About the Authors

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About Ball State CBER

The Center for Business and Economic Research (CBER) conducts timely economic policy research, analysis, and forecasting for a public audience. We share our insight with the community through the Indiana Economic Outlook and the Ball State Business Roundtable.

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Regional Cities Initiative:
PRELIMINARY ECONOMIC IMPACTS

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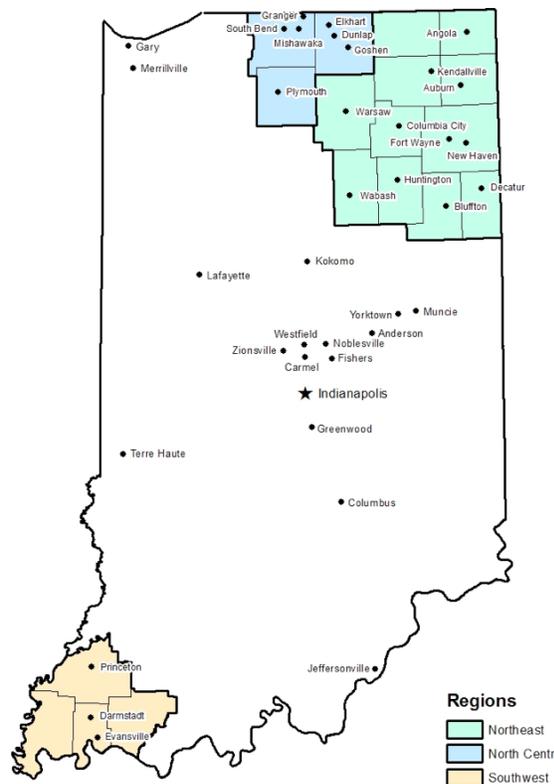Director, Center for Business and Economic Research
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Introduction

On May 7, 2015 HEA 1043 and HEA 1001 were signed by Governor Pence creating the Regional Cities Initiative.[1] This legislation created a governing body for selection of regional cities and released funds from the tax amnesty to create the Regional Cities Development Fund.[2]

Over the ensuing months seven communities completed plans and submitted them to IEDC for review. These included regions in North Central, Northeast, Northwest, East Central, Central, West Central, and Southwest Indiana. An eighth region completed a plan, but was unable to secure sufficient county support to meet submission requirements. In December of 2015, the plans from Regional Development Authorities in three regions (North Central, Northeast and Southwest) were selected.[3] See *Figure 1*.

Figure 1. Regional Cities Designees

1. See https://openstates.org/in/bills/2015/HB1001/, retrieved September 22, 2015 and http://iga.in.gov/legislative/2015/bills/house/1403, retrieved September 22, 2015.
2. See Heupel and Hicks (2013) and Hicks, Terrell, and Heupel (2015) for background on the regional city policy dimensions, including the goal of infrastructure investment and the role of rural places in regional cities.
3. See https://www.iedc.in.gov/programs/regional-cities-initiative/regional-plans for these plans.

Ultimately, each region received up to $42 million from Indiana to match to their regional plans. As of October 2017, each community had allocated local public and private investment, and secured other state funds (such as INDOT funding) to support projects in their communities.

Data on these investments were self-reported as part of the approval process for individual projects. Importantly, at the time of this writing, investments are not complete, and all projects have not been started since many were not planned to commence until spring 2018 or later. Thus, comparison of regions with respect to relative scale of impacts is not appropriate until final projects are complete, and have had sufficient time to affect investment and relocation decisions in their regions. Summary data appear in *Table 1*.

Estimating the Impact of the Regional Cities Initiative

A full evaluation of the comprehensive impact of the Regional Cities Initiative investments will require several years. For example each region selected chose population growth as a chief goal of these investments. That impact would naturally require several years or longer to be fully realized as households adjust their location decisions to changes in amenities and employment. Moreover, the projects themselves may take several years to complete, and data availability for the full range of impacts will lag project completion by as much as four years. Thus, any assessment during the construction phase of these projects must be viewed as preliminary and subject to a fuller evaluation in later years.

The most appropriate methodology to deploy in this type of scenario is a dynamic Computable General Equilibrium Model (CGE). This is a type of economic model which includes known relationships between variables (such as population growth and regional income), permitting the user to simulate the effects of a 'shock' to the model. Examples of shocks would include large population changes, capital investment or policy changes such as a tax change. Clearly the size of the Regional City investments represent the potential for such a shock.

To conduct these estimates we use the best known of dynamic regional CGE models, produced by REMI, Inc. in a 23 sector model of Indiana.[4] In addition, we conduct separate confirmatory analysis of some of the particulars of the model results. For example, among the important outputs to be considered are population growth resulting from investments. Thus, we would test, in an independent model, the impact of population change on assessed value (investment) in Indiana.

To perform this test, we construct an econometric model which

Table 1. Summary of Regional City Regions & Investment Data

Participating Counties	Elkhart, Marshall, St. Joseph, Kosciusko, LaGrange, Steuben, Noble, DeKalb, Whitley, Wabash, Huntington, Wells, Adams, Allen, Posey, Gibson, Vanderburgh, Warrick
Number of Projects	64
Private Investment	$835,558,756
Regional Cities Initiative	122,111,537
Local Investment	$251,187,226
Other State Funds*	$35,485,000
Total	$1,208,857,519

*Note: Other state funds are not included in the total funding or in the impacts, since they would likely have been spent in the region and are thus not exogenous impacts related to the Regional Cities Legislation.

Figure 2. Impulse Response Function Results of a One Standard Deviation Change in Assessed Value on Population (Roughly $512 Million)
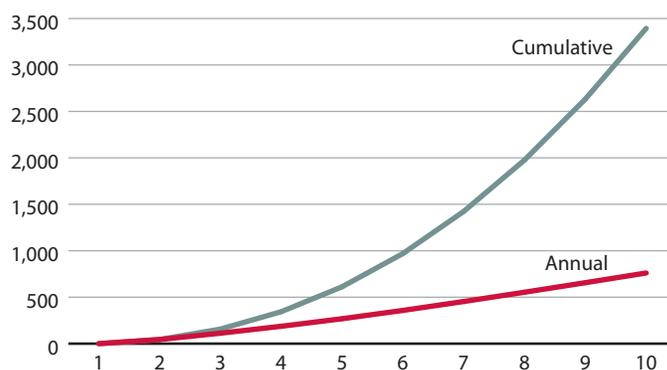
evaluates the historical linkages between assessed value growth and employment growth in Indiana's 92 counties. We use data from 2003-2013 in the following model specification:

$$\frac{\partial Pop}{\partial t} = \alpha_{1,t\text{-}n} \left(\frac{\partial Pop_{t\text{-}n}}{\partial t\text{-}n} \right) + \alpha_{2,t\text{-}n} \left(\frac{\partial AV}{\partial_{t\text{-}n}} \right) + \varepsilon_{i,n} \quad \textbf{(Eq. 1)}$$

...which is referred to as an error correction model.[5] This model performed well on diagnostic relationships, and helpfully yields a dynamic relationship between investment change and population growth. See *Figure 2*.

This model suggests that a single roughly $500 million increase in assessed value in a county would continue to affect population for more than a decade, resulting in cumulative population increase of roughly 3,400 persons within a decade.

We report this as an illustration of the link between historical estimates and the dynamic Computable General Equilibrium model used to estimate the impacts of the Regional Cities Initiative.

4. See their model outline here: http://www.remi.com/the-remi-model/overview , and academic study in Trezy, Rickman and Shao (1991). For relevant examples of CGE modeling with REMI and other models see: Thaiprasert, Faulk, and Hicks (2013) and Burton, Hicks, and Sowards (2007).

5. In this model results, we assume a cointegrating relationship which includes an intercept and trend in the cointegrating (or linking equation). The R-squared between investment and population is a 0.91, in a two lag model.

One complicating feature of the CGE estimates is the assumption that the investments made in these regions associated with the Regional Cities Initiative are purely exogenous, meaning that they would not have occurred in these places without the RCI support. This matter is better answered after several years of additional data have been made available. However, to account for this issue, we do exclude any additional state investments made on these projects, assuming that these dollars would have eventually been made available through standard budgeting formulas.

One important weakness in a CGE model is that the calibrated values of impacts are typically made over several years preceding the target date of analysis. Changes to these relationships then necessarily weaken the results of the CGE. For example, the estimates of amenity investment impacts on population growth are likely based on much earlier econometric studies of the phenomenon. For example, the rapidly increasing pace of urbanization surrounding amenities would result in a greater population response to amenities that would be typically captured in a CGE model.

Thus, we proceed by estimating the impact of Regional Cities Initiatives investments that have begun prior to 4th Quarter 2017. There are two additional caveats remaining in this analysis. First, these estimates are not complete, and do not include all regional investments from the RCI, since some have not yet begun. For that reason, it is inappropriate to compare the results across regions. This is true for employment and GDP, fiscal and leverage of funds estimates. We report these aggregate results in the next section.

The Impact of the Regional Cities Initiative

The affected regions comprise 18 counties, with roughly 1.6 million residents. The 64 projects attracted a total of $1.20 billion in investments (not counting other state expenditures) in these regions. Using REMI, Inc. 23 sector model of Indiana, we estimate this investment would yield population growth of roughly 7,960 persons beyond current projections over the next 8 years. Importantly, this population growth allocated across these three regions includes only net new Indiana residents (including those who would otherwise have relocated) not intra-state transfers. See *Figure 3*.

The investments would boost Gross Regional Product by between $234.3 million and $817.7 million per year during the construction phase. Gross Assessed Value of the investments would top $888.9 million by 2020 and the state would recover a total of $54.7 million in tax revenue in the first three years of the project. Importantly, these investments also lead to impacts not included in this model, due to changes in amenity mix and housing values. See *Figure 4* and *Table 2*.

These estimates are likely conservative because they do not reflect the impact of amenities on growth. However, if we compare the investment levels to the historical estimates provided in

Figure 3. Regional Cities Population Impact*
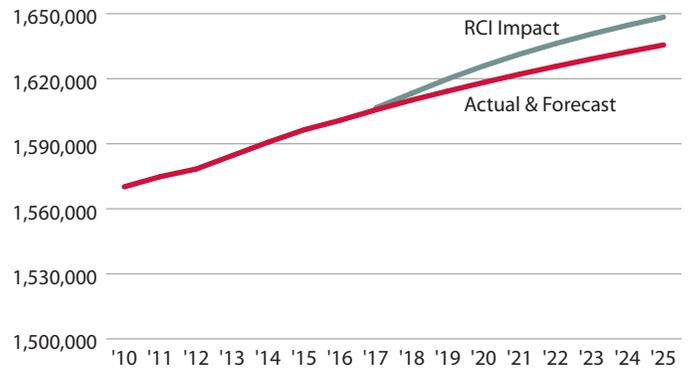*Note: Forecasts consists for 5-year moving average, with population estimates from the REMI model.

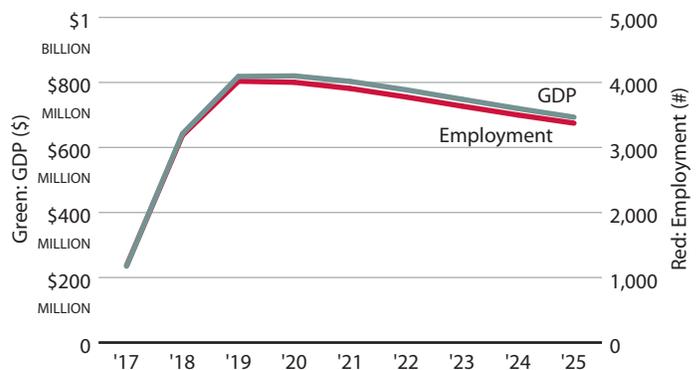## Figure 4. Cumulative Impact of RCI Investments on Employment & GDP

Table 2. State Tax Revenues from RCI Investments

	2017	2018	2019
Personal Income Tax ($)	5,113,784	9,651,349	4,981,043
Sales Tax ($)	5,727,438	10,809,511	5,578,768
Corporate Net Income Tax ($)	3,699,814	6,416,583	2,773,373
Total State Taxes ($)	*14,541,036*	*26,877,443*	*13,333,183*

Figure 1, we have a very strong concordance. In the empirical model underlying the estimate in *Figure 1*, a roughly $500 million increase in investment would result in population growth of 3,400 additional residents. In the REMI, Inc. model, investment of roughly $1.2 billion resulted 7,960 net new residents over the next eight years. These two estimates are very similar, despite very different methodological approaches.
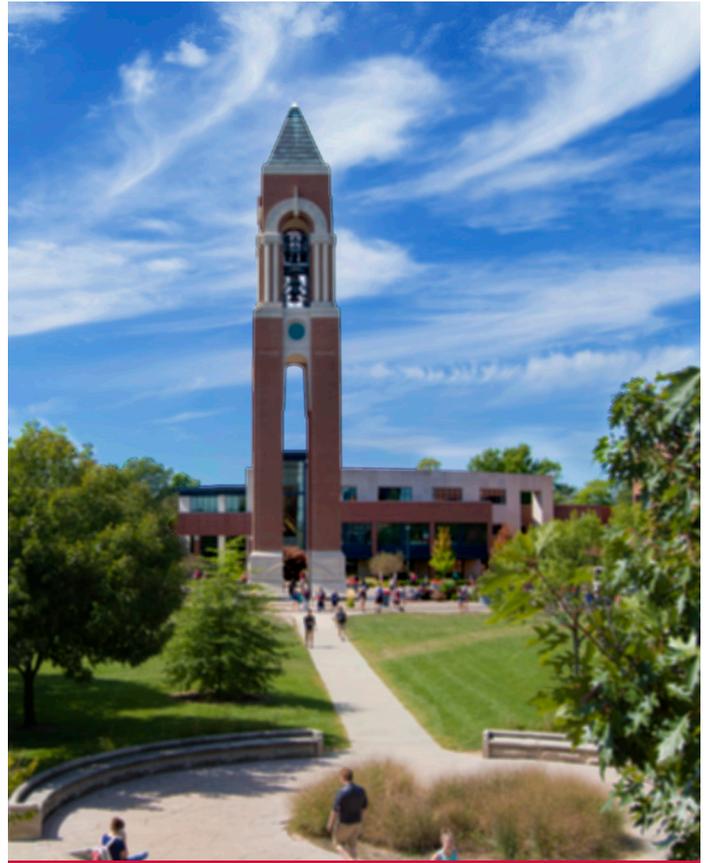
Summary & Discussion

With a promised investment of $42 million in each of three regions, the Regional Cities Initiative have supported investments that affect 1.66 million Hoosiers, or roughly a quarter of the state's residents. Excluding the roughly $35.48 million in other state dollars deployed to these projects (such as roadway or educational spending), total investment totals more than $1.2 billion with $804 million of that from the private sector. State tax revenues collected from these construction activities total $54.7 million over the first three years. Thus, the net cost to the state to attract 7,960 new residents over this initial time period is roughly $72 million, or $9,045 per new resident. This figure is consistent with the cost associated with traditional state job creation incentives. Importantly, the attraction of a new resident will typically have much longer term benefits, hence larger effects, that efforts to attract individual workers.

Not included in this analysis are the very long term effects of residential population growth in these regional cities. The goal of this program is to stimulate long term population growth through investments in urban amenities. This growth tends to be self-reinforcing through agglomerations effects, as larger cities observe population growth at rate higher than smaller cities. For example, in calculating population growth rates in metropolitan areas of the United States from 2001 to 2015 (the most recent data), we find that doubling the size of a city roughly doubles the population growth rate in that city.[6] Thus, the numbers provided here are conservative, in that they do not include amenity impacts which may be much larger than the estimates provided here.

6. In d(log(pop)) = -1.00 +0.015pop – 0.00054(pop)2, with average growth rate of roughly 0.8% from 2001-2015.

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