Table A.1. Summary Statistics

	Book Stores	Clothing Stores	Electronic Stores	Linens Stores
A: Store Level Variables (2006)				
Employment	34.7	68.7	42.1	24.0
	(26.8)	(83.0)	(60.5)	(38.4)
Sales ($1000s)	4,619.0	12,071.0	10,875.9	3,304.0
	(3,553.6)	(11,192.8)	(11,351.3)	(3,433.7)
B: 1 Mile Radius Neighborhoods (2006)				
Stores	1,703.2	642.3	1,000.0	770.8
	(5,765.0)	(578.1)	(3,830.1)	(1,960.4)
Employment	21,214.2	7,153.9	12,170.9	9,668.1
	(64,103.4)	(7,267.1)	(40,808.2)	(24,194.7)
Sales ($1,000,000)	3,304	1,248	2,115	1,639
	(11,006)	(1,026)	(7,401)	(3,868)
C: Zip Level Variables (2000)				
Median House Sale Price	328,780	328,295	290,971	290,790
	(218,357)	(188,198)	(177,544)	(164,510)
Percent Black	.137	.076	.135	0.126
	(.125)	(.080)	(.115)	(.111)
D: City Level Variables				
Income per capita	30,173	26,127	29,007	29,308
	(11,625)	(7,848)	(9,329)	(9,257)
Population	478,879	222,043	370,021	289,945
	(1,400,423)	(452,012)	1,125,635	(921,749)
Population Density (pop/mi^2)	4,165	2,854	3,547	3,208
	(4,701)	(1,981)	(4,087)	(3,251)

Notes: Data from Esri and the Census Bureau. Standard deviations in parentheses.

Table A.2. Spillovers from Big-Box Stores: Establishments and Employment (Census Data)

	Census Tract	Town
Defunct - Non Defunct Pair	ln Employment	ln Employment
	(1)	(2)
Panel A		
Defunct	-0.0142***	-0.0066***
	(0.0030)	(0.0026)
N	45019	41835
Panel B		
Defunct	-0.0140***	-0.0063***
	(0.0033)	(0.0024)
N	40572	41835

Notes: This table reports the results of regressions of the form $\ln(y_{it}) = a_i + a_t + b \times \text{Defunct} + u_{it}$ where a_i are fixed effects for the tract or town and a_t are year fixed effects. The observations are annual outcomes for tracts and towns in the Census LODES data for 2006-2011. This data does not include Massachusetts due to the state's lack of participation. Defunct is a time-varying dummy equal to 1 if the big-box chain is closed in that year. The standard errors are clustered by tract/town. Panel A measures the total employment impact in the tract or town. Panel B uses employment numbers that only include individuals who work and live in the same town. Standard errors are clustered by tract or zip.

Table A.3. Town Shape and Externalities (Census Data)

A	ln Employment (Town)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Pooled							
Defunct	-0.0071***	0.0153	0.0038	0.0045	-0.0229***	0.0189	-0.0070***
	(0.0024)	(0.0097)	(0.0037)	(0.0067)	(0.0043)	(0.0121)	(0.0024)
Defunct X		-0.0425**	-0.0509***	-0.0505*	0.0048***	-0.0381**	-0.0082***
Geographic Ratio		(0.0185)	(0.0137)	(0.0294)	(0.0010)	(0.0181)	(0.0026)
		Rectangular			Schwartzberg		
	-	Area	Polsby-		(larger is less		Compactness
Measure		Fraction	Popper	Reock	compact)	Convex Ratio	Index
N	40227	40227	40227	40227	40227	40227	40227

Notes: This table reports the results of regressions of the form $\ln(y_{it}) = a_i + a_t + b$ x Defunct + b_2 x Defunct x Geographic Ratio + u_{it} where a_i are fixed effects for the town and the a_t are store-type-year fixed effects. The observations are the annual outcomes for the town/political unit containing big-box retailers. Employment information is from Census LODES data for 2006-2011. This data does not include Massachusetts due to the state's lack of participation. The uninteracted geographic ratio cannot be included due to the fixed effects. Defunct is a time-varying dummy equal to 1 if the big-box chain is closed in that year. The geographic ratios are defined in the text. Note that a lower Schwartzberg ratio indicates a more compact shape, unlike the other measures. Standard errors are clustered by zip.

Table A.4. Exogeneity Tests: Dependent Variables

Dependent Variable	Number Stores 2006	Employment 2006	Number Stores 2003	Employment 2003
	(1)	(2)	(1)	(2)
1/2 Mile Radius				
Eventually Defunct Store	13.40	387.0	-1.852	-168.5
	(44.26)	(513.2)	(119.2)	(1575.0)
1 Mile Radius				
Eventually Defunct Store	-45.27	-85.48	-150.9	-2928.1
	(119.6)	(1270.5)	(243.5)	(3181.2)
2 Mile Radius				
Eventually Defunct Store	-219.9	-2100.8	-191.6	-4710.4
	(248.0)	(2624.3)	(338.5)	(4293.1)
N	7705	7705	7570	6807

Notes: The observations are outcomes for geographic neighborhoods of different sizes surrounding big-box retailers. Each coefficient represents a separate regression. A list of retailers can be found in the text. All chains were extant in 2006. The reported coefficients are from a regression of the number of stores or employment in 2006 or 2003 on a dummy for those chains that eventually close and a dummy for store type. The table demonstrates the absence of pre-closure differences. Standard errors are clustered by zip code. Data for 2003 arrived in a different format and featured significantly lower observation counts.

Table A.5. Exogeneity Tests: Neighborhood Characteristics

	ln Median Tract Income 2000	ln Median Tract House Price 2000	Percent Black Tract 2000	Percent Hispanic Tract 2000	Walk Score (1-100)	Transit Score (1-100)	Distance to City Center in Minutes	FCC Internet Score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Eventually Defunct	0.00118	0.00170	-0.107	-0.0755	1.074*	0.258	0.122	-0.00246
	(0.00777)	(0.0205)	(0.218)	(0.205)	(0.554)	(0.601)	(0.432)	(0.0264)
Zip Code Fixed Effects	X	X	X	X	X	X	X	X
N	5,355	3,720	5,375	5,375	7,051	2,195	6,956	5,386
R^2	0.890	0.905	0.916	0.954	0.720	0.930	0.756	0.867

Note: The observations are characteristics of neighborhoods surrounding big-box retailers and of their locations. Each coefficient represents a separate regression. A list of retailers can be found in the text. All chains were extant in 2006. The reported coefficients are from a regression of the variable of interest on a dummy for those chains that eventually close with zip code fixed effects included. Standard errors are clustered by zip code. $***$ $p<0.01$, $**$ $p<0.05$, $*$ $p<0.1$

Table A.6. Spillovers from Big-Box Stores: Establishments and Employment (Matching Estimator)

	0.25-Mile Radius		0.5-Mile Radius		1 Mile Radius		2 Mile Radius	
Defunct - Non Defunct Pair	In Stores	In Employment	In Stores	In Employment	In Stores	In Employment	In Stores	In Employment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pooled								
Defunct	-0.102***	-0.121***	-0.0605***	-0.0702***	-0.0292***	-0.0273***	-0.0153***	-0.0104**
	(0.0140)	(0.0163)	(0.00937)	(0.0120)	(0.00493)	(0.00673)	(0.00319)	(0.00463)
With Zip x Year Fixed Effects								
Defunct	-0.0716***	-0.0659***	-0.0327***	-0.0279***	-0.00686**	-0.00950**	-0.000928	-0.00299
	(0.0136)	(0.0157)	(0.00751)	(0.00938)	(0.00327)	(0.00433)	(0.00167)	(0.00262)
Dependent Variable Mean								
(Levels)	121.2181	1725.487	314.6142	4455.352	818.5909	10842.52	2276.205	27856.01
N	53,808	53,658	54,201	54,176	54,236	54,234	54,237	54,237

Notes: This table reports the results of regressions of the form $\ln(y_{it}) = a_i + a_t + b \times \text{Defunct} + u_{it}$, where a_i are fixed effects for the neighborhood (or radius) and a_t are year fixed effects. We use sample weights from coarsened exact matching to balance the sample of neighborhoods around surviving and ultimately defunct stores on their zip code level median house price, median income, percentage black, and percentage Hispanic; their unemployment rate in the store's census tract from the 2000 Census; and their initial (2006) employment level and number of stores. The observations are annual outcomes for neighborhoods of various sizes around big-box retailers from 2006-2013. Each coefficient represents a separate regression. Defunct is a time-varying dummy equal to 1 if the big-box chain is closed in that year. Standard errors are clustered by zip code.

Table A.7. Spillovers from Big-Box Stores: Establishments (Non-Overlapping Tracts and Cities)

	Panel A: Census Tracts			Panel B: City	
	ln Stores (1)	ln Stores (2)		ln Stores (3)	ln Stores (4)
Defunct within 0.25 mi	-0.0472***	-0.0507***	No. Big-Box Stores	0.0003	0.0001
	(0.0169)	(0.0184)	x Post	(0.0006)	(0.0006)
Defunct within 0.5 mi	-0.0239*	-0.0258*	No. Defunct Big-Box Stores	-0.0025**	-0.0035***
	(0.0143)	(0.0155)	x Post	(0.0011)	(0.0013)
Defunct within 1.5 mi	-0.0131***	-0.0174***	No. Big-Box Stores		0.0001
	(0.00392)	(0.00368)	x Post x Compactness		(0.0004)
Defunct within 2.5 mi	-0.00828*	-0.0148**	No. Defunct Big-Box Stores		-0.0026***
	(0.00465)	(0.00683)	x Post x Compactness		(0.0009)
Measure of Defunct Variables	Dummy	Count		Count	Count
Observations	445405	445405		13835	13835

Notes: Panel A of this table reports regressions of the form $\ln(y_{it}) = a_i + a_t + a$ x Big-Box Stores x Post at Distance D+ b x Defunct BB Stores at Distance D x Post + u_{it}, where a_i are fixed effects for the census tract and a_t are year fixed effects. The observations are annual outcomes for census tracts within 30 miles of a big-box retailer from 2006-2012. Observations do not overlap and are not duplicated. The retailers included in this regression are: Borders and Barnes & Noble, CompUSA, Circuit City, and Best Buy, Mervyn's, and Kohl's, Bed Bath & Beyond and Linens 'n Things. In column 1 defunct is a time-varying dummy equal to 1 if the big-box chain is closed in that year at that distance to the tract centroid. In column 2 the time-varying defunct measure is a count rather than a dummy. Controls for store counts at greater distances not reported. The standard errors are clustered by census tract. Panel B of this table displays regressions of the form $\ln(y_{it}) = a_i + a_t + a$ x Big-Box Stores x Post + b x Defunct BB Stores x Post + u_{it}, where a_i are fixed effects for towns and a_t are year fixed effects. Observations are town-years; towns are not duplicated and do not overlap. In both types of regressions the store measures are counts of big-box stores within the town. In column two, the count measures are interacted with the compactness index for the town. Standard errors are clustered by city.

Table A.8. Spillovers from Big-Box Stores: Establishments and Employment

	0.25-Mile Radius		0.5-Mile Radius		1 Mile Radius		2 Mile Radius	
Defunct - Non Defunct Pair	ln Stores (1)	ln Employment (2)	ln Stores (3)	ln Employment (4)	ln Stores (5)	ln Employment (6)	ln Stores (7)	ln Employment (8)
Neighborhoods Around Book Stores								
Defunct	-0.116***	-0.0998***	-0.0470***	-0.0847***	-0.0201**	-0.0308**	-0.00513	-0.0186**
	(0.0263)	(0.0312)	(0.0157)	(0.0211)	(0.00832)	(0.0121)	(0.00564)	(0.00903)
Neighborhoods Around Electronics Stores								
Defunct	-0.121***	-0.145***	-0.0815***	-0.0641***	-0.0364***	-0.0325***	-0.0222***	-0.0147**
	(0.0230)	(0.0266)	(0.0148)	(0.0183)	(0.00745)	(0.0105)	(0.00459)	(0.00646)
Neighborhoods Around Clothing Stores								
Defunct	-0.122***	-0.185***	-0.0948***	-0.0955***	-0.0586***	-0.0472***	-0.0380***	-0.0278***
	(0.0278)	(0.0325)	(0.0181)	(0.0208)	(0.0129)	(0.0149)	(0.00870)	(0.00969)
Neighborhoods Around Linen Stores								
Defunct	-0.111***	-0.129***	-0.0513***	-0.0873***	-0.0184*	-0.0207	-0.00740	0.00578
	(0.0286)	(0.0346)	(0.0184)	(0.0254)	(0.0103)	(0.0143)	(0.00657)	(0.00871)

Notes: This table reports the results of regressions of the form $\ln(y_{it}) = a_i + a_t + a_{zt} + b \times \text{Defunct} + u_{it}$ where a_i are fixed effects for the neighborhood (or radius), a_t for the year, and $_{zt}$ for the zip-year. The observations are annual outcomes for neighborhoods of various sizes around big-box retailers from 2006-2012. Each coefficient represents a separate regression. The retailers included in this regression are: Borders and Barnes & Noble; CompUSA, Circuit City, and Best Buy; JC Penney, Mervyn's, and Kohl's; Bed Bath & Beyond and Linens 'n Things. Defunct is a time-varying dummy equal to 1 if the big-box chain is closed in that year. Standard errors are clustered by zip.

Table A.9. Spillovers from Big-Box Stores: Heterogeneous Effect Sizes

	In Stores 1 miles Radius			
Defunct - Non Defunct Pair				
	(1)	(2)	(3)	(4)
Pooled				
Defunct	0.0134	0.0379**	-0.0432***	-0.0565***
	(0.0108)	(0.0153)	(0.00623)	(0.00882)
Defunct x Interaction Variable	-0.000938***	-0.00182***	0.000395	0.00906**
	(0.000166)	(0.000263)	(0.000266)	(0.00400)
Interaction Variable	Walk Score	Transit Score	Distance to City Center	Saiz Housing Elasticity
N	55,339	17,273	54,617	46,140
R^2	0.975	0.980	0.975	0.976

Notes: This table reports the results of regressions of the form $\ln(y_{it}) = a_i + a_t + b_1$ x Defunct + b_2 x Defunct x Variable of Interest + u_{it} where a_i are fixed effects for the neighborhood (or radius) and a_t are year fixed effects. The observations are annual outcomes for neighborhoods of various sizes around big-box retailers from 2006-2013. Each coefficient represents a separate regression. A list of retailers can be found in the text. Defunct is a time-varying dummy equal to 1 if the big-box chain is closed in that year. Standard errors are clustered by zip.

Table A.10. Nielsen Consumer Behavior Data: Total Visits by Type

	Electronics		Furnishings		Department	
	Operating	Defunct	Operating	Defunct	Operating	Defunct
Same-Day Visits	5.5596	4.9577	5.6081	4.9926	6.2150	5.4763
	(4.3555)	(3.9994)	(4.2136)	(4.0537)	(4.5406)	(4.3128)
Different-Day Visits	5.2013	5.0227	5.2152	5.0981	4.0537	4.0069
	(3.7185)	(3.7588)	(3.9165)	(3.7621)	(3.0807)	(2.9403)
Defunct Date	July 2008		May 2008		October 2008	
Households	1081		796		547	

Notes: The table displays the mean of monthly visits in pre- and post-bankruptcy periods with standard deviations in parentheses. Data includes households in defunct zip codes only that were observed in at least 48 months of the sample.

Table A.11. Spillovers from Big-Box Stores: Consumer Behavior

	Electronics	Furnishings	Department
Defunct	-0.01902***	-0.02262***	-0.01384***
	(0.00378)	(0.00448)	(0.00427)
Observations	67,747	49,221	33,037
R^2	0.9018	0.8978	0.9247

Notes: The table depicts a regression of the form: $ratio_{it}$ = b x $defunct_t + c_i + u_{it}$, where $ratio_{it}$ is the ratio of stores visited on the same day as the big-box store to total visits at all stores, defunct is an indicator for a defunct store and ci is a household fixed effect. Data includes households in defunct zip codes and that were observed in at least 48 months of the sample. Observations are at the household-by-month level, and standard errors are clustered by household.

Table A.12. Town Shape and Externalities - Part 1

Panel A	ln Stores (Town)				
	(1)	(2)	(3)	(4)	(5)
Pooled					
Defunct	0.0211*	0.00528	0.00939	-0.0188***	0.0254*
	(0.0116)	(0.00403)	(0.00775)	(0.00697)	(0.0146)
Defunct X	-0.0552***	-0.0588***	-0.0761**	0.00333	-0.0488**
Geographic Ratio	(0.0213)	(0.0149)	(0.0320)	(0.00213)	(0.0209)
	Rectangular			Schwartzberg	
	Area	Polsby-		(larger is less	
Measure	Fraction	Popper	Reock	compact)	Convex Ratio
N	46358	46358	46358	46358	46358

Panel B	ln Stores (1-Mile Radius)				
	(1)	(2)	(3)	(4)	(5)
Pooled					
Defunct	-0.00702	-0.0180***	-0.0139	-0.0338***	-0.00376
	(0.0167)	(0.00677)	(0.0129)	(0.00891)	(0.0207)
Defunct X	-0.0385	-0.0414*	-0.0589	0.00198	-0.0344
Geographic Ratio	(0.0309)	(0.0224)	(0.0528)	(0.00223)	(0.0297)
	Rectangular			Schwartzberg	
	Area	Polsby-		(larger is less	
Measure	Fraction	Popper	Reock	compact)	Convex Ratio
N	46357	46357	46357	46357	46357

Notes: This table reports the results of regressions of the form $\ln(y_{it}) = a_i + a_t + b_1$ x Defunct + b_2 x Defunct x Geographic Ratio + u_{it} where a_i are fixed effects for the town in Panel A and neighborhood in Panel B, and the a_t are store-type-year fixed effects. The observations in Panel A are the annual outcomes for the town/political unit containing big-box retailers. The observations in Panel B are annual outcomes for 1-mile radii around big-box retailers. Defunct is a time-varying dummy equal to 1 if the big-box chain is closed in that year. The geographic ratios are defined in the text. Note that a lower Schwartzberg ratio indicates a more compact shape, unlike the other measures. The standard errors are clustered by zip.

Table A.12. Town Shape and Externalities - Part 2

Panel A	ln Employment (Town)				
	(6)	(7)	(8)	(9)	(10)
Pooled					
Defunct	0.0184	0.000672	0.00446	-0.0177***	0.0223
	(0.0115)	(0.00440)	(0.00824)	(0.00574)	(0.0142)
Defunct X	-0.0461**	-0.0294*	-0.0456	0.00365***	-0.0412**
Geographic Ratio	(0.0219)	(0.0168)	(0.0343)	(0.00137)	(0.0209)
	Rectangular			Schwartzberg	
	Area	Polsby-		(larger is less	
Measure	Fraction	Popper	Reock	compact)	Convex Ratio
N	46358	46358	46358	46358	46358

Panel B	ln Employment (1-Mile Radius)				
	(6)	(7)	(8)	(9)	(10)
Pooled					
Defunct	-0.0295	-0.0276***	-0.0157	-0.0247**	-0.0423
	(0.0222)	(0.00857)	(0.0159)	(0.0101)	(0.0270)
Defunct X	-0.00152	-0.0116	-0.0634	-0.00174	0.0175
Geographic Ratio	(0.0408)	(0.0258)	(0.0651)	(0.00249)	(0.0385)
	Rectangular			Schwartzberg	
	Area	Polsby-		(larger is less	
Measure	Fraction	Popper	Reock	compact)	Convex Ratio
N	46355	46355	46355	46355	46355

Notes: See previous page.

Table A.13. Compactness Matters More Near Boundaries

	ln Stores (1)
Pooled	
Defunct	-0.0073597** (0.0037525)
Defunct X Compactness Index	-.0102568** (0.0035375)
Defunct X Compactness X $>$ 2 mi Border	.0179528*** (0.0068214)
N	29436

Notes: This table reports the results of regressions of the form $\Delta \ln(y_{it}) = a_i + a_t + b_1$ x Defunct + b_2 x Defunct x Geographic Ratio + b_3 * Defunct x Far From Border + b_4 * Defunct x Far From Borderx Geographic Ratio + u_{it}, where a_i are fixed effects for the town in Panel A and neighborhood in Panel B, and the a_t are year fixed effects. The annual outcomes are for the town/political unit containing big-box retailers. The uninteracted geographic ratio can not be included due to the fixed effects. Defunct is a time-varying dummy equal to 1 if the big-box chain is closed in that year. The geographic ratios are defined in the text. Standard errors are clustered by zip.

Table A.14. Additional Data on Subsidies

	ICMA Development Focus						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A	Retail	Agriculture	Institution/ Non-Profit	Tourism	Transportation	Technology	Other
Compactness	0.0525**	-0.00808	-0.0159	-0.0146	-0.0149	-0.0156	0.000354
	(0.0238)	(0.00657)	(0.0117)	(0.0146)	(0.0122)	(0.0122)	(0.0139)
N	643	643	643	643	643	643	643

Panel B	Good Jobs First Subsidy Tracker Program	
	Retail	Non-Retail
Compactness	0.0169***	-0.00116
	(0.00564)	(0.00181)
N	4259	4259

Notes: Panel A uses data from the 2009 ICMA Economic Development Survey. The dependent variables are dummies for the cities reporting an economic development focus in the listed economic sector. Each coefficient is an independent regression. Standard errors are clustered by state, and all regressions control for population bin dummies and area. Panel B uses data from the Good Jobs First database. Only cities with at least one program are included in the analysis. Retail and non-retail programs were coded based on the programs' description and recipient. The dependent variable indicates at least one retail or non-retail program for the city. All regressions control for population bin dummies and area.

Table A.15. Effect of Compactness By Town Size

	Survey Retail Focus	
	(1)	(2)
Compactness	0.0554402**	0.02501
	(0.0229512)	(0.0165188)
Area	Below Median	Above Median
N	1010	1005

Notes: The table reports regressions of the form Retail Subsidies$_i$ = a+ b x Geographic Ratio + cX$_i$ +u$_i$, where retail subsidies is an indicator for retail development focus in the ICMA 1999, 2004, and 2009 Economic Development Surveys. Each coefficient represents a separate regression.All regressions include controls for area and year. Columns 1 and 2 show the same specifications run on the sample of jurisdictions with smaller / larger than sample median areas respectively. Standard errors clustered by state in parentheses.

Table A.16. Rental Contracts for Anchor and Non-Anchor Stores

Median Rental Income Per Sqft	Total Sample	Less than 500,000 Sqft	500,000 to 799,999	800,000 to 999,999	1,000,000 or Greater
Rental Income					
Anchors	$1.84	$3.91	$1.98	$2.13	$1.14
Mall Stores	$22.67	$13.33	$20.70	$21.78	$26.36
Food Court Tenants	$60.68	$36.19	$62.55	$58.17	$73.39
Outparcels	$8.89	$8.13	$6.85	$8.99	$16.21
Total Rent	$10.45	$9.27	$9.50	$10.20	$11.57
Total Operating Expense	$16.37	$11.94	$14.01	$15.48	$18.20

Source: ICSC (2004) *Shopping Center Operations, Revenue and Expenses,* ICSC Research.

Table A.17. Summary Statistics

Shopping Centers & Malls: Median Statistics	
Gross Leasable Area	337,648
Total Sales	78,500,000
Number of Stores	33
Anchor Square Footage	184,544
Most Common Anchors:	JC Penney
	Walmart
	Target
	Sears
	Macy's
	Kohl's
	Home Depot
	Lowe's
	Ross Dress for Less
	Best Buy
	Mashalls
	Bed Bath & Beyond
Kosmont-Rose Cost of Doing Business Survey:	
Business Improvement Districts	46.4%
Taxable Retail Store Sales (Median)	909,708,100
Population (Median)	77,500
Sales Tax Rate	8.25%

Notes: The table reports selected summary statistics from Esri Shopping Centers and Malls database and from the Kosmont-Rose Institute at Claremont McKenna College, Cost of Doing Business Survey 2013.

Table A.18. Compactness, Shopping Malls and Business Improvement Districts

	(1)	(2) Shopping Center Indicator	(3)
	All Distances	$<$ 2 Miles from Border	$>$ 2 Miles from Border
Compactness	-0.0175***	-.0163488***	.0004958
	(0.00389)	(.0035139)	(.0006494)
N	28940	28940	28940
Controls	Population Dummies and CSA Dummies	Population Dummies and CSA Dummies	Population Dummies and CSA Dummies
	(4)	(5)	(6)
	Log (Shopping Centers)	Log (Center Stores)	Business Improvement District Indicator
Compactness	-0.0747***	-0.0646*	-0.0790**
	(0.0234)	(0.0324)	(0.0259)
N	2219	2217	293
Controls	Population Dummies and CSA Dummies	Population Dummies and CSA Dummies	Population Dummies and CSA Dummies

Note: The table reports regressions of the form Y_i = a + b x Compactness + cX_i +u_i where the dependent variable is (in order) a dummy for the existence of a mall or shopping center, the log number of malls/centers, the log number of stores in malls/centers, and the existence of a business improvement district. The explanatory variable is our compactness index. Each coefficient represents a separate regression and all regressions control for area. Additional controls are listed in the the table. Standard errors clustered by state in parentheses.

Table A.19. Town Shape, Shopping Malls, and Business Improvement Districts

	(1)	(2)	(3)	(4)	(5)	(6)
	Subsidy Indicator		Mall Indicator		Business Improvement District Indicator	
Rectangular Area Fraction	0.336***	0.335***	-0.179***	-0.0603***	-0.958**	-0.940**
	(0.0924)	(0.0927)	(0.0222)	(0.0159)	(0.342)	(0.336)
Polsby-Popper	0.261***	0.242***	-0.268***	-0.0984***	-0.867***	-0.720***
	(0.0877)	(0.0745)	(0.0271)	(0.0188)	(0.0970)	(0.0851)
Reock	0.218	0.271*	-0.174***	-0.0571***	-0.508*	-0.594*
	(0.149)	(0.152)	(0.0281)	(0.0198)	(0.252)	(0.263)
Schwartzberg (larger is less compact)	-0.0226**	-0.0162*	0.0700***	0.0303***	0.0740	0.0624
	(0.0104)	(0.00959)	(0.0111)	(0.00702)	(0.0541)	(0.0525)
Convex Ratio	0.320***	0.307***	-0.0472***	-0.0182***	-0.831**	-0.790**
	(0.0850)	(0.0873)	(0.00568)	(0.00398)	(0.302)	(0.305)
Additional Controls	None	Pop and State Dummies	None	Pop and State Dummies	None	Pop and State Dummies
N	2022	2022	28940	28940	293	293

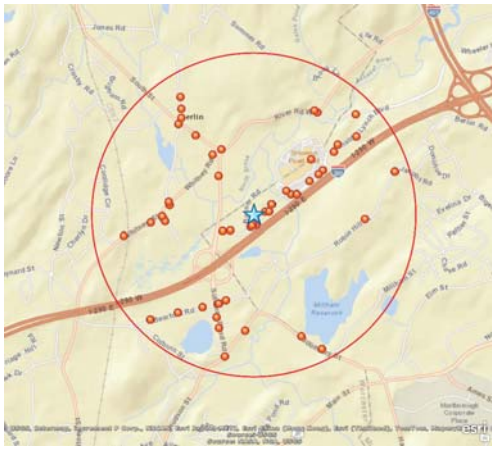
Notes: The table reports regressions of the form $y_i = a_i + b$ x Geographic Ratio $+ cX_i + u_i$ where the outcome variables are indicators for retail development subsidies in the ICMA surveys, the presence of a mall, and the presence of a Business Improvement District. Each coefficient is from a separate regression, all regressions control for area, and the geographic measures are described in the text. Note that a higher Schwartzberg ratio means a town is less compact. Standard errors are clustered by state.

Table A.20. Tax Increment Financing and New Shopping Malls

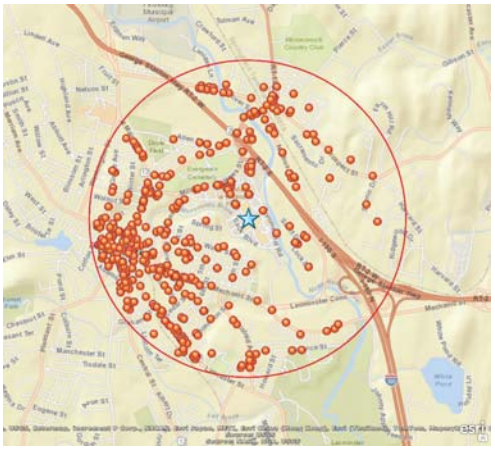
Defunct - Non Defunct Pair	New Shopping Centers & Malls per 100,000 people	New Shopping Centers & Malls per 100,000 people
	(1)	(2)
Post TIF Enabling Legislation Dummy	-0.011**	-0.012**
	(0.005)	(0.005)
Additional Controls	X	Census Divison Trends
N	2,400	2,400

Notes: This table reports the results of regressions of the form New Malls Per Capita$_i$ = a$_i$ + a$_t$ + b x Post TIF Enabling Legislation + u$_{it}$, where a$_i$ are fixed effects for the state and a$_t$ are year fixed effects. Alaska and Hawaii were dropped due to missing data. The observations are state-years for 1961-2010. Each coefficient represents a separate regression. Dates for TIF enabling legislation come from the Council of Development Finance Agencies website. Standard errors are clustered by state.

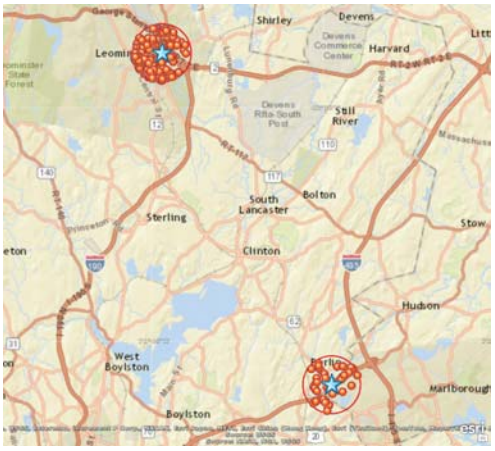
Figure A.1. Empirical Strategy: Visualization



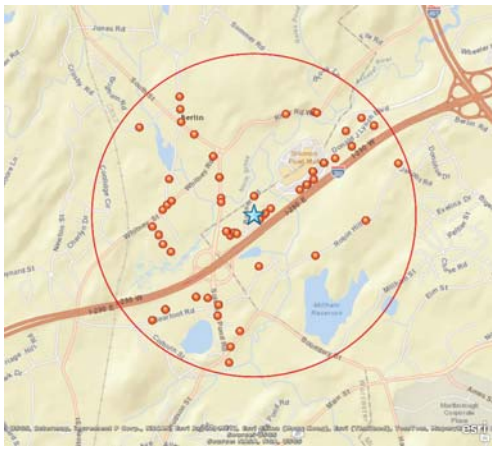
Best Buy in Marlborough, MA in 2006



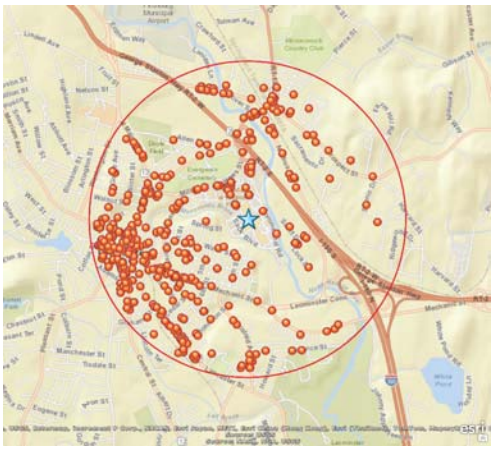
Circuit City in Leominster, MA in 2006



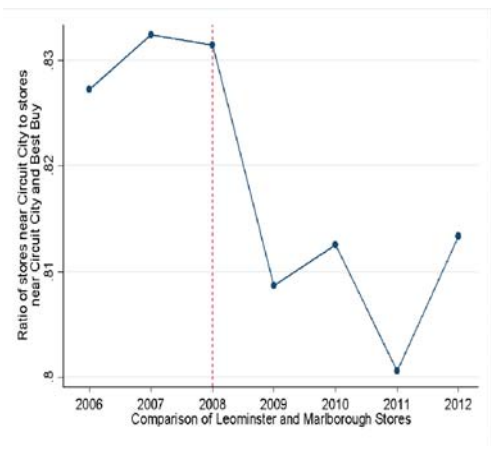
Circuit City in Leominster, MA and Best Buy in Marlborough, MA



Best Buy in Marlborough, MA in 2012



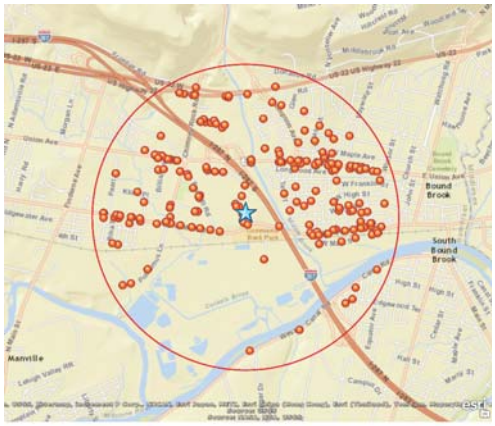
Circuit City Location in Leominster, MA in 2012



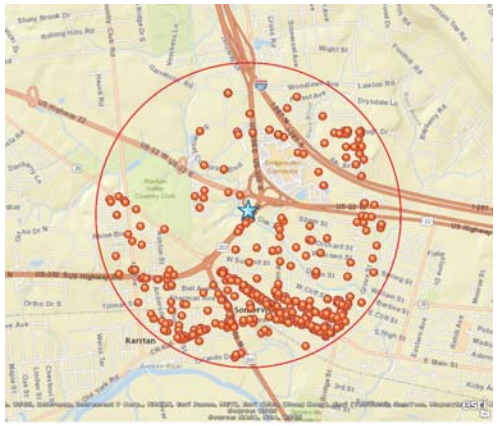
2008 Circuit City Bankruptcy Impact

Notes: The Blue star represents a given store or its location (if it closed). The red circle is the one mile radius around a given store. Other stores are represented by the red dots. The final figure plots the ratio of stores near this eventually defunct Circuit City relative to this non-defunct Best Buy over time.

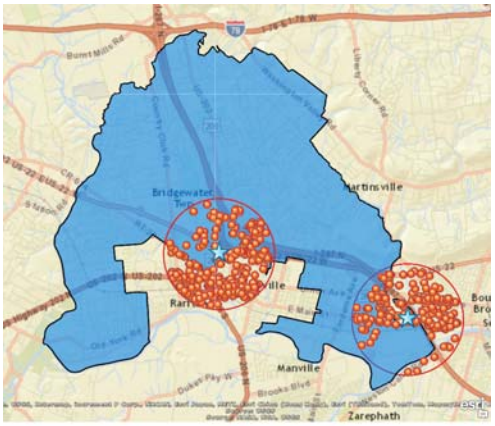
Figure A.2. Zip Code Fixed Effects Empirical Strategy: Visualization



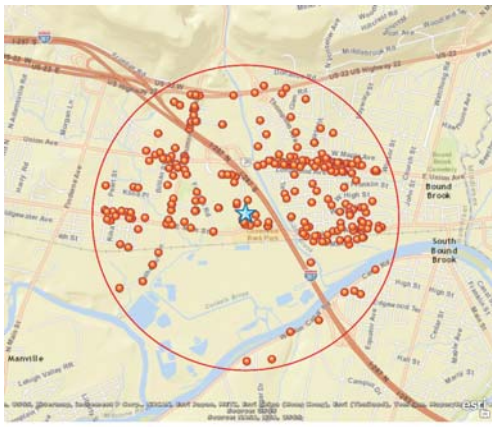
Linens 'n Things in zip code 08807 in 2006



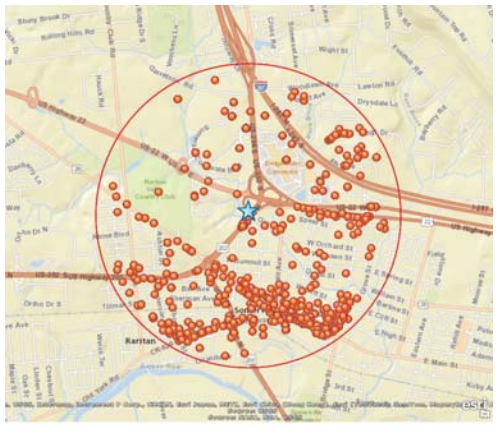
Bed Bath & Beyond in zip code 08807 in 2006



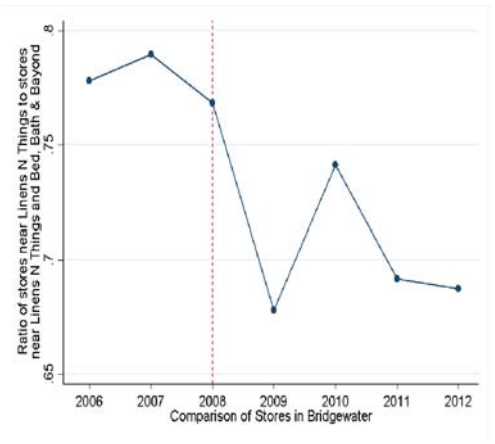
Linens 'n Things and Bed, Bath & Beyond in zip code 08807



Linens 'n Things Location in zip code 08807 in 2012



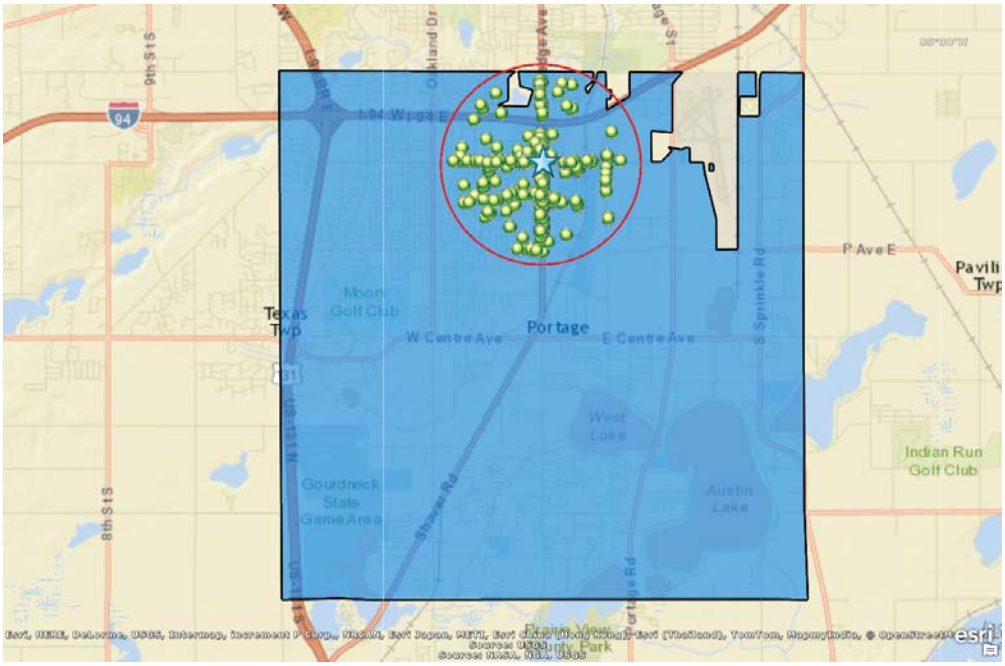
Bed Bath & Beyond in zip code 08807 in 2012



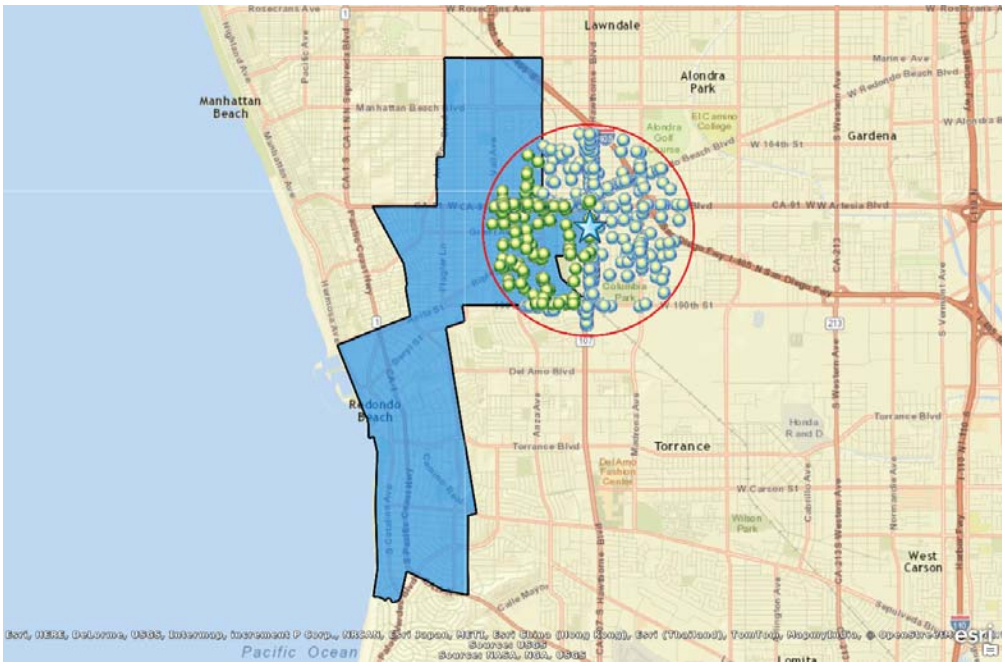
2008 Linens 'n Things Bankruptcy Impact

Notes: The Blue star represents a given store or its location (if it closed). The red circle is the one mile radius around a given store. Other stores are represented by the red dots. The zip code area is highlighted in blue. Both the defunct and non-defunct store are located in the same zip code. The final figure plots the ratio of stores near this eventually defunct Linens 'n Things relative to the non-defunct Bed Bath & Beyond over time.

Figure A.3. Examples of Compactness and City Shape



Circuit City in Portage, MA

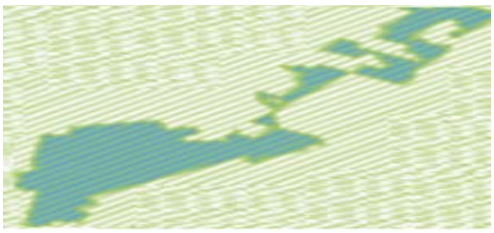


CompUSA in Redondo Beach, CA

Notes: The city boundaries are highlighted in blue. The green dots represent stores that are in the city. The blue dots represent stores that are outside city boundaries, but within the one mile radius of a big-box store, which is represented by a blue star. Redondo Beach's compactness index value is -0.475, while Portage's is 2.299.

Figure A.4. Examples of Compactness Measures

Reock



Rectangular Fraction Ratio

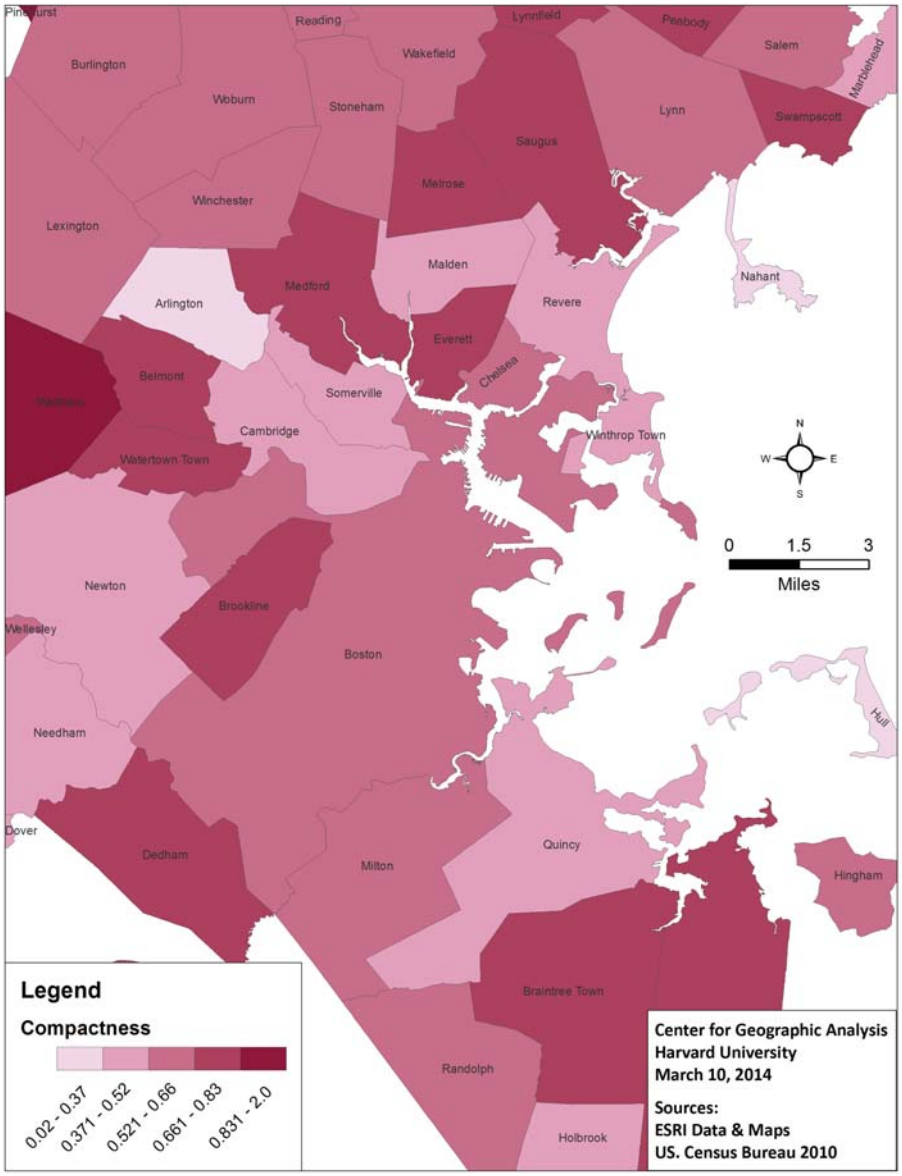
Convex Ratio

Polsby-Popper

Schwartzberg

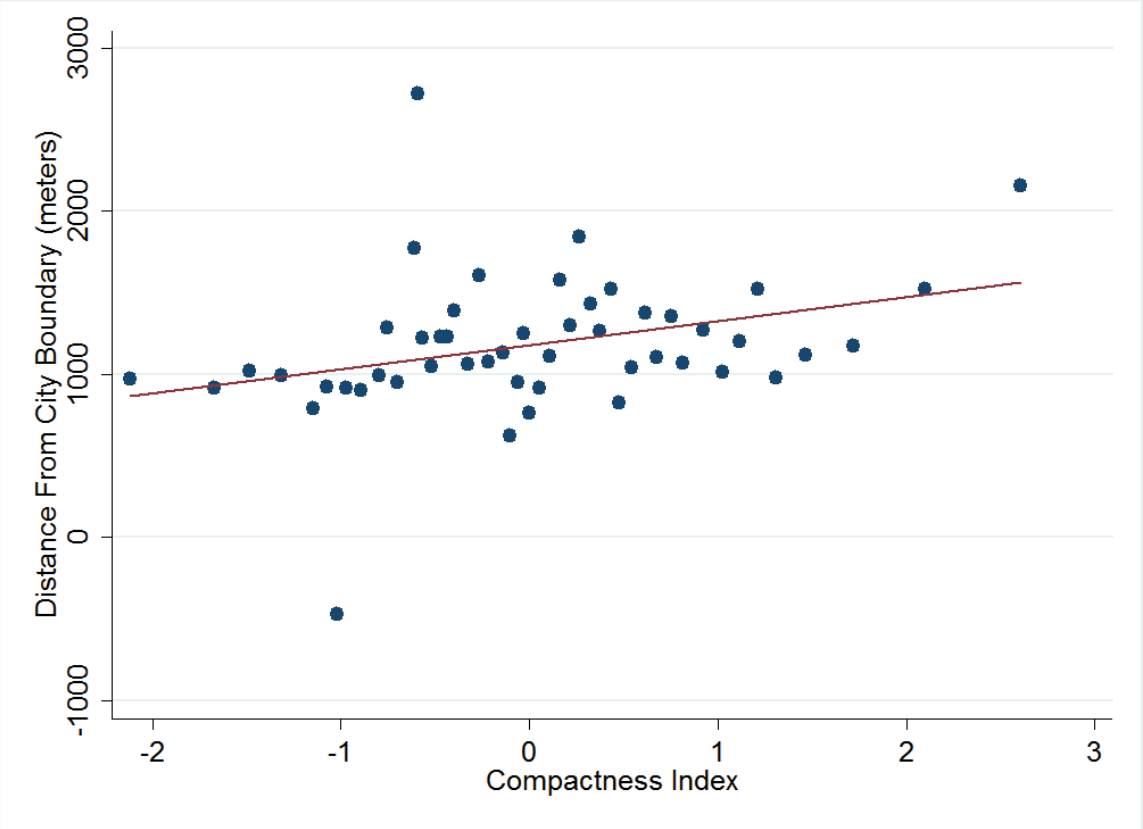
Notes: This figure provides visual examples of the five compactness measures.

Figure A.5. Boston Metro Area Compactness Example



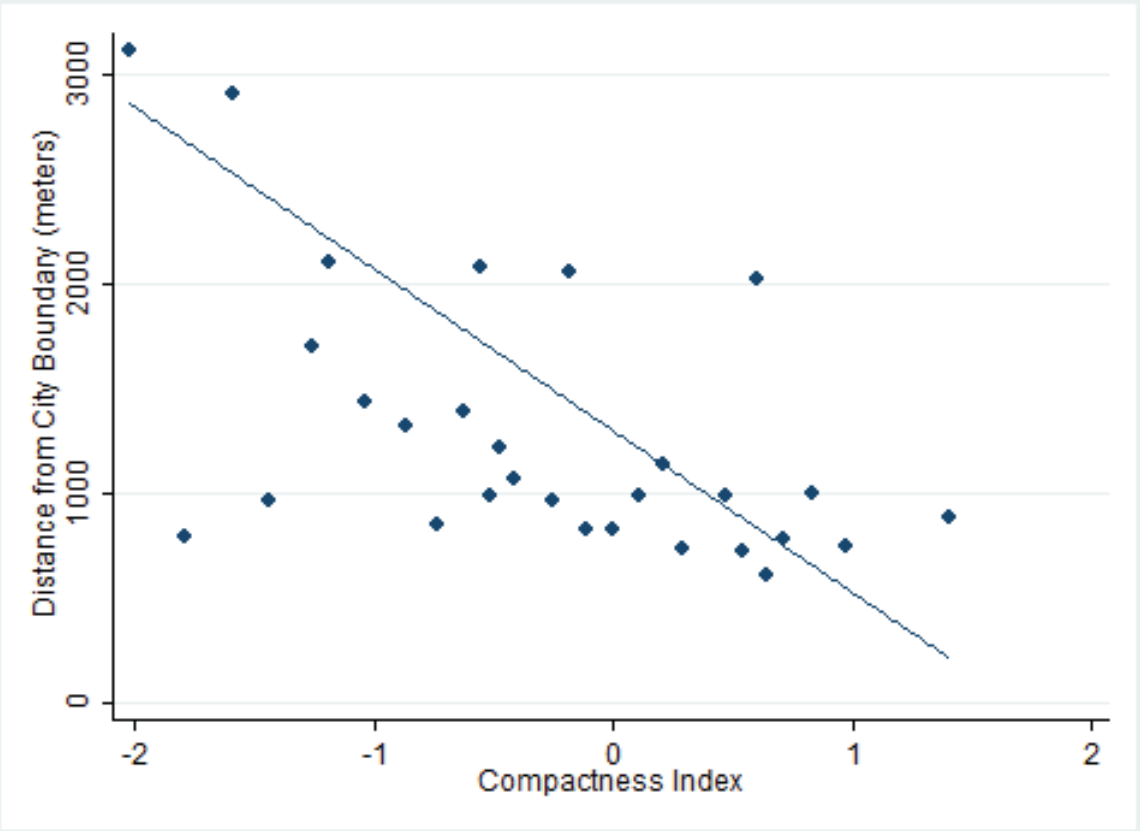
Notes: This map plots the distribution of the rectangular area ratio for Census incorporated places in the Boston Metro Area. More details about geographic compactness measures are reported in the text.

Figure A.6. City Compactness Index and Store Distance from Boundary



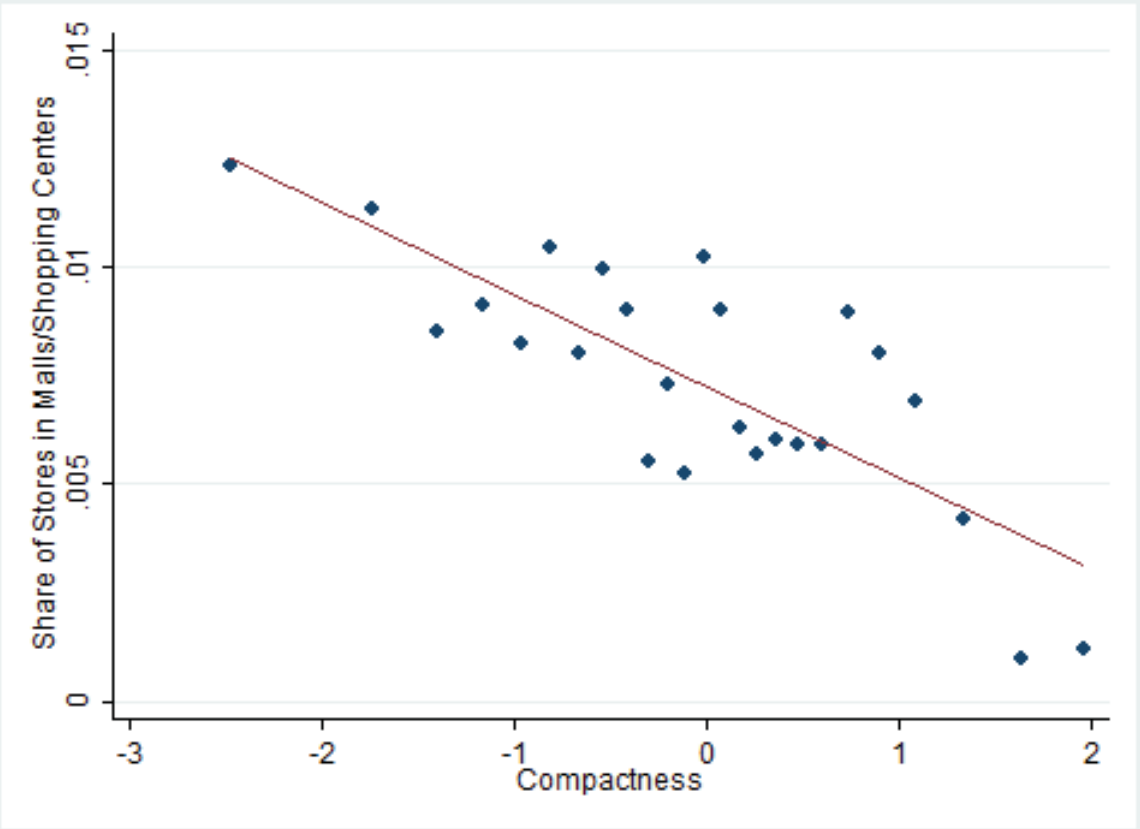
Notes: This figure plots the average distance to the city border (in meters) for big-box stores in our sample against the value of the city's compactness index. To ease visibility, cities are grouped into 25 bins according to their compactness index, and we plot average distances in meters for each bin.

Figure A.7. City Compactness Index and Subsidized Project Distance from Boundary



This figure plots the average distance to the city border (in meters) for subsidized projects in the Good Jobs First data against the value of the subsidizing city's compactness index. The figure shows that non-compact cities are more likely to subsidize projects farther away from town boundaries, providing within-city evidence of the spillover-to-subsidy mechanism described in the text. This relationship is statistically significant at the 1% level when clustering by state. Note that Appendix Figure 6 shows that big box stores (whether subsidized or not) are also farther from town boundaries, on average, in compact towns. Geocodeable locations were only available for roughly 23% of GJF subsidies. Though GJF data are incomplete, they are not obviously biased in their coverage by compactness and distance to boundary. To ease visibility, projects are grouped into bins according to their compactness index, and we plot average distances in meters for each bin.

Figure A.8. City Compactness Index and Fraction of Stores in Malls



Notes: This figure plots the fraction of establishments in a city that are in a shopping center or mall against our principal measure of city compactness. To ease visibility, cities are grouped in to 25 bins according to their compactness index and average values for each bin are plotted above.

Figure A.9. Development Incentives Popularity

Note: This figure plots the yearly occurrence of the bigram ”development incentives” as a percentage of total bigrams in Google Books.

APPENDIX 1: Data Appendix

A. Data Sources

1987 Census of Governments. To identify the decade in which each city was incorporated, we used the 1987 Census of Governments as a source.

2002 Census of Governments. To identify local government expenditure per capita and local government revenue per capita, we used the 2002 Census of Governments.

An Assessment of Municipal Annexation in Georgia and the United States: A Search for Policy Guidance, 2002. We use this paper by Steinbauer, Paula E., Betty J. Hudson, Harry W. Hayes, and Rex L. Facer II to create an index of the stringency with which states allow annexations by local governments.

Cartographic Boundary Shapefiles – Places, 2006 & 2012. In order to provide a visual representation of the relationship between city compactness and big-box externalities, we use the Cartographic Boundary Shapefiles for the years 2006 and 2012 to draw simple city boundaries.

Cartographic Boundary Shapefiles - ZIP Code Tabulation Areas, 2013. In order to demonstrate our zip-code fixed effects identification strategy, we draw simple zip code boundaries using the 2013 Cartographic Boundary Shapefiles for zip-codes.

Census, 2000. To compare the similarity of our treatment and control big-box chain locations, we use the 2000 Census for socio-economic data that includes: median house sale price, median income, percent black, percent Hispanic income per capita, population and population density (pop/mi^2). Furthermore, information from the Census is also used to test the validity of our instrument. To do that we again use income per capita, median house price, population density (pop/mi^2) as well as percent non-English speakers, percent who have graduated college and the unemployment rate.

Council of Development Finance Agencies, 1961 - 2010. To identify the date each state enabled Tax Increment Financing we use information provided on the Council of Development Finance Agencies website. From data this we create the Post TIF Enabling Legislation Dummy.

County Business Patterns, 2006 – 2012. To test the robustness of our results to different datasets, we obtain zip code level establishment counts from Census County Business Patterns and aggregate them to the census place level.

Current Population Survey, Computer and Internet Use, 2007, 2009 – 2012. To test for the relationship between internet penetration and retail bankruptcies, we use data from CPS Computer and Internet Use supplement to create the variables: Stores in States with Internet Penetration > Median (0.5-mile radius, log) and Stores in States with Internet Penetration < Median (0.5-mile radius, log).

Esri Business Analyst Data, 2006 - 2012. To measure establishment and employment counts within a certain radius of a big-box retailer we use the geocoded information provided by Esri Business Analyst Dataset. The precise geographic information available allows us to calculate store and employment counts at the ¼ mile, ½ mile, one mile, two mile and three mile radii. We also use the provided city information to calculate these two counts for Incorporated Places.

Esri Major Shopping Centers. To identify the presence of malls and shopping centers within an incorporated place, we use data on over 7,000 shopping centers and malls provided by Esri and match more than 6,000 of them to places for which we have data. From this source we include the following variables: an indicator for the presence of a shopping center or mall, the number of shopping centers or malls (log) and the number of establishments within a shopping center or mall.

Federal Communications Commission Internet Access Services Report. We use the FCC's classification of census tracts into bins based on the number of residential fixed Internet access

service connections at least 10 Mbps downstream and 1 Mbps upstream per 1,000 households based on Form 477 fixed broadband subscribership data, as of December 31st, 2006.

Good Jobs First Subsidy Tracker 2.0, 1976 - 2014. To measure the presence of retail and other subsidies provided by municipalities we create dummy variables that indicate whether there was at least one subsidized retail development and at least one subsidized non-retail development.

International City/County Management Association (ICMA) Economic Development Surveys, 1999, 2004 and 2009. To measure development strategies of cities, we use the ICMA Economic Development surveys for the years 1999, 2004 and 2009. We include the following variables: total number of development strategies, total spend on development strategies, indicators for the presence of a sales tax, presence of a large retail base and seven dummies for development focus on either retail, agriculture, non-profit/institutional, tourism, transportation, technology or other categories.

International Council of Shopping Centers (ICSC) Shopping Center Operations, Revenue and Expenses, 2004. To demonstrate the differences in rent paid by store type in a shopping center or mall we use ICSC data on Shopping Center Operations for 2004.

Kosmont-Rose Institute Cost of Doing Business Survey, 2013. Data on the presence or absence of a Business Improvement District within a given city is from the Kosmont-Rose Institute Cost of Doing Business Survey, 2013. We create a dummy BID variable using this source.

LEHD Origin-Destination Employment Statistics (LODES), 2006-2011. The robustness of our employment results to different datasets is checked for by replicating select parts using LODES data for 2006-2011.

Multi-Resolution Land Characteristics Consortium's National Land Cover Database, 2011. To instrument city compactness, we use geographic features that affected city shape, but are no longer economically relevant. From the Multi-Resolution Land Characteristics Consortium's National Land Cover Database we use dummies for the presence of a river or wetlands within the city borders as instruments.

National Census Tracts Gazetteer File. To calculate the distance between 2010 census tracts and big-box retailers, we use the geographic coordinates for census tracts provided in the National Census Tracts Gazetteer file.

National Consumer Panel, 2004 - 2009. To identify consumer responses to big-box Bankruptcies, we obtain data on shopping behavior for a representative consumer sample from AC Nielson. We create the following variables: department ratio, electronics ratio and furnishings ratio.

Walkscore.com. To identify walkability, access to public transportation, and travel distance to city center, we use Walkscore.com's Walk Scores, Transit Scores, and distances to city center in minutes.

B. Notes on Variables

<u>Establishment Variables</u>

Ln Competitor Stores (0.5-mile radius). The logarithm of the number of competitor stores that are within a half-mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula. Establishments are classified as competitors if they share the same four-digit NAICS code as our big-box retailers.

Ln Entrant Stores (0.5-mile radius). The logarithm of the number of new entrants that are within a half-mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst

dataset. Then the distance from a big-box retailer is calculated using the great circle formula. An establishment is classified as an entrant in the first year of its existence.

Ln Foot Traffic Stores (0.5-mile radius). The logarithm of the number of foot traffic stores (NAICS 44 and 45) that are within a half-mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Ln Incumbent Stores (0.5-mile radius). The logarithm of the number of incumbents that are within a half-mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula. An establishment is classified as an incumbent for all the years it is open other than the first.

Ln Non-Competitor Stores (0.5-mile radius). The logarithm of the number of non-competitor stores that are within a half-mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula. Establishments are classified as non-competitors if they have a different four-digit NAICS code than our big-box retailers.

Ln Non-Foot Traffic Stores (0.5-mile radius). The logarithm of the number of non-foot traffic stores (NAICS 11, 21, 22, 23, 31, 32, 33, 42, 48, 49, 51, 55, 56, 92, and 99) that are within a half-mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Ln Stores (0.25-mile radius). The logarithm of the number of stores that are within a quarter mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Ln Stores (0.5-mile radius). The logarithm of the number of stores that are within a half-mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Ln Stores (1-mile radius). The logarithm of the number of stores that are within a mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Ln Stores (2-mile radius). The logarithm of the number of stores that are within a two mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Ln Stores (city). The logarithm of the number of stores that are within the same city as a big-box retailer for the years 2006 to 2012.

Ln Stores in States with Internet Penetration > Median (0.5-mile radius). The logarithm of the number of stores that are within a half-mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided by the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula. The sample is limited to establishments in states with internet penetration rates greater than the median. Internet penetration is calculated as the average percent of individuals who

live in households with internet access for the years 2007, 2009 – 2012. The data on Internet use is from supplements to the Current Population Survey (not available for 2008).

Ln Stores in States with Internet Penetration > Median (0.5-mile radius). The logarithm of the number of stores that are within a half-mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided by the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula. The sample is limited to establishments in states with internet penetration rates less than the median. Internet penetration is calculated as the average percent of individuals who live in households with internet access for the years 2007, 2009 – 2012. The data on internet use is from the Current Population Survey.

Δ *ln Stores (1 Mile Radius).* This is the rate of change for the number of stores that are within a one mile radius of a big-box store between 2006 and 2007. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Δ *ln Stores (1 Mile Radius).* This is the rate of change for the number of stores that are within a one mile radius of a big-box store between 2003 and 2007. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Δ *ln Stores (2 Mile Radius).* This is the rate of change for the number of stores that are within a two mile radius of a big-box store between 2006 and 2007. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Δ *ln Stores (2 Mile Radius).* This is the rate of change for the number of stores that are within a two mile radius of a big-box store between 2003 and 2007. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Δ *ln Stores (3 Mile Radius).* This is the rate of change for the number of stores that are within a three mile radius of a big-box store between 2006 and 2007. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Δ *ln Stores (3 Mile Radius).* This is the rate of change for the number of stores that are within a three mile radius of a big-box store between 2003 and 2007. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Number Stores, 2006 (0.5-mile radius). The logarithm of the number of stores that are within a half-mile radius of a big-box store for the year 2006. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Number Stores, 2006 (1 Mile Radius). The logarithm of the number of stores that are within a one mile radius of a big-box store for the year 2006. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Number Stores, 2006 (2 Mile Radius). The logarithm of the number of stores that are within two mile radius of a big-box store for the year 2006. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Number Stores, 2003 (0.5-mile radius). The logarithm of the number of stores that are within a half-mile radius of a big-box store for the year 2003. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Number Stores, 2003 (1 Mile Radius). The logarithm of the number of stores that are within one mile radius of a big-box store for the year 2003. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Number Stores, 2003 (2 Mile Radius). The logarithm of the number of stores that are within two mile radius of a big-box store for the year 2003. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Sales ($1,000,000). The estimated number of sales per each establishment.

Employment Variables

Employment, 2006 (0.5-mile radius). The number of workers that are within a half a mile radius of a big-box store for the year 2006. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Employment, 2006 (1 Mile Radius). The number of workers that are within a one mile radius of a big-box store for the year 2006. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Employment, 2006 (2 Mile Radius). The number of workers that are within a two mile radius of a big-box store for the year 2006. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Employment, 2003 (0.5-mile radius). The number of workers that are within a half a mile radius of a big-box store for the year 2003. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Employment, 2003 (1 Mile Radius). The number of workers that are within a one mile radius of a big-box store for the year 2003. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Employment, 2003 (2 Mile Radius). The number of workers that are within a two mile radius of a big-box store for the year 2003. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Ln Employment (0.25-mile radius). The logarithm of the number of workers that are within a quarter mile radius of a big-box store for the year 2006 to 2012. To calculate this number we use the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Ln Employment (0.5-mile radius). The logarithm of the number of workers that are within a half a mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the

Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Ln Employment (1-mile radius). The logarithm of the number of workers that are within one mile radius of a big-box store for the years 2006 to 2012. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Ln Employment (2-mile radius). The logarithm of the number of workers that are within two miles radius of a big-box store for the years 2006 to 2012. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Ln Employment (city, Esri Business Analyst). The logarithm of the number of employees that are within the same city as a big-box retailer for the years 2006 to 2012. Employment counts are based on Esri Business Analyst data.

Ln Employment (city, LODES). The logarithm of the number of employees that work in the same city as a big-box retailer for the years 2006 to 2012. Employment counts are based LODES 2010 census tract work-area characteristics data and are aggregated up to city. If there are multiple cities in a census tract employment numbers are split evenly among them.

Ln Employment (census tract). The logarithim of the number of employees that work within the same 2010 census tract as a big-box retailer for years 2006 to 2012. The Center for Geographic Analysis at Harvard matched establishments to tracts by geocoding addresses.

Ln Employment (census tract, LODES). The logarithim of the number of employees that work within the same 2010 census tract as a big-box retailer for years 2006 to 2012. The employment counts are based on LODES work-area-characteristics data.

Ln Employment (same city). The logarithm of the number of employees that work within the same city as a big-box retailer and live in the same city for the years 2006 to 2012. The name of the city is provided in the Esri Business Analyst data. However, the employment numbers are from LODES 2010 census tract origin-destination data and are aggregated up to city. If there are multiple cities in a census tract employment numbers are split evenly among them. The origin-destination files allow us to know the number of employees who live in one census tract (the origin) and work in another (the destination).

Ln Employment (same city census tract). The logarithim of the number of employees that work within the same 2010 census tract as a big-box retailer and live in the same city as the retailer for years 2006 to 2012. The employment counts are based on LODES origin-destination data. The origin-destination files allow us to know the number of employees who live in one census tract (the origin) and work in another (the destination). We use this information to calculate city numbers only for employees who live in the same city as the big-box retailer.

Δ *ln Employment (1 Mile Radius).* This is the rate of change for the number of employees that are within a one mile radius of a big-box store between 2006 and 2007. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula. Employment in stores that are within one mile is then summed.

Δ *ln Employment (1 Mile Radius).* This is the rate of change for the number of employees that are within a one mile radius of a big-box store between 2003 and 2007. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula. Employment in stores that are within one mile is then summed.

Δ *ln Employment (2 Mile Radius).* This is the rate of change for the number of employees that are within a two mile radius of a big-box store between 2006 and 2007. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Δ *ln Employment (2 Mile Radius).* This is the rate of change for the number of employees that are within a two mile radius of a big-box store between 2003 and 2007. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Δ *ln Employment (3 Mile Radius).* This is the rate of change for the number of employees that are within a three mile radius of a big-box store between 2006 and 2007. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Δ *ln Employment (3 Mile Radius).* This is the rate of change for the number of employees that are within a three mile radius of a big-box store between 2003 and 2007. To calculate this number we use the employment count and the latitude and longitude coordinates of each establishment provided in the Esri Business Analyst dataset. Then the distance from a big-box retailer is calculated using the great circle formula.

Bankruptcy Variables

Defunct. A time-varying dummy equal to 1 if the big-box chain is closed in that year.

Defunct within 0.25 mi. (dummy). A time-varying dummy equal to one if a 2010 census tract is less than 0.25 miles away from a defunct big-box retailer. We use the latitude and longitude coordinates provided by the Census bureau for each census tract to calculate this distance.

Defunct within 0.5 mi. (dummy). A time-varying dummy equal to one if a 2010 census tract is between 0.25 miles and 0.5 miles of a defunct big-box retailer. We use the latitude and longitude coordinates provided by the Census bureau for each census tract to calculate this distance.

Defunct within 1.5 mi. (dummy). A time-varying dummy equal to one if a 2010 census tract is between 0.5 miles and 1.5 miles of a defunct big-box retailer. We use the latitude and longitude coordinates provided by the Census bureau for each census tract to calculate this distance.

Defunct within 2.5 mi. (dummy). A time-varying dummy equal to one if a 2010 census tract is between 1.5 miles and 2.5 miles of a defunct big-box retailer. We use the latitude and longitude coordinates provided by the Census bureau for each census tract to calculate this distance.

Defunct within 0.25 mi. The number of defunct big-box retailers that are less than 0.25 miles from a 2010 census tract. We use the latitude and longitude coordinates provided by the Census bureau for each census tract to calculate this distance.

Defunct within 0.5 mi. The number of defunct big-box retailers that are between 0.25 miles and 0.5 miles from a 2010 census tract. We use the latitude and longitude coordinates provided by the Census bureau for each census tract to calculate this distance.

Defunct within 1.5 mi. The number of defunct big-box retailers that are between 0.5 miles and 1.5 miles from a 2010 census tract. We use the latitude and longitude coordinates provided by the Census bureau for each census tract to calculate this distance.

Defunct within 2.5 mi. The number of defunct big-box retailers that are between 1.5 miles and 2.5 miles from a 2010 census tract. We use the latitude and longitude coordinates provided by the Census bureau for each census tract to calculate this distance.

No. big-box Stores. The total number of big-box stores within the city. ERSI has city identifiers.

No. Defunct big-box Stores. The number of big-box stores in a city from retail chains that did file for Bankruptcy.

Compactness Variables

Compactness Index. The different ratios are aggregated using factor analysis. The index is the first principal component of the different measures.

Convex Ratio. This ratio is the area of the town divided by the area of the town's convex hull.

Polsby-Popper ratio. This ratio is the town area multiplied by 4π and then divided by the squared value of the town's perimeter.

Rectangular Area Fraction ratio. This is the town area divided by the area of the smallest rectangle that would enclose the whole town.

Reock ratio. This is calculated by dividing the town area by $\times \frac{1}{2} \times \max(width, length)^2$. Here *width* is the width and *length* is the length of the smallest rectangle that would enclose the entire town.

Schwartzberg ratio. This ratio is the town perimeter divided by $2 \times \pi \sqrt{\frac{town\ area}{\pi}}$.

City Development Variables

Agriculture Focus. A dummy variable indicating if the city primarily focuses on agriculture development. It is equal to one if the respondent selected agriculture to the question "Which of the following best describes your local government's primary economic base (primary source of revenue) and focus of your economic development efforts? (Check only one in each column)" in regards to development focus.

Development Budget. The respondent answer to the question "How much did your local government budget for economic development activities for FY [1999/2004/2009]?"

Large Retail Base. Indicates if a city has a large retail base. It is equal to one if the respondent selected retail to the question "Which of the following best describes your local government's primary economic base (primary source of revenue) and focus of your economic development efforts? (Check only one in each column)" in regards to economic base.

Local Government Expenditure Per Capita. The city expenditures per capita for 2002.

Local Government Revenue Per Capita. The city revenues per capita for 2002.

Non-profit/Institution Focus. A dummy variable indicating if the city primarily focuses on non-profit/institutional development such as government contracts. It is equal to one if the respondent selected non-profit/institution to the question "Which of the following best describes your local government's primary economic base (primary source of revenue) and focus of your economic development efforts? (Check only one in each column)" in regards to development focus.

Non-retail Subsidy Program Indictor. A dummy equal to one if the city subsidizes at least one non-retail development.

Other Focus. A dummy indicating if city has a development focus that is not retail, agriculture, non-profits, tourism, transportation or technology. It is equal to one if the respondent selected other to the question "Which of the following best describes your local government's primary economic base (primary source of revenue) and focus of your economic development efforts? (Check only one in each column)" in regards to development focus.

Post TIF Enabling Legislation Dummy. This is a dummy variable that is equal to one for each year in which Tax Increment Financing is legal in a state.

Retail Development Focus Indicator. A dummy variable indicating if the city primarily focuses on retail development. It is equal to one if the respondent selected retail to the question "Which of the following best describes your local government's primary economic base (primary source of revenue) and focus of your economic development efforts? (Check only one in each column)" in regards to development focus.

Retail Subsidy Program Indicator. A dummy equal to one if the city subsidizes at least one retail development.

Sales Tax. Indicates if a city has a sales tax. It is equal to one if the responded selected sales tax to the question "Which of the following taxes does your local government levy and what is the rate?"

Technology Focus. A dummy variable indicating if the city primarily focuses on technology development. It is equal to one if the respondent selected technology to the question "Which of the following best describes your local government's primary economic base (primary source of revenue) and focus of your economic development efforts? (Check only one in each column)" in regards to development focus.

Total Development Strategies. The number of development strategies that the local government is pursuing. It is the sum of positive responses to the question "Does your local government support any of the following programs to promote or support economic development?"

Tourism Focus. A dummy variable indicating if the city primarily focuses on tourism as its main plan of development. It is equal to one if the respondent selected tourism to the question "Which of the following best describes your local government's primary economic base (primary source of revenue) and focus of your economic development efforts? (Check only one in each column)" in regards to development focus.

Transportation Focus. A dummy variable indicating if the city primarily focuses on transportation development. It is equal to one if the respondent selected transportation to the question "Which of the following best describes your local government's primary economic base (primary source of revenue) and focus of your economic development efforts? (Check only one in each column)" in regards to development focus.

<u>Shopping Mall and BID variables</u>
Business Improvement District. An indicator for the presence of a Business Improvement District in a town.

Center Stores (log). The logarithm of the number of town stores that are in a shopping center or a mall.

New Shopping Centers & Malls. The number of new shopping centers and malls per 100,000 state residents for the years 1961-2010. These data come from the Esri Shopping Center dataset, which records mall openings.

Shopping Center Indicator. An indicator for the presence of a shopping center or mall in a town.

Shopping Centers (log). This is the logarithm of the number of shopping centers or malls in a town. If the city does not have a shopping center it is then dropped from the sample.

Instruments

Incorporation date. The average compactness of all cities incorporated in the same decade as the city of interest, excluding the city itself. This is field 12 in Attachment 4 in the 1987 Census of Governments.

Rivers. An indicator variable. It takes on the value of one if a city has a river within its borders and zero otherwise.

State annexation index (0-4). An index indicating the stringency of legislation that states have adopted in regards to annexation by local governments, based on Steinbauer, Hudson, Hayes, and Facer (2002). We code a dummy variable for whether a state requires an impact plan, a service plan, judicial review, and a public petition in order for cities to annex land. Our index is the sum of these dummy variables.

Wetlands. An indicator variable. It takes on the value of one if a city has a wetlands area within its borders and zero otherwise.

Demographic Variables

All data are taken from the 2000 Census.

Income per capita. The income per capita for a city in the year 2000.

Income per capita (log). The logarithm of municipal income per capita for the year 2000.

Median House Sale Price. The median price of all the houses sold in a zip code in 2000.

Median House Sale Price (log). The logarithm of the median sales price of a house in a municipality in the year 2000.

Median Tract Income. The median household income for a tract in the year 2000.

Percent Black. The percentage of a zip code's population that was African-American in 2000.

Percent Black Tract. The percentage of a tract's population that was African-American in 2000.

Percent College Grad. The percentage of individuals in a municipality who have a bachelor's degree or higher in 2000.

Percent Hispanic Tract. The percentage of a tract's population that was Hispanic in 2000.

Population Density. The population density for the municipality in the year 2000.

Population Density (log). The logarithm of the population density for the municipality in 2000.

Population Dummies. The city population in 2000 split into ten evenly sized bins.

Share in Poverty. The percentage of individuals in a municipality that live below the poverty line in 2000.

Share non-English. The percentage of the municipality's population that do not speak English 2000.

Unemployment Rate. The percentage of the municipality's population that was unemployed in 2000.

Consumer Variables

Department Ratio. This is the ratio of visits at stores visited on the same day as a Department store to total visits at all stores for each month from 2004 to 2009.

Electronics Ratio. This is the ratio of visits at stores visited on the same day as an Electronics store to total visits at all stores for each month from 2004 to 2009.

Furnishings Ratio. This is the ratio of visits at stores visited on the same day as a Furnishings store to total visits at all stores for each month from 2004 to 2009.

Accessibility Variables

Walk Score. This is a measure of how much can be accomplished on foot starting from a store location, on a scale from 0 (completely car-dependent) to 100 (daily errands do not require a car at all).

Transit Score. This is a measure of the availability of public transportation at a score location that ranges from 0 (very poor) to 100 (world-class).

Distances to City Center. This is the travel time in minutes from a store location to the center of the city.

FCC Internet Score. This is a census tract's fixed high-speed connections bin, ranging from 0 (no connections) to 6 (over 800 connections per 1,000 households).

C. A Note on Esri Business Analyst Data

In our main specifications studying establishment data we use data from Esri Business Analyst. As we discuss in the main text, although the Esri data are not produced by the federal statistical system, we believe that this is the correct choice for a variety of reasons:

"First and foremost, Esri includes address data, which allows us to work at a high-precision geographical level. It includes establishments not counted in the Census' County Business Patterns dataset (unincorporated or no employees) - someone teaching violin lessons might show up, for example. This broader measure of economic activity is appropriate for our purposes (and for many other purposes as well, which is why there is a market for these datasets), although there may be systematic scale differences. We always include fixed effects, and our estimates are in percentage terms. In addition, our results stand even if one worries about the quality of the data. We use establishment counts as a dependent variable, and as long as the noise in the Esri data is not correlated with a chain eventually becoming defunct, a type of correlation that strikes us as wildly implausible, the noise merely inflates our standard errors. That said, we do not believe that even measurement error is particularly severe. Establishment counts at the county level are strongly correlated with County Business Patterns data from the Census Bureau in both levels and in log changes over time, as depicted in our Data Appendix. Additionally, where we can, we replicate our results using LODES data, which is derived from the Census Bureau's LEHD and uses a completely different methodology. These replication exercises strengthen our confidence in the robustness of our findings to the point of practical certainty."

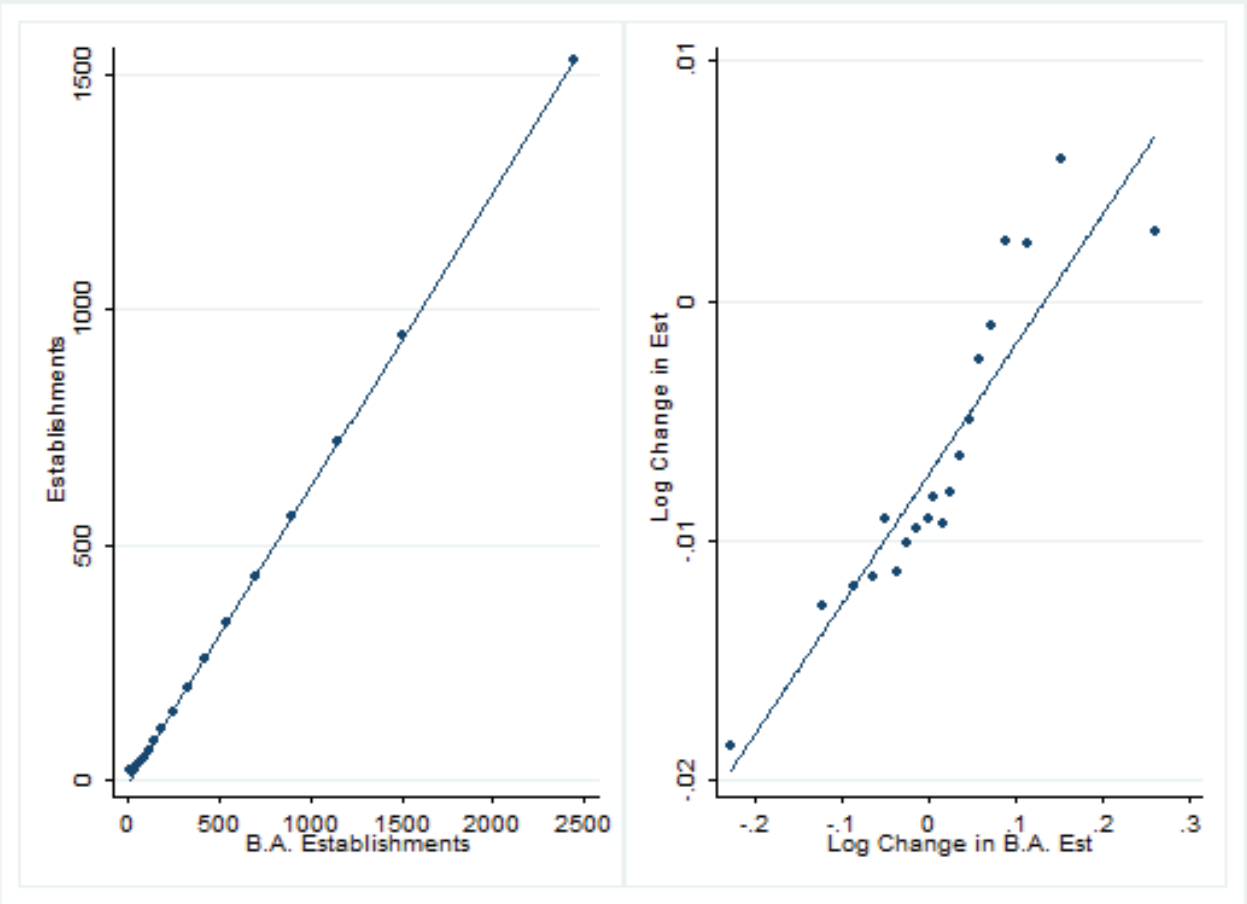


Figure D. 1 Esri versus County Business Patterns Establishment Counts

APPENDIX 2: Instrumental-Variable Estimation

We showed in Section III of the main text that, first, a town's compactness is uncorrelated with the size of economic spillovers size at a fixed radius, second, that compactness is strongly related to the size of the spillover within the town's jurisdiction, particularly along city boundaries, and third, that compactness is predictive of a town offering retail subsidies targeting these spillovers, even among cities within the same metro area. We argue that this relationship is, in part, causal: towns are responding to differences in spillovers. One might be concerned about that it is, instead, entirely spurious, and that omitted-variable bias drives the relationship. In this appendix we present four different instrumental-variable estimates of the relationship between compactness and retail focus to address such concerns.

The instruments draw on very different sources of variation in city shapes: from state laws to geographic features to historical incorporation patterns. Each of these instruments affects the compactness of towns and the size of within-jurisdiction spillovers. There is not an intuitive reason, however, that all of these different instruments should individually be correlated with other factors that make subsidies more likely. The instruments we use are the following:

- An index indicating the stringency of legislation states have adopted regarding annexation by local governments, based on Steinbauer, Hudson, Hayes, and Facer (2002). We code a dummy variable for whether a state requires an impact plan, a service plan, judicial review, and a public petition in order for cities to annex land. Our index is the sum of these dummy variables.

- A dummy variable indicating whether a municipality contains a river within its borders, from the 2011 Multi-Resolution Land Characteristics Consortium's National Land Cover Database.

- An indicator for the presence of wetlands, also from the 2011 Multi-Resolution Land Char-

acteristics Consortium's National Land Cover Database.

- The average compactness of all cities incorporated in the same decade as the city of interest, excluding the city itself. The data on incorporation dates are from the 1987 Census of Governments (Bureau of the Census, 1990). Incorporation rates and average compactness levels correlate and have varied over time, with both series peaking from the Civil War to World War I. The time series of both rates is in Figure IV.1.

As a first-pass check, in Table IV.1 we test whether these instruments for compactness are correlated with the most obvious non-spillover determinants of retail subsidies and shopping centers. We find that there is no relationship between compactness, instrumented for with these variables, and potential confounders like local income, housing prices, and levels of education. While not dispositive, this suggests that any pure omitted-variable bias violating the exclusion restriction for all of the instruments would have to operate quite subtlely (that is, not through income, housing prices, etc.).

Though the instruments are not correlated with these potential confounders, we see in Table IV.2 that compactness as identified using each of these instruments individually is strongly predictive of retail subsidy offerings. This is true across and within metro areas, as well as conditional on a large suite of controls.[1]

Interestingly, our IV estimates are larger than our OLS estimates. Part of this is due to measurement error. As shown in Figure IV.2 for Clearwater, FL, the official boundaries used by the

[1]The relationship between each instrument and a city's compactness, the first stage in our IV estimates, can be found in Table IV.3. The instruments are strongly predictive of a city's realized compactness index. When using all four instruments concurrently, we estimate a coefficient on compactness of 0.194 (SE: 0.053) when controlling only for year and area (clustered by state). The first stage F-statistic equals 17.6, while the Hansen J-statistic equals 2.107 (p-value: 0.55) rejecting overidentification. When controlling for CSA fixed effects (which renders state law variation unusable), we get a point estimate of 0.144 (SE: 0.047), a first stage F-statistic of 27.8 and a Hansen's J-statistic of 1.2 (p-value: 0.55).

Census for many cities exaggerate their non-compactness. Boundaries can differ for voting rights, taxation authority, city services, and many other purposes. The carve-outs shown in the figure are pervasive in the data, but as far as we can tell they do not reflect true carve-outs with respect to a town's political economy or tax base. As such, these carve-outs introduce substantial measurement error into our compactness measure, biasing our result towards zero. Our IV estimates do not suffer from this problem.

Finally, Table IV.4 is an instrumental-variable version of Table 6 and Appendix Table 18.

Table IV.1. Exogeneity of Instrumented Compactness

	Log Income Per Capita	Log Median House Price	Log Pop Per Sqmi	Percent Non-English Speaker	Percent College Grad	Unemployment Rate	Local Gov't Expenditure Per Capita	Local Gov't Revenue Per Capita
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Compactness	0.0152	-0.101	0.0914	-1.576	-2.060	-0.448	-0.142	-0.220
	(0.0393)	(0.103)	(0.186)	(2.779)	(1.395)	(0.436)	(0.438)	(0.462)
First Stage F-Statistic	27.4	28.0	27.4	27.4	27.4	27.4	27.3	27.3
N	15492	15350	15533	15525	15523	15513	15510	15510

Notse: This test examines whether the instruments for compactness are orthogonal to other potential determinants of retail subsidies and shopping centers. Observations are Census places. Demographic data from 2000 are from the Census Bureau and 2002 local government expenditure data from the Census of Governments. The absence of any relationship between these variables and instrumented compactness lessens concerns that the observed relationship between compactness and retail subsidies is spurious. Standard errors are clustered by state. Results remain insignificant when clustering at the CSA level.

Table IV.2. Compactness and Local Development Policy: Instrumental-Variables Estimates

	Survey Retail Bidding Indicator				
	(1)	(2)	(3)	(4)	(5)
State Annex. Law IV	0.170**	-	0.190**	0.185**	-
	(0.0751)		(0.0815)	(0.0797)	
First Stage F-Statistic	17.6		14.7	14.3	
Rivers IV	0.454***	0.205**	0.529**	0.347**	0.314***
	(0.168)	(0.0882)	(0.214)	(0.148)	(0.111)
First Stage F-Statistic	7.8	10.9	9.0	7.5	14.9
Wetlands IV	0.246***	0.169**	0.453***	0.203**	0.148**
	(0.0738)	(0.0808)	(0.135)	(0.0812)	(0.0640)
First Stage F-Statistic	22.8	34.0	12.5	20.7	45.0
Incorp. Date IV	0.184***	0.120*	0.261***	0.173***	0.128*
	(0.0672)	(0.0716)	(0.0849)	(0.0647)	(0.0693)
First Stage F-Statistic	30.9	27.8	37.5	31.4	31.9
Controls	Area	Area, Pop & State Dummies, Log Med. House Prices, Share in Poverty, Share Non-English	Area, Total Development Strategies Development Budget	Area, Large Retail Base, Sales Tax	Area, Combined Statistical Area Fixed Effects

Notes: The table reports instrumental-variable estimates of regressions of the form Retail Subsidies$_i$ = a+b x Compactness + cX$_i$ +u$_i$i where Retail Subsidies$_i$ is an indicator for reporting retail development focus in the ICMA 1999, 2004, and 2009 Economic Development Surveys. Each coefficient represents a separate regression. All regressions include controls for area and year. Details about the instruments are in the text. Note that the state-level IV strategy can not be used in columns 2 and 5. Standard errors are clustered by state.

Table IV.3. First Stage Regressions: ICMA Sample

	City Compactness Index								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
State Law Annexation Difficulty Index	-0.311*** (0.0718)							-0.305*** (0.0686)	
River Dummy		-0.229*** (0.0788)	-0.236*** (0.0645)					-0.164* (0.0892)	-0.158*** (0.0601)
Wetlands Dummy				-0.499*** (0.101)	-0.515*** (0.0806)			-0.373*** (0.0801)	-0.459*** (0.0823)
Incorporation Date Instrument						9.793*** (1.708)	6.520*** (1.075)	9.313*** (1.780)	6.123*** (1.149)
Additional Controls	None	None	Combined Statistical Area Fixed Effects	None	Combined Statistical Area Fixed Effects	None	Combined Statistical Area Fixed Effects	None	Combined Statistical Area Fixed Effects
N	2015	2015	2015	2015	2015	1868	1868	1868	1868

Notes: The table reports regressions of the form $Compactness_i = a + b \times Instrument + cX_i + u_i$. All regressions control for area, and standard errors are clustered by state (or CSA when CSA fixed effects are included).

Table IV.4. Compactness, Shopping Malls and Business Improvement Districts - IV Results

	(1)	(2)	(3)	(4)	(5)	(6)
			Shopping Center Indicator			
	All Distances		< 2 Mi From Border		> 2 Mi From Border	
Compactness (IV)	-0.175***	-0.0588***	-.2288186***	-.1219457***	-.0133154***	-.0102008***
	(0.0192)	(0.0121)	(.0221639)	(.0162713)	(.0042783)	(.0030231)
N	28438	28438	28438	28438	28438	28438
	(7)	(8)	(9)	(10)	(11)	(12)
	Log (Shopping Centers)		Log (Center Stores)		Business Improvement District Indicator	
Compactness (IV)	-0.252*	-0.366***	-0.361	-0.530***	-0.277***	0.0436**
	(0.149)	(0.136)	(0.248)	(0.199)	(0.0463)	(0.0208)
N	2206	2206	2164	2164	293	293
Controls	X	Population Dummies and CSA Dummies	X	Population Dummies and CSA Dummies	X	Population Dummies and CSA Dummies

Note: The table reports regressions of the form $Y_i = a + b \times \text{Geographic Ratio} + cX_i + u_i$, where the dependent variable is (in order) a dummy for the existence of a mall or shopping center, the log number of malls/centers, the log number of stores in malls/centers, and the existence of a Business Improvement District. Each coefficient represents a separate regression and all regressions control for area. Additional controls in both panels are listed in the final row of the table. Standard errors are clustered by state.

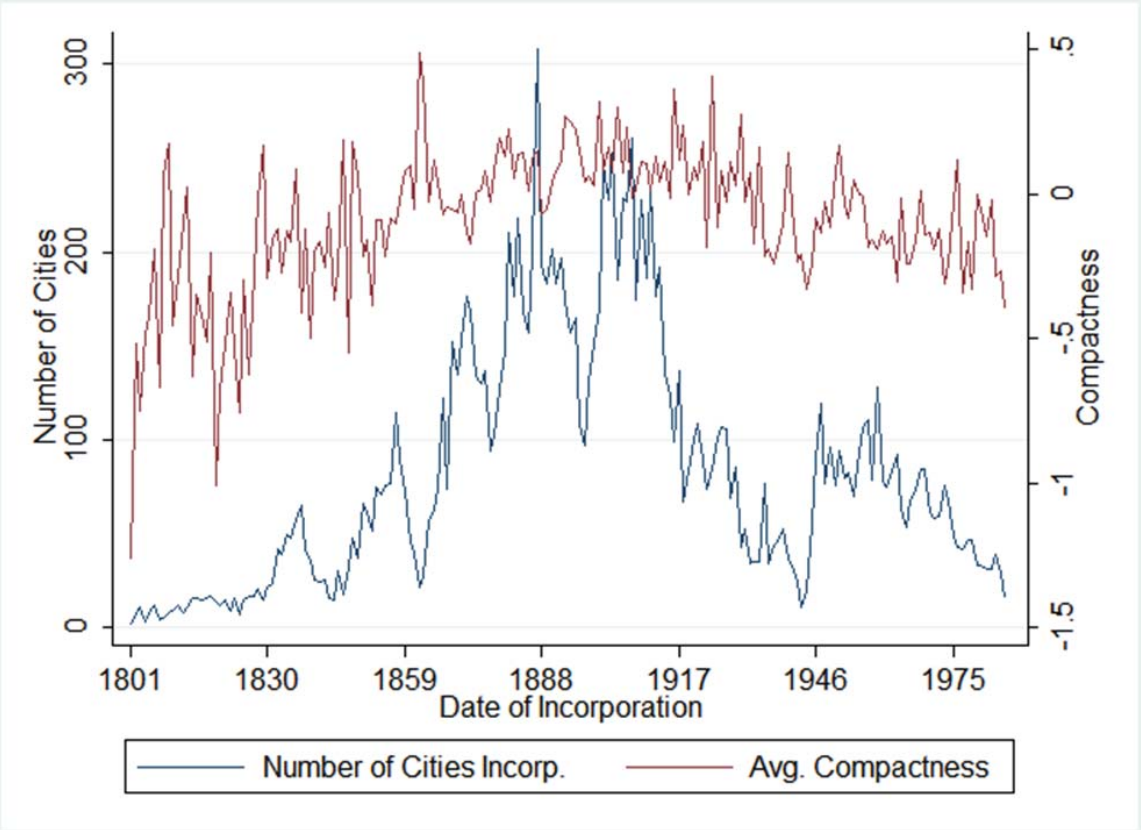
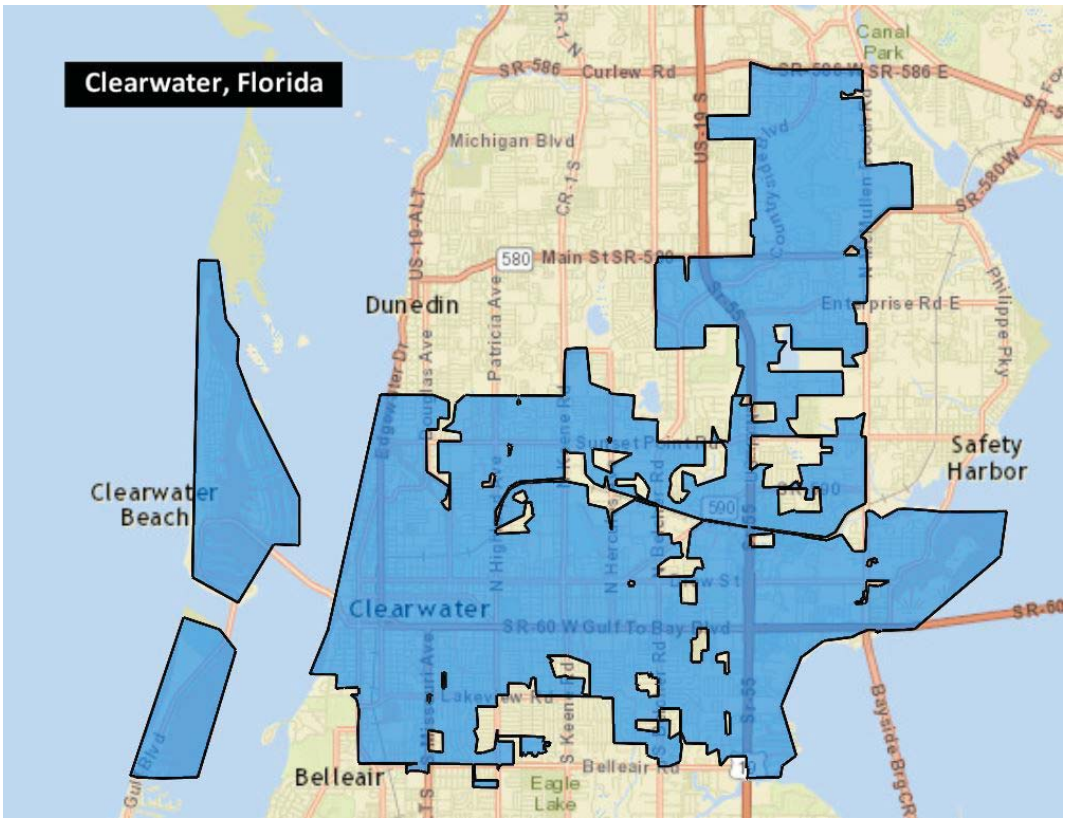


Figure IV.1. Data are for cities existing in 2010. Information on incorporation from the 1987 U.S. Census of Governments.

Figure IV.2. Compactness Example



Note: This figure maps the boundary of the town of Clearwater, Florida.