

Appendix

Table A1: Variable definitions and measurement

Variable name	Variable description
Value per acre	Dependent variable; derived from self-reported values from the June Agricultural Survey or sale transaction prices
Acres	Acreage of sale transaction or survey segment
Percent high-quality soil	Percentage of land in soil classes 1-3
Percent medium-quality soil	Percentage of land in soil classes 4-6
Precipitation	Average total precipitation from April-June over 1981-2010
Mean temperature	Average daily temperature from April-June over 1981-2010
Population interaction index	Inverse-distance-weighted sum of nearby population (2010) within a 50-mile radius
Travel time, small town	Road hours to nearest town/city of at least 2,500 residents
Travel time, big city	Road hours to nearest town/city of at least one million residents
Distance, recreational water	Miles to nearest recreational water source
Distance, highway ramp	Miles to nearest interstate highway ramp
Median income	County-level median household income

Table A2: Simple pooled model

	Full sample (1)	Active market (2)	Thin market (3)
Acres	-0.0003 (0.000)	-0.0004 (0.000)*	0.0001 (0.000)
Percent high-quality soil	0.006 (0.001)***	0.007 (0.001)***	0.004 (0.002)**
Percent medium-quality soil	0.002 (0.001)*	0.004 (0.001)***	0.001 (0.001)
Precipitation	-0.163 (0.087)*	-0.281 (0.107)**	-0.016 (0.067)
Mean temperature	-0.079 (0.075)	-0.211 (0.087)**	0.107 (0.062)*
Population interaction index	0.009 (0.004)**	0.007 (0.004)*	0.005 (0.004)
Travel time, small town	-0.081 (0.245)	-0.306 (0.297)	0.676 (0.417)
Travel time, big city	-0.223 (0.067)***	-0.201 (0.104)*	-0.462 (0.089)***
Distance, recreational water	-0.013 (0.005)**	-0.013 (0.006)**	-0.017 (0.008)**
Distance, highway ramp	0.004 (0.004)	0.004 (0.005)	-0.001 (0.006)
Median income	0.009 (0.009)	0.022 (0.016)	0.001 (0.007)
Survey	0.099 (0.060)	0.158 (0.064)**	-0.058 (0.093)
Parcels	3,130	2,421	709
Weighted observations	540,926	390,096	150,830

Notes: Standard errors, given in parentheses, are clustered by county and data source. All models also include year and region dummy variables. Active markets denote counties with a sales volume above the median over 2009-2014. Thin markets denotes counties with a sales volume below the median over 2009-2014. Asterisks denote statistical significance (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Table A3: Full sample results, unweighted

	Full sample		
	Survey (1)	Sale (2)	Difference (3)
Acres	0.001 (0.001)	-0.001 (0.000)***	0.002 (0.001)***
Percent high-quality soil	0.008 (0.003)***	0.006 (0.001)***	0.001 (0.003)
Percent medium-quality soil	0.002 (0.003)	0.004 (0.001)***	-0.001 (0.003)
Precipitation	-0.137 (0.094)	-0.067 (0.051)	-0.070 (0.105)
Mean temperature	-0.152 (0.099)	-0.065 (0.055)	-0.088 (0.111)
Population interaction index	0.014 (0.005)***	0.001 (0.003)	0.013 (0.005)**
Travel time, small town	-0.399 (0.317)	-0.746 (0.203)***	0.347 (0.368)
Travel time, big city	-0.147 (0.107)	-0.334 (0.060)***	0.187 (0.120)
Distance, recreational water	-0.013 (0.007)*	-0.025 (0.004)***	0.012 (0.008)
Distance, highway ramp	-0.006 (0.005)	0.009 (0.004)**	-0.014 (0.006)**
Median income	0.014 (0.010)	0.020 (0.009)**	-0.006 (0.013)
Parcels	389	2,741	-

Notes: Standard errors, given in parentheses are clustered by county in columns 1 and 2. The difference coefficients in column 3 are derived from a pooled model with interaction terms for all covariates (including the intercept) and standard errors clustered by county and data source. All models also include year and region dummy variables. Asterisks denote statistical significance (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Table A4: Market activity subsample results, unweighted

	Active market			Thin market		
	Survey (1)	Sale (2)	Difference (3)	Survey (4)	Sale (5)	Difference (6)
Acres	0.001 (0.001)	-0.001 (0.000)***	0.002 (0.001)**	0.001 (0.001)	-0.001 (0.000)***	0.002 (0.001)**
Percent high-quality soil	0.012 (0.003)***	0.007 (0.001)***	0.006 (0.003)*	0.002 (0.004)	0.004 (0.002)**	-0.002 (0.004)
Percent medium-quality soil	0.011 (0.003)***	0.004 (0.001)***	0.007 (0.003)**	-0.003 (0.004)	0.003 (0.001)***	-0.006 (0.004)
Precipitation	-0.309 (0.094)***	-0.082 (0.048)*	-0.226 (0.102)**	-0.187 (0.163)	0.001 (0.068)	-0.188 (0.167)
Mean temperature	-0.309 (0.078)***	-0.125 (0.060)**	-0.184 (0.096)*	0.044 (0.145)	0.074 (0.063)	-0.030 (0.150)
Population interaction index	0.009 (0.005)*	0.007 (0.004)	0.002 (0.006)	0.025 (0.012)**	-0.004 (0.001)***	0.029 (0.011)**
Travel time, small town	-0.776 (0.365)**	-0.726 (0.248)***	-0.049 (0.426)	1.145 (0.634)*	-0.554 (0.393)	1.699 (0.711)**
Travel time, big city	-0.201 (0.139)	-0.228 (0.107)**	0.027 (0.170)	-0.680 (0.126)***	-0.497 (0.118)***	-0.184 (0.167)
Distance, recreational water	-0.008 (0.008)	-0.026 (0.004)***	0.017 (0.008)**	-0.019 (0.016)	-0.017 (0.011)	-0.002 (0.019)
Distance, highway ramp	-0.016 (0.004)***	0.007 (0.004)*	-0.023 (0.006)***	0.012 (0.010)	0.006 (0.008)	0.006 (0.013)
Median income	0.054 (0.014)***	0.007 (0.016)	0.048 (0.021)**	-0.012 (0.015)	0.016 (0.008)**	-0.029 (0.016)*
Parcels	248	2,173	-	141	568	-

Notes: Standard errors, given in parentheses are clustered by county in columns 1, 2, 4, and 5. The difference coefficients in columns 3 and 6 are derived from a pooled model with interaction terms for all covariates (including the intercept) and standard errors clustered by county and data source. Active markets denote counties with a sales volume above the median over 2009-2014. Thin markets denotes counties with a sales volume below the median over 2009-2014. Asterisks denote statistical significance (* p < 0.10, ** p < 0.05, *** p < 0.01).

Table A5: Full sample results, non-linear model specification (*continues on next page*)

	Full sample		
	Survey (1)	Sale (2)	Difference (3)
Acres	0.002 (0.001)**	-0.0004 (0.000)*	0.002 (0.001)***
Percent high-quality soil	0.005 (0.003)**	0.006 (0.001)***	-0.0004 (0.003)
Percent medium-quality soil	0.001 (0.003)	0.003 (0.001)***	-0.002 (0.003)
Precipitation	3.110 (2.586)	-0.253 (1.310)	3.363 (2.811)
Precipitation ²	-0.131 (0.070)*	0.008 (0.033)	-0.139 (0.075)*
Mean temperature	-0.808 (2.255)	0.139 (1.315)	-0.947 (2.536)
Mean temperature ²	0.039 (0.065)	-0.004 (0.038)	0.043 (0.074)
Precipitation * Mean temp.	-0.029 (0.091)	-0.001 (0.055)	-0.028 (0.103)
Population interaction index	0.0004 (0.020)	0.006 (0.005)	-0.005 (0.020)
Population interaction index ²	0.0002 (0.000)	-0.00002 (0.000)	0.0003 (0.000)
Parcels	389	2,741	-
Weighted observations	314,984	225,942	-

Notes: Standard errors, given in parentheses are clustered by county in columns 1 and 2. The difference coefficients in column 3 are derived from a pooled model with interaction terms for all covariates (including the intercept) and standard errors clustered by county and data source. All models also include year and region dummy variables. Asterisks denote statistical significance (* p < 0.10, ** p < 0.05, *** p < 0.01).

Table A5: Full sample results, non-linear model specification (*continued*)

	Full sample		
	Survey (1)	Sale (2)	Difference (3)
Travel time, small town	0.987 (0.925)	-0.467 (0.655)	1.454 (1.105)
Travel time, small town ²	-2.156 (1.749)	0.653 (1.080)	-2.809 (1.999)
Travel time, big city	-0.486 (0.464)	-0.627 (0.217)***	0.141 (0.496)
Travel time, big city ²	0.044 (0.070)	0.050 (0.033)	-0.006 (0.075)
Distance, recreational water	-0.053 (0.024)**	-0.033 (0.016)**	-0.020 (0.028)
Distance, recreational water ²	0.002 (0.001)	0.001 (0.001)	0.001 (0.002)
Distance, highway ramp	0.003 (0.011)	0.022 (0.007)***	-0.019 (0.013)
Distance, highway ramp ²	-0.0002 (0.000)	-0.0003 (0.000)**	0.0001 (0.000)
Median income	0.179 (0.098)*	-0.024 (0.071)	0.203 (0.118)*
Median income ²	-0.002 (0.001)*	0.0004 (0.001)	-0.002 (0.001)*
Parcels	389	2,741	-
Weighted observations	314,984	225,942	-

Notes: Standard errors, given in parentheses are clustered by county in columns 1 and 2. The difference coefficients in column 3 are derived from a pooled model with interaction terms for all covariates (including the intercept) and standard errors clustered by county and data source. All models also include year and region dummy variables. Asterisks denote statistical significance (* p < 0.10, ** p < 0.05, *** p < 0.01).

Table A6: Market activity subsample results, non-linear model specification (*continues on next page*)

	Active market			Thin market		
	Survey (1)	Sale (2)	Difference (3)	Survey (4)	Sale (5)	Difference (6)
Acres	0.002 (0.001)*	-0.001 (0.000)**	0.002 (0.001)**	0.002 (0.002)	-0.0001 (0.000)	0.002 (0.002)
Percent high-quality soil	0.011 (0.002)***	0.007 (0.001)***	0.004 (0.002)**	0.002 (0.008)	0.002 (0.001)	-0.0003 (0.007)
Percent medium-quality soil	0.009 (0.003)***	0.004 (0.001)***	0.005 (0.003)*	0.002 (0.003)	0.002 (0.001)**	-0.0002 (0.003)
Precipitation	8.712 (2.878)***	-1.183 (1.831)	9.895 (3.259)***	5.412 (3.693)	5.534 (2.081)**	-0.123 (3.959)
Precipitation ²	-0.242 (0.072)***	0.022 (0.046)	-0.264 (0.082)***	-0.207 (0.111)*	-0.062 (0.057)	-0.145 (0.116)
Mean temperature	7.814 (3.003)**	0.731 (2.686)	7.083 (3.885)*	5.471 (3.575)	5.034 (1.797)***	0.437 (3.720)
Mean temperature ²	-0.190 (0.076)**	-0.050 (0.085)	-0.140 (0.110)	-0.186 (0.152)	-0.049 (0.037)	-0.137 (0.143)
Precipitation * Mean temp.	-0.285 (0.118)**	0.048 (0.075)	-0.333 (0.133)**	-0.063 (0.135)	-0.325 (0.106)***	0.262 (0.163)
Population interaction index	-0.004 (0.022)	0.002 (0.013)	-0.006 (0.024)	-0.047 (0.039)	0.006 (0.008)	-0.053 (0.036)
Population interaction index ²	0.0002 (0.000)	0.00002 (0.000)	0.0002 (0.000)	0.001 (0.001)**	-0.00002 (0.000)	0.001 (0.000)**
Parcels	248	2,173	-	141	568	-
Weighted observations	211,681	178,415	-	103,303	47,527	-

Notes: Standard errors, given in parentheses are clustered by county in columns 1, 2, 4, and 5. The difference coefficients in columns 3 and 6 are derived from a pooled model with interaction terms for all covariates (including the intercept) and standard errors clustered by county and data source. All models also include year and region dummy variables. Active markets denote counties with a sales volume above the median over 2009-2014. Thin markets denotes counties with a sales volume below the median over 2009-2014. Asterisks denote statistical significance (* p < 0.10, ** p < 0.05, *** p < 0.01).

Table A6: Market activity subsample results, non-linear model specification (*continued*)

	Active market			Thin market		
	Survey (1)	Sale (2)	Difference (3)	Survey (4)	Sale (5)	Difference (6)
Travel time, small town	0.781 (0.998)	-0.731 (0.699)	1.513 (1.167)	0.442 (2.087)	-0.663 (0.984)	1.105 (2.140)
Travel time, small town ²	-2.427 (2.163)	0.953 (1.128)	-3.379 (2.319)	-0.414 (3.867)	-0.265 (1.721)	-0.150 (3.920)
Travel time, big city	-0.641 (0.524)	-0.224 (0.279)	-0.417 (0.565)	-3.649 (1.274)***	-1.773 (0.373)***	-1.876 (1.217)
Travel time, big city ²	0.047 (0.075)	0.016 (0.035)	0.031 (0.078)	0.597 (0.213)**	0.320 (0.089)***	0.277 (0.214)
Distance, recreational water	-0.021 (0.022)	-0.017 (0.012)	-0.004 (0.024)	-0.115 (0.066)*	-0.033 (0.033)	-0.083 (0.069)
Distance, recreational water ²	0.0004 (0.001)	-0.0001 (0.001)	0.001 (0.001)	0.004 (0.003)	0.002 (0.002)	0.002 (0.003)
Distance, highway ramp	-0.007 (0.015)	0.024 (0.008)***	-0.031 (0.016)*	0.035 (0.065)	0.003 (0.020)	0.032 (0.062)
Distance, highway ramp ²	-0.0002 (0.000)	-0.0003 (0.000)**	0.0001 (0.000)	-0.0002 (0.003)	-0.0004 (0.001)	0.0001 (0.003)
Median income	0.364 (0.164)**	0.174 (0.209)	0.189 (0.259)	-0.024 (0.140)	-0.036 (0.088)	0.012 (0.155)
Median income ²	-0.003 (0.002)*	-0.002 (0.002)	-0.001 (0.003)	-0.0002 (0.001)	0.0005 (0.001)	-0.001 (0.001)
Parcels	248	2,173	-	141	568	-
Weighted observations	211,681	178,415	-	103,303	47,527	-

Notes: Standard errors, given in parentheses are clustered by county in columns 1, 2, 4, and 5. The difference coefficients in columns 3 and 6 are derived from a pooled model with interaction terms for all covariates (including the intercept) and standard errors clustered by county and data source. All models also include year and region dummy variables. Active markets denote counties with a sales volume above the median over 2009-2014. Thin markets denotes counties with a sales volume below the median over 2009-2014. Asterisks denote statistical significance (* p < 0.10, ** p < 0.05, *** p < 0.01).

Table A7: Full sample results, alternative urban proximity specification 1

	Full sample		
	Survey (1)	Sale (2)	Difference (3)
Acres	0.002 (0.001)**	-0.0004 (0.000)*	0.003 (0.001)***
Percent high-quality soil	0.006 (0.002)**	0.006 (0.001)***	-0.0002 (0.002)
Percent medium-quality soil	0.003 (0.003)	0.003 (0.001)***	-0.0001 (0.003)
Precipitation	-0.180 (0.113)	-0.105 (0.052)**	-0.075 (0.121)
Mean temperature	-0.122 (0.112)	0.022 (0.059)	-0.143 (0.124)
Population interaction index	0.016 (0.005)***	0.001 (0.002)	0.015 (0.006)***
Travel time, small town	0.276 (0.309)	-0.098 (0.183)	0.374 (0.351)
Travel time, big city	-0.206 (0.115)*	-0.335 (0.070)***	0.129 (0.132)
Distance, recreational water	-0.009 (0.008)	-0.018 (0.005)***	0.009 (0.010)
Distance, highway ramp	-0.008 (0.004)*	0.011 (0.003)***	-0.018 (0.005)***
Median income	0.008 (0.013)	0.017 (0.009)*	-0.009 (0.015)
Parcels	389	2,741	-
Weighted observations	314,984	225,942	-

Notes: Standard errors, given in parentheses are clustered by county in columns 1 and 2. The difference coefficients in column 3 are derived from a pooled model with interaction terms for all covariates (including the intercept) and standard errors clustered by county and data source. All models also include year and region dummy variables. Asterisks denote statistical significance (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Table A8: Market activity subsample results, alternative urban proximity specification 1

	Active market			Thin market		
	Survey (1)	Sale (2)	Difference (3)	Survey (4)	Sale (5)	Difference (6)
Acres	0.002 (0.001)*	-0.001 (0.000)**	0.002 (0.001)***	0.002 (0.002)	-0.0001 (0.000)	0.002 (0.001)
Percent high-quality soil	0.010 (0.002)***	0.007 (0.001)***	0.003 (0.003)	0.0002 (0.004)	0.002 (0.001)	-0.002 (0.004)
Percent medium-quality soil	0.011 (0.003)***	0.004 (0.001)***	0.007 (0.003)**	0.001 (0.004)	0.002 (0.001)**	-0.001 (0.003)
Precipitation	-0.385 (0.117)***	-0.152 (0.064)**	-0.233 (0.128)*	-0.082 (0.159)	-0.043 (0.071)	-0.040 (0.164)
Mean temperature	-0.278 (0.117)**	-0.081 (0.072)	-0.197 (0.133)	-0.040 (0.142)	0.126 (0.088)	-0.166 (0.159)
Population interaction index	0.011 (0.006)*	0.001 (0.004)	0.010 (0.007)	0.018 (0.012)	-0.002 (0.001)	0.020 (0.011)*
Travel time, small town	0.125 (0.362)	-0.099 (0.188)	0.224 (0.393)	0.262 (0.383)	-0.498 (0.119)***	0.575 (0.480)
Travel time, big city	-0.430 (0.149)***	-0.125 (0.090)	-0.304 (0.168)*	-0.541 (0.140)***	-0.002 (0.011)	-0.043 (0.177)
Distance, recreational water	-0.005 (0.010)	-0.018 (0.005)***	0.013 (0.010)	-0.035 (0.022)	-0.001 (0.007)	-0.033 (0.023)
Distance, highway ramp	-0.016 (0.005)***	0.008 (0.004)**	-0.024 (0.006)***	0.008 (0.010)	0.023 (0.009)**	0.009 (0.012)
Median income	0.056 (0.016)***	-0.007 (0.013)	0.063 (0.020)***	-0.018 (0.012)	-0.313 (0.320)	-0.041 (0.014)***
Parcels	248	2,173	-	141	568	-
Weighted observations	211,681	178,415	-	103,303	47,527	-

Notes: Standard errors, given in parentheses are clustered by county in columns 1, 2, 4, and 5. The difference coefficients in columns 3 and 6 are derived from a pooled model with interaction terms for all covariates (including the intercept) and standard errors clustered by county and data source. All models also include year and region dummy variables. Active markets denote counties with a sales volume above the median over 2009-2014. Thin markets denotes counties with a sales volume below the median over 2009-2014. Asterisks denote statistical significance (* p < 0.10, ** p < 0.05, *** p < 0.01).

Table A9: Full sample results, alternative urban proximity specification 2

	Full sample		
	Survey (1)	Sale (2)	Difference (3)
Acres	0.002 (0.001)**	-0.0004 (0.000)*	0.003 (0.001)***
Percent high-quality soil	0.006 (0.002)**	0.006 (0.001)***	-0.0001 (0.002)
Percent medium-quality soil	0.002 (0.002)	0.003 (0.001)***	-0.0003 (0.003)
Precipitation	-0.184 (0.116)	-0.102 (0.049)**	-0.082 (0.123)
Mean temperature	-0.144 (0.115)	0.029 (0.057)	-0.173 (0.125)
Population interaction index	0.016 (0.006)**	0.001 (0.002)	0.015 (0.006)**
Travel time, small town	-0.067 (0.354)	-0.018 (0.203)	-0.049 (0.399)
Travel time, intermediate city	0.058 (0.182)	-0.130 (0.129)	0.188 (0.219)
Travel time, big city	-0.202 (0.113)*	-0.316 (0.071)***	0.114 (0.130)
Distance, recreational water	-0.008 (0.008)	-0.017 (0.005)***	0.009 (0.010)
Distance, highway ramp	-0.007 (0.005)	0.013 (0.004)***	-0.019 (0.006)***
Median income	0.007 (0.014)	0.016 (0.009)*	-0.008 (0.016)
Parcels	389	2,741	-
Weighted observations	314,984	225,942	-

Notes: Standard errors, given in parentheses are clustered by county in columns 1 and 2. The difference coefficients in column 3 are derived from a pooled model with interaction terms for all covariates (including the intercept) and standard errors clustered by county and data source. All models also include year and region dummy variables. Asterisks denote statistical significance (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Table A10: Market activity subsample results, alternative urban proximity specification 2

	Active market			Thin market		
	Survey (1)	Sale (2)	Difference (3)	Survey (4)	Sale (5)	Difference (6)
Acres	0.002 (0.001)**	-0.001 (0.000)**	0.002 (0.001)***	0.002 (0.002)	-0.00003 (0.000)	0.002 (0.001)
Percent high-quality soil	0.010 (0.002)***	0.007 (0.001)***	0.003 (0.002)	0.002 (0.004)	0.002 (0.001)	-0.0001 (0.004)
Percent medium-quality soil	0.010 (0.002)***	0.004 (0.001)***	0.006 (0.002)**	0.001 (0.003)	0.002 (0.001)**	-0.001 (0.003)
Precipitation	-0.356 (0.123)***	-0.144 (0.058)**	-0.212 (0.131)	-0.063 (0.123)	-0.056 (0.072)	-0.007 (0.135)
Mean temperature	-0.288 (0.109)**	-0.060 (0.068)	-0.228 (0.124)*	0.088 (0.133)	0.134 (0.073)*	-0.047 (0.144)
Population interaction index	0.013 (0.007)*	-0.001 (0.004)	0.014 (0.008)*	0.021 (0.013)	-0.001 (0.002)	0.022 (0.012)*
Travel time, small town	-0.417 (0.427)	0.0001 (0.254)	-0.417 (0.479)	1.425 (0.670)**	-0.670 (0.468)	2.095 (0.781)**
Travel time, intermediate city	0.232 (0.283)	-0.292 (0.124)**	0.524 (0.297)*	0.094 (0.412)	0.333 (0.136)**	-0.239 (0.407)
Travel time, big city	-0.427 (0.160)**	-0.082 (0.097)	-0.345 (0.180)*	-0.612 (0.110)***	-0.543 (0.106)***	-0.069 (0.148)
Distance, recreational water	-0.005 (0.009)	-0.016 (0.005)***	0.012 (0.010)	-0.031 (0.019)	-0.007 (0.011)	-0.023 (0.021)
Distance, highway ramp	-0.017 (0.006)***	0.012 (0.004)***	-0.028 (0.007)***	0.010 (0.011)	-0.0003 (0.007)	0.010 (0.012)
Median income	0.067 (0.025)**	-0.017 (0.012)	0.084 (0.027)***	-0.010 (0.010)	0.028 (0.007)***	-0.038 (0.012)***
Parcels	248	2,173	-	141	568	-
Weighted observations	211,681	178,415	-	103,303	47,527	-

Notes: Standard errors, given in parentheses are clustered by county in columns 1, 2, 4, and 5. The difference coefficients in columns 3 and 6 are derived from a pooled model with interaction terms for all covariates (including the intercept) and standard errors clustered by county and data source. All models also include year and region dummy variables. Active markets denote counties with a sales volume above the median over 2009-2014. Thin markets denotes counties with a sales volume below the median over 2009-2014. Asterisks denote statistical significance (* p < 0.10, ** p < 0.05, *** p < 0.01).

Figure A1: Price per acre, 2009-2014

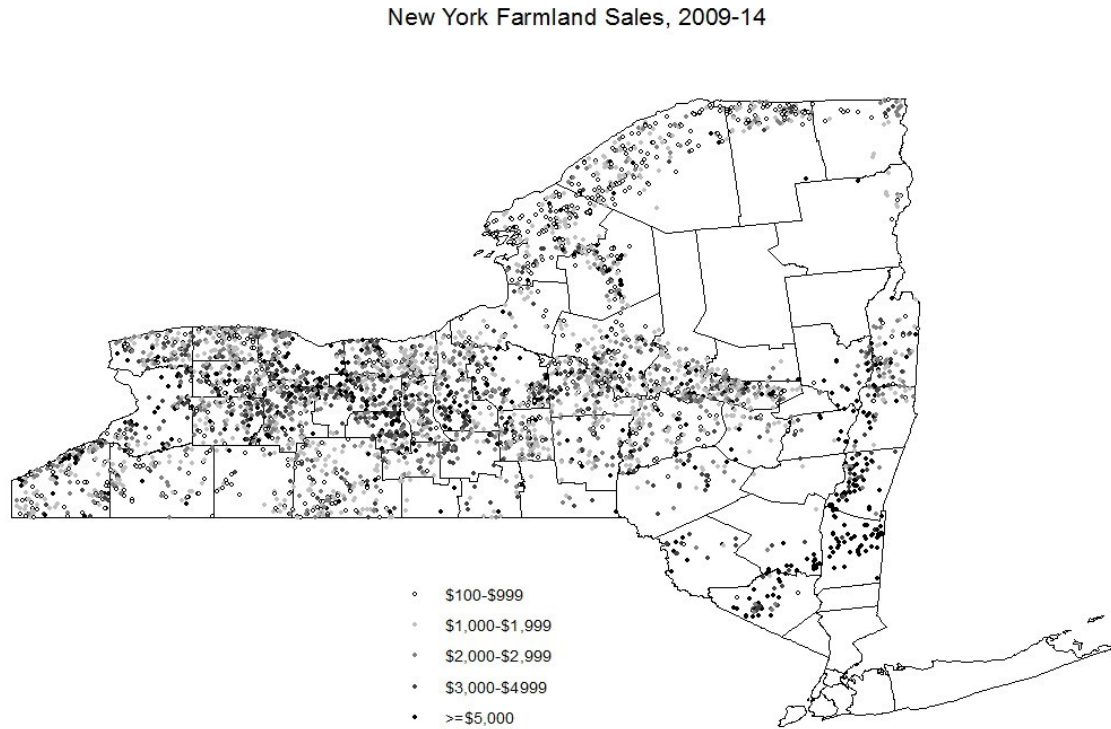


Figure A2: Acres per parcel sold, 2009-2014

