SUPPLEMENT TO "LAND USE REGULATION AND WELFARE"

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BY MATTHEW A. TURNER, ANDREW HAUGHWOUT, AND WILBERT VAN DER KLAAUW

APPENDIX C: SUPPLEMENTAL RESULTS

TABLE A.I PROVIDES COUNTS OF TRANSACTIONS by metropolitan statistical area and sampling rule. We note that COSTAR follows major metropolitan area "markets" whose boundaries do not strictly follow metropolitan statistical area boundaries. Thus, parcels in some of the MSA's in Table A.I appear to be included as part of COSTAR's efforts to track transactions in a market that lies primarily in an adjacent MSA. Since COSTAR does not make their boundary files or market identifiers available, it is not clear how to count the number of markets that COSTAR covers. From Figure 5, the number of metropolitan areas covered by our sample of COSTAR data appears to be about 30.

In the body of the paper, we present coefficient estimates only for our regulation variables. We here present estimates of the rest of the coefficients for a subset of our results. Table A.II reports more completely on the regressions of row 3 of Table II. These are our own-lot effect regressions using a sample of parcels that match to a straight border and are at least 1 km from the nearest intersection of municipal borders. All regressions include municipal border fixed effects.

The top row reports the coefficient of the WRLURI index, B_{OWN}, and matches row 3 of Table II. Subsequent rows report other coefficients, with errors clustered at the municipal border level given in parentheses. These results largely accord with our priors. Larger parcels sell for lower prices per square foot. Parcels that are more remote from the central business district are also cheaper. The roughness of the surrounding terrain has a small negative effect on price. Blacks, Asians, and the more highly educated live on more expensive land. This presumably reflects the fact that these populations live nearer to the central business district. Nearby employment has a small positive effect on prices, as does a high share of developed area in a 5 km radius around the parcel. Conditioning on the level of development and employment within 5 km, developed share within 1 km or 5 km is negative. Coefficients are generally consistent across different specifications.

The regressions in columns 2–6 of Table A.II also control for per pupil school funding and property taxes per square foot of land. Two comments about these variables are required. First, we are not conducting a border study of the effect of school district quality on land prices across school district borders, as in Black (1999) or Bayer, Ferreira, and McMillan (2007). We examine what happens across *municipal* borders. That the effect of school funding is negative tells us that within municipality variation in funding has the negative effect on

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TABLE A.I

COUNTS OF TRANSACTIONS BY METROPOLITAN STATISTICAL AREA AND SAMPLING RULE

MSA (Census 2003)	All and WRLURI	Table II Row 3	Table VI Row 2
New York–Northern New Jersey–Long Island, NY–NJ–PA	1,673	0	2
Phoenix–Mesa–Scottsdale, AZ	1,252	100	205
Dallas–Fort Worth–Arlington, TX	960	19	42
Denver–Aurora, CO	699	14	41
Los Angeles–Long Beach–Santa Ana, CA	672	7	17
Miami–Fort Lauderdale–Miami Beach, FL	591	6	20
Seattle–Tacoma–Bellevue, WA	534	3	10
San Diego–Carlsbad–San Marcos, CA	466	0	1
Detroit–Warren–Livonia, MI	406	27	51
Chicago–Naperville–Joliet, IL–IN–WI	395	1	3
Minneapolis–St. Paul–Bloomington, MN–WI	260	9	19
Boston–Cambridge–Quincy, MA–NH	254	5	14
Columbus, OH	193	13	18
Riverside–San Bernardino–Ontario, CA	162	5	13
Cleveland–Elyria–Mentor, OH	149	2	20
Portland–Vancouver–Beaverton, OR–WA	139	0	1
Atlanta–Sandy Springs–Marietta, GA	130	0	0
Tampa–St. Petersburg–Clearwater, FL	105	0	0
Cincinnati–Middletown, OH–KY–IN	96	0	1
Houston–Baytown–Sugar Land, TX	92	1	2
Philadelphia–Camden–Wilmington, PA–NJ–DE–MD	89	7	11
Trenton–Ewing, NJ	75	1	5
Jacksonville, FL	64	0	0
San Jose–Sunnyvale–Santa Clara, CA	49	0	0
Orlando, FL	30	0	0
Palm Bay–Melbourne–Titusville, FL	29	0	0
San Francisco–Oakland–Fremont, CA	29	1	1
Flint, MI	29	0	0
Akron, OH	24	3	5
New Haven–Milford, CT	20	0	0
Charlotte–Gastonia–Concord, NC–SC	16	0	0
Providence–New Bedford–Fall River, RI–MA	14	0	0
Dayton, OH	14	0	0
Bridgeport–Stamford–Norwalk, CT	12	0	0
Austin–Round Rock, TX	12	0	0
Worcester, MA	12	0	3
Oxnard–Thousand Oaks–Ventura, CA	9	0	0
Harrisburg–Carlisle, PA	8	2	3
Tucson, AZ	8	0	0
Fort Collins–Loveland, CO	8	0	0
Manchester–Nashua, NH	4	0	0
Lancaster, PA	4	0	0
Allentown–Bethlehem–Easton, PA–NJ	3	0	0
Atlantic City, NJ	3	0	0
Vineland–Millville–Bridgeton, NJ	2	0	0
Colorado Springs, CO	1	0	0
Canton–Massillon, OH	1	0	0
Boulder, CO	1	0	0

TABLE A.II

ALL COEFFICIENTS FOR ROW 3 OF TABLE II[a]

WRLURI, 1 km (Dist. < 0.1)	(1) [2000–2009]	(2) [2000–2009]	(3) [2000–2009]	(4) [2000–2009]	(5) [2000–2009]	(6) [2000–2009]
WRLURI	1.51	−0.99	−8.37	−8.84	−5.45	−5.89
	(1.46)	(1.76)	(2.85)***	(2.75)***	(2.84)*	(2.16)***
Per pupil expenditures (000 $)		−3.65	−6.22	−6.09	−5.12	−5.23
		(1.64)**	(0.78)***	(1.40)***	(1.57)***	(1.83)***
Property taxes per acre		7.04	14.91	8.45	5.56	1.94
		(2.70)**	(1.71)***	(3.29)**	(3.12)*	(3.83)
Share black			−10.61	−2.93	−2.31	−1.51
			(19.45)	(17.37)	(31.54)	(25.69)
Share Asian			−49.32	−12.77	−69.37	−33.02
			(99.21)	(75.22)	(123.35)	(95.10)
Share high school			108.71	93.58	74.08	64.84
			(64.07)*	(58.02)	(60.51)	(59.91)
Share college			−2.42	45.96	60.88	93.53
			(45.56)	(44.65)	(51.70)	(47.71)*
Median income (000 $)			0.65	0.44	0.29	0.16
			(0.14)***	(0.19)**	(0.17)*	(0.19)
Size (000 ft^2)				−0.08		−0.07
				(0.02)***		(0.02)***
Size^2				0.00		0.00
				(0.00)***		(0.00)***
log(km to CBD)				−67.24		66.27
				(88.88)		(130.81)
log(km to CBD)^2				8.16		−13.04
				(15.99)		(25.03)
TRI 500 m				−0.02		−0.12
				(0.16)		(0.21)
TRI 5 km				−0.03		0.02
				(0.03)		(0.03)
TRI 10 km				0.00		0.00
				(0.02)		(0.01)
ZBP Emp. 1994 500 m					0.02	0.02
					(0.01)***	(0.01)***
ZBP Emp. 1994 5 km					−0.00	−0.00
					(0.00)	(0.00)*
ZBP Emp. 1994 10 km					−0.00	−0.00
					(0.00)	(0.00)
Dev. Area 1992 (km^2) 500 m					−18.29	−16.95
					(6.00)***	(5.52)***

(*Continues*)

TABLE A.II—*Continued*

WRLURI, 1 km (Dist. < 0.1)	(1) [2000–2009]	(2) [2000–2009]	(3) [2000–2009]	(4) [2000–2009]	(5) [2000–2009]	(6) [2000–2009]
Dev. Area 1992 (km^2) 5 km					−0.32	−0.15
					(0.26)	(0.25)
Dev. Area 1992 (km^2) 10 km					0.38	0.34
					(0.13)***	(0.15)**
Border pair FE	Y	Y	Y	Y	Y	Y
Quarter dummies	Y	Y	Y	Y	Y	Y
Per pupil expenditures		Y	Y	Y	Y	Y
Property taxes per acre		Y	Y	Y	Y	Y
Demographics			Y	Y	Y	Y
Parcel controls I				Y		Y
Parcel controls II					Y	Y

[a]Standard errors are clustered by municipal border pair. *, **, and *** denote estimates different from 0 at 10%, 5%, and 1% significance levels.

land prices that is familiar from cross-sectional regressions of school funding and land prices. Second, while we do not have a strong prior over the effect of property taxes on land prices, we note that we are controlling for property taxes per acre of municipality area. Thus, this variable partly reflects the extent of development in a municipality. It lets us control for tax rates, but should not be regarded as a measure of tax rates. These comments also apply to the results in Table A.III.

Table A.III reports more completely on the regressions of row 2 of Table VI. These are our external effect regressions using a sample of parcels that match to a straight border and are at least 1 km from the nearest intersection of municipal borders. All regressions include municipality fixed effects.

The top row of this table reproduces estimates of B_{EXT} reported in Table VI. As for the own-lot effect regressions, we see that larger parcels sell at a somewhat lower price. None of the other control variables in these regressions is consistently different from 0 at ordinary levels of significance, nor does including them change our estimates of the coefficient of interest dramatically. Two comments about this are required. First, since we include municipality fixed effects, the regression compares parcels that are generally very close to each other. Thus, for many of the explanatory variables (e.g., distance to central business district), there will be little within municipality variation. Second, our demographic variables are not levels of these variables, but are cross-border changes. Thus, Table A.III tells us that changes in demographic composition do not have measurable spill over effects on nearby land prices over the spatial scales that we consider.

TABLE A.III

ALL COEFFICIENTS FOR ROW 2 OF TABLE VI[a]

WRLURI, 1 km ($0.5 > x > 0.25$, $0.25 > x > 0$)	(1) [2000–2009]	(2) [2000–2009]	(3) [2000–2009]	(4) [2000–2009]	(5) [2000–2009]	(6) [2000–2009]	(7) [2000–2009]	(8) [2000–2009]
ΔWRLURI	−1.91	−0.69	−2.28	−3.00	−0.98	−1.24	−1.27	−1.71
	(1.22)	(1.56)	(1.09)**	(1.32)**	(1.36)	(1.28)	(1.39)	(1.48)
ΔPer pupil expenditures		−1.31			−2.98	−2.48	−3.07	−2.52
		(0.96)			(1.46)**	(1.40)*	(1.49)**	(1.54)
ΔProperty taxes per acre		2.71			4.96	4.50	4.58	3.96
		(2.82)			(2.58)*	(2.40)*	(2.72)*	(2.67)
ΔShare black			−10.60	−15.50	21.52	15.21	23.28	16.46
			(23.16)	(23.13)	(20.12)	(20.26)	(20.62)	(20.49)
ΔShare Asian			−101.56	−111.65	−173.42	−173.20	−170.78	−165.57
			(73.41)	(75.28)	(79.21)**	(77.91)**	(86.84)*	(86.04)*
ΔShare high school			−11.05	−14.56	1.15	2.01	3.86	2.70
			(41.89)	(39.98)	(43.98)	(36.95)	(44.95)	(38.40)
ΔShare college			−2.47	−22.51	−25.54	−7.32	−18.81	−21.50
			(29.42)	(27.94)	(33.41)	(27.68)	(35.54)	(31.16)
ΔMedian income			0.05	0.07	0.10	0.08	0.10	0.10
			(0.07)	(0.08)	(0.09)	(0.09)	(0.09)	(0.10)
Size (000 ft^2)			−0.02	−0.02			−0.02	−0.02
			(0.01)**	(0.01)**			(0.01)*	(0.01)*
Size^2			0.00	0.00			0.00	0.00
			(0.00)*	(0.00)*			(0.00)	(0.00)*
log(km to CBD)			−14.54	47.79			27.72	30.53
			(54.55)	(53.26)			(67.21)	(68.02)
log(km to CBD)^2			−0.29	−9.31			−6.50	−7.21
			(9.45)	(8.30)			(10.59)	(10.86)
TRI 500 m			0.13	0.04			−0.04	−0.02
			(0.26)	(0.17)			(0.18)	(0.17)

(*Continues*)

TABLE A.III—*Continued*

WRLURI, 1 km ($0.5 > x > 0.25, 0.25 > x > 0$)	(1) [2000–2009]	(2) [2000–2009]	(3) [2000–2009]	(4) [2000–2009]	(5) [2000–2009]	(6) [2000–2009]	(7) [2000–2009]	(8) [2000–2009]
TRI 5 km			−0.02	0.01			0.01	0.01
			(0.03)	(0.02)			(0.02)	(0.02)
TRI 10 km			0.00	0.00			0.00	0.00
			(0.01)	(0.01)			(0.01)	(0.01)
ZBP Emp. 1994 500 m				0.01	0.01		0.01	0.01
				(0.01)	(0.01)		(0.01)*	(0.01)*
ZBP Emp. 1994 5 km				−0.00	−0.00		−0.00	−0.00
				(0.00)	(0.00)		(0.00)	(0.00)
ZBP Emp. 1994 10 km				−0.00	−0.00		−0.00	−0.00
				(0.00)	(0.00)		(0.00)	(0.00)
Dev. Area 1992 (km^2) 500 m				−9.62	−7.25		−7.97	−8.22
				(4.45)**	(4.91)		(4.66)*	(4.50)*
Dev. Area 1992 (km^2) 5 km				−0.24	0.02		−0.05	−0.08
				(0.22)	(0.24)		(0.22)	(0.22)
Dev. Area 1992 (km^2) 10 km				0.32	0.14		0.20	0.23
				(0.15)**	(0.16)		(0.15)	(0.15)
Interior dummy				−2.45		−0.90		−2.04
				(1.12)**		(0.87)		(1.06)*
Municipality-border FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter dummies	Y	Y	Y	Y	Y	Y	Y	Y
ΔPer pupil expenditures		Y			Y	Y	Y	Y
ΔProperty taxes per acre		Y			Y	Y	Y	Y
ΔDemographics			Y	Y	Y	Y	Y	Y
Parcel controls I			Y	Y			Y	Y
Parcel controls II				Y	Y		Y	Y
Interior dummy				Y		Y		Y

[a]Standard errors are clustered by municipal border pair. *, **, and *** denote estimates different from 0 at 10%, 5%, and 1% significance levels.

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Dept. of Economics, University of Toronto, 150 Saint George Street, Toronto, Ontario, Canada M5S 3G7; mturner@chass.utoronto.ca,

Research and Statistics Group, Federal Reserve Bank of New York, 33 Liberty Street, New York, NY 10045, U.S.A.; Andrew.Haughwout@ny.frb.org,

and

Research and Statistics Group, Federal Reserve Bank of New York, 33 Liberty Street, New York, NY 10045, U.S.A.; Wilbert.VanDerKlaauw@ny.frb.org.

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