

Southeastern Indiana Regional Planning Commission

State of Digital Inclusion



Center for Regional Development

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Development

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Section I - Background & Justification

The Southeastern Regional Planning Commission (SIRPC) and the Purdue Center for Regional Development (PCRD) partnered to develop a comprehensive regional digital inclusion plan. The SIRPC consists of nine counties in southeastern Indiana: Dearborn, Decatur, Franklin, Jefferson, Jennings, Ohio, Ripley, Shelby, and Switzerland.

This report is the first step in the planning process and provides valuable information to the regional digital advisory team (RDAT). Ensuing planning steps will include public input and drafting a regional digital inclusion plan. The main objective of this plan is to make the region more digital inclusive by focusing not only on broadband infrastructure but also digital literacy, devices, community and economic development, and quality of life in general.

This state of digital inclusion report was compiled using a mixed methods approach. An innovative individual digital capital survey was conducted. In addition to the survey data, multiple secondary data sources were analyzed including but not limited to Microsoft, GoDaddy, U.S. Census Bureau, Federal Communications Commission (FCC), M-Lab, and school district data, among others.

This report consists of several sections where regional and county-level data are presented. The second section discusses socioeconomic trends, including the digital economy, to set the stage and context in the region.

The third section looks at broadband deployment data from the Federal Communications Commission (FCC) to provide a detailed understanding of the broadband technologies available and visualize underserved areas—defined as areas with no access to at least 100 download and 20 upload (100/20 for short) megabit per second (Mbps) speeds. The current FCC broadband definition of 25/3 is also presented. County-level speed test results were also analyzed in this section. This section also analyzed Census data to identify areas in digital distress as well as homework gaps. An overview of the digital divide index is also discussed in this section.

In section four, findings from the digital capital survey are discussed, which focus on digital inclusion differences between counties while section five looks at differences between groups in the region.

The main objective of this report is to provide useful information to the RDAT as they begin drafting digital inclusion plans for their communities.

Section II - Socioeconomic Trends

This section looks at the socioeconomic trends in the region to provide a better understanding of the context under which digital inclusion is taking place. These trends are not meant to be comprehensive. Rather, provide a quick snapshot of multiple metrics associated with technology adoption. Notice that multiple sources are used.

First, population change and race & ethnicity breakdown are reviewed between 2010-2019. These metrics provide an overall sense of population growth in the region as well as diversity. Next, the share of the population among specific age groups is reviewed to understand if the region's population is growing older. This is important because technology adoption is strongly associated with age. Younger age groups are more digitally savvy while their older counterparts required a bit more time and assistance to adopt digital technologies.

Next, educational attainment among those ages 25 years or older is examined. Again, educational attainment is a strong predictor of technology adoption and the ability to leverage it to improve an individual's quality of life. Closely related to educational attainment is income, which is analyzed next. A unique metric called per capita market income is reviewed since income is also highly associated with adoption and use of digital technology.

The share of self-employed and innovative entrepreneurs is reviewed next. These two metrics are highly associated with technology use and in fact, require access to adequate digital technology and use of digital applications in order to compete and grow. Regarding internet adoption and use, a new metric is introduced as a proxy to internet use among residents and businesses in the region. This metric gauges active and highly active websites per 100 residents and is strongly associated with positive economic impacts.

Finally, digital economy trends are reviewed. The concept of the digital economy continues to evolve but currently it includes a list of more than 150 industries that are digitizing at a fast pace or have a significant impact on the digital economy (e.g., data centers, retailers that sell primarily online, advanced manufacturing, etc.). Likewise, a look at the growth of jobs in the region is reviewed to better understand the demands regarding levels of digital skills. In other words, of the jobs being generated or lost in the region, did they require low, middle, or high levels of digital skills. Remote work is also reviewed to better gauge the breadth and depth of this strategy in the region.

II. Population Change & Race

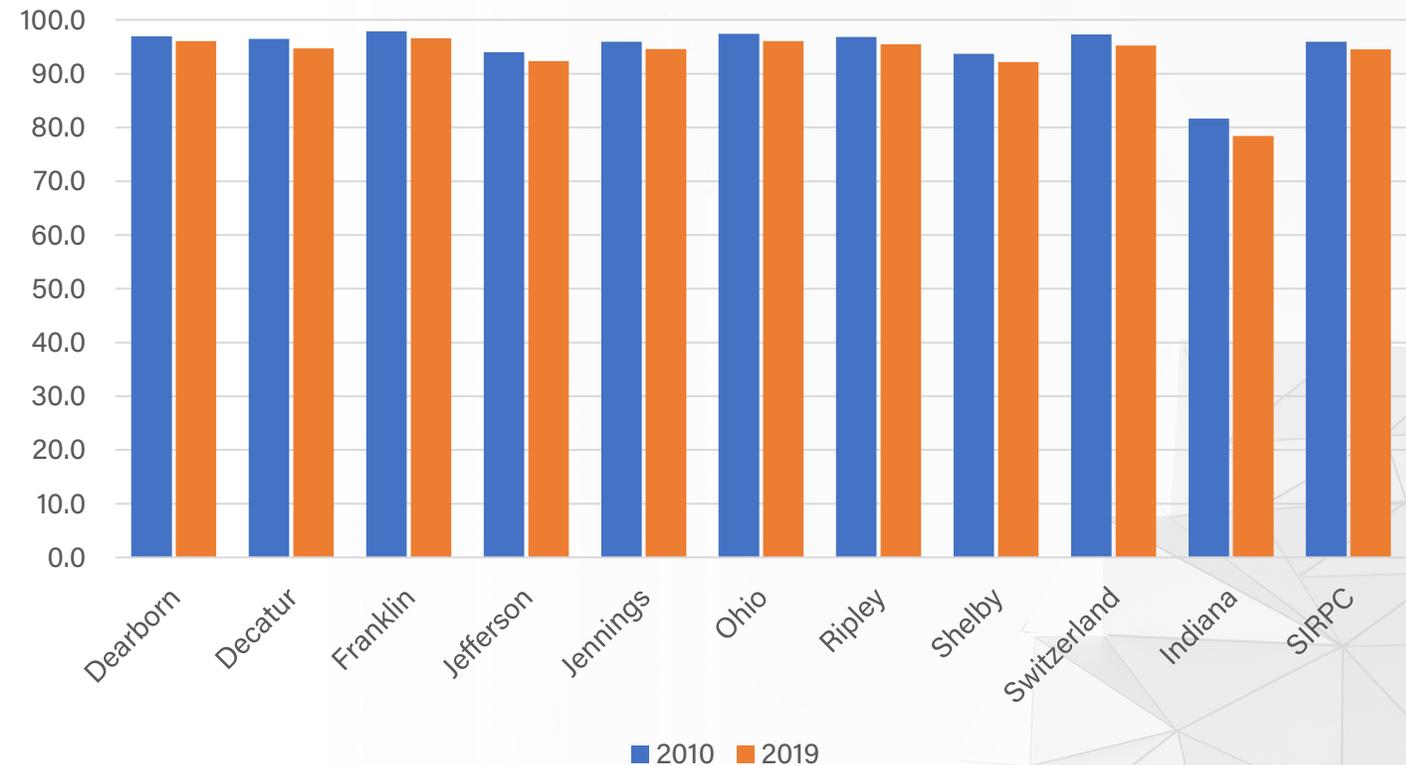
Source: U.S. Census Population Estimates

2010-2019 Population Change

Geography	2010	2019	Per. Change
Dearborn	50,047	49,458	-1.2
Decatur	25,740	26,559	3.2
Franklin	23,087	22,758	-1.4
Jefferson	32,428	32,308	-0.4
Jennings	28,525	27,735	-2.8
Ohio	6,128	5,875	-4.1
Ripley	28,818	28,324	-1.7
Shelby	44,436	44,729	0.7
Switzerland	10,613	10,751	1.3
Indiana	6,483,802	6,732,219	3.8
SIRPC	249,822	248,497	-0.5

The region's population decreased half a percentage point from 249,822 in 2010 to 248,497 in 2019. Three counties gained population with Decatur County experiencing the largest increase (3.2%) followed by Switzerland County (1.3%) and Shelby County (0.7%). Of the six counties in the region that experienced a population decrease, Ohio County had the largest (4.1%) followed by Jennings County (2.8%).

2010-2019 Percent White, non-Hispanic



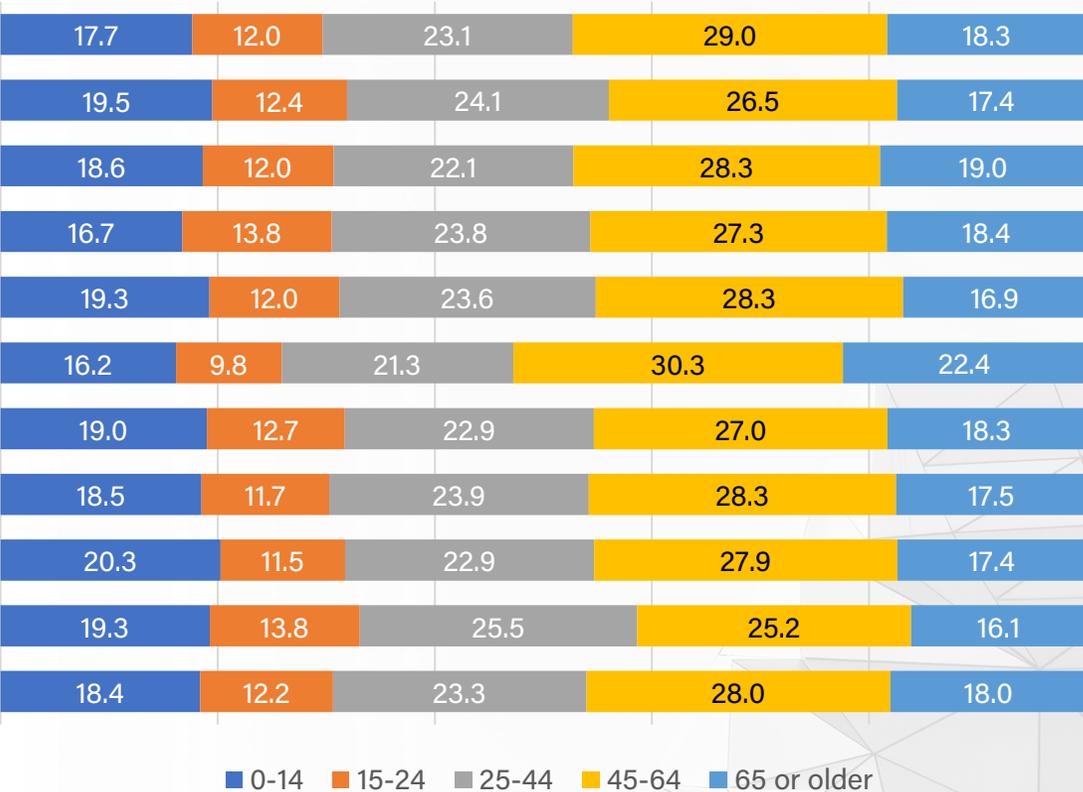
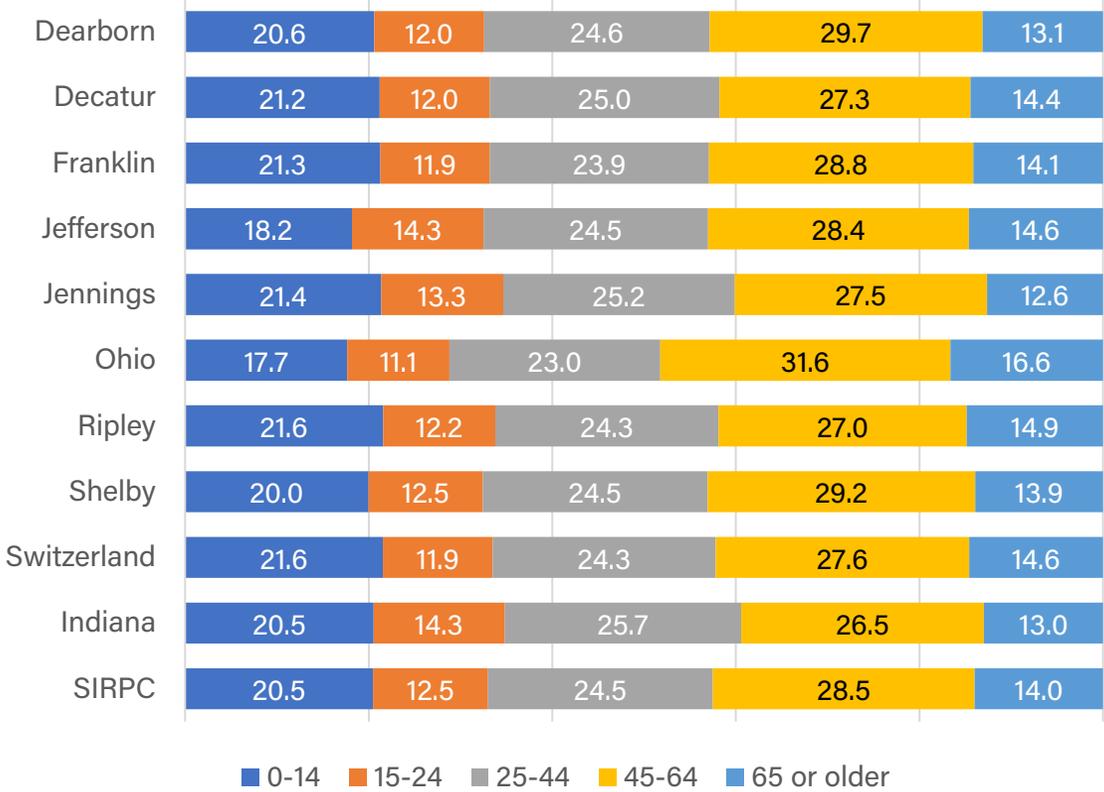
Most of the the region's population is white, non-Hispanic accounting for 94.5% in 2019. This has not changed much between 2010 and 2019. The share of minorities in the region increased from 4.1% in 2010 to 5.5% in 2019, below the state's share of 21.6% in 2019. Shelby County had the largest share of minorities in the region with 7.9% in 2019 followed by Dubois County with 7.6%.

II. Age Groups Breakdown

Source: U.S. Census Population Estimates

2010

2019

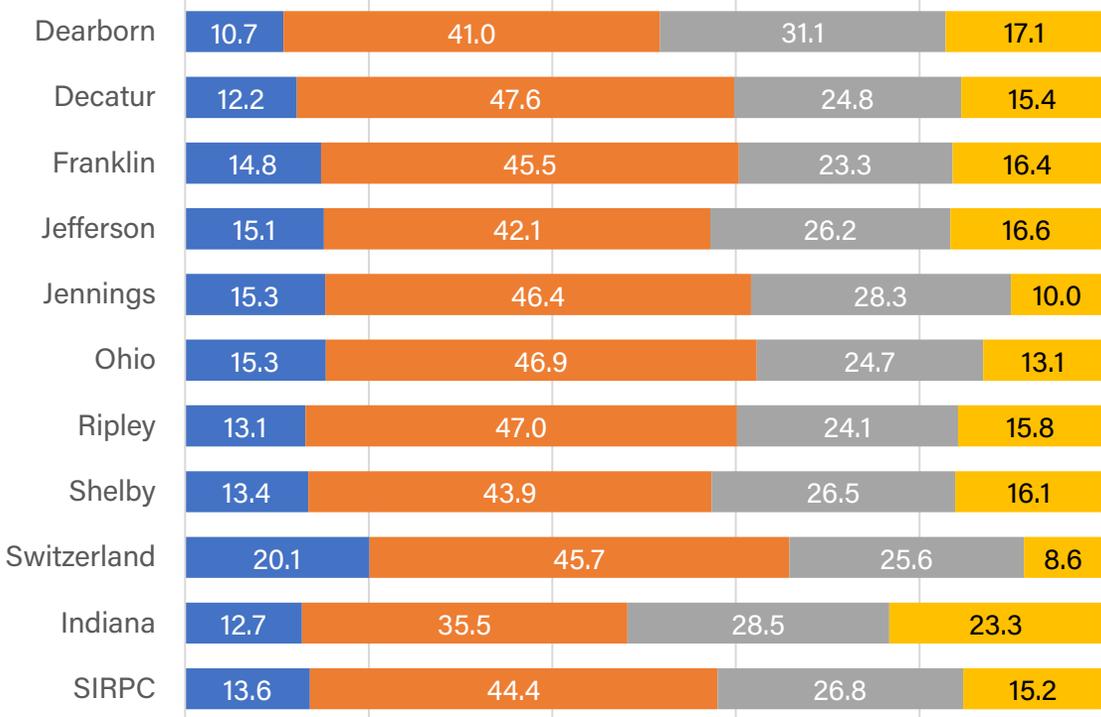


i The share of those less than 25 years old decreased in the SIRPC region from 33% in 2010 to 30.6% in 2019. Likewise, the share of those younger than 15 years old decreased from 20.5% to 18.4%. On the other hand, the share of those ages 65 or older in the region increased from 14% in 2010 to 18% in 2019. Ohio County had the highest share of those age 65 or older in 2019 with a little more than one-fifth (22.4%) followed by Franklin County with 19%. Switzerland County on the other hand had the highest share of those younger than 15 in 2019 with 20.3%.

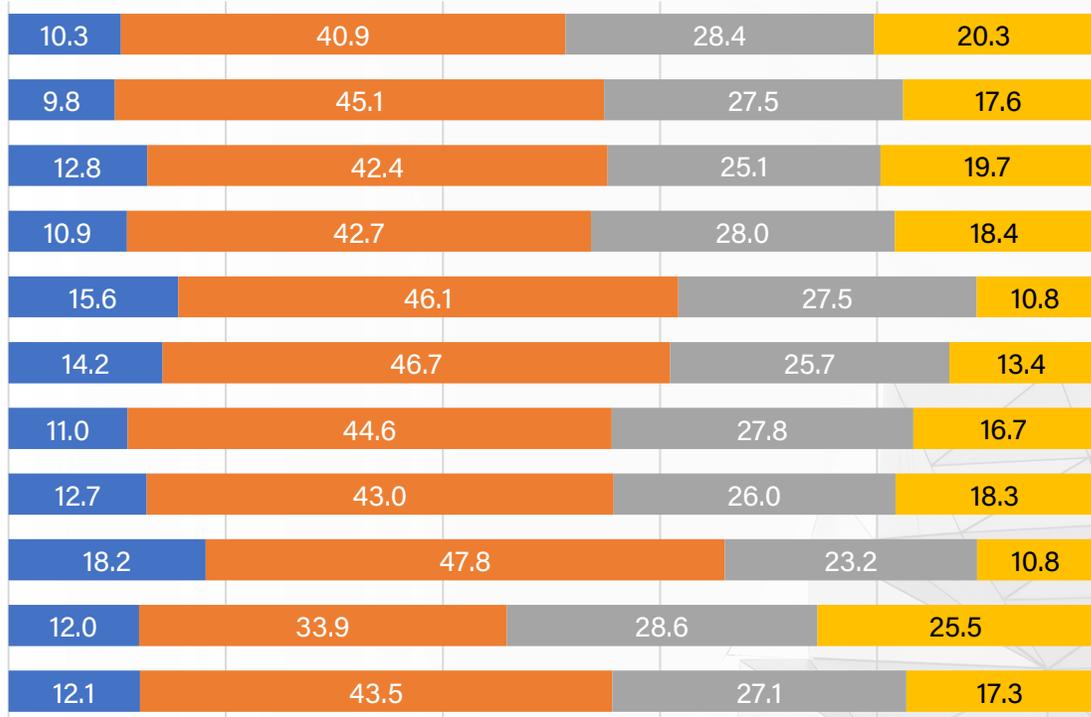
II. Educational Attainment

Source: EMSI

2010



2019



■ Less than high school ■ High school ■ Some college ■ Bachelor's or higher

■ Less than high school ■ High school ■ Some college ■ Bachelor's or higher

i The graph shows educational attainment of the population 25 years or older. In the region, about 15.2% in 2010 had a bachelor's degree or higher compared to 17.3% in 2019. Overall, the region's share of those with a high school diploma was ten percentage points higher than the state, 43.5% versus 33.9% respectively. Likewise, the share of those with less than a high school diploma decreased across all counties in the region. Franklin County had the largest share of those with a bachelor's degree or higher with 19.7% while Switzerland County had the lowest with 10.8%.

II. Per Capita Market Income

Source: Bureau of Economic Analysis

2010 & 2019 Per capita market income (in 2019 dollars)

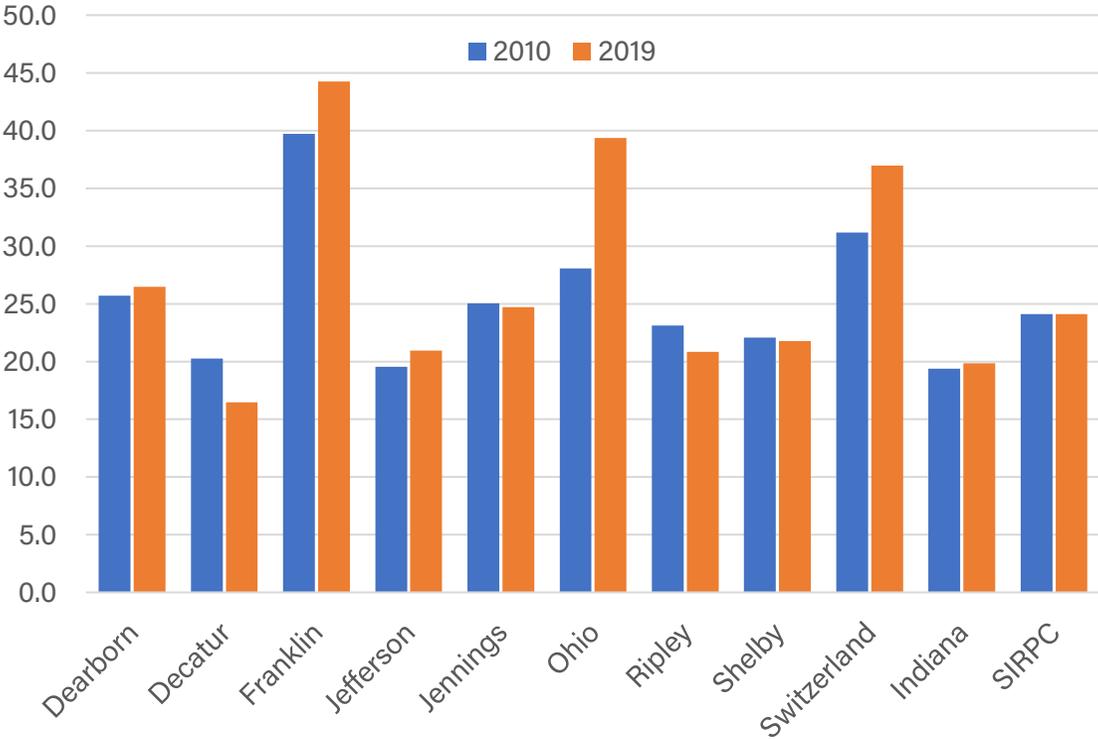


This graph shows the per capita market income (PCMI) in the region between 2010 and 2019. Per capita market income subtracts government transfers to individuals from personal income. Figures are adjusted for inflation (in 2019 dollars). PCMI increased across the region from \$30,544 in 2010 to \$34,555 or about \$4,000. Largest increase took place in Dearborn County followed by Jennings County. However, PCMI in the region (\$34,555) is still below the state PCMI of \$39,498 in 2019. Data does not say why the sharp decrease in per capita market income in Ohio County.

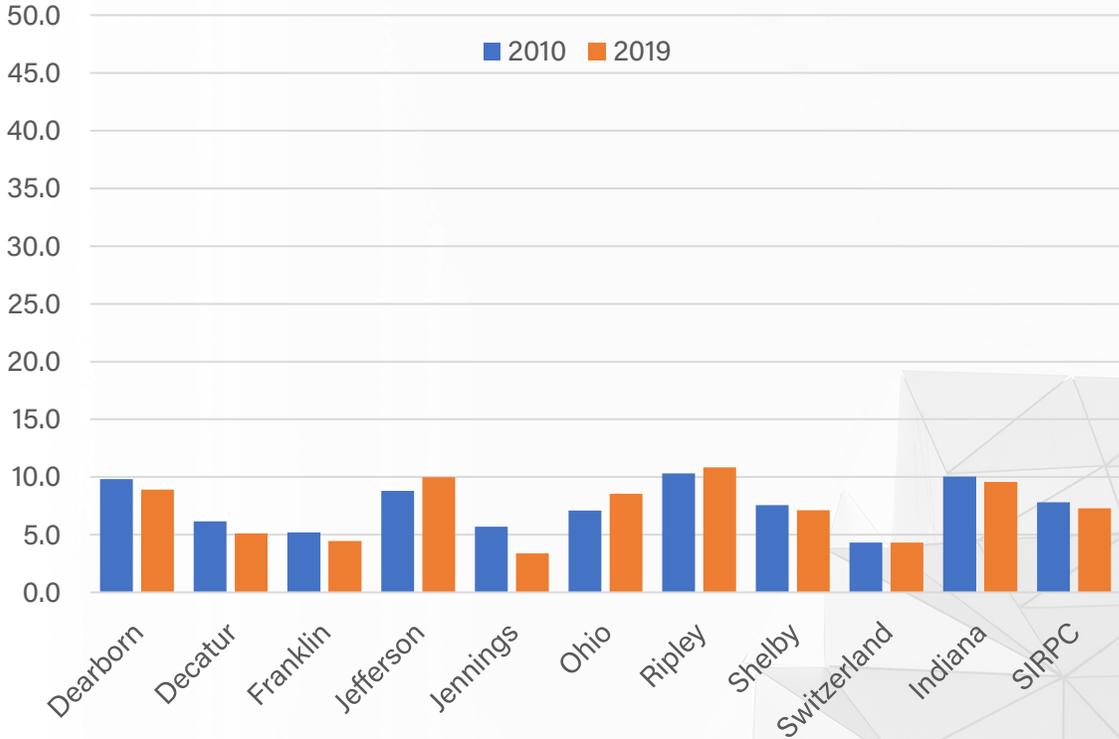
II. Self-Employed & Innovative Entrepreneurs

Source: Low & Isserman (2015); EMSI

Percent Self-Employed of Total Jobs



Percent Innovative of Self-Employed

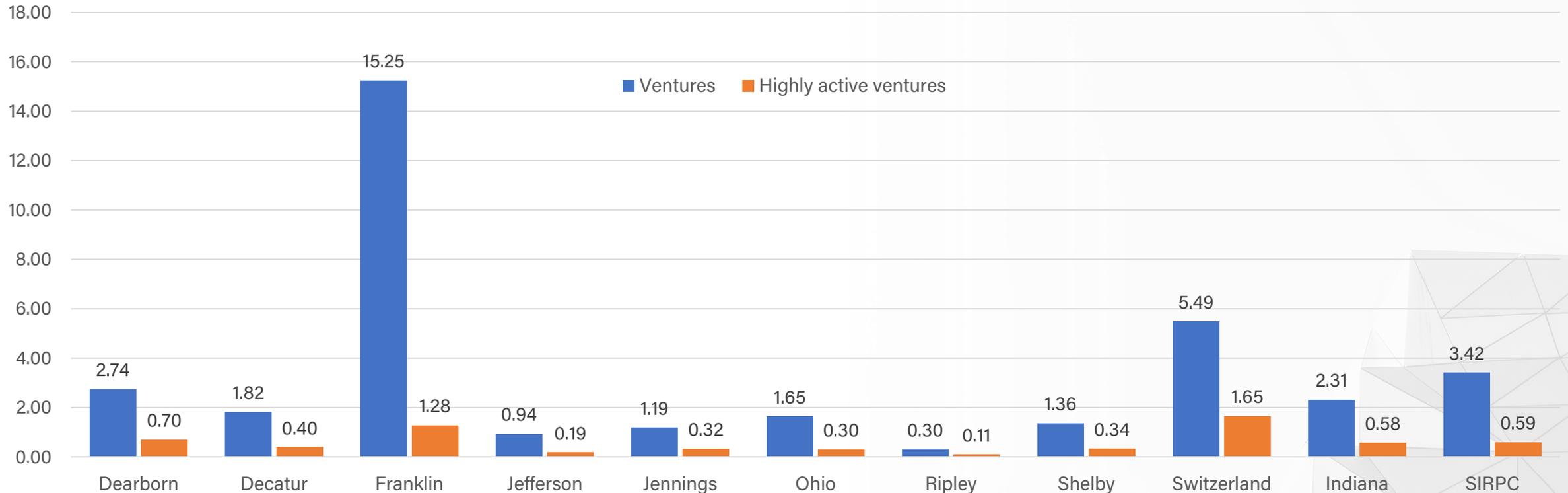


Self-employed includes those who consider self-employment as a significant part of their income as well as extended proprietors or those that earn an income through self-employment but do not consider it their primary job. As shown, the region had a higher share of self-employed compared to the state though it remained at 24.1% for both 2010 and 2019. Five counties in the region experienced an increase in their self-employed while four experienced a decrease. Research identifies multiple types of entrepreneurs ranging from innovative to reactive. Reactive entrepreneurs typically fill in local needs (e.g., grocery shops). On the other hand, innovative entrepreneurs are considered those with more growth potential and are defined by 35 industries ranging from electric power generation to software publishers to office administrative services. For this metric, the region had a lower share compared to the state though Jefferson and Ripley Counties reached at least 10% of innovative entrepreneurs of all self-employed.

II. Venture Density (Websites)

Source: GoDaddy

2019 Venture and highly active venture density (websites per 100 residents)

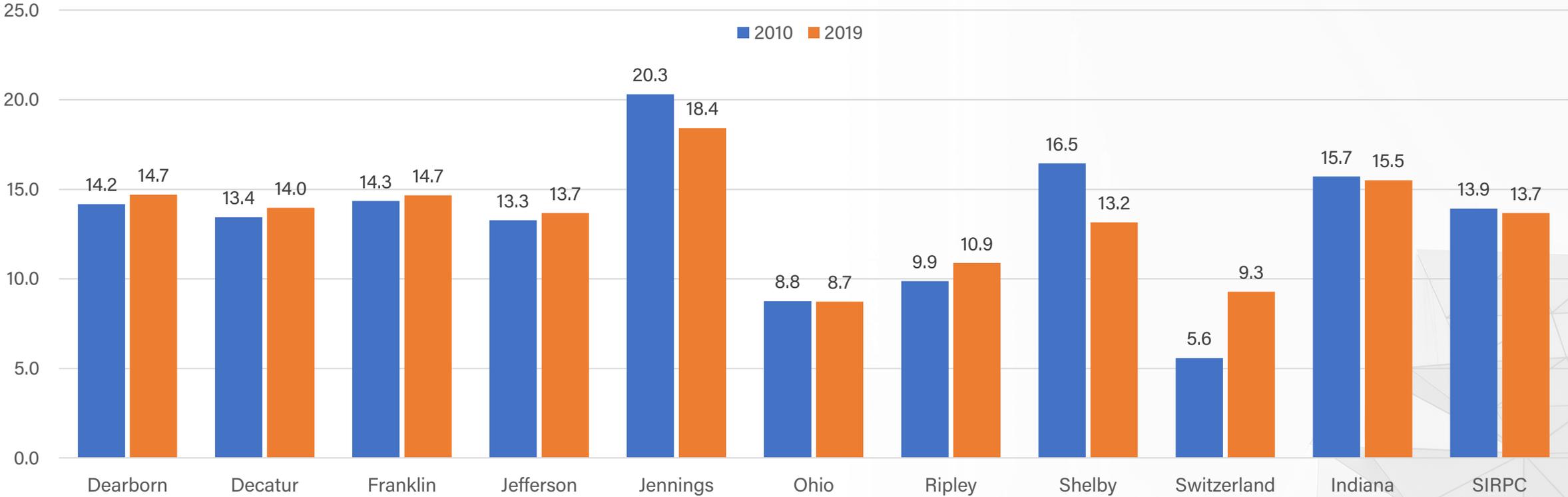


This graph shows data from the internet hosting company GoDaddy. They calculated ventures and highly active ventures density (websites per 100 residents) at the county-level as of December 2019. A venture includes active websites as well as services attached to a website (email, payments, social media, etc.). A highly active venture considers how busy the website is, how networked or linked it is to other websites, and how built-out it is (breadth and depth of services available on the website). This is a good indicator of internet adoption and use and is associated with a positive economic impact. As expected, the highly active venture density is much lower compared to the venture density. On average, the venture density in the region was of 3.42 compared to 2.31 in the state. Franklin County had the highest ventures per 100 residents (15.25) while Switzerland County had the highest highly active ventures per 100 residents (5.49) in the region.

II. Digital Economy: 2010 & 2019

Source: Bureau of Economic Analysis; EMSI

Percent digital economy jobs of total jobs

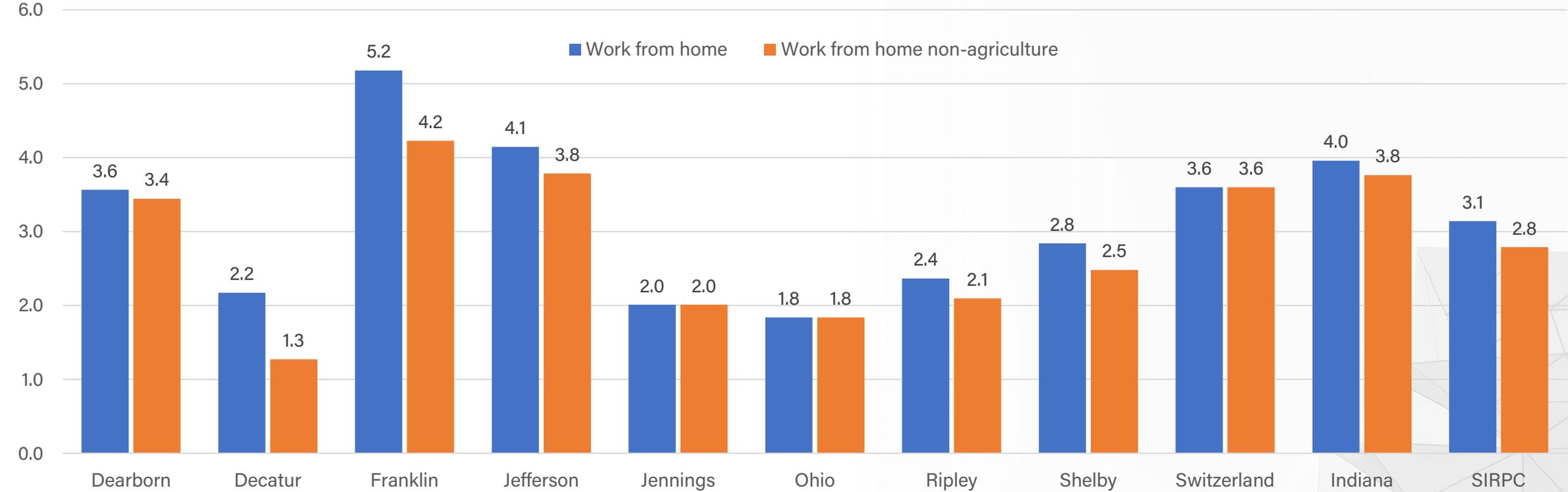


The digital economy is defined as a group of 189 industries (includes industries known as advanced industries), whose activities are strongly associated with the digital economy (e.g., communication equipment manufacturing, distribution centers, or retail that takes place primarily online). This portion of the economy has higher wages and is experiencing on average faster growth in the nation. The share of digital economy jobs in the region decreased slightly between 2010 and 2019, from 13.9% to 13.7%. The share of digital economy jobs increased in Dearborn, Decatur, Franklin, Jefferson, Ripley, and Switzerland Counties. In fact, it increased the most in Switzerland County. Jennings County had the highest share with 18.4% as of 2019.

II. Work from Home Trends

Source: 2015-2019 ACS

Percent workers 16 and older working from home



i Although remote work or work from home has been around for a while, the COVID pandemic has emphasized its potential as a feasible rural economic development strategy. This graph shows the percent of workers 16 and older that worked from home. Since farmers can be included as working from home, a share shows overall working from home and the share that does not include working from home in agriculture. Overall, farmers do not account for most of those working from home in the region. For example, the work from home share for the region was 3.1% compared to 2.8% among those in the non-agriculture industry. Franklin County had the highest share of those working from home at 5.2% compared to Ohio County with only 1.8%.

II. Jobs by Digital Skill Level

Source: Brookings Institution; EMSI

2010 & 2019 Jobs that required digital skills

This table shows the breakdown of jobs based on occupations whose digital skill levels were identified. The low digital skills category included 104 occupations; the medium digital skills category included 245 occupations; and the high digital skills category included 169 occupations. These jobs categorized on digital skill levels accounted for about 85% of total jobs. In other words, the digital skills required was not possible to identify for about 15% of total jobs.

The state overall added a net of 113,922 jobs between 2010 and 2019 among these types of jobs (with digital skill levels identified) or an increase of 3.5%. On the other hand, the region lost a net of 674 jobs or a decrease of 0.7%. Notice, however, that more than 4,700 jobs were lost that required low digital skills versus a gain of 2,500 requiring medium digital skills and 1,500 high digital skills. In other words, the gain in medium and high digital skill jobs was not sufficient to offset the loss of low digital skill jobs in the region.

All counties in the region lost jobs requiring low digital skills. Dearborn, Ohio, and Switzerland counties lost jobs across those requiring low, medium, and high digital skills. Shelby County gained the most jobs requiring medium and high digital skills in the region. In other words, most new jobs in the region between 2010 and 2019 required medium or high digital skills.

Jobs with Digital Skills Identified	Total			Digital Skill Level Change		
	2010	2019	Difference	Low	Medium	High
Dearborn	18,966	17,896	-1,069	-817	-102	-150
Decatur	13,545	13,866	320	-1,394	1,184	530
Franklin	6,998	6,969	-29	-621	312	279
Jefferson	14,343	14,123	-220	-527	104	203
Jennings	9,054	8,997	-57	-108	110	-59
Ohio	2,027	1,923	-104	-55	-42	-8
Ripley	14,592	14,394	-198	-229	-82	113
Shelby	19,494	20,352	859	-1,005	1,209	654
Switzerland	3,208	3,034	-175	-38	-126	-11
Indiana	3,235,557	3,349,480	113,922	-158,276	154,474	117,725
SIRPC	102,227	101,553	-674	-4,793	2,566	1,552

Section III - Broadband Deployment

This section looks at multiple metrics concerning broadband deployment and internet speeds. Internet speeds are reviewed because the current federal broadband definition is based on speeds, specifically 25 megabits per second (Mbps) download and 3 megabits per second upload, or 25/3 for short. Availability of 100/20 is also included since multiple states are planning deployment around those speeds. The ROI region should attempt to plan for this speed threshold as well. Otherwise, the region and the state will be at a competitive disadvantage.

While the multiple metrics reviewed in this section may result in contradicting results, this is important for two main reasons. First, it highlights that broadband availability data is far from perfect and results will vary depending on which metric is used. These discrepancies should prompt more accurate and granular data gathering prior to broadband deployment efforts. Second, it makes it clear that broadband infrastructure planning needs to begin at the local level. This is a complex issue and requires broad coalitions and all hand on deck to be resolved.

Second, availability of maximum advertised speeds were analyzed. The source of this data is the Federal Communications Commission (FCC) Form 477. Internet providers submit information using this form twice per year. However, this data is known to overstate broadband availability for multiple reasons, specifically in rural areas. Regardless, this is the only dataset available and thus it is used for illustrative purposes and to jumpstart meaningful conversations. Data only includes residential service and does not include satellite technology.

Next, data provided by Microsoft is reviewed. This data looked at server logs (when computers requested to update Windows or Office) and calculated the share of people in a county not using the internet at a minimum speed of 25 Mbps download. In other words, this data looks at actual usage speeds versus maximum advertised speeds provided by the FCC From 477. Discrepancies between these two datasets are significant.

Like Microsoft's data, a third metric is reviewed showing results of speed tests conducted by internet users in the region and stored by M-Lab. While speed tests are not a perfect metric, they too provide a different story to the maximum advertised data.

In addition, census data is analyzed to identify areas in digital distress as well as homework gaps. Digital distress refer to areas where a higher share of homes either do not have internet access or rely solely on cellular data connections and do not have a computing device or rely solely on mobile devices when using the internet. Research has found that relying solely on cellular data connection or mobile devices undermines the technology's potential due to limited data plans and smaller screens. Related to digital distress is a metric that identifies areas in the region that are at a disadvantage when implementing e-learning and remote work because of limited connectivity and/or a higher share of their jobs not being remote work friendly. While this issue surfaced due to COVID-19, changes brought by the pandemic will persist still leaving these areas at a disadvantage.

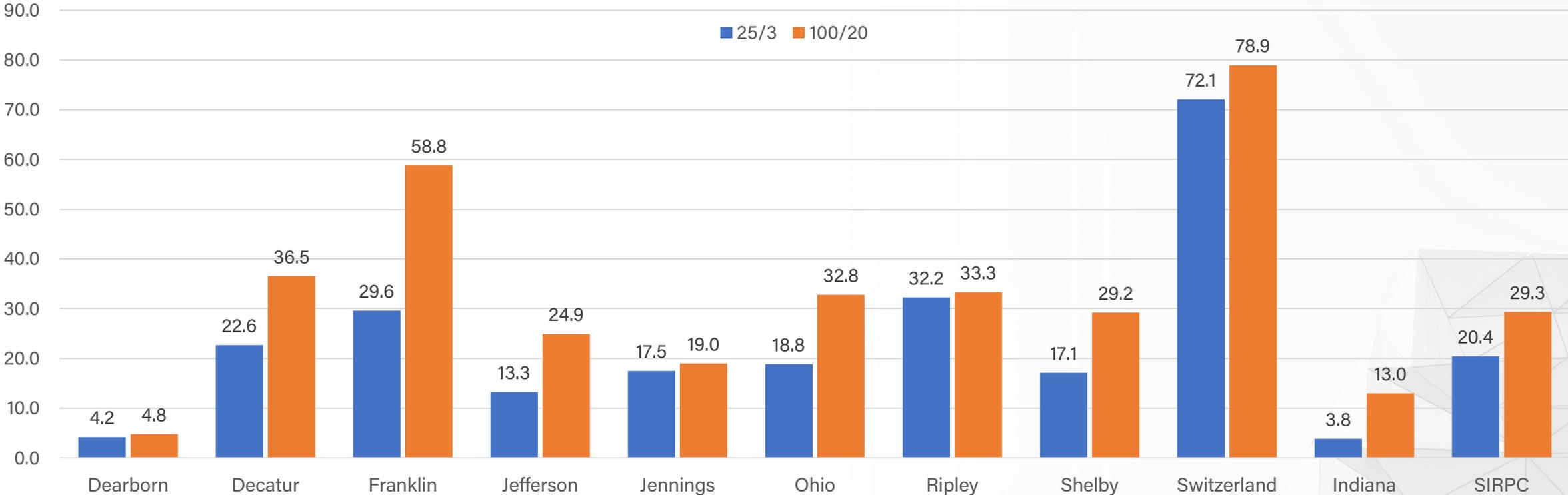
Finally, areas in the region with homework gaps are identified. The homework gap is a term used to describe a situation where children are not able to engage in e-learning and/or complete homework assignment due to lack of adequate connectivity and devices at home.

Finally, a broad metric called the digital divide index (DDI) is reviewed. The DDI incorporates multiple indicators including availability, adoption, and socioeconomic characteristics known to impact technology adoption (see Section II) to identify areas in the region in need of not only broadband infrastructure investment but also efforts to ensure all residents and businesses in the region have access to, can afford, and can utilize this technology and its applications for community and economic development purposes.

III. Broadband Access: Speed Tiers

Source: FCC Form 477 December 2019 v1

2019 Percent of housing units without access to advertised 25/3 & 100/20 Mbps

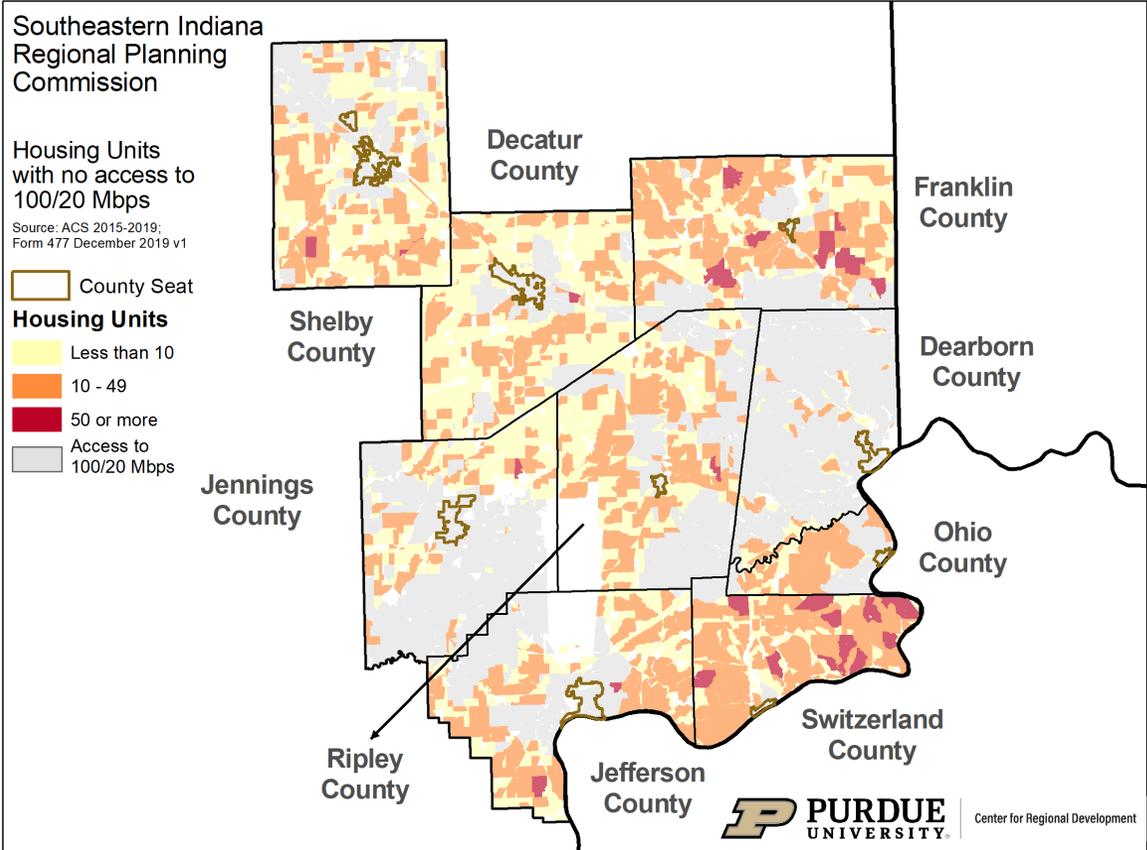
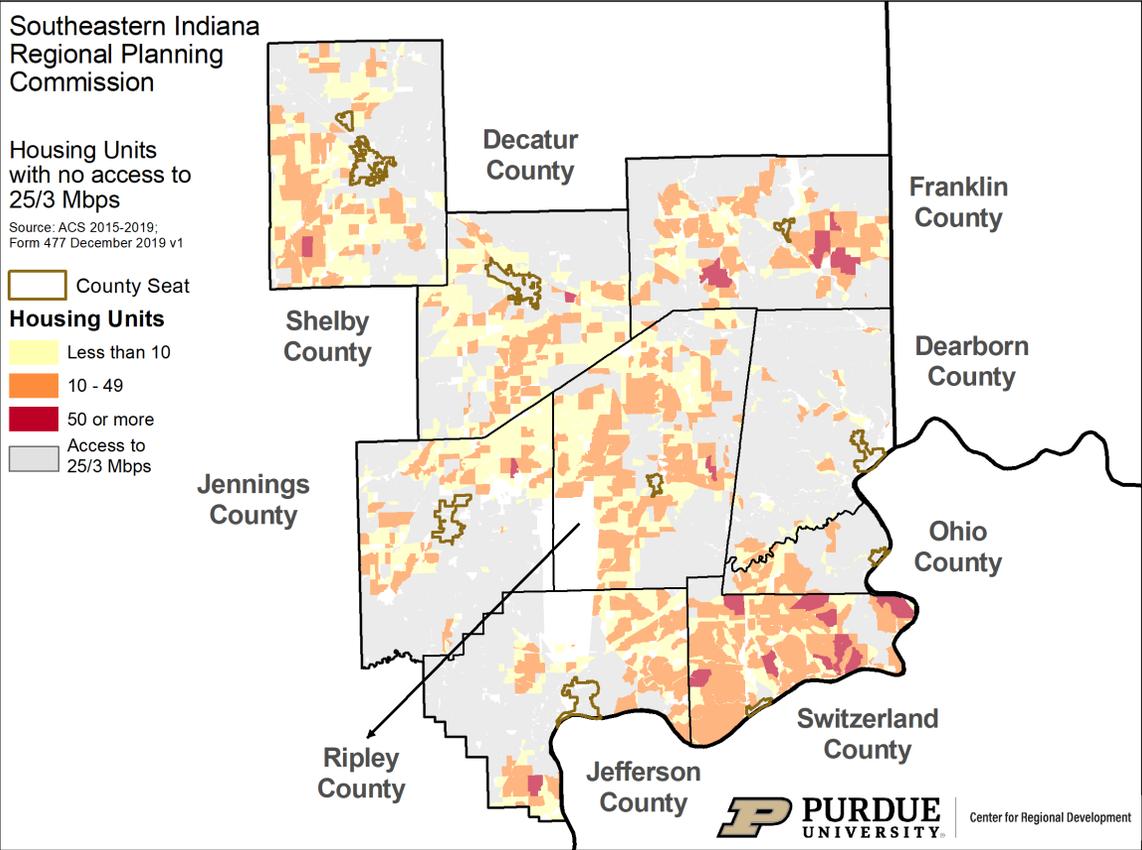


This graph shows the percent of housing units without access to advertised 25/3 & 100/20 Mbps. Switzerland County had the highest share of unserved housing units for both speed tiers while Dearborn County had the lowest share for 25/3 with 4.2% and 100/20 with 4.8%. Most counties in the region had shares higher than the state average of 3.8% for 25/3 and 13% for 100/20. All in all, there were roughly 22,000 housing units in the region without access to advertised 25/3 and about 32,000 without access to advertised 100/20.

III. Broadband Access: Housing Density

Source: FCC Form 477 December 2019 v1

2019 Housing unit density outside the 25/3 & 100/20 footprint



i These maps show the housing unit density outside the 25/3 & 100/20 footprints in the region. The darker orange indicates a higher number of housing units per Census block outside of the speed tier. For example, Daviess County seems entirely covered by 25/3 service. However, when looking at 100/20, several orange areas appear. This indicates housing units outside of the 100/20 footprint.

III. Broadband Technology: Access

Source: FCC Form 477 December 2019 v1

2019 Percent housing units with access to advertised 25/3 & 100/20 by technology

% Housing Units	DSL		Fixed Wireless		Cable		Fiber	
	25/3	100/20	25/3	100/20	25/3	100/20	25/3	100/20
Dearborn	82.0	81.4	0.3	0.3	83.0	83.0	35.2	35.2
Decatur	75.9	62.5	19.7	5.9	54.1	54.1	53.4	53.4
Franklin	64.1	39.2	23.0	2.5	8.0	6.6	39.9	39.9
Jefferson	82.0	70.6	42.8	33.9	69.5	69.5	68.2	68.2
Jennings	66.7	65.3	20.7	19.6	64.2	64.2	49.3	49.3
Ohio	79.3	65.3	77.6	64.8	65.9	65.9	49.8	49.8
Ripley	55.3	54.2	17.4	16.6	27.4	27.4	39.9	39.9
Shelby	72.4	62.9	82.0	70.8	65.9	65.9	6.9	6.9
Switzerland	26.0	19.2	27.8	21.0	19.2	19.2	1.8	1.8
Indiana	89.4	82.3	80.7	72.5	84.3	82.9	40.6	40.2
SIRPC	70.4	62.4	32.3	24.9	56.2	56.1	37.7	37.7



This table shows the percent of housing units with access to advertised 25/3 & 100/20 Mbps by broadband technology. For example, 35.2% of housing units in Dearborn County had access to 25/3 speeds through fiber.

For both 25/3 & 100/20, the most accessible technology in the region was DSL serving 70.4% and 62.4% of housing units, respectively. On the other hand, the most accessible technology in the state for 25/3 was DSL versus cable for 100/20.

Dearborn County had the highest share of homes with access to 100/20 through cable with 83%.

III. Broadband Technology: Speeds

Source: FCC Form 477 December 2019 v1

2019 Average maximum advertised speeds by technology (Mbps)



This table shows the average maximum advertised speeds by technology in megabits per second (Mbps). Overall, cable and fiber had significantly higher advertised download and upload speeds. Fiber, however, was the one advertising almost symmetrical speeds (identical download and upload speeds).

Note how the average per technology varies across counties. For example, the average advertised download DSL speed for Dearborn County was 19 Mbps compared to 14 in Jennings County.

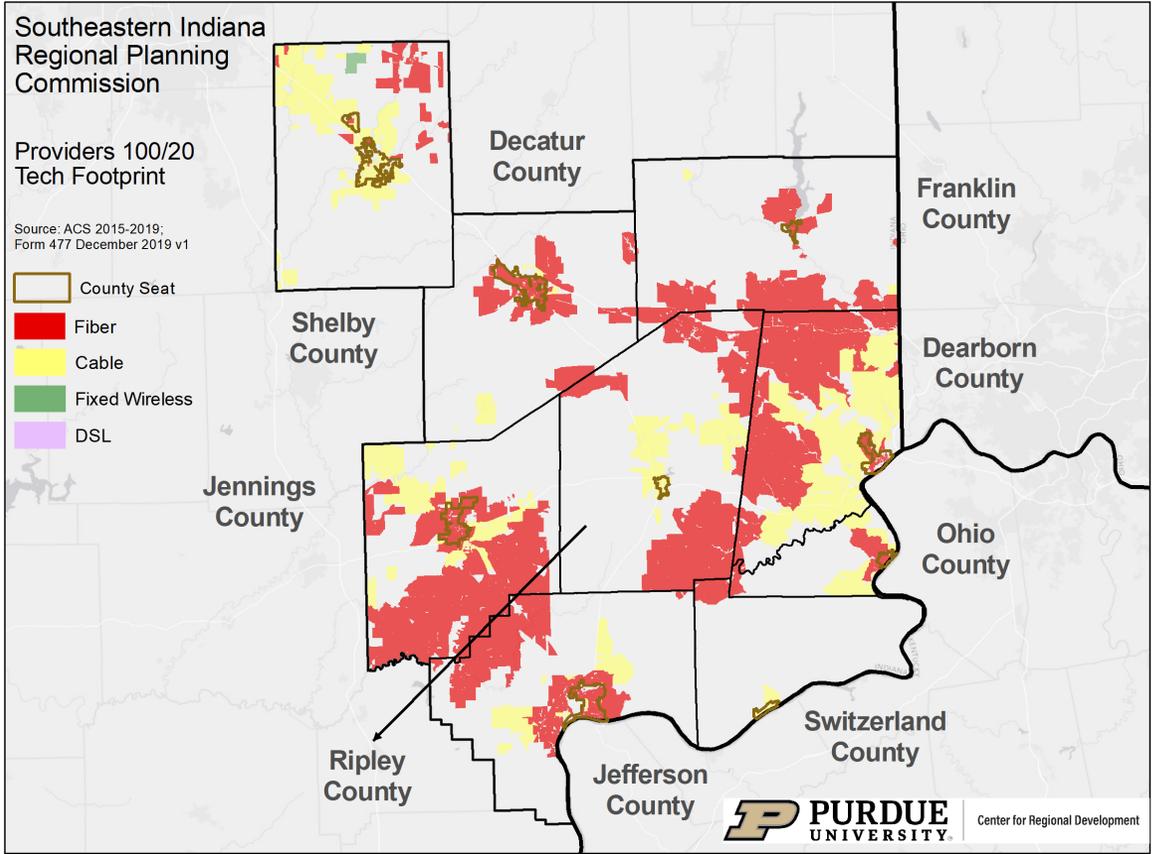
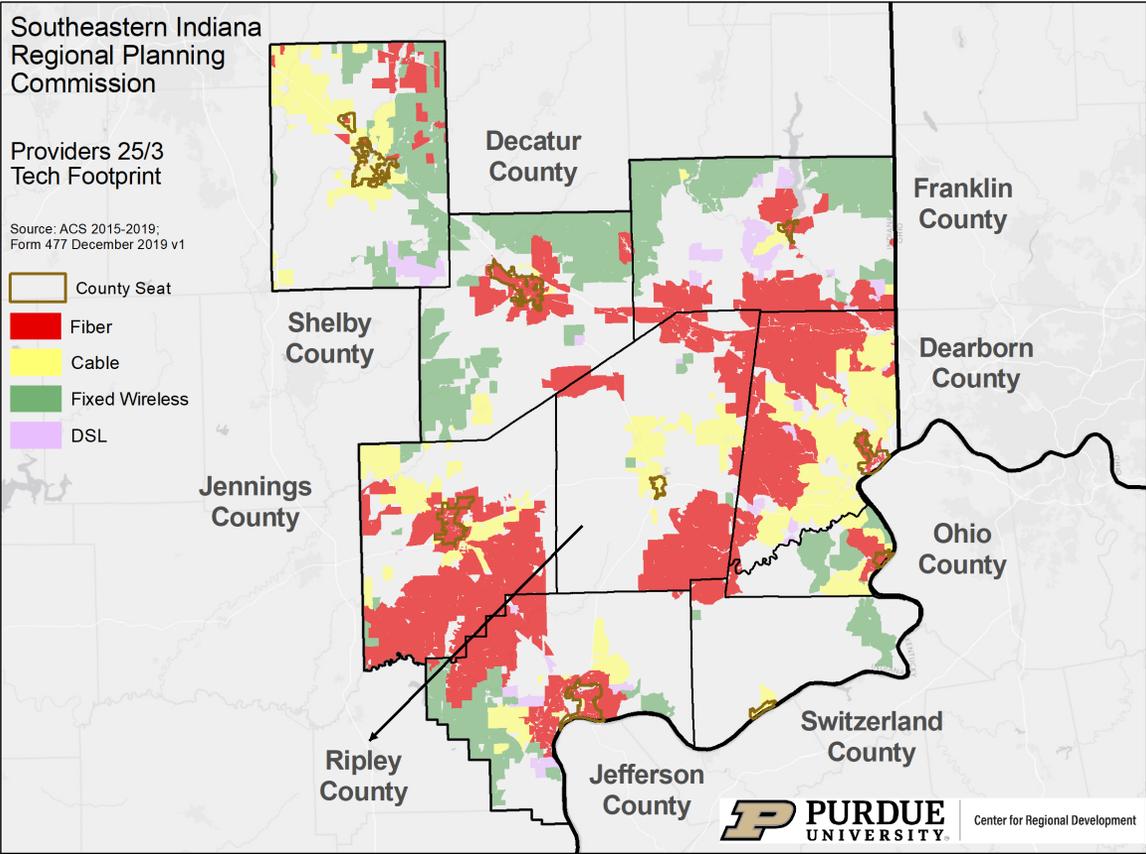
For the region, cable technology had the highest average advertised download speed (973 Mbps) while fiber had the highest average advertised speed (683 Mbps).

Maximum Advertised Speeds (Mbps)	DSL		Fixed Wireless		Cable		Fiber	
	Download	Upload	Download	Upload	Download	Upload	Download	Upload
Dearborn	19	1	3	0.9	985	35	770	537
Decatur	15	1	17	3	987	35	1,000	500
Franklin	20	1	31	11	273	16	1,000	487
Jefferson	19	1	11	1	987	35	929	929
Jennings	14	1	9	1	987	35	750	750
Ohio	29	2	4	29	987	35	963	487
Ripley	15	1	4	1	987	35	821	440
Shelby	24	3	14	2	987	35	992	992
Switzerland	20	1	4	30	940	35	250	250
Indiana	20	2	24	7	935	36	813	695
SIRPC	19	1	13	6	973	34	873	683

III. Broadband Access: Technology Footprint

Source: FCC Form 477 December 2019 v1

2019 25/3 & 100/20 broadband technology footprint

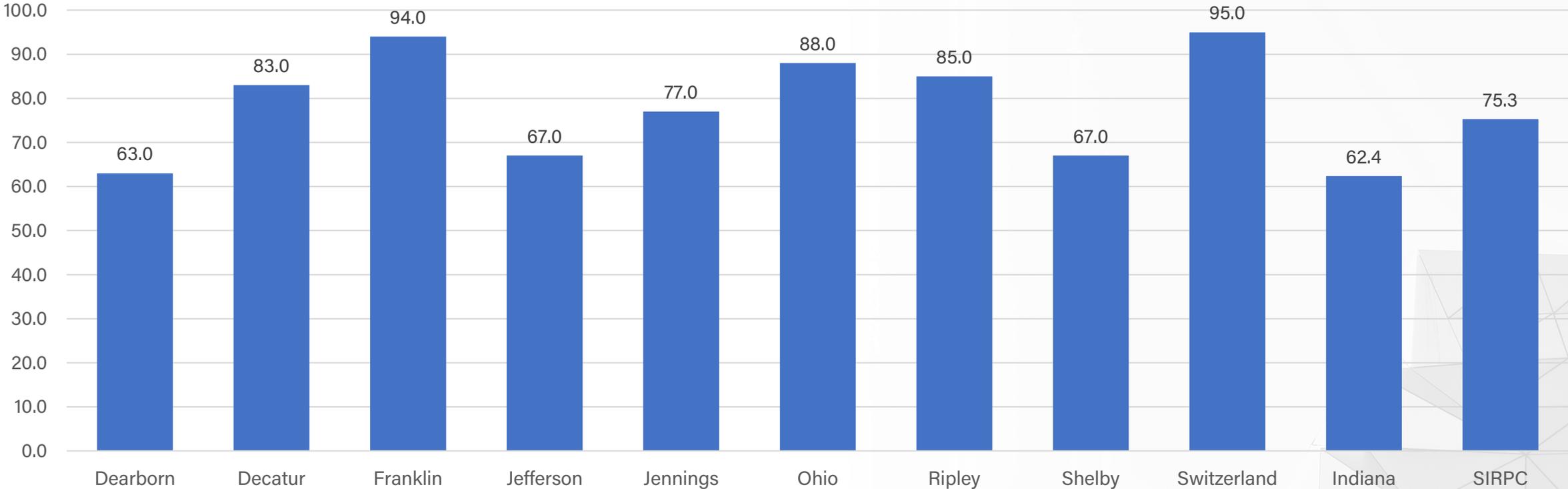


i These maps show the 25/3 & 100/20 footprints in the region by technology. Note that fiber is on top followed by cable, fixed wireless, and DSL. If DSL is visible, this means there are no other technologies at those speed tiers since it is the bottom layer. For example, in Greene County, cable (yellow) is the most accessible technology for 100/20 speeds while fixed wireless (green) is for 25/3. County seats are outlined for reference.

III. Actual Download Speed Use

Source: Microsoft

2019 Percent people **not using** the internet at a speed of at least 25 Megabits per second (Mbps)

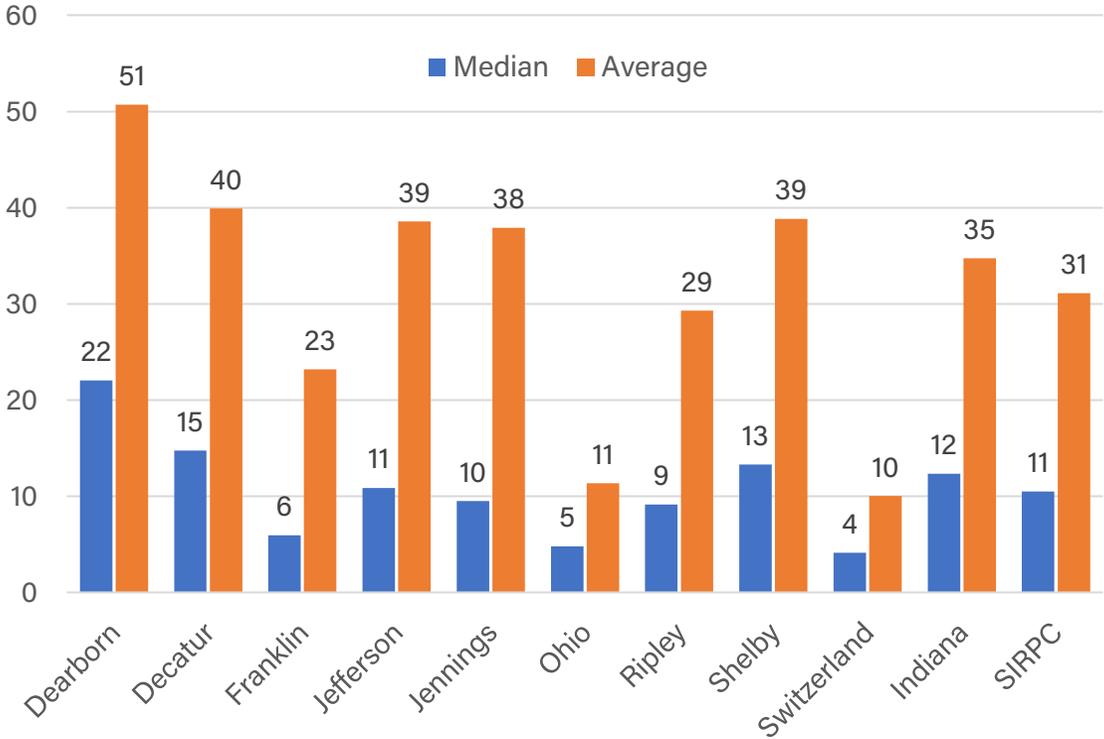


This graph includes data compiled by Microsoft where the percentage of people not using the internet at a speed of at least 25 Mbps download is shown. As shown, 95% of the population in Switzerland County did not use the internet at a minimum of 25 Mbps download. On the other hand, Dearborn County had the lowest share at 63%. Overall, about three-quarters of the population in the region did not use the internet at a minimum speed of 25 Mbps, higher than the state's share of 62.4%. This places the region at a competitive disadvantage. People may not be using the internet at this minimum speed for multiple reasons including Wi-Fi home configuration, operating system on their devices, number of devices connected at the time data was gathered, or issues with the internet connection.

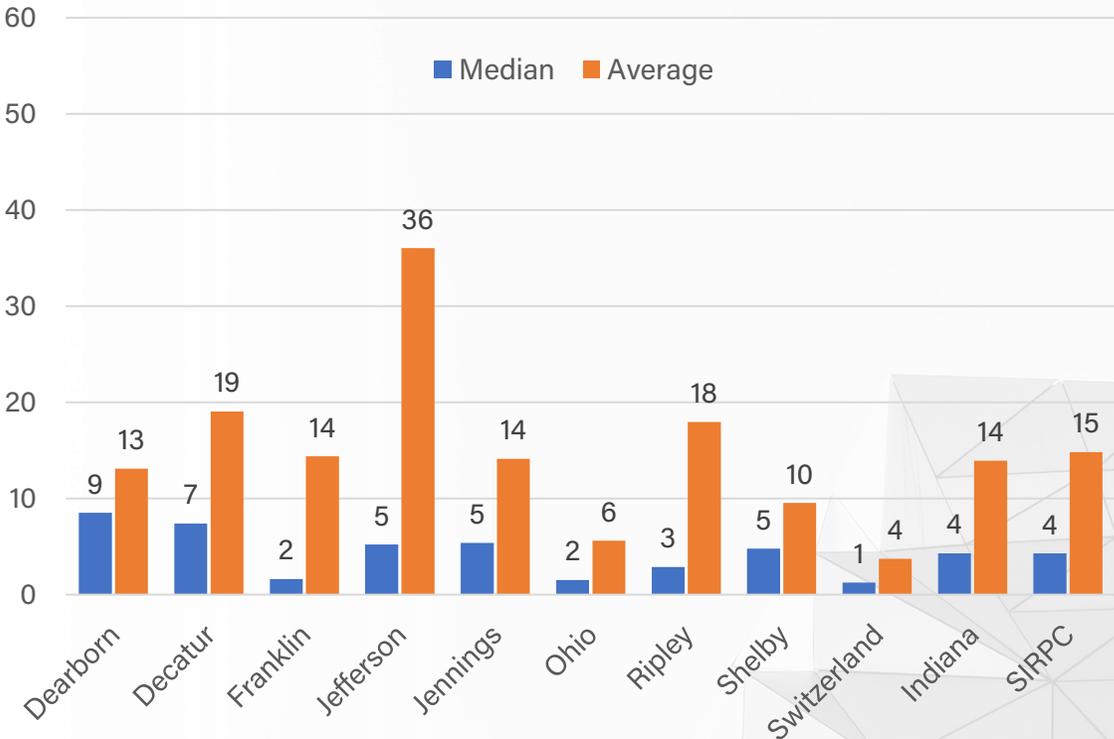
III. Speed Test Results (Mbps)

Source: M-Lab

Download



Upload



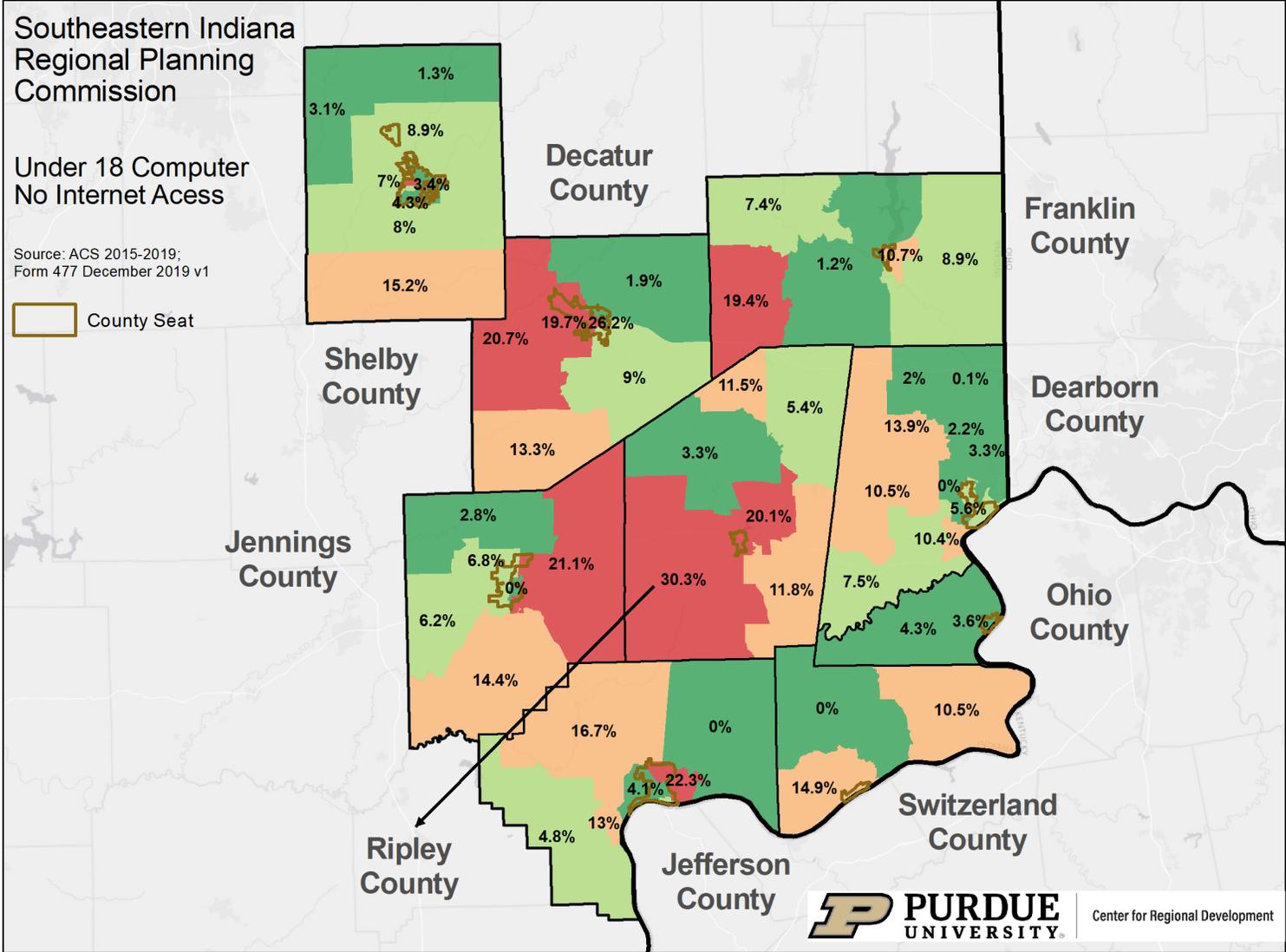
Graph shows data provided by M-Lab that stores speed test results from across the country. During 2019, there were about 107,800 speed tests conducted in the region. Each county had more than 1,000 tests completed (except for Ohio County with about 360 tests completed). Average speeds are higher because they may include outliers while the median shows the value in the middle of the distribution. In other words, a median value indicates that half of all speed tests fall below the median and the other half above. Notice how overall upload speeds were slower than download speeds. This points to a potential issue of asymmetrical speeds. Households and businesses are producing more content, rather than consuming, and faster upload speeds are becoming critical.

III. Homework Gap

Source: PCRD; 2015-2019 ACS

Map shows census tracts with the percent of children with a computer but no internet subscription as of 2019. A darker color indicates a higher percentage of children with a computer but no internet or homework gap.

Children with a computer but no internet	Homework Gap (%)
Dearborn	5.1
Decatur	13.7
Franklin	9.4
Jefferson	10.9
Jennings	8.9
Ohio	4.1
Ripley	11.4
Shelby	6.9
Switzerland	8.4
Indiana	7.7
SIRPC	8.8

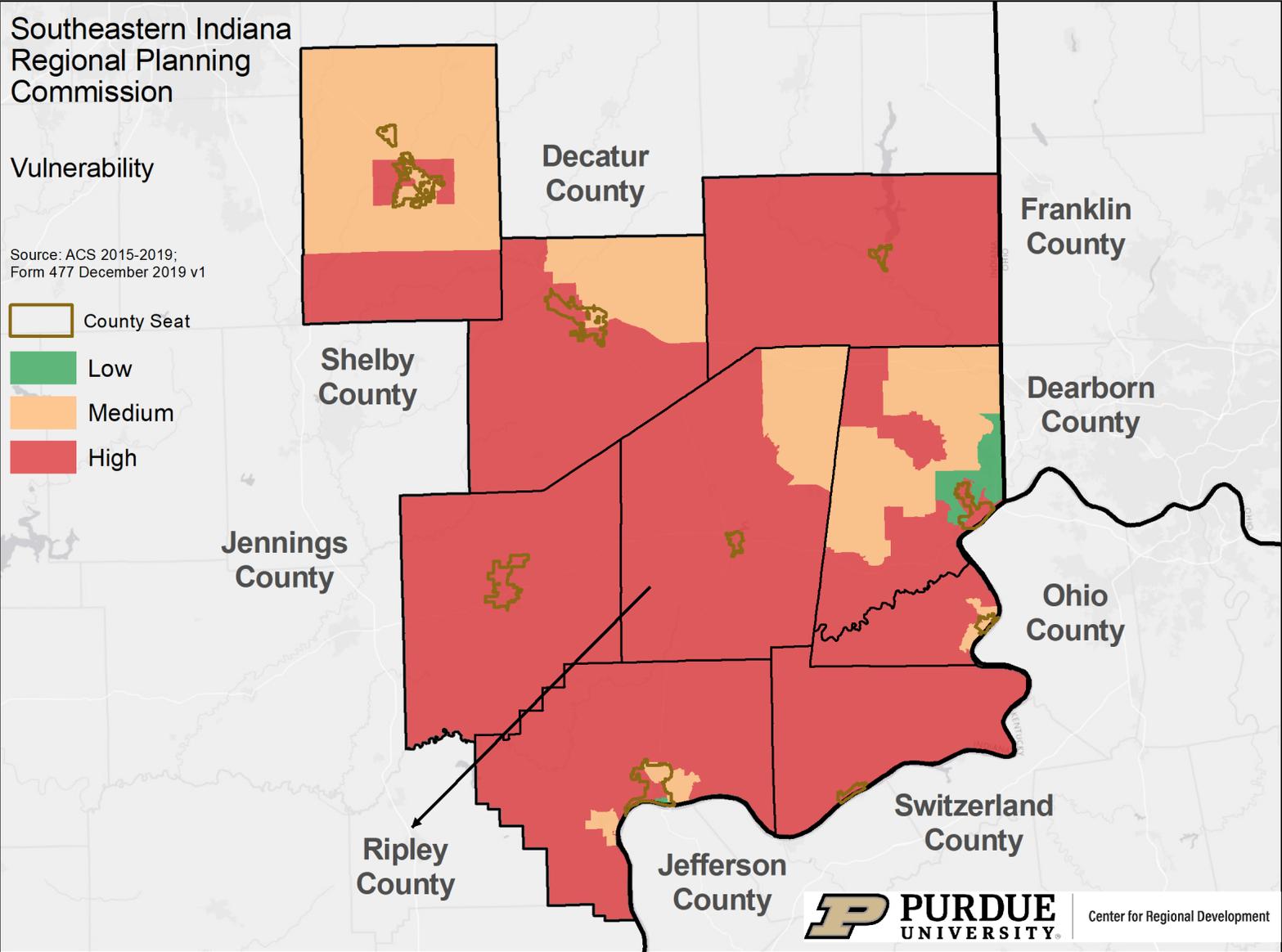


III. Remote Work & e-Learning Vulnerability (ReV)

Source: PCRD; 2015-2019 ACS

Map shows the census tract in the region by level of vulnerability to engage in remote work or e-learning due to inadequate connectivity, higher share of children with no internet, or higher share of jobs not conducive to remote work. Table shows the percent of households in highly vulnerable census tracts.

Households	High Vulnerability (%)
Dearborn	39.2
Decatur	67.6
Franklin	100.0
Jefferson	64.6
Jennings	100.0
Ohio	55.4
Ripley	73.8
Shelby	25.4
Switzerland	100.0
Indiana	31.5
SIRPC	62.3

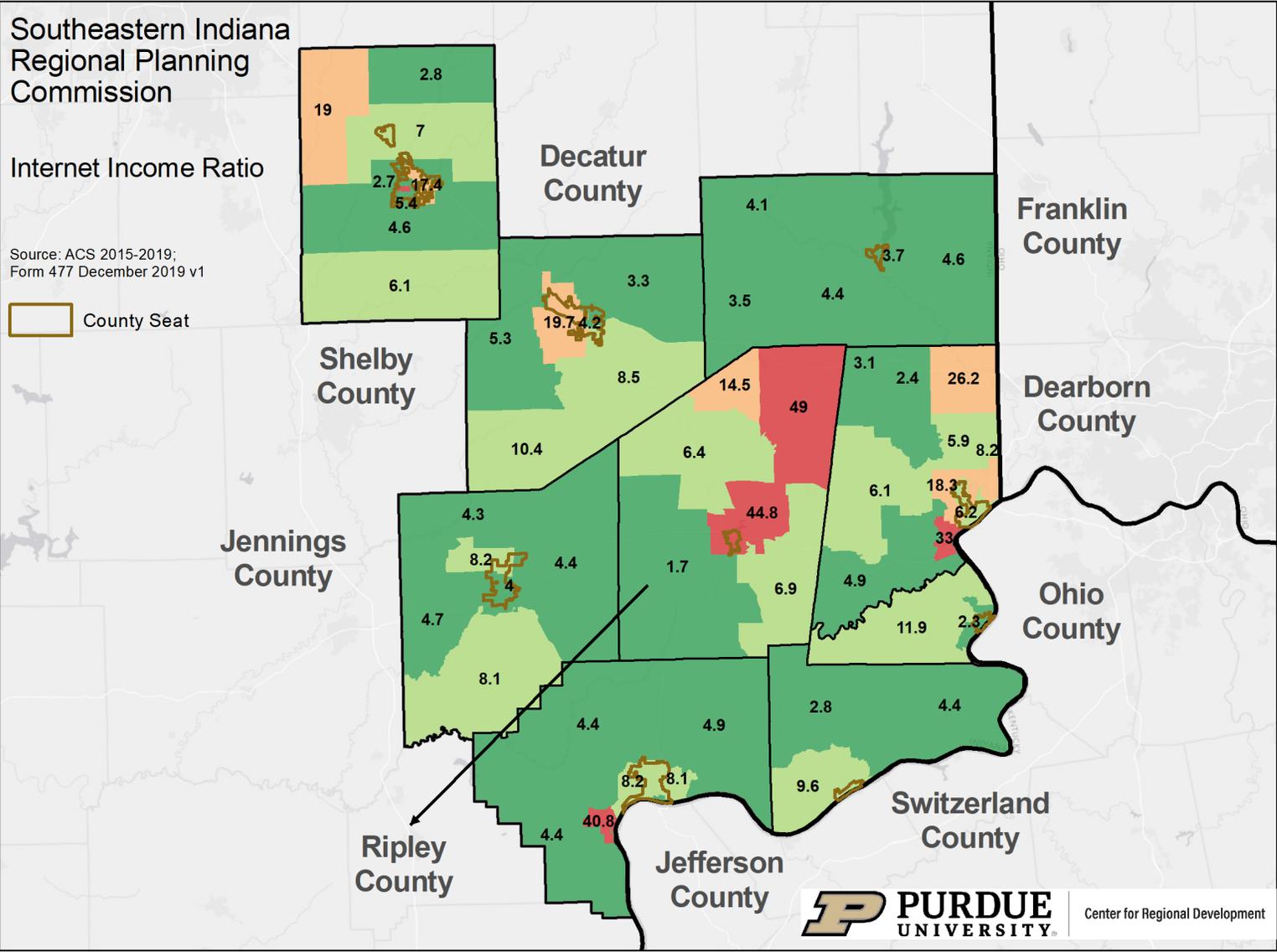


III. Internet Income Ratio (IIR)

Source: PCRD; 2015-2019 ACS

Map shows census tracts with the internet income ratio. A higher ratio indicates higher inequality regarding household income and internet access. For example, the share of low-income households without internet is 8.4 times higher compared to wealthier households in Ripley County.

Households with no internet access	% < \$35k	% 75k +	IIR
Dearborn	34.8	4.9	7.2
Decatur	42.2	6.3	6.7
Franklin	46.0	10.2	4.5
Jefferson	41.8	7.3	5.8
Jennings	42.9	8.4	5.1
Ohio	54.2	10.7	5.0
Ripley	48.5	5.8	8.4
Shelby	48.9	8.5	5.8
Switzerland	41.7	8.7	4.8
Indiana	37.3	6.5	5.8
SIRPC	43.4	7.2	6.0



III. Digital Divide Index

Source: PCRD; 2015-2019 ACS

Map shows census tracts and their digital divide index (DDI) score. DDI includes 10 variables divided into infrastructure/adoption (INFA) and socioeconomic (SE) scores ranging from 0 to 100 where a higher score indicates a higher divide. For example, a higher SE score implies more efforts on relevance & literacy while a higher INFA score implies more efforts to improve infrastructure or adoption. Data used to calculate the scores included all tracts in the state.

County	SE	INFA	DDI
Dearborn	42.4	0.0	0.6
Decatur	46.9	38.4	34.8
Franklin	39.9	47.0	37.8
Jefferson	60.8	31.6	37.6
Jennings	50.8	28.6	29.2
Ohio	54.2	37.7	38.6
Ripley	61.7	36.5	42.1
Shelby	50.8	34.2	33.7
Switzerland	86.3	60.5	76.5

