

An Assessment of the Economic Importance of the Forest Products Industry to WV's Economy

By Kathryn Gazal, Clinton Gabbert, Joseph McNeel and David McGill

Introduction and Justification

West Virginia has abundant forest resources that contribute significantly to the state's economy. It is the 3rd most heavily forested state in the nation covering over 12 million acres of forest land and has been relatively stable since the late 1980s (USDA Forest Service, 2016). Most of this forest area is available for timber production. Timberland makes up 97% of this total forest area making it economically important to the state. In addition, WV's forests have been maturing and the acreage of large diameter stands has been steadily increasing since the 1975 inventory (USDA Forest Service, 2016). Thus, the state's forest products industry can continue to capitalize on this rich forest resource base.

Given the abundance of forest resource and productive timberlands in West Virginia, the state's economy is more specialized in wood products than is the nation (Childs, 2005). It is still one of the top-wood producing states in the nation producing more than 700 million board feet of lumber, 770 million square feet of OSB and 800 million square feet of veneer annually (WV Department of Commerce, 2017). The economic importance of the forest products industry in the state has been widely recognized. However, no recent data exists regarding the economic contribution of the industry to the state's economy. The last study that evaluated such contribution was conducted in 2005 and showed that the industry contributed 30,000 jobs and \$4 billion annually to West Virginia Economy (Childs, 2005). However, much has happened in the forest products industry since then. For example, the downturn of the economy in 2007-2008 has affected this industry resulting in mill closures and job losses. A study by Woodall et al. (2012a) showed a substantial decline in employment in the forest industry in the state as a result of the recession. In addition, the boom in Marcellus shale drilling in the state that started in 2007 also affected employment in the forest products industry. Anecdotal evidence has shown that some forestry jobs may have been lost to the oil and gas industry due to the recent boom in Marcellus Shale drilling. A study by Grushecky and Wang (2013) showed a drop in logging jobs in the top four counties (i.e., Harrison, Wetzel, Marshall and Doddridge) involved in Marcellus shale drilling during the period 2009-2012. There has been concern regarding the status and future of the forest products industry throughout the US as a result of this downturn in the economy. There is a concern on long-term decline in wood products and paper manufacturing industries due to global competition, increase in the use of electronic media and a decline in U.S. housing markets (Michigan Department of Forest Resources, 2015).

Given the recent economic changes mentioned above, is the forest products industry still an important component of the state's economy? Even with these changes in the economy, the forest products industry still has the potential to be an important component of the state's economy given abundance of high value forest resources in the state that could provide the raw material needs of the industry. However, the current performance of this industry is not fully understood. An updated analysis and more recent data is needed to assess the importance of the forest products industry to West Virginia's economy. Therefore, the objectives of this study are to:

1. Assess the economic contribution of the major sectors of the forest industry to WV's economy.
2. Estimate the overall economic contribution of the forest-based industries to WV's economy.
3. Assess the current state of WV's forest products industry

An updated analysis regarding the economic contribution of the forest products industry is crucial to better understand its role to the regional economy. Such data can provide policymakers and other interested groups (e.g., industry members, industry organizations/associations, landowners) important information in policy and industry decisions. With changes in state administration, this information becomes even more important in regional economic development planning. Assessing the contribution of the major sectors that make up the forest products industry will provide information regarding which sector/s of the industry is performing well or which ones are not doing well relative to the other sectors. This information can then be used to identify sectors of the industry where government efforts should be focused in terms of providing industry assistance and economic development support.

Methodology

The Impact Analysis for Planning (IMPLAN) software and data was used to construct an input-output model of the West Virginia economy in order to estimate the economic contribution of the forest products industry as a whole as well as the contribution of individual sectors that make up the industry. IMPLAN is a modelling system that uses input-output and social accounting analysis to estimate economic impacts generated within a predefined region in terms of dollars added to the economy and jobs produced (IMPLAN LLC, 2004). IMPLAN classifies the economy into 536 sectors which corresponds to the North American Industry Classification System (NAICS).

The 2015 IMPLAN database was used to determine the contribution of 5 major forest-based industries in WV: logging, solid wood products, wood furniture, and pulp and paper, and miscellaneous forest products. These groupings of forest-based industries follow previous economic contribution analysis from other states (e.g., Dahal et al., 2013; Henderson and Munn; and Brandeis and Hodges, 2015). Table 1 shows the different sectors included under these 5 categories. There were 26 IMPLAN sectors that make up the forest-based industries. The economic contribution of the entire forest-based industries was also estimated. Single industry contribution analysis as proposed by IMPLAN (2015a and 2015b) was conducted for industry categories that only have a single sector while multiple industry economic contribution analysis was performed for industry categories that have multiple sectors as well as for the determining the economic contribution analysis of the forest products industry as a whole. The multiple industry contribution analysis technique eliminates the double counting that happens if a single industry contribution analysis was instead used for a multi-sector industry.

Model Sectors	IMPLAN Sectors
1. Miscellaneous Forest products	Forestry, forest products, and timber tract production (15)
2. Logging	Commercial logging (16)
3. Solid Wood Products	Sawmills (134); wood preservation (135); veneer and plywood manufacturing (136); engineered wood members and truss manufacturing (137); reconstituted wood product manufacturing (138); cut stock, resawing lumber, and planing (140); other millwork, including flooring (141); wood container and pallet manufacturing (142); prefabricated wood building and manufacturing (144); all other miscellaneous wood product manufacturing (145); and custom architectural woodwork and millwork manufacturing (374)
4. Wood Furniture	Wood windows and doors and millwork manufacturing (139); wood kitchen cabinet and countertop manufacturing (368); upholstered household furniture and manufacturing (369); nonupholstered wood household furniture manufacturing (370); and office furniture (373).

5. Pulp and Paper	Pulp mills (146); paper mills (147); paperboard mills (148); paperboard container manufacturing (149); all other paper bag and coated and treated paper manufacturing; (150); stationery product manufacturing (151); sanitary paper product manufacturing (152); and all converted paper product manufacturing (153)
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Note: IMPLAN sector numbers are in parenthesis

Economic contribution analysis in IMPLAN reports results in terms of output (or sales or the dollar measure of production in a region); employment (number of full-time and part-time jobs associated with an industry; and value added (the sum of employee income, propriety income, other property income, and indirect business taxes) and are broken down into *direct effects*, *indirect effects* and *induced effects*. Henderson et al. (2017) define these effects in the forest products sector as follows:

- Direct Effect – “Includes the money initially spent to pay for salaries, supplies, raw materials, and operating expenses by the primary forestry-related sectors”.
- Indirect Effect – “Business respond to the direct effects and purchase additional inputs to supply the direct industry”.
- Induced Effect – “Results from spending of personal income originating from the direct and indirect effects. Local industries respond to money spent by people employed in forestry-related or supporting sectors”.

The total effect therefore is comprised of the direct, indirect and induced effects.

Results and Discussion

A. Economic Contribution of the Forest-Based Industries by Industry Category

Miscellaneous Forest Products

This industry category represents sectors that are involved in forestry, forest products and timber tract production or IMPLAN sector 15. This sector created a total of about 40 jobs and contributed \$1.44 million, \$1.82 million, and \$3.37 million in total labor income, total value added, and total output, respectively (Table 2). This industry category contributed the least among the 5 forest-based industry categories in terms

of jobs, labor income, value added and output.

Table 2. Economic contribution of miscellaneous forest products sector in WV, 2015.

Contribution Type	Employment	Labor Income (\$MM)	Value Added (\$MM)	Output (\$MM)
Direct	25.5	1.03	1.06	2.06
Indirect	8.8	0.16	0.31	0.51
Induced	6.5	0.25	0.45	0.80
Total	40.8	1.44	1.82	3.37

Logging

This industry category includes establishments engaged in cutting timber, cutting and transporting timber and producing wood chips in the field (Dahal et al., 2013). This sector created a total 3,360 jobs in 2015, contributed \$104.78 million in total labor income, \$128.74 million in total value added, and \$237.24 million in total output (Table 3). This is the second largest contributor to WV's economy among the 5 categories of forest-based industries in the state.

Table 3. Economic contribution of the logging sector in WV, 2015.

Contribution Type	Employment	Labor Income (\$MM)	Value Added (\$MM)	Output (\$MM)
Direct	1,938	77.58	79.57	144.25
Indirect	947.7	8.97	16.49	35.04
Induced	474.9	18.23	32.67	57.95
Total	3,360.4	104.78	128.74	237.24

Solid Wood Products

This industry category is a major component of the forest-based industries in WV and includes saw mills, wood preservation, veneer and plywood manufacturing, engineered wood members and truss manufacturing, reconstituted wood product manufacturing, wood container and pallet manufacturing, prefabricated wood building and manufacturing, all other miscellaneous wood product manufacturing, and custom architectural woodwork and millwork manufacturing. The solid wood products sector was the largest contributor to WV's economy among the 5 forest-based industries categories. It contributed 12,445 total jobs in 2015, \$534.93 million

in total labor income, \$770.67 million in total value added and \$2.23 billion in total output (Table 4).

Table 4. Economic contribution of the solid wood products sector in WV, 2015.

Contribution Type	Employment	Labor Income (\$MM)	Value Added (\$MM)	Output (\$MM)
Direct	5,731.9	258.73	342.70	1,430.81
Indirect	4,303.3	183.45	262.09	506.09
Induced	2,410.0	92.75	165.88	294.35
Total	12,445.9	534.93	770.67	2,231.26

The solid wood products sector contributes more jobs and output to the WV economy than any other forest products industry sector. It consists of 11 sub-sectors, which are listed in Table 1 and in the figures below.

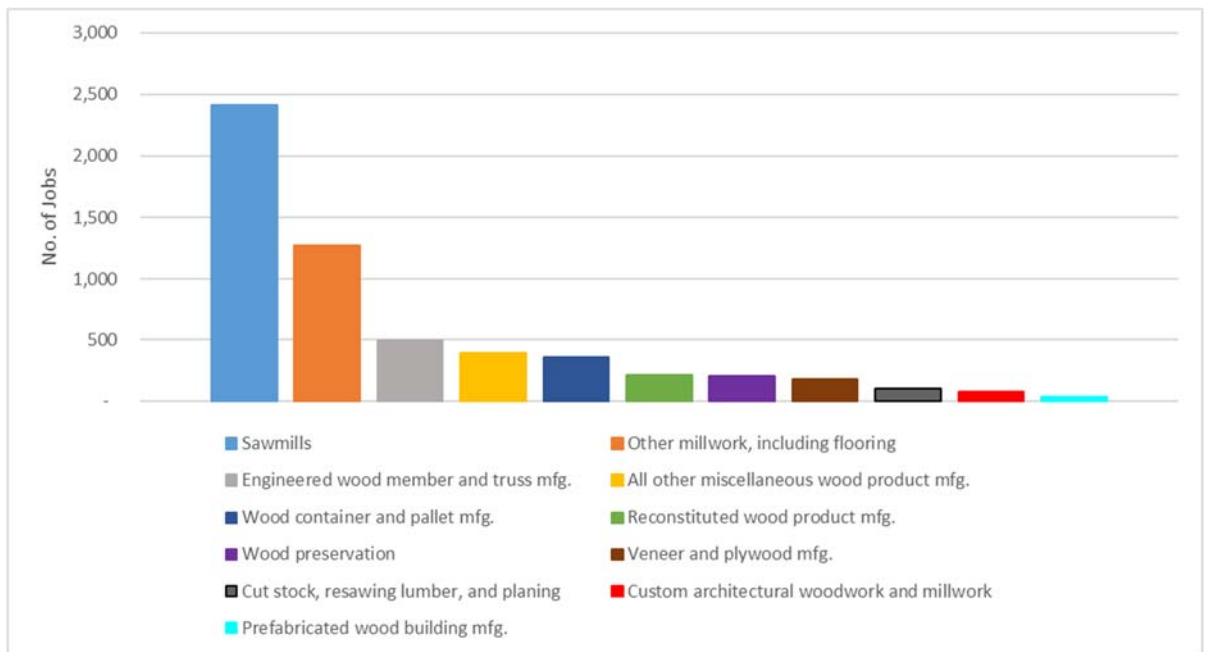


Figure 1. Direct employment in the solid wood products sector by sub-sectors, WV, 2015.

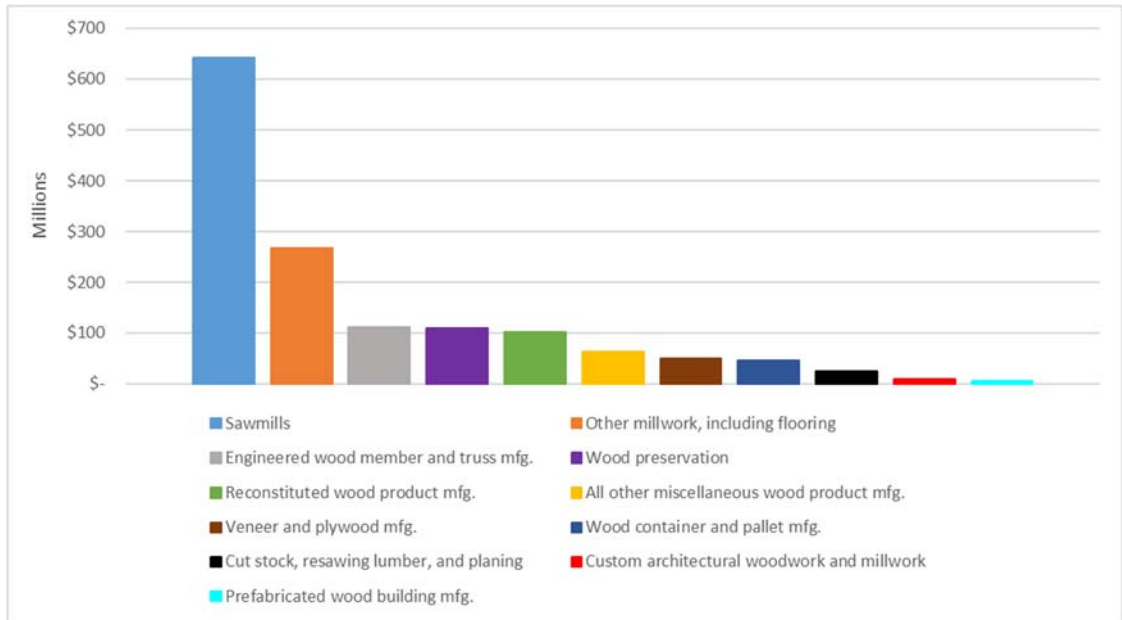


Figure 2. Direct output (\$MM) in the solid wood product sector by sub-sectors, WV, 2015.

Wood Furniture

This aggregated industry includes sectors involved in wood windows and doors and millwork manufacturing, wood kitchen cabinet and countertop manufacturing, upholstered and nonupholstered household wood furniture manufacturing, and office furniture. The wood furniture sector created a total of 2,188.7 jobs to WV's economy in 2015. In addition, this sector was responsible for contributing \$94.69 million in total labor income, \$104.90 million in total value added and \$278.41 million in total sales or output (Table 5). This aggregated sector was ranked 3rd among the categories of forest-based industries in WV.

Table 5. Economic contribution of the wood furniture sector in WV, 2015.

Contribution Type	Employment	Labor Income (\$MM)	Value Added (\$MM)	Output (\$MM)
Direct	1,403.1	61.16	50.78	171.67
Indirect	358.9	17.11	24.76	54.62
Induced	426.7	16.42	29.36	52.12
Total	2,188.7	94.69	104.90	278.41

Pulp and Paper

The pulp and paper industry category includes pulp, paper and paperboard mills,

paperboard container manufacturing, coated and laminated paper, packaging paper and plastic films manufacturing, sanitary paper product manufacturing and other converted paper product manufacturing. This sector contributed a total of 1,648 jobs, \$86.76 million in total labor income, \$135.48 million in total value added, and \$485.75 million in total output (Table 6).

Table 6. Economic contribution of the pulp and paper sector in WV, 2015.

Contribution Type	Employment	Labor Income (\$MM)	Value Added (\$MM)	Output (\$MM)
Direct	575.5	37.90	56.29	323.40
Indirect	679.4	33.72	52.12	114.30
Induced	393.4	15.14	27.06	48.05
Total	1,648.3	86.76	135.48	485.75

Total Industry Impact

The forest products industry in WV created a total of 16,361 jobs in 2015 with a total labor income of \$738.31 million. The total industry output was \$3.02 billion and related value-added was \$1.03 billion (Table 7). In 2015, employment, labor income, value-added and total industry output accounted for approximately 1.7%, 1.08%, 1.40%, and 4.08% of the state's total, respectively. The total economic contribution of the forest-based industries in the state represented approximately 1.4% of the state's Gross Regional Product (GRP).

Table 7. Economic contribution of the forest industry in WV, 2015.

Contribution Type	Employment	Labor Income (\$MM)	Value Added (\$MM)	Output (\$MM)
Direct	9,676.2	436.49	530.51	2,072.37
Indirect	3,355.8	173.74	273.48	537.54
Induced	3,329.3	128.07	229.08	406.45
Total	16,361.3	738.31	1,033.07	3,016.36

In terms of contribution by sector, the solid wood products industry is the largest contributor in the forest products industry, accounting for 63% in total employment and 69% in total output (Figures 3 and 4). Miscellaneous forest products contributed the least, accounting for less than 1% in both total employment and total output. Within the solid wood products sector, the largest contributor in direct employment and output is the sawmill sub-sector while the least contributor is prefabricated building manufacturing sub-sector.

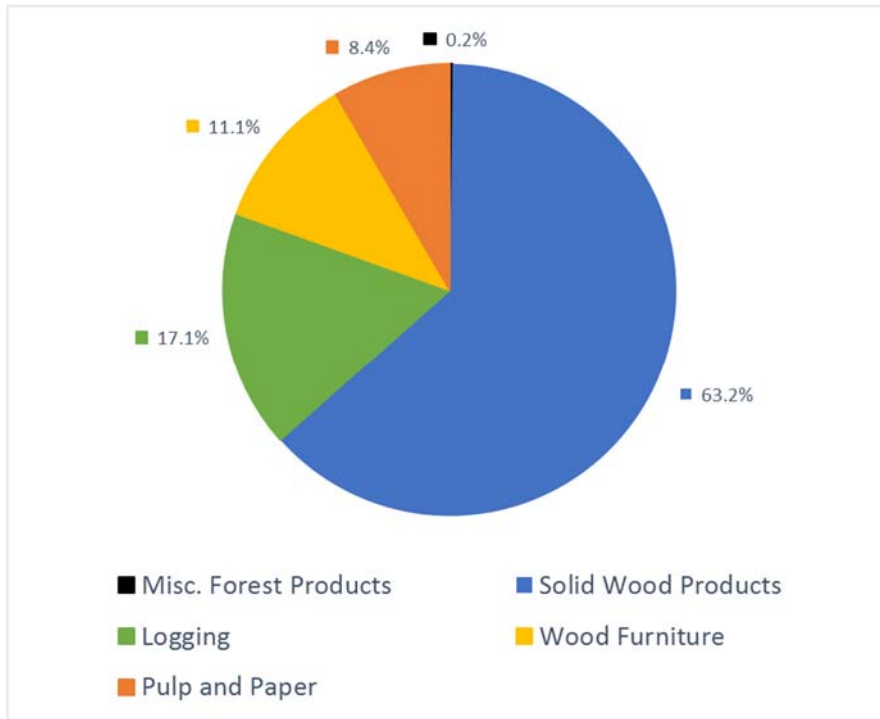


Figure 3. Total employment contribution by sector in the forest products industry in WV, 2015.

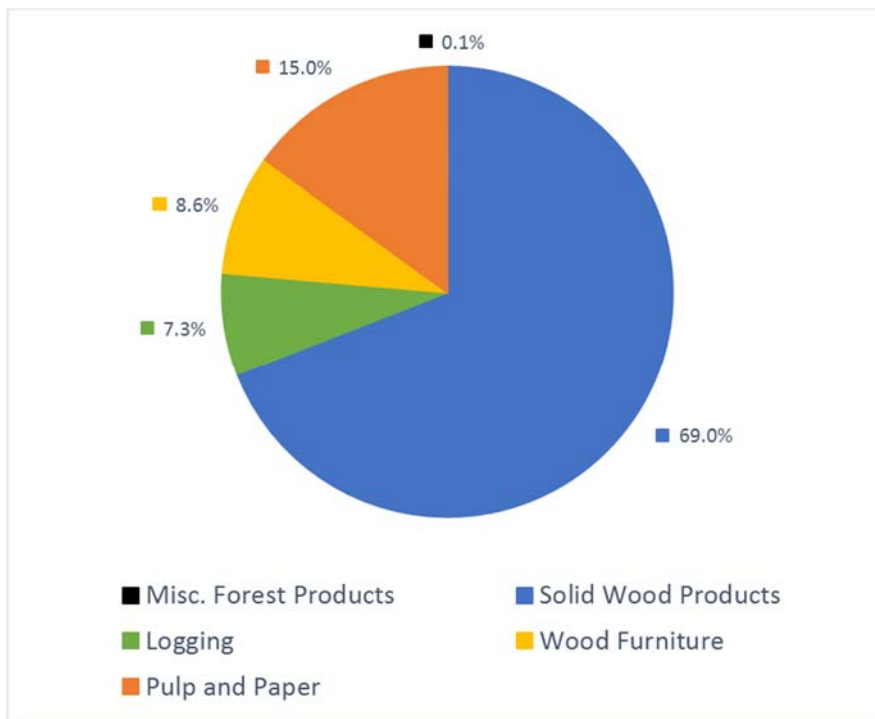


Figure 4. Total output contribution by sector in the forest products industry in WV, 2015.

The total employment impact of the forest products industry decreased by approximately 45% from those reported by Childs in 2005. As mentioned before, a lot has happened since the 2005 Economic Impact Report by Childs (2005) such as the downturn of the economy and the collapse of the housing market in 2007-2008 and the boom in Marcellus shale drilling in 2007, which both affected employment in the forest products industry. The performance of the forest products industry in general is sensitive to the performance of the economy as a whole especially with the performance of the housing market. (Dahal et al., 2013).

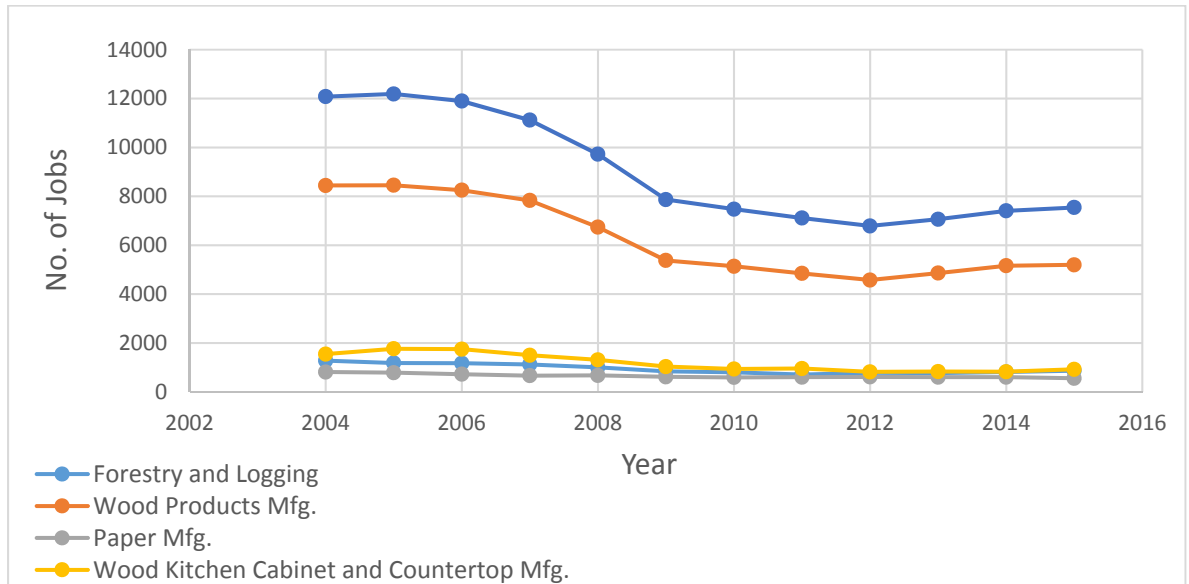


Figure 5. Average annual full-time and part-time employment in selected forest products industries in WV.

(Source: Bureau Labor and Statistics Quarterly Census of Employment and Wages).

The recession in 2007 significantly impacted the forest products industry in the state. Figure 5 shows the historical full-time and part-time employment in the selected forest based sectors in WV. There was a decline in employment in all the forest-based sectors beginning 2006, with the largest decline observed after 2008. Dahal et al. (2013) also reported a sharp decline in the forest products industry employment Mississippi in 2006. The wood products manufacturing sector was mostly affected as this sector was highly dependent on the housing market, which suffered significantly during the recession. While the state's forest products industry had suffered significantly during the recession and housing slump as well as the period of Marcellus shale gas drilling boom in 2007, it still remains an important component of the WV's economy. The forest products industry started picking back up in 2012 with a steady increase in employment annually through 2015. This coincides with the performance of the US economy in 2012 where it experienced an upward trend

compared to the previous year (Brandeis and Hodges, 2015). With the recovery of the housing market and improvement in the overall economy, the forest products industry in WV will continue to be an important driver of WV's economy.

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