

The Organizational Evolution of Markets for Wood Products in the Southern United States

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Abstract

This paper represents the first case study attempt to develop a transaction cost conceptual model to describe industry evolution of the paper and lumber industries in the Southern United States around the late 1800s and early 1900s. We use transaction cost theory to explain the co-evolution of markets for wood products noting that variation in the level and type of investments made in physical and human capital assets needed to manage paper and lumber miller operations had a significant influence on the use of wood dealer systems compared to more vertically organized business arrangements. We identify some testable hypotheses and areas of future research.

Key Words: Industry Evolution, Contracting, Property Rights, Vertical Integration, Forest Products

JEL Classifications: L14, L24, L73, J24

The Organizational Evolution of Markets for Wood Products in the Southern United States

Background

The study of contracting behavior between producers and agribusinesses has received much attention in recent years among agricultural economists. For example, vertical integration within agricultural supply chains featuring commodities such as corn, soybeans and others have been studied as well as the livestock sector. However, much less attention has been given to other industries, namely the forest industry in the U.S. We attempt to bridge this gap.

In this paper, we use transaction cost theory to explain the evolution of markets for wood products during the late 1800s and early 1900s. We describe how the paper and lumber industries co-evolved following different industrial organization paths due to variation in the level and type of investments made in physical and human capital to manage paper and lumber miller operations. Using these factors, we explain why some companies purchased land for wood supplies from producers and others contracted only for the supply of timber. We conclude by identifying a future research agenda to formally test some of the transaction cost hypotheses identified in this study.

We suggest transaction cost factors of physical and human asset specificity as well as quality uncertainty explain the alternative evolution of the paper and lumber industries in the U.S. during the late 1800s and early 1900s. In addition, these same factors help explain how contracting for wood supplies was accomplished between paper and lumber companies and producers. When companies made significant investments in physical and human assets and wood supply and quality was highly uncertain, our analysis reveals this matches the early practices of the lumber industry. Because timber had to be processed into lumber for which

quality standards were clearly defined, we observe companies were more likely to purchase large tracts of land from producers. Given the high level of asset specific investments and high quality uncertainty of wood supplies, the industry moved toward more vertical integration instead of market procurement systems. The paper industry, according to these same factors, evolved in the opposite direction. Relatively low levels of investments in human and physical assets combined with lower wood quality uncertainty led to the development of purchasing timber from producers and the development of wood dealer systems instead of vertical integration systems. We discuss how shifts in technology and unionization of workers also affected these results.

This paper represents the first case study attempt to develop a transaction cost conceptual model to describe industry evolution of the paper and lumber industries in the U.S. The challenge remains to do more empirical work in this area, including how technology and regulatory policies affected these two industries as they evolved. We conclude by highlighting some of the future research that can be done to analyze current vertical integration and market procurement systems for wood supplies in the U.S.

A Snapshot of Industry Formation

One of the most critical economic aspects of the forest products industry is the supply of raw materials. The questions of where and how to procure wood inputs from standing supplies (referred to as “stumpage”) are of critical importance to the forest products industry. The historical development of the two main groups in the forest products industry—sawmills and paper mills—and the current state of these two productive activities revolves around the pursuit of the most efficient means possible to procure wood from forests and transport it to mills. A study of the development of the lumber and paper industries reveals the two activities, in their

early evolution in the South, developed very different procurement strategies, which impacted the way each was organized, including the degree of vertical integration.

Production within the southern lumber industry declined during the Great Depression and never really recovered to its pre-depression “boom” period (figure 1). Investment in pulp and paper mills began as early as 1909 in the South (United States Forest Service 1988). However, the pulp and paper industry really began to flourish in the 1930s with the development of the southern newsprint industry and with the development of container technologies which could better utilize southern yellow pine (Oden 1973) (figure 2). At approximately the same time period in which lumber production was declining in the South, pulpwood production was entering its infancy. The time periods in which each industry developed is critical to understanding why each organized as it did.

The development of the lumber and paper industries was markedly different requiring different organizational tactics. The lumber industry, to a large extent, established sawmills in prime locations—those that most readily had access to water (rivers), rail lines, and the wood resource—and purchased land fee simple, from which they harvested the virgin sawtimber. In fact, the sixty-seven largest timberland owners in the South owned roughly one-quarter of the standing southern pine in 1913, and 925 landholders held over eighty percent of the 58 million acres of privately-owned pine timberland (Williams 1989).

The paper industry also chose prime locations in which to build mills. The ideal pulp and paper mill location provided abundant water, plentiful labor and resource, and good transportation. However, the paper industry, to a much larger degree than the lumber industry, did not purchase massive amounts of land from which they procured pulpwood. Instead, the paper industry employed a third party wood dealer or agent system. Agents (wood dealers)

procured stumpage from dispersed landowners and insured its delivery to the mill. The dealer, then, became a locus of contractual relationships. He contracted with the mill regarding a price for stumpage (called a “delivered price”), contracted with land owners to secure the stumpage, and contracted with producers (or loggers) to harvest the stumpage (Flick 1985). The wood dealer earned his profits by minimizing transaction costs faced by the other parties.

The story of the evolution of the lumber and paper industries can viewed through the lens of transaction cost theory. However, before analyzing the transaction cost factors that contributed to the industry evolution of markets for wood products, we first describe some of the production factors that contributed to the organization of the forest industry during the late 1800s and early 1900s.

Industry Evolution and the Factors of Production

Land

Following the Civil War, the southern lumber industry was still in its infancy. For the most part, small, portable, locally owned lumber mills dotted the southern landscape. In those days, mills located along larger waterways (Hickman 1962) where timber resources were also abundant. By locating along waterways, logs could be floated from harvesting operations to mills. Finished lumber could be shipped via waterways overseas and to the northern United States. An added bonus would be to find a location not only adjacent to a major waterway, but also close to a major rail line.

The southern forest went unnoticed by the great northern lumber interests—the “Lumber Barons”—for the first three-quarters of the 19th century. Wood had originally been considered a nuisance to be conquered and removed in the early years of the United States. Beginning in the 1700s, the lumber industry sheared a swath of timber that virtually cleared New England. Once

the high quality sawtimber had been removed from New England, the lumber industry turned Westward and moved into the Great Lakes states (Williams 1989). As the nineteenth century progressed beyond the Civil War and into the 1870s and 1880s, the lumber barons began to foresee an end to the abundant timber supply in Minnesota, Wisconsin, and Michigan. They began to search for new areas to “mine” in the southern United States.

As they moved into the South they found cheap, plentiful land that was concentrated into a few large ownerships. For example, when Georgia was admitted as a state, it ceded its western lands to the United States. This area was later to become Mississippi and Alabama. Therefore much of this land was in federal hands (Dodd 1974). Later, when Alabama was admitted to the union, the United States granted to each state “16th section lands,” the proceeds of which were, at least theoretically, earmarked for education (Harris 1951). The state, finding it could fund little education with idle lands, sold much of it, as did the federal government. Speculators, many of whom acted on behalf of the railroad and lumber industries, bought many of the government-auctioned tracts. At this stage in the development of the industry, it found fee simple land purchases to be more efficient than trying to procure wood from land they did not own. In many cases the northern lumbermen purchased the land, harvested the large trees suitable for lumber, and then sold or abandoned the land, moving on to the next prime timber location (Flick, personal communication, June 1996).

The paper industry faced a more fragmented ownership when it developed. The state governments of the South and the federal government had, for the most part, abandoned their policies of massive land disposal via auctions and patents prior to the arrival of the paper industry. Therefore, this industry would have had to purchase relatively small tracts of timberland from many small landowners scattered over wide areas, had it chosen to procure

stumpage internally from its own holdings. This approach would have meant relatively high transaction costs compared to the lumber industry.

The first paper mills in the South, during the period 1900 – 1930, were created to utilize lumber mill waste. Then, in 1933, a technological breakthrough occurred that allowed, through chemical process, the bleaching of the heavy resin content inherent in southern yellow pine. The system made it possible to convert southern yellow pine into paper acceptable for newsprint (Oden 1974).

Early pulpwood procurement was simple (Oden 1974). A new mill was constructed in an area, whereupon its owners announced publicly that it was accepting pulpwood on a first come, first served basis. This practice was later known as *gatewood*, where all wood received at the mill's "gate" was paid the market price at that time. Soon, a four-tiered procurement system developed in the South which included the pulpwood owner, the pulpwood producer, the dealer who coordinated the operations of the producers and the delivery of wood to the mill, and the mill itself. This system developed as an effective response to the input needs of the mills and southern woodland ownership and labor characteristics (Flick 1985).

Technology

There was no gasoline technology and therefore no advanced highway system during the heyday of the southern lumber industry. During the 1800's and early 1900's, it relied on steam technology to harvest and transport its logs (Williams 1989). Once lumbermen purchased land, they built "spur lines" or crude railroad lines in order to transport man, machine, and animals to and from the woods. Steam locomotives provided the engine by which woods workers and their equipment were moved to the woods. When enough wood had been harvested it was loaded onto rail cars, again with steam technology, which powered the loaders. In the forests of the

lumber industry, harvesting and transportation operations were relatively capital intensive, requiring heavy monetary outlays in order to get the wood from the forest to the mill, compared to the paper industry.

The paper industry's capital was spent, for the most part, in the mill itself. There was not as heavy a requirement for woods technology (both machine and man) in the paper industry. Pulpwood, particularly in the early years, had commodity characteristics (no size requirements as existed with lumber mills, standardized, with no quality differential). This situation was quite different from the early lumber industry, which required specific wood inputs of highest quality. There is a much more complex transformation involved in deriving paper from wood than lumber from wood. Therefore, complex equipment in the form of pulping machines, digesters, and paper machines had to be employed in the manufacture of paper. For the lumber industry, the transformation of logs to lumber was relatively easy and required less sophisticated and expensive equipment and labor.

In addition, by the time the paper industry arrived in the South, an extensive transportation system had developed, including rail lines, waterways, and especially highways (Dodd 1974). Technology had advanced beyond steam-driven machinery and into the fossil fuel era of gasoline and diesel-powered machinery. The paper industry did not have to invest in massive amounts of technology in the field. They did not have to create their own transportation systems as did the lumber industry; and because the technology was more accessible to others outside of the paper industry itself, there did not exist transportation economies as existed during the lumber era.

Labor

Because of the technologies used in the woods and in the mills, each industry, lumber and paper, had differing labor requirements. Since capital expenditures were oriented heavily in woods technology for the lumber industry, it required higher quality skilled workers outside the mill. A knowledgeable labor force was needed to establish and maintain rail systems and the steam locomotives that operated on them, as well as operating the steam-powered equipment in the woods. The lumber mill worker on the other hand (with the exception of several skilled workers that operated the machinery) was not as skilled relative to his brethren on the railroads and in the woods. He performed basic, menial tasks such as stacking and moving lumber.

For the paper industry, however, the relatively skilled worker was required to operate the complex machinery within the mill itself, while the unskilled worker manned a chainsaw or drove a pulpwood truck in the woods. However, as has been stated earlier, the pulp and paper industry divested itself of as much harvesting activities as possible.

Another factor that contributes to the differences in organizational behavior between the lumber and paper industries is the legal environment in which each operated. During the 1800s, a period of “true” *laissez - faire* existed in the United States, particularly in the South. Virtually anyone could be hired to work under any condition (Williams 1989). There were few, if any, labor laws with which to contend. Courts looked favorably upon business activities and only rarely looked to the “deep pockets” in cases of potential employee liability from negligent actions. There was no minimum wage, nor maximum allowable amount of hours per week in which one could work, nor any administrative agencies to inspect for working conditions. There were no unions in the South in the 1800s. Lumber mills operated under conditions of nearly total

freedom. They could employ labor cheaply and utilize it to maximize profits unhindered by administrative rules and regulations.

The 1930s and 1940s, however, saw the rise of the Administrative State in America, resulting in three laws crucial to wood workers: the Fair Labor Standards Act, the Federal Insurance Contributions Act, and the National Labor Relations Act. (Granskog 1983). Thus, we have the rise of the dealer system in the pulp and paper industry, whereas one existed only to a very limited degree previously.

An Alternative, Transaction Cost Explanation

Williamson (1985) asserts that the principle factor involved in a transaction cost analysis is asset specificity, and that transactions are described with three attributes: frequency, uncertainty and asset specificity (Williamson 1986). When an industry requires a specific asset in its production processes, or when the industry utilizes a very specific technological asset in its production processes, then it becomes less likely that market bidding systems will develop and more likely that vertical integration will occur, due to increased transaction costs arising from the likelihood of imperfect contracts and their associated higher governance costs.

There are, therefore, three distinct levels of asset specificity and associated contractual behavior (Williamson 1986, 144). Where the assets required in production processes are not transaction specific, contracting will occur in the “classical” sense. Vertical integration into ownership and complete control (or internal governance) will not occur because the transaction costs associated with making (or internal procurement) will be higher than those associated with buying (or external procurement). When assets are semi-specific, bilateral contractual arrangements will rise to prominence. Such might be the case, for example, in an industry where

franchising takes place. The franchise style of organization establishes a bilateral relationship in which the franchisee receives the benefits of the franchiser's trademark and marketing power (and shares in the profits associated with joint ownership) while the franchiser enjoys the benefits of the search power (or the ability of the franchisee to seek out and pursue customers on a local level) and the resulting profits (Minkler and Park 1994). Finally, where assets are very specific, vertical integration and internal governance structures are likely to arise, because transaction costs associated with external procurement are too costly with specific assets.

Williamson (1985) states that there are three main differences between market organization and internal organization. They are the following:

- 1) Market organization promotes competition among rivals vying for a firm's business to a greater extent than does internal organization. Market organization also helps restrain internal inefficiency (bureaucratic distortions) more effectively than does internal organization.
- 2) Markets, in some cases, are able to aggregate demands efficiently, which can lead to economies of scale. An example would be the wood dealer aggregating the demand for wood and aggregating the supply of wood.
- 3) Market organization can not typically provide "distinctive governance instruments." If a lumber mill is integrated into wood supply, it has internal instruments at its disposal to assure contractual performance that it may otherwise not have, or may have only at higher costs, if it were not integrated into ownership of the resource. For example, in the presence of the need for specific assets, internal control of the wood input reduces or eliminates the risk of holdup. Contracting through market systems in the presence of high asset specificity can subject the

mill to higher risks associated with input owners withholding the input for higher profits or economic rents (holdup).

In establishing a transaction cost model of asset specificity, let us first consider a mode of governance in which output is held constant and it is assumed that economies of scale are insignificant. With these assumptions, attention can now be focused on governance, which are those transaction costs associated with controlling production costs (monitoring, contractual enforcement, and uncertainty), with transaction costs broadly defined as the costs of establishing and maintaining property rights (Allen 1991). The critical factors that determine whether a firm will make or buy, according to Williamson, are production cost control and the ease with which the potential contracting parties can adapt intertemporally. The lumber mill's decision to purchase land and timber fee simple provides for unique governance methods, but at a cost of higher bureaucracy and inefficiencies arising from a lack of competition. The lumber mill could procure its wood input externally, by contracting with third parties; however, it would lose some of its unique governance abilities, such as the ability to reduce holdup risk.

As asset specificity increases, the ability to intertemporally adapt, given a market procurement system, declines. If there is a case where a large number of suppliers may compete at the outset to deliver an input, where asset specificity is high transactions associated with investment in this highly specific asset (for example, sawlogs in the late 19th and early 20th century) undergo what Williamson calls a "Fundamental Transformation" (Williamson 1996, 14). The contractual problem is transformed from what is a large number of potential suppliers (or bidders) initially to a small number of exchange relationships later as repeated contracting occurs. An example might be found in the relationships established within the pulp and paper industry. Occasionally, it can be observed that mills establish open or gatewood policies

regarding the acceptance of wood from the market. As transactions repeat themselves, *ex post* information and learning takes place. Experience is gained by both parties as to the relationship with the other. For example, the mill procurement officers establish relationships with preferred wood dealers, people they have come to trust through repeated transactions. The mill may install a preferred dealer system in which certain trusted dealers get the best timber contracts. From the dealer's perspective, repeated transactions with mills may establish (in the dealer's mind) a superior mill with which to contract, based upon prices received for stumpage and quality of relationship (including security of future contracts). Thus, a bilateral dependency develops in which both contracting parties develop a dependency for the other. The mill depends upon the preferred dealer to deliver quality wood on a timely basis, while the dealer depends on the mill for sustained contractual relationships.

Bilateral dependency will generally only develop in those situations where asset specificity is not too high or low. Where asset specificity is high, the risks associated with holdup are too great and the resulting transaction cost structure lends itself to internal procurement (the lumber industry). When asset specificity is very low, market conditions will prevail. The mill will contract with many stumpage sellers for wood inputs.

It is theoretically possible that the early southern lumber industry faced asset specificity in the form of required specific wood inputs. The wood required by the lumber industry as an input was relatively specialized and needed special assets itself in order to be transported to the mill. Lumber mills required large, straight trees with clear boles. At the time of the southern lumber boom, mills required forests of large trees to produce the best, most highly valued lumber. They also required vast quantities of the resource given the technologically confining nature of log transportation. There was no knowledge that trees could be more rapidly

regenerated; American forestry was in its infancy at this time. This requirement of large quantities of a specific type of tree led to the choices made regarding the type of technology needed to most efficiently harvest the wood and transport it to the mill. The constraint placed on the industry was the technology used in the mill. Mill technology was such at that time wood had to be of a sufficient size and quality to manufacture into lumber.

Therefore, we see a higher level of input asset specificity regarding the lumber industry than for its later rival and counterpart, the paper industry. The paper industry, as has been previously discussed, faced an entirely different environment from the one faced by the lumber industry. Due to the nature of its product—paper goods—the paper industry did not require such a specific wood input. In fact, the paper industry could utilize almost any southern yellow pine, large or small, in its paper making process.

The case for asset specificity in the early lumber industry does not reside with merely the wood input alone. In addition, there was also possibly a higher degree of asset specificity regarding “woods labor” for the lumber industry than for the paper industry. The lumber industry needed highly skilled workers for particular jobs in the woods and on the rail lines. Certain skills were needed to design and construct the spur lines that extended from main rail lines into the woods. Other skilled workers were required to harvest the large trees, transport them to the loading areas, and load them onto the trains. Much of the equipment used to perform these tasks was steam-driven and required at least a moderate level of expertise.

At first pass, it would seem obvious to any economist that the factors previously discussed obviously led to each industry’s choice of procurement strategy. In other words, because the lumber industry could purchase land cheaply from concentrated ownerships, was capital intensive in the procurement side of production, and had a cheap labor supply, it procured

stumpage internally by purchasing timber land fee simple and harvesting from its own land. The pulp and paper industry, on the other hand, faced a widely dispersed land ownership in the 1930s and 1940s, required intensive capital outlays in the mill, and required a good labor force for its mill production, not for the procurement of wood input. In addition, the pulp and paper industry faced labor costs in the form of regulations that the lumber industry did not face; therefore, it procured wood input externally, by utilizing the wood dealer.

A View Through the Lens of Transaction Cost Theory

The discussion of the factors mentioned above are important because they set the stage for a discussion of transaction costs and how asset specificity might have determined industry procurement organization and strategy. Transaction cost economists will argue that it is not technology that determines industry structure and make or buy decisions. Rather, technology contributes in defining what assets can or will be used in a particular production process (Williamson 1986). On the one hand, one might argue that in the latter half of the 19th century and the early years of the 20th century, the steam technology employed by the lumber industry was decisive and therefore constituted a specific organizational makeup in order to maximize profits and reduce risk. The lumbermen faced enormous procurement costs, in relative terms. Their objective was to locate at a center that provided an excellent resource base (in order to minimize transportation costs involving the input), yet it still had to be reasonably close to major rail outlets, so that transportation costs involving the output were minimized as well. Once a mill was established, extensive harvesting activities began, in which as much wood input was harvested as possible in order to cover transportation costs.

On the other hand, perhaps a logical hypothesis is that a market oriented wood supply system, in the case of the early southern lumber industry, was unfeasible, because the transaction costs associated with procuring from different landowners, as opposed to procuring from one's own land (make versus buy) were too high. There are several reasons for this. Recall that the federal and state governments owned much of the land in the South prior to the lumber industry's migration. Recall, also, that speculators had bought much of the prime land (Hickman 1962). Many purchased on behalf of northern lumber interests. Why was no consideration given by any of the land holders to forming a wood supply industry to furnish lumber mills with wood, rather than merely sell the land and timber to the mills themselves? Likewise, why did no independent, third parties organize to purchase wood from landowners and sell it to the mills?

One might assume that this is the natural result of transportation economies; indeed, transportation costs have always constituted a large portion of the production functions of activities associated with the forest products sector. However, would it not have been possible for any of the three possible parties of exchange to capture transportation economies? For example, the resource owner could just as easily transport the wood to the mill by building spur lines from his land to the mill and by purchasing the rights-of-way necessary to complete these rail lines. What works one way should be able to work the other. In this case, the returns to the landowner would include the costs of establishing and maintaining rail lines. The landowner could also provide the labor and equipment. All the mill would then have to do is transact to secure wood as it came to the gate from landowners who were supplying it. The same situation holds for a third party system. A dealer, instead of a mill, could perform all the intermediate functions and capture returns associated with transportation, equipment, and labor. Thus, any of the three parties should be able to realize transportation economies. However, only the mill (or

more precisely, the mill owners) attempted to realize these economies. This occurrence would seem to minimize the argument for technological determinism. Why, then, did the lumber mills to a large degree purchase land and timber (make) rather than procure it using outside systems (buy)?

The answer has to lie in the relative transaction costs associated with the make or buy decision. If we assume that the harvesting of sawtimber stumpage and the transportation of that material can be performed by any of the potential contracting parties, and we further assume that the mill chooses not to make, but rather to buy the resource, are there not “hazards” associated (from the land owner’s or wood dealer’s point of view) with performing these functions? The answer is likely yes.

Let us first examine the case of a landowner in the late 19th century who is considering selling timber on the market. He does not engage in lumbering activities; he merely owns the land and timber. In the early years of the southern lumber industry, saw mills were likely widely dispersed, with each striving to choose a location not only in which there were efficient transportation potentials, but also where there was as little competition as possible from other mills. Williams (1989) states that logging railroad construction cost roughly one thousand dollars per mile. However, once the lines were constructed, the transportation cost was roughly twenty-five percent of the cost associated with using animals (such as oxen) to haul the logs. The general rule of thumb used by the industry was that the costs associated with building logging railroads and spur lines could only be profitable so long as there was a twenty-year supply of wood.

This situation provides an excellent example of how asset specificity, or the investments made in specialized assets that “cannot be redeployed from existing uses and users except at a

significant loss of productive value (Williamson 1996), creates transaction cost problems associated with governance issues. We can begin to see now why landowners (most of whom were speculators) did not personally engage in the harvesting and manufacture of sawlogs into lumber. Transaction costs in the form of governance—the institutional framework in which the integrity of a transaction or related sets of transactions is decided—and prevention of asset holdup—where one contracting party withholds the asset from another contracting party in an attempt to extract rents—made incentives such that it would be unfeasible for speculators or landowners to build the logging railroads. The possibility of holdup and the uncertainty of the transactions associated with securing a timber supply for such a long period made it imperative that lumber interests procure the timber internally. Thus, we see high transaction costs faced by the landowner in this alternative wood supply system.

However, it is also possible that the mill faced “hazards” as well. These risks lay in the potential of landowners to organize and withhold the resource and in the uncertainty associated with securing an external wood resource for twenty years. In this case, where there were few landowners (with governments and speculators being the largest landowners), it would be much easier to cartelize and attempt to extract rents from the mill. Thus, the mill also potentially faced higher hazards in the buy scenario than in the make scenario. The central problem was one of contracting completely in order to clearly define property rights, which is necessary in order to maintain efficiency. In the case of the lumber industry buying instead of making the resource (procuring instead of owning), the transaction costs rose relative to the transaction costs associated with fee simple land purchases. Therefore, the incentive for both the buyer of wood (sawmill) and the seller of wood (landowner) was to engage in fee simple land sales, implying

simple, standard, relatively inexpensive contracting processes with associated low transaction costs and long-term security.

For the pulp and paper industry, the opposite was true. The paper industry did not face the “hazard” of landowners potentially cartelizing in order to restrict the supply of wood and raise its price. Land holdings were dispersed and smaller than they were in the 1800s. The paper industry, therefore, faced relatively lower transaction costs arising from lower risk associated with procuring externally through a wood dealer system.

Williams (1989) also supports an asset specificity hypothesis. Several attempts were made in the early part of the 20th century to organize woods workers. One example is the case of the Brotherhood of Timber Workers in Louisiana in 1910. Williams states that employers used “lockouts, dismissals, the physical breaking up of meetings, and the blacklisting of individuals involved in union activities” to quash labor organization attempts. The mills were able to accomplish this because the labor was procured internally; therefore, they were able to exert internal governance to assuage unionization attempts. Had labor been hired on a contract basis through market procurement, asset holdup (or withholding of the labor asset from the mills) could have been more easily accomplished. That the mills hired labor and used internal governance to enforce contractual relationships provides possible insights into labor specificity, for if the transaction costs associated with hiring and training replacement workers for the unionized or striking workers had been low, surely such an endeavor would have been undertaken.

The paper industry needed more skilled labor in the mill than “in the field.” The specific non-human assets required by the paper industry occurred for the most part within the confines of the mill itself. These assets took the form mainly of very specific machines used in

transforming wood into pulp and in paper machines. It is interesting to consider the rise of craft unions in the pulp and paper industry versus the lumber industry. While unions successfully organized in the South within paper mills, they were not prominent among woods workers. Unions have never been very successful in organizing within the lumber industry. Of course, it is not necessarily the *ability* to organize that arises from existing as a specific asset. It is, rather, that organized labor *exists* in the form of craft unions within mills. Other institutional changes (labor laws and changes in technology) contributed to the ability of labor to organize. That it organized and was able to stay organized is more indicative of the presence of asset specificity. In fact, one might even hypothesize that asset specificity for labor inputs was so high within the paper industry that the industry itself found transaction costs to be cheaper when bargaining with a collective (such as a union) than to engage in activities designed to “bust” the union.

Therefore, regarding wood supply systems, the paper industry did not face the same hazards that the more asset-specific lumber industry faced. Its transaction costs were lower to purchase wood (buy) rather than to own its own land and procure wood from its own holdings (make), which led to the paper industry’s decision to employ a third party wood dealer system. The mill could set up contracts with the dealers, who in turn contracted with landowners to purchase their wood and with producers (loggers) to harvest the wood. The dealers were typically local business or community leaders who had access to better information than the newly organized mills (Flick 1985). Both parties gained from this contractual arrangement. The paper mills faced less governance costs regarding transactions than they would if they integrated into massive land ownership, because of the increased transaction costs they would have faced in transacting with thousands of woods workers. Since land ownership was not concentrated, mills did not face a high risk of cartelization on the part of landowners. They also typically (in the

early years) had exclusive contracts with the wood dealers, who, in effect became agents of the mill with which they had contracted (Cantrell 1969). The contract typically expressed arrangements regarding the relationship between the mill and the dealer (typically exclusivity) and agreed-upon delivered wood prices, unless the mill used a “gatewood” pricing strategy (where the mill quotes a price and as people arrive at the “gate” they are paid by weight or volume).

These fundamental differences in asset specificity regarding the wood input and labor requirements led the paper industry to choose against integration into wood supply, while its counterpart, the lumber industry, chose integration.

Concluding Remarks

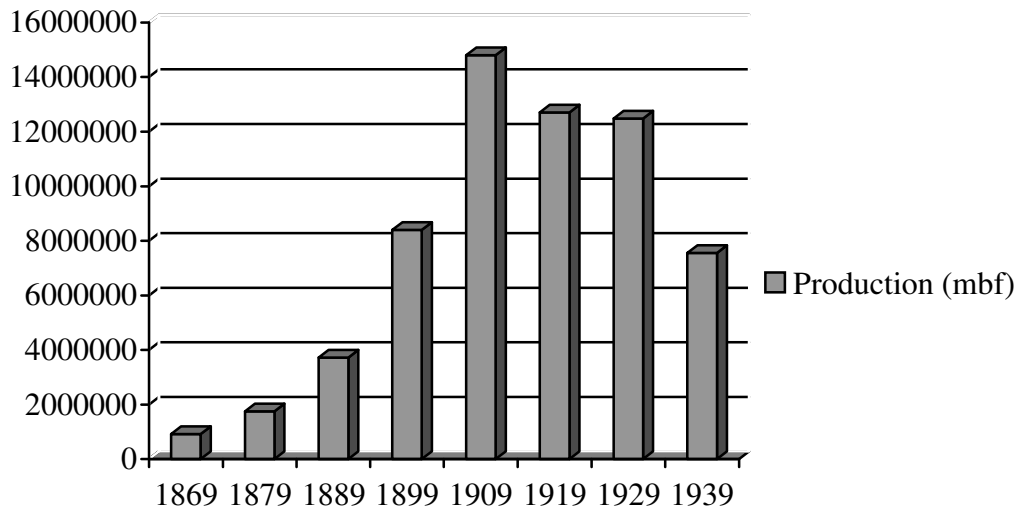
No attempt has thus far been made to empirically accept or refute an asset specificity model using data from the forest products industries. One possibility might be to examine lumber camps and mill towns for evidence of labor asset specificity. Such a study would be similar to Fishback’s (1992) study of company housing in the coalfields *circa* 1920, and would involve the collection of data regarding mill towns and population. Fishback’s hypothesis, based on asset specificity, was that towns were more likely to be company-owned when populations were small, because larger populations offered greater opportunities for independent builders, and miners had more incentive to own housing themselves. If a study could be conducted that could adequately collect data, then such a quantitative analysis would be worthy.

Another possibility for analysis lies in the market segmentation literature of rural sociology. For example, a study conducted by Bailey, et al. (1996) examined Alabama’s pulp and paper industry for evidence of segmented labor markets. They found that there was a core

industry of skilled workers that earned high wages and enjoyed a large measure of job security. Fringe workers, such as truck drivers, woods workers, and other contract labor did not earn the same level of income or possess job security. They also found that “during the industry’s formative years, African-Americans were systematically excluded from many primary labor market employment opportunities.” This exclusion from “core industry” jobs is interesting to the institutional economist, but from another perspective and for different reasons. If the expectation of labor quality and ability to efficiently operate specific assets (paper machines, for example) were generally different between whites and blacks, it could perhaps be due to the level of education and perceived quality of the workforce between the races. For example, if mill owners expected (either through experience or through prejudice) that black labor would be inferior to white labor in terms of managing complex machinery, then a case could be made that asset specificity exists or existed within that “core industry.” In this case, the core industry is the paper mill, and the specific assets are not only the machines required to transform wood inputs, but also the highly trained specific labor necessary to efficiently operate the machinery.

Figure 1.

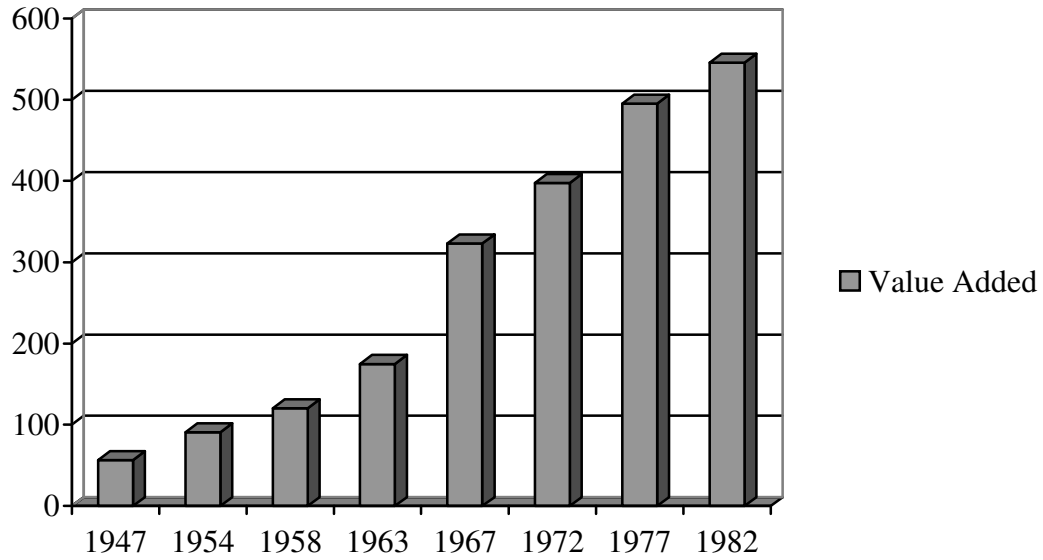
Pine/Hardwood Lumber production (thousands of board feet) in the Southern United States (Alabama, Arkansas, Florida, Georgia, Louisiana, Oklahoma, Mississippi, and Texas) for the period 1869-1939.



Source: Census of Manufactures, 1939. United States Bureau of the Census.)

Figure 2.

Value added (millions of 1967 real dollars) in the manufacture of pulp and paper products in the south-central region (Alabama, Arkansas, Louisiana, Oklahoma, Tennessee, and Texas) from 1947 to 1982.



(Source: United States Forest Service. *The South's Fourth Forest*. U.S.F.S. Forest Resource Report No. 24, 1988.)

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