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Economic Considerations for Indiana's Housing Markets

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Tags: #housing #populationchange #placemaking

Key Points

- Across Indiana, the fundamentals of market supply and demand explain nearly all the variation in home prices. Chief among these market conditions are local school quality, amenities and population change.
- The problems many policymakers perceive in local housing markets are the result of market forces appropriately responding to changes in housing supply and demand.
- As in other Midwestern states, Indiana is oversupplied with vacant housing and currently has roughly 316,000 vacant single-family homes. Places that have experienced population loss are most at risk of an excess supply of vacant housing stock.
- The oversupply of vacant homes suppresses home values in counties and regions where they are most concentrated. This in turn attracts lower skilled workers to communities with more affordable housing.
- The Great Recession reduced both housing prices and new home construction in Indiana. However, the cost of constructing a new home has continued to rise, making new home construction unprofitable to speculative home builders across much of Indiana.
- Across Indiana, speculative new home construction is clearly profitable in only 14 of 92 counties. In 62 of 92 counties, it is clearly not profitable to construct a new speculative home, and in the remaining 16 counties, the data are not sufficiently precise to make a certain determination.
- Availability of rental homes follows many of the same pattern as owner-occupied homes, but appear more abundant in urban counties.
- The tiered nature of Indiana's property tax structure on residential and rental properties exacerbates tight rental markets and likely increases the number of vacant homes.
  To address broad concerns about housing conditions in Indiana, we have several policy recommendations.
- Consider economic dynamics of housing costs vs local market value when promoting new construction.
- Modify tax increment financing (TIF) to stimulate appropriate residential growth.
- Stabilize middle-class neighborhoods.
- Modulate the local housing supply.
- Address the community's quality of life characteristics.
- Use fiscal incentives for housing rehabilitation.

Background

There is widespread concern about the state of Indiana's housing markets. These concerns featured prominently in the 2017 Rural Listening Sessions sponsored by the Lt. Governor and the Office of Rural and Community Affairs; and news media reports offer a nearly constant stream of housing quality and housing shortage stories.[1] We take seriously the expressions of alarm over housing conditions. However, we note that these concerns over housing issues are widely heterogeneous. Some community leaders believe there is a lack of housing for low-income families, while others report a shortage of homes for middle-income workers. Other cities and towns report a shortage of 'executive' homes. These types of statements indicate serious misconception over the fundamental economic factors that determine the supply and demand for housing in a residential market.

Factors such as population growth, household income, neighborhood characteristics (e.g. school quality), and local amenities determine the demand for housing. The expected return to investment accruing to home ownership also influences potential homeowners, as well as businesses who supply new home construction. The supply of housing is determined by past home construction, and by the fact that existing housing stock is a very durable asset. Housing stock changes are influenced by existing supply, factors such as the profitability of new home construction, the rate of housing stock decay, quality of local public services, taxation, and regulatory constraints on new construction.

The demand and supply of housing together determine the level of housing stock each year and, importantly, the price of that housing. Across regions with highly different housing supply and demand characteristics, this may result in vastly different home prices that are seemingly unconnected to individual home characteristics.

To illustrate this phenomenon, we compare two structurally similar houses in two vastly different housing markets. See *Figure 1*. Both houses have reasonably similar appliances and lot sizes. Both homes have four bedrooms and two baths, similar exterior design, and climactically similar locations. The home in Chicago is nearly 1,000 square feet smaller than the home located in Marion, Indiana but has an advertised sale price of $628,000, while the larger Marion, Indiana home is listed for $39,000. Both homes were built within the same decade, more than 100 years ago, and were listed by the same real estate firm, and interior improvement differences appear modest. However, one is listed at more than 16 times the price of the other home.

Figure 1 clarifies the idea that economic fundamentals matter deeply to the supply and demand for housing, which ultimately determine the price of homes and the rate of new home construction.

Figure 1. Housing Price Difference in Chicago, IL and Marion, IN

Note: 4 bed, 2 bath, 1,435 sq. ft in Chicago, IL $628,000;
https://coldwellbankerhomes.com/il/chicago/4136-north-claremont-avenue/pid_25538503/
4 bed, 2 bath, 2,414 sq. ft. in Marion, IN $39,000; https://coldwellbanker.com/property/1005-W-3rd-St-Marion-IN-46952/93774377/

4 bed, 2 bath; 1,435 sq. ft. in Chicago, IL: $628,000

4 bed, 2 bath, 2,414 sq. ft. in Marion, IN: $39,000

Therefore, much of the perceived problems in housing markets are likely the result of market forces that determine the price and quantity of housing in a community. Understanding these market forces is an inherent part of effective public policy development.

In this study, we provide a county-level analysis of housing markets in Indiana. To do this, we review several key studies, which examine the role that population change, income, human capital, and amenities play in the supply and demand for housing. We then present our own model of Indiana housing markets and derive lessons about price and quantity from this model. Using some of the results of this model, we then report housing market conditions in each Indiana county across the four domains of housing profitability, new home starts, population change, and vacancy rates for all residential and rental properties. We then summarize our findings and present broad policy considerations. To begin, we outline the challenges to understanding housing markets in Indiana, outlining some evidence of regional variation.

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1. See examples at https://indianaeconomicdigest.com/Search.asp with the keyword "housing."

Indiana's Housing Situation

Indiana is home to one very large and robust urban and suburban housing market in the greater Indianapolis metropolitan area. This 11-county region has absorbed all the net population growth in Indiana for a generation and is projected to see population growth that is larger than the state as a whole over the next generation.[2] According to the Case-Schiller Index, the Indianapolis metro area as a whole has fully recovered from the Great Recession housing price declines and has returned to a 30-year trend of increasing house prices.

The residual effect of this central Indiana growth is that the remaining counties in Indiana—which include metropolitan counties in large urban areas including Chicago, Cincinnati, and Louisville—have lost and will continue to lose net population. As of 2016, across Indiana, the average county has a home vacancy rate of 12.2 percent and a rental vacancy rate of 8.5 percent (Census, 2018). This means that there are approximately 316,800 vacant single-family homes scattered across Indiana. In aggregate, this provides sufficient excess capacity in Indiana to house nearly one third of the state's population.

Much of this enormous vacant housing stock is not readily suited for new residents. Individual homes may be badly decayed, or the homes may be located in undesirable neighborhoods. We discuss these issues later in the study. However, the presence of vacant housing stock reduces the price of homes in the surrounding neighborhood and broader community. Other factors do as well, including poorly performing schools and the absence of other local amenities.

One consequence of depressed prices is the lack of profitability in new home construction. By our calculations, speculative new home construction is clearly profitable in only 14 counties, and clearly not profitable in 62 counties. We cannot be certain about the profitability of new home construction in another 16 counties. This has resulted in significant reductions in new home construction. To better explain this, we offer the following static analysis of housing supply and demand.

In *Figure 2*, price is on the vertical axis and quantity of housing on the horizontal axis. Initially, housing demand and supply intersect at a price that is above the minimum profitability of constructing a new home. In this case, new home construction will occur to meet demand. While this is a static model, it should be apparent that as population grows, so too will the supply of housing. However, demand may decrease due to out-migration, low-quality public goods and services, or some other factor. If demand falls to a point where it intersects with supply beneath the minimum profitability level, new home construction will no longer be profitable and speculative home construction will cease.
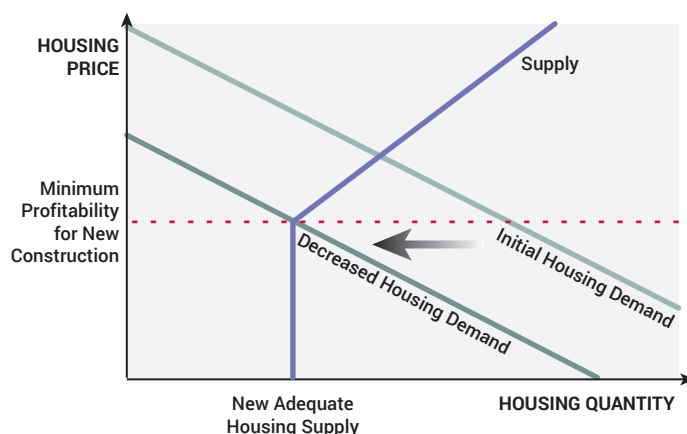
This very simple illustration conveys the general concern with decreasing home prices. Obviously, homes in different price ranges and with different characteristics form different submarkets. However, house prices in these various sub-markets in a community are related to each other. In addition, as we will detail later in this study, housing markets cover broad geographic areas, and the presence of disamenities in one region influence homes throughout the price and quality range within that area.

The condition of unprofitable new home construction has economic consequences in Indiana. In the average Indiana county, the home construction rate from 2010-2016 is only 54 percent of the 2001-2016 period, reflecting a remarkably slower period of expansion. In fact, only two Hoosier counties have experienced new housing starts averaging more per year in the post-Great Recession period than in the whole of the 2001-2016 period. Finally, and consequently, only 15 of 92 counties experienced population growth faster than the nation as a whole from 2001-2016, and a full 25 have fewer residents now than in 2001.

We will explore each of these facts again later in this study. The point we wish to reinforce throughout this study is that housing market fundamentals are the root cause of much of the current policy-oriented concerns about housing. Efforts to mitigate perceived ills of the housing market must therefore focus on the fundamentals of demand and supply in local housing.

Furthermore, it should be clear that the fundamental economic conditions surrounding home price and new construction are not generally favorable across much of the state. At the same time, it is important to understand that these data imply a rather challenging environment for housing that is neither new nor isolated in Indiana. Indeed, a rather extensive body of research outlines these issues. In this study, we focus on the most salient to broad economic conditions affecting county housing markets, and the effect of housing markets on local economic conditions.

2. See Hicks and Devaraj (2016) –
https://projects.cberdata.org/reports/Forecast2016.pdf

Figure 2. Supply and Demand for Housing

When housing prices are lower than new home construction costs, speculative home construction (which fuels most new neighborhood residential construction) is not profitable.

Housing Markets and Local Conditions

At the outset, we noted that policy concern over housing has many forms. However, lack of adequate supply of housing and local economic development dominates the discussion. Addressing this, Glaeser and Gyourko (2005) offer the most compelling link between local economic conditions and housing. This research examined the role of housing supply and profitability on urban growth and decline. Their findings offer a primer on most of the subsequent analysis of these issues.

Glaeser and Gyourko examine the role durable housing played in extending the supply of housing in locations experiencing population decline. In testing this model using US metropolitan area data, they outline six important conclusions. First, urban population growth is far more rapid than urban population decline. Second, this urban decline is far more persistent than urban growth. Both of these conclusions result from testing their hypothesis on city data, but are also consistent with the rapid early growth and slow decline of rustbelt communities over the past century.

Glaser and Gyourko also find that the growth in population is more rapid than the growth in prices, suggesting an elastic supply of housing during periods of growth. In contrast, larger negative price effects accompany population decline. This implies that supply reductions are highly inelastic, meaning that as the price of housing declines (with population decline), the housing stock persists due to its durable nature. This also conforms to the observation that housing stock is highly durable and excess supply imposes long-term negative shocks on housing prices across the region. These are observable at the metropolitan area level, which are typically multi-county housing markets. Keep this point in mind as we discuss our empirics and the role of excess housing supply on countywide home prices later in the study.

These authors also report that when housing price decreases are below new home construction costs, it precipitates decline in urban areas. When housing prices are lower than new construction costs, speculative home construction (which fuels most new neighborhood residential construction) is not profitable.

In turn, the lower-priced housing attracts low human capital households to declining urban places. This acts to further suppress home prices, and generate net population declines. It should also be noted that the increasing share of low human capital residents also serves to reduce regional wages, reduce labor force participation, and reduce overall economic activity.

It is difficult to overstate the influence of this research on the understanding of housing markets, especially in declining urban places. The phenomenon described in the preceding paragraphs dominates subsequent research due to its unusual ability to explain the asymmetric speed and magnitude of growth and decline of cities and this is especially relevant for Rust Belt cities.

Later works by Glaser and Gottlieb (2009) and Glaser and Gyourko (2018) assess the role agglomeration (industry clustering) plays in determining city size and evaluate these issues within the context of housing supply. In the first paper, Glaser and Gottleib (2009) outline a model where supply that is more elastic translates productivity growth in cities into larger population growth. In contrast, a more restrictive supply of housing leads to higher income, as home prices are bid up by workers seeking to locate to a region. The second study (Glaser and Gyourko, 2018) chronicles the role housing regulations play in restricting new construction. These papers are important because they evocatively illustrate the difference between home price changes in the Midwest relative to the denser and richer urban locations on the coasts.

Notowidigdo (2011) extends this model to explain growth in the share of low wage, low skilled workers and housing prices following labor demand shocks. This paper builds a spatial equilibrium model, as did Glaser and Gottlieb, to outline the joint effects of a labor demand shock on labor supply and housing prices. He finds asymmetry in the labor demand effects on population. Positive shocks to the demand for labor increase population more than negative shocks reduce population. However, he finds that negative shocks tend to cause less migration among low-skilled workers.

Notowidigdo (2011) also finds that low-income workers migrate at a lower rate than do high-income workers following a negative demand shock to labor. He reasons that this is due less to moving costs than to the realization that labor demand shocks for low-skilled workers are less disruptive than for high-skilled workers. This is important, because it confirms a second causal mechanism for the growth of low-skilled workers in declining regions.

In addition to a very robust series of studies on home construction and pricing, there is long-standing literature on neighborhood characteristics and home values. These studies account for variation in home prices by accounting for both home and neighborhood characteristics. One way to think of the utility of these studies is to imagine two identical homes, one of which is placed in a quiet neighborhood, the other at the end of a busy airport runway. Hedonic pricing models are statistical techniques that can estimate the disamenity of noise (or other characteristics) on home values.

These studies include such varied analysis as the effects of hazardous waste sites (Michael and Smith, 1990) to the effect of proximal registered sex offenders (Pope, 2008). For the purposes of this study and in the development of policy responses we focus on a subset of issues.

Greenspaces, or city parks, show strong impact on property values. Burton and Hicks (2007) report the presence of a park increases home value in a contiguous census tract by $2,600 per property, while a linear park or trail increases values between $10,600 and $11,600 per home in Charleston and Huntington, West Virginia. Espey and Edusai (2001) find similar effects in their examination of individual homes in Greenville, South Carolina. Troy and Grove (2007) evaluate the role of urban greenspace in high crime environments. They find that the perception of criminal behavior in parks reduces home values, while greenspace causes home value growth. This very robust analysis of Baltimore, Maryland offers evidence that public goods (parks) and public services (crime prevention) are complementary goods.

Other studies include Morancho (2003) evaluating green spaces, Panduro and Veie (2013) on greenspace, Asbare and Huffman (2009) on trails and greenbelts, and Sander and Polasky (2009) on open spaces and viewspace. A broad review is available from Sirmans, Macpherson and Zietz (2005), which reviewed not only home characteristics, but proximity to hog farms, landfills, high voltage lines, commercial property, flood zones and other issues.

Public services, e.g. crime prevention, are heavily reviewed (Troy and Grove, 2007; Pope, 2008), as well as schools. Indeed, an abundant literature on schools suggest that quality plays a large role in home values. Reviewing work across several nations, and times, across different levels of education, using multiple measure of quality and a variety of statistical techniques, across several research designs (identification) Black and Machin (2011)

Neighborhood characteristics influencing housing value include safety, distance from noise and pollution, greenspaces, and school quality.

conclude that sizable home value effects emerge from differences in school quality.

It is helpful to apply the expected effects of the Black and Machin (2011) review to Indiana. Moving a house from the school corporation with the lowest passing rate of the ISTEP+ to the school corporation with the highest passing rate would increase that home's value by 18 percent, or roughly $24,102 for the average home in Indiana.[3] The importance of this will emerge later in this study as we describe the challenges to new home construction due to profitability considerations.

The vast hedonic pricing literature is important, because the direction and rough magnitude of findings are frequently confirmed in subsequent studies with new data. Home prices are influenced by more than just individual home characteristics. Also, the abundance of these studies, and the persistence of the findings argues for their broad use in policy development. The effects of schools, trails, greenspace, and public safety are all well known and clearly established.

Finally, there is a growing literature on the role of restrictive housing regulation on home prices and access (Glaeser and Gyourko, 2018). Evidence of restrictive housing regulation in these studies are largely based upon very large urban areas, with highly restrictive land use regulation. While some urban places in the Midwest may experience this, there is no evidence this plays a meaningful role in the housing concerns expressed in Indiana.

These studies offer some important highlights for our empirical exploration of the economic fundamentals of housing in Indiana. First among these is that housing matters, but it plays a very different role than most policy advocates believe. As population grows, housing supply adjusts, and there is no evidence of markets failing to adjust. However, few Indiana counties are

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3. This is calculated using the Zillow 2018 average home price in Indiana, not the average sale price.

experiencing population increases, while many are experiencing population decreases. The literature reviewed above suggests that widespread population loss predicts rapid and persistent home price declines as we observe in Indiana. These price declines are a causal influence on an increasing share of low-skilled workers in declining places and the concomitant economic struggles of those locations.

Moreover, should price declines be sufficiently large so that the construction of new homes is not profitable, we should expect a very persistent regional decline. These declines may last for decades and are likely to be extended by increasingly low levels of human capital and low levels of private and public amenities in the affected places.

A recurring theme in this research is that traditional models of housing supply and demand explain the bulk of variation in home prices and new home construction. There is no evidence of unexplained anomalies in housing markets requiring direct policy intervention. Thus, it is clear that effective policy remedies to long-term decline, low housing prices and limited new home construction must address the underlying economic fundamentals of housing supply and demand.

A Model of Housing Starts

Data on housing is abundant, annualized, and of high quality. The Federal Housing Finance Agency constructs a constant-quality home price index (HPI) for most counties. Calhoun (1996) outlines the technical description of this index. In summary though, this index tracks actual home sales prices across time, accounting for the stochastic adjustment in prices. This eliminates the strong bias resulting from simply reporting new home prices when home characteristics change over time. County-level new housing starts are compiled by the US Bureau of the Census, as are population data. The National Bureau of Economic Research provides the only widely used measure of recessions, and the US Bureau of Labor Statistics provides employment data. For the purposes of this study, we separate all price increases and price decreases into two series, and introduce a profit gap, which is the difference between each county's home price index and the "Producer Price Index for Residential Construction" series for goods. This is available at the Bureau of Labor Statistics. Summary statistics appear in *Table 1*.

The model we construct provides evidence of the historical scale of effects outlined above on new home construction. We do this in a dynamic model at the county level, which offers some strengths and limitations. This modeling approach accounts for local market conditions, the size and non-linear effects of urban places and labor market conditions. Trends and an autoregressive value are included as controls.

To account for prices, we use three approaches. One separates price changes into increases and decreases. This provides two data series for each county, one with zeros and positive changes and one with zeros and negative changes each year. The second approach uses the profitability gap, which is a proxy for the profitability of home construction in a county housing market. The third approach scales the new housing starts to a per capita basis (removing population from the explanatory variables). We label these Model 1, Model 2 and Model 3.

The model itself is a time series, cross-sectional model examining housing starts, using 21 years of data for 88 counties (four Indiana counties have too little housing transfers to reliably model prices). This yields 1,731 observations.[4] These estimates are performed in log-log form for ease of interpretation. To allow for this, negative values were converted for estimation, while zero values were scaled to unity. Results appear in *Table 2*.

These results offer significant confirmation of existing work by Glaser and Gyourko (2005); Notowidigdo (2017), and others who discuss the role of home prices and profitability on regional growth. They also support Hwang and Quigley (2006) in their discussion of economic fundamentals of housing markets in US metropolitan areas.

Table 1. Summary Statistics
Source: Author calculations using data from the US Bureau of the Census, the National Bureau of Economic Research (NBER), and the US Bureau of Labor Statistics (BLS)

	Mean	Median	Max	Min	Std. Dev.
Dependent Variable					
Housing starts (new home construction)	272.14	98.00	5,382	0.00	526.44
Independent Variable					
Positive home price index (HPI) change	1.98	0.00	23.48	0.00	3.76
Negative HPI change	-12.68	-6.50	0.00	-95.72	15.34
HPI profit gap	-10.71	-6.50	23.48	-95.72	17.31
Population	71,816	35,266	941,229	7,195	115,760
Employment-to-population ratio	0.50	0.50	0.89	0.28	0.12
Recession year	0.17	0.00	1.00	0.00	0.38

4. The model is GLS-weighted and uses White's 1980 heteroskedasticity invariant, variance covariance matrix.

In our empirical models, downward price pressures result in declining new housing starts, while price increases show no statistically valid boost to housing construction (Models 1 and 3). Our home profitability gap illustrates strong, positive effects on new housing construction (Model 2). This is important for the period following the Great Recession, since a majority of Indiana counties continues to have home prices beneath the expected replacement costs. Population change over a three-year period was also positively correlated with new housing starts, a relationship that should be interpreted as causal. We discuss this in more detail in the next section.

City size plays a role in the rate of new housing growth, and the effect is non-linear, with decreasing effects of scale. The regional effect is also important; the average number of new starts in surrounding counties positively influenced the own county housing starts, suggesting strong regionalism in the factors that affect housing markets. This finding suggests strong cross-border effects, which bolsters the county-wide geography as a useful minimum proxy for housing markets. More directly, a county is certainly not too big to consider as a relevant area for housing markets, and may be too small.

Finally, labor market conditions drive much of new housing starts with the employment to population ratio and the business cycle affecting home construction as expected. The interpretation of these variables are as long-run and short-run influencers of new home construction.

Among the chief predictions of Glaeser and Gyourko (2005) was that the persistence of substandard housing stock attracted low human capital households. Our model certainly suggests a corollary that low levels of human capital (low employment-to-population ratio) lead to lower levels of new home construction.

These models, and indeed all the existing literature on housing, make clear just a few stylized facts. The first, and perhaps most salient of these, is that local housing market outcomes are strongly influenced by economic factors such as the profitability of new home construction, population growth, and labor market conditions.

This model demonstrates that broad economic factors explain roughly 90 percent of variation in new home construction over the period 1998 through 2016. This implies that perceptions of local housing problems are caused not by market failures (e.g. lack of adequate capital access, availability of construction workers, imperfect information about housing markets, or regulatory environments), but by underlying economic forces.

Acknowledging that economic fundamentals drive much of housing supply issues, we now turn to a more complete discussion of county-level housing issues.

Table 2. Empirical Results (Housing Starts)

Source: Author calculations using data from US Census, NBER, and BLS

Note: *** t < 0.01, ** t < 0.05, * t < 0.1

n = 1,731	Model 1 New Housing Starts	Model 2 New Housing Starts	Model 3 Per Capita New Housing Starts
Market Conditions	Coefficient (t-ratio)	Coefficient (t-ratio)	Coefficient (t-ratio)
Positive HPI change	0.02 (1.06)	...	-0.0028 (-0.74)
Negative HPI change	0.04** (2.37)	...	0.0155*** (4.67)
Profitability	...	0.005*** (6.08)	...
Population change, three years	1.57** (2.34)	1.15* (1.95)	1.58*** (4.67)
Urban and Regional Conditions			
Size (population)	8.34*** (7.70)	7.16*** (5.82)	...
Size sq. (population)	-0.29*** (-6.61)	-0.25*** (-4.98)	...
Average new starts in contiguous counties	0.48*** (19.00)	0.53*** (25.33)	0.018*** (15.23)
Labor Market Conditions			
Employment-to-population ratio	17.83*** (10.88)	18.07*** (9.51)	1.115*** (27.21)
Recession	-0.11*** (-3.59)	-0.11*** (-3.19)	-0.02*** (-3.98)
Controls			
Trend	-0.03*** (-9.12)	-0.03*** (-10.91)	-0.0011** (-1.99)
Intercept	-69.48*** (-11.77)	-62.66	-0.67*** (-17.16)
Adjusted R-squared	0.98	0.98	0.76
S.E. of regression	0.38	0.38	0.077
F-statistic	876.29	846.66	793.24
Durbin-Watson stat	1.16	1.17	0.54

County-Wide Housing Markets in Indiana

The model provided in the previous section offers significant insight into the market conditions that affect housing statewide. In this section we offer simple measures of home price, profitability, and change in population in Hoosier counties. We also report Census vacancy rates at the county level, for both residential and rental housing units. Each of these factors tell us something about the price and quantity of available housing at the county level.

We begin with the housing profitability measure. Using the FHA home price index for each county, we compare the change in quality-adjusted home prices with a national home construction price index. This national home construction price index consists of a modification of the data set "Producer Price Index, Input to Residential Construction: Goods", indexed to year 2000. This is essentially the non-labor component to new home construction, which has been estimated at roughly 43.4 percent of the total cost of a new home (Carliner, 2003). At that level, it is the single largest share of total home costs.

The adjustment to this price index to reflect a comparable construction cost index was undertaken by accounting for a home builder profit of 17 percent (Glaeser and Gyourko, 2005; 2018). This is somewhat higher than that estimated by Carliner (2003) in his examination of 17 publicly traded building companies from 1998 through 2002. That profit ranged between 6.7 and 10.7 percent before taxes. We call this our home construction cost index. Importantly, the use of the Glaser and Gyourko approach likely biases the cost downward because this uses a higher profit rate than displayed in the Carliner (2003) study.

Combined with the costs, the home price index can be used to provide an average county profit rate for new residential construction. Importantly, this approach has some limitations. The use of county averages is an imperfect measure of some local housing markets. However, because this housing index is constructed from actual housing sales data, the most active areas in a county are over-represented, not under-represented. As such, any bias introduced into this study is likely upwards in prices and downwards in home construction costs. Thus, the following interpretation likely overstates the profitability of new home construction in all of Indiana's counties.

The use of the materials in new home construction is imperfect because it does not account for labor costs, which are likely to be heterogeneous between regions. Also, it does not account for changes in the labor share of construction, which anecdotally appears to be declining. There is a further value in using the materials price increase, because data on construction worker cost index is shorter than the housing cost index. However, when we compare the two series from 2001 to the present, the period for which we have data, we observe a very close correlation over time. The wage rate does not include fringe benefits, such as healthcare, which have been rising much more quickly than direct salaries. More critically, between 2001 and 2016, the annual deviation between these two series is 0.425 percent, which is much slower than healthcare cost growth. This likely biases downward our cost estimate of construction. However, the two series enjoy a correlation coefficient of 0.943, which means any model testing annual changes is largely irrelevant in the subsequent analysis. We will use the construction materials cost index in assessment.

We use this measure to examine the relationship between the profitability of local new home construction and the level annual home construction at the county level. To test this we offer a spare empirical test, where new home construction (housing starts) is a function of the profit gap in each county (the difference between the home price index and our home construction cost index), and a county-level intercept and common error term. It takes the form of:

$$HS_{i,t} = c_i + \text{\O}PI_{i,t} + e_{i,t}$$

This parsimonious model then captures the effect of the profitability index (*PI*) on new housing starts (*HS*) from 1992 to 2016 with only a random error term (*e*) and a county fixed-effect intercept (*c*), but explains 79.4 percent of the variation in new housing starts. The coefficient (Ø) is highly statistically significant (results not shown). The model is stationary, but exhibits a great deal of evidence of autocorrelation, which, when corrected, increases the explanatory power of the model to 96 percent of variation while sustaining the statistical significance of the profitability index.

Figure 3. Housing Starts and Profitability in the Average Indiana County

Source: Housing data from Federal Reserve Bank of St. Louis Economic Data (FRED); Construction data from Bureau of Labor Statistics

Note: Recession years are marked in gray
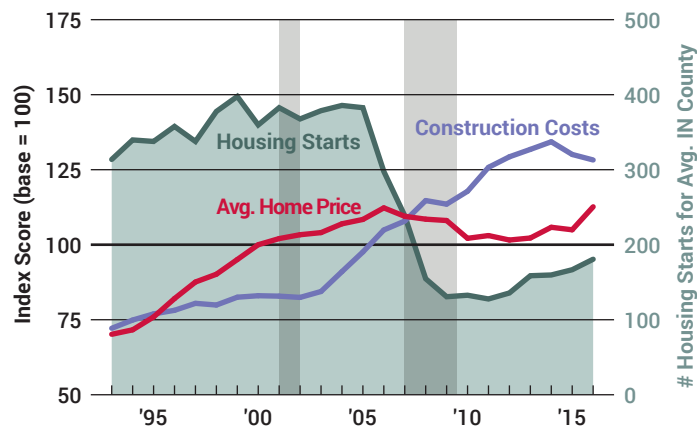
These results should be wholly unsurprising. The profitability of new home construction explains nearly all new home construction in Indiana's counties from 1995 through 2016, the period of time for which data is available.

Beyond the empirical modeling, the relationship between profitability and new housing starts offers one of the clearest graphics we have encountered in economic research. *Figure 3* combines the national construction cost index with the average of the county home price index to illustrate the two elements of profitability. This data is layered over a green graph reflecting the annual new housing starts data for the average Indiana county.

This figure illustrates at its earliest point a housing recovery following the 1990-1991 recession through 2000. This period experienced increasing average profitability until the mid-2000s. From the early 2000s until roughly 2006, construction costs increased coincident with a period of significant employment stagnation across the Midwest. This was the jobless recovery of the 2000s. Beginning in 2006, as home construction profits were squeezed, new home construction in Indiana dropped significantly (right-side scale in green), falling to roughly a quarter of its 2005 level by 2008-2009. Home construction costs have continued to rise, while average home prices recovered slowly. By 2016, home prices were visibly higher, cost growth was moderating down and new construction rising. Still, statewide, the average home was worth less than it would have cost to build today.

New housing starts are administrative data reported at the county level, and are reliably strong. The construction cost index measures only material costs, not labor, but likely offers a robust growth measure of the cost of a new home. The price index is a constant-quality index of home prices derived from transaction data. These are reliable data, but allowance for errors of a full standard deviation would not alter the interpretation of these results.

We restate the timeline below, to illustrate the recent relationship to the overall economy.

Following the 1990-1991 recession the US economy recovered slowly, as did housing prices. Indiana closely mirrored this trend, and average new housing starts rose by a third from 1993 through 1998. New home construction remained a profitable enterprise in the typical Indiana country from the mid-1990s until the mid-2000s. However, by 2006 profitability of new home construction declined sharply. This was partially explained by decreased demand that accompanied the slow recovery from the post-2001 recession, issues with the housing market preceding the Great Recession, and rising construction costs. Between 2005 and 2010, new home construction in the average Indiana county dropped by 75 percent. Since the end of the Great Recession, home prices have risen, but as of 2016, it was not profitable to build a home in a typical Indiana county. As a result, new home construction remained dormant and remains at levels less than half the 2005 rate of new home construction.

These data strongly indicate that the current concern over housing is unrelated to broad housing market failures. Rather, housing markets are reacting appropriately to the demand placed upon them by new homebuyers. As of 2016, this means average home prices remain beneath the replacement cost in most Indiana counties. *Figure 4* (page 10) illustrates this at the county level in Indiana. We observe that 62 of Indiana's 92 counties have home prices beneath estimated replacement cost in those counties (shown in red). Fourteen counties have home prices that exceed the replacement costs (shown in green), while 16 counties fall within a range in which profitability cannot be determined (shown in yellow).

Importantly, the lack of profitability does not mean homes will not be constructed in a county. Rather, it means that speculative home construction typically associated with new neighborhoods will not occur. Households may continue to build homes even if they do not expect capital gains from this new housing to equal non-housing investments. Importantly, these data end in 2016 as home prices were rising, so data through 2017 may indicate a higher share of profitable homes.

Turning to new housing starts, we create a recent growth ratio that shows new home starts after 2009 relative to the entire 2000-2016 period. See *Figure 5* (page 10). A ratio of less than 1.0 suggests home construction in the post-recession period has yet to return to average. Again, much of Indiana remains moribund, with only seven counties returning to 70 percent of the 2000-2016 rate in the years since the Great Recession. Another 57 counties have new home construction at less than half the 2000-2016 rate, with the remainder falling between 50 and 75 percent of the longer-term rate.

Population change also plays a part in housing demand. See *Figure 6* (page 10). Since housing represents durable investment, even modest population declines often lead to an excess supply of housing. This reduces the price of existing homes, which if sufficient eliminates the profitability of speculative home construction. This

Figure 4. Housing Profitability
Source: St. Louis FRED
Note: New home profit rate in 2016 using imputs of national construction cost growth and county-level price changes

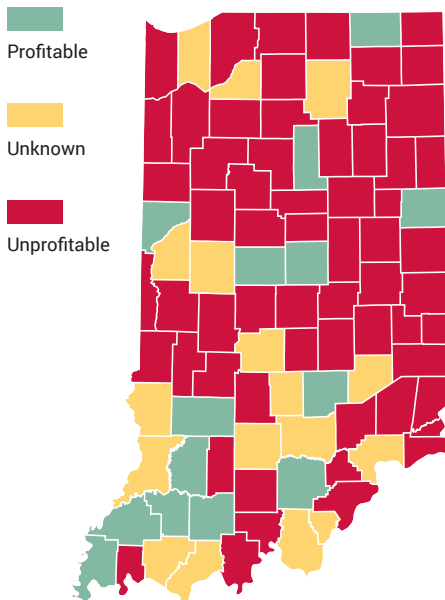Profitable
Unknown
Unprofitable

Figure 5. Housing Starts Ratio
Source: St. Louis FRED
Note: Ratio of new home construction during 2010-2016 as compared to full sample period, 2000-2016

High Activity
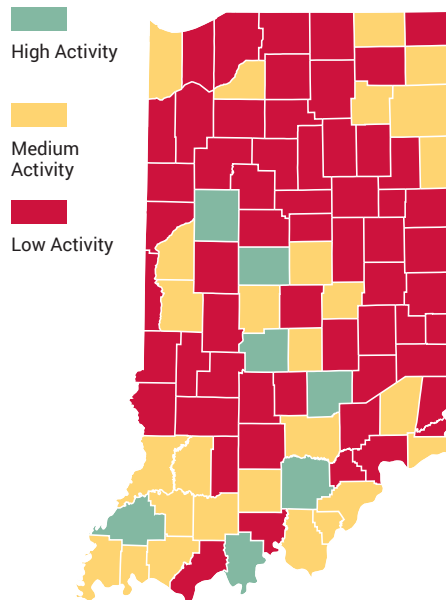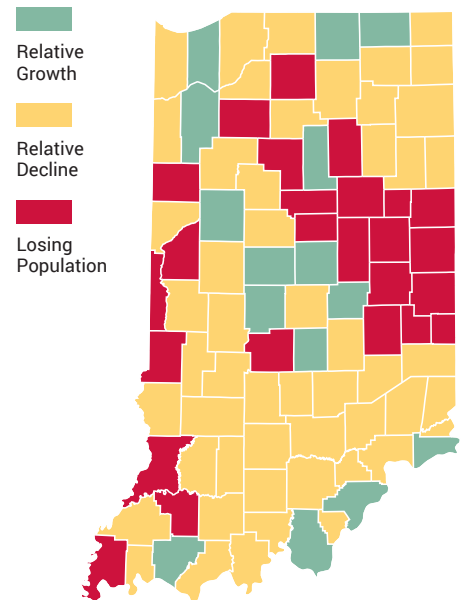Medium Activity
Low Activity

Figure 6. Population Change
Source: US Census
Note: County population change 1992-2016; relative growth is above national average; relative decline is below national average

Relative Growth
Relative Decline
Losing Population

causal mechanism is identified as the prime element in declining regions in a series of important papers starting with Glaeser and Gyourko (2005).

Between 2000 and 2016, 25 Indiana counties lost population, while a further 51 grew more slowly than the nation as a whole. Only 15 counties grew more rapidly than the nation as a whole. Over the longer period, the data are similar. Since the 1960s, 20 Indiana counties have enjoyed population growth rates faster than the nation as whole, while 22 lost population. Population decline is becoming more widespread across the state's geography.

Figure 7 depicts residential vacancy rates in Indiana counties. The loss of population has left a considerable footprint of housing vacancy across the state of Indiana. Indeed, in the average county, 12.2 percent of homes are vacant, which is nearly one out of every eight homes. With roughly 2.336 million households in Indiana, there are more than 316,000 vacant single-family home scattered across Indiana. **There is sufficient excess housing in Indiana to house more than a quarter of the state's population.**

This fact is not widely known, in part because the Multiple Listing Services (MLS) that are used to populate home sale listings do not include these homes. Low-value homes transact with

Figure 7. Residential Property Vacancy Rate, 2016
Source: US Census American Community Survey
Note: Using total county-wide housing vacancy (a measure of excess supply of housing)
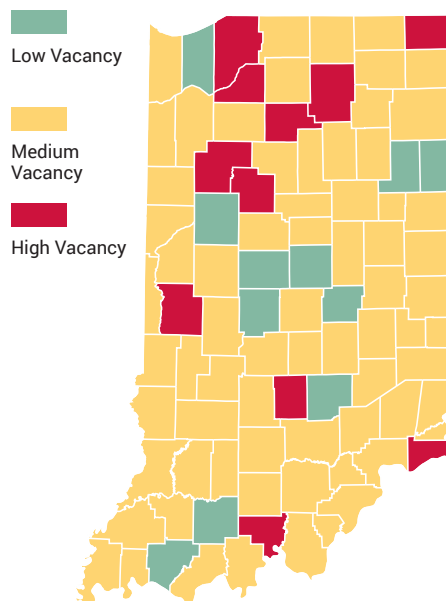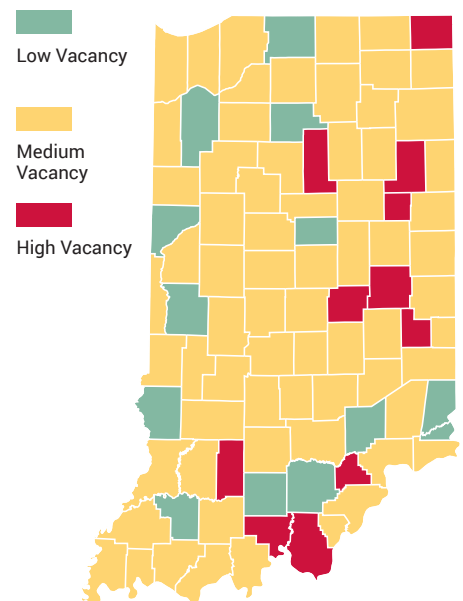

Low Vacancy
Medium Vacancy
High Vacancy

Figure 8. Rental Property Vacancy Rate, 2016
Source: US Census American Community Survey
Note: Rental housing shortage is inference of potential shortage in rental units

Low Vacancy
Medium Vacancy
High Vacancy

great regularity, but are not included in MLS listing. MLS real estate data has many uses, but in the matter of quantity of housing stock, and quality constant home prices, these data are of no direct value. This is important, because determination of local real estate market health depends upon data, which assesses price over a lengthy period, and captures all available housing data.

Indeed, it is difficult to overstate the inability of raw MLS data to provide inference about housing markets. New homes are typically larger and better appointed than existing housing stock, which introduces persistent bias in home valuation estimates. More critically, the entirety of the housing stock influences home prices within a market area, and unsold homes likely play an outsized role in housing market values. This is especially true in urban areas where vacant homes act as a robust disamenity.

One study of the effect of nearby vacant homes reports each vacant or abandoned home in a neighborhood reduces the price of existing homes by 1.3 percent, and each tax-foreclosed home by 4.6 percent (Whitaker and Fitzpatrick, 2011). Another study (Alm, et al, 2016) found much larger effects per property of between 2.5 and 5.1 percent for each vacant home. In communities with 40 percent vacancy rates, and significant foreclosures, the effect can account for more than half of total home value decline. The inability to capture data on the vast share of vacant homes means that MLS data offers a very limited overall measure of local housing markets.

Finally, we examine rental markets. The US Census also reports annual rental vacancy rates, which is important because the home ownership rate, which rose nationally from 64 percent to over 69 percent from 1995 to 2005, has declined. From 2005 through 2016, home ownership rates dipped to roughly 63 percent, rising only in 2016 to closer to 64 percent. Thus, overall demand for rental property has increased for a decade. Moreover, the need for rental properties may be very strong in locations with colleges or universities or a disproportionate share of low-income or younger households.

Rental vacancy rates in Indiana counties range from less than 1.0 percent to more than 18 percent as of 2016. There appears to be very little correlation between residential housing vacancy rates and rental property vacancy rates across Indiana. However, rental property adjustments are likely more rapid than residential housing adjustments, simply because commercial rental property is subject to depreciation. See *Figure 8* (page 10).

Rental property is a common concern, and Indiana experiences significant variability in rental housing availability. Part of the supply issue may be exacerbated by tax policy, especially in low rent locations. *Table 3* provides an example using the jurisdictions with the highest and lowest tax rates in Delaware County, Indiana.

Suppose a home, of, say, $55,000 assessed value becomes vacant. As an owner-occupied property, this property would be subject to a homestead standard deduction of $45,000 or 50 percent of assessed value, whichever is lowest, for an adjusted AV of $22,000 (= $55,000 - $33,000). This property would also quality for a supplemental standard deduction of $7,700 (= 0.35 * $22,000).

If the homeowners have a mortgage, they would also qualify for a mortgage deduction of $3,000. For this property, that means a net assessed value of $11,300 and a gross tax liability of $607 in the high rate jurisdiction (Column I). With the 1.0 percent property tax rate caps currently in place for homestead properties, the property owner would owe $550 (= 0.01 * 55,000) in property taxes. If this property were a rental, it would lose both the 1.0 percent cap, the homestead deduction, supplemental deduction and mortgage deduction, thus increasing the annual tax liability to a maximum of $1,100. This is

Table 3. Differences in Property Tax Liability for Owner-Occupied and Rental Properties
Source: Author calculations

Line	Delaware County, Indiana — Single-Family Home	I	II	III	IV
		High Tax Rate Jurisdiction		**Low Tax Rate Jurisdiction**	
		If Owner-Occupied (Homestead)	If Rental	If Owner-Occupied (Homestead)	If Rental
1	**Gross assessed value (GAV) of property**	55,000	55,000	55,000	55,000
	minus deductions				
2	Homestead standard deduction ($45,000 or 60% of assessed value, whichever is lowest)	33,000	0	33,000	0
3	Supplemental standard deduction (35% of adjusted GAV)	7,700	0	7,700	0
4	Mortgage deduction	3,000	0	3,000	0
5	**Total deductions (sum of lines 2-4)**	43,700	0	43,700	0
6	**equals Net Assessed Value (1 minus 5)**	11,300	55,000	11,300	55,000
7	Multiply by local tax rate	5.3757	5.3757	1.5025	1.5025
8	equals gross tax liability	607	2,957	170	826
9	minus credit due to property tax cap	57	1,857	0	0
10	Total property tax liability	550	1,100	170	826
	Maximum property tax liability (1.0% of GAV on owner-occupied property, 2.0% of GAV on rental property)	550	1,100	550	1,100

Figure 9. Assessed Values for Housing in Muncie, IN
Source: Delaware County, IN GIS and Ball State University Libraries
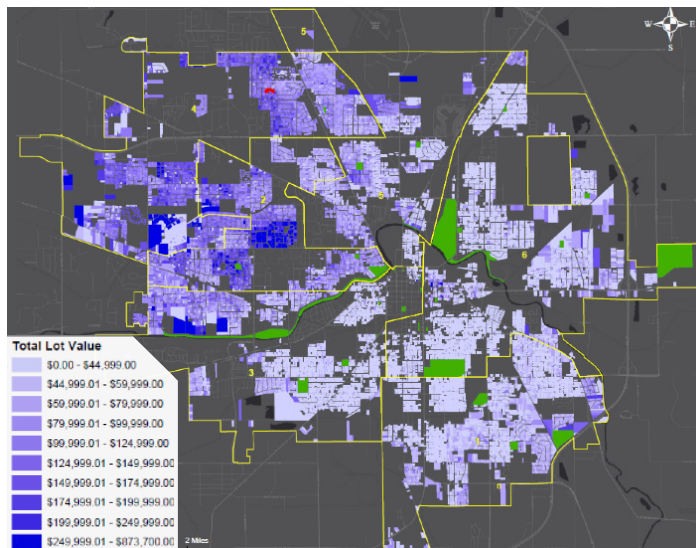
likely more than 10 percent of the annual rental income stream in a housing environment where no capital gains can be expected. Thus, tax policy may reduce the incentive for the landlord to maintain the property and ultimately may render this property no longer economically feasible to use as a rental property. This would reduce its price to near zero, thus reducing home values across the housing market resulting in housing vacancy and abandonment.

As the example in Columns III and IV show, this same property (with AV = $55,000) in the low tax jurisdiction would have lower property tax liability, but the contrast is even starker—the tax liability on the rental property is almost five times that of the owner-occupied property.

Moreover, low-value homes cluster in neighborhoods located in small- to medium-sized municipal areas with long-term population decline. As noted above, these neighborhoods are attractive to low-income households due to the low cost of living. Policies that depress home values beneath their economically viable level serve the counterproductive purposes of depressing home values across entire housing markets, while also removing properties from productive use. Thus a high tax wedge on the transfer of owner-occupied to rental properties might have the dual effect of both reducing home values across a housing market while simultaneously removing rental properties from the local market. This leaves the region with abandoned housing stock for which there is no profitable use by the private sector.

As *Figure 9* illustrates, Muncie, Indiana offers a clear example of the clustering of low-value housing. In this map, three of six city council districts possess thousands of properties worth less than $45,000 but fewer than a dozen above that. Here vacant properties (estimated to be more than 5,000 houses) offer a very grim prognosis for housing stock revival during the balance of the 21st century. These problems suggest more focused consideration of Indiana's housing problems is necessary.

Summary

How to Think About Economic Fundamentals in Housing

Consider Economic Dynamics of Housing Cost vs Local Market Value

Residential housing plays many economic roles, including shelter, investment, and employment. State and local policymakers are typically concerned about a well-functioning housing market, because economic prosperity in local areas is affected by housing markets and vice versa. Fortunately, the evidence is very strong that housing markets in Indiana are well-functioning and responding appropriately to the market forces of supply and demand. Indeed, this appears to be the case nationwide. Even in places such as San Francisco, the very tight housing markets appear to be the result of normal functioning markets with restrictive supply regulations.

The apparent problems with residential housing markets are not due to failures of supply and demand, but rather the consequence of market forces. The apparent unavailability of new housing in many of Indiana's counties is a normal consequence of lower demand, rendering new home construction unprofitable. This reality often provides communities with the seemingly contradictory outcomes of potential buyers looking for new homes, but builders unwilling to construct them. This is a common event across Indiana related to the lengthy period of declining home values depicted in *Figure 3* (see page 9).

Importantly, the presence of potential buyers is not evidence enough of realistic demand for new housing that is sufficient to spawn new construction. Actual demand requires buyers willing to pay prices at a level sufficient to cause new home construction or renovation of existing homes. This motivates a discussion of public policy issues pertaining to housing markets.

Modify TIF to Stimulate Appropriate Residential Growth

Tax increment financing (TIF) has grown enormously in the past two decades in Indiana. Its use in recent years has been heavily studied. The overwhelming evidence is that the use of TIF tends to capture economic activity from nearby areas rather than create assessed value, leading to no net increases in economic activity across the county in which it is used (Yadavalli and Landers, 2017; Funderburg, 2017; Hicks, Faulk and Quirin, 2015; Hicks, Faulk and Devaraj, 2016).

The problems with TIF are not merely related to widespread 'capture' rather than creation of economic activity, but also heterogeneous application of existing rules. The 'but for' rule of TIF requires that the redevelopment commission agree that the

economic activity would not happen in that place 'but for' the use of TIF. The standard for this determination does not exist outside the vote of the appointed redevelopment commission. Consequently, the studies cited above find that the use of TIF does not affect economic activity in a statistically significant way, thus the 'but for' rule as an operational outline for TIF is not followed. One influential study finds that the 'but for' rule across all economic development incentives over the past two decades are met in between 3.0 percent and 35 percent of instances (Bartik, 2018).

We believe that no a priori restrictions on either 'but for' or use restrictions can be reasonably imposed or enforced on TIF. At the same time, their widespread use is shifting more than $300 million per year in property taxes from other local governments sharing the same tax base (Hicks, Faulk, and Quirin, 2015). Therefore, we recommend three adjustments to tax increment financing in Indiana. These are designed to improve the quality and efficacy of projects, while increasing local flexibility in finance.

First, we recommend ending the explicit 'but for' rule, all limits on revenue use, and an elimination on the types of personal property which may be subject to TIF. Thus, a redevelopment commission vote to approve a project or expenditures of funds would be assumed to be in the best interest of the community. This would permit a TIF on residential property.

Second, we recommend that no elected government may be required to surrender their share of TIF funds without an authorizing vote. School boards, county or city government councils, townships or other elected bodies must vote to participate or 'opt-out' with regard to their share of the 'increment' captured by a TIF.

Third, we recommend the elimination of bond 'pass through' payments. These payments are used to secure 'super abatements' during the duration of the TIF period, while largely subsidizing private infrastructure. This appears to be in direct contradiction the intent of the state General Assembly, and should be ended.

These reforms to TIF would preserve a potentially useful budget management tool, which has nevertheless diverted more than $100 million per year in assessed value from the most critical local amenity—schools—while increasing tax rates or reducing public services to other taxpayers. The use of TIF for residential properties would allow dedicated revenues to support infrastructure or amenity development, while insuring that only projects that benefited other elected taxing bodies would have access to their share of the incremental assessed value growth. This would both improve the quality of TIF use and increase the fiscal aptitude of local governments by forcing them to consider a broader set of effects of their tax and spending policies.

Stabilize Middle-Class Neighborhoods

Every Indiana county has excess housing. In fast-growing Hendricks and Hamilton counties, the vacancy rates reflect the movement of housing supply towards housing demand in a hot real estate market. In slow-growing Martin County, a low vacancy rate likely reflects moribund housing demand and supply in which new housing starts averaged less than two per year through the 21st century. This likely means that every Indiana county has many middle-class neighborhoods that are facing decline. We think these should be a priority for stabilization and improvements.

Local governments must focus the development of amenities in at-risk neighborhoods. Otherwise, efforts to stabilize housing values or create new housing in low-amenity communities will be ineffective. Local governments must focus on improving schools, public safety, and other local amenities as a primary duty. These are the most durable economic development activities.

Modulate the Local Housing Supply

Even under the rare conditions in which it may be appropriate to encourage new housing development, consideration needs to be given to the realities of the community's existing housing stock. If that stock is worth preserving, consideration should be given to mechanisms to encourage investment in that stock. If that stock is beyond remediation, it should be torn down, making room for new housing or boosting the value of existing homes. In recent years, the state has played an important role in this effort by providing assistance for owner-occupied rehabilitation programs and demolition programs, through the Indiana Housing and Community Development Authority (IHCDA). This program may need to continue, as many communities are still overwhelmed by excess supply. If the existing stock is not factored in any new local policy development, the community could encounter other new unintended consequences such as continued artificially lower housing prices. Two thirds of all Indiana counties suffer residential housing vacancy rates in excess of 10 percent. These vacancy rates negatively affect local economic conditions. Most perniciously, they negatively affect home prices throughout the county. Ignoring this problem while simultaneously building new housing will inevitably reduce the market price of existing homes throughout a county.

Federally subsidized housing for low-income housing is popular in many municipalities. Yet, Indiana has an excess supply of housing. This apparent contradiction reflects the lack of private sector housing construction in unprofitable locations. This is not to say there is not a need for subsidized housing in many communities; however, the local demand should be critically ascertained in the context of population growth or decline and in the overall housing market.

Address the Community's Quality of Life Characteristics

As discussed above, true demand for housing is caused by population growth, either natural or through net migration. Net migration in a county or community is driven almost wholly by the existence of good schools, livable neighborhoods, and other

amenities. Any consideration regarding housing stock must begin with a careful consideration of community investment priorities. The lack of any particular type of housing is a market outcome of community conditions, not a cause. Housing priority should be directed towards policies that encourage the attraction of new households. Policies that shift resources from fundamental factors that determine the price and quantity of housing are likely to prove counterproductive.

Use Fiscal Incentives for Housing Rehabilitation

Both Indiana and the United States have tax credits available to rehabilitate homes that meet certain historic conditions. These are modest, but have been important tools in historic places (see Thompson and Stewart, 2004). There are also programs under the Housing and Community Development Act, and its antecedents, as well as Rental Housing Tax Credits. However, this has not resulted in broad rehabilitation of the more than 300,000 vacant homes in Indiana. That is unlikely to change. In the most distressed communities, the incremental tax burden associated with shifting a home from a primary residence to a rental property is surprisingly large. For example, a homestead residence assessed at $50,000 and taxed at the property tax cap pays just $500 per year in taxes, but would pay $1,000 per year as a rental property at the 2.0 percent cap.

Property taxes in excess of two-months' rent are unlikely to be passed on to renters, and so act as a significant disincentive to the creation of rental properties and the maintenance of existing rental properties. The state of Indiana should consider experimenting with forms of rental deductions in distressed communities.

Finally, it is critical to once again restate that the evidence strongly suggests that housing markets in Indiana are well functioning and responding appropriately to the market forces of supply and demand. Policy efforts to 'fix' housing markets that are not 'broken' are likely to generate unintended consequences that further depress home values, and reduce the private sector incentive to build new homes. These policies may appear beneficial in the short run but will prove disappointing over the long run. Focus on fundamental housing demand and supply issues, such as school quality, livable neighborhoods, and amenities are the only long-term remedy to inadequate housing.

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