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Support for Suburban Growth Management: Lessons from Loudoun County, Virginia

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Introduction

The social and environmental consequences of rapid growth have made its management an important public policy issue in communities across the United States (Bosselman and Callies 1971; Babcock and Bosselman 1973). Traditionally, local governments manage short-term growth through zoning ordinances and subdivision regulations (Carter et al. 1975; Einsweiler et al. 1975). They rely on comprehensive planning and capital improvement programs to manage long-term growth. Newer policy instruments to manage growth include public land purchases as well as regulatory and incentive-based approaches (Bengston et al. 2004; Porter 2008).

However, implementing specific growth management instruments are not necessarily obligatory responses to growth (Neiman and Loveridge 1981; Baldassare 1984). Nor is support for such instruments assured after their implementation. For example, individuals in areas experiencing growth may generally support growth management, but it may only be those individuals from communities that are experiencing the most growth that continue to support a specific growth management instrument (Connerly and Frank 1986). In analyzing support for a specific growth management instrument it is therefore vital to understand how individual and community support for a specific growth instrument interact.

Using two years of individual resident survey data from communities across Loudoun County, Virginia the study undertakes a retrospective analysis of support for a specific growth management instrument. The research questions that the study attempts to answer are as follows. How do perceptions of local government's general efficacy in managing growth condition support for a specific growth management instrument? What individual-level and community-level predictors are most associated with support for a specific growth management instrument? Finally, how do individual-level and community-level predictors interact in regards to support for a specific growth management instrument?

The different sections of the study are as follows. The first section reviews the empirical literature on how individual-level and community-level predictors affect support for specific growth management instruments. In light of the empirical literature, the second section describes the study area as well as the data and methodology the study uses to model individual resident support for a specific growth management instrument in communities across Loudoun County. The third section presents results from the analysis as well as a discussion of how the results contribute to the empirical literature on growth management. The fourth, and final, section discusses the public policy implications of the results and suggests avenues for future research.

Background on Growth Management

Identifying the predictors of support for growth management has been a longstanding topic of interest (Harris 1988; Deakin 1989). The empirical literature on the topic (Connerly and Frank 1986; Baldassare and Wilson 1996) suggests many different hypotheses on support for growth management. The different hypotheses tend to focus on two levels of analysis—the individual-level and the community-level. At the individual-level, the social class hypothesis is the most popular. At the community-level, the community context hypothesis which includes local growth rates is the most popular. The following two subsections discuss the empirical literature on the social class and community context hypotheses on support for growth management.

Social Class Hypothesis

The social class hypothesis argues that support for growth management originates from higher social class households who wish to exclude lower social class households from the community (Molotch 1976; Logan 1978). Overall, the empirical evidence on the social class hypothesis is not unequivocal. Connerly and Frank (1986) found that education (college attendance) had a positive and statistically significant effect on support for growth management, but the effects of income and homeownership were not statistically significant. Baldassare and Wilson (1996) found that annual median household income was a positive and statistically significant predictor of stricter growth controls in a 1982 survey of Orange County, California residents. McLeod et al. (1999) found that education (four-year college degree) and income had statistically significant effects on support for a specific growth management instrument (purchase development rights) in Sublette County, Wyoming. However, each had a negative effect.

Community Context Hypothesis

The community context hypothesis (Connerly and Frank 1986) argues that individual attitudes toward community affect support for growth management. According to Baldassare (1984),

> "[t]he perception of adverse community changes, service delivery problems, rapid growth, ineffective local government, excessive taxes and spending, and a diminished quality of life" (p. 40)

is the best predictor of support for growth management. Rapid growth has a negative effect on quality of life because it taxes the adaptive capacity of the community (Connerly and Frank 1986). The lower capacity to adapt leads to

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bottleneck effects and size effects (Dowall 1980). Bottleneck effects occur when local government institutions are so taxed that the quality of public services declines. In response, tax rates climb to meet the demand for more capital facilities. Size effects relate to the optimum community size and the diseconomies of scale due to rapid growth. One example of such diseconomies is congestion. Another example of such diseconomies is a decrease in sense of community; a concept which most individuals in the United States seem to associate with smaller sizes (Hibbard and Davis 1986). In order to preserve a sense of community a "last one in, close the door" (Harris 1988, p. 468) mentality, also known as "gangplank" syndrome (Voss 1980, p. 96), emerges amongst new arrivals who oppose more growth (Dubbink 1984).

Unfortunately, few researchers include "aggregate measures of community context" (Wassmer and Lascher 2006, p. 629). On the one hand, in a 1982 Orange County, California resident survey Baldassare (1984) found that local growth rates and local median incomes did not have a statistically significant affect on local concern about growth. Connerly and Frank (1986) found that, surprisingly, residents of the fastest growing counties in Florida were not more supportive of growth management. Nor were the effects of taxes and income on growth management support statistically significant. The authors attribute the above results to the scale of analysis; community context affects are more likely to manifest at the sub-county, rather than the county, level of analysis. Baldassare and Wilson (1996) found that local growth rates did not have statistically significant effects on support for local growth controls in surveys of Orange County, California residents in 1982, 1991 or 1993. On the other hand, Wassmer and Lascher (2006) found that the effect of income on general support for growth management was positive in 1989 and 2002 surveys of residents from counties across California. In addition, the effect of the five-year, county growth rate on support for a specific growth management instrument was positive in the 2002 survey of residents from counties across California. Overall, the empirical literature suggests that "[t]here has never been a strong link between actual local population growth and…public support for local growth controls…" (Baldassare 1998, p. 263) in the empirical literature.

The effect of length of residence on support for growth management is also inconsistent in the empirical literature. Voss (1980) found no differences in attitudes toward future growth between old timers and newcomers from a 1977 migration survey in the Upper Great Lakes Region. Baldassare (1984) found that length of residence did not have a statistically significant effect on local concern for growth in a 1982 Orange County, California resident survey. However, Baldassare and Wilson (1996) found that length of residence had a statistically significant effect on support for local growth controls in a 1991 survey of Orange County, California residents. McLeod et al. (1999) found that the effect of length

of residence on support for a specific growth management instrument was not statistically significant in Sublette County, Wyoming.

Interaction between Individual- and Community-Level Predictors

A review of the empirical literature suggests that social class and community context hypotheses are, at best, inconsistent. One explanation for the inconsistency is that each hypothesis tends to focus on one level of analysis or the other alone—the individual-level or the community-level—but not both together. More than likely, as Medler and Mushkatel (1979) suggest, "a combination of contextual and individual-level effects" interact such that "the effects of individual characteristics are conditioned by the context" (p. 339). Such individual-level and community-level interaction effects may help to answer the research questions in the study, especially, the research question on how perceptions of local government's general efficacy in managing growth condition support for a specific growth management instrument. The greatest impediments to such a multilevel analysis where individual-level and community-level effects interact are data and methodology. The next section describes the data and methodology the study uses to overcome such impediments.

Data and Methodology

Study Area

Loudoun County is a high-growth, outer suburb in the Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Statistical Area (MSA) (Fig. 1). It is home to Dulles International Airport and the Janelia Farm Research Campus of the Howard Hughes Medical Institute. The demographic, social, and economic profiles of Loudoun County are different from the State of Virginia and the United States (Table 1). First, the population in Loudoun County is young and highly educated. Second, Loudoun County is as racially/ethnically diverse as is the State of Virginia but more so than the United States. Third, households in Loudoun County are large and incomes are very high.

The growth in Loudoun County is consistent with the expansion of Megalopolis (Gottman 1961), the track of urbanization on the northeastern seaboard of the United States, into the Northern Virginia suburbs. Driven by the decentralization of the federal government away from the District of Columbia and greater demand for services to support the federal government (Gottmann 1969) Loudoun County grew rapidly after 1950. Indeed, the percent change in population in Loudoun County between 1950 and 2000 was +702.0. Between 1990 and 2000 the population grew by +96.9 percent and between 2000 and 2010

the population grew by 84.1% percent. The explosive growth in Loudoun County means that growth management is a concern for residents who share the same concerns as residents of other high-growth counties across the United States (Atkins et al. 2002).

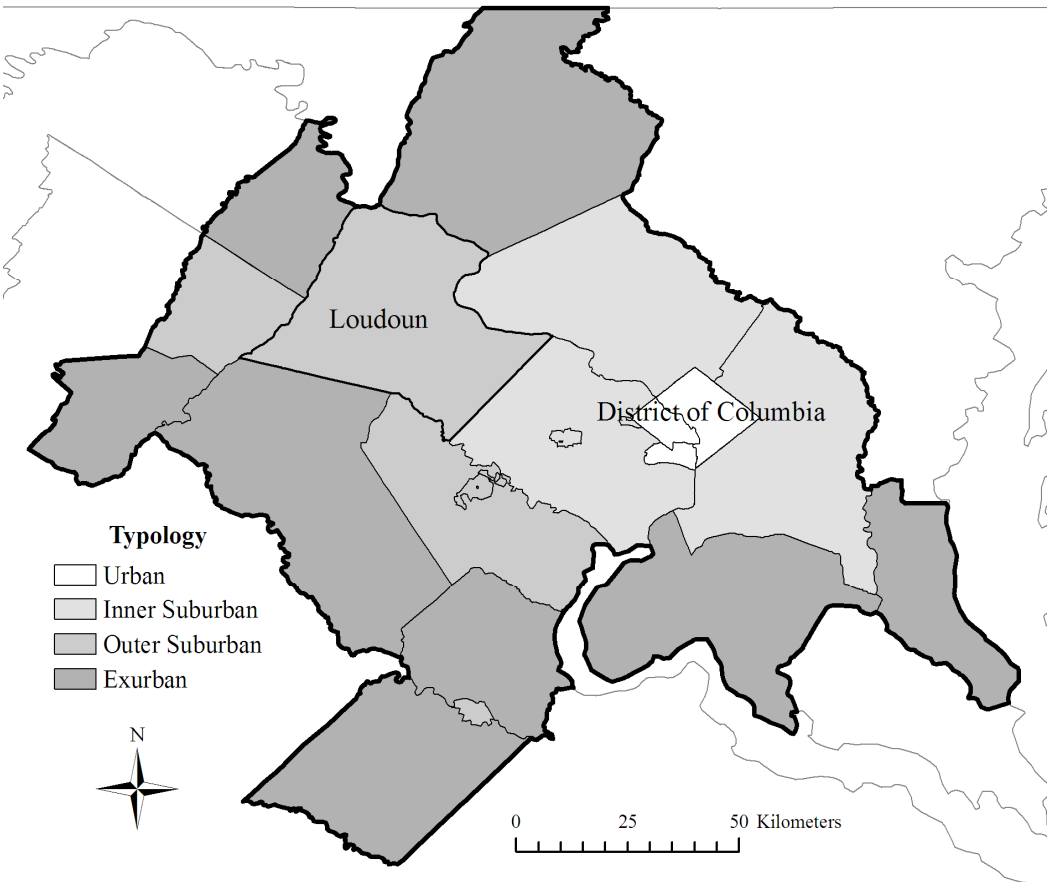

Figure 1. Loudoun County, Virginia, an outer suburb of the Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Statistical Area (MSA)

Data sources

The individual-level dependent and independent variables are from telephone surveys of random samples of Loudoun households commissioned by the County Administrator in May of 2001 (County of Loudoun 2001) and November of 2002 (County of Loudoun 2003). These surveys asked respondents for their view on growth, their opinion on the County's response to growth, and their view on a specific growth management instrument adopted by the County known as the

Purchase of Development Rights (PDR) Program. Given the range of questions on growth, this survey data is ideal for disentangling individual opinions on growth

Table 1
Loudoun County, Virginia versus the State of Virginia and the United States[a]

		Loudoun	Virginia	United States
Demographic				
	Under 5 Years (%)	8.4	6.3	6.5
	65 Years and Over (%)	6.9	12.5	13.3
	White (%)	72.8	71.3	78.1
	Persons Per Household	3.0	2.6	2.6
Social				
	Bachelor's Degree (%)	57.6	34.4	28.2
Economic				
	Median Household Income ($)	120,096	63,302	52,762

a. United States Bureau of the Census, 2013.

from individual support for a specific growth management instrument. The percentage of households that were called and agreed to respond to the survey, also known as the cooperation rate, was reported as "extremely high" in 2001 (County of Loudoun 2001, p. 3) and 70 percent in 2002. The resultant pool of random samples of 1,001 households in 2001 and 1,010 households in 2002 represented approximately 1.7% and 1.4%, respectively, of the total number of Loudoun County households. Deletion of 27 respondent households from communities other than the eighteen communities in Loudoun County and 738 respondent households who didn't know, didn't answer, or refused to answer at least one of the individual-level questions left a combined subsample size of 1,246 respondents. The community-level independent variables are from *The Sourcebook of Zip Code Demographics, 2003* (Environmental Systems Research Institute 2003).

Descriptive Statistics

Descriptive statistics for the individual-level dependent and independent variables appear in Table 2. The individual-level dependent variable is PDR. It equals 1 if the respondent 'strongly' or 'somewhat' supports the PDR and 0 otherwise. The PDR was created in response to fears associated with the loss of rural agricultural land in the County to development (County of Loudoun 2000). The loss of agricultural land was thought to pose a threat to the County's natural resources, tourism industry, and general quality of life. The PDR allows individual property

owners to sell to the County the right to place a conservation easement on their property, and thus restrict its potential future use. Property owners retain other rights over their property. In both telephone surveys (2001 and 2002), respondents were asked if they supported Loudoun County's growth management instrument to purchase development rights from landowners on a voluntary basis to preserve open space. The vast majority of respondents supported the PDR even though support decreased slightly from 83.0% to 77.2% and opposition increased slightly from 9.6% to 13.7% from 2001 to 2002 (Table 3).

Table 2
Descriptive Statistics for Individual- and Community-Level Variables

Level	n	Variable	Mean	SD	Min	Max
Individual	1,426	PDR[a]	0.80	0.40	0	1
		TENURE[b]	0.88	0.33	0	1
		LENGTH[c]	11.69	13.85	1	99
		VALUE[d]	0.83	0.37	0	1
		PROBLEM[e]	0.62	0.49	0	1
		GROWTH[f]	0.82	0.38	0	1
		RACE[g]	0.86	0.34	0	1
		INCOME[h]	0.56	0.50	0	1
Community	18	E[i]	0.34	0.49	0	1
		PR[j]	5.73	2.89	2.00	12.40
		CW[k]	−1.25	1.22	−3.60	1.50
		MHI[l]	$96,180.61	$33,005.59	$64,298	$209,897
		MHV[m]	$331,893.28	$116,845.18	$183,639	$671,836

a. Equals 1 if respondent 'strongly' or 'somewhat' supports the purchase of development rights (PDR) program, 0 otherwise.
b. Equals 1 if respondent owns their home, 0 otherwise.
c. Years respondent has lived in Loudoun County.
d. Equals 1 if respondent believes Loudoun County provides good value for the tax dollar, 0 otherwise.
e. Equals 1 if respondent believes growth is the single biggest problem facing Loudoun County, 0 otherwise.
f. Equals 1 if respondent supports efforts to manage growth in Loudoun County, 0 otherwise.
g. Equals 1 if respondent is White, 0 otherwise.
h. Equals 1 if respondent's total household income is less than $100,001, 0 otherwise.
i. Equals 1 if respondent lives in an eastern Loudoun County community, 0 otherwise.
j. Percentage increase in population between 2000 and 2003.
k. Percentage change in White population between 2000 and 2003.
l. Median household income in 2003.
m. Median home value in 2003.

The individual-level independent variables are: TENURE; LENGTH; VALUE; PROBLEM; GROWTH; RACE; and INCOME. TENURE equals 1 if the respondent owns their home and 0 otherwise. LENGTH is the number of years

respondents have lived in Loudoun County. VALUE equals 1 if the respondent believes Loudoun County provides good value for the tax dollar and 0 otherwise. PROBLEM equals 1 if the respondent believes growth/development (too much, too fast, not planned well) is the single biggest problem facing Loudoun County. GROWTH equals 1 if the respondent supports the efforts of the Board of Supervisors to manage growth in Loudoun County and 0 otherwise. RACE equals 1 if the respondent is White and 0 otherwise (American Indian, Asian, Black, or Hispanic). INCOME equals 1 if the respondent's total household income before taxes is less than $100,001 and 0 otherwise. Unfortunately, respondents were asked their age in only one survey year (2002) and they were not asked their gender in either survey year (2001 or 2002).

Table 3
Percentage of Respondents Who Supported the Purchase of Development Rights by Loudoun County

	2001	2002
Strongly support	52.2%	45.5%
Somewhat support	30.8%	31.7%
Total support	**83.0%**	**77.2%**
Somewhat oppose	4.9%	5.6%
Strongly oppose	4.7%	8.1%
Total opposition	**9.6%**	**13.7%**
Neither support nor oppose/neutral/no opinion	7.4%	9.1%

Descriptive statistics for the community-level independent variables also appear in Table 2. The community-level independent variables are: E; PR; CW; MHI; MHV. E equals 1 if the respondent lives in an eastern Loudoun County (high-growth) community—Ashburn, Chantilly, Sterling, or Great Falls—and 0 otherwise (Fig. 2). PR is the percentage increase in population between 2000 and 2003. CW is the percentage change in White population between 2000 and 2003. MHI is the median household income in 2003. MHV is the median home value in 2003.

Expected Effects

In light of the empirical literature on growth management, the individual-level and community-level independent variables are expected to have the following effects on support for the PDR. At the individual-level, TENURE (respondents own their home) is expected to have a positive effect on support for the PDR because respondent's who own their home stand to gain monetarily from the appreciation in property values attributable to the PDR. While empirical

Figure 2. Eastern Loudoun County communities

precedent suggests no significant relationship between LENGTH (number of years respondents lived in Loudoun County) and support for the PDR, the rapidity of growth in Loudoun County probably engenders a "last one in, close the door" (Harris 1998, p. 468) mentality amongst new arrivals. Therefore, the effect of LENGTH on support for the PDR is expected to be slightly positive. Since excessive taxation is one of the negative consequences of rapid growth in the community context hypothesis, the effect of VALUE (respondents believe Loudoun County provides good value for the tax dollar) on support for the PDR is expected to be negative. The effect of PROBLEM (respondents believe growth/development is the single biggest problem facing Loudoun County) is expected to be positive. GROWTH (respondents support the efforts of the Board

of Supervisors to manage growth in Loudoun County) is expected to have a positive effect on support for the PDR. In addition, its effect is expected to be conditioned by local growth rates, that is, GROWTH is expected to have a stronger effect in high-growth communities. The effect of RACE (respondents are White) on support for the PDR is expected to be negative since non-Whites have more to gain economically from further growth in terms of employment opportunity, for example. Finally, given the ambiguous empirical record on the effect of income on support for growth management, INCOME (respondent's total household income before taxes is less than $100,001) is expected to have no effect on support for the PDR. At the community-level, the effects of E (respondents live in an eastern Loudoun County (high-growth) community) and PR (percentage increase in population between 2000 and 2003) on support for the PDR are expected to be positive; consistent with community context hypothesis. The effect of CW (percentage change in White population between 2000 and 2003) on support for the PDR is expected to be negative because communities that became more racially diverse are expected to oppose growth management less than communities that stayed the same or became less racially diverse. MHI (median household income in 2003) is expected to have no effect on support for the PDR. Finally, MHV (median home value in 2003) is expected to have a positive effect on support for the PDR because respondents from communities with the highest home values stand to the gain the most from an appreciation in local property values.

Methodology

To study how individual- and community-level independent variables interact to affect resident support for a specific growth management instrument, a multilevel model of individual resident support for the PDR is specified. The main justification for adopting a multilevel approach to model support for growth management derives from the ability of a multilevel model to account for nesting (individuals nested within communities) in survey data on support for growth management (Medler and Mushkatel 1979; Goldstein 1991). Simultaneously incorporating individual-level and community-level independent variables into a multilevel model is a practical method to determine if: 1) support for the PDR is higher in the most rapidly growing communities in the County; and 2) support for a specific growth management instrument is higher amongst individuals who generally support the County's efforts to manage growth. The latter determination is important because of the specificity issue (Heberlein and Black 1976). The specificity issue relates to the phenomenon where survey respondents will support norms if the question is general in expression, but not if the question is specific in expression. Survey respondents may then generally support growth management but not specific growth management instruments because of the respondent's

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perception that the instrument may have adverse personal consequences (Neiman and Loveridge 1981).

The multilevel models in the study nest individuals (*i*) at the micro-level within communities (*c*) at the macro-level. The macro-level corresponds to the community of residence of individuals in May of 2001 and November of 2002; coinciding with administration of the two surveys (County of Loudoun 2001; County of Loudoun 2003). In each community, the probability of resident support for the PDR is a function of individual-level variables:

$$Y'_{ic} = \beta_{0c} + \beta_{1c}X_{1ic} + \beta_{2c}X_{2ic} + \ldots + \beta_{Pc}X_{Pic} \quad (1)$$

where

Y'_{ic} is the logit transformation of a binary response variable which equals 1 if individual *i* in community *c* 'strongly' or 'somewhat' supports the PDR and 0 otherwise;
β_{0c} is the intercept in community *c*;
X_{Pic} are $p = 1, \ldots, P$ individual-level independent variables; and
β_{Pc} are the corresponding level-one coefficients that indicate the sign and magnitude of the association between each individual-level variable, X_{Pic}, and the log odds of the outcome in community *c*.

A general model of the variation among individuals within communities predicts each non-fixed individual effect:

$$\beta_{Pc} = \gamma_{P0} + \gamma_{P1}W_{1c} + \gamma_{P2}W_{2c} + \ldots + \gamma_{PQ}W_{Qc} + u_{Pc} \quad (2)$$

where

γ_{P0} is the intercept for community *c* in modeling the individual effect β_{Pc};
W_{Qc} are $q = 1, \ldots, Q$ community-level variables;
γ_{PQ} is the corresponding coefficient that represents the sign and magnitude of the association between community-level predictor W_{Qc} and β_{Pc}; and
u_{Pc} is a level-two random effect that represents the deviation of community *c*'s level-one coefficient, β_{Pc}, from its predicted value based on the community-level model.

In a two-level model with individuals nested within communities, the intercept and any or all of the regression coefficients at level-one can be fixed or random. A multilevel model in which the intercept is random and all of the regression coefficients are fixed is known as a random-intercept model. In this study, the first multilevel model is a random-intercept model. The random-intercept multilevel model estimates how individual-level and community-level

variables interact to affect the likelihood that support for the PDR is higher in the most rapidly growing communities in Loudoun County. A multilevel model in which the intercept and at least one of the regression coefficients is random is known as a random-coefficient model. In this study, the second multilevel model is a random-coefficient model. The random-coefficient multilevel model estimates how individual-level and community-level variables interact to affect the likelihood that support for the PDR is highest amongst individuals who generally support the County's efforts to manage growth.

Analysis

Random-Intercept Multilevel Model Results

Results from the random-intercept multilevel model appear in Table 4. TENURE

Table 4
Random-Intercept Multilevel Model Results

Level	n	Variable	Coefficient (*p*-value)	Odds Ratio
Individual	1,426	TENURE	+0.38 (0.09)	1.47
		LENGTH	−0.01 (0.03)	0.99
		VALUE	+0.80 (0.00)	2.22
		PROBLEM	+0.39 (0.01)	1.48
		GROWTH	+1.00 (0.00)	2.72
		RACE	+0.42 (0.04)	1.52
		INCOME	+0.14 (0.38)	1.15
Community	18	Intercept	+0.99 (0.02)	0.37
		E	−0.10 (0.76)	0.90
		PR	+0.01 (0.89)	1.01
		CW	−0.09 (0.55)	0.92
		MHI	+5E−6 (0.56)	1.00
		MHV	−2E−6 (0.35)	1.00

is statistically significant at the 10% level, LENGTH and RACE are statistically significant at the 5% level, and VALUE, PROBLEM, and GROWTH are statistically significant at the 1% level. If the respondent owns their home, then the odds that the respondent supports the PDR increase by 47%. Each additional year lived in Loudoun County decreases the odds that the respondent supports the PDR by 1%. If the respondent is White, then the odds that the respondent supports

the PDR increase by 52%. If respondents believe Loudoun County provides good value for the tax dollar, then the odds that respondents support the PDR increase by 122%. If respondents believe growth/development is the single biggest problem facing Loudoun County, then the odds that respondents support the PDR increase by 48%. Finally, if respondents support the efforts of the Board of Supervisors to manage growth in Loudoun County, then the odds that respondents support the PDR increase by 172%. Interestingly, if respondents live in an eastern Loudoun County (high-growth) community—Ashburn, Chantilly, Sterling, or Great Falls—then the odds that they support the PDR decrease by 10%. However, the community-level independent variable E is not statistically significant.

The intraclass correlation coefficient provides information on the proportion of the variance in the dependent variable (support for the PDR) which is attributable to differences between-communities versus differences between respondents' within-communities. It is only applicable to random-intercept multilevel models. The equation for the ICC (ρ_I) is:

$$\rho_I = \frac{\tau_0^2}{\tau_0^2 + \frac{\pi^2}{3}} \tag{3}$$

where τ_0^2 is the intercept variance for the random-intercept multilevel model (Snijders and Bosker 1999). The ICC for the dependent variable in the random-intercept multilevel model is approximately 1.00% (0.98%). Such a result suggests that almost all of the variance in respondent support for the PDR is attributable to differences between respondents within communities rather than to differences between communities.

Random-Coefficient Multilevel Model Results

Results from the random-coefficient multilevel model appear in Table 5. TENURE is not statistically significant at the 10% level as in the random-intercept multilevel model. However, LENGTH and RACE are statistically significant at the 5% level and VALUE and PROBLEM are statistically significant at the 1% level as in the random-intercept multilevel model. The intercept for the random coefficient GROWTH is also statistically significant at the 1% level. Further, the odds ratios for LENGTH, RACE, VALUE, PROBLEM, and GROWTH are all approximately the same as in the random-intercept multilevel model. Amongst respondents who generally support the County's efforts to manage growth, a one percent increase in population increases the odds that the respondent supports the PDR by 20%. Finally, the community-level independent variable MHV03 (median home value in 2003) is statistically significant at the 10% level (p-value = 0.08). However, the magnitude of the

MHV03 coefficient in the random-coefficient multilevel model is effectively zero (0.000007). Such a result suggests that the random-coefficient multilevel model estimates the MHV03 coefficient precisely, but the effect of median home value on support for the PDR (after controlling for respondents general support for growth management) is minimal.

Table 5
Random-Coefficient Multilevel Model Results

Level	n	Variable	Coefficient (*p*-value)	Odds Ratio
Individual	1,426	TENURE	+0.36 (0.12)	1.43
		LENGTH	−0.01 (0.02)	0.99
		VALUE	+0.82 (0.00)	2.27
		PROBLEM	+0.41 (0.01)	1.51
		GROWTH		
		Intercept	+0.94 (0.00)	2.56
		E	−0.04 (0.96)	0.97
		PR	+0.19 (0.03)	1.20
		CW	−0.20 (0.44)	0.82
		MHI03	−2E−5 (0.18)	1.00
		MHV03	+7E−6 (0.08)	1.00
		RACE	+0.42 (0.05)	1.53
		INCOME	+0.17 (0.29)	1.19
Community	18	Intercept	−0.96 (0.03)	0.38
		E	−0.07 (0.91)	0.93
		PR	−0.13 (0.15)	0.88
		CW	+0.04 (0.87)	1.04
		MHI	+2E−5 (0.22)	1.00
		MHV	−6E−6 (0.09)	1.00

Discussion

A retrospective analysis of a specific growth management instrument shows that, as Medler and Mushkatel (1979) suggest, individual-level and community-level effects interact to affect support. In addition, the context (local growth rates) conditions both general and specific support for growth management at the individual-level. That is, perceptions of local government's general efficacy in

growth management condition support for a specific growth management instrument in those communities that are the most rapidly growing. In fact, support for a specific growth management instrument clearly increases amongst residents who generally support local government efforts to management growth and who live in high-growth communities. Results from the multilevel models also confirm the assertion by Connerly and Frank (1986) that community context effects such as local growth rates manifest at the sub-county (community) level of analysis rather than the county level of analysis.

The results of the study are highly relevant to growth management policymaking. Individual constituents may generally be supportive of growth management. However, their support for a specific growth management instrument may be conditioned by perceptions of the negative externalities of growth in their local community. These perceptions seem to overshadow any adverse personal consequences to the individual constituent. Overall then, policymakers who wish to engender support for a specific instrument would do well to focus on individuals who are generally supportive of growth management and who live in high-growth communities.

Conclusions

The limitations of the study suggest avenues for future research. First, Loudoun County, Virginia is typical of other PDRs in the United States. That is, most PDRs are local programs found on the urban fringe of northeastern MSAs (Buckland 1987; Daniels 1991). Unfortunately, however, Loudoun County is atypical with regard to income (Loudoun County is one of the highest income counties in the United States) which limits the generalizability of the results. Second, the predictors of support for PDRs may differ from the predictors of support for other specific growth management instruments. In addition, the individual-level and community-level predictors of support for other specific growth management instruments may interact differently. Third, support for growth management may, in reality, reflect opposition to infill development (new development in existing communities) on the part of residents. Indeed, opposition from current residents is the biggest obstacle to infill development (McConnell and Wiley 2012). Residents particularly worry that new development will occur at a higher density. The classic refrain from planners that density is the only thing people hate more than sprawl (Flint 2005) may be apropos. Finally, another potential limitation is the timeliness of the data and the relevance of the results in the aftermath of the Great Recession. Historic gaps between revenues and expenditures because of lower property and sales tax receipts portend a new normal for local governments (Martin et al. 2012). Managing growth is not a high priority today for many local governments who continue to cope with the

remnants of the foreclosure crisis. Land banks (governmental or nongovernmental entities which acquire and manage tax-delinquent properties) are one solution to redevelopment problems for communities with many such properties (Alexander 2005; Sage Computing 2009). The foreclosure crises notwithstanding many communities across the United States continue to cope with the long-term consequences of rapid growth. For example, Loudoun County is still a high-growth, outer suburb in the second decade of the new century.

In order to address the above limitations, future research on interactions between individual-level and community-level predictors of support for other specific growth management instruments, besides PDRs, in different locations across the United States is necessary. Ideally, such research would rely on resident surveys which ask respondents questions on general support for growth management as well as questions on support for specific growth management instruments as well as infill development. More in-depth research which adopts a similar approach would provide a better understanding of how individual-level and community-level predictors interact with regard to support for specific growth management instruments.

References

Alexander, F. 2005. Land bank strategies for renewing urban land. *Journal of Affordable Housing & Community Development Law* 12 (2): 140-169.

Atkins, P., Wolman, H. and Jordan, J. 2002. Edge counties struggle with impacts of rapid growth. *Housing Facts and Findings* 4 (1): 1, 6-7.

Babcock, R. and Bosselman, F. 1973. *Exclusionary Zoning: Land Use Regulations and Housing in the 1970's*. Washington, DC: Praeger.

Baldassare, M. 1984. Predicting local concern about growth: The roots of citizen discontent. *Journal of Urban Affairs* 6 (4): 39-49.

Baldassare, M. 1998. Citizen preferences for local growth controls: trends in U.S. suburban support for new political culture movement. In *The New Political Culture*, eds. T. Clark, Hoffmann-Martinot, V., Gromala, M., 261-276. Boulder, CO: Westview Press.

Baldassare, M. and Wilson, G. 1996. Changing sources of suburban support for local growth controls. *Urban Studies* 33 (3): 459-471.

Bengston, D., Fletcher, J., and Nelson, K. 2004. Public policies for managing urban growth and protecting open space: Policy instruments and lessons learned in the United States. *Landscape and Urban Planning* 69 (2-3): 271-286.

Bosselman, F. and Callies, D. 1971. *The Quiet Revolution in Land Use Control*. Washington, DC: Council on Environmental Quality.

DOI: http://dx.doi.org/10.5038/2164-0866.1.1.1

Buckland, J. 1987. The history and use of purchase of development rights in the United States. *Landscape and Urban Planning* 14 (3): 237-252.

Carter, S., Bert, K., and Nobert, P. 1975. Local government techniques for managing growth. In *Management and Control of Growth: Issues, Techniques, Problems, Trends*, eds. R. Scott, Brower, D., Miner, D., 330-354. Washington, DC: Urban Land Institute.

Connerly, C. and Frank, J. 1986. Predicting support for local growth controls. *Social Science Quarterly* 67 (3): 572-586.

County of Loudoun. 2000. *Proposed Purchase of Development Rights Program.* Leesburg, VA: Loudoun County.

County of Loudoun. 2001. *2001 Survey of Loudoun residents*. Loudoun County Leesburg, VA: Department of Economic Development.

County of Loudoun. 2003. *2002 Survey of Loudoun residents*. Loudoun County Leesburg, VA: Department of Economic Development.

Daniels, T. 1991. The purchase of development rights: Preserving agricultural land and open space. *Journal of the American Planning Association* 57 (4): 421-431.

Deakin, E. 1989. Growth controls and growth management: A summary and review of empirical research. In *Understanding Growth Management: Critical Issues and a Research Agenda*, eds. D. Brower, Godschalk, D., Porter, D., 3-21. Washington, DC: Urban Land Institute.

Dowall, D. 1980. An examination of population-growth-managing communities. *Policy Studies Journal* 9 (3): 414-427.

Dubbink, D. 1984. I'll have my town medium-rural, please. *Journal of the American Planning Association* 50 (4): 406-418.

Environmental Systems Research Institute. 2003. *The Sourcebook of Zip Code Demographics, 2003*. Vienna, VA: ESRI Press.

Einsweiler, R., Gleeson, M., Ball, I., Morris, A., and Sprague, D. 1975. Comparative descriptions of selected municipal growth guidance systems: A preliminary report. In *Management and Control of Growth: Issues, Techniques, Problems, Trends*, eds. R. Scott, Brower, D., Miner, D., 283-329. Washington, DC: Urban Land Institute.

Flint, A. 2005. *The Density Dilemma: Appeal and Obstacles for Compact and Transit-Oriented Development*. Washington, DC: Lincoln Land Institute.

Goldstein, H. 1991. Multilevel modelling of survey data. *The Statistician* 40 (2): 235-244.

Gottmann, J. 1961. *Megalopolis; The Urbanized Northeastern Seaboard of the United States*. New York, NY: Twentieth Century Fund.

Gottmann, J. 1969. *Virginia in Our Century*. Charlottesville, VA: The University Press of Virginia.

Harris, D. 1988. Growth management reconsidered. *Journal of Planning Literature* 3 (4): 466-482.

Heberlein, T. and Black, J. 1976. Attitudinal specificity and the prediction of behavior in a field setting. *Journal of Personality and Social Psychology* 33 (4): 474-479.

Hibbard, M. and Davis, L. 1986. When the going gets tough: Economic reality and the cultural myths of small-town America. *Journal of the American Planning Association* 52 (4): 419-428.

Logan, J. 1978. Growth, politics, and the stratification of places. *American Journal of Sociology* 84 (2): 404-416.

Martin, L., Levey, R., and Cawley, J. 2012. The "new normal" for local governments. *State and Local Government Review* 44 (1S): 17S-28S.

McConnell, V. and Wiley, K. 2012. Infill development: Perspectives and evidence from economics and planning. In *The Oxford Handbook of Urban Economics and Planning*, eds. N. Brooks, Donaghy, K., Knaap, G., 473-502. New York, NY: Oxford University Press.

McLeod, D., Worihaye, J., and Menkhaus, D. 1999. Factors influencing support for rural land use control: A case study. *Agriculture and Resource Economics Review* 28 (1): 44-56.

Medler, J. and Mushkatel, A. 1979. Urban-rural class conflict in Oregon land use planning. *The Western Political Quarterly* 32 (3): 338-349.

Molotch, H. 1976. The city as a growth machine: Toward a political economy of place. *American Journal of Sociology* 82 (2): 309-332.

Neiman, M. and Loveridge, R. 1981. Environmentalism and local growth control: A probe into the class bias thesis. *Environment and Behavior* 13 (6): 759-772.

Porter, D. 2008. *Managing Growth in America's Communities*. Washington, DC: Island Press.

Sage Computing. 2009. *Revitalizing Foreclosed Properties with Land Banks*. Washington, DC: United States Department of Housing and Urban Development.

Snijders, T. and Bosker, R. 1999. *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. Thousand Oaks, CA: Sage.

United States Bureau of the Census. 2013. *State & County QuickFacts*. http://quickfacts.census.gov/qfd/index.html.

Voss, P. 1980. A test of the 'gangplank syndrome' among recent migrants to the Upper Great Lakes Region. *Journal of the Community Development Society* 11 (1): 95-111.

Wassmer, R. and Lascher, E. 2006. Who supports local growth and regional planning to deal with its consequences. *Urban Affairs Review* 41 (5): 621-645.