

# Appendix

This appendix is part of the Master’s thesis “Consumer Satisfaction with Water, Wastewater and Waste Services in Portugal” by Karoline Hormann, Master’s student in Economics at Nova School of Business and Economics (submitted in January 2016).

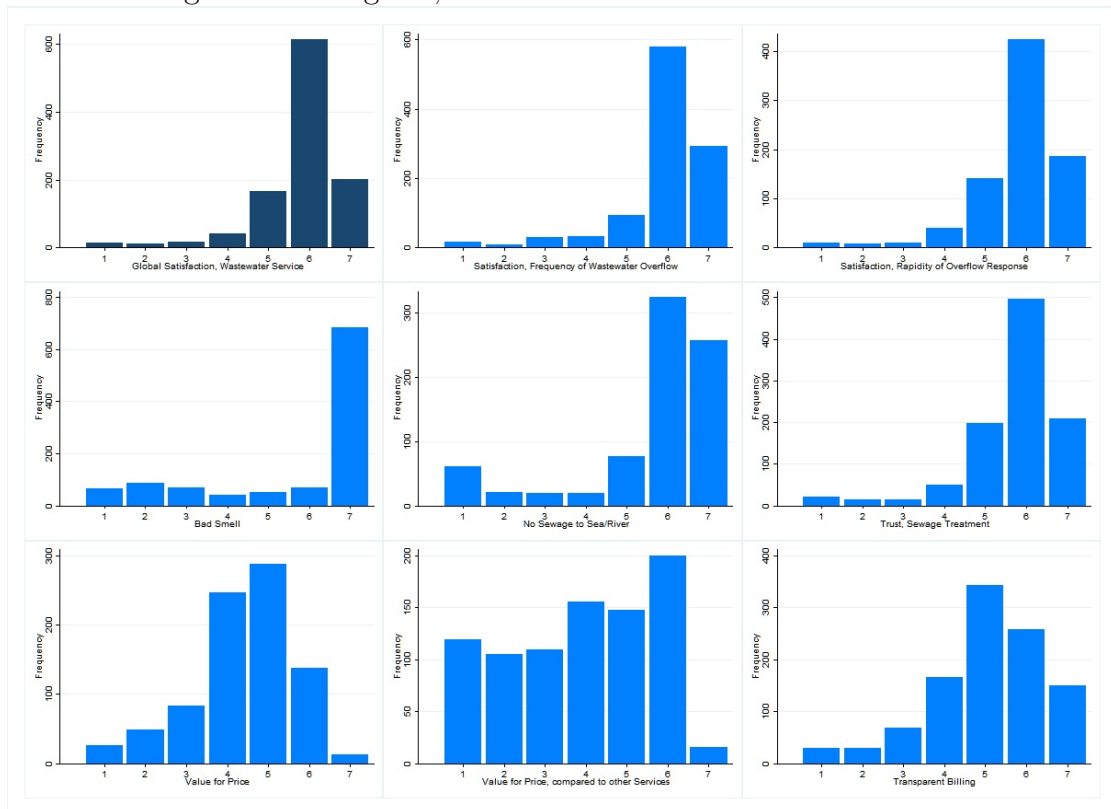
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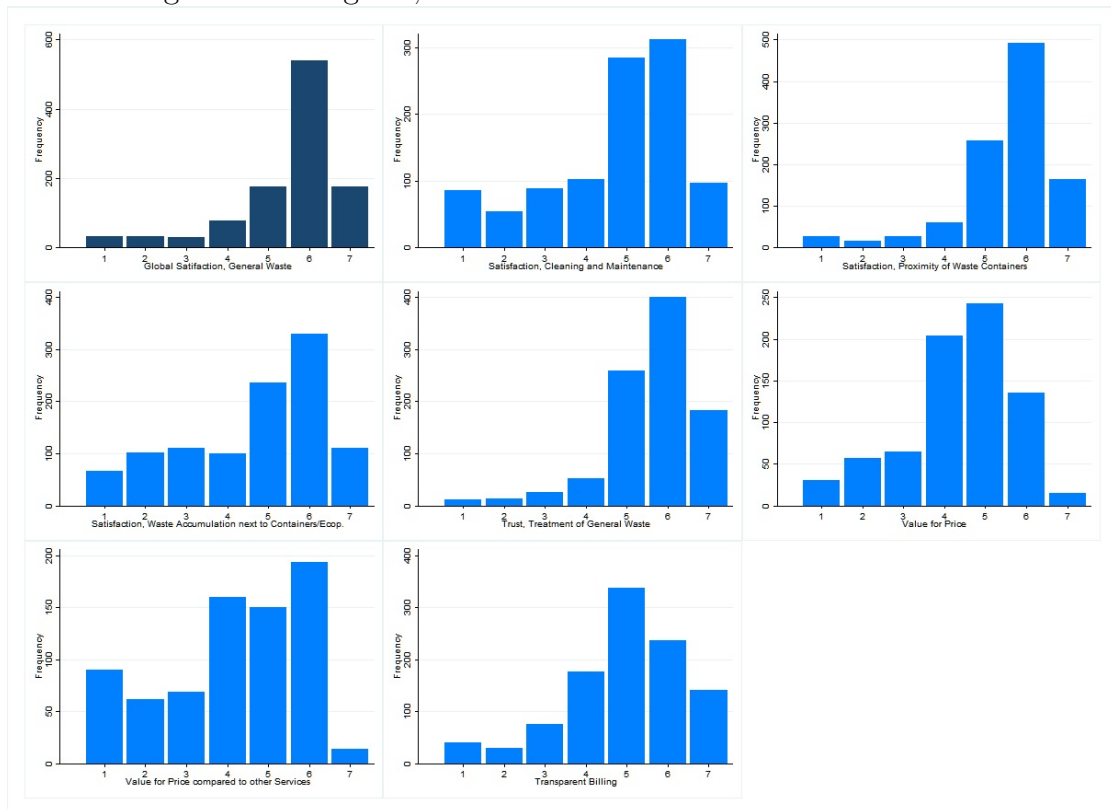
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Figure 1: Histogram, Satisfaction with Wastewater Services



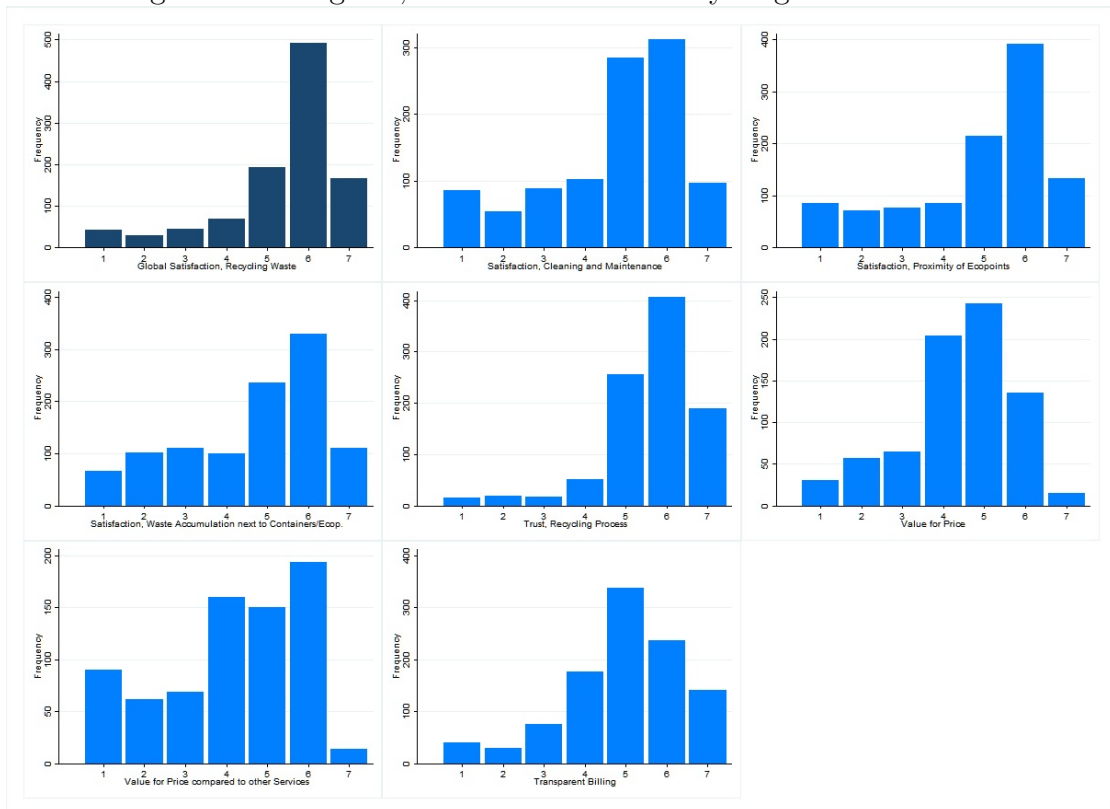
Source: Own graphic based on survey data

Figure 2: Histogram, Satisfaction with General Waste Services



Source: Own graphic based on survey data

Figure 3: Histogram, Satisfaction with Recycling Waste Services



Source: Own graphic based on survey data

Table 1: Summary of Median, Mean and Standard Deviation Scores

	N	Median	Mean	SD
<i>Water</i>				
Global Satisfaction	1067	6	5.77	1.12
Water Quality	1059	6	5.62	1.11
Water Pressure	1063	6	5.84	1.00
Interruptions	1051	6	5.96	0.97
Problem Response	893	6	5.80	1.03
Value for Price	1041	5	4.59	1.18
Value for Price, comp.	1047	4	4.11	1.66
Transparent Billing	1043	5	5.31	1.28
<i>Sewage</i>				
Global Satisfaction	1068	6	5.79	1.07
Overflow	1054	6	5.93	1.11
Problem Response	821	6	5.81	1.09
Smell	1069	7	5.69	2.04
To River/Sea	778	6	5.61	1.73
Trust in Process	1004	6	5.71	1.19
Value for Price	841	5	4.41	1.25
Value for Price, com.	851	4	3.90	1.78
Transparent Billing	1040	5	5.05	1.39
<i>Waste</i>				
Global, General Waste	1068	6	5.49	1.38
Global, Recycling	1038	6	5.39	1.45
Clean Containers	1027	5	4.72	1.70
Proximity Containers	1043	6	5.53	1.24
Proximity Ecopoints	1057	5	4.87	1.77
Waste Accumulation	1055	5	4.67	1.74
Trust, Gen. Waste Pro	954	6	5.61	1.19
Trust, Recycling Proc.	946	6	5.61	1.15
Value for Price	750	5	4.39	1.35
Value for Price, comp.	738	4	4.16	1.71
Transparent Billing	1034	5	4.94	1.45

Table 2: Marginal Effects from Ordered Logit, Water

	UNSATISFIED Marginal effects	NEUTRAL Marginal effects	SATISFIED Marginal effects
Water Quality	-0.00919*** (0.00321)	-0.0103*** (0.00365)	0.0195*** (0.00632)
Water Pressure	-0.00702** (0.00328)	-0.00785** (0.00365)	0.0149** (0.00662)
Interruptions	-0.00931** (0.00427)	-0.0104** (0.00482)	0.0197** (0.00867)
Problem Response	-0.00245 (0.00351)	-0.00274 (0.00394)	0.00519 (0.00742)
Value for Money	-0.00665* (0.00356)	-0.00744* (0.00402)	0.0141* (0.00733)
Value for Money, compared	-0.00403* (0.00244)	-0.00451* (0.00273)	0.00854* (0.00504)
Transparent Billing	-0.00392 (0.00256) (0.0119)	-0.00438 (0.00287) (0.0134)	0.00830 (0.00531) (0.0251)
Demographics	YES	YES	YES
Regions	YES	YES	YES

Table 3: Marginal Effects from Ordered Logit, Wastewater

	UNSATISFIED Marginal effects	NEUTRAL Marginal effects	SATISFIED Marginal effects
Flooding	-0.00190 (0.00272)	-0.00318 (0.00449)	0.00509 (0.00714)
Problem Response	-0.00394 (0.00316)	-0.00659 (0.00526)	0.0105 (0.00817)
Smell	-0.00211 (0.00147)	-0.00353 (0.00234)	0.00564 (0.00365)
Contamination	-2.96e-05 (0.00163)	-4.95e-05 (0.00274)	7.91e-05 (0.00437)
Trust	-0.00805** (0.00333)	-0.0135*** (0.00515)	0.0215*** (0.00742)
Value for Money	-0.00319 (0.00274)	-0.00535 (0.00453)	0.00854 (0.00708)
Value for Money, compared	-0.00310 (0.00199)	-0.00520 (0.00321)	0.00830* (0.00495)
Transparent Billing	-0.00389* (0.00211)	-0.00652* (0.00339)	0.0104** (0.00513)
Demographics	YES	YES	YES

Table 4: Marginal Effects from Ordered Logit, General Waste

	UNSATISFIED Marginal effects	NEUTRAL Marginal effects	SATISFIED Marginal effects
Cleaning + Maintenance	-0.0138*** (0.00337)	-0.0277*** (0.00599)	0.0415*** (0.00800)
Proximity	-0.00600** (0.00296)	-0.0121** (0.00581)	0.0181** (0.00850)
Waste Accumulation	-0.00573** (0.00247)	-0.0116** (0.00478)	0.0173** (0.00696)
Trust	-0.00906*** (0.00332)	-0.0183*** (0.00647)	0.0273*** (0.00924)
Value for Money	-0.00906** (0.00371)	-0.0183** (0.00716)	0.0273*** (0.0104)
Value for Money, compared	0.00119 (0.00257)	0.00241 (0.00516)	-0.00360 (0.00772)
Transparent Billing	-0.00313 (0.00286)	-0.00630 (0.00572)	0.00943 (0.00850)
Demographics	YES	YES	YES

Table 5: Marginal Effects from Ordered Logit, Recycling Waste

	UNSATISFIED Marginal effects	NEUTRAL Marginal effects	SATISFIED Marginal effects
Cleaning + Maintenance	-0.0159*** (0.00388)	-0.0196*** (0.00473)	0.0354*** (0.00737)
Proximity	-0.0123*** (0.00319)	-0.0152*** (0.00386)	0.0274*** (0.00614)
Waste Accumulation	-0.00528* (0.00290)	-0.00651* (0.00356)	0.0118* (0.00628)
Trust	-0.0109*** (0.00381)	-0.0134*** (0.00470)	0.0243*** (0.00794)
Value for Money	-0.00862** (0.00421)	-0.0106** (0.00515)	0.0193** (0.00904)
Value for Money, compared	0.00436 (0.00306)	0.00538 (0.00378)	-0.00975 (0.00673)
Transparent Billing	-0.00734** (0.00343)	-0.00905** (0.00424)	0.0164** (0.00739)
Demographics	YES	YES	YES

Table 6: Extended Spearman Correlation Matrix, Water

	Global Satisfaction	Water Quality	Water Pressure	Interruptions	Problem Response	Value	Value, compared	Billing	Safe Water	Turbidity	Affordability	Supply Problems	Rehabilitation	Real Water Losses
Global Satisfaction	10.000													
Water Quality	0.4591*	10.000												
Water Pressure	0.4366*	0.4254*	10.000											
Interruptions	0.3350*	0.3230*	0.4252*	10.000										
Problem Response	0.3289*	0.3102*	0.4311*	0.7140*	10.000									
Value	0.1122*	0.1638*	-0.0084	-0.0047	0.0245	10.000								
Value, compared	0.0221	0.0600	-0.0796*	-0.1379*	-0.1414*	0.3239*	10.000							
Billing	0.1912*	0.1775*	0.2637*	0.1468*	0.1608*	0.0156	0.1502*	10.000						
Save Water	-0.0604	0.0442	-0.0347	-0.0457	-0.0202	0.0088	-0.0602	-0.0861	* 1.0000					
Turbidity	-0.0431	-0.0295	-0.0079	-0.0081	-0.0349	0.0475	-0.0013	0.0285	0.1057*	10.000				
Affordability	0.0156	0.0995*	0.0091	-0.0284	-0.0274	0.0792*	0.0251	0.0787*	0.1254*	0.1612*	10.000			
Supply Problems	0.1004*	0.0406	0.0148	0.0366	0.0364	-0.0232	0.0393	-0.0551	-0.1936*	0.0138	-0.1914*	10.000		
Rehabilitation	0.0500	0.0747*	0.0082	-0.0325	-0.0336	-0.0076	0.0642*	-0.0609	-0.0337	-0.1788*	-0.0497	0.1421*	10.000	
Real Water Losses	0.0222	-0.0163	-0.0487	-0.0360	-0.0059	0.1140*	0.0762*	-0.0224	-0.0317	0.1087*	-0.2514*	0.2832*	0.0042	10.000

Table 7: Extended Spearman Correlation Matrix, Wastewater

	Global Satisfaction	Flooding	Problem Response	Smell	Contamination	Trust	Value	Value, compared	Billing	Affordability	Flooding	Collapse	Labour	Adequate Destination	Discharge Criteria
Global Satisfaction	10.000														
Flooding	0.2614*	10.000													
Problem Response	0.3372*	0.5042*	10.000												
Smell	0.2085*	0.1657*	0.1632*	10.000											
Contamination	0.1780*	0.1371*	0.1265*	0.1210*	10.000										
Trust	0.3770*	0.2049*	0.2264*	0.0791*	0.2657*	10.000									
Value	0.1693*	0.0925*	0.1475*	0.1268*	0.1487*	0.1818*	10.000								
Value, compared	0.0721*	0.0536	0.0697	-0.0274	0.1590*	0.0988*	0.3161*	10.000							
Billing	0.0869*	0.0396	0.0892*	-0.0322	-0.0000	0.0871*	0.0101	0.0829*	10.000						
Affordability	-0.0116	-0.0124	-0.0433	-0.0539	-0.0601	0.0329	-0.0633	-0.1437*	0.0233	10.000					
Flooding	0.0903*	0.0723*	0.0628	0.1775*	0.0769	0.0221	0.1323*	0.1187*	-0.0453	0.0907*	10.000				
Collapse	0.0781*	0.0703*	0.0941*	0.1424*	0.0243	0.0140	0.0240	0.0533	-0.0550	-0.1337*	0.3985*	10.000			
Labour	-0.0695*	-0.0624	-0.1041*	-0.0274	-0.0137	0.0068	0.0499	-0.0303	0.0190	0.0779*	-0.0761*	-0.3798*	10.000		
Adequate Destination	0.0442	0.0113	0.0151	0.0629*	0.0164	-0.0269	0.0710*	0.0242	-0.0366	-0.0627*	-0.1087*	0.1415*	-0.1693*	10.000	
Discharge Criteria	0.0112	-0.0630	-0.0180	0.0150	0.0479	0.0157	0.0181	-0.0692	0.0463	.	-0.1576*	0.0602	-0.0111	0.2127*	10.000

Table 8: Extended Spearman Correlation Matrix, General Waste

	Global Satisfaction	Cleaning/Maintenance	Proximity	Waste Accumulation	Trust	Value	Value, compared	Billing	Accessibility	Clean Containers
Global Satisfaction	10.000									
Cleaning/Maintenance	0.4307*	10.000								
Proximity	0.3160*	0.2635*	10.000							
Waste Accumulation	0.3300*	0.4100*	0.2349*	10.000						
Trust	0.3315*	0.2974*	0.2761*	0.2565*	10.000					
Value	0.2832*	0.2359*	0.1375*	0.0712	0.1593*	10.000				
Value, compared	0.2164*	0.2335*	0.1256*	0.0838*	0.1183*	0.4843*	10.000			
Billing	0.1406*	0.1735*	0.1307*	0.1382*	0.1615*	0.0427	0.1842*	10.000		
Accessibility	-0.0628	-0.0462	-0.0674*	-0.0818*	-0.0551	0.0025	0.0226	-0.0691*	10.000	
Clean Containers	-0.0155	-0.0053	-0.1037*	-0.1356*	-0.0543	0.0127	-0.0027	-0.0221	0.0560	10.000

Table 9: Extended Spearman Correlation Matrix, Recycling Waste

	Global Satisfaction	Cleaning/Maintenance	Proximity	Waste Accumulation	Trust	Value	Value, compared	Billing	Accessibility	Clean Containers	Recycling
Global Satisfaction	10.000										
Cleaning/Maintenance	0.3601*	10.000									
Proximity	0.3119*	0.1500*	10.000								
Waste Accumulation	0.2712*	0.4100*	0.1272*	10.000							
Trust	0.3038*	0.2924*	0.1380*	0.2423*	10.000						
Value	0.2237*	0.2359*	0.1039*	0.0712	0.1305*	10.000					
Value, compared	0.1355*	0.2335*	0.0352	0.0838*	0.1287*	0.4843*	10.000				
Billing	0.1739*	0.1735*	0.1850*	0.1382*	0.1767*	0.0427	0.1842*	10.000			
Accessibility	-0.0280	-0.0436	-0.0360	-0.0387	-0.0259	-0.0434	-0.1386*	-0.1182*	10.000		
Clean Containers	-0.0130	-0.0053	-0.0283	-0.1356*	-0.0271	0.0127	-0.0027	-0.0221	0.2243*	10.000	
Recycling	-0.0256	-0.1636*	0.0234	-0.1436*	-0.0306	0.0194	-0.0535	-0.0590	-0.0131	0.1142*	10.000