	6	7	6	2
Rehavya	**2**	**2**	**2**	**24**	**25**	**24**	**1**
Romema	**2**	**2**	**2**	**24**	**23**	**22**	**1**
Givat Shaul	1	1	1	3	4	3	0
Har Nof	**1**	**1**	**1**	**25**	**21**	**22**	**1**
Qiryat Moshe, B. Hakerem	**3**	**3**	**3**	**27**	**27**	**27**	**2**
Nayot	1	1	1	11	11	11	1
Ramat Sharet-Denya	1	1	0	1	1	0	0
Qiryat HaYovel South	**3**	**2**	**2**	**27**	**26**	**26**	**1**
Rassco, Givat Mordekhay	**2**	**2**	**2**	**26**	**27**	**27**	**1**
Baqa, Abu Tor, Y. Moshe	**1**	**1**	**1**	**26**	**25**	**23**	**1**
Talpiot, Arnona, M. Haim	1	1	1	4	4	2	0
Gilo East	0	1	0	0	1	0	0
Gilo West	2	2	2	12	13	12	0
Talpiot CD	**7**	**7**	**7**	**27**	**27**	**27**	**5**
Givat Shaul CD	**3**	**3**	**3**	**27**	**27**	**26**	**3**
Malcha CD	1	1	1	3	4	4	1
Romema CD	**1**	**1**	**1**	**27**	**27**	**23**	**3**
Mahane Yehuda CD	**10**	**10**	**9**	**25**	**24**	**24**	**1**

Notes: The 15 neighborhoods with price data for at least 21 out of the 27 products appear in bold.

Table D4: Product composition of composite good

	Neighborhood														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Product															
Waffles	3	3	3	3	3	1	3	3	3	3	3	3	3	3	1
Mayonnaise	3	3	3	3	2	2	1	3	3	3	3	3	3	2	3
Cottage ch.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Sugar	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
Chocolate bar	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Mineral water	3	2	1	3	3	3	3	3	3	3	1	3	3	3	3
Coca cola	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ketchup	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Tea	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Turkish coffee	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Cocoa powder	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Potatoes	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Tomatoes	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Cucumbers	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Onion	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Carrots	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Eggplants	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Cabbage	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
Cauliflower	3	3	3	3	3	0	0	3	3	3	1	3	3	2	3
Apples	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Bananas	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Lemons	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3
G. peas (can)	3	3	2	3	1	2	0	3	3	3	2	3	3	2	2
Hummus	3	3	3	3	1	2	1	3	1	3	2	3	2	3	3
Fabric soft.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Dishwasher d.	3	2	2	3	1	3	3	3	3	2	3	3	3	3	1
Shaving c/g	3	3	0	3	2	1	1	3	3	3	2	3	3	2	0

Notes: Entries are the number of times a product (row) appears in a neighborhood (column) over the three periods. A "3" means that the products was always in the composite basket, while a "0" means that it was never included in the basket. In both cases, there is no change in the composition of the basket over time. The 15 neighborhoods are: 1= Neve Yaaqov, 2= Pisgat Zeev N., 3=Ramot Alon N., 4=givat Shapira, 5=Rehavia, 6=Romema, 7=Har Nof, 8=Qiryat Moshe, Bet Hakerem. 9=Qiryat Hayovel South, 10=Rasko, Givat Mordekhay, 11=Baqa, Abu Tor, Yemin Moshe, 12= Talpiot (CD1), 13=Givat Shaul (CD2), 14=Romema CD, 15=mahane Yehuda CD.

Table D5: Distribution of products across neighborhoods

	Sep-07	Nov-07	Nov-08
Waffles	15	13	13
Low fat mayonnaise	15	14	11
Cottage cheese	15	15	15
Sugar	15	14	15
Chocolate bar	15	15	15
Mineral water	14	12	14
Coca cola	15	15	15
Ketchup	15	15	15
Tea	15	15	15
Turkish coffee	15	15	15
Cocoa powder	15	15	15
Potatoes	15	15	15
Tomatoes	15	15	15
Cucumbers	15	15	15
Onion	15	15	15
Carrots	15	15	15
Eggplants	15	15	15
Cabbage (white)	14	15	15
Cauliflower	12	12	12
Apples	15	15	15
Bananas	15	15	15
Lemons	15	14	15
Green peas (can)	13	13	9
Hummus	13	13	10
Fabric softener	15	15	15
Dishwasher detergent	10	13	15
Shaving cream/gel	13	11	8

Notes: Entries are the number of neighborhoods in which a product has non-missing price data per period.

Table D6: Composite good prices (NIS) across Jerusalem neighborhoods

Sep-07		Nov-07		Nov-08	
Ramot Allon north	6.23	**Talpyiot CD (CD1)**	6.15	**Talpyiot CD (CD1)**	6.89
Talpyiot CD (CD1)	6.33	Ramot Allon north	6.56	**Givat Shaul CD (CD2)**	7.07
Mahane Yehuda CD	6.84	**Mahane Yehuda CD**	6.81	**Mahane Yehuda CD**	7.20
Romema CD	7.03	Pisgat Zeev North	6.89	Pisgat Zeev North	7.36
Har Nof	7.13	Har Nof	6.93	Ramot Allon north	7.61
Neve Yaaqov	7.15	**Romema CD**	6.99	Har Nof	7.62
Rassco, Givat Mordekhay	7.32	Baqa, Abu Tor, Yemin Moshe	7.06	Baqa, Abu Tor, Yemin Moshe	7.76
Pisgat Zeev North	7.34	Rehavya	7.27	Qiryat Moshe, Bet Hakerem	7.85
Givat Shaul CD (CD2)	7.45	**Givat Shaul CD (CD2)**	7.30	Rassco, Givat Mordekhay	7.87
Giv'at Shapira	7.54	Neve Yaaqov	7.31	Neve Yaaqov	8.01
Qiryat Moshe, Bet Hakerem	7.55	Rassco, Givat Mordekhay	7.34	Giv'at Shapira	8.14
Romema	7.61	Qiryat Ha-Yovel south	7.36	Romema	8.17
Baqa, Abu Tor, Yemin Moshe	7.68	Romema	7.38	Qiryat Ha-Yovel south	8.19
Qiryat Ha-Yovel south	7.80	Giv'at Shapira	7.39	Rehavya	8.52
Rehavya	8.01	Qiryat Moshe, Bet Hakerem	7.61	**Romema CD**	8.69
Mean	7.27		7.09		7.80
Standard deviation	0.50		0.38		0.52

Notes: Source: CBS.

Table D7: Credit Card Expenditures

Neighborhood	Fraction spent at		
	Own neighborhood	CD1	CD2
Neve Yaaqov	0.25	0.03	0.02
Pisgat Zeev North	0.68	0.10	0.03
Pisgat Zeev East	0.22	0.23	0.06
Pisgat Zeev (North - West & West)	0.01	0.24	0.08
Ramat Shlomo	0.18	0.01	0.02
Ramot Allon North	0.25	0.12	0.06
Ramot Allon	0.15	0.15	0.08
Ramot Allon South	0.31	0.18	0.11
Har Hahozvim, Sanhedria	0.08	0.01	0.02
Ramat Eshkol, Givat-Mivtar	0.56	0.05	0.02
Maalot Dafna, Shmuel Hanavi	0.18	0.08	0.02
Givat Shapira	0.42	0.18	0.04
Mamila, Morasha	0.05	0.29	0.06
Geula, Mea Shearim	0.24	0.06	0.02
Makor Baruch, Zichron Moshe	0.03	0.04	0.02
City Center	0.10	0.16	0.05
Nahlaot, Zichronot	0.03	0.17	0.04
Rehavya	0.44	0.19	0.03
Romema	0.54	0.03	0.02
Givat Shaul	0.60	0.03	0.16
Har Nof	0.30	0.01	0.31
Qiryat Moshe, Bet HaKerem	0.14	0.16	0.18
Nayot	0.08	0.14	0.20
Bayit VaGan	0.05	0.17	0.10
Ramat Sharet, Ramat Denya	0.12	0.31	0.07
Qiryat HaYovel North	0.21	0.21	0.07
Qiryat HaYovel South	0.33	0.31	0.05
Qiryat Menahem, Ir Gannim	0.52	0.21	0.03
Manahat slopes	0.07	0.55	0.06
Gonen (Qatamon)	0.07	0.55	0.03
Rassco, Givat Mordekhay	0.31	0.47	0.03
German Colony, Gonen (Old Qatamon)	0.07	0.61	0.03
Qomemiyyut (Talbiya), YMCA Compound	0.01	0.29	0.05
Baqa, Abu Tor, Yemin Moshe	0.00	0.65	0.02
Talpiot, Arnona, Mekor Haim	0.15	0.71	0.02
East Talpiot	0.01	0.71	0.03
East Talpiot (East)	0.01	0.66	0.02
Homat Shmuel (Har Homa)	0.00	0.72	0.03
Gilo East	0.21	0.46	0.02
Gilo West	0.26	0.46	0.03
Talpiot commercial district	0.76	0.76	0.03
Givat Shaul commercial district	0.41	0.06	0.41
Malcha commercial district	0.01	0.60	0.05
Romema commercial district	0.60	0.04	0.03
Central Bus Station	0.14	0.16	0.01
Mahane Yehuda	0.06	0.26	0.08
Mean	0.22	0.27	0.06
Median	0.16	0.19	0.03

Notes: Entries are expenditure fractions averaged over the three periods of data.

E Observed and counterfactual posted prices and Average Prices Paid in all neighborhoods

Table E1 presents the counterfactual price changes in the 15 neighborhoods where prices could be computed using at least 21 products. Table E2 presents changes in the APP in all 46 neighborhoods.

Table E1: Counterfactual changes to posted prices

Neighborhood	Observed price	Reduced travel disutility		Improved amenities		Additional entry
		Distance	Distance & κ	CD1	CD1-CD2	
Neve Yaaqov (NAP1)	8.01	3.3%	4.7%	-0.1%	-0.3%	-2.8%
Pisgat Zeev North	7.36	0.3%	0.7%	-0.9%	-1.2%	-3.4%
Ramot Allon north	7.61	0.2%	0.3%	-0.4%	-0.5%	-3.3%
Givat Shapira (NAP2)	8.14	0.4%	0.8%	0.0%	-0.1%	-1.3%
Rehavya (AC1)	8.52	-8.2%	-12.0%	-3.6%	-1.1%	-6.8%
Romema	8.17	-1.3%	-2.7%	1.2%	1.9%	-4.4%
Har Nof	7.62	-0.7%	-1.7%	0.0%	-1.3%	-4.3%
Qiryat Moshe, B. HaKerem (AC2)	7.85	-1.3%	-3.7%	0.2%	-0.8%	-1.9%
Qiryat HaYovel South (NAP3)	8.19	-0.5%	-0.5%	-0.6%	-0.9%	-3.5%
Rassco, Givat Mordekhay	7.87	-1.7%	-3.4%	-0.7%	-0.9%	-4.6%
Baqa, Abu Tor, Y. Moshe (AC3)	7.76	-0.2%	-0.3%	-0.1%	-0.2%	-3.0%
Talpiot (CD1)	6.89	-0.3%	-0.2%	0.5%	0.2%	0.0%
Givat Shaul (CD2)	7.07	-1.1%	-1.0%	0.3%	0.3%	0.0%
Romema CD	8.69	-1.0%	-1.0%	0.4%	0.3%	0.1%
Mahane Yehuda CD	7.20	-1.5%	-1.4%	0.1%	-0.2%	0.1%
Mean (residential)		-0.9%	-1.6%	-0.5%	-0.5%	-3.6%
Median (residential)		-0.5%	-0.5%	-0.1%	-0.8%	-3.4%

Notes: The table reports the percentage changes in prices charged in the 15 neighborhoods where the composite good price could be computed using at least 21 goods. The counterfactuals, performed in the third sample period, are described in the text in detail.

Table E2: Counterfactual changes to the Average Price Paid (APP)

Retail location	Observed price	Reduced travel disutility		Improved amenities		Additional entry
		Distance	Distance & κ	CD1	CD1-CD2	
Neve Yaaqov (NAP1)	7.86	0.4%	0.0%	-2.2%	-3.2%	-2.6%
Pisgat Zeev North	7.48	-1.5%	-1.5%	-3.2%	-3.7%	-2.7%
Pisgat Zeev East	7.67	-4.2%	-4.2%	-6.3%	-6.8%	-0.8%
Pisgat Zeev (NW & W)	7.46	-3.0%	-2.9%	-4.6%	-4.9%	-1.5%
Ramat Shlomo	8.20	-1.1%	-1.4%	-0.5%	-2.8%	-1.2%
Ramot Allon north	7.86	-3.3%	-3.5%	-5.2%	-6.6%	-1.6%
Ramot Allon	7.83	-3.6%	-3.8%	-5.5%	-6.8%	-1.1%
Ramot Allon South	7.75	-4.8%	-4.9%	-6.0%	-6.9%	-0.7%
Har Hahozvim, Sanhedria	8.29	-1.4%	-1.7%	-0.4%	-3.0%	-1.4%
Ramat Eshkol, Givat-Mivtar	8.12	-2.6%	-2.6%	-4.2%	-5.3%	-0.3%
Maalot Dafna, Shmuel Hanavi	8.07	-2.8%	-2.9%	-4.9%	-5.8%	-0.4%
Givat Shapira (NAP2)	7.85	-3.5%	-5.5%	-6.6%	-7.2%	-0.7%
Mamila, Morasha	7.80	-3.6%	-3.9%	-7.4%	-7.8%	-0.7%
Geula, Mea Shearim	8.18	-2.2%	-2.3%	-4.0%	-5.4%	-0.5%
Makor Baruch, Zichron Moshe	8.28	-2.5%	-3.1%	-2.6%	-4.3%	-1.1%
City Center	7.96	-3.6%	-3.9%	-7.4%	-8.1%	-0.8%
Nahlaot, Zichronot	7.93	-5.2%	-6.5%	-7.8%	-8.1%	-2.6%
Rehavya (AC1)	7.98	-5.7%	-7.3%	-8.6%	-8.7%	-3.2%
Romema	8.24	-1.8%	-2.2%	-0.8%	-2.3%	-2.7%
Givat Shaul	7.97	-2.0%	-2.2%	-1.4%	-6.6%	-0.5%
Har Nof	7.62	-1.5%	-1.9%	-0.6%	-5.1%	-1.8%
Qiryat Moshe, Bet HaKerem (AC2)	7.67	-2.9%	-3.4%	-4.7%	-6.2%	-0.5%
Nayot	7.71	-3.1%	-3.4%	-5.1%	-6.6%	-0.9%
Bayit VaGan	7.86	-3.0%	-3.3%	-6.0%	-7.3%	-0.9%
Ramat Sharet, Ramat Denya	7.71	-2.4%	-2.5%	-6.9%	-7.3%	-0.5%
Qiryat HaYovel North	7.78	-3.4%	-3.5%	-6.7%	-7.3%	-0.7%
Qiryat HaYovel South (NAP3)	7.72	-3.3%	-4.7%	-7.0%	-7.3%	-1.2%
Qiryat Menahem, Ir Gannim	7.86	-3.8%	-3.9%	-7.2%	-7.7%	-0.3%
Manahat slopes	7.34	-1.7%	-1.8%	-4.6%	-4.7%	-0.5%
Gonen (Qatamon)	7.41	-1.1%	-1.4%	-5.2%	-5.4%	-0.8%
Rassco, Givat Mordekhay	7.44	-1.8%	-3.2%	-5.4%	-5.6%	-1.6%
German Colony, Gonen	7.28	-1.3%	-1.5%	-4.1%	-4.3%	-0.6%
Qomemiyyut (Talbiya), YMCA	7.75	-3.0%	-3.4%	-7.4%	-7.6%	-0.8%
Baqa, Abu Tor, Y. Moshe (AC3)	7.28	-1.1%	-1.2%	-4.1%	-4.3%	-0.3%
Talpiot, Arnona, Mekor Haim	7.21	-0.5%	-0.6%	-3.4%	-3.6%	-0.2%
East Talpiot	7.19	-0.9%	-1.0%	-3.1%	-3.3%	-0.2%
East Talpiot (East)	7.23	-1.2%	-1.3%	-3.5%	-3.7%	-0.2%
Homat Shmuel (Har Homa)	7.14	-1.3%	-1.3%	-2.6%	-2.8%	-0.1%
Gilo East	7.55	-2.4%	-2.4%	-6.4%	-6.6%	-0.2%
Gilo West	7.55	-2.7%	-2.8%	-6.3%	-6.5%	-0.2%
Talpiot (CD1)	7.14	0.0%	2.3%	-2.6%	-2.8%	-0.2%
Givat Shaul (CD2)	7.51	-1.1%	0.8%	-1.9%	-4.7%	-0.4%
Malcha CD	7.29	-1.4%	-1.4%	-4.2%	-4.2%	-0.3%
Romema CD	8.34	-3.5%	-6.7%	-3.1%	-6.3%	-1.0%
Central Bus Station CD	8.06	-4.2%	-4.5%	-6.3%	-6.6%	-1.1%
Mahane Yehuda CD	7.79	-4.7%	-5.5%	-7.1%	-7.5%	-2.1%
Mean		**-2.5%**	**-2.8%**	**-4.7%**	**-5.6%**	**-1.0%**
Median		**-2.5%**	**-2.8%**	**-4.8%**	**-6.0%**	**-0.8%**
APP levels						
Mean APP	7.72	7.53	7.50	7.36	7.28	7.65
Median APP	7.75	7.51	7.43	7.28	7.20	7.67

Notes: The table reports the percentage changes in Average Prices Paid (APP) charged in all 46 neighborhoods. See text for detailed explanations of each scenario. All counterfactuals performed in the third sample period. The last two rows report statistics on the expected prices in levels rather than in percentage changes.

F Model, estimation and identification: additional details

In this online appendix, we provide some additional technical details regarding the demand model and its application, including some additional discussion of several aspects of our assumptions.

Deriving equation (2). It is convenient to rewrite the utility function as

$$U_{hjsn} = \gamma^{-1} \ln y_j \cdot x_j\alpha + \delta_{jsn} + \zeta_{hn}(\sigma) + (1-\sigma)\epsilon_{hjsn},$$

where $\delta_{jsn} = \nu_c + \nu_j + \nu_n + hp_j \cdot \nu_n - \ln p_{sn} \cdot x_j\alpha - d_{jn} \cdot x_j\beta + \kappa \cdot h_{jn}$ is the mean utility level, common to all origin-j residents who shop at s in destination n. The model is completed by specifying the utility of a resident of neighborhood j from shopping at the outside option $n = 0$, defined as the only member of its nest:

$$U_{hjs0} = \gamma^{-1} \ln y_j \cdot x_j\alpha + \zeta_{h0}(\sigma) + (1-\sigma)\epsilon_{hjs0} \tag{F.1}$$

This definition normalizes, without loss of generality, j-residents' mean utility from the outside option at $\delta_{j0} = 0$. The terms v_j in the mean utility δ_{jsn} associated with "inside options" allow for heterogeneity in the utility from the outside option across origin neighborhoods. This is particularly important given that, for residents of neighborhoods in which the price is not observed, the choice to shop in their home neighborhood is considered part of the outside option.

The model implies predicted values for choice probabilities and expenditures. Integrating over the Type I Extreme Value density of the i.i.d. idiosyncratic terms delivers the familiar nested logit formula for the probability that a resident of neighborhood j shops at store s located in neighborhood n, conditional on shopping at n,

$$\pi_{js/n}(\mathbf{p};\theta) = e^{\left(\gamma^{-1} \ln y_j \cdot x_j\alpha + \delta_{jsn}\right)/(1-\sigma)} / D_{jn} \tag{F.2}$$

where $\theta = (\alpha, \beta, \kappa, \sigma)$ are the model's parameters, and the term D_{jn} is defined by

$$D_{jn} = \sum_{s=1}^{L_n} \exp((\gamma^{-1} \ln y_j \cdot x_j\alpha + \delta_{jsn})/(1-\sigma)) \text{ for } n = 1, ..., 15, \text{ and } D_{j0} = \exp(\gamma^{-1} \ln y_j x_j\alpha/(1-\sigma)),$$

where L_n denotes the number of retailers located in neighborhood n.

The probability that a resident from origin j shops in neighborhood n (the "nest share") is,

$$\pi_{jn}(\mathbf{p};\theta) = D_{jn}^{1-\sigma} / \sum_{m=0}^{N} D_{jm}^{1-\sigma} \tag{F.3}$$

The probability of shopping at store s located in neighborhood n is given by multiplying the terms in (F.2) and (F.3). Imposing within-neighborhood price symmetry (Assumption 1), we have $p_{sn} = p_n$, and the terms simplify to

$$\begin{aligned} D_{jn} &= L_n \cdot \exp(\left(\gamma^{-1} \ln y_j \cdot x_j \alpha + \delta_{jn}\right) / (1-\sigma)) \\ \pi_{js/n}(\mathbf{p};\theta) &= 1/L_n \\ \pi_{jsn}(\mathbf{p};\theta) &= \pi_{jn}(\mathbf{p};\theta)/L_n \end{aligned} \tag{F.4}$$

We further obtain that each store in the neighborhood is visited with equal probability so that demand per neighborhood-j household for the composite good sold at destination n is

$$q_{hjn} = \gamma(y_j/p_n) \tag{F.5}$$

Finally, we note that the expected monetary expenditure of household h residing in neighborhood j in destination neighborhood n at time t can be written as $e_{hjnt} = \pi_{jnt} q_{hjnt} p_{nt} = \pi_{jnt} \gamma y_j$, using (F.5) and taking income to be time-invariant. Because income is assumed identical across households within the neighborhood, q_{hjnt} and e_{hjnt} do not vary within the neighborhood, and aggregate expenditures by neighborhood j residents in neighborhood n are,

$$E_{jnt} = H_j e_{hjnt} = H_j \pi_{jnt} \gamma y_j \tag{F.6}$$

where H_j is the number of households residing in neighborhood j.[5]

Motivated by the within-neighborhood store symmetry, we pursue a variant of Berry's (1994) inversion strategy: rather than inverting a product (in our case, store) level market share equation, we invert a nest-level expenditure share equation that equates the *nest* expenditure shares predicted by the model to those observed in the data. This enables us to solve for the mean utility level. Using (F.3), (F.6) and the definition of the mean utility δ_{jn}, we obtain:[6]

[5]We could allow income to vary within neighborhoods by implementing the computationally intensive Random Coefficient Logit (Berry, Levinsohn and Pakes 1995) instead of the Nested Logit model. We favor the simplicity of the Nested Logit, particularly in this case since it still allows us to capture the very rich cross-neighborhood variation available in our data.

[6]Note that the time fixed effect v_t is part of the definition of δ_{jnt}. Again, the model in Section 3.1 omitted all time indices for expositional clarity.

$$
\begin{aligned}
\ln\left(\frac{E_{jnt}}{E_{j0t}}\right) &= \ln(\pi_{jnt}/\pi_{j0t}) = (1-\sigma)\ln L_n + \delta_{jnt} \\
&= \nu_c + \nu_j + (\nu_n + (1-\sigma)\ln L_n) + hp_j \cdot \nu_n + \nu_t - \ln p_{nt} \cdot x_j\alpha - d_{jn} \cdot x_j\beta + \kappa \cdot h_{jn}
\end{aligned}
$$

which is equation (2). As shown in the main text, adding Assumption 2 allows us to obtain the estimation equation (3) which is the one taken to the data.

Identification. The distance effect in the utility function is captured by $d_{jn} \cdot x_j\beta$, where x_j contains a constant, and shifters such as the origin-j share of car ownership. The coefficient on the constant term is obtained by relating the variation in expenditures (net of origin, destination, time and distance effects) in location n to the variation in the distance to n from origin neighborhoods sharing identical demographics. The other elements of β are identified by relating this net expenditure variation to the variation in demographics across origin neighborhoods sharing an identical distance to n.

The price effect is captured by $\ln p_{nt} \cdot x_j\alpha$ where, similarly, x_j contains a constant, and a shifter of origin-j's price sensitivity, namely, housing prices. Identification of the constant term is obtained by relating the net variation in expenditures to the variation in price over time in the same destination neighborhood. The additional element of α is identified by relating the net variation in expenditures at destination n to the variation in demographics across neighborhoods. Note that since we have multiple observations on expenditures in destination n and from origin j, we could estimate destination and origin fixed effects even with a single sample period.

Demand elasticities. Demand for the composite good at store s located in neighborhood n from households residing in neighborhood j is $Q_{jsnt} = (E_{jsnt}/p_{snt}) = H_j\pi_{jsnt}(\gamma y_j/p_{snt})$, where E_{jsnt} is the total expenditure of origin neighborhood j's residents at store s located in neighborhood n and π_{jsnt} is the probability that a resident from origin j shops at the store. Aggregate demand at the store from all origin neighborhoods is $Q_{snt} = \sum_{j=1}^{J} Q_{jsnt}$. The retailer's own price elasticity is therefore

$$
\text{(F.7)} \qquad \eta_{snt,p} = \frac{p_{snt}}{Q_{snt}}\frac{\partial Q_{snt}}{\partial p_{snt}} = -\sum_{j=1}^{J}\frac{Q_{jsnt}}{Q_{snt}}\left[1 + x_j\alpha\left(\frac{1}{1-\sigma} - \frac{\sigma}{1-\sigma}\pi_{js|nt} - \pi_{jsnt}\right)\right]
$$

where $\pi_{js|n}$ was defined in (F.2). This elasticity measures the percentage change in demand at store s located in destination n in response to a one percent increase in the composite good's price charged at that store. This is a quantity-weighted average of origin-specific price elasticities.

Imposing the within-neighborhood symmetry mean utility levels (Assumption 1) simplifies this elasticity term: we obtain $\pi_{js|nt} = 1/L_n$, $\pi_{jsnt} = \pi_{jnt}/L_n$, and $Q_{jsnt}/Q_{snt} = Q^j_{nt}/Q_{nt}$, where we have denoted the total demand faced by all retailers in neighborhood n Q_n, whereas Q_n^j is the part of this demand generated by residents of origin j. In other words, the symmetry assumption implies that the fraction of sales at store s that are made to customers arriving from neighborhood j is equal to the fraction of total sales by neighborhood n's retailers to origin j's residents. This gives rise to the elasticity formula in (4) as presented in the main text. Similar calculations deliver the distance semi-elasticity:

$$\eta_{jnt,d} = \frac{1}{Q_{nt}^j}\frac{\partial Q_{nt}^j}{\partial d_{jn}} = -x_j\beta\left(1-\pi_{jnt}\right),$$

measuring the percentage change in demand from residents of neighborhood j at destination $n \neq j$ in response to a 1 km increase in the distance between these neighborhoods.

Choice probabilities and expenditure shares. In our application π_{jnt} does not necessarily equal the observed expenditure share due to the measurement error and the fact that the estimated fixed effects (ϕ) confound the utility fixed effects (ν) with measurement error effects. As a consequence, even though the parameters α, β, κ are consistently estimated given the assumptions of Section 3.1, the mean utility levels δ are not identified, and hence, neither are the choice probabilities, absent additional assumptions. Applying the definition $\tilde{E}_{jnt}^{cc} = \frac{\tau_{jnt}}{\lambda_{jnt}}E_{jnt}$ for every destination n, and using (F.6), observed expenditure shares s_{jnt}^{CC} (in words: the share of expenditures by residents of origin j spent in destination n) can be expressed as:

$$s_{jnt}^{CC} = \frac{\tilde{E}_{jnt}^{cc}}{\sum_{m=0}^{N}\tilde{E}_{jmt}^{cc}} = \left(\frac{\tau_{jnt}}{\lambda_{jnt}}\right)\frac{\pi_{jnt}}{\sum_{m=0}^{N}\left(\frac{\tau_{jmt}}{\lambda_{jmt}}\right)\pi_{jmt}}$$

If, for any fixed origin neighborhood j, the ratio $(\tau_{jnt}/\lambda_{jnt})$ is constant across destinations n, then these ratios cancel out, implying that the observed credit-card expenditure share s_{jnt}^{CC} is equal to the choice probability π_{jnt},

$$s_{jnt}^{CC} = \frac{\pi_{jnt}}{\sum_{m=0}^{N}\pi_{jmt}} = \pi_{jnt} \tag{F.8}$$

This explains the role played by Assumption 3.

The supply side model. We provide here some more detail on the implications of Assumption 4 which captures all our assumptions regarding retailers' behavior. In what follows we omit the time index t everwhere.

Given rival prices p_{-sn}, the price p_{sn} charged by retailer s in destination neighborhood n maximizes the profit function, $\Pi_{sn} = (p_{sn} - c_n)Q_{sn}(p_{sn}; p_{-sn})$, where $Q_{sn} = \sum_{j=1}^{J} Q_{jsn}$ is the total quantity sold by retailer s in neighborhood n. Rearranging yields the familiar inverse elasticity formula for the equilibrium margins,

$$\text{(F.9)} \qquad \frac{p_{sn}-c_n}{p_{sn}} = -\frac{1}{\eta_{sn,p}} = \frac{1}{\sum_{j=1}^{N} \frac{Q_{jsn}}{Q_{sn}} \left[1 + x_j\alpha\left(\frac{1}{1-\sigma} - \frac{\sigma}{1-\sigma}\pi_{js|n} - \pi_{jsn}\right)\right]}$$

where the last equality follows from (F.7).

We follow the literature by assuming the existence of a unique interior Nash equilibrium in prices.[7] We further assume that the unique pricing equilibrium satisfies within-neighborhood symmetry, a natural assumption given the assumed symmetry of the non-price components of mean-utility levels. When generating counterfactuals we will compute such equilibria at the estimated parameter values. It follows that when exploring equilibrium outcomes, we use (F.4) to replace $\pi_{js|n}$ by $1/L_n$, π_{jsn} by π_{jn}/L_n. As explained above in the derivation of the demand elasticities, this symmetry also allows us to replace (Q_{jsn}/Q_{sn}) by Q^j_{nt}/Q_{nt} .

Margins are intuitively affected by within-neighborhood competition, by neighborhood demographics, and by spatial frictions. With respect to within-neighborhood competition, note that higher values of L_n are associated with lower markups, and the magnitude of this effect depends on the parameter σ: the derivative of the margin with respect to σ is negative (as long as $L_n > 1$). Higher values of σ imply greater substitutability of stores within a neighborhood. The text offered additional discussion of the intuition underlying the margins formula.

Discussion: some implications of our modeling assumptions. We next provide a point-by-point discussion of some additional aspects of our assumptions.

1. Complete information. We have implicitly assumed that consumers are perfectly informed regarding all shopping locations and the prices and amenities offered there. This stands in contrast to a familiar "search cost" literature in which price differentials are explained as a consequence of consumers being imperfectly informed about prices (Stigler, 1961). In Jerusalem, prices in residential neighborhoods are *persistently* higher than those in the commercial areas. The exact location of the low price stores is common knowledge. This is likely to be true in many urban settings, and we thus choose to ignore potential information frictions and emphasize spatial frictions instead.[8]

2. A single shopping trip. Our model would be misspecified if many consumers split their grocery shopping among multiple destinations. While such behavior can definitely be expected, we believe that the time and effort involved with grocery shopping imply that most consumers perform a single weekly sopping trip, possibly complemented by small "top-up" trips to make up for a small number of necessary items.

If consumers favor visiting a commercial district where they can split their shopping across multiple supermarkets, the model would again be misspecified, as it does not allow supermarkets

[7] Caplin and Nalebuff (1991) demonstrate such uniqueness under stronger conditions than those imposed here. See also Nocke and Schutz (2015).

[8] Dubois and Perrone (2015) offer a different view. Other examples of empirical studies of imperfect information settings include Sorensen (2000), Lach (2002), Brown and Goolsbee (2002), and Chandra and Tapatta (2011).

to serve as complements. Most consumers, however, are not likely to split their grocery shopping across two stores within a single shopping trip. Moreover, greater product variety in shopping areas is controlled for by the destination fixed effects ν_n.

Finally, a scenario that would violate Assumption 3 is that households may use credit cards in their major shopping trip, and cash in small "top-up" trips, performed close to home. In this case, our measurement error would be correlated with distance, even after controlling for fixed effects.[9] However, as long as the "top-up" trips primarily take place in the home neighborhood, this issue can be overcome by altering Assumption 3 to condition not only on origin, destination and time fixed effects, but also on the "shopping at home" dummy variable h_{jn}. This will not change our estimated coefficients but would change the interpretation of the "shopping at home" coefficient, which would then confound the utility effect κ with measurement error.

3. Additional unobserved heterogeneity. Our model and estimation follow familiar strategies in the IO literature based on Berry's (1994) inversion strategy for the estimation of demand functions using aggregate data. While we explicitly model measurement error and use it to construct the econometric error term, the standard approach typically ignores measurement error and derives the econometric error term by specifying an unobserved random shifter at the product level. In our context, this would imply adding an unobserved utility shifter v_{jnt} to equation (2), which would be known to firms and therefore correlated with prices, generating an identification problem.

The presence of v_{jnt} would imply that residents of certain origin neighborhoods j have a systematic preference for traveling to certain destination neighborhoods n, over and above the overall tendency to travel to n (which is controlled for by the v_n fixed effect), and for reasons not related to the distance d_{jn} or to the price at the destination p_n. We do not expect such systematic tendencies to be important. One scenario that could generate such tendencies is that residents of affluent origin neighborhoods may prefer shopping at specific destinations if those offer unobserved amenities that are particularly appealing to wealthy individuals (e.g., better product variety, organic food etc.). We included the term $hp_j \cdot \nu_n$ (origin's housing prices interacted with destination fixed effects) to control for such possibilities. This inclusion has little bearing on the estimated coefficients, reinforcing our prior beliefs that such systematic effects, to the extent that they are present, are not likely to be quantitatively important.

G Computational details on counterfactuals

We solve for counterfactual price equilibria, focusing on equilibria that satisfy within-neighborhood price symmetry. It follows that the pricing equilibrium is characterized by a system of first-order conditions, containing one "representative" first-order condition per destination neighborhood. This is the FOC that characterizes the optimal pricing decision of a representative retailer in

[9] We are grateful to Pierre Dubois for pointing out this possibility.

the neighborhood, as defined in (F.9). It is convenient to organize the FOCs in vector form:

$$(p - c) \bullet d(p) = p \tag{G.1}$$

where $\bullet$ represents element-by-element multiplication and d is a vector defined by

$$d(p) = \begin{bmatrix} \sum_{j=1}^{J} \frac{Q_1^j}{Q_1} \left[1 + x_j\alpha \left(\frac{1}{1-\sigma} - \frac{\sigma}{1-\sigma}(1/L_1) - \pi_{j1}/L_1\right)\right] \\ \sum_{j=1}^{J} \frac{Q_2^j}{Q_2} \left[1 + x_j\alpha \left(\frac{1}{1-\sigma} - \frac{\sigma}{1-\sigma}(1/L_2) - \pi_{j2}/L_2\right)\right] \\ \vdots \\ \sum_{j=1}^{J} \frac{Q_N^j}{Q_N} \left[1 + x_j\alpha \left(\frac{1}{1-\sigma} - \frac{\sigma}{1-\sigma}(1/L_N) - \pi_{jN}/L_N\right)\right] \end{bmatrix}$$

The system of equations in (G.1) is solved by the price equilibrium vector p (assumed to be unique per discussion above). In each counterfactual experiment, we vary the relevant primitives and then compute the vector p that solves (G.1), i.e., the counterfactual price equilibrium. To perform the counterfactual exercise, one must be able to compute the left hand side of (G.1), namely $(p - c) \bullet d(p)$ given any price vector p. Computation of $(p - c)$ is, of course, trivial since p is given and c is held fixed during the exercise. The critical task is, therefore, the computation of $d(p)$. Examining the terms inside this vector, we note that x_j (observed data) and α (an estimated parameter) are also held fixed. The terms that need to be calculated are then the choice probabilities $\pi_{jn}(p)$, and the quantities $Q_n^j(p)/Q_n(p)$ for each j and n. We now explain how these are calculated.

We begin by explaining how to calculate $\pi_{jn}(p)$ for any j, n and a generic value for p. Recall that the model implies equation (F.3):

$$\pi_{jn}(\mathbf{p}; \theta) = \frac{D_{jn}^{1-\sigma}}{\sum\limits_{m \in \mathbb{N}} D_{jm}^{1-\sigma}}$$

where $\theta = (\alpha, \beta, \kappa, \sigma)$ are the model's parameters, and the term D_{jn} is defined by:

$$D_{jn} = \sum_{s \in n} e^{(\delta_{jsn} + \gamma^{-1} \ln y_j x_j \alpha)/(1-\sigma)}$$

Imposing price symmetry within the neighborhood (which, again, holds by assumption in the observed equilibrium and in any counterfactual equilibrium), we can write

$$D_{jn} = e^{(\gamma^{-1} \ln y_j x_j \alpha)/(1-\sigma)} \cdot L_n \cdot e^{(\delta_{jn})/(1-\sigma)}$$

where, again, L_n denotes the number of symmetric retailers located in neighborhood n, and the symmetric mean utility is

$$\delta_{jn} = \nu_c + \nu_j + \nu_n + hp_j \cdot \nu_n - \ln p_n \cdot x_j\alpha - d_{jn} \cdot x_j\beta + \kappa \cdot h_{jn}$$

The choice probability simplifies to:

$$\text{(G.2)} \qquad \pi_{jn}(\mathbf{p};\theta) = \frac{L_n^{1-\sigma}e^{\delta_{jn}}}{\sum\limits_{m\in\mathbb{N}} L_m^{1-\sigma}e^{\delta_{jm}}}$$

To compute these probabilities in the various counterfactuals we need estimates of the mean utility levels δ_{jn}. While the terms $\ln p_n \cdot x_j\alpha, d_{jn}\cdot x_j\beta$ and $\kappa \cdot h_{jn}$ are known to us given the data, the estimated parameters and the current guess for p, the terms v_c, v_j and v_n are not known to us, since the fixed effects actually used in estimation are the terms ϕ_j, ϕ_n. In other words, unlike typical applications, our treatment of measurement errors implies that our estimation strategy does not deliver estimates that allow the direct computation of the mean utility terms δ_{jn} given any price vector.

This, however, is once again resolved given Assumption 3. As shown in Online Appendix F, this assumption implies that the choice probabilities in *the observed equilibrium* are equivalent to the observed credit card expenditure shares. We can use this fact, along with the inversion principle from Berry (1994), to calculate the mean utility levels δ_{jn} in the observed equilibrium. We then hold these values, denoted δ_{jn}^{obs}, fixed and calculate the counterfactual level of δ_{jn}, given any price vector p, by $\delta_{jn}(p) = \delta_{jn}^{obs} - x_j\alpha(\ln p_n - \ln p_n^{obs})$. Counterfactuals that change distances or demographics are handled similarly by appropriately adjusting the observed mean utility levels.

To compute δ_{jn}^{obs} for all j and n, we first recall a result derived in Online Appendix F,

$$\ln\left(\frac{E_{jn}}{E_{j0}}\right) = (1-\sigma)\ln L_n + \delta_{jn}$$

We further note that

$$\frac{E_{jn}}{E_{j0}} = \frac{\tilde{E}_{jn}^{cc}(\lambda_{jn}/\tau_{jn})}{\tilde{E}_{j0}^{cc}(\lambda_{j0}/\tau_{j0})} = \frac{\tilde{E}_{jn}^{cc}}{\tilde{E}_{j0}^{cc}}$$

where the first equality holds by definition, and the second equality follows from Assumption 3. We can now obtain an estimate for δ_{jn}^{obs}

$$\delta_{jn}^{obs} = \ln(\tilde{E}_{jn}^{cc}/\tilde{E}_{j0}^{cc}) - (1-\widehat{\sigma})\ln L_n$$

where $\widehat{\sigma} = 0.7$ is our estimate for the correlation parameter σ. It is, therefore, easy to calculate δ_{jn}^{obs} for all j and n. This enables, as explained above, the calculation of $\delta_{jn}(p)$ given any price vector, and the calculation of $\pi_{jn}(p)$ then follows easily from (G.2).

It remains to show how to calculate $Q_n^j(p)/Q_n(p)$ for each j and n and any price vector p. Note first that $Q_n^j(p) = H_j\pi_{jn}(p)q_{jn} = H_j\pi_{jn}(p)\gamma y_j/p_n$, and that $Q_n(p) = \sum\limits_{j=1}^{N} Q_n^j(p)$. As a consequence, we have:

$$Q_n^j(p)/Q_n(p) = \frac{H_j \pi_{jn}(p) \gamma y_j / p_n}{\sum_{\tau=1}^{N} H_\tau \pi_{\tau n}(p) \gamma y_\tau / p_n} = \frac{\gamma y_j H_j \pi_{jn}(p)}{\sum_{\tau=1}^{N} \gamma y_\tau H_\tau \pi_{\tau n}(p)} \tag{G.3}$$

We next note that, *in the observed equilibrium*, the following identity holds: $\tilde{E}_{jn}^{cc} = (\tau_{jn}/\lambda_{jn})E_{jn}$, where $\tilde{E}_{jn}^{cc}$ are the observed credit card expenditures. Substituting in the definition of E_{jn}, we get that $\tilde{E}_{jn}^{cc} = (\tau_{jn}/\lambda_{jn})H_j e_{jn} = (\tau_{jn}/\lambda_{jn})H_j \pi_{jn}^{obs} \gamma y_j$, implying that:

$$\gamma y_j H_j = \frac{(\lambda_{jn}/\tau_{jn})\tilde{E}_{jn}^{cc}}{\pi_{jn}^{obs}}$$

By Assumption 3, the ratio (τ_{jn}/λ_{jn}) is fixed over all j and n. Substituting into (G.3), we then get:

$$Q_n^j(p)/Q_n(p) = \frac{\widetilde{M}_{jn} \cdot \pi_{jn}(p)}{\sum_{s=1}^{N} \widetilde{M}_{sn} \cdot \pi_{sn}(p)}$$

where $\widetilde{M}_{jn} = \tilde{E}_{jn}^{cc}/\pi_{jn}^{obs}$.

$\widetilde{M}_{jn}$ is treated as a constant which is easy to calculate since $\tilde{E}_{jn}^{cc}$ is observed and $\pi_{jn}^{obs} = s_{jn}^{cc}$. Since $s_{jn}^{cc} = \tilde{E}_{jn}^{cc}/\sum_{\tau=1}^{N} \tilde{E}_{j\tau}^{cc}$, we finally get that $\widetilde{M}_{jn} = \sum_{\tau=1}^{N} \tilde{E}_{j\tau}^{cc}$. That is, this constant is equal to the total observed expenditures by residents of location j and does not actually vary by n, that is, $\widetilde{M}_{jn} = \widetilde{M}_j = \sum_{\tau=1}^{N} \tilde{E}_{j\tau}^{cc}$. The $\widetilde{M}$ constants are therefore computed from direct data and are held fixed during the iterative process that solves the FOCs. The other terms that appear in $Q_n^j(p)/Q_n(p)$ are choice probabilities $\pi_{jn}(p)$, and we already explained above how to obtain those given any p. As a consequence, the final form of $d(p)$ is:

$$d(p) = \begin{bmatrix} \sum_{j=1}^{N} \left[\frac{\widetilde{M}_j \cdot \pi_{j1}(p)}{\sum_{s=1}^{N} \widetilde{M}_s \cdot \pi_{s1}(p)} \left[1 + x_j \alpha \left(\frac{1}{1-\sigma} - \frac{\sigma}{1-\sigma}(1/L_1) - \pi_{j1}/L_1 \right)\right] \right] \\ \sum_{j=1}^{N} \left[\frac{\widetilde{M}_j \cdot \pi_{j2}(p)}{\sum_{s=1}^{N} \widetilde{M}_s \cdot \pi_{s2}(p)} \left[1 + x_j \alpha \left(\frac{1}{1-\sigma} - \frac{\sigma}{1-\sigma}(1/L_2) - \pi_{j2}/L_2 \right)\right] \right] \\ \vdots \\ \sum_{j=1}^{N} \left[\frac{\widetilde{M}_j \cdot \pi_{jN}(p)}{\sum_{s=1}^{N} \widetilde{M}_s \cdot \pi_{sN}(p)} \left[1 + x_j \alpha \left(\frac{1}{1-\sigma} - \frac{\sigma}{1-\sigma}(1/L_N) - \pi_{jN}/L_N \right)\right] \right] \end{bmatrix}$$