

A Review of Logging Business Characteristics: Comparisons across Time and Between Regions

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Abstract

Changes in the eastern United States' logging industry have been documented by more than thirty state logger surveys conducted since the 1980s. This paper summarizes the findings of state logger surveys, describes the evolution of logging businesses, and compares logging businesses in the Northeast, Midwest, and the U.S. South. Approximately 90% of loggers in the southern Piedmont and Coastal Plain operate fully mechanized whole-tree systems. Loggers in the Northeast and Lakes States operate a greater diversity of equipment mixes with a large percentage of firms using chainsaw systems and an increasing number using cut-to-length systems. All three regions have experienced logging sector consolidation. Since 1990, the eastern U.S. lost nearly 3,000 logging businesses and 20,000 logging workers. These losses were offset by increases in production from surviving firms, especially the most productive quintile. For example, in 1987 almost 75% of Georgia logging firms produced fewer than 46,000 tons per year, whereas the average firm delivered more than 70,000 tons in 2012. Today the most productive 20% of logging firms produce close to half of the annual harvest in both the South and Lake States. As a result, logging capacity is adequate to meet the needs of the forest products industry, at least in the near term. Logging businesses in each region face a number of challenges including aging business owners, high capital costs, and profitability concerns.

Introduction

Changes in logging businesses have been documented by surveys conducted by research universities (e.g. Greene et al. 1988, Smidt and Blinn 1994) and trade associations (Munn et al. 1998, Cabbage and Carter 1994, Knight 2016). More than 30 statewide logger surveys have been conducted since the 1980s. The University of Georgia has conducted surveys of Georgia loggers every five years since 1987 (e.g. Greene et al. 1988, Baker and Greene 2008, Greene et al. 2013). Periodic surveys of Minnesota loggers have been conducted since the 1970s (e.g. Puettmann et al. 1998, Blinn et al. 2015). Surveys in Georgia, Minnesota, Virginia, and Wisconsin have documented logging system changes and productivity trends over time (e.g. Baker and Greene 2008, Bolding et al. 2010, Blinn et al. 2015, Rickenbach et al. 2015). Most other surveys have addressed specific issues such as training (Smidt and Blinn 1994, Egan et al. 1997), parcelization (Moldenhauer and Bolding 2009), and occupational choice (Egan and Taggart 2004). The purpose of this paper is to synthesize the results of logger surveys conducted since the late 1980s and compare trends among logging firms in the Northeast, Midwest, and U.S. South.

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Harvesting Systems

Whole-tree feller-buncher/grapple skidder systems harvest the majority of the timber in the Northeast and the southern Coastal Plain and Piedmont (Table 1). Nearly 90% of Georgia loggers have used these systems since the 1980s (Greene et al. 1988, Greene et al. 2013). In the Northeast, the majority of firms use tree-length systems, but most of the volume is harvested by loggers using whole-tree systems (Leon and Benjamin 2012).

Tree-length chainsaw systems are commonly employed in the Appalachian Mountains and on small tracts in the Northeast and Midwest. For example, more than 80% of loggers in West Virginia and the mountain of Virginia used tree-length chainsaw systems (Milauskas and Wang 2006, Bolding et al. 2010). Approximately one-third of Wisconsin loggers used chainsaw systems in 2003 and 2011 (Rickenbach et al. 2005, Rickenbach et al. 2015). Across the Midwest, 59% of Midwestern firms used chainsaw felling exclusively in 2004 (Allred et al. 2011). In the Northeast, the percentage of chainsaw firms ranged from 33% in New Hampshire to 71% in Vermont (Leon and Benjamin 2012). Research indicates that these tree-length chainsaw systems may be profitable on parcels too small to support fully mechanized whole-tree systems (Rickenbach and Steele 2005, Allred et al. 2011), which may explain the prevalence of these systems in the gentle terrain of the Northeast and Midwest.

Table 1: Typical harvesting systems and equipment configurations by state. The most common configuration was based on the percent of volume harvested by that system in the state or region.

State/Region	Harvesting System	Most common equipment configuration			Workers per firm
		Felling	Primary transport	Processing	
GA, SC, VA Coastal Plain/Piedmont	Whole-tree	Drive-to-tree feller-buncher	Grapple skidder	Pull-through delimeter, slasher saw	5-8
WV, VA Mountains	Tree-length	Chainsaw	Cable skidder	Chainsaw, slasher saw	3-5
MI & WI	Cut-to-length	Harvester	Forwarder	Harvester	3-7
MN	Whole-tree	Swing-to-tree feller-buncher	Grapple skidder	Pull-through delimeter, slasher saw	7
ME, NH, NY, VT	Whole-tree	Swing-to-tree feller-buncher	Grapple skidder	Stroke delimeter	<5
CT, MA, RI	Tree-length	Chainsaw	Cable skidder	--	--

Sources: Rickenbach et al. (2005), Milauskas and Wang (2006), Baker and Greene (2008), Moldenhauer and Bolding (2009), Bolding et al. (2010), Egan (2011), G.C. and Potter-Witter (2011), Leon and Benjamin (2012), Greene et al. (2013), Blinn et al. (2014), Blinn et al. (2015), Rickenbach et al. (2015).

Cut-to-length systems harvest the majority of the timber in the Lake States of Michigan and Wisconsin (Table 1). The system has been growing in popularity in the Northeast (Leon and Benjamin 2012) and Minnesota (Blinn et al. 2015), but whole-tree systems harvest much more volume in those areas. The dominance of the cut-to-length system in Michigan and Wisconsin is likely a result of mill demand for short log lengths (Conrad et al. 2016) and public land policies that discourage whole-tree skidding.

Capital Investment

Capital investment has been higher in the South than the Northeast and Midwest. Loggers in Georgia and South Carolina invested a median of \$783,000 and \$863,000, respectively in 2012 (Greene et al. 2013) and this investment has been consistent for the past twenty years after adjusting for inflation (Baker and Greene 2008). In contrast, loggers' median investment in the Midwest was less than \$250,000 with similar investment likely in the Northeast (Leon and Benjamin 2012, Blinn et al. 2014, Rickenbach et al. 2015).

As capital investment increased, logging businesses encountered the law of diminishing marginal returns. Annual production per \$1,000 invested by Georgia loggers declined from 200 tons in 1987 to 140 tons in 2012 (Greene et al. 2013). Stuart et al. (2010) found constant to decreasing returns to scale in the eastern U.S. logging industry. LeBel and Stuart (1998) found that loggers achieved increasing returns to scale up to 75,000 tons produced per year and diminishing returns to scale above this production level.

Annual Production

Logging businesses in all regions have achieved impressive gains in production in the past 30 years. In 1987, approximately 75% of Georgia loggers harvested fewer than 46,000 tons per year, but by 2012 two-thirds of loggers harvested more than 46,000 tons per year (Greene et al. 2013). In Minnesota, 75% of loggers produced fewer than 6,000 tons per year in 1996, but in 2011 more than 60% of loggers achieved this production level (Puettmann et al. 1998, Blinn et al. 2014). Similar increases in production were achieved in the Northeast as well (Pan Atlantic Consultants and The Irland Group 1999, Leon and Benjamin 2012).

Median annual production per-crew is much higher in the South than elsewhere (Figure 1), with long operating seasons, gentle terrain, and pine plantation harvests the likely differentiating factors. Logging crews in Georgia now harvest an average of 70,000 tons annually and loggers in the Coastal Plain of Virginia harvested 36,000 tons per year, even in the midst of the economic downturn of 2009 (Bolding et al. 2010, Greene et al. 2013). Production in the Midwest and Northeast is typically under 30,000 tons per crew per year (Leon and Benjamin 2012, Blinn et al. 2014, Rickenbach et al. 2015).

Sector Consolidation

Logging sector consolidation has been a consistent trend across the Eastern U.S. All regions have lost both workers and businesses over the past twenty-five years. While each region has lost businesses and workers, the Northeast and Midwest have retained many more small logging businesses compared to the South. In Wisconsin and the Northeast, more than 40% of businesses

were owner-operators with no employees according to recent surveys (Leon and Benjamin 2012, Rickenbach et al. 2015). In contrast, most of the surviving logging businesses are high-production, and often multi-crew firms (Greene et al. 2013).

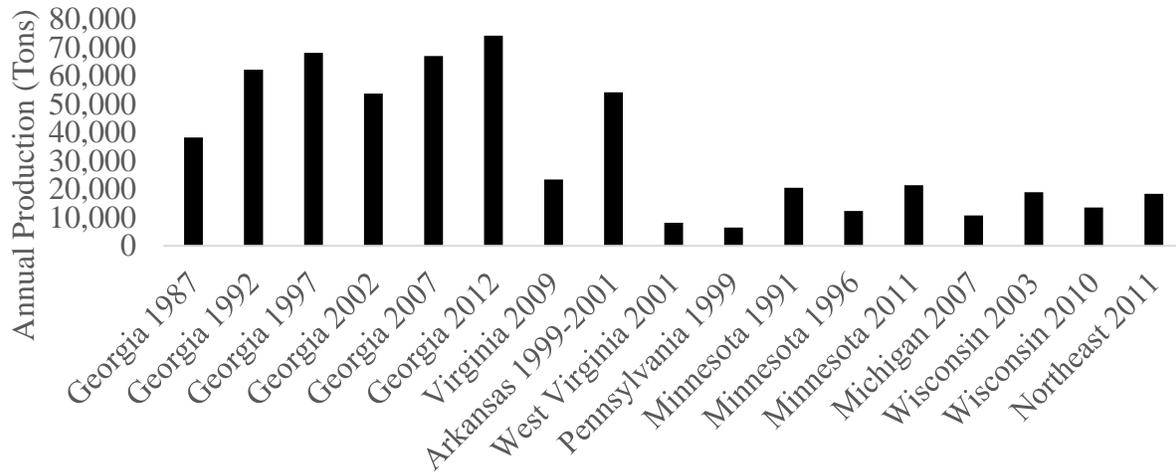


Figure 1: Typical annual production per crew from logger surveys 1987-2012. Sources: Baker and Greene (2008), Greene et al. (2013), Bolding et al. (2010), Milauskas and Wang (2006), Keefer et al. (2003), Blinn et al. (2014), G.C. and Potter-Witter (2011), Rickenbach et al. (2005), Rickenbach et al. (2015), Leon and Benjamin (2012).

Despite the large proportion of small firms in the Northeast and Midwest, the high-production firms are increasing their share of the annual harvest. In Minnesota, the most productive 15% of firms harvest 57% of the annual volume and the top 2.4% harvest one-quarter of the annual harvest volume (Blinn et al. 2014). The most productive 10% of loggers harvest 40% of the annual harvest in Wisconsin (Rickenbach et al. 2015). In Georgia, the most productive 20% of firms account for more than half of the annual harvest (Greene et al. 2013).

Logging employment fell by 41% nationwide between 1990 and 2016, a 2.0% average annual decline (Figure 2) (BLS 2017). During this period, employment declined by 36% in Maine, 34% in Georgia, and 5% in Michigan. Tennessee (+347) and Minnesota (+280) were the only two states to add logging workers during this period.

The number of logging businesses also declined by 39% nationwide between 1990 and 2016 (Figure 3) (BLS 2017). The retention of small logging businesses in the Michigan and Maine is evident in Figure 3. While the number of logging businesses in Georgia declined by 36% between 1990 and 2016, logging firms declined by just 9.0% and 21% in Maine and Michigan, respectively.

The loss of logging workers and businesses has been offset by productivity gains and reductions in forest industry demand. Consequently, logging capacity has been sufficient to meet mill demand (Greene et al. 2013, Conrad et al. 2017). However, the aging of logging business owners should be a source of concern. During the 1990s and early 2000s, the median age of logging business owners was 40-45 years (Munn et al. 1998, Rickenbach et al. 2005, Milauskas and

Wang 2006). By the 2010s, most surveys showed a median age exceeding 50 years (Leon and Benjamin 2012, Greene et al. 2013, Rickenbach et al. 2015) and the median age is likely approaching 60 years today. Within the next decade, new logging business owners will need to emerge, something that has been uncommon since 2000.

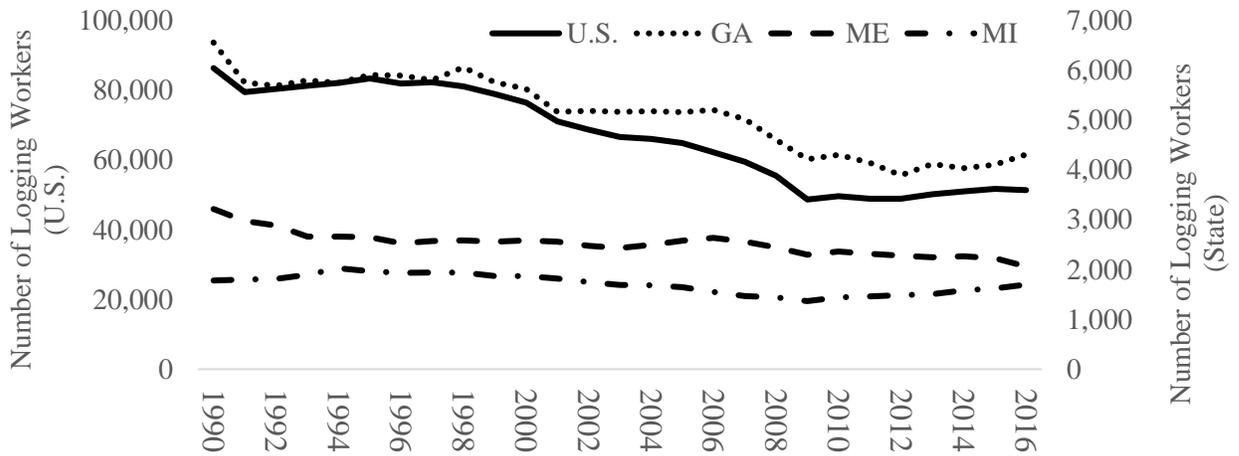


Figure 2: Number of logging workers in the U.S. (left axis) and Georgia, Maine, and Michigan (right axis) from 1990-2016 (BLS 2017).

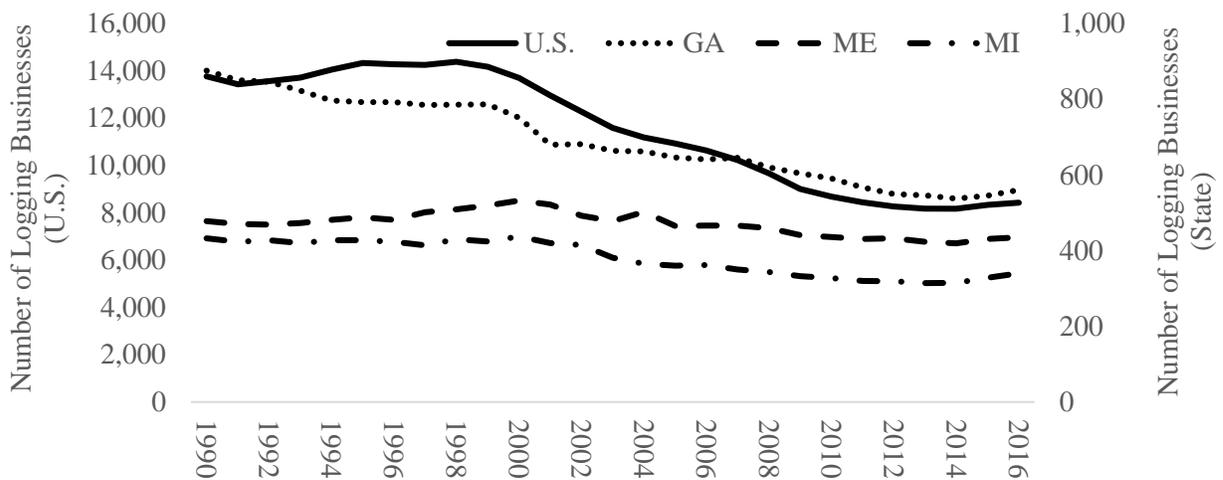


Figure 3: Number of logging businesses in the U.S. (left axis) and in Georgia, Maine, and Michigan (right axis) from 1990-2016 (BLS 2017).

Profitability

In order to attract new business owners, logging must be profitable. While not all logger surveys have collected profitability data, the studies that did collect this information found poor profitability. Northern New England loggers reported an average annual profit of \$22,000 in 2000 (Egan and Taggart 2004). Reduced profits were reported by 61% of Minnesota loggers in 2011 (Blinn et al. 2014). Fewer than 40% of Wisconsin loggers reported making a profit in

2011(Rickenbach et al. 2015) and just 23% of Arkansas loggers reported an operating profit in 2009 (Pelkki 2012).

Conclusion

Logging businesses have undergone substantial changes over the past thirty years. Many of these changes were consistent across the eastern U.S. Consolidation, productivity gains, and increasing capital investments have been documented in the Midwest, Northeast, and the South. Likewise, all face the challenges of aging business owners, uncertain markets, and reduced harvest tract sizes. Conversely, small logging firms have persisted in the Midwest and Northeast, whereas large firms operating multiple crews have become increasingly common in the South. Southern loggers report higher average productivity and capital investment compared to their counterparts in the Northeast and Midwest, probably because of longer operating seasons, gentle terrain, and productive pine plantations.

Statewide logger surveys have provided critical information about the logging sector for the past 30 years. Surveys conducted consistently are most valuable, like those conducted in Minnesota since the 1970s and Georgia since the 1980s. A number of recent surveys have been regional in nature, and this may be beneficial; however, researchers should be careful to communicate with researchers in other states to avoid conflicts and prevent survey fatigue among loggers.

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