Online Appendix for:

To (Rent) Bees or Not to (Rent) Bees?
An Examination of the Farmer's Question

Steven W. Wilcox, David R. Just, C.-Y. Cynthia Lin Lawell,
Miguel I. Gómez, Heather Grab*

February 10, 2026

*Corresponding author: Steven W. Wilcox (steven.wilcox@usu.edu). Wilcox is affiliated with the Department of Applied Economics at Utah State University. Just: Cornell University; drj3@cornell.edu. Lin Lawell: Cornell University; clinlawell@cornell.edu. Gómez: Cornell University; mig7@cornell.edu. Grab: Penn State University; hlc30@psu.edu. We gratefully acknowledge financial support from three awards from the Cornell Atkinson Center for Sustainability: a Sustainable Biodiversity Award, an Atkinson Venture Fund (AVF) Grant, and an AVF-Engaged Cornell grant for undergraduate involvement. We are indebted to Craig Khalke and the Lake Ontario Fruit Program for assistance and very helpful details on apple production in the Northeast. We also appreciate comments from a number of apple growers and consultants in the Northeast, including Debbie Biltonen, Mike Biltonen, and Ian Merwin. Carrie Jones at USDA-ERS and Donnie Fike at USDA-NASS kindly assisted us with many aspects of USDA-ARMS data. Anna Espinoza, Adeline Sutton, Jacob Llodra, and Katie Warner provided excellent research assistance. We thank Todd Gerarden, Ivan Rudik, Bryan Danforth, Maria Van Dyke, Mia Park, Chris Barrett, Kathy Baylis, Jo Albers, Christian Langpap, Adeline Yeh, Brian Adam, and Dominic Parker for helpful comments; and we thank seminar and conference participants at Cornell University, the Food Studies International Conference, the Association of Environmental and Resource Economists (AERE) Summer Conference, and the Agricultural and Applied Economics Association (AAEA) Annual Meeting. Just, Lin Lawell, and Gómez are Faculty Fellows at the Cornell Atkinson Center for Sustainability. Wilcox is a faculty affiliate of the USU Ecology Center. All errors are our own.

A Supplementary Tables and Figures

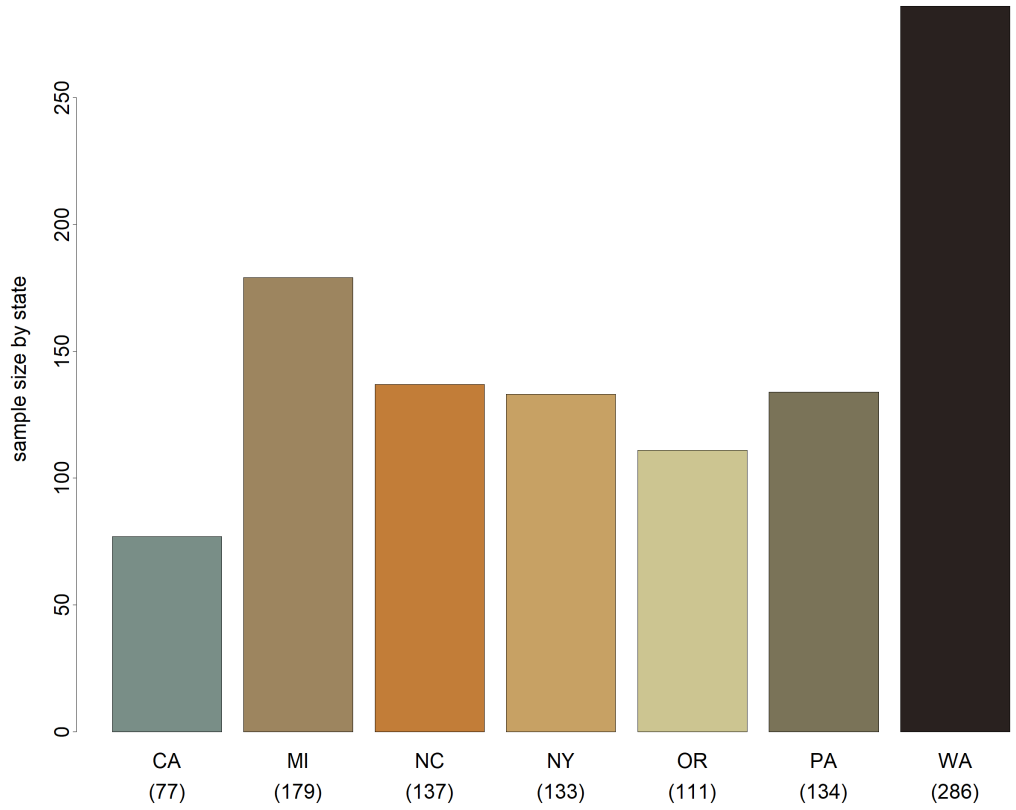

Figure A.1: Distribution of the sample apple farmers from 2007 USDA-ARMS that we employ in our analysis.

Table A.1: Summary statistics.

	Weighted Mean	Standard Deviation	# Observations
Operation-level variables (weighted)			
total bearing apple blocks	15.08	20.55	1,057
attended recent pest management training (dummy)	0.54	0.5	1,057
Block-level variables (weighted)			
rented bees in 2007 (dummy)	0.74	0.44	1,057
rented bees in 2007 (dummy), Western states	0.81	0.39	474
rented bees in 2007 (dummy), Eastern states	0.64	0.48	583
rented bees in 2006 (dummy)	0.74	0.44	1,057
rented bees in 2006 (dummy), Western states	0.80	0.40	474
rented bees in 2006 (dummy), Eastern states	0.66	0.48	583
did not rent bees in 2006-2007 (dummy)	0.25	0.43	1,057
number of honey bee colonies rented (conditional on renting) in 2007	17.37	30.13	601
number of honey bee colonies rented per acre (conditional on renting) in 2007	1.87	2.26	601
honey bee rental fee ($/colony) in 2007	47.66	13.33	1,057
honey bee rental fee ($/colony) in 2006	44.71	12.63	1,057
apple bearing acres	10.6	21.88	1,057
trees per acre	283.13	257.16	1,039
average age of trees	18.94	12.71	1,042
has federal crop insurance in 2007 (dummy)	0.62	0.48	1,057
yield (bushels/acre)	589.78	422.3	1,057
approximate profit ($) per acre	5746.59	7467.6	1,057
number apple trees	3512.68	12248.46	1,039
production for fresh market (dummy)	0.84	0.37	1,057
deliberately scouts for pests (dummy)	0.85	0.36	1,057
grass valley floor system (dummy)	0.88	0.33	1,056
semi dwarf tree type (dummy)	0.55	0.5	1,057
bee rental cost share (proportion of total costs) in 2007	0.05	0.10	1,048
bee rental cost share (proportion of total costs) in 2007, West Coast states	0.04	0.07	472
bee rental cost share (proportion of total costs) in 2007, Eastern states	0.07	0.14	576
Zip code-level variables			
zip code distance to Fresno County, CA (km)	2490.48	1313.74	466
zip code distance to Fresno County, CA (km) X total almond acres in CA	1892765217	998006436.5	932
State-level variables			
total utilized production price ($/lb) in 2007	0.25	0.01	7
total utilized production price ($/lb) in 2006-2007	0.24	0.08	14
County-level variables			
natural forest cover (county proportion)	0.50	0.22	207
natural open cover (county proportion)	0.17	0.16	207

Notes: Table presents operation- and block-level summary statistics (weighted) from the 2007 USDA Agricultural Resource Management Survey (USDA-ARMS); and summary statistics for zip-code, county, and state-level variables derived from publicly available data (USDA-NASS, USDA Cropland Data Layer (CDL)). Sample sizes for operation- or block-level variables may differ from respective full sample sizes because a farmer did not answer the question, or the question was not applicable. There are 7 states, 207 counties, and 466 zip codes. The West Coast states in our data set (which we refer to as the 'Western' states) are California, Oregon, and Washington. The Midwest and East Coast states in our data set (which we refer to collectively as the 'Eastern' states) are Michigan, New York, North Carolina, and Pennsylvania.

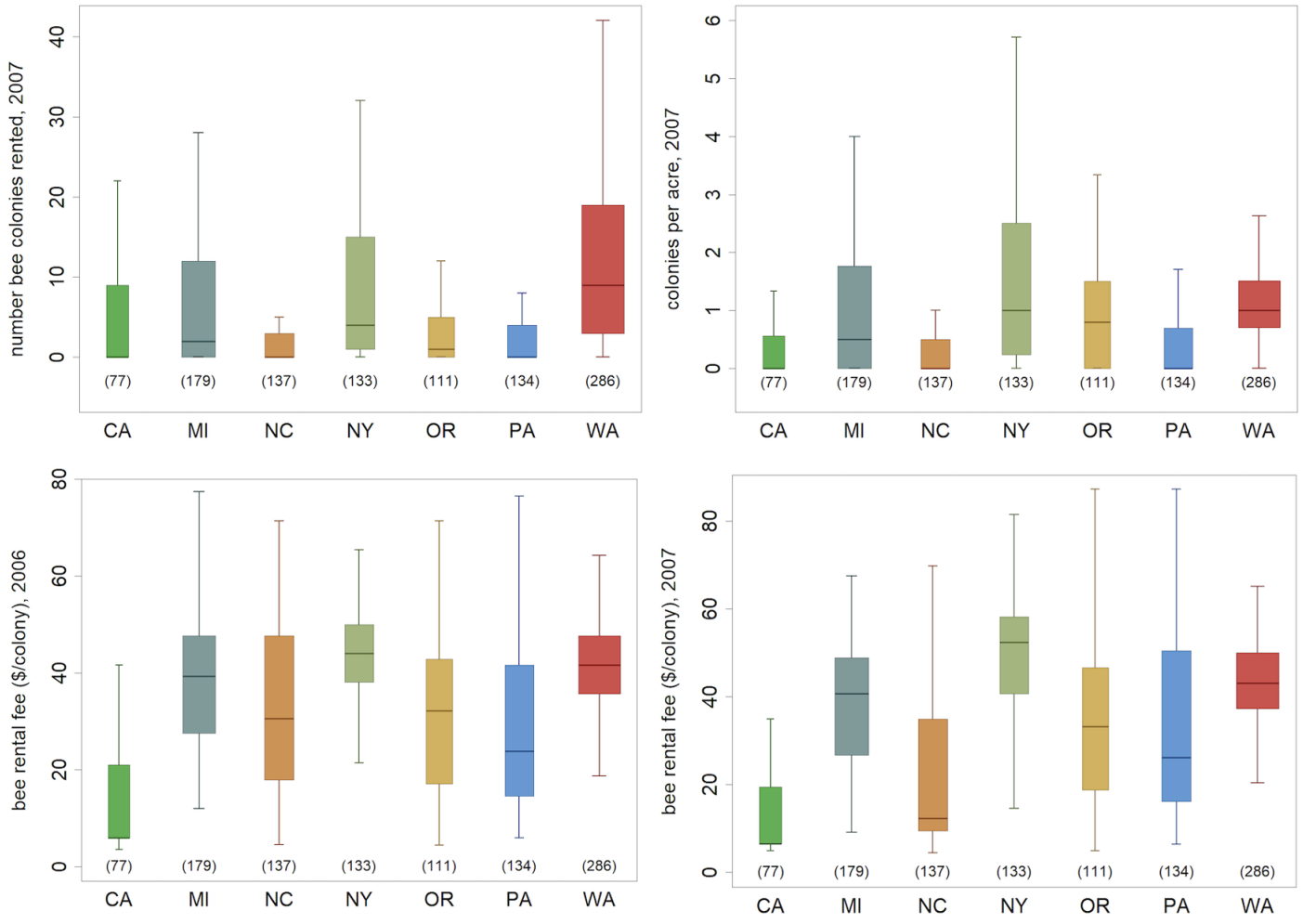

Figure A.2: Weighted boxplots by state capturing: the number of honey bee colonies rented in 2007; the number of honey bee colonies rented per acre in 2007; honey bee rental fee ($/colony) in 2006; and honey bee rental fee ($/colony) in 2007. All variables are comprised of random block-level variation. Numbers in parentheses next to state abbreviations indicate the respective sample size for that boxplot.

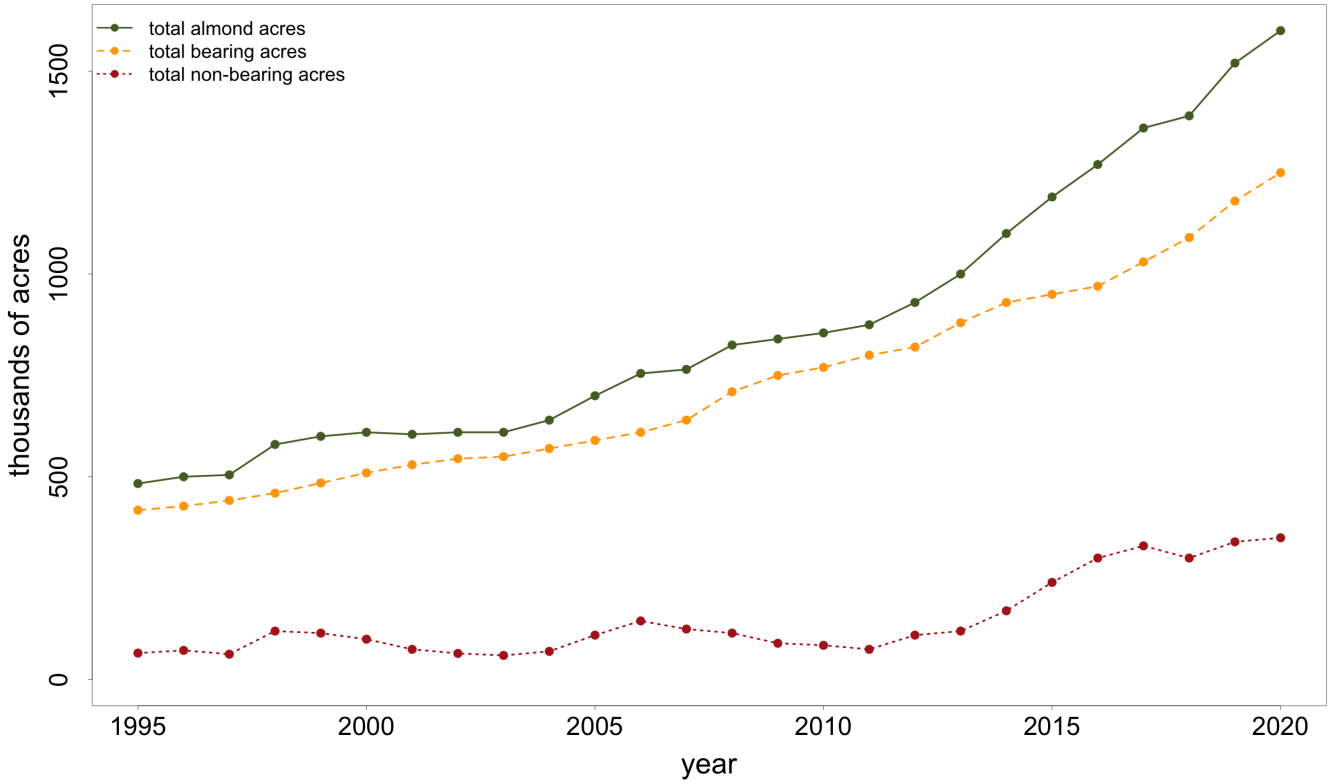

Figure A.3: Almond acreage in California, 1995-2020 (author's calculations).
Data source: USDA-NASS 2020 California Almond Acreage Report.

Table A.2: First-stage results for honey bee demand own-price elasticity estimation, 2SLS (weighted).

Dependent variable is the honey bee rental fee ($/colony)			
	(1)	(2)	(3)
IV: zip code distance to Fresno County, CA (km)	0.00811***		
	(0.00165)		
IV: zip code distance to Fresno County, CA (km) X total almond acres in CA		0.000000009***	0.000000010***
		(0.000000002)	(0.000000002)
apple bearing acres	-0.024	-0.015	-0.014
	(0.033)	(0.027)	(0.023)
apple bearing acres, squared	0.000076	0.000056	0.000048
	(0.000090)	(0.000074)	(0.000063)
total bearing apple blocks	-0.0594	-0.0460	-0.0404
	(0.0534)	(0.0427)	(0.0369)
total bearing apple blocks, squared	0.00034	0.00028	0.00035
	(0.00054)	(0.00044)	(0.00037)
trees per acre	0.0148***	0.0121***	0.0137***
	(0.0049)	(0.0037)	(0.0034)
trees per acre, squared	-0.0000083**	-0.0000068**	-0.0000085***
	(0.0000041)	(0.0000033)	(0.0000028)
average age of trees	0.116	0.091	0.049
	(0.079)	(0.057)	(0.055)
average age of trees, squared	-0.0016	-0.0010	-0.0009
	(0.0011)	(0.0008)	(0.0008)
natural forest cover	-11.45**	-9.17**	-12.47***
	(5.55)	(4.35)	(3.86)
natural forest cover, squared	22.57***	16.40***	25.85***
	(7.06)	(5.31)	(4.90)
natural open cover	35.98**	23.34**	42.79***
	(13.96)	(9.81)	(9.69)
natural open cover, squared	-32.78**	-23.67**	-39.42***
	(15.72)	(10.85)	(10.91)
total utilized production price ($/pound)	56.74***	41.83***	26.31***
	(13.70)	(9.70)	(7.93)
has federal crop insurance in 2007 (dummy)	1.54*	1.47**	1.41**
	(0.82)	(0.63)	(0.57)
CA (dummy)	-3.27	-3.80	-1.31
	(5.90)	(4.27)	(3.97)
OR (dummy)	-3.29	-0.33	-0.28
	(5.27)	(3.69)	(3.36)
WA (dummy)	-6.44	-2.33	-0.09
	(5.40)	(3.78)	(3.27)
year 2007 (dummy)		1.59*	1.29*
		(0.83)	(0.66)
constant	6.15	12.44***	11.43***
	(6.26)	(4.46)	(4.29)
Data included in sample:			
All observations from 2007	Y	Y	Y
Growers who did not rent in 2006	N	Y	Y
Growers who rented bees in 2006	N	N	Y
First-stage F-statistic, F_{kp}	9.83	13.17	14.9
Adjusted R^2	0.243	0.313	0.238
# Observations	1,020	1,438	2,056

Notes: Table presents first-stage results for honey bee demand IV estimation (weighted). Specification (1) uses data from 2007 only; this is the first stage for specification (1) in Table 1. Specification (2) employs an unbalanced panel over 2006-2007 that includes all observations from 2007, as well as growers who reported not renting bees in 2006; this is the first stage for specification (2) in Table 1. Specification (3) is a balanced panel that includes all growers in the data for both 2006 and 2007; this is the first stage for both specifications (3) and (4) in Table 1. For specification (1), the instrument Z_{sct} is the distance from the centroids of zip code units of farm locations to the centroid of Fresno County, California. For specifications (2) and (3), the instrument Z_{sct} is the interaction between the distance from zip code centroids where farms are located to the centroid of Fresno County, California and the total almond acres in California in year t. Huber-White robust standard errors are in parentheses. Significance codes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A.3: Honey bee demand own-price elasticity estimation, OLS results (weighted).

Dependent variable is the number of honey bee colonies rented				
	(1)	(2)	(3)	(4)
honey bee rental fee ($/colony)	-0.054	-0.054	-0.028	-0.036
	(0.050)	(0.042)	(0.035)	(0.027)
apple bearing acres	1.117***	0.992***	1.117***	0.891***
	(0.053)	(0.044)	(0.037)	(0.029)
apple bearing acres, squared	-0.00080***	-0.00051***	-0.00080***	-0.00011
	(0.00014)	(0.00012)	(0.00010)	(0.00008)
total bearing apple blocks	0.139	0.122*	0.139**	0.137***
	(0.085)	(0.069)	(0.059)	(0.045)
total bearing apple blocks, squared	-0.00161*	-0.00161**	-0.00156***	-0.00143***
	(0.00086)	(0.00070)	(0.00060)	(0.00046)
trees per acre	0.019**	0.018***	0.020***	0.015***
	(0.008)	(0.006)	(0.005)	(0.004)
trees per acre, squared	-0.00002**	-0.00002***	-0.00002***	-0.00001***
	(0.00001)	(0.00001)	(0.000005)	(0.000004)
average age of trees	-0.080	-0.038	-0.048	-0.046
	(0.125)	(0.091)	(0.088)	(0.067)
average age of trees, squared	-0.00037	-0.00029	-0.00061	-0.00046
	(0.00182)	(0.00124)	(0.00128)	(0.00098)
natural forest cover	-1.80	-1.08	2.35	-1.49
	(8.83)	(7.04)	(6.20)	(4.75)
natural forest cover, squared	5.03	2.62	-0.56	3.15
	(11.25)	(8.59)	(7.89)	(6.05)
natural open cover	16.27	8.16	11.79	20.97*
	(21.66)	(15.49)	(15.09)	(11.57)
natural open cover, squared	-12.60	-5.57	-7.69	-20.09
	(24.41)	(17.17)	(17.03)	(13.06)
total utilized production price ($/pound)	57.01***	36.96**	26.51**	20.50**
	(21.26)	(15.24)	(12.37)	(9.48)
has federal crop insurance in 2007 (dummy)	-1.281	-2.006*	-1.124	0.201
	(1.308)	(1.026)	(0.917)	(0.703)
CA (dummy)	-10.43***	-7.30**	-6.44**	-5.38***
	(4.01)	(2.87)	(2.60)	(1.99)
OR (dummy)	-10.95**	-5.89*	-5.08*	-4.11*
	(4.97)	(3.31)	(3.03)	(2.32)
WA (dummy)	-12.58**	-6.65*	-5.09	-4.47*
	(5.91)	(3.95)	(3.33)	(2.56)
year 2007 (dummy)		6.36***	-1.33	-1.07
		(1.33)	(1.05)	(0.80)
constant	-11.25*	-11.83***	-6.33*	
	(5.86)	(3.98)	(3.59)	
Elasticity at mean	-0.200	-0.246	-0.102	-0.130
Data included in sample:				
All observations from 2007	Y	Y	Y	Y
Growers who did not rent in 2006	N	Y	Y	Y
Growers who rented bees in 2006	N	N	Y	Y
Adjusted R^2	0.544	0.537	0.546	0.665
# Observations	1,020	1,438	2,056	2,056

Notes: Table presents OLS results for honey bee demand (weighted). Specification (1) uses data from 2007 only. Specification (2) employs an unbalanced panel over 2006-2007 that includes all observations from 2007, as well as growers who reported not renting bees in 2006, for whom we know the number of colonies rented in 2006 is zero (thereby eliminating the need for quantity imputation). Specification (3) is a balanced panel that includes all growers in the data for both 2006 and 2007: if the grower rented bees in both years, we impute the number of colonies rented in 2006 to be the number of colonies rented in 2007; if the grower rented bees in 2006 but not in 2007, we impute the quantity rented in 2006 using regression-based imputation. Specification (4) is a balanced panel that includes all growers in the data for both 2006 and 2007: we impute missing quantity using regression-based imputation. Elasticity is evaluated at the mean price and quantity in the data for the respective sample of data. Huber-White robust standard errors are in parentheses. Significance codes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A.4: Honey bee demand own-price elasticity estimation using honey bee colonies rented per acre, 2sls results (weighted).

Dependent variable is the number of honey bee colonies rented per acre.				
	(1)	(2)	(3)	(4)
honey bee rental fee ($/colony)	-0.152***	-0.135***	-0.140***	-0.151*
	(0.048)	(0.038)	(0.035)	(0.080)
total bearing apple blocks	0.014	0.014	0.020**	0.071***
	(0.013)	(0.010)	(0.009)	(0.020)
total bearing apple blocks, squared	-0.00018	-0.00017*	-0.00020**	-0.00073***
	(0.00013)	(0.00010)	(0.00009)	(0.00020)
trees per acre	0.0025*	0.0021**	0.0023**	-0.0058***
	(0.0013)	(0.0010)	(0.0009)	(0.0021)
trees per acre, squared	-0.000002**	-0.000002**	-0.000002***	0.000003*
	(0.000001)	(0.000001)	(0.000001)	(0.000002)
average age of trees	-0.044**	-0.037***	-0.049***	-0.189***
	(0.019)	(0.013)	(0.013)	(0.030)
average age of trees, squared	0.00028	0.00029*	0.00034*	0.00171***
	(0.00027)	(0.00017)	(0.00019)	(0.00043)
natural forest cover	-1.29	-0.62	-0.92	3.42
	(1.42)	(1.03)	(1.00)	(2.32)
natural forest cover, squared	2.40	1.05	2.18	-6.38*
	(2.05)	(1.37)	(1.49)	(3.46)
natural open cover	6.83**	3.44	6.89***	-2.78
	(3.37)	(2.19)	(2.39)	(5.54)
natural open cover, squared	-8.78**	-5.23**	-8.75***	-5.99
	(3.71)	(2.42)	(2.60)	(6.03)
total utilized production price ($/pound)	19.15***	13.78***	9.08***	2.52
	(4.78)	(3.03)	(2.26)	(5.24)
has federal crop insurance in 2007 (dummy)	0.023	-0.001	0.047	-0.826**
	(0.201)	(0.148)	(0.138)	(0.321)
CA (dummy)	-5.88***	-4.57***	-4.52***	-2.85
	(1.54)	(1.09)	(0.97)	(2.25)
OR (dummy)	-5.17***	-3.50***	-3.41***	-0.04
	(1.37)	(0.84)	(0.791)	(1.83)
WA (dummy)	-5.38***	-3.57***	-2.88***	2.30
	(1.52)	(0.92)	(0.77)	(1.78)
year 2007 (dummy)		1.20***	-0.100	-1.10***
		(0.19)	(0.155)	(0.360)
constant	5.24***	4.39***	6.50***	13.44***
	(1.73)	(1.43)	(1.36)	(3.15)
Elasticity at mean	-5.05***	-5.57***	-4.49***	-3.25*
Data included in sample:				
All observations from 2007	Y	Y	Y	Y
Growers who did not rent in 2006	N	Y	Y	Y
Growers who rented bees in 2006	N	N	Y	Y
First-stage F-statistic, F_{kp}	9.79	13.03	14.78	14.78
DWH t-statistic	2.45	2.58	3.13	2.51
Adjusted R^2	-0.623	-0.386	-0.537	-0.005
# Observations	1,020	1,438	2,056	2,056

Notes: Table presents IV results for honey bee demand (weighted). Specification (1) uses data from 2007 only. Specification (2) employs an unbalanced panel over 2006-2007 that includes all observations from 2007, as well as growers who reported not renting bees in 2006, for whom we know the number of colonies rented per acre in 2006 is zero (thereby eliminating the need for quantity imputation). Specification (3) is a balanced panel that includes all growers in the data for both 2006 and 2007: if the grower rented bees in both years, we impute the number of colonies rented per acre in 2006 to be the number of colonies rented per acre in 2007; if the grower rented bees in 2006 but not in 2007, we impute the quantity rented in 2006 using regression-based imputation. Specification (4) is a balanced panel that includes all growers in the data for both 2006 and 2007: we impute missing quantity using regression-based imputation. For specification (1), the instrument for price (honey bee rental fee) is the distance from the centroids of zip code units of farm locations to the centroid of Fresno County, California. For specifications (2), (3), and (4), the instrument for price (honey bee rental fee) is the interaction between the distance from zip code centroids where farms are located to the centroid of Fresno County, California and the total almond acres in California in year t. Elasticity is evaluated at the mean price and quantity in the data for the respective sample of data. Huber-White robust standard errors are in parentheses. Significance codes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A.5: Honey bee demand own-price elasticity estimation using honey bee colonies rented per acre, IV-tobit results (weighted).

Dependent variable is the number of honey bee colonies rented per acre				
	(1)	(2)	(3)	(4)
honey bee rental fee ($/colony)	-0.202*	-0.293**	-0.169**	-0.223*
	(0.104)	(0.128)	(0.074)	(0.123)
total bearing apple blocks	0.037	0.047	0.047***	0.155**
	(0.026)	(0.0304)	(0.017)	(0.076)
total bearing apple blocks, squared	-0.00039	-0.00050	-0.00043**	-0.00146**
	(0.00026)	(0.00031)	(0.00018)	(0.00074)
trees per acre	0.0036	0.00446	0.00317	-0.00414
	(0.0038)	(0.00391)	(0.00257)	(0.00984)
trees per acre, squared	-0.000003	-0.000003	-0.000003	0.000003
	(0.000003)	(0.000003)	(0.000002)	(0.000006)
average age of trees	-0.041	-0.029	-0.044	-0.193
	(0.050)	(0.048)	(0.033)	(0.171)
average age of trees, squared	0.000054	-0.00014	0.00011	0.00138
	(0.00057)	(0.00055)	(0.00039)	(0.00170)
natural forest cover	-2.383	-2.250	-1.370	2.397
	(2.283)	(2.514)	(1.550)	(4.046)
natural forest cover, squared	4.256	3.682	3.047	-5.101
	(3.933)	(3.719)	(2.721)	(9.893)
natural open cover	12.80*	15.03**	11.76**	10.77
	(7.487)	(6.937)	(5.072)	(13.01)
natural open cover, squared	-15.92**	-19.28***	-14.79***	-24.75**
	(7.234)	(7.163)	(4.823)	(10.32)
total utilized production price ($/pound)	32.11***	52.05***	14.88***	19.22***
	(8.655)	(10.05)	(4.092)	(7.310)
has federal crop insurance in 2007 (dummy)	0.462	0.794**	0.473*	0.452
	(0.372)	(0.387)	(0.255)	(0.618)
CA (dummy)	-9.133***	-12.97***	-6.522***	-8.374**
	(3.198)	(3.717)	(2.018)	(3.589)
OR (dummy)	-7.742***	-10.11***	-4.501***	-2.336
	(2.725)	(2.656)	(1.569)	(4.548)
WA (dummy)	-8.308**	-11.96***	-3.893***	0.142
	(3.232)	(3.000)	(1.784)	(7.089)
year 2007 (dummy)			-0.364	-2.020**
			(0.309)	(0.888)
constant	3.411	2.411	5.194*	9.384
	(4,067)	(4.655)	(3.047)	(6.348)
Elasticity at conditional mean	-5.08*	-7.37**	-4.10**	-3.65*
Data included in sample:				
All observations from 2007	Y	Y	Y	Y
Growers who did not rent in 2006	N	Y	Y	Y
Growers who rented bees in 2006	N	N	Y	Y
# Observations	1,020	1,438	2,056	2,056

Notes: Table presents IV-tobit results for honey bee demand (weighted). Specification (1) uses data from 2007 only. Specification (2) employs an unbalanced panel over 2006-2007 that includes all observations from 2007, as well as growers who reported not renting bees in 2006, for whom we know the number of colonies rented per acre in 2006 is zero (thereby eliminating the need for quantity imputation). Specification (3) is a balanced panel that includes all growers in the data for both 2006 and 2007: if the grower rented bees in both years, we impute the number of colonies rented per acre in 2006 to be the number of colonies rented per acre in 2007; if the grower rented bees in 2006 but not in 2007, we impute the quantity rented in 2006 using regression-based imputation. Specification (4) is a balanced panel that includes all growers in the data for both 2006 and 2007: we impute missing quantity using regression-based imputation. For specification (1), the instrument for price (honey bee rental fee) is the distance from the centroids of zip code units of farm locations to the centroid of Fresno County, California. For specifications (2), (3), and (4), the instrument for price (honey bee rental fee) is the interaction between the distance from zip code centroids where farms are located to the centroid of Fresno County, California and the total almond acres in California in year t. Elasticity at conditional mean is evaluated at the mean price and quantity among grower-years with positive quantity in the respective sample of data. Huber-White robust standard errors are in parentheses. Significance codes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A.6: Binary choice to never rent bees, probit and IV-probit results (weighted).

Dependent variable is probability of never renting honey bees				
	(1) probit	(2) probit	(3) IV-probit	(4) IV-probit
honey bee rental fee in 2006 ($/colony)			0.015	
			(0.045)	
honey bee rental fee in 2007 ($/colony)				0.010
				(0.032)
apple bearing acres	-0.017*	-0.017*	-0.018*	-0.017*
	(0.009)	(0.009)	(0.009)	(0.009)
apple bearing acres, squared	0.000037*	0.000037*	0.000037*	0.000036*
	(0.000021)	(0.000021)	(0.000021)	(0.000021)
total bearing apple blocks	-0.068***	-0.070***	-0.068***	-0.067***
	(0.014)	(0.014)	(0.014)	(0.014)
total bearing apple blocks, squared	0.00059***	0.00061***	0.00058***	0.00058***
	(0.00016)	(0.00016)	(0.00016)	(000016)
trees per acre	0.0005	0.0004	0.0003	0.0003
	(0.0012)	(0.0012)	(0.0013)	(0.0013)
trees per acre, squared	-0.000002	-0.000002	-0.000002	-0.0000019
	(0.000001)	(0.000001)	(0.000002)	(0.0000015)
average age of trees	-0.0036	-0.0053	-0.0024	-0.0041
	(0.0172)	(0.0173)	(0.0167)	(0.0175)
average age of trees, squared	0.00021	0.00024	0.00020	0.00021
	(0.00026)	(0.00026)	(0.00025)	(0.00026)
natural forest cover	1.370	1.235	1.553	1.479
	(1.313)	(1.304)	(1.498)	(1.370)
natural forest cover, squared	-2.039	-1.711	-2.473	-2.281
	(1.492)	(1.508)	(2.072)	(1.681)
natural open cover	-6.896***	-6.374***	-7.531**	-7.063***
	(2.366)	(2.521)	(2.997)	(2.417)
natural open cover, squared	6.243***	5.776**	6.848**	6.360***
	(2.352)	(2.449)	(2.955)	(2.406)
total utilized production price ($/pound)	-7.196***	-8.002**	-8.061***	-7.872***
	(2.180)	(4.057)	(2.981)	(2.689)
has federal crop insurance in 2007 (dummy)	-0.553***	-0.525***	-0.567***	-0.563***
	(0.152)	(0.151)	(0.154)	(0.154)
CA (dummy)	1.524***	1.557***	1.942	1.817*
	(0.410)	(0.495)	(1.274)	(0.943)
OR (dummy)	1.232**	1.250**	1.590	1.472*
	(0.497)	(0.625)	(1.129)	(0.815)
WA (dummy)		1.420	1.677	1.593*
		(0.982)	(1.182)	(0.968)
PA (dummy)	1.340*	0.116		
	(0.723)	(0.305)		
NC (dummy)		-0.474		
		(0.454)		
NY (dummy)		[dropped]		
constant	2.639***	2.773***	2.183	2.286*
		(1.020)	(1.647)	(1.345)
Average partial effects				
apple bearing acres	-0.00217*	-0.00211*	-0.0167*	-0.0163*
total bearing apple blocks	-0.00656***	-0.00656***	-0.0499***	-0.0496***
trees per acre	-0.0000898	-0.0000940	-0.000798	-0.000785
average age of trees	0.000569	0.000468	0.00513	0.00394
natural forest cover	-0.0172	-0.00319	-0.268	-0.201
natural open cover	-0.431**	-0.390**	-3.585**	-3.397***
# Observations	1,020	1,020	1,020	1,020

Notes: Table presents results (weighted) from probit and IV-probit regressions of the binary choice to never rent honey bees. For the IV-probit regessions in specifications (3) and (4), the instrument for price (honey bee rental fee) is the distance from the centroids of zip code units of farm locations to the centroid of Fresno County, California. Huber-White robust standard errors are in parentheses. Significance codes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

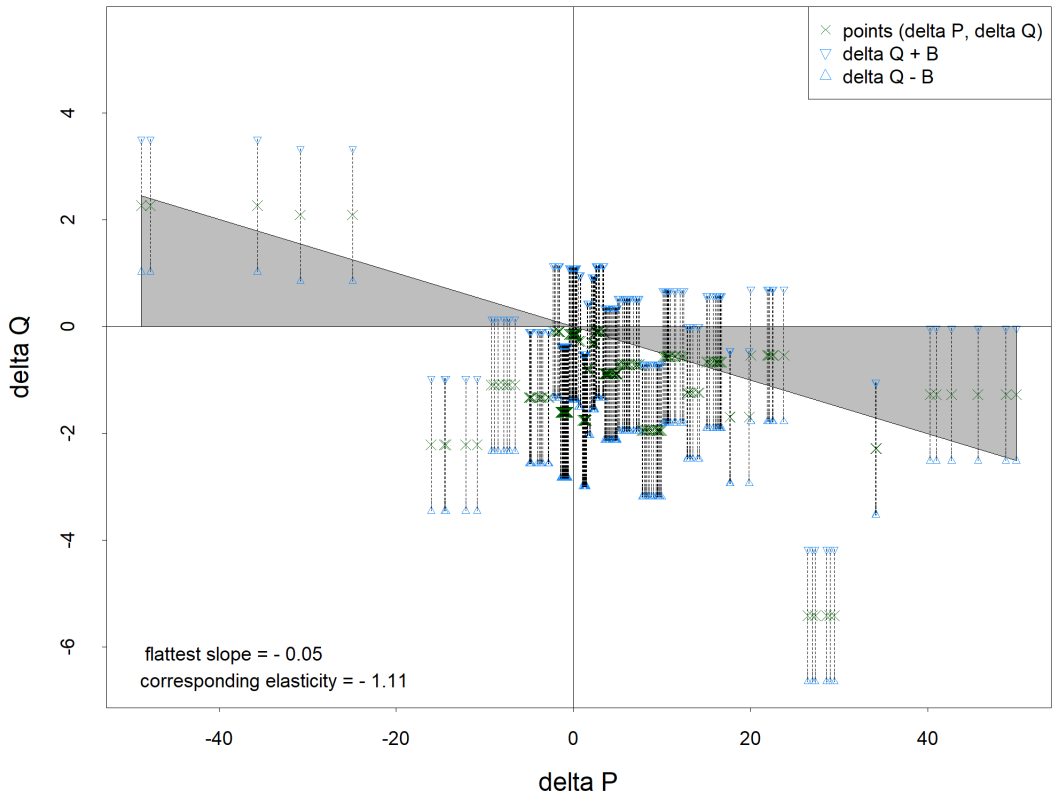

Figure A.4: Figure illustrates the construction of bounds on the honey bee demand elasticity from using the absolute value of the differenced quantity for observations for which the differenced price is equal to zero as our demand shock, the number of colonies rented per acre (rather than the number of colonies rented) as our measure of quantity, and a demand shock bound B of 1.24, which is twice the maximum absolute value of the differenced quantity for observations for which the differenced price is equal to zero. The subsample is the same balanced panel of 1,028 farmers that we use in specification (4) in Table 1 and specification (4) in Table A.4. The cross-hatches depict a scatterplot of the first differenced price on the x-axis and smoothed first differenced quantity on the y-axis. The dotted interval around each cross-hatch as radius of $B = 1.24$. The shaded region depicts all demand functions consistent with an upper bound of $B = 1.24$ on the maximum absolute value of the demand shock. These are the downward-sloping lines that pass through the origin and through all of the dotted intervals. The implied bound on the slope is -0.05 and the corresponding bound on demand elasticity (when evaluated at mean price and quantity) is -1.11.

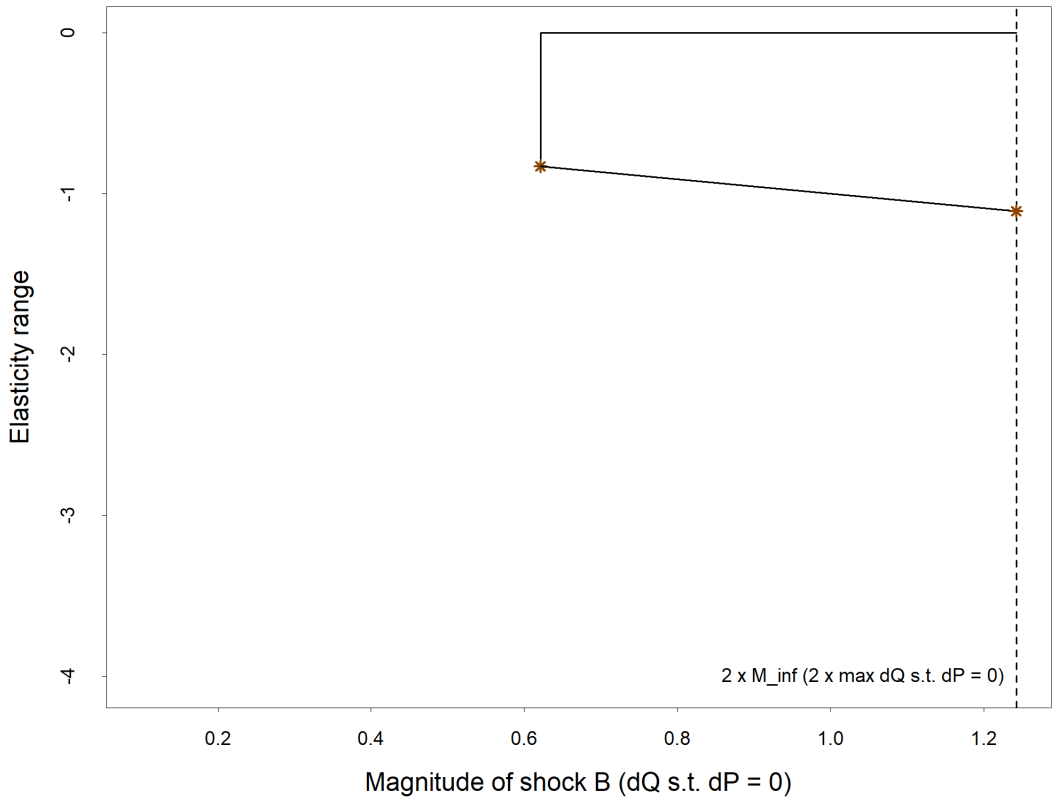

Figure A.5: Figure plots the range of honey bee elasticities (when evaluated at mean price and quantity) that are consistent with bounds on the plausible size of shocks to demand ranging from the mean absolute value of the differenced quantity for observations for which the differenced price is equal to zero, to twice the maximum absolute value of the differenced quantity for observations for which the differenced price is equal to zero, when using the number of colonies rented per acre (rather than the number of colonies rented) as our measure of quantity. The subsample is the same balanced panel of 1,028 farmers that we use in specification (4) in Table 1 and specification (4) in Table A.4. The dashed vertical line is at twice the maximum absolute value of the differenced quantity for observations for which the differenced price is equal to zero.