

CHAPTER VII

Conclusion

The four day books, four journals and four ledgers covering the years 1850-1870 are the primary sources for the quantitative data that is the basis for the analysis in this chapter. The correspondence and invoice books provide information supplementing the financial records of the business. While the financial books represent a lode of information, they are not always easy to mine. As will be seen below, for various reasons they do not give a convenient and periodic check on the profits of the business. They do, however, provide accurate serial data which permit the construction of important time series after 1860. These time series will allow the analysis of some of the problems facing the business and they will provide the basis for estimates about the profits of the firm over the single decade 1860-1870.

Most of the financial records of the Lukens rolling mill for the period 1850-1870 survive, but there are gaps in each of the series of daybooks, journals, and ledgers. The daybook covering July, 1851 to April, 1855 is missing

along with the one covering the first four months of 1859. The journal series is complete but it was very poorly kept between 1856 and 1859. The entries for those years were sporadic and capriciously arranged; for example, all journal entries for 1857 to 1859 appear on the last four pages of the journal for that period. The ledger series suffers from two very considerable gaps. The two ledgers are missing which would have covered the periods between October, 1851 to April, 1855 and February, 1862 to January, 1866.

The partners kept the books in the usual fashion of the day. Entries were taken from the day book and put into the journal, and periodically the entries from the journal were posted to the ledger. Ledger and journal entries were cross-indexed. Since the missing parts of the series of journals and ledgers do not overlap, some of the data lost in one series may be retrieved in the other.

While the overlaps ease the loss of the missing books, they do not solve the problem of interpreting the ones that survive. The ledgers are a study in baffling simplicity. They, inevitably, give a balance of all accounts, but the accounts were not systematically segregated into functional categories before 1860. Further,

the firm never closed the books during the period of this study. By 1860, however, Lukens modernized the book-keeping methods to show certain basic cost accounts. These new accounts show costs for fuel, blooms, wages and repairs. These accounts, unlike others, were closed out each year at the end of March, save in 1864.

Certain costs do not show up as separate accounts at all. This is notably true first of all in the case of certain capital costs. This makes it impossible to determine precisely the cost of rebuilding the old mill or of building the new mill. The books list capital expenses like lumber, nails, mortar and bricks as parts of "sundry" charges against the partners or the rolling mill. They list other capital costs individually but not as capital costs per se.

Second, the books do not include accounts for the amortization of capital. For example, new rolls were charged to a repair account rather than a replacement account. This kind of bookkeeping side-stepped the problem of capital costs and rendered the problem of capital amortization moot.

Third, taxes had no account in the books. Like some capital expenses, tax payments made their way into the journals and ledgers as parts of sundry charges against

the partners or the rolling mill. It is not possible to determine from the books the taxes paid by the business.

Fourth, there was no general sales account. The partners credited the commission agents' remittances to the rolling mill. However, they often lumped remittances in with other income, such as interest. This method of posting to the ledger makes it impossible to determine the exact dollar amount of sales made by each agent. Once again, the use of sundry entries obscures the accounts.

Finally, there was a so-called profit and loss account in the ledgers but it was not used to show profits from 1850 to 1870. The "profit and loss account" typically stood at several hundred dollars in the red until the late 1860's when the firm wrote off the Vinton enterprise as a large loss. The profits of the business went by circuitous routes to various accounts in the ledger. As noted, the partners entered receipts for the sale of iron under "Rolling Mill". They then withdrew funds from that account and transferred the money to their own drawing accounts or put it into any of several stock, bond or treasury note accounts that they created during the Civil War. This procedure makes accurate determination of profits very difficult.

Some of the difficulties cited above can be overcome by the construction of time series for production, prices and basic costs from the data that does exist in the books and correspondence. The outgoing correspondence and invoice books allow the construction of a time series for production by weight and kind (see Appendix A). This series is complete save for two years between March, 1853 to March, 1855. The correspondence also gives a series of prices for Lukens iron in all major markets except for the same two missing years (see Appendix B). A third time series concerns Lukens's four basic costs of operation - blooms, wages, fuel and repairs. The daybooks and journals give data for a complete wage time series (see Appendix C). Bloom, repair and fuel cost series are possible only after 1860 when the books show these costs in separate accounts that were closed yearly (see Appendices D, E and F). A fourth series, for sales, can be constructed from the price and production series.

Despite the absence of a complete set of books, these time series are good enough to allow a close evaluation of the firm and its profits between 1860 and 1870 (see Appendix G).

The decade of the 1850's presents both a greater

and lesser problem: greater because the lack of cost data does not allow calculation of profits; lesser because the evidence that is available shows that the firm experienced fewer major changes in output, prices, sales and costs. Hence, profits were presumably more stable than they were in the 1860's. The production, wage and price series are quite stable in the 1850's. From high to low, production varied only twenty one per cent, prices eighteen per cent and wages twenty three per cent. Even with the Panic of 1857, that decade was a model of stability compared to the one which followed.

Table I below shows that the Civil War was very good for business at Lukens. Between 1861 and 1864 profits show a continuing dramatic increase. While costs doubled, so too did both prices and output. Consequently sales receipts rose four and one half times and profits soared to twenty four times the level of 1861.

The decade got off to a poor start, showing a loss. The next two years were better because costs declined while production rose. This situation gave Lukens a profit of 7.6 % in 1861 and 20% in 1862.

The greatest change for all indices occurred

Table I

	Costs	% of change from prev. year	Production	% of change from prev. year	Prices (Best Iron in N.Y.)	% of change from prev. year	Sales	% of change from prev. year	Profits	% of change from prev. year	Profits as % of sales
1860	\$ 64,133		796 tons		4 3/8		\$ 62,874		\$ 7,545-		
1861	58,984	-8	860 tons	+8	4 1/2	+3	71,589	+11	5,447+	+340	7.6
1862	55,333	-6	950 tons	+10	4 1/2	0	79,292	+14	23,959+	+133	20.0
1863	111,509	+101	1538 tons	+61	6 3/8	+41	186,040	+134	55,927+	+133	30.0
1864	120,198	+7	1717 tons	+12	8 1/2	+33	278,559	+49	130,506+	+133	47.0
1865	201,198	+67	1558 tons	-9	9 1/2	+12	275,944	-1	47,152+	-63	17.0
1866	181,719	-9	1546 tons	-1	8 1/2	-11	253,523	-8	46,452+	-1	18.0
1867	169,184	-7	1226 tons	-21	7 1/2	-12	165,033	-35	20,654-		
1868	112,078	-33	1175 tons	-4	7	-7	138,174	-16	12,279+		9.0
1869	152,619	+36	1553 tons	+32	6 3/4	-4	180,060	+30	9,435+	-22	5.6
1870	125,677	-17	1251 tons	-19	6 1/2	-4	140,371	-22	657+		.4

Note: Dates are for the end of Bookkeeping Year March 31.

in 1863-1864. These combined to produce enormous profits. In 1863, while costs doubled over 1862, prices went up 41% and production advanced 61%. This drove both sales and profits one and a third times ahead of 1862. The firm received a handsome 30% return on sales. Incredibly, better things were yet to come, for 1864 would see record profits for Lukens. Costs crept up only 7% while prices forged ahead a third, and production gained 12%. The result was that dollar sales gained by half over 1863 and profits rose by one and a third, giving a colossal 47% return on sales. That single year provided 44% of the cumulative profits for the decade.

This extraordinary situation could not endure. In 1865 costs whose doubling in 1863 and slender rise in 1864 had been muffled by combined substantial increases in prices and output, now by rising 67% in the face of stabilizing prices and declining production led to a slump in profits from the extraordinary level of 1864. Profits, however, were still very good for 1865, averaging 17% of sales. In 1866 costs trailed off at the same rate as prices, while production remained steady, leading to a return of 18% of sales.

When, however, in 1867, prices and production fell by 12 and 21% respectively, the result was catastrophic,

for costs had slipped only 7%. The cost per ton at Coatesville was only marginally higher than in New York, but the addition of transportation and commission overhead costs resulted in an overall loss of \$20,654. Just as the lag in the rise of costs behind the rise of prices and output made possible the miracle profits of 1864, so now did the lag in the fall of costs contribute to the loss of 1867.

When costs did fall the following year, a recovery ensued which gave a nice profit of 8.8%. From 1868 to 1870 changes in costs were mirrored by similar changes in production. However, since prices drifted lower by 7% in that period, profits were whittled away from 8.8 in 1868 to only half a per cent in 1870.

The decision to build a new mill in 1870, while it came in the face of declining profits, was not as risky as it might appear. Lukens had discovered a rich new market in the shipbuilding industry and the new mill could easily handle the demand for cheap wide boat iron. The market for rolled plate was quite buoyant in 1869-70. The decision to increase the capacity of the mill was quickly justified. In 1871 the new mill rolled 2,453 tons of plate. In 1872 and 1873 the mill produced 3,323 tons and 3,839 tons of plate respectively. The

latter figure was more than twice the output of the best year of the Civil War.

The partners had read the market right and made an adjustment to it. The market was always beyond the control of Lukens. The cooperative attempts made in the 1850's to regulate prices had quickly failed. But individually, as one firm among many, Lukens had several alternative tactics it could use in the face of a changing market. The two most drastic possibilities were to shut down when business was bad or to expand its operations when business was good. Neither of these tactics was often used. Most often Lukens simply adjusted its prices and output to meet the existing circumstances. Price adjustments could be made quickly, thanks to an efficient postal system and later the telegraph. Price adjustments were often made with great delicacy; an eighth of a cent could be shaved off base prices for a large order. The correspondence shows these constant fine adjustments well. Production schedules were changed on short notice with almost no penalty. The piece rate wage system allowed sporadic activity at the mill with little cost; a man standing idle at the mill cost Lukens nothing. The cost of keeping the furnaces hot or bringing a cold furnace up to temperature was the only disadvantage of working the mill slowly or letting it stand idle for

short periods. On the other hand, production increases of considerable magnitude could be made at minimal cost if necessary, as during the Civil War when the old mill increased its output 50% simply by adding men and driving the machinery harder and longer. The kind of rolled iron produced could also be changed on fairly short notice from the market. The late 1860's show a trend towards making more cheap iron than best iron. Eventually however, a growing and changing market drove Lukens to a more drastic and long term adjustment - the construction of the new mill and the conversion of the old rolling mill to a puddling mill.

If Lukens's market escaped its control, so too did its suppliers, the bloomaries and forges. During periods of stability, a certain amount of give and take was possible between the mill and its suppliers. The correspondence shows effective bargaining by the mill with suppliers. At times, certain forges were dropped because of the price or quality of their blooms. On the other hand, during times of high demand, the bloom makers were able to impose their prices on the mill in spite of lamentations and dire warnings from Lukens.

While Lukens could not control the market or supplies, there was never any problem in the internal

control of the business, and this made the problem of tuning the business to the market easy. The potential problem of control of the firm was avoided by limiting the business to a partnership of no more than two men and by further limiting the choice of partners to family relatives. With no exceptions, from the time Issac Pen-nock took Charles Lukens as a partner, the business was run by people related by marriage to Charles and Rebecca Lukens. Thus the control of Lukens was untroubled by succession problems. Nor was there ever any significant problem with labor in terms of wages, strikes or a proper supply of skills or manpower. Finally, there was no shortage of capital when needed.

There were other constants that made the control of the business simple. Between 1850 and 1870 the mill produced a single product - plate iron. There were varieties of plate, but the same technology was used to roll all kinds. The technology for producing the plate remained fixed until the steam mill went to work in 1870. The agencies that served Lukens in its market remained stable. The only principle difference between the market of 1850 and those of 1870 was that Lukens had no agent in Baltimore, but this was balanced by the new boat iron market in Wilmington. The other primary markets remain unchanged: New York, Boston, Philadelphia and New Orleans.

The partners kept their own books, thus keeping themselves informed of the business situation on a daily basis. They employed a clerk during the Civil War, but the handwriting of Charles Huston continued to appear in the journals, ledgers and correspondence. The absence of certain accounts in the ledgers implies that the partners thought that their business was a simple, straightforward affair. The lack of capital and capital amortization accounts suggest that the partners viewed the mill as a permanent entity, and the fixed technology used up to 1870 probably reinforced this notion. Recurring capital costs like rolls were charged off to a repair account, which indicates they viewed any cost as an operating cost. Taxes were charged off as a sundry expense to the rolling mill, indicating that they too were seen as a cost of operation. The books were never closed until December, 1871, with the consequence that profits were not reckoned on any regular basis. The nature of the books indicates that the partners knew where the business stood at any time from their daily work at the books and that they were more interested in continuing the business than in closely examining its profitability.

The goal of the various family partnerships running the mill was to maintain an ongoing business controlled by the family. The partners never changed

anything unless the pressure to do so was enormous. They stayed with proven techniques and products until the market for different goods was established and proven, allowing others to take the risks of pioneering new techniques and markets. Innovation and expansion were not seen as virtues in themselves and the partners remained skeptical of change until the late 1860's.

Under these conditions entrepreneurial decision-making was a simple affair. Lukens could not control the market for its products and had only a minor influence on its source of raw materials. These areas thus remained proof against any kind of entrepreneurial effort. The business itself was small, its management unified and its market fiercely competitive. For success under these circumstances, the management of the business had to be quick, active and attentive to these things which it could control. The vigilant skepticism that was the hallmark of the management at Lukens served it well. While Lukens was never large or innovative compared to its competitors, it endured and prospered.