Manufacturing Level of Manufactural Evansville

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The manufacturing level is a revealing and useful ratio. It is, broadly speaking, the percentage ratio of the output to the input. It is not a measure of profits; rather it is a rough indicator of the economic contribution of the factory, an indicator of the relative change effected by the factory.

In an unpublished paper read at the universities of Chicago and Illinois, there was depicted the areal distribution of the manufacturing level in the United States by counties, and thereby was demonstrated a striking areal differentiation in the distribution of the manufacturing level. In this paper there is shown the distribution of the manufacturing level in time (1859-1939) in manufactural Evansville, Indiana, and in selected categories thereof.

There is discernible order in these curves of manufactural Evansville and 25 of its categories as exhibited in the accompanying chart (Fig. 1). Some aspects of this order are presented herein, but an exhaustive analysis is beyond the space limitations of this paper.

Consider for our first example the curve for the category, Cigars. This industry started in Evansville in the 1850's, with two factories in 1860, with 42 in 1899, eleven in 1923 when the dollar volume of the output was nearly eight million dollars (this climax was also the zenith of the industry), and six factories in the early 1930's. About 50 wage earners were employed in 1859, and they mounted to about 180 in 1889; but the number jumped to about 550 in 1899, to about 1900 in 1914, and to nearly 2700 five years later, after which there was a decline to about 1500 as of the early 1930's. In 1859 the manufacturing level was 180, which means that the value added by the tobacco factories was 180 per cent of the value of the tobacco (and fuel and other closely associated items). This is a high level, and indicates much labor and know-how. Note that there followed 1859 (with exceptions) a gradual decline in the manufacturing level to a figure of 109 as of 1937. This gradual decline in the manufacturing level of the cigar industry of Evansville was normal, and it was due to many factors such as increased relative competition, technology, cost of materials and fuel. The major interruption in the smoothness of the curve occurred between 1899 and 1905. The manufacturing level dropped from 161 as of 1899 to 86 as of 1904, although the gross output rose from \$259,000 dollar volume to \$383,000. (This decline was due in part to an increase in the cost of materials as compared to the selling price of cigars f.o.b., and to an incipient change from numerous small factories to larger factories with an associated increase in facilities, and in output per worker.) There is evidence that the entire curve rose to a level exceeding 180 preceding



Fig. 1. Manufacturing level of manufactural Evansville, selected categories.

1859. From birth to 1937, therefore, the entire curve is roughly parabolic, with exception. The same is substantially true of the category, Printing and Publishing.

As a matter of fact, the normal curve of a manufactural category tends to be parabolical, with exceptions, though the curve is in many instances masked by various factors and forces. Many cases are not simple. Nevertheless, the recognition of this tendency toward a parabolic curve, and the isolation of the curve, are important, and potential for analysis, diagnosis, and prediction. In the case of Cigars, the Evansville manufacturing level was lower in recent decades than that of the average for the United States, largely owing to Evansville's location with respect to raw materials versus her location with respect to market. The local industry, therefore, faced some problems. However, the management of at least one of the factories preferred to remain at Evansville because of home ties.

Consider for a second example the curve of the category, Wagons, which category has disappeared, though it persisted in Evansville for more than a century. There were four wagon factories in Evansville in 1837; three in 1890; and one in 1933. The dollar volume of production exceeded two million in 1919, the climax. The manufacturing level declined from 309 in 1859 to 53 in 1919, after which the rate of decline increased bringing the level to nadir, the zenith having been attained prior to 1859. The most striking lowering of this manufacturing level was associated with huge contractual mass-production for a mail order firm, on low-margin profit per unit. In a sense the wagon industry did not perish; it mutated to automobile bodies, ice boxes, Victrola and radio cabinets, refrigerators, etc. This industry is an example of one which ran the gamut from youth, to maturity, to old age and demise; but that is another story.

Consider for the third example the curve of the category, Furniture, which category represents the wood industries of Evansville, where wood dominated manufactural Evansville for decades (1855-1930). There was a cabinet-making establishment in Evansville as of 1836; there were 27 furniture factories as of 1914, since when the number has declined. The gross output reached a climax in 1923 (more than eleven million dollars). The manufacturing level of furniture was 345 in 1859; it declined gradually to 126 in 1899; fluctuated to a nadir of 73 in 1914; and then rose to a plateau of about 100. Outstanding factors in the lowering of the curve were relative increase in competition, technology, and cost of wood, plus mass production on a marginal level of profit per unit, especially for mail order houses. Later the category recovered somewhat, partly by means of an increase in high-price class goods. The chief elements of strength of the extant industry are excellent relative position with respect to hardwoods of the Lower Mississippi, relatively low cost of fuel, skilled labor with wages in keeping with the location of Evansville, and manufactural momentum. Other wood industries, such as Sawmilling and also Cooperage, exhibit similar curves, marking the heyday and relative decline of wood manufactures in manufactural Evansville. Millplaning, however, has rejuvenated, owing largely to veneering, and production of parts and units for buildings.

For the fourth example we may note the curve of the category, Foundry and Machine Shops, as representing Metals. Metals have displaced wood in dominance in Manufactural Evansville. There were three foundries and machine shops in 1856, which number increased to 18 as of 1919, and then declined to eight as of 1932. The climax number of wage earners was in 1919 (1300), which date also marked the climax and zenith in production (over six million dollars). The manufacturing level of the category was 275 in 1859. It gradually declined to 97 in 1914 due to many factors such as increased relative competition, cost of materials and fuel, technology; increased output per worker; advertisement; and the rise of foundries in the South. Note, however, that rejuvenation set in during the middle nineteen teens, and raised the level to 145 in 1919. Rejuvenation was due in part to World War I, innovations, mutations, a change to higher-price class products, improved freight rates, a shifting of the main market from the South northward, and to influx of capital and management from the East. Note similarity in the curves for Foundries, Ploughs, Stoves—all marking the rise of Metals, now strikingly apparent in the huge factories producing automobile bodies, refrigerators, steel for structures, steam shovels, engines, etc. The outlook for Metals is firm.

The category, Monuments and Cut Stone, presents an instance of inverted parabolic curve. The manufacturing level rose longtime, from 86 in 1859 (when finished stone was rough) to 287 in 1939 in line with highly finished stone, high union wages, much labor on semi-custom work, quasi-fictitious values of tombstones inherent in custom, respect for the dead, pride, etc. Note the low but steady manufacturing level of such foods as flour, meat, and butter (but not of pharmaceutical foods).

Manufactural Evansville has maintained a flattened, plateau-like, strong curve (with exceptions) for the most part slightly higher than the level of average for the United States. This augurs well for her future.

It is apparent that when the manufacturing level of a category continues to fall in comparison with those of its competitors, the category faces problems irespective of dollar volume of output, and current profits; and vice versa. Even the Ford company encountered that fact.

Finally, in analysis of a category other indicators and clues in addition to the device of the manufacturing level must be employed. In conclusion, the device should be studied, corrected, and improved.

Summary

(1) A large majority of the categories net-trend from an early high manufacturing-level to a recent lower level, with a nadir hovering about the dawn of the twentieth century. (2) the rejuvenation of old industries, the mutation of others. The aperiodic appearance of new industries, with high levels, and the death of certain industries with low levels, all tend to rejuvenate the composite curve of manufactural Evansville. (3) Some industries, like ice, and bricks, have maintained a very high level (low cost of fuel and materials; high cost of conveyance by potential competitors). (4) Some industries, like wagons, exhibit a marked drop in manufacturing level (not quality) coincidental with quantity-production for special consumers. (5) The curves tend to be parabolical.