Deerfield Township
Multi-Unit Housing Analysis

Prepared For
Deerfield Township

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EconomicsCenter

University of Cincinnati

Deerfield Township Multi-Unit Housing Analysis

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EXECUTIVE SUMMARY

I. Purpose

Deerfield Township is home to 37,000 residents occupying more than 13,000 households which range from Single-family dwellings to condominium homes. The Township has partnered with the Economics Center to explore the fiscal impact of various housing types on the community. Based on this research, Deerfield Township will be able to better plan for a growing or transformative housing stock and be able to take into account varying levels of public service use (police, fire and EMT, and roadways) by housing type.

II. Literature Review

The Economics Center identified three types of literature to review: fiscal impact; community attitudes; and home owners versus renters. The research on fiscal impact was heavily used in creating the revenue and expenditure tables for the entire Township. Additionally, much of the 2013 Comprehensive Annual Financial Review was used to provide baseline levels of revenue and expenditure. Next, research on community attitudes and opposition to Multi-unit was used to better understand the qualitative and ineffable aspects of owners and renters. Similarly, owners and renter research was used to guide the qualitative research on Single-family and Multi-unit. This owners and renters research was focused on explaining the differences in expenditure and service needs of owners and renters. There is an extended version of the literature review within the Appendix.

III. Government Impacts

The fiscal impacts of Multi-unit and Single-family homes come primarily from the property taxes generated by the assessed value of the units. Within Deerfield Township, the average Single-family home is worth more than twice of the value of a Multi-unit home.[1] However, between the two types, the public service consumption levels for Single-family homes are 50 percent higher for police, and road and bridges maintenance. Differences in fire and EMT reliance between the two housing designations are not significant.

The point at which Multi-unit housing's tax revenue equals cost for police, fire, and road maintenance for a Multi-unit home is approximately $94,000 in real property value, whereas a Single-family home is approximately $120,000. Additionally, the fiscal impact to local school districts is likely to be less for a Multi-unit construction project than for a Single-family home project.

[1] This comparison is tentative based upon expanding the sample size for Multi-unit homes.

IV. Residential Impacts

In year 2000, Deerfield Township had 9,667 housing units and is projected to have at least 15,000 in 2020. Further, the percent of renter-occupied housing increased from almost 20 percent to nearly 30 percent. Vacancy rates have been stable at approximately five percent. The Economics Center estimates that the increases in population will be primarily in the 24-39 and 55+ age cohorts. This will result in a decrease in enrollment of approximately 285 school-aged children (age 5-19) from between the years 2015 and 2020.

PURPOSE

Deerfield Township, located along a large commuter corridor, Interstate 71, is home to more than 37,000 residents and over 13,000 households. The Township has had high-quality schools for years and hosts large businesses such as Anthem and Macy's. The first-class Deerfield Towne Center is a bustling retail location.

The existing housing stock in the Township offers a wide range of options including Single-family subdivisions, condominiums, and apartments. The purpose of this report is to explore the fiscal impacts of Multi-unit housing on the community. Additionally, the Economics Center will be providing detailed a breakdown of services such as police, fire and Emergency Medical Services (EMS), and roadway maintenance based on differing patterns of consumption for Single-family and Multi-unit homes.

Ultimately, Deerfield Township will be able to fully understand the fiscal impacts of housing developments within their community and be able to better predict the impact of a growing or changing housing stock.

The Economics Center identified three types of literature to review: fiscal impact; community attitudes; and home owners versus renters. The research on fiscal impact was heavily used in creating the revenue and expenditure tables for the entire Township. Additionally, much of the 2013 Comprehensive Annual Financial Review was used to provide baseline levels of revenue and expenditure. Next, research on community attitudes and opposition to Multi-unit was used to better understand the qualitative and ineffable aspects of owners and renters. Similarly, owners and renter research was used to guide the qualitative research on Single-family and Multi-unit. This owners and renters research was focused on explaining the differences in expenditure and service needs of owners and renters. There is an extended version of the literature review within the Appendix.

I. FISCAL IMPACT

Two main sources of research were used in developing the Economic Center's approach to quantify the fiscal impacts of housing development and service demands of different housing designations.

The first examines various methods that can be used to conduct a fiscal impact analysis of a community development project on a government's revenues and expenditures. It provides a general review of several studies that have assessed trends in community development and how these trends impact government budgets at the local, state, and national levels. More importantly, this report closely examines commonly utilized methods of conducting a fiscal impact analysis. Such methods fall under two categories: the average-cost approach and the marginal-cost approach. The average-cost approach analyzes the per-unit costs of development whereas the marginal-cost approach analyzes the next-unit costs of development. The average-cost approach is an easier method to apply since it derives costs and revenues by multiplying the average cost per unit by the demand for that unit. The marginal-cost approach is more time consuming and nuanced since it derives costs and revenues by assessing a specific jurisdiction's capital and how its capital would be impacted by community developments. Although the marginal cost approach yields higher cost estimates for short-term analyses, cost estimates for long-run analyses are similar for both approaches (Mix & Hurley, 2008).

The second resource described a fiscal impact tool, or a method to stepwise calculate the costs and revenues prior to and after development takes place. The first step calculates the number of new residents in a new development by multiplying the

number of dwelling units of the development by the number of people per dwelling unit. The second step requires listing all of a government's expenditures. The third step uses parcel data as well as land value data to calculate the estimated share of costs and revenues generated exclusively by residents. This share ratio is then applied to each government expenditure category to yield all of the residentially-associated costs. The fourth step uses population data in addition to the cost data from step three to determine residentially associated government expenditures per capita. The fifth step estimates the total residential costs of a new development by multiplying the per-capita costs generated in the fourth step by the new development's population. The sixth step requires listing all of a government's revenues and their respective sources. The seventh step applies the ratio generated in step three to each government revenue category, excluding property taxes, to yield all of the residentially associated revenues. Per-capita revenues are then determined. Step eight calculates the property tax revenue of a new development by multiplying the property value of the development by the local property tax rate. Total revenues are calculated by adding the development's property tax revenue to the product of per-capita revenues and the new development's population. The ninth and final step calculates the net fiscal impact of a new development by subtracting government expenditures generated by the new development from government revenues generated by the new development (Edwards, 2000).

II. COMMUNITY ATTITUDES

Community attitudes must be taken into account when considering the development the Multi-unit dwellings. There are many common arguments made against developing Multi-unit housing in communities with primarily single-family dwellings.

The first source that the Economics Center looked at is from the Harvard University Joint Center for Housing Studies. Opponents of Multi-unit housing developments argue that such developments reduce property values of single-unit homes in the community. Contrary to this belief, evidence provided by two different studies has supported the argument that Multi-unit housing has a neutral or positive impact on local single-unit housing property values. The first study concluded that "working communities with multifamily dwellings actually have higher property values than other types of working communities" (Obrinsky & Stein, 2007). The other study concluded that "houses with apartments nearby actually enjoy a slightly higher appreciation rate than houses that don't have apartments nearby" (Obrinsky & Stein, 2007).

A primary concern among members of predominantly single-unit housing communities is that apartments burden local school systems. Specifically, they fear that apartment complexes consist of more school-age children than do single-unit homes. They believe that as a result, the increase in demand for public school services strains school budgets and thus lowers the quality of education for all students. Contrary to this widely held belief, "100 single-family owner-occupied houses include 51 school-age children" and "100 apartment units average just 31 children" (Obrinsky & Stein, 2007). Furthermore, the publication claims that apartment complexes typically generate higher property tax revenue than do single-unit homes and therefore contribute more to local schools.

The Economics Center also used a study completed by the MIT Center for Real Estate. This examines the relationship between Multi-unit rental density and surrounding single-unit home property values over time. The study concentrated on the following communities close to Boston: Littleton, Mansfield, Norwood, Randolph, Wilmington, and Woburn. These communities were selected because their local zoning rules conflicted with Massachusetts' affordability criteria. Under such circumstances, developers that have obtained special permits have the opportunity to override local zoning rules and construct mixed income Multi-unit developments. This often raises fears in homeowners that such overrides will have a negative impact on their property values. In conducting this study, single-family price changes over time were tracked before, during, and after the development of Multi-unit housing in the community. This was accomplished by estimating impact areas, applying hedonic modeling, and using a control area for comparison. It was concluded that high-density Multi-unit housing developments had no impact on property values in single-family housing communities (Pollakowski, Ritchay, & Weinrobe, 2005).

III. HOME OWNERS AND TENANTS

Lastly, the Economics Center researched differences in local expenditures, property taxation, and the correlated effects of Single-family dwellings and proximity to Multi-unit dwellings.

It has become evident through various studies that most of the fiscal impacts that Multi-unit housing developments have on local communities are primarily positive. For example, a study conducted by Dorothy Ives-Dewey from West Chester University found that positive fiscal deficits are positively correlated with increased apartment activities. This same study shows that as apartment values increase, the tax burden per household tends to decrease. Another study conducted by the Bureau of Labor Statistics found that

both homeowner and renter expenditures on apparel services and food decreased from 1986 to 2010; however this expenditure decrease was far less drastic for renters.

Despite the fact that Multi-unit housing generates several positive effects on local communities, residents neighboring such developments often raise concerns or may even be opposed to the development of Multi-unit housing altogether. There are several reasons why local residents would raise these concerns. One of the most common arguments made in opposition to developing Multi-unit housing is that such developments may cause surrounding property values to decrease. Although such a concern is understandable, a study published in the *Journal of Urban and Regional Analysis* found that there exists "no statistically significant negative associations between multifamily housing and single-family property selling prices" in a sample collected from a community in Tallahassee, Florida (Gibson, et al 77).

Another cause for opposition that local residents may raise concerns what is known as the renter effect. The renter effect is a phenomenon wherein renters vote in favor of property tax increases since they believe that they do not directly pay property taxes. Resulting property tax increases would yield inefficient increases in public service provisions. Studies have found that the renter effect varies among communities. While this theory may seem logical, a study published in *Regional Science and Urban Economics* suggests that the renter effect may be illusory. This is based on evidence indicating that renters may not know whether or not they pay property taxes, and "that homeowner aversion to the property tax is associated with the higher salience of the property tax" (Brunner, et al 48).

GOVERNMENT IMPACTS

I. TAX REVENUE

Deerfield Township's primary source of revenue is through property taxes. These taxes go to support the Township's general fund, road and bridge construction and maintenance, police, fire and EMS, and park services. The Economics Center used a number of sources to calculate the estimated value of property for both Multi-unit and Single-family homes.

The calculations below are strictly for Multi-unit and Single-family housing options. Two blueprints of Deerfield Township were created—one with one unit attached garages and one unit detached garages and the other with Multi-units from two-plus to twenty-plus units per structure.

These blueprints were then combined with the U. S. Census data, auditor's property assessments, and commercial real estate data to create an average price per unit.

Table 1

Average, Estimated, and Total Assessed Value of Multi-unit and Single-family Homes

	Housing Units	Average Price per Unit*	Estimated Actual Value	Assessed Value (35%)
Multi-unit	3,675	$ 62,235	$ 228,715,107	$ 80,050,287
Single-family	9,755	$224,258	$2,187,636,790	$765,672,877
TOTAL	13,430	$179,922	$2,416,351,897	$845,723,164

***Average Price differs from Census due to a limited sample of Multi-unit house prices.**
See Tables 10 and 11 for comparisons of property value to Cost-of-service contributions

The difference in the average price per unit between Multi-unit and Single-family home is significant. The estimated actual value of Multi-unit properties in Deerfield is approximately $225 million, whereas Single-family homes account for over $2 billion in estimated actual values. The assessed value of real estate in Deerfield Township is approximately 35 percent of the estimated actual value.

The table below shows the most recent Comprehensive Annual Financial Report (CAFR) breakdown for the 2013 tax millage. These numbers represent how many dollars per $1,000 of assessed value any one property is responsible for. For example, a property with an assessed value of $100,000 is responsible for $1,410 (14.1 x 100) of property taxes annually.

Table 2

2013 Millage, Per $1,000 of Assessed Valuation	
Direct Rates	Millage
General Fund	0.86
Road and Bridge	1.44
Police	4.00
Fire	6.80
Park	1.00
Total	14.1

Based on the assessed values for Multi-unit and Single-family homes in Deerfield, below is a detailed view of how each property type contributes to the fiscal well-being of the community. Multi-unit properties, despite comprising 27 percent of all housing units in the Township, contribute only 10 percent of its overall property tax revenue[2].

Table 3

Total Property Tax Contributions by Housing Type		
	Multi-unit	Single-family
General Fund	$ 68,843	$ 658,479
Road and Bridge	$ 115,272	$ 1,102,569
Police	$ 320,201	$ 3,062,692
Fire	$ 544,342	$ 5,206,576
Park	$ 80,050	$ 765,673
Total	$1,128,709	$ 10,795,988

In addition to the total contributions of property tax by the type of property, a helpful example to further understand the impact of individual housing units is in Table 4. The per unit property tax contributions are predominantly based on the average assessed value per unit. While each Single-family home is contributing $1,107 per year, on average, to the total Deerfield Township tax revenue, by comparison, Multi-unit units are contributing $307, on average.

Table 4

Per Unit Property Tax Contributions by Housing Type		
	Multi-unit	Single-family
General Fund	$19	$68
Road and Bridge	$31	$113
Police	$87	$314
Fire	$148	$534
Park	$22	$78
Total	$307	$1,107

[2] This is tentative considering the limited sample of Multi-unit dwellings used in creating the average assessed values per unit.

II. TOWNSHIP SERVICES

Township services such as police, fire, and roadway maintenance are consumed by all individuals and households within Deerfield Township. However, the average level of service consumed may differ between Single-family and Multi-unit homes. At the same time, the level of Township's residential tax revenue differs within housing unit designations, including for median prices when comparing Multi-unit and Single-family homes.

Police and Fire geographic information systems (GIS) data was used to calculate the number of runs to both residential types. Each service was mapped with locations of the destinations. Then, those geographic points were overlaid onto a map of the single-family and Multi-unit residential zoning layers and automated counts were taken. Any calls that were on public easements or roadways were removed to ensure that calls were accurately and consistently attributed to only dwellings.

Table 5 shows the total number of Deerfield households within both residential types with their respective number of annual police and fire runs. There were considerably more total police runs assisting Single-family home residents relative to the total household count than for Multi-unit residents.[3] The level of fire calls to Single-family and Multi-unit homes is consistent with the household count in each of these two designations.

Table 5

Residential Service Calls by Household Type			
	Households	**Police runs**	**Fire runs**
Multi-unit	3,675	1,718	457
Single-family	9,755	9,332	1,204

Surprisingly, the most often visited individual property by Deerfield police was a Single-family home, not a Multi-unit complex. The top-ten most visited Single-family homes all had more police visits than the top most visited Multi-unit home. This is due to a large number of home visits being completed for "Vacation Property Checks." The Single-

[3] While Single-family homes comprise 72 percent of all housing-units, single-family homes comprise nearly 85 percent of all police calls.

family home with the most annual police runs had 106 visits, whereas the most visited Multi-unit had 56 visits.

The costs per residential fire and police service were calculated by taking the total expenditure for police and fire and dividing that by the number of runs. The expenditure data are from the 2013 CAFR and adjusted to 2015 dollars.

Table 6

Cost per Residential Service Run by Service			
	2015 Expenditures*	Number of residential runs	Cost per Run
Police	$ 1,857,883	11,050	$ 168.13
Fire	$ 3,528,496	1,661	$ 2,124.32
			***Estimated from 2013 CAFR and adjusted for inflation**

Next, the Economics Center calculated the per capita and per household expenses. The per household expense will be used to compare the total revenues and expenditures of different housing designations. Below are two tables detailing the total expenditures for police and fire service by household type.

Table 7

Police Expenses per Capita and Household for Multi-unit and Single-family Homes					
Household Type	Total Expenditure*	Population	Per capita Expense	Household Size	Expense per HHLD
Multi-unit	$ 288,854.51	7,754	$37.25	2.11	$ 78.60
Single-family	$1,569,028.10	29,558	$53.08	3.03	$160.84
					***Estimated from 2013 CAFR and adjusted for inflation**

The police expense per household is calculated by taking the number of police runs for each type of residential property visited, multiplied by the per run cost. The totals are calculated based on the numbers of households, not the population. Instead, the population and household size (people per dwelling) is also listed to potentially offer insights into the differences in the expenses. Whereas Multi-unit homes have an average of 2.11 persons per dwelling, Single-family homes have 3.03 people. This may explain the greater utilization of police services for Single-family homes.

Below is a table detailing the use of fire and EMS services per capita and household. The same methodology used to calculate police service costs were used in this calculation.

Table 8

Fire/EMS Expenses per Capita and Household for Multi-unit and Single-family Homes					
Household Type	Total Expenditure *	Population	Per capita Expense	Household Size	Expense per HHLD
Multi-unit	$970,814.39	7,754	$125.20	2.11	$264.17
Single-family	$2,557,681.67	29,558	$86.53	3.03	$262.19

***Estimated from 2013 CAFR and adjusted for inflation**

Lastly, the Economics Center calculated the costs to Multi-unit and Single-family homes by estimating the total residential responsibility for roadways; this value is then appropriated relative to calculated use between the two housing designations. A significant amount of research by Fehr and Peers, a leading transportation planning firm, enabled the Economics Center to better estimate differences in daily trips between Multi-unit housing and Single-family homes. The Economics Center used a standard 8.11 miles per trip, due to the nature of Multi-unit housing in Deerfield Township being relatively consistent with location and building density of Single-family homes.

Table 9 shows the detailed breakdown of unit count, daily trips, vehicle miles traveled (VMT), and the total, as well as per unit costs.

Table 9

Road and Bridge Vehicle Miles Traveled (VMT) Calculation by Type of Housing				
		Multi-unit		Single-family
Unit count		3,675		9,755
Daily Trips		6.51		9.57
Vehicle miles per trip		8.11		8.11
Total VMT		194,084		757,112
Share of VMT		20.4%		79.6%
Total Dollars liability	$	220,200	$	906,655
Dollars per unit	$	60	$	93

Single-family homes are responsible for around 50 percent more of the expenditures to roads than are Multi-unit homes. This is due to Single-family households generally taking more trips per day for to a number of reasons, including household population, density, walkability to commercial services, and a wider array of household demands.

Table 10 summarizes composite revenue and expenditure figures based on the previous estimates detailing road and bridge, police, and fire services. The Multi-unit housing

type is estimated to be costing Deerfield Township approximately $137 per unit per year for these three service types.

Table 10

Per Unit Property Tax Revenue and Expenditures by Housing Type						
	Multi-unit			Single-family		
	Revenue	Expenditure	Net	Revenue	Expenditure	Net
Road and Bridge	$ 31	$ 60	$ (29)	$ 113	$ 93	$ 20
Police	$ 87	$ 79	$ 8	$ 314	$ 161	$ 153
Fire	$ 148	$ 264	$(116)	$ 534	$ 262	$ 272
Total	$ 266	$ 403	$(137)	$ 961	$ 516	$ 445

The Economics Center also calculated a top market rate assessed value calculation for all cost-of-services. Using a number of recent and high-end multi-unit developments, the average value of an apartment unit is approximately $115,000, compared to the spatially calculated $62,000. This increase of over $50,000 had a substantial effect on multi-unit development's ability to cover their cost-of-services. In particular, multi-unit dwellings were only covering their cost to police whereas they had a net loss of $145 between fire and road and bridge.

Table 11

Per Unit Property Tax Revenue and Expenditures by Housing Type						
	Multi-unit			Single-family		
	Revenue	Expenditure	Net	Revenue	Expenditure	Net
Road and Bridge	$ 58	$ 60	$ (2)	$ 113	$ 93	$ 20
Police	$ 161	$ 79	$ 82	$ 314	$ 161	$153
Fire	$ 273	$ 264	$ 9	$ 534	$ 262	$272
Total	$ 492	$ 403	$ 89	$ 961	$ 516	$445

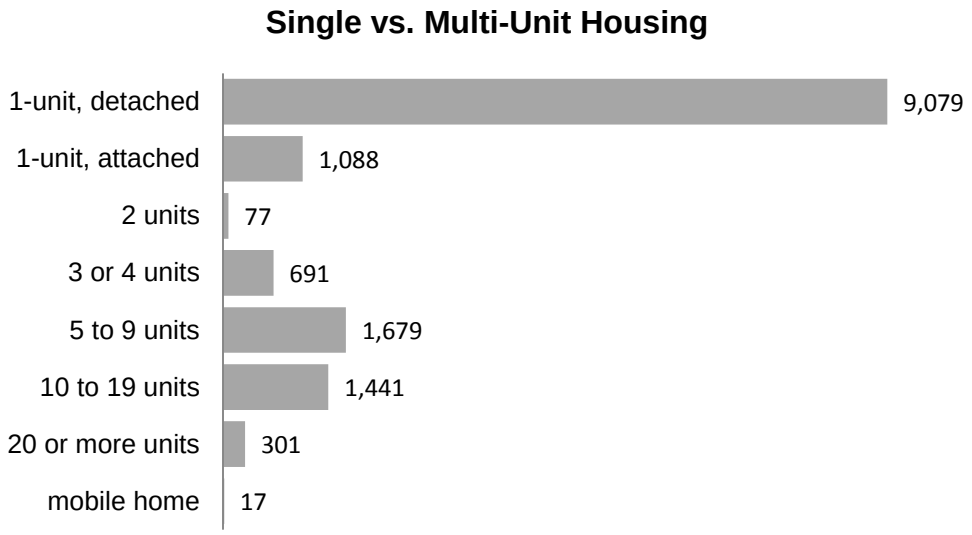
Table 11 shows the updated cost-of-service payment abilities of multi-unit housing. While multi-unit dwellings are still in a $2 deficit with road and bridge usage, their net fiscal impact is a positive $89, a change of $226 dollars between the two assessed value differences ($62,000 and $115,000).

I. TENANT PROFILE

Based upon the current tenant profile, the Economics Center was able to create a profile of tenants in order to predict the likely demographics of future residents, should additional Multi-unit housing be developed.

According to the U.S. Census Bureau, 29.2 percent of Deerfield Township's residents live in Multi-family housing units, while 70.8 percent reside in Single-family homes. These numbers can be broken down further to determine which type, large or small, of Multi-unit housing are the most populated.

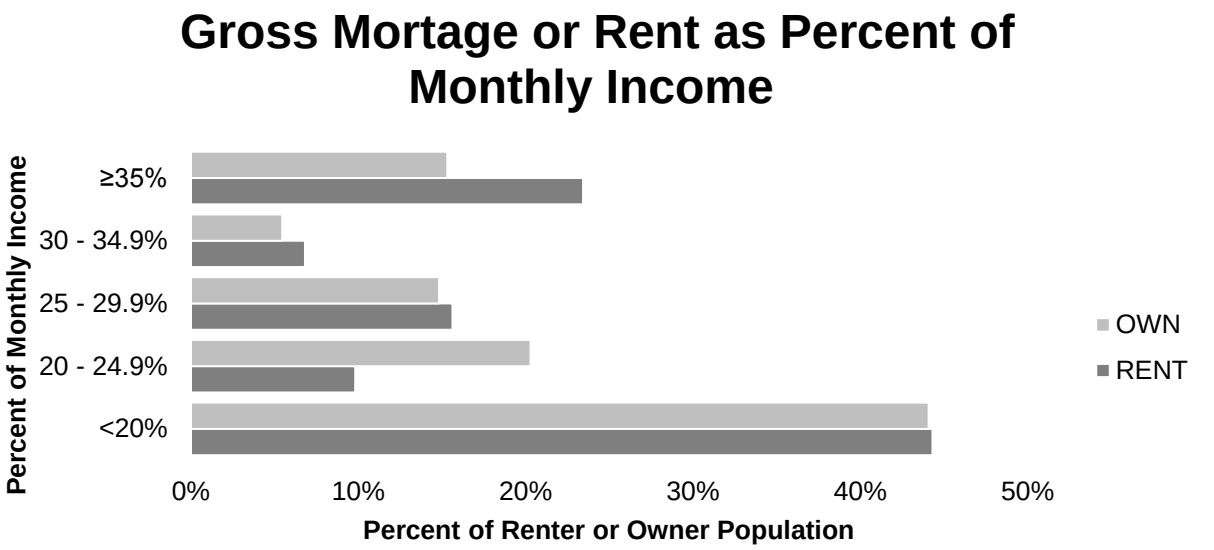
Figure 1



Of the 4,206 Multi-units, 74.18 percent of the residents live in the mid to large range Multi-family units, with 39.92 percent living in the 5 to 9 units, and 34.26 percent living in the 10 to 19 units.

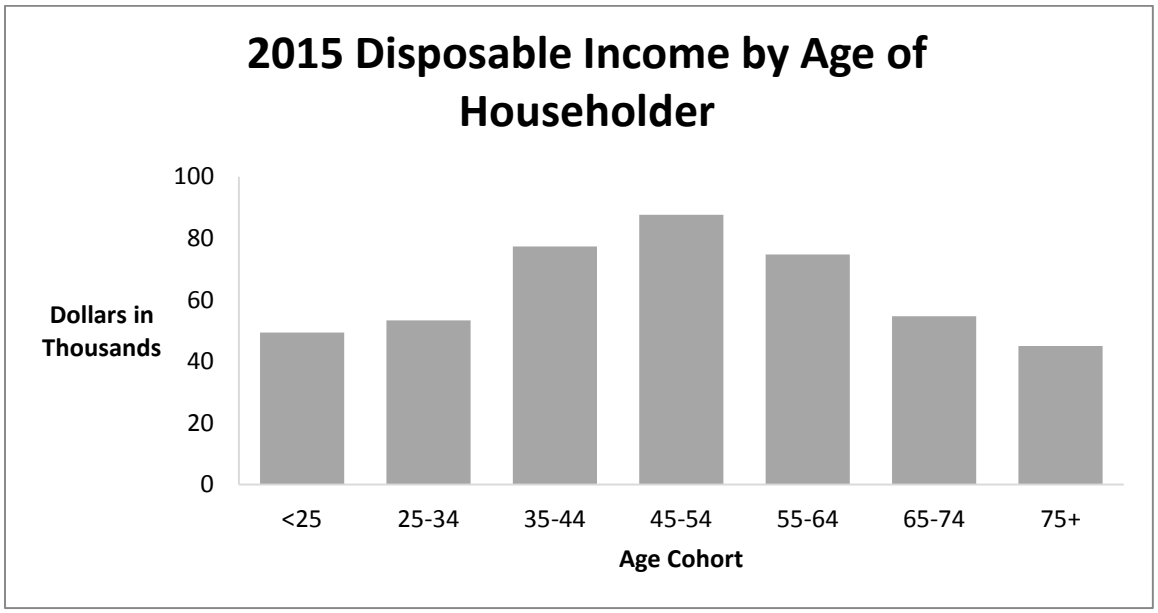
Assuming the majority of the renter population is made up of Multi-family housing units, 3,640 of the 4,206 Multi-unit residents are renters. Roughly, 950 residents of Deerfield Township are home-owners with a monthly mortgage. Of those, 44.1 percent of home-owners have a monthly mortgage cost of less than 20 percent of their household income. Similarly, 44.3 percent of renters have a monthly gross rent cost of less than 20 percent of their household income. However, 23.4 percent of renters have a gross rent of more than 35 percent of their household income compared to 15.3 percent of home owners and mortgages.

Figure 2



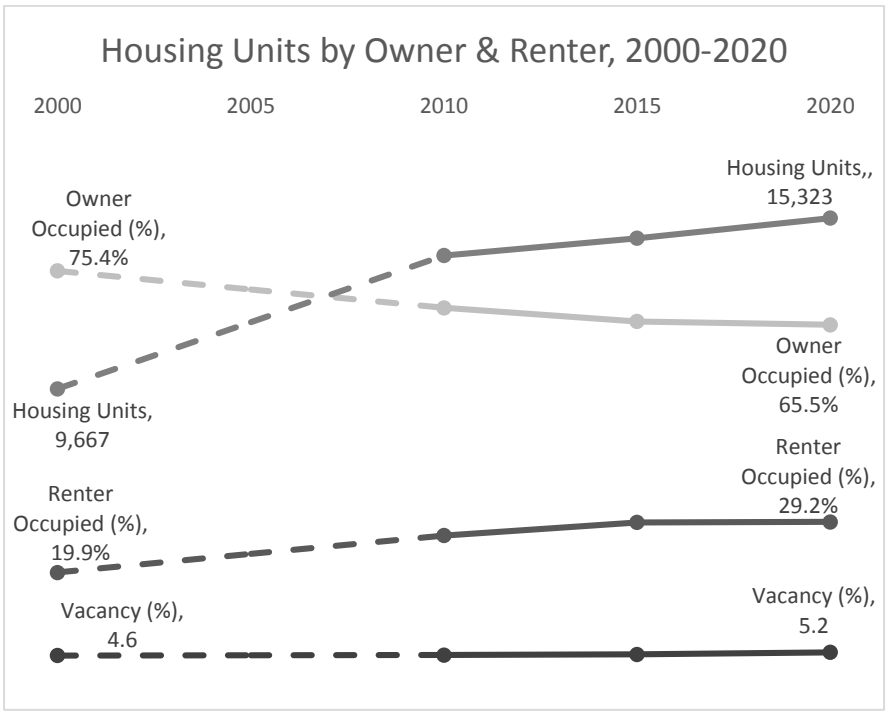
The discrepancy in home-owners who incur over35 percent of their monthly income on housing costs versus renters may be a good indicator as to which population has a higher disposable income. Having a gross rent of more than 35 percent of household income may leave one strapped for money, meaning one is less likely to spend more in the local community, such as shopping or dining out. With younger people putting off buying their first house, it may mean that the majority of renters in Deerfield Township are in this younger population. With this is mind, the Economics Center was able to compare the 2015 disposable income by age of householder. According to Environmental Systems Research Institute (ESRI), the age group with the highest median disposable income are 45-54 year olds, at $87,696. Conversely, and as noted below, the age group with the lowest disposable income is the 75+ age group at $44,977, followed by the <25 age group, $49,409.

Figure 3



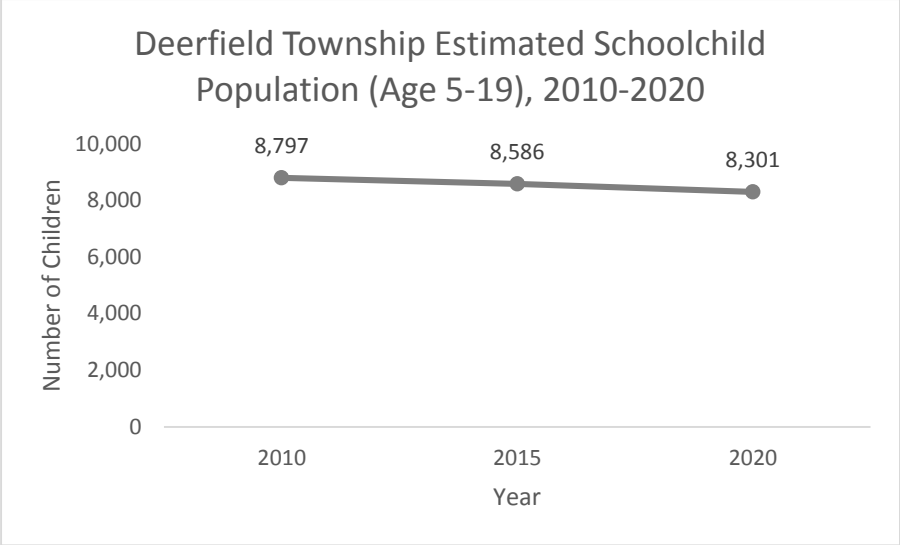
As shown in Figure 3, the percentage of renter-occupied housing units has increased greatly since 2000 and, according to ESRI, is expected to level off by 2020 (from 19.9 percent to 29.2 percent). However, it is not clear whether this leveling off can be attributed to a lack of interest in Multi-unit family housing, or to a shortage of Multi-unit availability. The number of housing units will have increased from 9,667 in 2000 to an estimated 15,323 in 2020. Lastly, the percent of vacant housing units has remained relatively stable, from 4.6 percent in 2000 to an estimated 5.2 percent in 2020.

Figure 4 – Data is interpolated from 2000-2010, the dotted line may not reflect five-year changes



The population of Deerfield Township is predicted to increase to 38,806 residents by 2020. The largest population increase is expected in the 25-39 age group, as well as in the 55+ age group. There is also an expected decrease in the <24 age group, and in the 40-54 age group. The precise estimates of the given age groups can be found in the appendix. Given these numbers, the Economics Center was able to calculate an approximate decrease in school-aged children (5-19 years old) from 2015 to 2020 of 285 students.

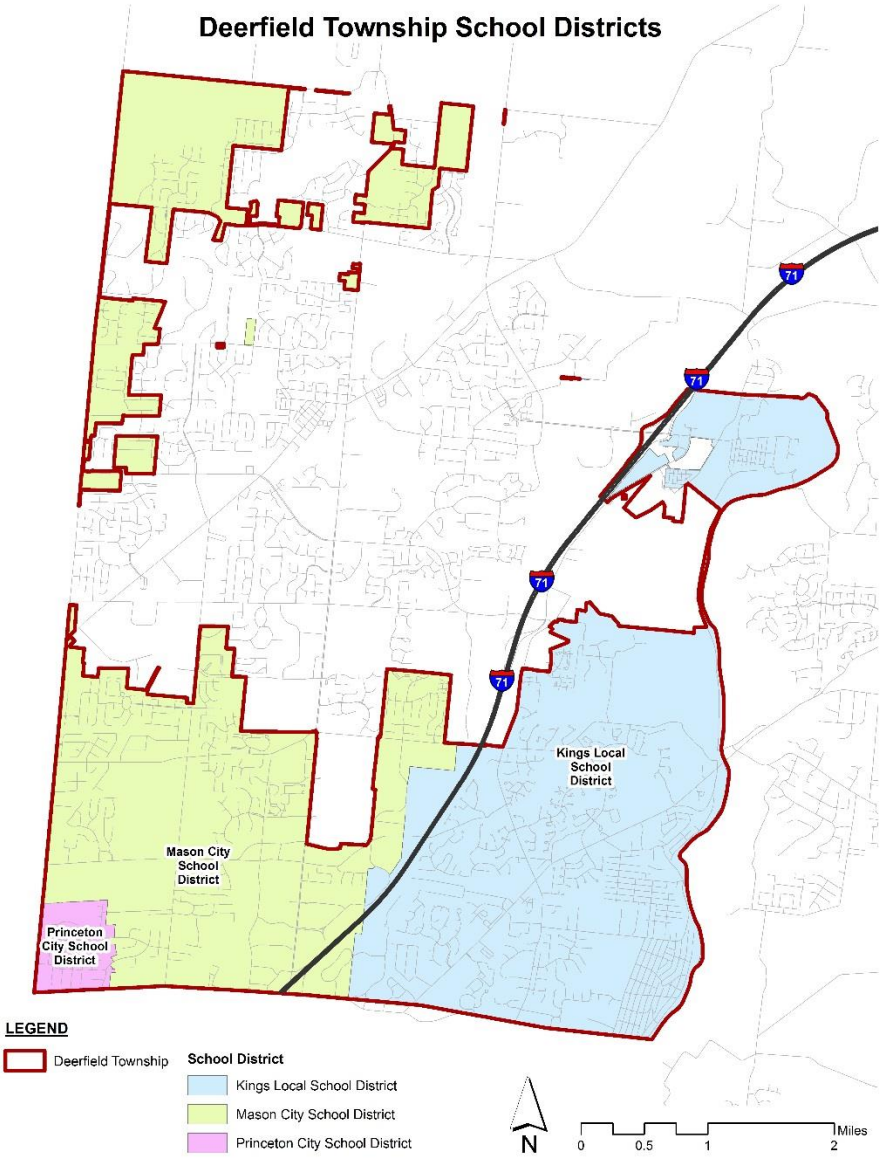
Figure 5



II. PUBLIC SCHOOL SYSTEM

The predominant schools in Deerfield Township are Mason City and Kings Local, with a total population of 10,604 and 4,059 in 2015, respectively. Mason City and Kings Local school budgets appropriate $9,344 and $9,489 of annual spending respectively, per pupil. The map below shows Deerfield Township and the school districts. The main dividing line of Kings Local School District and Mason City School District is I-71.

Figure 6



In the 2013-14 school year, Mason City School District had its lowest tax levy rate in history of $11.45 (per $1,000 assessed valuation). Since then, it has risen to $13.20.

According to Mason City, the school district is in need of a higher tax levy for the 2015-16 school year due to an increase in students with special needs.

Tables 12 and 13 show the millage revenue for both school districts in 2013. These totals include State, Federal, and other revenue streams.

Table 12

Mason City School District Millage Revenue 2013			
Source of Funds	District	Number of Students	Cost Per Pupil
Local	$51,091,690		$4,758.47
State	$43,243,200		$4,027.49
Federal	$2,416,471	10,737	$225.06
Other Non-Tax	$10,528,836		$980.61
Total	$107,280,197		$9,991.64

Table 13

Kings Local School District Millage Revenue 2013			
Source of Funds	District	Number of Students	Cost Per Pupil
Local	$23,964,786		$5,763.54
State	$13,338,851		$3,208.00
Federal	$1,398,247	4,158	$336.28
Other Non-Tax	$4,634,275		$1,114.54
Total	$43,336,159		$10,422.36

In 2013, the millage for the local purpose (not gross or effective) school districts were 83.97 for Mason City and 71.33 for Kings Local. Based on these numbers, and assuming that the 285 new students are divided based relatively on school size (80 students at Kings Local and 205 at Mason City), there will be a reduction of $1.4 million in expected costs. At the same time, the taxable property values will likely increase, especially based on the growth patterns of the 25-39 and 55+ age cohorts.

Based on research by the Harvard Joint Center for Housing Studies, the number of school-aged children residing in Single-family homes and Multi-family units is not the same. Whereas there are approximately 51 children per 100 Single-family households, there are only 31 children per 100 Multi-family units (Obrinksy and Stein, 5).

The Economics Center assumed the total number of potential new dwelling units would be similar regardless of dwelling type. Table 14 shows the impact of education based on the data used above to calculate police, fire, and road service expenditures and revenues. The Economics Center calculated the impact on education service revenue

and expenditure based on a 227-unit development. This development estimate was used due to the average number of units in Multi-unit dwellings in Deerfield and the average number of homes within a Single-family subdivision.

Table 14

Revenue and Expenditure of Students Based on a 227 Unit Model Development		
	Multi-Unit	Single Family
Kings Local and Mason City Tax Revenue	$281,268.65	$969,066.54
Number of Students	70.37	115.77
Revenue per Pupil	$3,997.00	$8,370.62
Average Local Expenditure per Pupil	$5,039.00	$5,039.00
Net Per Pupil Within 227 Unit Development	($1,042.00)	$3,331.62
Net Total Per 227-unit Development	($73,325.78)	$385,701.51

These figures are again based on the $62,000 and $224,000 average dwelling unit valuation estimates for Multi-unit and Single-family dwellings, respectively. Table 16 shows the millage breakdown according to the 2013 CAFR including residential and commercial percentage reductions. Table 15 shows the expected impact of a new model development using the same $115,000 per unit expected property value as the cost of services above.

Table 15

Revenue and Expenditure of Students Based on a 227 Unit Model Development		
	Multi-Unit	Single Family
Kings Local and Mason City Tax Revenue	$521,707.98	$969,066.54
Number of Students	70.37	115.77
Revenue per Pupil	$7,413.78	$8,370.62
Average Local Expenditure per Pupil	$5,039.00	$5,039.00
Net Per Pupil Within 227 Unit Development	$2,374.78	$3,331.62
Net Total Per 227-unit Development	$167,113.55	$385,701.51

Table 16 shows the millage breakdown according to the 2013 CAFR including residential and commercial percentage reductions.

Table 16

	Mason City	Kings LSD
Single-family	55.3328	51.8373
Multi-unit	56.1552	58.8555

APPENDIX

I. Literature Review

a. Fiscal Impacts

Mix, Troy, and Rachael Hurley. Fiscal Impacts of Development: Literature Review and Discussion. Rep. Newark, DE: U of Delaware Institute for Public Administration, 2008. Web. 10 June 2015.

This report examines various methods that can be used to conduct an analysis of a fiscal impact of a community development project on a government's revenues and expenditures. It provides a general review of several studies that have assessed trends in community development and how these trends impact government budgets at the local, state, and national levels. More importantly, this report closely examines commonly utilized methods of conducting a fiscal impact analysis. Such methods fall under two categories: the average-cost approach and the marginal-cost approach. The average-cost approach analyzes the per-unit costs of development whereas the marginal-cost approach analyzes the next-unit costs of development. The average-cost approach is an easier method to apply since it derives costs and revenues by multiplying the average cost per unit by the demand for that unit. The marginal-cost approach is more time consuming and nuanced since it derives costs and revenues by assessing a specific jurisdiction's capital and how its capital would be impacted by community developments. Although the marginal cost approach yields higher cost estimates for short-term analyses, cost estimates for long-run analyses are similar for both approaches.

Both approaches can be further broken down into separate methods. The Per-Capita Multiplier Method, the Service Standard Method, and the Proportional Valuation Method fall under the average-cost approach. The Case Study Method, the Comparable City Method, and the Employee Anticipation Method fall under the marginal-cost approach. The Per-Capita Multiplier Method was deemed to be the most appropriate method to use for the Deerfield Township Multi-Unit Housing Analysis. This is the most commonly utilized average-cost method. This nine-step method breaks down a government's cost and revenue sources and determines what percentage of these costs and revenues are generated by both residential and non-residential sources. Based on this data as well as new development parameters, the costs and revenues generated by a new development are then calculated. This method assumes that current data figures are sufficient predictors for future figures. The Per-Capita Method is adequate if new

development is not expected to generate significant changes in infrastructure and service provisions.

Edwards, Mary. "Fiscal Impact Analysis." Community Guide to Development Impact Analysis. University of Wisconsin Land Information & Computer Graphics Facility, 2000. Web. 16 June 2015.

The fiscal impact analysis tool described in this guide is a version of the Per-Capita Multiplier Method. It provides some general guidance about utilizing the Per-Capita Multiplier Method. Followed by this is a thorough breakdown of the specific calculations necessary to assess a government's costs and revenues before and after a development takes place. These calculations are organized using the nine-step process described in *Fiscal Impacts of Development: Literature Review and Discussion*. The guide uses examples for every step in order to further illustrate these calculations. The first step calculates the number of new residents in a new development by multiplying the number of dwelling units of the development by the number of people per dwelling unit. The second step requires listing all of a government's expenditures. The third step uses parcel data as well as land value data to calculate the estimated share of costs and revenues generated exclusively by residents. This share ratio is then applied to each government expenditure category to yield all of the residentially associated costs. The fourth step uses population data in addition to the cost data from step three to determine residentially associated government expenditures per capita. The fifth step estimates the total residential costs of a new development by multiplying the per-capita costs generated in the fourth step by the new development's population. The sixth step requires listing all of a government's revenues and their respective sources. The seventh step applies the ratio generated in step three to each government revenue category, excluding property taxes, to yield all of the residentially associated revenues. Per-capita revenues are then determined. Step eight calculates the property tax revenue of a new development by multiplying the property value of the development by the local property tax rate. Total revenues are calculated by adding the development's property tax revenue to the product of per-capita revenues and the new development's population. The ninth and final step calculates the net fiscal impact of a new development by subtracting government expenditures generated by the new development from government revenues generated by the new development.

b. COMMUNITY ATTITUDES

Obrinsky, Mark, and Debra Stein. Overcoming Opposition to Multifamily Rental Housing. Cambridge, MA: Harvard U Joint Center for Housing Studies, 2007. Web. 8 May 2015.

This publication from Harvard University's Joint Center for Housing Studies explores common arguments made against developing Multi-unit housing in communities. It also provides counterarguments to negative attitudes toward Multi-unit housing. While some opponents to such developments stand against Multi-unit housing simply out of principle, opposition to Multi-unit housing is typically more nuanced.

A primary concern among members of predominantly single-unit housing communities is that apartments burden local school systems. Specifically, they fear that apartment complexes consist of more school-age children than do single-unit homes. They believe that as a result, the increase in demand for public school services strains school budgets and thus lowers the quality of education for all students. Contrary to this widely held belief, "100 single-family owner-occupied houses include 51 school-age children" and "100 apartment units average just 31 children" (5). Furthermore, the publication claims that apartment complexes typically generate higher property tax revenue than do single-unit homes and therefore contribute more to local schools.

Another concern that opponents of Multi-unit housing development have is that such developments may have a negative impact on various local infrastructure services. Specifically, they fear that building apartments will exacerbate traffic congestion and parking issues. The counterargument to this is that on average, single-unit homeowners have more cars than do apartment renters. Additionally, single-unit homeowners utilize their cars more often. One explanation for this is that single-unit homeowners tend to live farther away from shopping centers, areas of employment, and public transportation access points. This increased car utilization from single-unit homeowners increases the demand for parking services.

Opponents of Multi-unit housing developments also argue that such developments reduce property values of single-unit homes in the community. Contrary to this belief, evidence provided by two different studies has supported the argument that Multi-unit housing has a neutral or positive impact on local single-unit housing property values. The first study concluded that "working communities with multifamily dwellings actually have higher property values than other types of working communities" (10). The other

study concluded that "houses with apartments nearby actually enjoy a slightly higher appreciation rate than houses that don't have apartments nearby" (10).

The final argument often cited by opponents of Multi-unit housing developments is that residents of such developments are more likely to be antisocial and participate in criminal activities. According to a research survey conducted on behalf of the National Multi Housing Council, only 47% of apartment tenants regularly vote in elections whereas 78% of single-unit homeowners regularly vote (14). Furthermore, apartment tenants are less likely to "attend religious services at least once a month" and "feel close to the neighborhood they live in" (13-14). The survey also found that apartment tenants and single-unit homeowners were about equally likely "to be involved in structured social groups like sports teams, book clubs, and the like"; "identify closely with the town or city they live in"; and have an interest in politics (13-14). Regarding the correlation between apartment occupation and criminal activity, GIS analyses have not found any connection between housing density and crime rates. In summary, most of the fears that homeowners have toward Multi-unit housing development are misplaced.

Pollakowski, Henry O., David Ritchay, and Zoe Weinrobe. Effects of Mixed-Income, Multi-Family Rental Housing Developments on Single-Family Housing Values. Publication. MIT Center for Real Estate, Apr. 2005. Web. 19 June 2015.

This study conducted by MIT's Center for Real Estate examines the relationship between Multi-unit rental density and surrounding single-unit home property values over time. The study concentrated on the following communities close to Boston: Littleton, Mansfield, Norwood, Randolph, Wilmington, and Woburn. These communities were selected because their local zoning rules conflicted with the state's affordability criteria. Under such circumstances, developers that have obtained special permits have the opportunity to override local zoning rules and construct mixed income Multi-unit developments. This often raises fears in homeowners that such overrides will have a negative impact on their property values. In conducting this study, single-family price changes over time were tracked before, during, and after the development of Multi-unit housing in the community. This was accomplished by estimating impact areas, applying hedonic modeling, and using a control area for comparison. It was concluded that high-density Multi-unit housing developments had no impact on property values in single-family housing communities.

Reichenberger, Adam. "A Comparison of 25 Years of Consumer Expenditures by Homeowners and Renters." Beyond the Numbers 1.15 (2012): 1-8. Oct. 2012. Web. 22 June 2015.

The purpose of this article from the Bureau of Labor Statistics is to compare the expenditure patterns of homeowners and renters from 1986 to 2010. The data which the Bureau relied upon to make such a comparison came from the Consumer Expenditure Survey. According to the Survey, homeowners made up 62% of the consumer units sampled in 1986 whereas renters made up 38%. From 1986 to 2010, the number of homeowners increased by 36% and the number of renters increased by 17%. Over the span of 25 years, the dollar amount of expenditures from homeowners and renters has remained relatively constant; however, both homeowners and renters have changed how they allocate their expenditures. By 2010, both groups were spending more on "housing, personal insurance and pensions, and healthcare while decreasing the shares spent on transportation, food, and apparel and apparel services" (3). While homeowners spent more money on housing expenditures, renters spent a greater percentage of their income on housing. Over the years, the percentage of income that homeowners and renters pay for housing expenditures has increased. This trend has had a greater impact on renters than on homeowners since "owners increased their share of expenditures on housing from 30 percent in 1986 to 33 percent in 2010, and renters made the jump from 33 percent in 1986 to 38 percent in 2010" (4). Additionally, homeowners were spending more on entertainment in 2010 than in 1986 whereas renters reduced their spending on entertainment from 2010 to 1986. Although both groups decreased their expenditures on apparel and apparel services, the expenditure decrease was far more drastic for homeowners than for renters. A similar trend can be observed for expenditures on food prepared and consumed at home.

Oates, Wallace E. "Property Taxation and Local Public Spending: The Renter Effect." Journal of Urban Economics (2005): 419-431. Science Direct. Elsevier Inc., 16 Jan. 2005. Web. 29 June 2015.

The purpose of this study was to determine the typical size of the renter effect in local communities. The renter effect simply refers to the phenomena wherein a local community spends more on local public services as the number of renters in the community increases. Renters may think that they do not have to pay property taxes since this burden is often borne by the landlord. This gives renters the incentive to vote in favor of increasing local government budgets thus resulting in an inefficient increase

in the provision of public services. Measuring the renter effect typically entails building an econometric model wherein the dependent variable is public expenditures and the independent variables include population, the tax-price of the median voter, the income of the median voter, and the percentage of residents that are homeowners. The value that is derived to represent the renter effect actually represents "the implied percentage decrease in spending that would occur if all renters were to become home-owners" in the observed community (422). This study reviewed several other studies that measured the size of the renter effect on local community budgets. The renter effect varies widely from community to community according to these findings. The renter effect ranged anywhere from 7 percent to over 40 percent.

Pendall, Rolf. "Opposition to Housing NIMBY and Beyond." Urban Affairs Review 35.1 (1999): 112-36. Sage Journals. Sage Publications, Inc. Web. 29 June 2015.

For this study, a logit analysis was performed in order to identify the various reasons why people would be opposed to renter-occupied housing developments in the San Francisco Bay Area. Often, opponents of such housing developments are labeled as part of the "Not in My Backyard" or NIMBY movement which "connotes a selfish desire to abdicate responsibility for important community facilities" (112). The purpose of this study is to prove that this is an oversimplification of housing development opposition. To accomplish this, 182 proposed and approved housing projects from the San Francisco Bay Area were examined. These projects "accounted for more than 30,000 housing units in 33 jurisdictions" (113). According to the logit analysis, the projects that drew the most controversy were the ones that were located next to single-family housing; required multiple permits; consisted of higher density developments; or were approved by a city council as opposed to a planning commission. There are several reasons why people would oppose housing development on these grounds. Opponents may be concerned about the environmental impacts of a highly dense development. They may fear that building a Multi-unit housing development will decrease the property values of any surrounding single-family housing. Furthermore, if these communities rely more heavily on property taxes, they may feel antagonistic toward renter-occupied housing. These represent only a few of the many reasons behind Multi-unit housing opposition. This is an indication that NIMBY is overused in its application to opponents of certain types of housing developments.

Brunner, Eric J., Stephen L. Ross, and Becky K. Simonsen. "Homeowners, Renters and the Political Economy of Property Taxation." Regional Science and Urban Economics 53 (2015): 38-49. Elsevier. Elsevier B.V., 16 Apr. 2015. Web. 30 June 2015.

This study attempts to determine the size of the previously discussed renter effect. Based on the face value of the results of this study, one would conclude that "renters are approximately 10 to 18 percentage points more likely than homeowners to favor a property tax increase over a sales tax increase" (38). These findings were produced by conducting a "difference-in-differences estimation strategy" using micro-level survey data (48). Upon closer examination of the data, it was discovered that renters are indifferent to increases in property and sales taxes regardless of income, age, and education level. This suggests that renters may not know whether or not they pay property taxes. On the other hand, homeowners strongly oppose increases in property taxes over increases in sales taxes; however, there is no correlation between the percentage of the property tax burden borne by an individual homeowner and said homeowner's opposition to property tax increases. This suggests that as voters, homeowners have limited knowledge regarding property taxes and property tax revenue allocation. Ultimately, the findings yielded by the analysis conducted in this study are consistent with the theory "that homeowner aversion to the property tax is associated with the higher salience of the property tax" (48). In other words, when property tax prices are presented in a way such that they stand out from other tax prices, homeowners tend to show greater opposition to them.

Gibson, Huston, and Mathew Becker. "Smart Growth and the Challenge of NIMBY: Multifamily Dwellings and Their Association with Single-Family House Selling Prices in Tallahassee, Florida, USA." Journal of Urban and Regional Analysis 1 (2013): 77-88. 2013. Web. 30 June 2015.

The purpose of this study is to address the common homeowner fear that constructing a multifamily housing development near single-unit housing will cause the property values of the latter to decrease. This study breaks down multifamily housing into categories and determines each category's "monetary association with proximate single-family housing prices" (77). Through applying a multivariate regression analysis to the data collected from a cross-sectional study, this study finds that there is "no statistically significant negative associations between multifamily housing and single-family property selling prices in the sample" (77). The study even yields evidence that single-family property selling prices may increase when they are located in close proximity to Multi-family housing. This was clearly evident in cases involving townhouses and apartments. A possible explanation for this is that both multifamily and single-family housing units sampled were located near highly urbanized areas. Since the single-family homes were close to valuable urban amenities and consequentially located in close

proximity to multifamily dwellings, the property values of the single-family homes were higher.

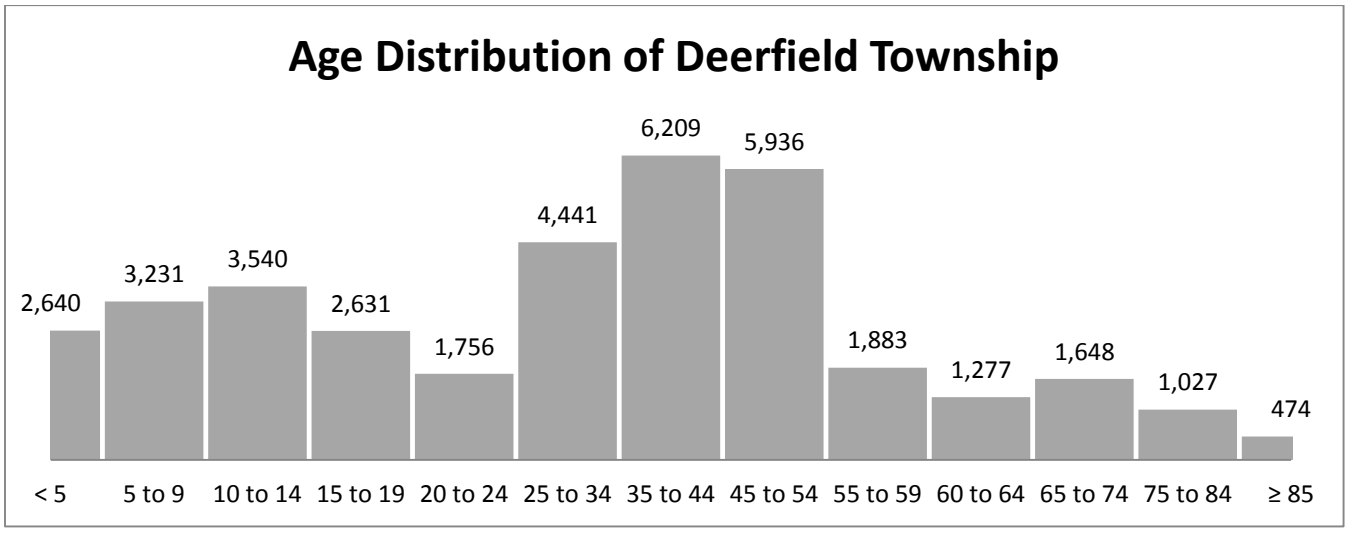
Ives-Dewey, Dorothy. "The Multi-Family Myth: Exploring the Fiscal Impacts of Apartments in the Suburbs." Middle States Geographer 40 (2007): 39-46. Digital Commons @ West Chester University. West Cester University. Web. 30 June 2015.

This study seeks to determine the fiscal impacts that apartments have on municipalities in two counties located in the Philadelphia Region, namely Chester County and Bucks County. The reason why these locations were selected for this study is that "they have been facing suburbanization pressures over the past thirty years, with significant population growth over the past fifteen years" (43). An ordinary least squares (OLS) multiple regression analysis was applied to the cross-sectional data collected on the counties. According to this analysis, positive fiscal deficits in a community are positively correlated with increased apartment activities. Additionally, apartment values and tax burden per household are negatively correlated. These findings show that apartment developments in communities undergoing rapid suburbanization yield positive fiscal impacts

II. Tables and Figures

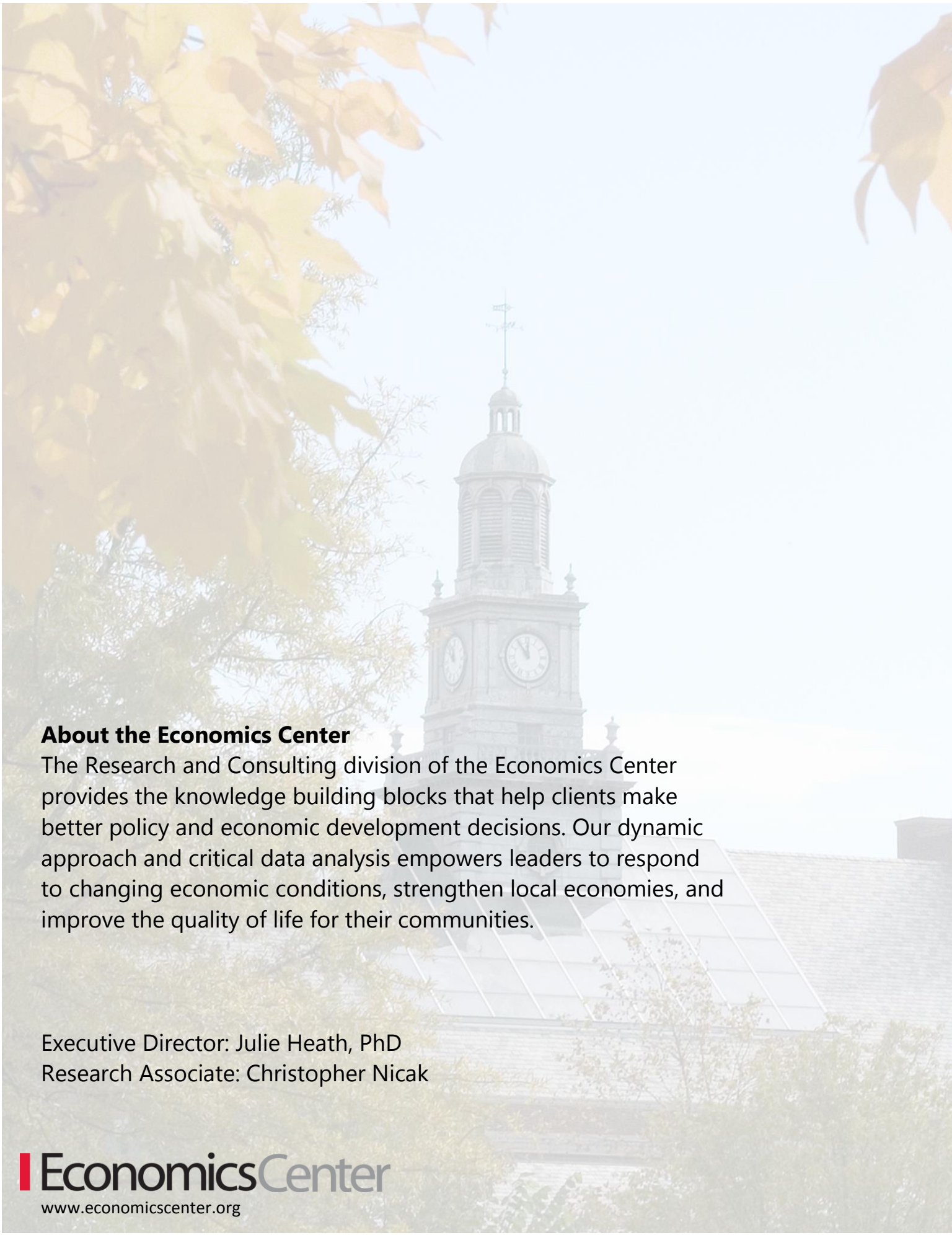
Owner vs Renter Forecasts	
2000 Housing Units	9,667
Owner Occupied Housing Units	75.5%
Renter Occupied Housing Units	19.9%
Vacant Housing Units	4.6%
2010 Housing Units	14,084
Owner Occupied Housing Units	68.6%
Renter Occupied Housing Units	26.7%
Vacant Housing Units	4.7%
2015 Housing Units	14,657
Owner Occupied Housing Units	66.1%
Renter Occupied Housing Units	29.1%
Vacant Housing Units	4.8%
2020 Housing Units	15,323
Owner Occupied Housing Units	65.6%
Renter Occupied Housing Units	29.2%
Vacant Housing Units	5.2%

Population Change by Age Cohort for Deerfield Township, 2010-2020 (ESRI)						
Total Population by Age	2010		2015		2020	
	Number	Percent	Number	Percent	Number	Percent
Total	36,059	100.00%	37,301	100.00%	38,806	100.00%
0 - 4	2,492	6.91%	2,306	6.18%	2,383	6.14%
5 - 9	3,206	8.89%	2,821	7.56%	2,713	6.99%
10 - 14	3,174	8.80%	3,163	8.48%	2,903	7.48%
15 - 19	2,417	6.70%	2,602	6.98%	2,685	6.92%
20 - 24	1,657	4.60%	1,997	5.35%	1,951	5.03%
25 - 29	2,234	6.20%	2,089	5.60%	2,377	6.13%
30 - 34	2,394	6.64%	2,546	6.83%	2,665	6.87%
35 - 39	2,902	8.05%	2,661	7.13%	3,049	7.86%
40 - 44	3,211	8.90%	2,948	7.90%	2,815	7.25%
45 - 49	3,243	8.99%	2,900	7.77%	2,742	7.07%
50 - 54	2,706	7.50%	3,041	8.15%	2,736	7.05%
55 - 59	2,034	5.64%	2,593	6.95%	2,781	7.17%
60 - 64	1,481	4.11%	1,886	5.06%	2,331	6.01%
65 - 69	1,013	2.81%	1,410	3.78%	1,716	4.42%
70 - 74	703	1.95%	930	2.49%	1,253	3.23%
75 - 79	546	1.51%	610	1.64%	804	2.07%
80 - 84	416	1.15%	434	1.16%	480	1.24%
85+	230	0.64%	364	0.98%	422	1.09%



Income Distribution of Deerfield Township				
	Households	**Families**	**Married couple families**	**Non-family households**
Less than $10,000	1.6%	0.8%	0.6%	4.7%
$10,000 to $14,999	1.5%	0.1%	0.1%	5.8%
$15,000 to $24,999	4.4%	2.7%	1.1%	10.6%
$25,000 to $34,999	4.6%	3.5%	2.5%	7.8%
$35,000 to $49,999	11.6%	8.3%	6.4%	20.2%
$50,000 to $74,999	20.1%	19.2%	17.8%	22.9%
$75,000 to $99,999	15.9%	16.8%	17.2%	12.3%
$100,000 to $149,999	19.6%	22.0%	25.3%	11.9%
$150,000 to $199,999	10.2%	12.9%	13.4%	2.6%
$200,000 or more	10.5%	13.7%	15.6%	1.2%
Total	13,430	9,947	8,116	3,483

Deerfield Township Household Composition					
	Married couple family household estimate	Male householder, no spouse present, family household estimate	Female householder, no spouse present, family household estimate	Non-family household estimate	Total estimate
Total households	**8,116**	538	1,293	3,483	13,430
Average household size	**3.34**	2.73	3.03	1.21	2.73
AGE OF OWN CHILDREN					
Households with own children under 18 years	4,372	202	920	(X)	5,494
Under 6 years only	24.90%	8.50%	12.00%	(X)	22.10%
Under 6 years and 6 to 17 years	22.90%	15.80%	17.20%	(X)	21.70%
6 to 17 years only	52.20%	75.70%	70.80%	(X)	56.20%
SELECTED HOUSEHOLDS BY TYPE					
Households with one or more people under 18 years	55.30%	38.80%	74.20%	0.00%	42.10%
Households with one or more people 60 years and over	20.00%	10.20%	15.80%	32.30%	22.40%
Householder living alone	(X)	(X)	(X)	85.40%	22.20%
65 years and over	(X)	(X)	(X)	22.90%	5.90%
UNITS IN STRUCTURE					
1-unit structures	84.40%	89.20%	60.60%	47.10%	72.70%
2-or-more-unit structures	15.40%	10.80%	39.40%	52.90%	27.20%
Mobile homes and all other types of units	0.20%	0.00%	0.00%	0.00%	0.10%
HOUSING TENURE					
Owner-occupied housing units	82.50%	79.60%	50.70%	56.60%	72.60%
Renter-occupied housing units	17.50%	20.40%	49.30%	43.40%	27.40%



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The Research and Consulting division of the Economics Center provides the knowledge building blocks that help clients make better policy and economic development decisions. Our dynamic approach and critical data analysis empowers leaders to respond to changing economic conditions, strengthen local economies, and improve the quality of life for their communities.

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