CHMURA
Economics & Analytics

Assessment of the Living Wage and Job Availability for Working Families in the Dan River Region, Virginia

Prepared for Dan River Region Collaborative

March 28, 2017

1309 E Cary Street, Richmond, VA 23219
1025 Huron Road East, Cleveland, OH 44115
chmuraecon.com

Table of Contents

1. Executive Summary

The Dan River Region Collaborative (DRRC) is a regional partnership with a mission to improve employment, training, and labor market outcomes for the region's low-income workers by supporting the improvement of both the quality of jobs as well as the capacity of workers in the region. To accomplish this mission, DRRC desires to understand the region's living wage (i.e., the employment income needed to meet basic household expenses) and the availability of jobs which pay a living wage. Chmura Economics & Analytics (Chmura) was contracted to perform such an analysis.

Chmura first reviewed the methodology used by three major living wage calculators. Based on this review, Chmura chose a method to calculate living wage that was the best fit for the Dan River Region. In the course of this analysis, a survey was conducted to understand the composition of the region's families. Chmura then estimated the quantity and quality of job openings in the region before finally evaluating whether the localities in the region have the capacity to provide jobs which pay a living wage. The main conclusions of the research are summarized below:

Improving the existing living wage estimation methods will provide a more accurate estimate of the income needed to meet basic household needs in the region's localities.

- The MIT Living Wage Calculator used mainly state-level data in its computation of local living wages in the Dan River Region. As a result, living wages for the six localities within the region are very similar.

- For some of the budget categories within the calculator, the MIT calculator makes some unreasonable assumptions.

After comparing the three methods of estimating living wages, Chmura chose a method that best fits the region.

- Chmura's method improved upon existing living wage calculators by:

    - Using national data from government sources as a baseline, but refining it with more county-specific data to estimate expenses for food, housing, child care, healthcare, transportation, other necessities, and taxes.
    - Differentiating living expenses for localities within micropolitan areas or rural areas. The estimates were provided for each locality within the Dan River Region and for 12 family types.
    - Using the survey of Dan River Region's residents to more accurately reflect the demographic composition of the region's families.

- Chmura's estimated annual living expenses for the region ranged from $17,969 for a one-adult family to $58,663 for a family with two adults (both working) and three children. Within the region, living expenses were lowest in the cities of Danville and Martinsville and highest in Pittsylvania and Patrick Counties. Compared with the MIT calculator, Chmura's estimated family living expenses were lower for all family types.

- Chmura converted annual minimum living expenses into a pre-tax hourly wage rate for each family type and locality.

    - The living wage is lowest at $6.85 per hour for a family with two working adults without children. This is the only family type that can meet basic needs earning the federal minimum wage of $7.25 per hour.
    - The highest living wage is for families with one adult and three children, which is estimated to be $23.88 per hour.
    - Chmura estimated the average living wage for the region is $10.68 per hour, $3.43 higher than the federal minimum wage.

- DRRC also sought to understand the difference in living wages between full-time and part-time workers. The key difference in living expenses between these groups is healthcare cost, which is lower for part-time workers. The living wage is lowest for part-time workers for a family with two working adults without children, at $6.54 per hour. The highest living wage for part-time workers is for a family with one adult and three children which is estimated to be $23.29 per hour.

Chmura implemented a household survey to inform the Dan River Region Collaborative of the number of families in the region in each of the family types.

- Among the twelve family types, the most common ones are the families without children—either two adults or one adult. For families with children, the number of those with one and two children is similar. There are significantly more families with one or two children than families with three children in the region.

- Close to half of the families in the Dan River Region do not belong to any of the twelve family types. Most of them are households without working adults. These include retired, unemployed, disabled, or discouraged individuals. The region's labor force participation rates are lower than the state and national averages, while the unemployment rate in the region is higher.

- Another group in the "other family type" category is working families with three or more adults. One or more adults are working and they may have children. Chmura's survey indicated over 10% of regional households belongs to this type of working family with more than three adults. Future research on living wages needs to include those families to understand their basic needs and whether their income can support their families.

Using Chmura's Real-Time Intelligence (RTI) database, the quantity and quality of available jobs in the Dan River Region were estimated. Available jobs are defined as the current job openings in the region, and were quantified by industry sector, pay range, and education requirement.

- Of the 3,314 job openings in the region in January 2017, almost two-fifths (39%) were in the retail sector. The next-largest number of openings was in the healthcare sector (20%), followed by manufacturing (7%).

- Compared with the state average, job openings in the Dan River Region are skewed toward low-wage jobs.

    - More than one-third of the region's job openings (36%) were in the $7.25-$8.99 per hour range which is consistent with the large number of openings in the retail sector. Occupations such as home health aides, food preparation and service workers, and customer service representatives also fall into this pay range.
    - More than 20% of jobs pay between $11.00 and $12.99 per hour. Those are jobs such as first-line managers for retail and food service, as well as truck drivers.

- Using the $10.68-per-hour average living wage, it is estimated that half (50%) of the job openings in the Dan River Region pay over the regional living wage. By family type, while the majority of job openings in the region can support families with one adult, families with children have a difficult time meeting their basic needs.

    - Based on job openings in the region in January 2017, 70% of available jobs can support one-adult families, and 100% of jobs pay higher wages than necessary to support families with two working adults.
    - As the number of adults or children increases, however, so do the wages necessary to support those family members. For example, for a family with three children, only 7% of available jobs can support this family with one adult, and 9% of jobs can support two adults (1 working) and three children. If two adults are working, 27% of available jobs can support such families.

- More than two-thirds of job openings in the region (68.4%) do not require any post-secondary education. This is compared with 51.8% of openings statewide indicating that job openings in the Dan River Region tend to be low-skilled positions that do not require college or higher degrees.

Chmura used the JobsEQ technology platform to evaluate whether the Dan River Region has the capacity to fill living wage jobs and determined that the fundamental challenge for the region is to expand job opportunities for residents.

- Currently, the Dan River Region has an estimated available workforce of 7,212. With open positions of 3,314, this indicates that the total number of workers far exceeds available positions in the region, with the available workforce exceeding the number of openings for most occupation groups.

    - The Dan River Region has an estimated supply of 1,518 production workers (unemployed plus new entries) and only 105 production job openings. It will be very challenging for workers in those occupations to find employment.
    - Similarly, for occupation groups such as transportation and material moving, office and administrative support, and construction and extraction, the available workforce surpasses the number of job openings.

- There are, however, some occupation groups including healthcare practitioners and technical workers where the region currently does not have enough workers to fill open positions.

2. Background

The Dan River Region Collaborative (DRRC) was founded in 2008 to address workforce development needs in the Dan River Region in Southern Virginia.[1] DRRC works with local community foundations and state and local government agencies to affect workforce improvements across the region. The mission of DRRC is to improve employment, training, and labor market outcomes for low-income individuals, ultimately supporting the improvement of both the quality of jobs and capacity of workers across the region.

The Dan River Region is in the process of economic transition. The traditional backbone of the local economy, such as manufacturing of textile, furniture, and tobacco products, has declined. As a result, the region has lost thousands of jobs over the past ten years. Even after the 2007-2009 recession, while other parts of Virginia have regained jobs lost due to the recession, the recovery in the region remains anemic.[2] Another concern is that even the limited jobs which have been generated in the region are not "good jobs." New job opportunities are concentrated in service industries such as retail and food services which typically pay low wages; these jobs may not be able to support a similar standard of living as the higher-paying manufacturing jobs which they are replacing.

As a result, there is an acute need for DRRC to understand living wage and the availability of "good jobs" in the region. More specifically, the overall research objective can be separated into the following research objectives:

1. Evaluate existing living wage calculations for the region (by locality) and propose a method for improving the estimation of living wages.
2. Estimate the number of families in different family types.
3. Estimate the available jobs by industry sector for different wage levels and minimum education requirements.
4. Evaluate the capacity of the region to fulfill the needs of those "good jobs."

Chmura Economics & Analytics (Chmura) was contracted to conduct this research. The remainder of this report is organized as follows:

- Section 3 briefly describes the Chmura methodology to undertake this study.
- Section 4 reports the estimation of living wage for the Dan River Region.
- Section 5 estimates the number of families in different family types in the region.
- Section 6 estimates the available jobs by industry sector, different wage levels, and minimum education requirements.
- Section 7 assesses the capacity of the region to fill those jobs.
- Section 8 offers a summary of this research.
- The Appendix includes the survey report, including the survey instrument.

[1] The Dan River Region includes the following localities: counties of Halifax, Henry, Patrick, and Pittsylvania, and cities of Danville and Martinsville. This region is also referred to as Southern Virginia in this report.
[2] Source: JobsEQ and Chmura Economics & Analytics.

3. Methodology

3.1. Review of Literature

Chmura conducted a literature review on the methodology to estimate a living wage. Chmura first summarized research on the living wage movement and its impact on the labor market. Chmura then focused its review on technical issues of living wage computations, especially the widely-used MIT Living Wage Calculator.[3]

3.1.1. General Literature on Living Wage

The living wage movement is a reaction by local and state governments toward the perceived inadequacy of the federal minimum wage. The U.S. federal government introduced mandatory minimum wage to the labor market in 1938, in the aftermath of the Great Depression. The federal minimum wage has been adjusted at irregular intervals over the past seven decades, and it stands at $7.25 per hour—as it has since 2009.[4] There is no mechanism for minimum wage to change, outside of an act of Congress and the President. Proponents of a higher minimum wage argue that the federal minimum wage is not keeping up with price inflation, and that families living on minimum wage cannot meet their basic needs.

Resulting from such debates, some state and local governments enacted their own minimum wage laws—supplementing the federal minimum wage level—and called those living wages. Meeting basic family needs thus became the key definition of a living wage. The first living wage law was passed in Baltimore in 1994. By 2012, it had spread to more than 140 jurisdictions in the United States, including many of the nation's largest cities.[5] However, living wage ordinances at the state or local level have limited scopes. Some only require city contractors to pay living wages, and some require businesses receiving assistance from state or local governments to pay living wages.[6] Minnesota's $9.50-an-hour minimum wage only applies to the state's largest employers. But other state or local governments have broader living wage laws. California recently passed a law increasing the statewide minimum wage to $15 per hour by 2022. It is expected that the debates will continue.[7]

Studies on the effect of living wages generally agree that those living wage ordinances have large positive effects on workers' pay and their families' living standards, especially increasing earnings for workers at the low end of the labor market. A significant percentage of them are women and workers of color, and they benefit disproportionately from living wage ordinances. One result of the increasing

---

[3] As this study shows, while there are other methods of estimating living wages, the MIT calculator is known to many local communities, including DRRC.

[4] Source: Labor Economics, 6th edition, by George Borjas, McGraw-Hill Irwin, 2013.

[5] Source: The Effects of Living Wage Laws on Low-Wage Workers and Low-Income Families: What Do We Know Now? By David Neumark, Matthew Thompson, and Leslie Koyle, IZA Discussion Paper DP7114, December 2012.

[6] Ibid.

[7] Source: California reaches deal on $15 minimum wage. Available at: http://www.usatoday.com/story/money/2016/03/28/california-raises-minimum-wage-15-hour/82348622/

prevalence of living wages is the reduction in family poverty rates. Moreover, low-wage workers and their families often rely on public assistance programs; new research on food stamps finds that raising minimum wage reduces these families' reliance on public assistance programs.[8]

While living wage laws can benefit low-wage workers and reduce poverty, some studies also found that living wage laws reduced employment among the low-skilled workers they are intended to help.[9] The reason could be that businesses reduced work hours or the number of workers to prevent labor costs from increasing, or invested in labor-saving processes or technology as a response. Thus, living wage laws can diminish job opportunities for some workers.

This Chmura study will not focus on the policy issues involving living wages, such as whether state or local governments should impose living wages, or what the positive or negative effects are of living wage laws. Instead, this study will focus on the methodology of computing living wages, and provide an estimate of the living wage in the Dan River Region.

3.1.2. Review of Living Wage Estimation Methodology

Living wage is typically defined as a wage rate (either annual or hourly) that can support the basic needs of a family. As a result, the first step of estimating a living wage is to understand the basic needs of different types of families. After the amount of money to fulfill the basic needs of a family is determined, this amount can then be converted into annual or hourly wages.

While researching, Chmura discovered three major estimation methods for estimating living wages, which will be described below. While the general approach of the three methods is consistent, they all use a different definition of basic needs, or different data sources in their estimations.

Dr. Amy K. Glasmeier of Massachusetts Institute of Technology (MIT) developed the MIT Living Wage Calculator in 2004, which was updated with 2015 data. The MIT calculator estimates the living wage needed to support families of twelve different family compositions based on geographically-specific expenditure data related to a family's minimum costs on food, child care, healthcare, housing, transportation, and other necessities (e.g., clothing, personal care items, etc.). This calculator is available at the county level.[10]

The Economic Policy Institute (EPI) has a Family Budget Calculator that measures the income a family needs in order to attain a modest yet adequate standard of living. This tool estimates the family budget for ten family types. This calculator is only available at the metropolitan statistical area (MSA) level and

---

[8] Source: Local Minimum Wage Laws: Impacts on Workers, Families and Businesses, by Michael Reich, Ken Jacobs, and Annette Bernhardt, University of California-Berkley, Institute for Research on Labor and Employment Working Paper #104-14, 2014.

[9] Source: The Effects of Living Wage Laws on Low-Wage Workers and Low-Income Families: What Do We Know Now? By David Neumark, Matthew Thompson, and Leslie Koyle, IZA Discussion Paper DP7114, December 2012.

[10] Section 3.1.3 will have a more in-depth analysis of the MIT Living Wage Calculator. Source: Living Wage Calculator User's Guide/Technical Notes, 2015 Update, Prepared by Amy Glasmeier and Carey Anne Nadeau, Department of Urban Studies and Planning, Massachusetts Institute of Technology.

not at the county level.[11] The main components of the family budget are rent, food, child care, transportation, healthcare, and other necessities. The calculator was updated in 2015 based on 2014 annual data.[12]

Researchers at the University of Washington (UW) School of Social Work developed a self-sufficiency standard for over 30 states, including Virginia. The self-sufficiency standard measures how much income a family of a certain composition in a given place needs to adequately meet their basic needs, without public or private assistance. For Virginia, the self-sufficiency standard is available at the county level for different family types. The major cost categories include housing, child care, food, healthcare, transportation, taxes and tax credits, and emergency savings.[13]

Table 2.1: Comparison of Three Basic Living Expenses Methodologies

	MIT	EPI	UW
Food	USDA Low Cost Food Plan	USDA Low Cost Food Plan	USDA Low Cost Food Plan
Child Care	Child Care Aware of America	Child Care Aware of America	Virginia Department of Social Service Survey
Health	Insurance Premium from MEPS	Insurance Premium from Keiser Family Foundation	Insurance premium from MEPS
	Out-of-pocket cost from CES	Out-of-pocket cost from MEPS	Out-of-pocket cost from MEPS
Housing	HUD Fair Market Rents	HUD Fair Market Rents	HUD Fair Market Rent
Transportation	CES	EPI Estimation based on miles travelled	UW Estimation including public transportation, auto ownership cost, and miles travelled
Other Necessities	CES	CES	10% of above expenditure
Taxes	Include payroll tax, state and federal income taxes	Use NBER TAXSIM model, include major tax and tax credits	Include federal state income tax, state sales tax, and tax credits
Emergency Savings	Not included	Not included	Included

Source: MIT, EPI, and UW

[11] Each state has a "catch-all" rural area family budget to represent all localities not in any MSA.
[12] Source: The Economic Policy Institute's 2015 Family Budget Calculator, Technical Documentation, by Elise Gould, Tanyell Cooke, Alyssa Davis and Will Kimball, Economic Policy Institute Working Paper #299.
[13] Source: Methodology Appendix: The Self-Sufficiency Standard for Virginia 2012, by Diana Pearce, Director, Center for Women's Welfare, University of Washington School of Social Work.

Table 2.1 summarizes the key elements of the three methodologies. Chmura's review found that these three major calculators have some common elements. They used the same data sources to estimate housing (rent), food, and child care costs. Data sources for food are from the United States Department of Agriculture (USDA) Food Plans: Cost of Food at Home at Four Levels. All three methods selected "Low-Cost Plan." The data source for housing cost (rent) is the U.S. Department of Housing and Urban Development's (HUD) Fair Market Rents. The child care costs are derived from state-level surveys of child care costs.

The three major calculators used different methods to estimate other components of family living expenses. For transportation costs, the MIT calculator estimated the cost based on data from the Consumer Expenditure Survey (CES), while EPI estimated transportation costs based on the estimated driving costs for adults to work and other non-social purposes. This method implicitly assumes that families have a car or cars and are without access to public transportation. The UW calculator estimated the cost of public transportation, as well as automobile costs including insurance, ownership, and fuel.

Healthcare costs were estimated differently as well. While all three calculators include health insurance premiums and out-of-pocket medical costs in their estimation, they relied on different data sources. The UW method relied on U.S. Department of Health and Human Services Medical Expenditure Panel Survey (MEPS) data for both health insurance premiums and out-of-pocket medical expenses. The EPI method used MEPS data only for out-of-pocket expenses, and its data on insurance premiums was from the Kaiser Family Foundation. The MIT calculator, however, used MEPS data to estimate the cost of health insurance, but used CES data to calculate out-of-pocket medical expenses.

For other necessities, both the MIT and EPI calculators used CES survey data to compute family costs for apparel, household goods, and personal care items. The UW calculator simply increased the costs of food, housing, child care, transportation, and healthcare by 10%, and labeled it as the cost of other necessities.

Taxes were treated differently between the three calculators as well. The MIT calculator estimated three major taxes: federal and state income taxes and federal payroll taxes such as social security and Medicaid. This method did not consider tax credits some families may qualify for. The UW calculator included federal and state income tax, and state sales tax. It also included the estimates of tax credits such as the child and dependent care credit. The EPI calculator used a composite tax rate from the National Bureau of Economic Research (NBER) to estimate the tax burden; the NBER tax model incorporated not only various tax rates, but also tax exemptions, deductions, and credits—thus establishing it as the most accurate estimate of taxes paid by families.

Finally, the UW calculator also included an emergency savings fund as a component of its self-sufficiency income standard. Neither the MIT calculator nor the EPI calculator included this component, assuming that living wages or a basic family budget would only cover the basic needs of a family, leaving no extra resources. The three major calculators also have different family types. For families with two adults, the EPI calculator assumed that both adults work, and did not provide a separate estimation of family living expenses for one working adult and two working adults, who would generally have very significant child care expenses.

Chmura's estimate of living wages for the Dan River Region will compare and contrast all three estimating methods, and choose a method that is the best fit for the region.

3.1.3. Evaluation of the MIT Living Wage Calculator

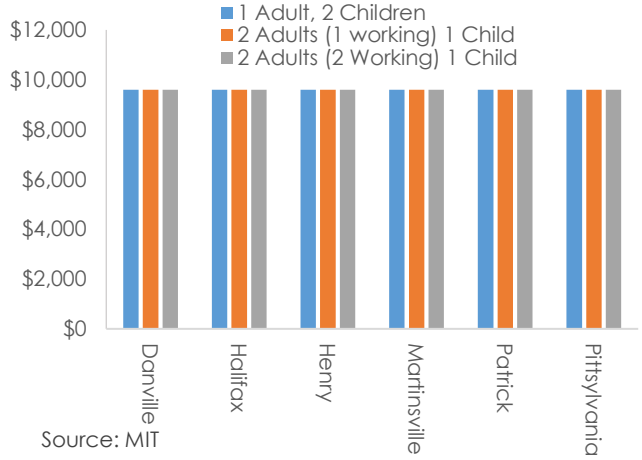
This section provides a more critical assessment of the MIT Living Wage Calculator, in the context of its estimates for the Dan River Region communities of the cities of Danville and Martinsville, and the counties of Pittsylvania, Henry, Halifax, and Patrick.

After reviewing the methodology and data sources behind the MIT living wage calculator, especially its estimate of living wages in the Dan River Region, Chmura concluded that the MIT calculator can be improved. The main deficiency of the MIT calculator is that it used mainly state-level data in its computation of local living wages in the Dan River Region. As a result, living wages for many local communities are very similar.

For the Dan River Region in Southern Virginia, the MIT calculator generates the same costs for food, child care, medical, transportation, and other necessities for all six localities. The only difference is the housing costs, which are specific to Micropolitan Statistical Areas. Thus, Danville and Pittsylvania County have the same housing costs, as do Martinsville and Henry County. While it can be justified that localities in the Dan River Region have similar food, medical, or transportation costs, a closer examination shows that the MIT calculator suggests the same food, medical, and transportation costs for all localities in Virginia, which is not justifiable. It is unrealistic to expect these items to cost the same in Southern Virginia as they do in the Richmond region or Northern Virginia, as the latter areas have a much higher cost of living. For all Virginia localities, the MIT calculator only differentiates living wages based on housing costs. So, it is likely that living wages estimated by the MIT calculator for the Dan River Region are overstated for those localities. Chmura believes that the MIT methodology and data sources need to be improved in computing living wages in Southern Virginia.

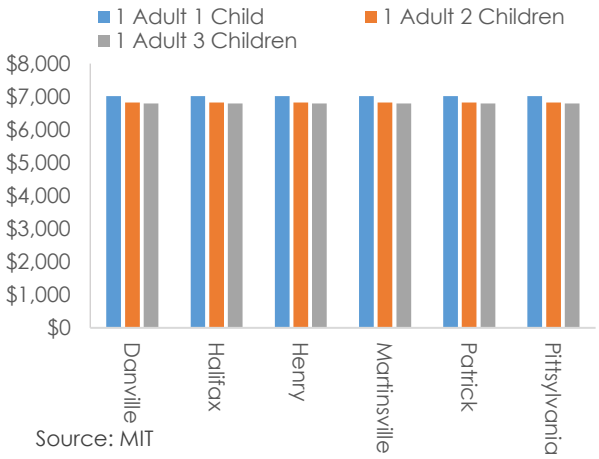
Another deficiency of the MIT calculator is how it estimated various living expenses for different family types. In some cases, the MIT calculator of living expenses only considered household size, and not the distinction between adults and children. For example, its estimates of transportation costs for a "1 Adult, 2 Children" family type is the same as the transportation cost for "2 Adults (1 working), 1 child" and "2 Adults (2 working), 1 Child" family type (Figure 3.1). It seems unreasonable to assume that two working adults have the same transportation costs as one working adult, as commuting cost is a major component of the family transportation budget. Medical costs have some issues as well, as one-adult households with three children have lower medical costs than one-adult households with 2 children or only one child (Figure 3.2). The underlying assumptions for the MIT calculator need to be carefully verified.

Figure 3.1: MIT Calculator: Annual Transportation Cost



Source: MIT

Figure 3.2: MIT Calculator: Annual Medical Cost



Source: MIT

3.2. Chmura Approach to Computing Living Wage

Based on the above review of the different methods of estimating family living expenses, Chmura compared all three methods, and chose a method that is the best fit for the region.

Similar to the three major calculators, Chmura used national data from government sources as a baseline, but refined it with more county-specific data. For housing prices, since county-level data are included in the MIT calculator, Chmura used the same county-level housing cost data source from the U.S. Department of Housing and Urban Development (HUD). For food costs, all three calculators used data from USDA Food Plans: Cost of Food at Home at Four Levels. Similarly, the sources for child care costs are from state-level surveys. Since those data, along with healthcare cost data are only available at the state level, Chmura designed a method to adjust them to the county level for the Dan River Region.

The general approach to county-level adjustment is to use the cost of living. For example, the Center for Community and Economic Research (C2ER) publishes cost of living indexes for Metropolitan and Micropolitan Statistical Areas, including the Danville and Martinsville micropolitan areas.[14] In addition, C2ER also has cost of living indexes for rural counties in Virginia. C2ER collects prices on over 50 items in those areas and its cost of living indexes are widely used by economic researchers. The prices contained in the C2ER index can be used to adjust the costs for food, medical, transportation, and other necessities in the following three areas: the Danville micropolitan area, the Martinsville micropolitan area, and rural areas (Patrick and Halifax Counties).[15]

[14] The Danville Micropolitan Statistical Area includes the city of Danville and Pittsylvania County. The Martinsville Micropolitan Statistical Area includes the city of Martinsville and Henry County.

[15] Chmura chose the average of Martinsville and Danville Micropolitan Statistical Areas to represent the cost of living for Patrick and Halifax Counties.

Chmura attempted to differentiate living expenses for localities within micropolitan areas or rural areas. In this process, Chmura treated different spending categories uniquely. For example, for transportation costs, county-level data on commuting show that residents in rural or suburban counties (Pittsylvania and Henry) spend more time commuting than those living in cities (Danville and Martinsville). Consequently, transportation costs are further adjusted based on commuting data. For cost items such as food, healthcare, and other necessities, since the Danville and Martinsville micropolitan areas are rather compact, and residents can easily travel between the city and county for shopping, individuals would likely pay similar costs for those items. As a result, Chmura did not further adjust the costs for those items to differentiate between Pittsylvania County and Danville, or between Martinsville and Henry County.

None of the three calculators differentiated between living wages among full-time and part-time workers. The key difference between those two types of workers is benefits. An individual with multiple part-time jobs, even if he or she works 40 hours per week or 2,080 hours per year, may have to pay more in terms of healthcare premiums or out-of-pocket healthcare costs. As a result, his or her minimum living expenses and living wages could be different from those of a full-time worker with benefits. After estimating living wages for full-time workers, Chmura also estimated living wages—assuming those workers have multiple part-time positions—and discussed the potential differences.

Another improvement Chmura made was to make better assumptions on family types based on the actual composition of families in the Dan River Region. Each calculator needs to make assumptions on the age of adults and children in a family. For example, the MIT calculator assumed that for a family with one child, the child is three years old. For families with two children, it assumed one child is four years old and the other child is nine years old. In this study, Chmura used data from the household survey to calculate the average ages of children in families. As a result, Chmura's assumptions are more representative of the families in the Dan River Region.

After annual minimum living expenses are calculated for each of the different family types and localities, Chmura converted them into a pre-tax hourly wage rate assuming individuals work full time (2,080 hours per year). In addition, the living wages for Virginia and the nation are computed for comparison.

3.3. Quantifying Family Types

Since living wage depends significantly on the family type, Dan River Region Collaborative also needs to know the number of families in different family types. DRRC specifies 12 family types, and they are: 1 adult; 1 adult and 1 child; 1 adult and 2 children; 1 adult and 3 children; 2 adults (one working); 2 adults (one working) and 1 child; 2 adults (one working) and 2 children; 2 adults (one working) and 3 children; 2 adults (both working); 2 adults (both working) and 1 child; 2 adults (both working) and 2 children; and 2 adults (both working) and 3 children.

Since secondary data on the above family types are not available, Chmura implemented a household survey to collect relevant information on family types. The survey instrument was designed with input from DRRC. The survey was launched on December 6, 2016 and was conducted over the course of two weeks. The survey was conducted by phone, and a total of 451 complete responses (all localities) were collected. Data from this survey enabled Chmura to quantify the number of households in each of the above family types.

3.4. Estimating Job Openings in the Region

In addition to calculating the living wage, Chmura also estimated the quantity and quality of available jobs in the Dan River Region. In this study, available jobs are based on current job openings in the region, and were quantified by industry sector, pay range, and education requirement.

DRRC desires to understand the job availability by the following major sectors: manufacturing, healthcare, IT and computer sciences, engineering, other life and physical sciences, construction, retail services, education services, financial/insurance services, legal services, office/administrative, transportation and logistics, local government, other government, protective services, arts/media and entertainment, and other. Jobs with a pay range will be classified by hourly wage, from the federal minimum wage of $7.25 to $40 and up. Finally, Chmura will estimate the job availability based on minimum education requirements under the following categories: less than high school, high school diploma or equivalent, some college but no degree, associate degree, bachelor's degree, master's degree, and doctoral or professional degree.

The focus of this research effort is to quantify the job openings in the region. To achieve that end, Chmura used its own JobsEQ® technology platform. Chmura's JobsEQ contains Real-Time Intelligence (RTI) data on current job openings in the region. These data were collected via "spidering" technology that collected information from job posting sites regarding job openings. After a rigorous deduplication process, the data are provided at a 6-digit North American Industry Classification System (NAICS) level and 6-digit Standard Occupation Code (SOC) level. Those jobs are further crosswalked to occupation wages and education requirements to analyze job openings by pay range and education requirement. Through this platform, Chmura identified current open jobs in the Dan River Region. Chmura also provided a list of firms with the most openings, when available.[16]

3.5. Evaluating Regional Capacity

The final task of this research is to evaluate whether the region and localities have the capacity to provide jobs which pay a living wage.

To complete this task, Chmura used the JobsEQ technology platform. Chmura's JobsEQ technology platform contains information on the industry, occupation, and educational attainment of unemployed workers in the region. Chmura first determined the current available workforce in the region (such as displaced workers and potential new entry into the labor market) with the estimated educational attainment. Chmura then evaluated the annual new entries (labor supply) into the labor market from high school, community college, and 4-year college graduates.

Through this analysis, Chmura was able to assess whether the region has the capacity to fill the openings for jobs which pay a living wage. This critical assessment was conducted based on the occupation data.

[16] Some jobs are posted through staffing firms, so ultimate employers are not available.

4. Living Wage of the Dan River Region

4.1. Basic Annual Living Expenses of Families

Living wage is defined as a wage rate (either annual or hourly) that can support the basic needs of a family. As a result, the first step in estimating a living wage is to understand the basic needs of a family. After the amount of money to fulfill the basic needs of a family is determined, that amount can be converted into annual or hourly wages.

Consistent with other methodologies reviewed in Section 3.1, Chmura assumes that the basic needs of a family consist of the following categories: food, housing, healthcare, child care, transportation, and other necessities. There is no surplus funding for savings, vacations, and other entertainment.

Family composition affects basic living expenses. Thus, Chmura will estimate living expenses in each Dan River Region locality for the following 12 family types:

- 1 adult
- 1 adult and 1 child
- 1 adult and 2 children
- 1 adult and 3 children
- 2 adults (one working)
- 2 adults (one working) and 1 child
- 2 adults (one working) and 2 children
- 2 adults (one working) and 3 children
- 2 adults (both working)
- 2 adults (both working) and 1 child
- 2 adults (both working) and 2 children
- 2 adults (both working) and 3 children

Consistent with other methodologies, Chmura assumes that for working adults, they will be working full time, which equates to 2,080 working hours per year.[17] The age of children has a significant impact on the cost of child care. Based on the Chmura survey, it is assumed that for families with two adults and one child, the child is ten years old. But for families with one adult and one child, the child is three years old.[18] For families with two children, the ages of children are assumed to be seven and ten. For families with three children, the ages of the children are assumed to be four, ten, and fourteen. Compared with other tools, Chmura's assumptions, which are based on the survey of the Dan River Region's residents, are more representative of the age composition of the region's families.

Living expenses are estimated for 2016. If the source data are not available for 2016, Chmura will use the consumer price index (CPI) in adjusting to 2016 levels.

---

[17] Chmura will discuss implications for part-time workers in Section 4.2.

[18] This assumption was requested by DRRC to understand the living wage of a single parent with young child.

4.1.1. Food

All three major living expense calculators reached a consensus on basic food costs. They all used the food costs for families published in the USDA Food Plan, by the USDA Center for Nutrition Policy and Promotion, as the basic data source. The USDA estimates of food costs are used in programs such as Supplemental Nutrition Assistance Program (SNAP), thus are recognized as the required costs to satisfy the basic needs of a family.[19] The USDA Food Plan estimates the cost of food for all meals prepared at home, assuming families on basic budgets do not eat out at restaurants. The latest data from the USDA is for October 2016, but Chmura used July 2016 data in this analysis, as the July data represent the annual average.[20]

The USDA data have average monthly food costs for children and adults based on gender and age groups. The at-home food costs are estimated for a family of four, but the USDA also provided guidance to estimate the food costs for larger or smaller families. Considering there are some types of economies of scale, adults and children will have different per capita food costs depending on family size.[21] USDA estimates are only available for the national average. Chmura further uses the latest cost of living index to estimate food costs for individual localities in the Dan River Region. Chmura did not further adjust for the difference between Danville and Pittsylvania County or between Henry County and Martinsville, because those areas are relatively compact and residents in those localities can easily shop for food in the other locality and vice versa. So, those households are likely to face the same food prices.

Table 4.1: Estimated Annual Food Costs-2016

Family Type	Danville	Halifax	Henry	Martinsville	Patrick	Pittsylvania	**Average**
1 Adult	$3,003	$3,016	$3,029	$3,029	$3,016	$3,003	**$3,014**
1 Adult 1 Child	$4,423	$4,442	$4,462	$4,462	$4,442	$4,423	**$4,439**
1 Adult 2 Children	$6,647	$6,677	$6,707	$6,707	$6,677	$6,647	**$6,672**
1 Adult 3 Children	$8,817	$8,856	$8,895	$8,895	$8,856	$8,817	**$8,849**
2 Adults (1 working)	$5,505	$5,529	$5,554	$5,554	$5,529	$5,505	**$5,525**
2 Adults (1 working) 1 Child	$6,849	$6,879	$6,910	$6,910	$6,879	$6,849	**$6,874**
2 Adults (1 working) 2 Children	$8,833	$8,872	$8,912	$8,912	$8,872	$8,833	**$8,865**
2 Adults (1 working) 3 Children	$10,753	$10,801	$10,849	$10,849	$10,801	$10,753	**$10,793**
2 Adults	$5,505	$5,529	$5,554	$5,554	$5,529	$5,505	**$5,525**
2 Adults 1 Child	$6,849	$6,879	$6,910	$6,910	$6,879	$6,849	**$6,874**
2 Adults 2 Children	$8,833	$8,872	$8,912	$8,912	$8,872	$8,833	**$8,865**
2 Adults 3 Children	$10,753	$10,801	$10,849	$10,849	$10,801	$10,753	**$10,793**

Source: Chmura Economics and Analytics

[19] Source: USDA Food Plans: Cost of Food. United States Department of Agriculture Center for Nutrition Policy and Promotion. Available at: https://www.cnpp.usda.gov/USDAFoodPlansCostofFood

[20] Due to inflation in food prices, data from early months tend to be less than the annual average, and data from later months tend to be higher than the annual average. As a result, the mid-year data are closest to the annual average.

[21] For example, a larger family can buy bulk or family-size food items, resulting in a lower average cost. As a result, a child living in a smaller household has a higher food cost than the same child living in a larger household.

Table 4.1 presents the estimated annual food costs for counties and cities in the Dan River Region in 2016. At the regional level, the estimated annual food cost in 2016 ranged from $3,014 for 1-adult families to $10,793 for families with two adults and three children.

4.1.2. Housing

For basic housing costs, there is a consensus among the three major living expense models. They all utilized fair market rents (FMRs) published by the U.S. Department of Housing and Urban Development (HUD). FMRs are gross rent estimates. They include the shelter rent plus the cost of all tenant-paid utilities such as electricity, water, and sewer. But FMRs do not include costs for telephone, cable or satellite television, or internet service. The current definition of FMRs for each region uses the 40th percentile rent in that market, implying that FMRs represent a rent below which 40 percent of the standard-quality rental housing units are rented.[22] The HUD FMRs provide rental rates for five dwelling units: efficiency, one-bedroom, two-bedroom, three-bedroom, and four-bedroom.

In calculating the basic housing cost for the Dan River Region, it is assumed that all families are renters. The rationale for this assumption is that families on a basic budget spend all of their income on basic needs, and there is no surplus to save for a down payment to purchase a house. In addition, sharing of bedrooms is needed for family members since families are on a basic budget. Consistent with other tools, Chmura assumes that a one-adult family would rent an efficiency unit (zero bedroom). A two-adult family would rent a one-bedroom apartment. Families with one child or two children will rent a two-bedroom apartment, and families with three children would rent a three-bedroom apartment.

The HUD estimates are available for Bureau of Economic Analysis (BEA) economic areas. While BEA economic areas are generally consistent with counties or cities, they sometimes combine some localities. For example, BEA treats the city of Danville and Pittsylvania County as one economic area, and the city of Martinsville and Henry County as its own economic area. Chmura further uses the latest home value data to differentiate rents between Danville and Pittsylvania County, and between Martinsville and Henry County. Chmura assumes that areas with high-value homes will have higher apartment rents as well.

Table 4.2 presents the estimated annual housing costs for counties and cities in the Dan River Region. At the regional level, the estimated annual housing costs in 2016 ranged from $6,151 for 1-adult families to $10,568 for families with three children. Pittsylvania County had the highest housing costs in the Dan River Region.

[22] Source: Fair Market Rents For the Section 8 Housing Assistance Payment Programs, U.S. Department of Housing and Urban Development, Office of Policy Development & Research. Available at: https://www.huduser.gov/portal/datasets/fmr.html#2016_query

Table 4.2: Estimated Annual Housing Costs-2016

Family Type	Danville	Halifax	Henry	Martinsville	Patrick	Pittsylvania	Average
1 Adult	$5,424	$6,038	$6,284	$5,699	$6,403	$6,621	**$6,151**
1 Adult 1 Child	$6,982	$7,591	$7,899	$7,164	$8,048	$8,524	**$7,819**
1 Adult 2 Children	$6,982	$7,591	$7,899	$7,164	$8,048	$8,524	**$7,819**
1 Adult 3 Children	$9,596	$9,460	$10,689	$9,695	$11,353	$11,715	**$10,568**
2 Adults (1 working)	$5,487	$6,397	$6,773	$6,143	$6,970	$6,699	**$6,428**
2 Adults (1 working) 1 Child	$6,982	$7,591	$7,899	$7,164	$8,048	$8,524	**$7,819**
2 Adults (1 working) 2 Children	$6,982	$7,591	$7,899	$7,164	$8,048	$8,524	**$7,819**
2 Adults (1 working) 3 Children	$9,596	$9,460	$10,689	$9,695	$11,353	$11,715	**$10,568**
2 Adults	$5,487	$6,397	$6,773	$6,143	$6,970	$6,699	**$6,428**
2 Adults 1 Child	$6,982	$7,591	$7,899	$7,164	$8,048	$8,524	**$7,819**
2 Adults 2 Children	$6,982	$7,591	$7,899	$7,164	$8,048	$8,524	**$7,819**
2 Adults 3 Children	$9,596	$9,460	$10,689	$9,695	$11,353	$11,715	**$10,568**

Source: Chmura Economics and Analytics

4.1.3. Child Care

For families with children, child care is a major responsibility. Chmura assumes that for families with one adult, this person works full time and pays someone else to care for the children. The same assumption applies for 2-adult families where both adults are working. For families with two adults but only one is working, Chmura assumes that the non-working adult takes care of the children at home.

Child care costs vary greatly by age of the children being cared for. Based on the Chmura survey, it is assumed that for one-child families with two adults, the age of the child is ten. For a family with one adult and one child, the age of the child is three. For households with two children, the ages of the children are assumed to be seven and ten. For families with three children, the ages of the children are assumed to be four, ten, and fourteen. In terms of child care cost, it is assumed that children over the age of 13 will not need arrangements for child care, while a young child (below 5) needs full-time care, and school-aged children (5-13) only need care after school and in summertime.

Basic child care cost data are from Child Care Aware of America.[23] This is the data source used by the MIT and EPI calculators as well. Child Care Aware of America is the national clearing house for child care-related resources, and it has child care costs for both center-based care and family care for children of different ages—infants, preschool, and school-aged children. Chmura chose to use the cost of family care, as this option is more affordable for parents. In addition, the latest data from Child Care Aware of America are for the child care costs in 2015. Chmura used the consumer price index (CPI) to estimate the 2016 cost. Since only the state-level data are available, Chmura used the cost of living index to estimate the local child care cost based on Virginia statewide data. Chmura did not further adjust the difference between Danville and Pittsylvania County or between Henry County and Martinsville, because those

[23] Source: Parents and the High Cost of Child Care: 2016. Available at: http://www.usa.childcareaware.org/advocacy-public-policy/resources/reports-and-research/costofcare/

areas are relatively compact and people in Danville can choose child care facilities in Pittsylvania County and vice versa.

Table 4.3 summarizes the estimated annual child care costs for counties and cities in the Dan River Region in 2016. At the regional level, the estimated annual child care cost was $0 for families without any children, or families with one adult staying at home caring for their children. The highest cost occurred for families with three children that have to pay for child care. The estimated child care cost was $10,214 for those families.

Table 4.3: Estimated Annual Child Care Costs-2016

Family Type	Danville	Halifax	Henry	Martinsville	Patrick	Pittsylvania	**Average**
1 Adult	$0	$0	$0	$0	$0	$0	**$0**
1 Adult 1 Child	$6,399	$6,184	$5,969	$5,969	$6,184	$6,399	**$6,222**
1 Adult 2 Children	$8,213	$7,937	$7,661	$7,661	$7,937	$8,213	**$7,985**
1 Adult 3 Children	$10,506	$10,153	$9,800	$9,800	$10,153	$10,506	**$10,214**
2 Adults (1 working)	$0	$0	$0	$0	$0	$0	**$0**
2 Adults (1 working) 1 Child	$0	$0	$0	$0	$0	$0	**$0**
2 Adults (1 working) 2 Children	$0	$0	$0	$0	$0	$0	**$0**
2 Adults (1 working) 3 Children	$0	$0	$0	$0	$0	$0	**$0**
2 Adults	$0	$0	$0	$0	$0	$0	**$0**
2 Adults 1 Child	$4,107	$3,969	$3,831	$3,831	$3,969	$4,107	**$3,993**
2 Adults 2 Children	$8,213	$7,937	$7,661	$7,661	$7,937	$8,213	**$7,985**
2 Adults 3 Children	$10,506	$10,153	$9,800	$9,800	$10,153	$10,506	**$10,214**

Source: Chmura Economics and Analytics

4.1.4. Healthcare

Healthcare costs include two major components—the health insurance premium and out-of-pocket costs for medical services—including prescription drugs, doctor's visits, and hospital visits. The magnitude of a family's healthcare costs thus depends on whether the family has employment-based health insurance or insurance from the private market or a healthcare exchange established by the Affordable Care Act (ACA). Even for families with the same type of insurance, the difference in coverage or deductibles will still affect healthcare costs significantly.

Due to the complexity of healthcare costs, different studies on living wages employed different assumptions. For example, the EPI model utilized the health premium from the ACA health exchange. Using the ACA insurance premium is not accurate because the majority of American families receive insurance through their employers. Based on this data, both the MIT and UW models utilized employment-based insurance premiums in their models using Medical Expenditure Panel Survey (MEPS) data. [24] In Virginia, 53% of the population was insured through employer-based plans in 2015, and this percentage

[24] Source: Department of Health and Human Services, Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey. Available at: https://meps.ahrq.gov/mepsweb/

was even higher for working families.[25] As a result, Chmura also used the employment-based insurance premium in estimating basic living expenses.

For out-of-pocket expenses, both the EPI and UW models used data from MEPS. However, the MIT calculator utilized medical expenses from the consumer expenditure survey (CES). Chmura decided to use MEPS data because this is a national survey specifically designed to collect healthcare spending data, and includes detailed data on out-of-pocket healthcare expenses. In addition, MEPS has state-level data, while CES only included estimates for the Southern region.

For health insurance premiums, MEPS provided employee contributions to premiums for three categories: single coverage, single plus one coverage, and family coverage. Chmura assumes that a 1-adult family will pay the premium for single coverage. For 2-person households (2 adults or 1 adult plus one child), the insurance cost will be the single plus one premium. For all other families, their insurance cost is the family coverage premium.[26] Because the state-level data are only available for 2015, Chmura estimated 2016 costs using the CPI for healthcare.

For out-of-pocket costs, the state-level data are only available for 2010, but the national data are available for 2014. Chmura first estimated Virginia 2014 costs based on changes in national out-of-pocket costs from 2010 to 2014, and calculated 2016 costs using the CPI for healthcare. Chmura then utilized the regional cost of living index to adjust healthcare costs at the regional level. Chmura did not further adjust for the difference between Danville and Pittsylvania County or between Henry County and Martinsville, because those areas are relatively compact and residents in one locality can seek healthcare services in neighboring counties.

Table 4.4: Estimated Annual Healthcare Costs-2016

Family Type	Danville	Halifax	Henry	Martinsville	Patrick	Pittsylvania	**Average**
1 Adult	$1,801	$1,755	$1,710	$1,710	$1,755	$1,801	**$1,763**
1 Adult 1 Child	$3,597	$3,507	$3,416	$3,416	$3,507	$3,597	**$3,522**
1 Adult 2 Children	$5,561	$5,421	$5,280	$5,280	$5,421	$5,561	**$5,445**
1 Adult 3 Children	$5,828	$5,681	$5,534	$5,534	$5,681	$5,828	**$5,707**
2 Adults (1 working)	$4,005	$3,904	$3,803	$3,803	$3,904	$4,005	**$3,922**
2 Adults (1 working) 1 Child	$5,826	$5,678	$5,531	$5,531	$5,678	$5,826	**$5,704**
2 Adults (1 working) 2 Children	$6,093	$5,939	$5,785	$5,785	$5,939	$6,093	**$5,966**
2 Adults (1 working) 3 Children	$6,360	$6,199	$6,039	$6,039	$6,199	$6,360	**$6,227**
2 Adults	$4,005	$3,904	$3,803	$3,803	$3,904	$4,005	**$3,922**
2 Adults 1 Child	$5,826	$5,678	$5,531	$5,531	$5,678	$5,826	**$5,704**
2 Adults 2 Children	$6,093	$5,939	$5,785	$5,785	$5,939	$6,093	**$5,966**
2 Adults 3 Children	$6,360	$6,199	$6,039	$6,039	$6,199	$6,360	**$6,227**

Source: Chmura Economics and Analytics

[25] Source: Health Insurance Coverage of the Total Population, Kaiser Family Foundation, available at: http://kff.org/other/state-indicator/total-population/?currentTimeframe=0#notes

[26] This is consistent with the assumptions made by the MIT calculator.

Table 4.4 summarizes the estimated annual healthcare costs for counties and cities in the Dan River Region in 2016. At the regional level, the estimated annual healthcare cost ranged from $1,763 for a one-adult family to $6,227 for families with two adults and three children.

4.1.5. Transportation

Transportation costs were estimated differently among the three models. For the EPI model, it computed non-social trips (based on estimated miles traveled to work, grocery stores, medical appointments, etc.). This model assumes that all families own cars and the estimated transportation cost could be overstated for areas with public transportation. Another drawback of the EPI calculator is that it only assumes transportation costs for adults, but not children. For example, its estimated transportation costs for one adult with one child, two children, or three children are the same. This is unrealistic because additional children have transportation needs such as doctor's appointments, school, and shopping, which are part of the basic necessities. For the MIT calculator, it includes the average transportation cost from the 2014 Consumer Expenditure Survey.[27] This estimation has some shortcomings, since it tends to overstate the costs for two reasons. First, the CES survey on transportation spending includes leisure travel such as vacations. The premise of a living wage is that vacations are not a basic need and should be excluded. In addition, the CES national number is based on households with a national average income of $74,527 per year for 2-person households, and $95,886 for 4-person households. Those incomes are too high for families on a basic budget, indicating that the MIT calculator's transportation costs are too high.

Chmura took the following approach to estimate transportation costs for the Dan River Region. Chmura used CES 2015 data from the Bureau of Labor Statistics as a base for estimation. Chmura only included costs for gasoline and motor oil, other vehicle expenses such as insurance and finance charges, vehicle maintenance and repair, public transportation, and used vehicle purchases. Chmura excluded new car purchases. Chmura used national averages for vehicle-related costs for households in lower income brackets, as opposed to households making average wages.[28] This also moderates the concerns about vacation transportation costs, as low-income households are less likely to take vacations or leisure trips. In addition, Chmura distinguished the transportation costs between children and adults, based on CES data.[29] Finally, Chmura also used the CPI to estimate 2016 costs using CES 2015 data and the cost of living index to estimate local transportation costs.

Chmura further adjusted the transportation cost difference between Danville and Pittsylvania County, and between Henry County and Martinsville. For example, Pittsylvania is the suburban county surrounding the city of Danville. Since Danville is compact and is home to many of the jobs in the region, it is likely that residents in Pittsylvania County will commute longer to work, resulting in higher transportation expenses. Data from the U.S. Census Bureau confirmed that. The average commuting time for Danville is 20 minutes while that for Pittsylvania County is 26 minutes.[30] A difference of six minutes can translate into hundreds of

[27] Source: Consumer Expenditure Survey, 2015, Table 1400 and Table 1800.
[28] Source: Consumer Expenditure Survey, 2015, Table 1203. Chmura used the average for households in the lower 50% of all U.S. households.
[29] Source: Consumer Expenditure Survey, 2015, Table 1502.
[30] Source: JobsEQ, Demographic Profile.

dollars in transportation costs per year, in terms of gasoline and vehicle maintenance costs. Similarly, Chmura used commuting time to differentiate the transportation costs between the city of Martinsville and Henry County.

Table 4.5 summarizes the estimated annual transportation costs for counties and cities in the Dan River Region in 2016. At the regional level, the estimated annual transportation cost ranged from $2,688 for a one-adult family to $7,741 for families with two working adults and three children.

Table 4.5: Estimated Annual Transportation Costs-2016

Family Type	Danville	Halifax	Henry	Martinsville	Patrick	Pittsylvania	**Average**
1 Adult	$2,310	$2,524	$2,753	$2,140	$2,979	$3,017	**$2,688**
1 Adult 1 Child	$2,741	$2,996	$3,268	$2,540	$3,536	$3,580	**$3,190**
1 Adult 2 Children	$3,499	$3,824	$4,171	$3,242	$4,513	$4,570	**$4,072**
1 Adult 3 Children	$4,257	$4,653	$5,075	$3,945	$5,491	$5,561	**$4,954**
2 Adults (1 working)	$3,507	$3,833	$4,181	$3,250	$4,524	$4,581	**$4,081**
2 Adults (1 working) 1 Child	$3,939	$4,304	$4,695	$3,650	$5,080	$5,144	**$4,583**
2 Adults (1 working) 2 Children	$4,697	$5,133	$5,599	$4,352	$6,058	$6,135	**$5,465**
2 Adults (1 working) 3 Children	$5,455	$5,961	$6,502	$5,054	$7,036	$7,125	**$6,348**
2 Adults	$4,705	$5,141	$5,608	$4,359	$6,068	$6,145	**$5,475**
2 Adults 1 Child	$5,136	$5,613	$6,123	$4,759	$6,625	$6,708	**$5,977**
2 Adults 2 Children	$5,894	$6,441	$7,026	$5,462	$7,602	$7,699	**$6,859**
2 Adults 3 Children	$6,652	$7,270	$7,930	$6,164	$8,580	$8,689	**$7,741**

Source: Chmura Economics and Analytics

4.1.6. Other Necessities

Different models take different approaches to estimating the cost of other necessities. The University of Washington model simply inflated the combined costs of food, housing, child care, healthcare, and transportation by 10% to 15%, and considered that to be the cost of other necessities. The EPI model used a percentage of housing and food costs and applied it to all households as other necessities. The MIT calculator is more detailed, and it used the annual consumer expenditure survey as a base for computing the annual costs for other necessities. However, the MIT model estimates can be overstated because the model simply used the cost of other necessities for households with national average incomes. In addition, it did not differentiate between the cost of other necessities for adults and children, which can vary greatly. The MIT calculator also did not include utilities such as phones and cell phones.[31]

Chmura took the following approach to estimate other necessities cost. Chmura used CES 2015 data from the Bureau of Labor Statistics. Chmura only included the following basic expenses: housekeeping supplies, apparel and services, personal care products and services, reading, and telephone services. Chmura excluded non-necessities such as furniture, entertainment and recreation, and education. To be

[31] Basic utilities such as electricity and water are included in the housing cost estimate.

conservative, Chmura used the average spending of households in the lower half of the income spectrum.[32]

Finally, Chmura used the CPI to estimate the 2016 value and the cost of living index to estimate the local cost for other necessities. Chmura did not further adjust for the difference between Danville and Pittsylvania County or between Henry County and Martinsville, because those areas are relatively compact and residents can travel easily between those localities to shop for those necessities, and thus they are likely to face the same prices.

Table 4.6 summarizes the estimated annual other necessities costs for counties and cities in the Dan River Region for 2016. At the regional level, the estimated annual other necessities costs ranged from $1,754 for a one-adult family to $5,055 for families with two adults and three children.

Table 4.6: Estimated Annual Other Necessities Costs-2016

Family Type	Danville	Halifax	Henry	Martinsville	Patrick	Pittsylvania	**Average**
1 Adult	$1,788	$1,747	$1,706	$1,706	$1,747	$1,788	**$1,754**
1 Adult 1 Child	$2,319	$2,266	$2,214	$2,214	$2,266	$2,319	**$2,276**
1 Adult 2 Children	$2,902	$2,836	$2,770	$2,770	$2,836	$2,902	**$2,847**
1 Adult 3 Children	$3,485	$3,406	$3,326	$3,326	$3,406	$3,485	**$3,419**
2 Adults (1 working)	$3,454	$3,376	$3,297	$3,297	$3,376	$3,454	**$3,389**
2 Adults (1 working) 1 Child	$3,986	$3,895	$3,804	$3,804	$3,895	$3,986	**$3,911**
2 Adults (1 working) 2 Children	$4,569	$4,465	$4,360	$4,360	$4,465	$4,569	**$4,483**
2 Adults (1 working) 3 Children	$5,152	$5,034	$4,917	$4,917	$5,034	$5,152	**$5,055**
2 Adults	$3,454	$3,376	$3,297	$3,297	$3,376	$3,454	**$3,389**
2 Adults 1 Child	$3,986	$3,895	$3,804	$3,804	$3,895	$3,986	**$3,911**
2 Adults 2 Children	$4,569	$4,465	$4,360	$4,360	$4,465	$4,569	**$4,483**
2 Adults 3 Children	$5,152	$5,034	$4,917	$4,917	$5,034	$5,152	**$5,055**

Source: Chmura Economics and Analytics

4.1.7. Taxes

Basic living expenses are the expenses remaining after families pay federal, state, and local taxes. There are also different tax burdens for different families, and there are different methods used to calculate the tax burden for each family. The MIT calculator included three tax types: federal income tax, federal payroll tax, and state income tax. However, this model used an effective federal income tax rate for a family of four for all family types, resulting in very similar overall tax rates for all families regardless of composition. This is not accurate because it understates the tax rate for households without children as they will not benefit from tax credits related to having children or child care expenses. The UW model included federal and state income tax, state sales tax, and calculated tax credits for children separately. On the other hand, the EPI calculator used a composite federal and state tax rate from the National Bureau of Economic Research (NBER) Tax Simulation (TAXSIM) Model, and tax rates are customized to

[32] Source: Consumer Expenditure Survey, 2015, Table 1203.

different family types. In addition, the NBER TAXSIM Model incorporated tax exemptions and tax credits related to child care, thus is a more relevant tax rate for working families.

Chmura chose to follow the EPI model to estimate tax because it provides an accurate estimate of federal and state taxes for all different family types. Chmura also considered three tax types: federal income tax, federal payroll tax, and state income tax. That is because those taxes are withheld from employee paychecks and are not part of their disposable income. Sales tax on food and household supplies is part of the family budget, and is included in the spending items estimated above, and does not need to be paid separately.[33]

The federal payroll tax rate for an employee in 2016 is 6.2% for social security and 1.45% for Medicare.[34] For federal and state income tax, Chmura applied an effective tax rate from the NBER TAXSIM Model. In estimating the federal and state income tax rate, the NBER model considered the number of adults, the number of children, personal exemptions, and standard deduction, as well as the child tax credit and earned income credit.[35]

Table 4.7 summarizes the estimated annual tax expenses, per family, for counties and cities in the Dan River Region in 2016. The tax burden depends on the family type. Adults with children have a lower tax rate due to child care costs and child tax credits which ultimately reduce their taxes.

Table 4.7: Estimated Annual Tax Payment-2016

Family Type	Danville	Halifax	Henry	Martinsville	Patrick	Pittsylvania	**Average**
1 Adult	$2,423	$2,551	$2,619	$2,417	$2,690	$2,746	**$2,600**
1 Adult 1 Child	$2,960	$3,019	$3,046	$2,882	$3,130	$3,226	**$3,073**
1 Adult 2 Children	$3,988	$4,044	$4,068	$3,872	$4,180	$4,296	**$4,110**
1 Adult 3 Children	$5,788	$5,750	$5,901	$5,612	$6,122	$6,254	**$5,955**
2 Adults (1 working)	$2,680	$2,811	$2,881	$2,690	$2,966	$2,959	**$2,849**
2 Adults (1 working) 1 Child	$1,887	$1,940	$1,973	$1,852	$2,024	$2,075	**$1,977**
2 Adults (1 working) 2 Children	$1,648	$1,691	$1,721	$1,616	$1,764	$1,805	**$1,723**
2 Adults (1 working) 3 Children	$3,786	$3,800	$3,956	$3,708	$4,101	$4,170	**$3,956**
2 Adults	$3,522	$3,703	$3,807	$3,522	$3,931	$3,925	**$3,762**
2 Adults 1 Child	$4,587	$4,690	$4,756	$4,463	$4,895	$5,021	**$4,781**
2 Adults 2 Children	$5,683	$5,775	$5,831	$5,509	$6,002	$6,151	**$5,878**
2 Adults 3 Children	$7,813	$7,797	$8,005	$7,565	$8,308	$8,476	**$8,065**

Source: Chmura Economics and Analytics

[33] Real estate taxes are not included because it is assumed that households with basic needs do not own homes. In addition, personal property tax is not included because it is assumed that it is included in car ownership cost (which is part of transportation cost).

[34] This is just the employee responsibility. The employer will also pay the same amount to the federal government. Source: Internal Revenue Service https://www.irs.gov/publications/p15/ar01.html.

[35] Source: National Bureau of Economic Research, Internet TAXSIM Version 9. http://users.nber.org/~taxsim/taxsim-calc9/index.html.

4.1.8. Total Annual Living Wages

After adding all basic living expenses and tax burdens together, Table 4.8 summarizes the estimated annual pre-tax wages needed to support basic living expenses for families in the Dan River Region localities. At the regional level, estimated annual living expenses range from $17,969 for a one-adult family to $58,663 for families with two working adults and three children.

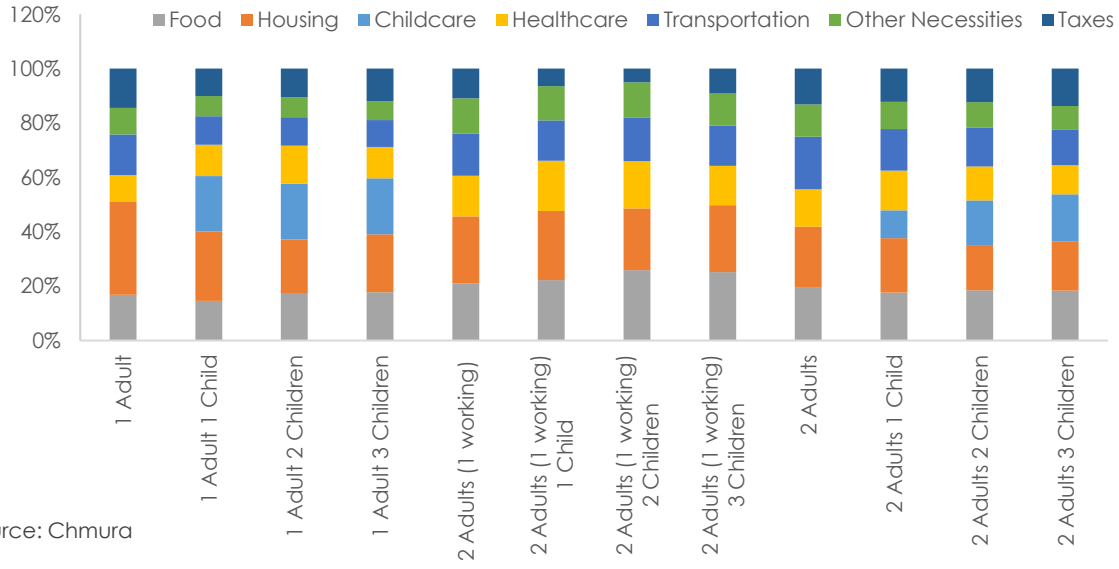
Table 4.8: Estimated Annual Living Wages -2016

Family Type	Danville	Halifax	Henry	Martinsville	Patrick	Pittsylvania	**Average**
1 Adult	$16,748	$17,632	$18,102	$16,701	$18,590	$18,975	**$17,969**
1 Adult 1 Child	$29,422	$30,005	$30,273	$28,647	$31,114	$32,070	**$30,540**
1 Adult 2 Children	$37,793	$38,330	$38,557	$36,697	$39,613	$40,715	**$38,950**
1 Adult 3 Children	$48,278	$47,959	$49,221	$46,807	$51,062	$52,166	**$49,667**
2 Adults (1 working)	$24,639	$25,850	$26,489	$24,737	$27,268	$27,203	**$26,194**
2 Adults (1 working) 1 Child	$29,469	$30,287	$30,813	$28,911	$31,606	$32,404	**$30,868**
2 Adults (1 working) 2 Children	$32,821	$33,690	$34,275	$32,189	$35,146	$35,958	**$34,321**
2 Adults (1 working) 3 Children	$41,101	$41,256	$42,952	$40,262	$44,524	$45,274	**$42,946**
2 Adults	$26,678	$28,050	$28,843	$26,678	$29,778	$29,733	**$28,501**
2 Adults 1 Child	$37,472	$38,315	$38,853	$36,463	$39,990	$41,021	**$39,058**
2 Adults 2 Children	$46,267	$47,020	$47,475	$44,853	$48,866	$50,082	**$47,855**
2 Adults 3 Children	$56,832	$56,715	$58,229	$55,028	$60,428	$61,650	**$58,663**

Source: Chmura Economics and Analytics

For working families in the Dan River Region, housing is typically the largest expense item in the family budget (Figure 4.1). However, for families with one adult and two children, child care is the largest spending item. For families without children or without child care expenses, the cost of food is typically the second-highest spending item. Figure 4.1 lists the spending pattern for each family type, based on the regional averages.

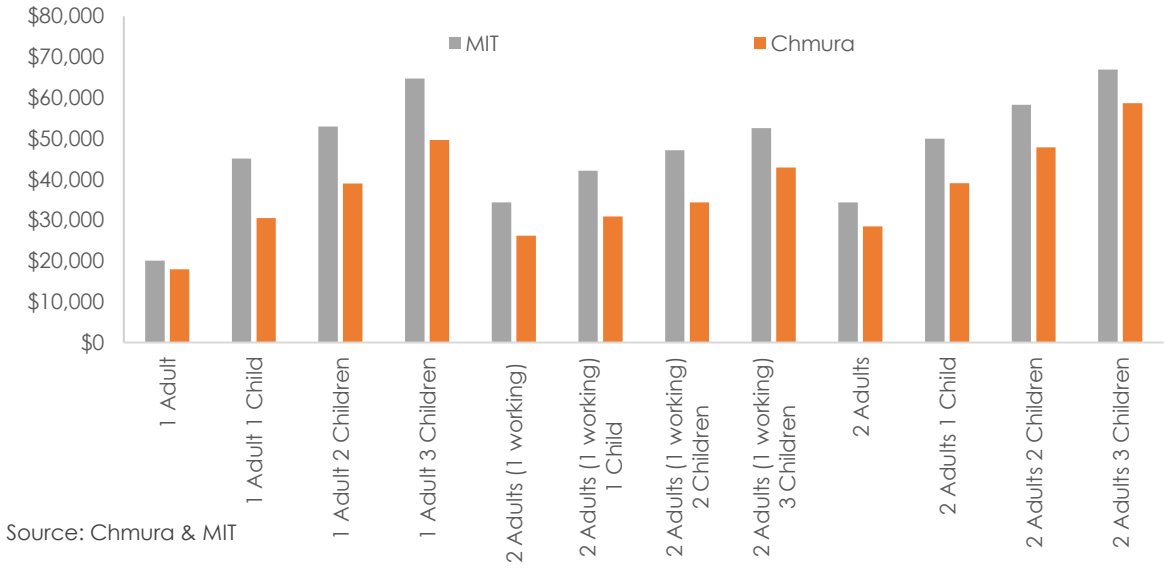
Figure 4.1: Distribution of Spending Categories



Source: Chmura

Since the MIT calculator is well known and widely used around the country, Figure 4.2 compared the Chmura estimates with the estimates from the MIT calculator. Chmura's average annual living expenses for all families are consistently lower than those estimated by the MIT calculator due to the cost of living adjustment. As mentioned before, the MIT calculator used national and state averages for several key spending items, such as food, child care, transportation, and other necessities. It did not take into consideration that the cost of living in the Dan River Region is lower than the national and state average. As a result, the required living expenses for families in the region should be lower. The other differences can be attributed to different data sources (healthcare costs, for example) and different estimating methodology. For example, the MIT calculation of transportation and other necessities costs used the expenditure for households making mean incomes, while Chmura's estimate used the average for households with incomes in the lower half of all households.

Figure 4.2: Comparision with MIT Calculator



Source: Chmura & MIT

4.2. Estimating Living Wages by Households

After annual minimum living expenses were calculated for each family type and each locality, Chmura converted them into a pre-tax hourly wage rate, assuming individuals work full time (2,080 hours per year).

In estimating living wages, Chmura assumes that each household is responsible for its own expenses and did not consider other financial support. For example, for a single parent with children, Chmura does not consider whether the single parent receives child support from other sources. In addition, some families may be eligible for public assistance programs. Public assistance was not considered in this analysis.

As Table 4.9 shows, the living wage is lowest for a family with two working adults without children. For them, the living wage is $6.85 per hour. This is the only family type that can meet basic needs with the federal minimum wage of $7.25 per hour. The highest living wage is for one adult with three children, which is estimated to be $23.88 per hour.

Table 4.9: Estimated Hourly Living Wages -2016

Family Type	Danville	Halifax	Henry	Martinsville	Patrick	Pittsylvania	**Average**
1 Adult	$8.05	$8.48	$8.70	$8.03	$8.94	$9.12	**$8.64**
1 Adult 1 Child	$14.15	$14.43	$14.55	$13.77	$14.96	$15.42	**$14.68**
1 Adult 2 Children	$18.17	$18.43	$18.54	$17.64	$19.04	$19.57	**$18.73**
1 Adult 3 Children	$23.21	$23.06	$23.66	$22.50	$24.55	$25.08	**$23.88**
2 Adults (1 working)	$11.85	$12.43	$12.73	$11.89	$13.11	$13.08	**$12.59**
2 Adults (1 working) 1 Child	$14.17	$14.56	$14.81	$13.90	$15.20	$15.58	**$14.84**
2 Adults (1 working) 2 Children	$15.78	$16.20	$16.48	$15.48	$16.90	$17.29	**$16.50**
2 Adults (1 working) 3 Children	$19.76	$19.83	$20.65	$19.36	$21.41	$21.77	**$20.65**
2 Adults	$6.41	$6.74	$6.93	$6.41	$7.16	$7.15	**$6.85**
2 Adults 1 Child	$9.01	$9.21	$9.34	$8.77	$9.61	$9.86	**$9.39**
2 Adults 2 Children	$11.12	$11.30	$11.41	$10.78	$11.75	$12.04	**$11.50**
2 Adults 3 Children	$13.66	$13.63	$14.00	$13.23	$14.53	$14.82	**$14.10**

Source: Chmura Economics and Analytics

DRRC also desires to understand the estimated living wages for full-time and part-time workers. The key difference is healthcare costs. The healthcare cost estimate in Section 4.1.4. includes the assumption that employers pay a portion of the health insurance premium. But for part-time workers who do not have employment-based health insurance, they will not have this benefit. For those individuals, they will need to purchase health insurance from the individual insurance market because the Patient Protection and Affordable Care Act (ACA) requires everyone to have insurance.[36] ACA also offers premium subsidies to households with moderate incomes.[37] Since households with living wages have incomes only sufficient to cover basic living expenses, they will be eligible for a premium credit. Chmura used the ACA tools from the Kaiser Family Foundation to estimate the health insurance premium for part-time workers in Virginia.[38] It turns out that all households purchasing insurance from the ACA health exchange can get a lower premium cost, after factoring premium subsidies, than they would have to pay with employment-based insurance. As a result, the resulting living wages for part-time workers are slightly lower than living wages for full-time workers.

Table 4.10 shows the living wages for part-time workers in the Dan River Region. The living wage is lowest for a family with two working adults without children, at $6.54 per hour. The highest living wage is for one adult with three children, which is estimated to be $23.29 per hour.

---

[36] ACA is often referred to as Obamacare by the news media. However, with the Trump Administration taking office, the fate of ACA is not clear at the time of this report. The law could be repealed, or replaced with different plans. It is not clear whether the individual mandate or premium subsidy will be retained. The analysis in this section assumes ACA remains in effect.

[37] For example, ACA provides premium credits for incomes up to four times the federal poverty line. The amount of the credit depends on household income.

[38] Source: Kaiser Family Foundation. This is calculated for each locality based on family type. http://kff.org/interactive/subsidy-calculator-2016/

Table 4.10: Estimated Hourly Living Wages, Part-time -2016

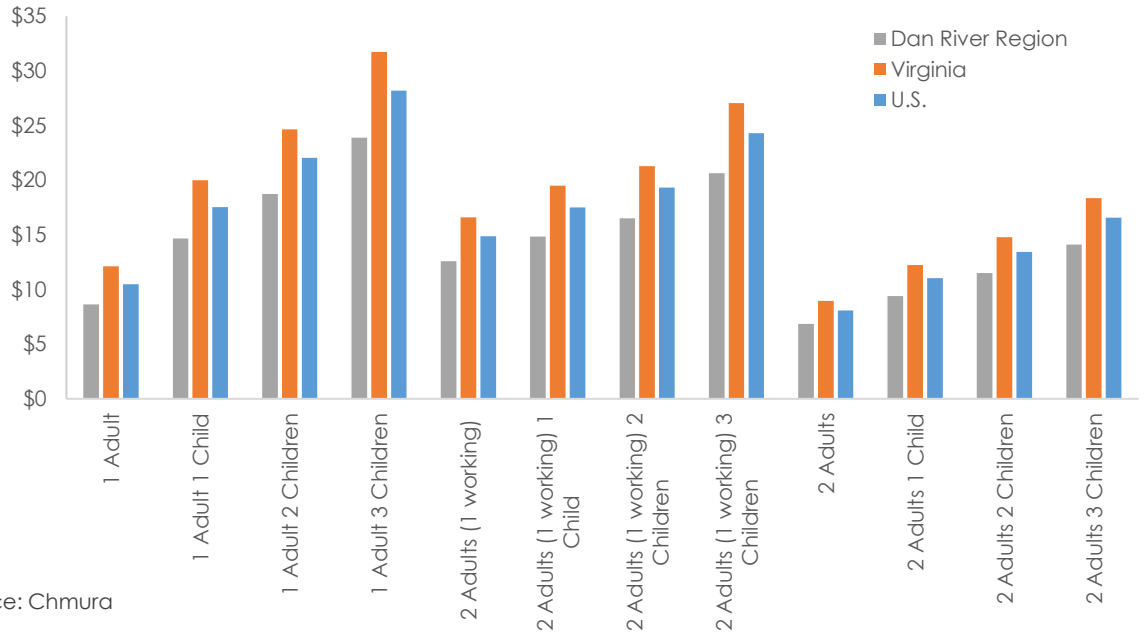
Family Type	Danville	Halifax	Henry	Martinsville	Patrick	Pittsylvania	**Average**
1 Adult	$7.73	$8.25	$8.49	$7.74	$8.76	$8.93	**$8.41**
1 Adult 1 Child	$13.38	$13.80	$13.92	$13.04	$14.41	$14.82	**$14.04**
1 Adult 2 Children	$17.00	$17.47	$17.54	$16.51	$18.17	$18.62	**$17.72**
1 Adult 3 Children	$22.46	$22.46	$23.09	$21.75	$24.17	$24.59	**$23.29**
2 Adults (1 working)	$10.76	$11.46	$11.82	$10.95	$12.22	$12.12	**$11.63**
2 Adults (1 working) 1 Child	$12.20	$12.83	$13.13	$12.04	$13.52	$13.86	**$13.08**
2 Adults (1 working) 2 Children	$13.84	$14.32	$14.67	$13.65	$15.20	$15.54	**$14.68**
2 Adults (1 working) 3 Children	$18.11	$18.27	$19.20	$17.60	$20.02	$20.33	**$19.13**
2 Adults	$6.02	$6.44	$6.65	$6.06	$6.92	$6.85	**$6.54**
2 Adults 1 Child	$8.41	$8.73	$8.85	$8.19	$9.19	$9.39	**$8.89**
2 Adults 2 Children	$10.67	$10.98	$11.06	$10.34	$11.49	$11.72	**$11.15**
2 Adults 3 Children	$13.42	$13.49	$13.86	$12.98	$14.52	$14.74	**$13.96**

Source: Chmura Economics and Analytics

4.3. Comparison with State and National Living Wages

Chmura also estimated the state and national living wages and compared them with the Dan River Region average. In general, living wages in the Dan River Region are lower than both state and national levels for all family types. The regional living wage average (hourly wages) was estimated at $10.70 in 2016. This is $3.47 lower than the state average and $1.96 lower than the national average, due to the lower cost of living in the Dan River Region. This translates into lower costs for food, housing, transportation, and other spending items.

Figure 4.3: Comparision with Virginia and National Living Wages



Source: Chmura

5. Estimating the Number of Families in the Dan River Region

Dan River Region Collaborative also desires to know the number of families in each of the family types. While data from the U.S. Census Bureau's American Community Survey provide information on the composition of households, the census data only include the number of adults and children per household. The data also do not convey whether the adults are working, or whether households are one-income or two-income households.

Chmura implemented a household survey to collect relevant information on family types. The survey instrument was designed with input from DRRC. The survey was launched on December 6, 2016 and was conducted over the course of two weeks. Chmura collected 451 total complete responses (all localities) that reflect a margin of error of 4.7%.[39]

5.1. Survey Validation

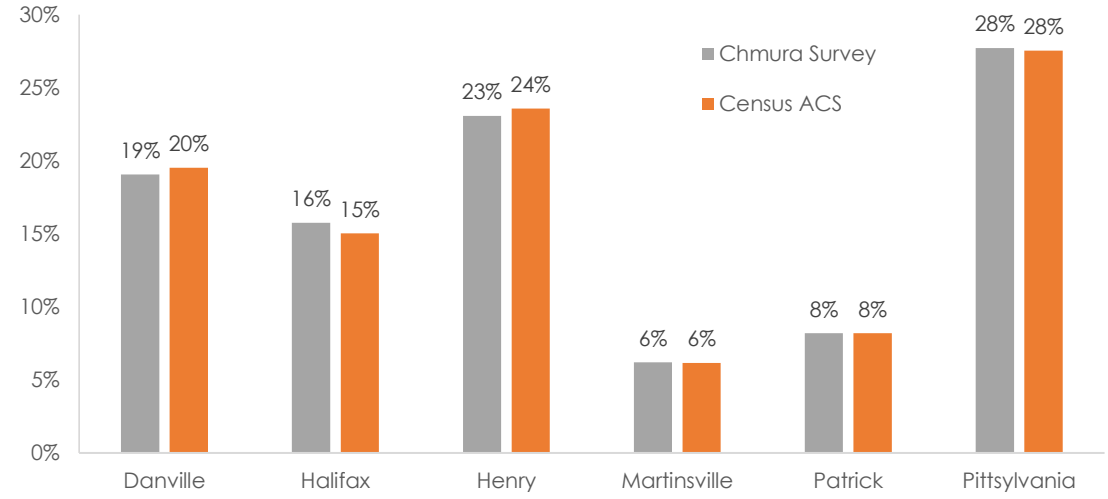
Since Chmura will rely primarily on the household survey to estimate the number of families in each family type, it is imperative that Chmura's sample represent the geographic, age, and household structure of the Dan River Region. Chmura performed some validation checks and comparisons with the publicly available government data to evaluate the reliability of the survey sample.

The geographic distribution of the sample closely resembles the household distribution in each locality in the Dan River Region. For example, based on the latest data from the U.S. Census Bureau's American Community Survey (ACS), 20% of total households in the Dan River Region are in the City of Danville; Chmura's sample had 19% of respondents in the city. The percentage of respondents in other localities also closely matches the data from the census's ACS.[40]

[39] Appendix 1 has the detailed survey report.

[40] Chmura chose to use the American Community Survey 2011-2015, 5-year average. Data for smaller localities are not available in ACS 2015 one-year data (2015) or three-year data (2013-2015).

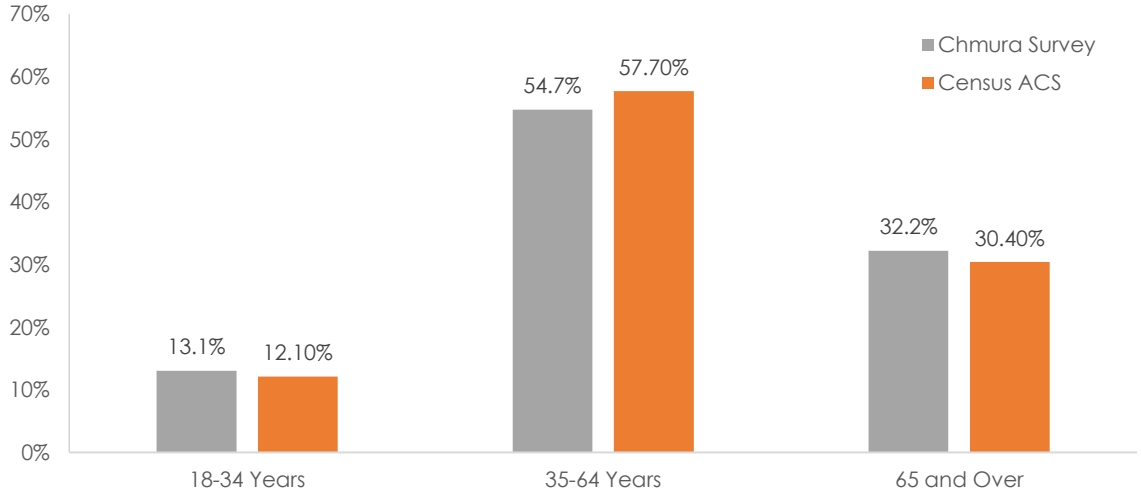
Figure 5.1: Geographic Distribution of Households



Source: Chmura & U.S. Census

Chmura also compared the age distribution of adults in Chmura's survey with the age distribution of households from the census's ACS. When breaking adults into three major age groups, the percentages from Chmura's survey are consistent with the percentages from ACS.[41] The differences between Chmura and ACS data for each age group are within the margin of error.

Figure 5.2: Age Distribution of Adults



Source: Chmura & U.S. Census

[41] ACS data only include the age of the head households.

For household size, Chmura compared the distribution of household sizes in its survey with the latest household size data from the U.S. Census Bureau's American Community Survey.[42] The distribution of household sizes is generally similar. Most household size groups are within the margin of error, except for the 2-person household. Chmura's survey seems to over-represent 2-person households.[43] Of respondents to Chmura's survey, 42.8% of households have only two persons, compared with 36.3% from ACS. The resulting average household size in the Chmura sample is 2.2, smaller than the ACS estimate of 2.4. On a related note, Chmura also found that the survey may have overrepresented the number of households without children. For example, the average household in the Chmura sample has 0.4 children, compared with 0.5 children per household in the American Community Survey. In the Chmura survey, 22% of households have children, compared with 26% in the American Community Survey.

Figure 5.3: Household Size Distribution

Source: Chmura & U.S. Census

While the Chmura survey clearly represents the geographic and age distribution of the population in the Dan River Region, it might be slightly underrepresenting families with children and over-representing families without children (especially 2-person households without children). Chmura's estimate of the number of families took this into consideration and made some minor adjustments to the survey results to make it more representative of regional families.

5.2. Estimating the Number of Families

In this section, Chmura quantified the number of families in each locality for the following 12 family types:

- 1 adult

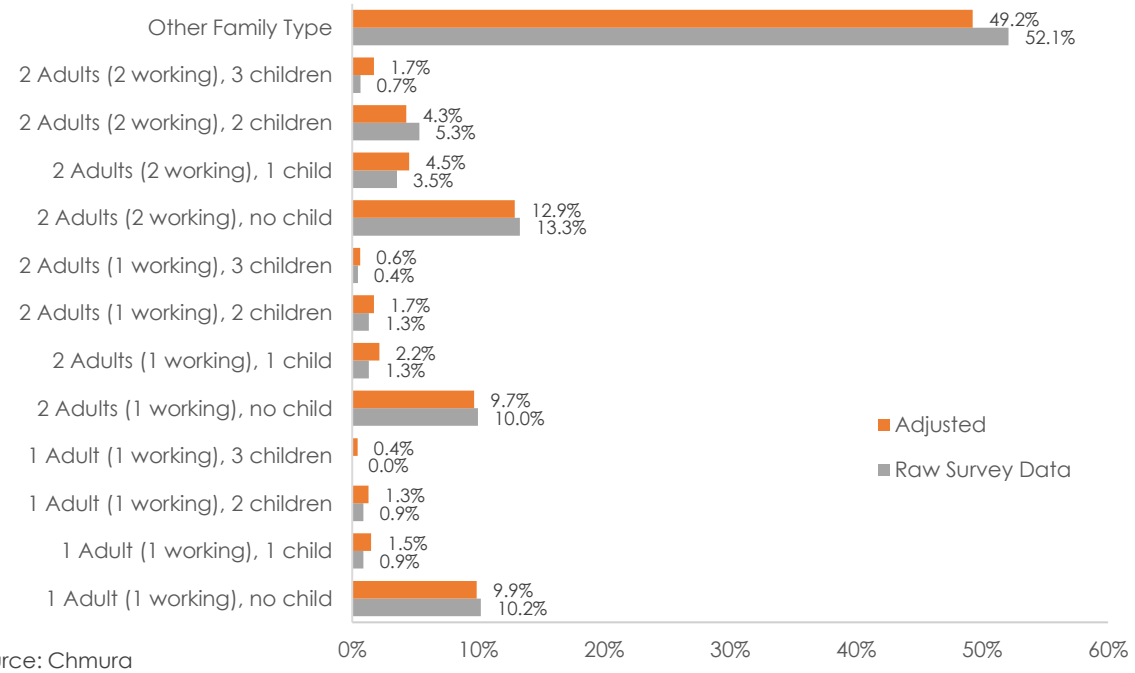
[42] Chmura chose to use American Community Survey 2011-2015, 5-year average. ACS 2015 one-year data (2015) or three-year (2013-2015) do not have data for smaller localities.

[43] Since the ACS data are also survey based, it is assumed that ACS data reflect the underlying demographic composition of the region because ACS is based on 2010 Census, and has a larger sample.

- 1 adult and 1 child
- 1 adult and 2 children
- 1 adult and 3 children
- 2 adults (one working)
- 2 adults (one working) and 1 child
- 2 adults (one working) and 2 children
- 2 adults (one working) and 3 children
- 2 adults (both working)
- 2 adults (both working) and 1 child
- 2 adults (both working) and 2 children
- 2 adults (both working) and 3 children

Chmura used survey results as a baseline, with some minor adjustments to make the results more consistent with the ACS data in terms of household size and the number of families with children. Figure 5.4 presents the percentage of households in each family type, both from raw survey data, and after the Chmura adjustment. For example, the survey showed that 13.3% of families have two working adults without children, and 10.0% have two adults without children with one adult working. The sample validation process implies that the Chmura survey has a slightly higher percentage of 2-person households. As a result, Chmura reduced the percentage of those two groups slightly. Accordingly, Chmura increased the percentages of families with children. With those adjustments, the data show that 26% of households have children; the overall household size increased to 2.36 while the average number of children in each household increased to 0.47. Those numbers are much closer to the same statistics from the census's ACS data.

Figure 5.4: Percentage of Family Types-Dan River Region



Source: Chmura

Chmura's estimate for each locality also took into consideration the regional differences in household structure, even though those differences were minor. For example, the cities of Danville and Martinsville have smaller households and fewer children per household than the regional average. On the other hand, Pittsylvania County has larger households and more children per household. Chmura's model uses census data to further adjust the household percentages in different localities.

Table 5.1 presents the estimated number of families in each of the 12 family types in each locality in the Dan River Region. Among the twelve family types, the most common are families without children—with either two adults or one adult. For families with children, those with one and two children are similar in number. There are significantly more families with one or two children than families with three children in the region.

Table 5.1: Estimated Number of Families in the Dan River Region-2016

	Danville	Halifax	Henry	Martinsville	Patrick	Pittsylvania	Region Total
1 Adult (1 working), no child	1,802	1,396	2,225	539	697	2,793	**9,452**
1 Adult (1 working), 1 child	273	214	338	82	106	426	**1,438**
1 Adult (1 working), 2 children	234	183	290	70	91	368	**1,235**
1 Adult (1 working), 3 children	78	61	97	23	30	122	**411**
2 Adults (1 working), no child	1,763	1,365	2,177	528	682	2,732	**9,247**
2 Adults (1 working), 1 child	390	305	483	117	151	609	**2,054**
2 Adults (1 working), 2 children	312	244	386	93	121	490	**1,646**
2 Adults (1 working), 3 children	117	92	145	35	45	183	**616**
2 Adults (2 working), no child	2,347	1,823	2,901	703	909	3,645	**12,328**
2 Adults (2 working), 1 child	818	641	1,014	245	317	1,279	**4,314**
2 Adults (2 working), 2 children	779	610	966	234	302	1,221	**4,112**
2 Adults (2 working), 3 children	312	244	386	93	121	487	**1,643**
Other Family Type	9,377	7,228	11,111	3,030	4,296	12,043	**47,083**
Total	18,600	14,405	22,518	5,793	7,869	26,396	**95,581**

Source: Chmura Economics & Analytics

Close to half of the families in the Dan River Region do not belong to any of the twelve family types. Most of them are households without working adults including retired, unemployed, disabled, or discouraged individuals. While the percentage appears to be large, Chmura's survey did not oversample this group. The region's labor force participation rates are lower than the state and national averages, while the unemployment rate in the region is higher. According to the latest ACS data, 49.7% of the adult population (those 16 years old and over) in the region is not working (either not in the labor force, or unemployed[44]), compared with only 37.9% in Virginia.

Another group labeled "Other Family Type" is working families with three or more adults. One or more adults are working and they may have children. Those families could have working adults living with their parents, adult children, or adult relatives. Some of them may have to take care of their children as well as

[44] Based on the BLS definition, people not in the labor force include: retirees, full-time students, disabled individuals, and discouraged workers who have given up looking for work. Unemployed persons are those in the labor force actively looking for work, but have not found employment.

elderly family members. Chmura's survey indicated over 10% of regional households belong to this type of working family with three or more adults. Future research on living wages needs to include those families to understand their basic needs and whether their income can support their families.

6. Analysis of Job Availability in the Dan River Region

In this section, Chmura estimates the quantity and quality of available jobs in the Dan River Region. Available jobs are defined as the current job openings in the region, and were quantified by industry sector, pay range, and education requirement.

6.1. Job Availability by Industry Sector & Employers

As of January 2017, there were 3,314 job openings in the Dan River Region. These data were collected via "spidering" online job posting sites to collect information regarding available jobs.[45] With the current employment of 88,712 in the region, there is one job opening per 27 current workers. As a comparison, there is one job opening per 18 current workers in the state of Virginia. This indicates that job availability seems to be more plentiful in Virginia than in the Dan River Region, which is not surprising given that the region has generally lagged the state in terms of job growth.

6.1.1. Job Availability by Industry Sector

Chmura's RTI database on job openings collected data on position titles. Those position titles enabled Chmura to classify available jobs into detailed occupations based on Standard Occupation Code (SOC) codes from the O*Net database.[46] Afterward, Chmura utilized the region's industry-occupation matrix to estimate the number of job openings in industries based on 4-digit North American Industry Classification System (NAICS) codes.[47] Finally, Chmura aggregated job openings from 4-digit NAICS industries into 17 major industry sectors specified by DRRC.

Table 6.1 presents job availability by industry sector. Data indicate that the retail services industry has the largest number of job openings as of January 2017. In fact, more than one-third of job openings in the region are in retail sales. In this study, retail services jobs include not only those in retail establishments such as grocery stores or department stores, but also jobs in food service establishments, including fast food and full-service restaurants. In addition, there are two factors that contribute to a large number of job openings—fast job growth due to demand and high turnover. Retail jobs tend to have high turnover rates where workers often move between similar jobs frequently. Some of the major occupations in retail services with sizable job openings are retail salespersons (320), first-line supervisors of retail sales workers (356), combined food preparation and serving workers (142), and first-line supervisors of food preparation and serving workers (129).

---

[45] Counts of unique job postings may not equate with actual job demand. For example, job postings may be placed in anticipation of possible openings that do not materialize. Moreover, slight variations of ads may be placed such that the number of ads exceeds the actual number of openings. In addition, online jobs included were active at any point in the 30-days preceding January 30, 2017. As such, this report may include some ads that were closed as of that date and may include some ads that were first posted prior to the 30-day period.

[46] O*Net is a national occupation classification system, sponsored by the U.S. Department of Labor, Employment and Training Administration. Source: https://www.onetonline.org/

[47] This approach is used because most job postings do not specify an industry. In addition, many advertisements are posted by staffing firms, which will then place workers in different firms or industries.

Table 6.1: Dan River Region Job Openings by Industry Sector, January 2017

Industry Sector	Job Openings	Sector Distribution (%)	
	January 2017	DRRC	Virginia
Arts/media and entertainment	52	1.6%	2.3%
Construction	64	1.9%	2.5%
Education services	157	4.8%	6.3%
Engineering	9	0.3%	1.5%
Finance/insurance services	58	1.7%	4.4%
Local Government (*)	76	2.3%	7.7%
Other Government	103	3.1%	
Healthcare	648	19.5%	14.6%
IT and computer sciences	52	1.6%	10.2%
Legal services	2	0.1%	0.3%
Manufacturing	239	7.2%	3.9%
Office/administrative	176	5.3%	9.2%
Other	206	6.2%	7.1%
Other life and physical sciences	4	0.1%	0.8%
Protective services	8	0.2%	0.5%
Retail Services	1,277	38.5%	24.4%
Transportation and logistics	184	5.6%	4.4%
Total	**3,314**	**100.0%**	**100.0%**

(*): Government percentage for Virginia includes local and other governments

Source: Chmura Economics & Analytics

About 20% of all job openings (648) in the Dan River Region are in the healthcare industry. The healthcare industry includes hospitals, medical offices, and dental offices. It also includes businesses such as nursing homes and mental health establishments. Healthcare is the fastest-growing industry in the region, and there are adequate job opportunities in this industry. Some of the occupations with a lot of openings are registered nurses (115), mental health counselors (44), nurse practitioners (25), occupational therapists (22), physical therapists (19), and pharmacy technicians (19).

Manufacturing is the third-largest industry in the region based on job openings and accounts for 7% of all job openings in the area. Despite declining jobs in recent years, manufacturing is still an important source for regional jobs. Major manufacturing industries in the region are rubber and plastic products, furniture, and textile manufacturing. Other industries with large job openings are office and administrative services, education services, other governments, and local governments.

Comparing the industry composition of job openings in the Dan River Region with that of Virginia, there are some key differences. While retail services and healthcare are also two sectors with the largest number of job openings in Virginia, the percentage for those industries are much smaller in the state. The Dan River Region also has a higher percentage of jobs in the manufacturing sector compared to the state average. On the other hand, 10.2% of job openings in Virginia are in IT and computer sciences,

compared with only 1.6% for the Dan River Region. In addition, the state also has a higher percentage of office/administrative and finance/insurance services jobs.

6.1.2. Job Availability by Major Employers

Not surprisingly, the top 10 employers with the most job openings in the Dan River Region are concentrated in the retail, healthcare, and government sectors. As Table 6.2 shows, in January 2017, there were 185 open positions at Dollar General, a major discount retailer in the region. This is followed by Food Lion, a grocery store chain, with 134 openings. The other retailer in the top 10 is Family Dollar. The list also includes two restaurant chains: Pizza Hut and Taco Bell. Three healthcare businesses belong to the top 10 employers. Sentara Health had 132 openings, along with Danville Regional Medical Center, and Healthcare Workforce Solutions. Two employers are related to local governments: City of Danville, and Danville Public Schools.

Table 6.2: Job Openings by Top 10 Employers in the Dan River Region, January 2017

Company	Job Openings
Dollar General	185
Food Lion	134
Sentara Healthcare	132
Family Dollar	72
City of Danville	47
Danville Regional Medical Center	46
Pizza Hut	44
HealthTrust Workforce Solutions	43
Taco Bell	34
Danville Public Schools	34

Source: Chmura & JobsEQ

6.2. Job Availability by Pay Range and Living Wages

6.2.1. Job Availability by Pay Range

DRRC desires to know the job availability by different pay ranges, from the federal minimum wage of $7.25 per hour (corresponding to an annual wage of $15,080 if a person works full-time) to jobs paying over $40 per hour ($83,200 annual wage). Since most advertisements of job openings do not include the wages and salaries for opening positions, Chmura used the regional entry-level wages from JobsEQ to estimate the wage associated with open positions. Chmura chose to use entry-level wages rather than average or median wages, because workers typically must accumulate experience and seniority before their income reaches the average wage level of the occupation. The entry-level wage for registered nurses was $40,900 per year in the Dan River Region. All job openings for registered nurses will be assigned

an hourly wage of $19.70. Similarly, the annual wage for an entry-level retail salesperson was $17,000 in 2016, corresponding to an $8.20 hourly wage.[48]

Table 6.3 presents the job openings by pay range. Because a large number of job openings are in retail services, the pay range with the most openings (1,187) is $7.25-$8.99 per hour. This range accounts for 35.8% of total job openings. Occupations such as home health aides, food preparation and service workers, and customer service representatives also fall into this pay range. More than 20% of jobs pay between $11.00 and $12.99 per hour. Those are jobs such as first-line managers for retail and food service as well as truck drivers. On the other hand, the jobs paying high hourly wages include registered nurses, nurse practitioners, physicians, and engineers.

Table 6.3: Job Openings by Pay Range, January 2017

	Number of Openings	Dan River Region	Virginia
$7.25-$8.99	1,187	35.8%	21.7%
$9.00-$10.99	490	14.8%	12.0%
$11.00-$12.99	668	20.2%	8.4%
$13.00-$14.99	168	5.1%	9.2%
$15.00-$17.99	290	8.8%	9.7%
$18.00-$19.99	194	5.9%	5.7%
$20.00-$24.99	112	3.4%	9.6%
$25.00-$29.99	108	3.3%	8.7%
$30.00-$39.99	61	1.8%	11.4%
$40.00 and up	36	1.1%	3.5%
Total	**3,314**		

Source: Chmura & JobsEQ

Compared with the state average, job openings in the Dan River Region are skewed toward low-wage jobs. In Virginia, for example, 33.3% of job openings are paying $20 and above, compared with only 9.6% for the Dan River Region. In addition, 30.7% of Virginia job openings pay below $11 per hour, compared with 50.6% for the Dan River Region. There are two reasons underlying this phenomena. First, Virginia has a higher number of jobs concentrated in the IT and computer science industries, and those industries pay higher wages. In addition, the state average wages are higher than the Dan River average even for the same job positions, resulting in a higher concetration of jobs in higher income ranges.

Table 6.4 lists the job openings in the Dan River Region by industry and pay range to illustrate the type of jobs available in various industry sectors. For the retail industry that has the most job openings, more than half of the job openings are in the lowest pay range ($7.25-$8.99), just over the federal minimum wage. The industry with the second largest openings is healthcare. For this industry, there are job openings across a wide range of pay ranges. While there are many job openings below $10.00 per hour, there are also a

[48] As a comparison, the regional average wages for a registered nurse and a retail salesperson are $54,600 and $25,500, respectively, per year.

significant number of job openinings paying over $20.00 per hour. For the manufacturing industry, most of the job openings pay below $18.00 per hour.

Table 6.4: Job Openings by Pay Range and Industry in Dan River Region, January 2017

	$7.25-$8.99	$9.00-$10.99	$11.00-$12.99	$13.00-$14.99	$15.00-$17.99	$18.00-$19.99	$20.00-$24.99	$25.00-$29.99	$30.00-$39.99	$40.00 and up
Arts/media and entertainment	28	13	6	1	3	1	1	1	0	0
Construction	3	14	26	6	8	5	1	1	0	0
Education services	43	27	22	13	46	13	10	10	1	0
Engineering	0	1	0	2	2	0	2	1	0	0
Finance/insurance services	11	8	19	3	11	1	3	1	0	0
Government	10	11	16	43	23	8	7	2	1	0
Healthcare	99	111	64	53	28	134	44	62	49	34
IT and computer sciences	6	4	6	5	21	2	4	4	0	0
Legal services	0	0	1	0	0	0	0	0	0	0
Manufacturing	58	43	56	8	38	7	13	15	0	1
Office/administrative	78	25	13	10	24	9	9	6	1	0
Other	88	38	34	17	17	5	5	1	0	0
Other life and physical sciences	0	0	0	0	1	0	1	1	0	0
Protective services	0	7	0	0	0	0	0	0	0	0
Retail Services	697	168	344	3	50	3	2	1	9	0
Transportation and logistics	66	19	62	3	18	3	10	2	0	0
Total	1,187	490	668	168	290	194	112	109	60	36

Source: Chmura & JobsEQ

6.2.2. Availability of Living-Wage Jobs

One research question is to understand the availability of living wage jobs in the Dan River Region. Living-wage jobs are defined as open positions that pay wages higher than living wages. The answer to this question depends on the family type. One job may provide a living wage for a single adult, but would not be sufficient to support a working family.

Table 6.4 presents data indicating the availability of living wage jobs. Since adults without children tend to have lower living expenses, 70% of available jobs in the region can support 1-adult families, and 100% of jobs pay higher wages than necessary to support 2-working-adult families. However, as the number of adults or children increases, so do the wages necessary to support those family members. For example, for a family with one adult and three children, only 7% of available jobs can support this family with one adult working. For a family of two adults and three children, then only 9% of jobs can support this family with one adult working. If both adults are working, 27% of available jobs can support such families.

Table 6.5: Availability of Living Wage Jobs

Family Type	% of Job Openings over Living Wage
1 Adult	70%
1 Adult 1 Child	24%
1 Adult 2 Children	15%
1 Adult 3 Children	7%
2 Adults (1 working)	32%
2 Adults (1 working) 1 Child	24%
2 Adults (1 working) 2 Children	21%
2 Adults (1 working) 3 Children	9%
2 Adults	100%
2 Adults 1 Child	60%
2 Adults 2 Children	48%
2 Adults 3 Children	27%
Overall	**50%**

Source: Chmura Economics and Analytics

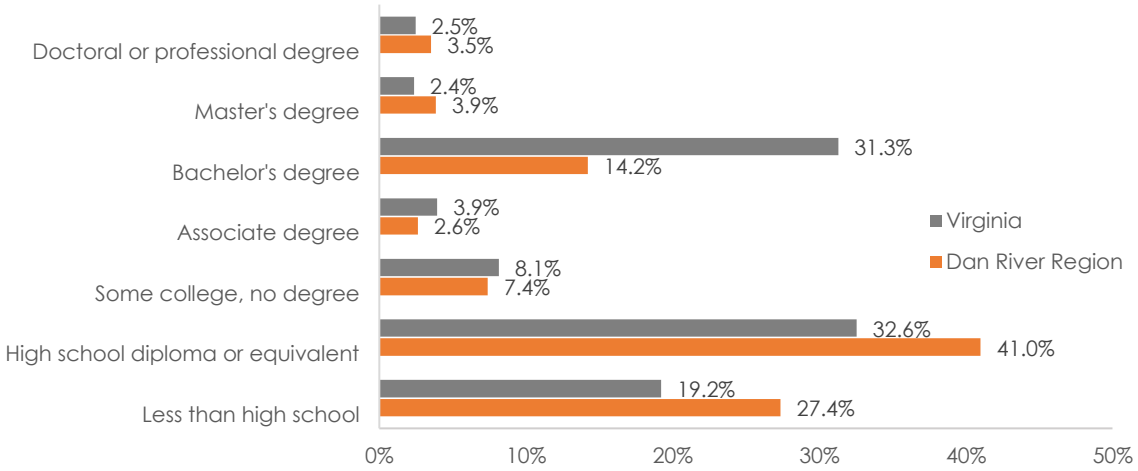
Based on the number of families of different types estimated in Section 5, Chmura calculated that the overall average living wage is $10.68 for the region. Using this regional average as a guide, it is estimated that half (50%) of the job openings in the Dan River Region are over the regional living wage. As Chmura's analysis shows, a majority of the job openings in the region do not pay living wages. Families with children will have a difficult time meeting their basic needs, which includes child care and transportation. Those are also the families that need more help. If affordable child care can be found, or employers can support child care, then more jobs can be living wage jobs for those families.

6.3. Job Availability by Education Requirement

Since many advertisements of job openings do not include data on education requirement, Chmura used the information from O*Net to estimate the number of job openings by education requirement. O*Net data for each occupation include the typical educational attainment for those occupations, and Chmura interpreted that as the required education.

Figure 6.1 presents job openings by education requirement in the Dan River Region. More than two-thirds (68.4%) of job openings do not require any post-secondary education. For example, 41.0% of all job openings in the Dan River Region only require a high school diploma or equivalent, and 27.4% of all jobs do not even require a high school diploma. As a comparison, 51.8% of Virginia job openings do not require any post-secondary education. On the other hand, 14.2% of job openings in the Dan River Region need a bachelor's degree, compared with 31.3% for the state average. The key conclusion is that job openings in the Dan River Region tend to be concentrated in low-skilled jobs that do not require college or higher degrees.

Figure 6.1: Job Opening by Education Attainment



Source: Chmura and JobsEQ

Exploring more details, Table 6.6 presents the job openings in the Dan River Region by industry and education requirement, providing more insignts residents who intend to seek employment in those sectors.

Table 6.6: Job Openings by Education Requirement and Industry in Dan River Region, January 2017

	Less than high school	High school diploma or equivalent	Some college, no degree	Postsecondary non-degree award	Associate degree	Bachelor's degree	Master's degree	Doctoral or professional degree
Arts/media and entertainment	14	32	0	0	0	5	1	0
Construction	12	30	1	16	0	6	0	0
Education services	25	39	2	2	2	70	17	28
Engineering	0	1	0	0	1	6	0	0
Finance/insurance services	2	38	1	2	0	15	0	0
Government	5	62	1	6	4	38	4	2
Healthcare	44	126	2	78	58	191	102	77
IT and computer sciences	2	13	3	19	1	15	0	0
Legal services	0	1	0	0	1	0	0	0
Manufacturing	31	142	3	16	6	40	0	0
Office/administrative	21	93	5	8	6	41	2	1
Other	50	107	1	17	6	21	2	1
Other life and physical sciences	0	0	0	0	1	2	0	0
Protective services	0	8	0	0	0	0	0	0
Retail Services	662	586	2	8	1	9	0	9
Transportation and logistics	39	80	1	53	1	11	0	0
Total	907	1,359	21	224	87	470	128	118

Source: Chmura & JobsEQ

For the retail industry, which has the most job openings, more than half of the openings (52%) do not even require a high school diploma, and another 46% of job openings require a high school diplima. The industry with the second largest openings is healthcare. For this industry, there are job openings across a wide range of education levels. While there are many healthcare jobs requring only a high school level education, there are also a significant number of job openinings requiring a bachelor's, master's, or doctoral or professional degree. For the manufacturing industry, while close to 60% of job openings need only a high school diploma or equivalent, 17% of job openings need a bachelor's degree, much higher than the percentage for the retail industry.

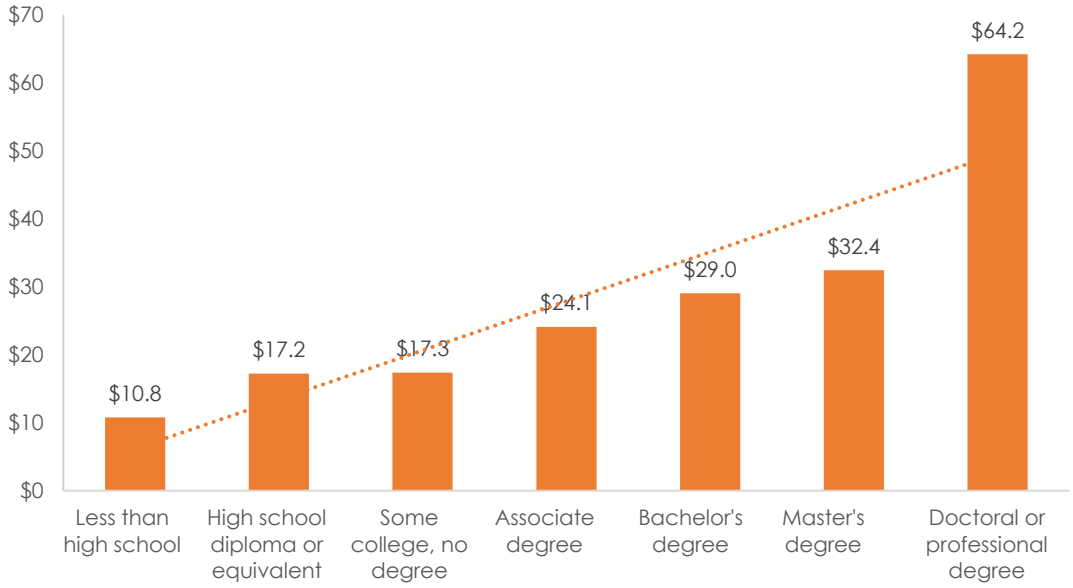
6.4. Correlation Between Education and Wages

It is not surprising that there is a strong positive correlation between education level and wages in the Dan River Region. The higher wages are necessary to compensate for the additional investment people spend to acquire additional education. It also reflects the additional value or productivity an individual with a high education level has in the labor market.

Figure 6.2 demonstrates the positive correlation between level of education and wages. As the level of education rises, so does the average hourly wage for jobs requiring that education. For example, the average hourly wage for job openings that do not require a high school diploma is $10.80 per hour, while average hourly wage for job openings that require a high school diploma is $17.20 per hour. For college-level education, average hourly wage for job openings requiring an associate degree is $24.10 per hour, while it is $29.00 per hour for jobs with a bachelor's degree. Based on the wage and education data in the Dan River Region, a statistical analysis indicates that each year of additional education can increase hourly wages by $4.10 per hour.[49]

[49] The currently available data do not enable Chmura to evaluate the effect of certifications or licenses on wages. The State Council of Higher Education for Virginia (SCHEV) and Virginia Community College System (VCCS) are working on a project to track pre- and post-certification wages for various certification programs. Chmura has reached out to SCHEV for possible access to such data, but the data will not be available until June 2018.

Figure 6.2: Hourly Wages by Education in DRRC



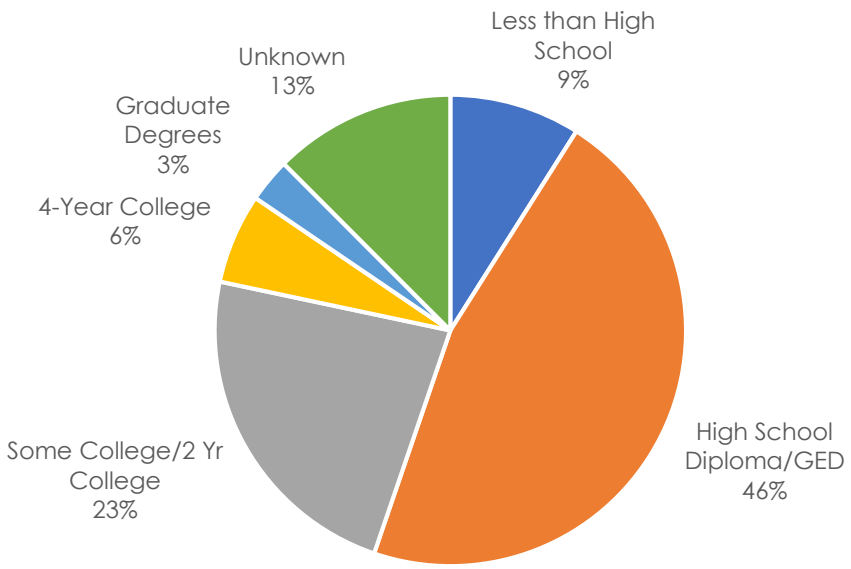
Source: Chmura and JobsEQ

7. Analysis of Regional Capacity

The final task of this research is to evaluate whether the Dan River Region has the capacity to fill living wage jobs. Chmura used the JobsEQ technology platform to complete this task. Chmura first determined the current available workforce in the region that can fill those jobs—including currently unemployed workers and potential new entries. Chmura's JobsEQ technology platform contains information on the industry and occupation of unemployed workers in the region. In addition, Chmura also estimates the annual new labor supply into the regional workforce. Based on the latest unemployment rate of 5.4% in November 2016, Chmura estimated that there are 5,371 unemployed workers in the region.[50]

As Figure 7.1 shows, of all unemployed workers, it is estimated that 55% either did not complete high school, or have a high school diploma or equivalent (General Educational Development or GED). Twenty-three percent are 2-year college graduates or those with some college education, 6% are those with 4-year degrees, and 3% are those with graduate degrees. Please note that 13% did not provide any information. It is not surprising that more than half of the unemployed do not have any college-level education.

Figure 7.1: Estiamted Education Level of the Unemployed in Dan River Region



Source: Chmura and JobsEQ

[50] Source: BLS.

Outside the current unemployed workers in the Dan River Region, another source of available labor force is annual entrants to the labor market from regional high schools and colleges. Chmura's JobsEQ estimated annual new entries into the labor market at 1,874.[51]

Table 7.1: Workforce Availability and Job Availability

Occupation Groups	Available Workforce	Job Availability	Labor Surplus
Architecture and engineering	79	30	49
Arts, design, entertainment, sports, and media	64	31	33
Building and grounds cleaning and maintenance	232	104	128
Business and financial operations	124	89	35
Community and social service	91	106	-15
Computer and mathematical	18	31	-13
Construction and extraction	489	42	447
Education, training, and library	232	96	136
Farming, fishing, and forestry	66	1	65
Food preparation and serving related	526	404	122
Healthcare practitioners and technical	140	394	-254
Healthcare support	157	85	72
Installation, maintenance, and repair	249	130	119
Legal	16	2	14
Life, physical, and social science	36	21	15
Management	391	153	238
Office and administrative support	1,113	327	786
Personal care and service	235	103	132
Production	1,518	105	1,413
Protective service	89	76	13
Sales and related	625	811	-186
Transportation and material moving	723	173	550
Total	**7,212**	**3,314**	**3,898**

Note: A negative number implies there is a labor shortage in those occupations

Source: Chmura Economics & Analytics

Combining unemployed workers and new entrants to the labor market, Table 7.1 lists the available workforce in the Dan River Region as well as the current job openings. Currently, the Dan River Region has an estimated available workforce of 7,212. With open positions of 3,314, it indicates that the total number of workers far exceeds available positions in the region. Breaking this down into different occupation groups, the available workforce exceeds the number of job openings for most occupation groups, implying a labor surplus. Among them, the most prominent is production workers. The Dan River Region has an estimated supply of 1,518 production workers (unemployed plus new entries) and only 105 production job openings. It will be very challenging for workers in those occupations to find employment.

[51] New entries into the workforce are projected workers who will enter the labor force after they graduate from high school, 2-year, or 4-year colleges. Despite the fact that they may not enter the workforce until summer, Chmura chose to include those in the analysis. This is to demonstrate that for some job openings, even considering potential new entries, the region may still not have a sufficient workforce to fill those positions.

Similarly, for occupation groups such as transportation and material moving, office and administrative support, and construction and extraction, the available workforce surpasses the number of job openings.

On the other hand, there are some occupations where the region currently does not have enough workers to fill open positions. Chief among them is healthcare practitioners and technical occupations. The number of open positions exceeds current displaced workers by 254. It means that even after considering new graduates from community colleges and four-year colleges in this area, the region still lacks the capacity to fill such occupations. Similarly, the region is also experiencing labor shortages in community and social service, and computer-related occupations, though to a smaller extent. In addition, there seems to be more sales and related job openings than available workers. One reason for the labor shortage in retail occupations is high turnover for those jobs. Another possible reason is that fewer people are willing to seek those opportunities due to low wages or other barriers for work such as lack of affordable child care or transportation.

Despite certain occupations that have a labor shortage, the fundamental challenge for the Dan River Region is that there are more displaced workers than job opportunities that match their experience or expectations. There is an imbalance between job availability and available workforce in the region, with available jobs falling well short of available workers. Economic theory indicates that when the unemployment rate falls to 3%-4%, the labor market can be considered to reach full employment, where every individual who wants to work can find a job. The current unemployment rate for the region is 5.4%, and it is estimated that the region needs about 1,500-2,000 additional jobs to achieve full employment. With only over three thousand available jobs, while it is necessary to be concerned about the quality of jobs in the region and whether those are living wage jobs, it is also imperative to expand job opportunities for regional residents.

8. Conclusion

In this study, Chmura estimated living wages for the Dan River Region. Using data from various government sources and Chmura's implemented survey, Chmura estimated that the average living wage for the region is $10.68 per hour, $3.43 higher than the federal minimum wage. However, this is the average living wage of all families in the Dan River Region. The actual living wage depends on family composition. Families with children require higher living wages to support basic family needs.

In January 2017, there were over three thousand job openings in the Dan River Region. Using the regional average as a guide, half (50%) of the job openings in the region pay higher than the regional living wage. However, for different family types, a living wage job for a single individual will not be able to support a family with either a spouse or children. Public policies should target different families to help with their basic needs, either in child care, transportation, or healthcare.

Finally, there are more than seven thousand individuals in the Dan River Region that are either unemployed or are new entrants to the labor market. This is much higher than the number of jobs available in the region. Thus, the fundamental challenge for the region is to expand job opportunities for regional residents.

Appendix 1: Household Survey Report

A1.1. Background and Methodology

Chmura worked with the DRRC and Issues & Answers Network, a full-service market research firm, to obtain 451 complete survey responses from the Dan River Region via landline and cell phone calls during the evenings between December 6 and December 15, 2016. The responses are proportioned based on the current population of each locality in the region. Chmura and the DRRC designed the survey instrument which included questions regarding the following:

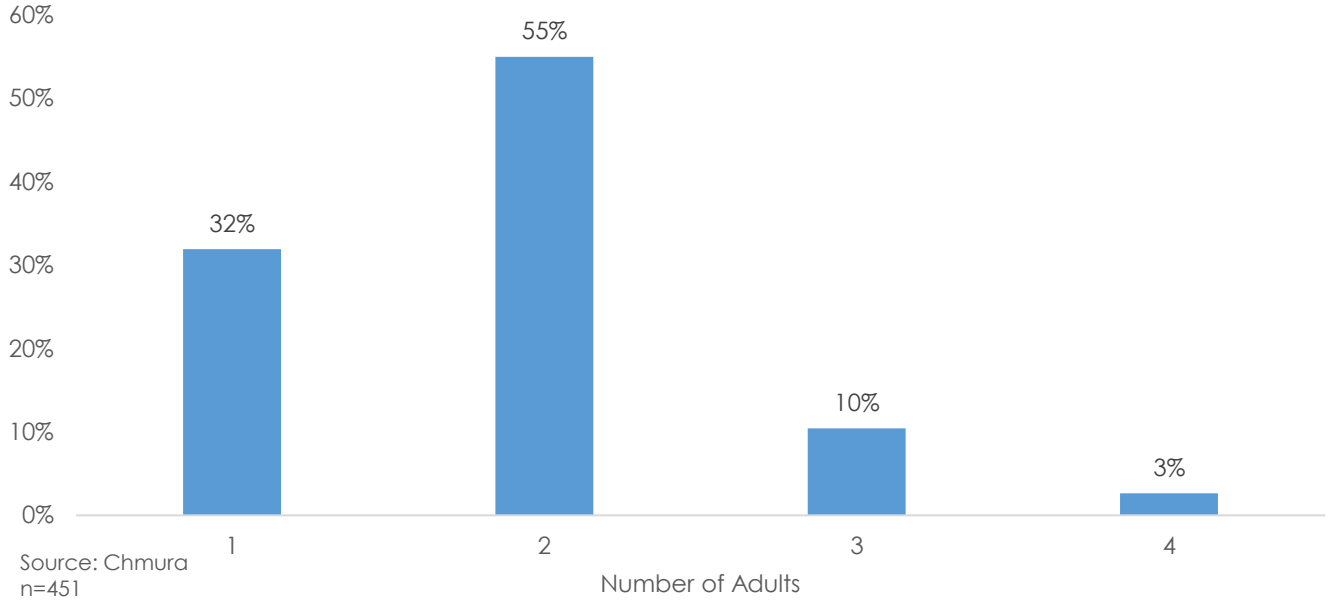
- The household composition, including number and age of adults and children
- The demographic profile of households, including geographic distribution, household size, dwelling size, and educational attainment
- The employment status of adults in the household
- The income and spending habits of the respondents

This survey enabled Chmura to quantify the region's family types as well as supplement secondary data with reliable estimates at the locality level with a 4.7% margin of error. While Chmura strived to obtain a representative sample of the Dan River Region's population, the initial sample is slightly skewed toward the older population, which is discussed in this section. Chmura collected 51 additional responses above the 400 in the scope in order to mitigate this sample bias. The sample's effects on household composition are highlighted in the following sections.

A1.2. Household Composition

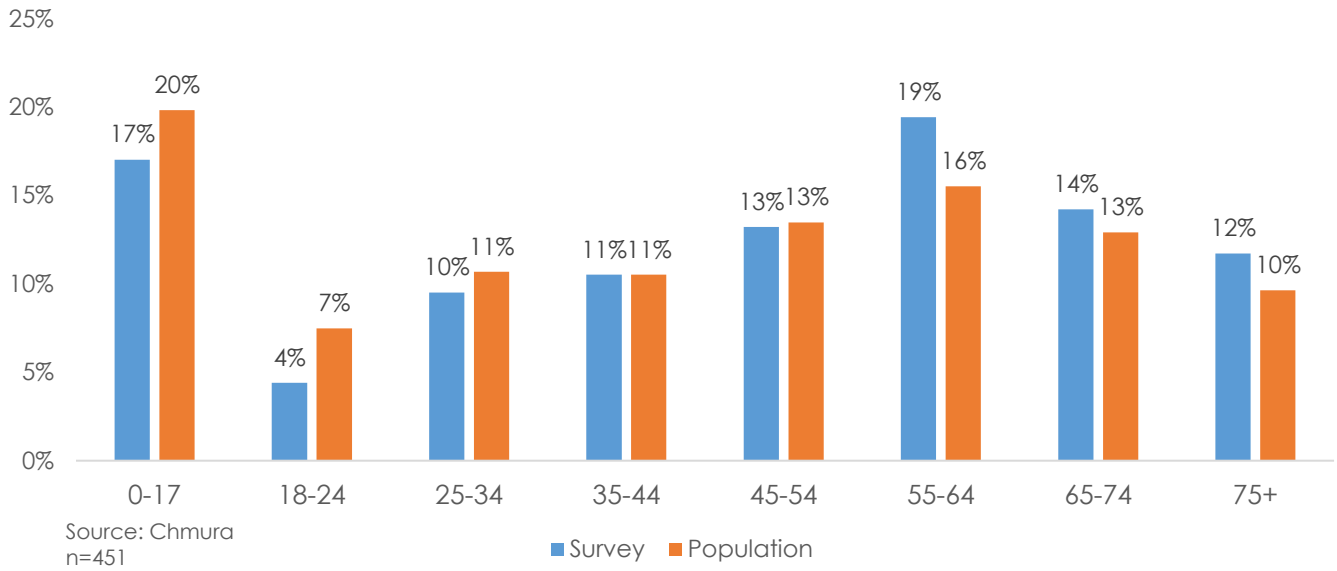
Respondents to Chmura's survey were asked how many adults and children live in their family's household. A family refers to everyone living in the respondent's household who shares living expenses with the survey respondent. Nearly one-third of respondents have one adult in their family, and over half of respondents have two adults in their family. As shown in Figure A1.1, another 10% of respondents have three adults in their family, and the remaining 3% of respondents have four adults in their family.

Figure A1.1: Number of Adults in Family Per Household



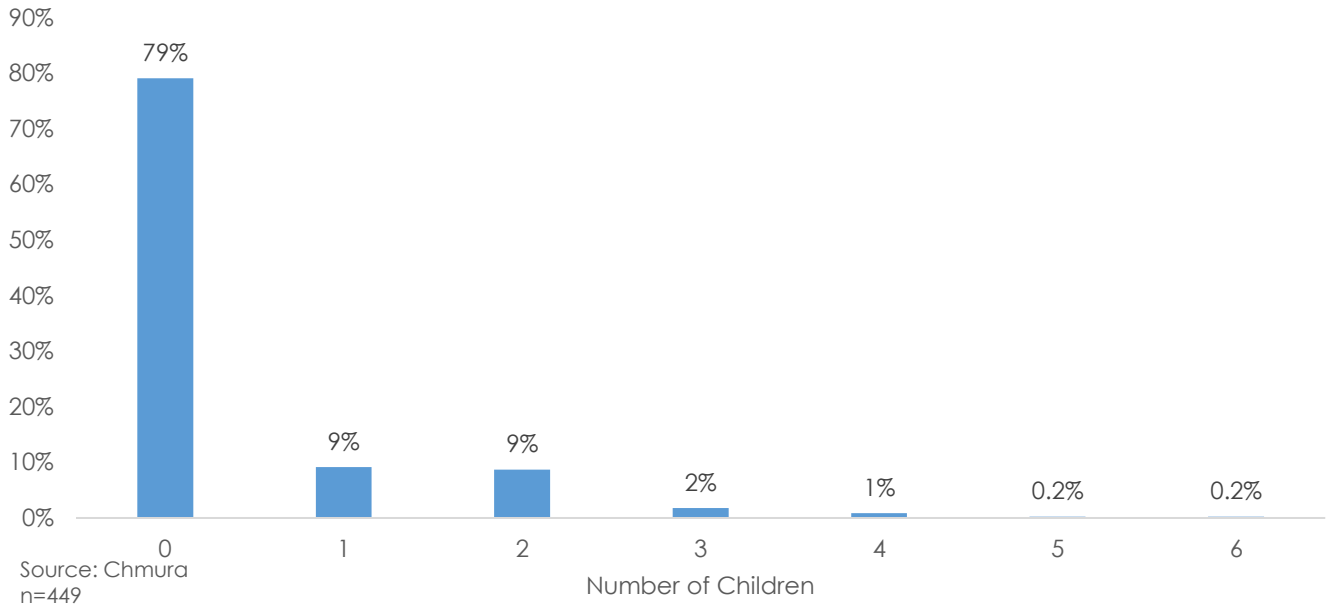
The respondents' ages skew slightly older, relative to the region's population. Respondents were asked the age of all adults and children in their family's household. When all family members are included, the older skew in the survey sample is evident when compared to the region's population, as shown in Figure A1.2. The oldest three cohorts, representing those over 54, are over-represented relative to the population while the two youngest cohorts, including individuals under 25 years old, are underrepresented relative to the population. When using survey data in the analysis, Chmura made appropriate adjustment to account for this slight bias.

Figure A1.2: Age Cohorts of Adults in Chmura's Survey Compared to the Population



While Chmura's survey sample is aged slightly older than the region's population, there is a greater disparity when examining presence of children. There are more families with children living in their households in the regional population (28%) than in Chmura's survey (21%).[52] As shown in Figure A1.3, households with one and two children in the family are both at 9% of the survey sample. Another 3% of surveyed households have three or more children in their families. The age distribution of the children was fairly uniform with a slightly higher number of older children (41% aged 12-17) than younger children (32% aged 0-5) and those in between (28% aged 6-11).

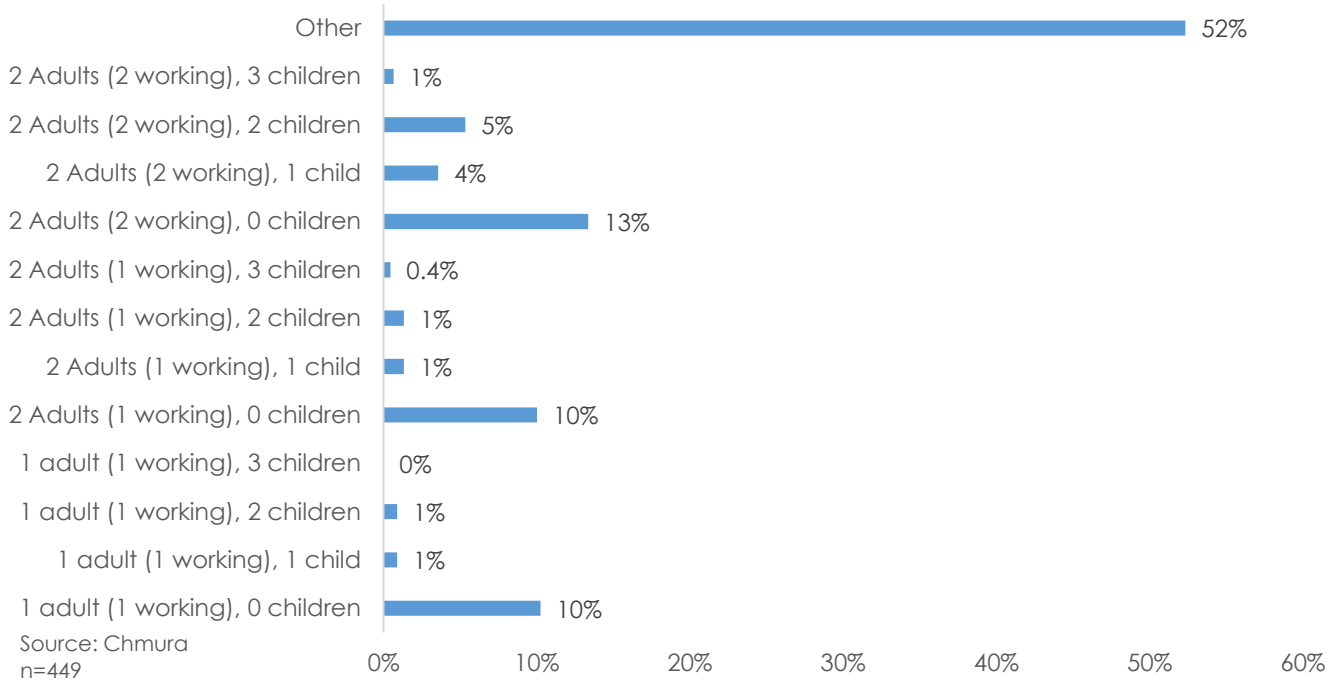
Figure A1.3: Number of Children in Family Per Household



Chmura's survey helps to quantify household types in the Dan River Region. While the survey data are adjusted using ACS data in the main report, Figure A1.4 shows the region's proportions of the 12 household types according to the survey. Over three-quarters of the "Other" household type represents households with no working adults. One-quarter of the "Other" household type represents households with three or four adults.

[52] Source: Chmura and Census 2010.

Figure A1.4: Household Types



A1.3. Demographics

Respondents to Chmura's survey span six localities in the Dan River Region. To obtain a representative sample, the responses are proportional to the localities' populations within the region. As Henry County and Pittsylvania County together make up more than half of the region's population, over half of the survey respondents are from these counties, shown in Table A1.1.

Table A1.1: Respondents' Localities

	Number of Responses	Percent of Total
City of Danville	86	19%
City of Martinsville	28	6%
Halifax County	71	16%
Henry County	104	23%
Patrick County	37	8%
Pittsylvania County	125	28%
Total	**451**	**100%**

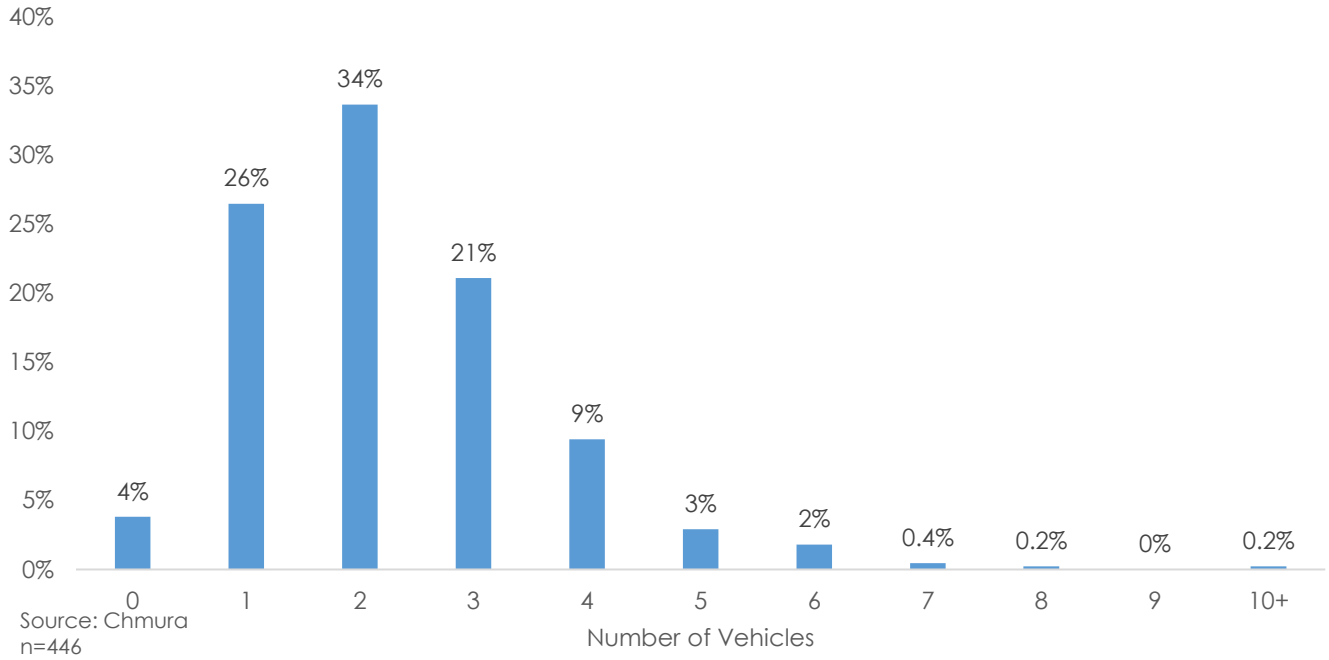
Source: Chmura

Respondents were asked about their home ownership and personal vehicles. The vast majority of respondents (83%) own their home, while some (16%) rent their place of residence. The ownership rate is

higher in the counties than the more densely populated cities of Danville (34% rent) and Martinsville (25% rent). Chmura's survey asked respondents about the number of bedrooms in their place of residence. On average, respondents have nearly three bedrooms in their home. Nearly three-quarters of respondents have two or three bedrooms in their home, and only 4% have four or more bedrooms. Homes in two cities appear to be smaller than those in the four counties. Of respondents living in the cities of Danville and Martinsville, 36% have two or fewer bedrooms in their household compared to 24% of respondents living in the four counties in the Dan River Region.

Similarly, respondents in the counties own more vehicles on average (2.4 vehicles per respondent) than those in the two cities (1.9). As shown in Figure A1.5, over 80% of respondents' families own between one and three personal, operable vehicles. Of the 17 respondents who do not own a vehicle, seven live in Danville and five live in Pittsylvania County.

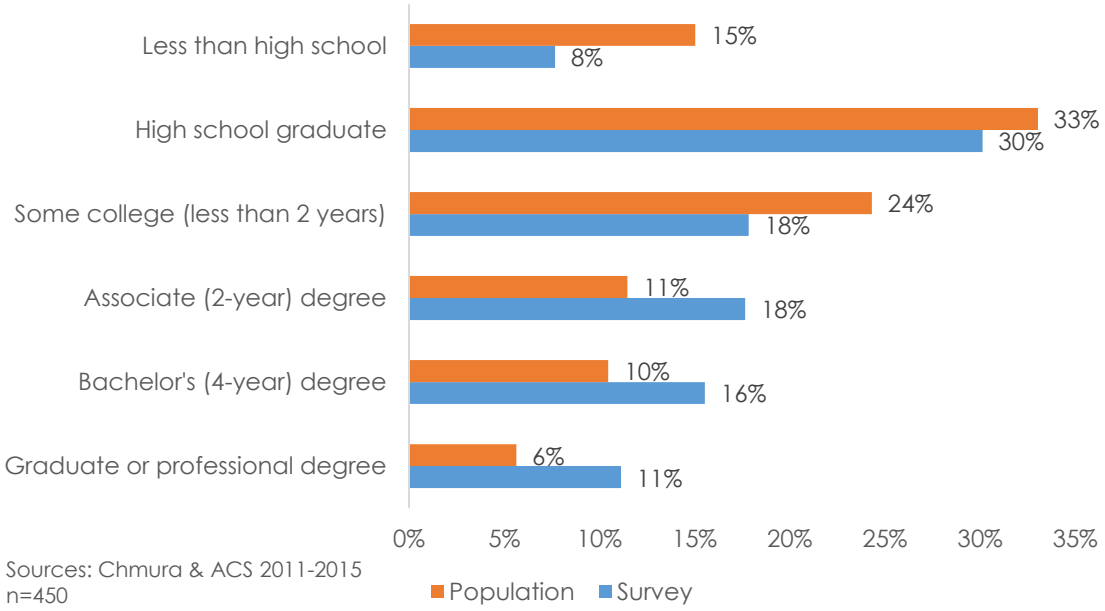
Figure A1.5: Vehicles Owned by Respondents' Families



Source: Chmura
n=446

Respondents were also asked about the highest level of education of all adults in their families. The educational attainment of adults in surveyed households was higher than the regional population's educational attainment, as shown in Figure A1.6. Attainment of an associate degree or higher is at a higher rate for adults in Chmura's surveyed households (44%) compared to the region's population (28%).

Figure A1.6: Educational Attainment of Adults Age 25-64



Sources: Chmura & ACS 2011-2015
n=450

A1.4. Employment

Chmura's survey asked several questions about respondents' employment. Of all respondents, 57% have at least one adult in the family working full time, including 24% of respondents with two adults in their family working full time. Of the 43% of respondents who don't have an adult in their family working full time, they are unemployed, stay at home or are retired. Chmura's survey includes data on 829 adults from 451 households, and 46% of those adults work full time, 6% work part time, 11% stay at home, and 37% reported that they unemployed, including a large number of retired adults.[53] Households with adults having part-time jobs work an average of 22 hours per week. Common occupations of working adults include education, healthcare, construction, retail, and manufacturing or industrial jobs. Over half (57%) of working adults have jobs which provide employee benefits.

A1.5. Income and Spending Habits

Respondents were asked several questions about their family's income and spending habits. Family spending averaged $2,687 per month with housing expenses serving as the largest spending category at $489 per month. As shown in Table A1.2, food ($418), transportation ($403), health insurance ($394), and utilities ($341) are other prominent monthly expenses. Child care costs are low because 79% of respondents do not have children in their household. Child care costs average $151 per month for families with at least one child. Monthly transportation costs are higher for respondents in the cities of Danville and Martinsville ($443) than for respondents in the four counties in the region ($315).

[53] Many retired respondents chose to report them as unemployed in this survey.

Table A1.2: Respondent Family Spending

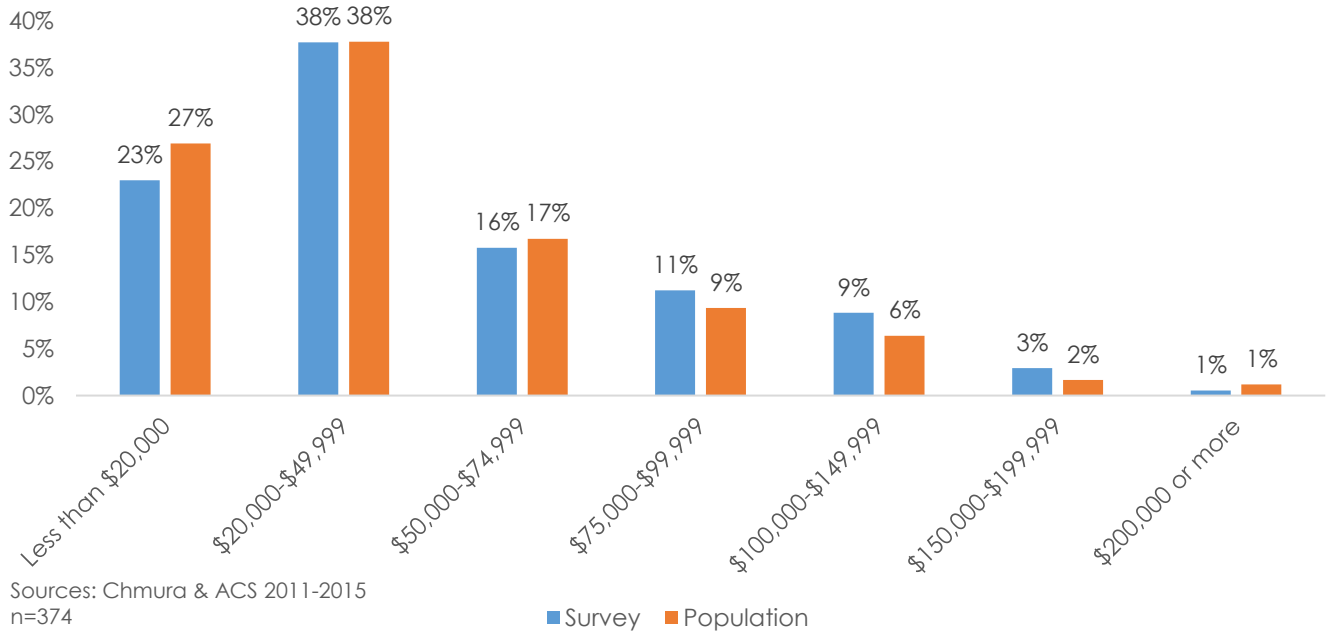
Average Monthly Spending		Number of Respondents
Food	$418	360
Child care	$33	437
Health insurance	$394	354
Other healthcare	$175	369
Housing	$489	392
Transportation	$403	393
Utilities	$341	419
Other necessities	$210	358
Savings and investment	$225	367
Total	**$2,687**	

Source: Chmura

Respondents were also asked if their family received any government assistance in the past year. Of the 17% of respondents who indicated they had received some form of governmental assistance, one-third of them listed social security, and another third listed food stamps. Other assistance programs such as Temporary Assistance for Needy Families (TANF, 2% of all respondents), unemployment benefits (2%), and Trade Adjustment Assistance (TAA, 1% of all respondents) were not as prevalent.

Chmura's survey asked respondents to identify the cohort of their total family income before taxes. Nearly one-quarter of surveyed households took home less than $20,000 last year, and 38% took home between $20,000 and $49,999. As shown in Figure A1.7, the income distribution of surveyed households closely resembles the income distribution of the population. Chmura's survey has a slightly larger proportion of responding households taking home over $75,000 (24%) compared to the population (19%), which is consistent with the slightly older age distribution and the higher educational attainment levels in survey respondents relative to the regional population.

Figure A1.7: Income Distribution



Sources: Chmura & ACS 2011-2015
n=374

When respondents were asked if they feel their family income is enough to support their family's basic needs, over two-thirds of respondents (68%) said "yes." Of these respondents, 63% stated their income is "just enough" to support their basic needs. The other 37% stated that they have a surplus, ranging from 1% to 90% of their income with an average surplus of about 20%. As 32% of respondents stated that their family income is not enough to support their basic needs, they were asked how their income falls short. Respondents stated that their income falls between 5% and 90% short of supporting their basic needs, with the average being 27%.

A1.6. Survey Instrument

Implementation Notes

- Implementation notes in [brackets]

Survey Instrument

Introduction

Hello, my name is [interviewer name] calling from Issues and Answers on behalf of the Dan River Region Collaborative, an organization that promotes regional partnerships to address workforce development in the Dan River Region. We are conducting a research study on the living wages of the region to help improve job opportunities and quality of life. We are administering a short, less than ten-minute survey in your area concerning household types and spending habits and would like to include your opinions. This is not a sales call and your answers will be kept confidential.

Questionnaire

1. Are you 18 years old or older?
    a. Yes
    b. No → [if no, please ask for an adult or terminate if unavailable]

2. In which city or county do you live? [Terminate if city/county is not in the following list]:
    a. City of Danville
    b. City of Martinsville
    c. Halifax County
    d. Henry County
    e. Patrick County
    f. Pittsylvania County
    g. Other [Terminate]

3. Does your family rent or own your place of residence?
    a. Rent
    b. Own [if prompted, clarify that this option includes if payments towards ownership are being made]
    c. (Vol) Some other arrangement
    d. (Vol) Prefer not to answer

4. How many personal, operable vehicles does your family own? __ [Range 0-10; 10 = 10 or more, 11=DK/REF]

5. How many adults in your family live in this household? ____ [Range 0-10; 10 = 10 or more, 11=DK/REF] [If prompted, explain that we are interested in the number of adults in your family's household who share expenses]

6. How many bedrooms are in your place of residence? (excluding any rooms rented out) __ [Range 0-10; 10 =10 or more, 11=DK/REF]

[All following questions about the respondent's family refer to everyone living in the respondent's household who shares living expenses with the respondent's family]

7. How many adults in your family… [total must add to # in question 5]
    a. … work full-time __
    b. … work part-time __
        i. [if >0 part-time] please estimate the number of hours worked each week (total for all part-time workers in family): __
    c. … stay-at-home __
    d. … unemployed __
    e. (Vol) DK/REF

8. How old are the adults in your family? [unless refusal, number of responses should add to # in question 5]
    a. __ years old [adult 1]

b. __ years old [adult 2]
c. [Etc. as needed]

9. [Ask only if at least one adult in the family is working: question 7 (a) or (b)] What is your occupation? (and what is the occupation of the other adults in your family?) [number of responses should match the number of working adults in the family from question 7]
    a. _____ [occupation 1; e.g. nurse, teacher, lawyer, cashier, etc.]
    b. _____ [occupation 2]
    c. [Etc. as needed]

10. [Ask only if at least one adult in the family is working: question 7 (a) or (b)] Does your job provide employee benefits? (Does the job of the other adults provide benefits?) [number of responses should match the number of working adults in the family from question 7]
    a. First working adult
        i. Yes
        ii. No
        iii. DK/REF
    b. Second working adult [if needed]
        i. Yes
        ii. No
        iii. DK/REF
    c. [Etc. as needed]

11. What is your highest level of education (and what is the highest level of education of the other adults in your family?) [number of responses should match the number of adults in the family from question 5]
    a. First Adult
        i. Less than high school
        ii. High school graduate
        iii. Some college (less than 2 years)
        iv. Associate (2-year) degree
        v. Bachelor's (4-year) degree
        vi. Graduate or professional degree
        vii. (Vol) DK/REF
    b. Second Adult (only ask if Question 5 is more than 1)
        i. Less than high school
        ii. High school graduate
        iii. Some college (less than 2 years)
        iv. Associate (2-year) degree
        v. Bachelor's (4-year) degree
        vi. Graduate or professional degree
        vii. (Vol) DK/REF
    c. Other Adult (only ask if Question 5 is more than 2)

12. How many children under 18 live in your family? __ [Range 0-10; 10= 10 or more, 11=DK/REF]

13. How old are the children in your family? [unless refusal, number of responses should add to # in question 12]
    a. __ years old [child 1]
    b. __ years old [child 2]
    c. [Etc. as needed]

14. On average each month, how much does your family spend on the following categories? [Range 0-99998; 99999=DK/REF]
    a. Food (including groceries, restaurants, etc.) $_____
    b. Childcare $_____
    c. Health Insurance $_____
    d. Other health care (including medical services, drugs, medical supplies, etc.) $_____
    e. Housing (including rent, mortgage, home repair, etc.) $_____
    f. Transportation (including cars and trucks payment, gas, parking, maintenance, public transportation, etc.) $_____
    g. Utilities (including electricity, gas, water, internet, phone etc.) $_____
    h. Other necessities (including clothing, personal care items, housekeeping supplies, miscellaneous, etc.) $_____
    i. Savings and investment $_____

15. Has your family received any government assistance from the following list of programs in the past year?
    [RANDOMIZE all but e; options for a through d are "yes," "no," or (Vol) DK/REF]
    a. Supplemental Nutrition Assistance Program (SNAP, or food stamps)
    b. Temporary Assistance for Needy Families (TANF)
    c. Trade Adjustment Assistance (TAA)
    d. Unemployment Benefits
    e. Other, please specify _____

16. Which of these ranges includes your total family income, [add "excluding any government assistance" if respondent answered "yes" to any responses in question 13], before taxes last year? Include your own income plus all members of your family living with you.
    a. Less than $20,000
    b. $20,000-$49,999
    c. $50,000-$74,999
    d. $75,000-$99,999
    e. $100,000-$149,999
    f. $150,000-$199,999
    g. $200,000-$249,999
    h. Over $250,000
    i. Prefer not to answer

17. Do you feel your family income is enough to support your family's BASIC needs?
    a. Yes

b. No
c. DK/REF

18. (Ask if Q17 = Yes) Do you feel that your family income supports your basic needs just enough or would you say you have a surplus? (If Surplus, ask: what percentage of surplus income would you say you have?
    a. Just enough
    b. Surplus; _____ [respondent may use percentage or dollar amount; 999=REF]
    c. (Vol) DK

19. (Ask if Q17 = No) Because you said no, by what percentage would you say that your income falls short of supporting your basic needs?
    a. Shortage; ___ [respondent may use percentage or dollar amount; 999=REF]
    b. (Vol) DK

Thank and terminate