MANUFACTURING FIRMS IN GHANA: COMPARING THE 1987 AND 2003 CENSUSES

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Abstract

This paper presents a comparison of the 1987 and 2003 censuses of manufacturing firms in Ghana. The study shows that the number of firms increased from 8,000 in 1987 to 26,000 in 2003. However, the increases were predominantly amongst small-sized firms which more than tripled, and medium-sized firms that doubled. Large firms remained about the same in number but firms employing 500 persons and more actually contracted from 52 to 40.

With regards to wage levels in the manufacturing sector, the findings from the two censuses indicate that wages in large firms, thus those employing more than 100, more than doubled for all categories of workers between 1987 and 2003. Average wage per employee per month in large firms rose from US$53 in 1987 to US$139 in 2003. For medium sized firms, those employing from 10 to 100 employees, the increase was much less, from US$38 in 1987 to US$56 in 2003, a 47 per cent increase.

There were very substantial increases in labour productivity measured both by output per employee and value-added per employee. For large firms average value-added per employee increased 4 times from US$4,024 to US$16, 900 while for medium sized firms it increased by nearly 3 times, from US$2,000 to US$5,400. A breakdown by sector and by size shows that these very large increases in productivity occurred generally across the Ghanaian manufacturing sector. The factors that explain this change in the size distribution and increased productivity will form the next stage of the project.

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1. Introduction

The Ghanaian economy is still developing, and for that matter it has been characterised by economic and political instability which has permeated all sectors of the economy of which industry is no exception. Manufacturing firms in Ghana have had a chequered history, right from independence where the emphasis was on state owned and managed enterprises or firms to our current economic dispensation which focuses on the private sector as the engine of Ghana's economic growth, where most if not all manufacturing firms are now owned and managed by the private sector.

The swings in their performance and operations are strongly tied to the economic dynamics that have characterised Ghana since independence, which have both national and international dimensions. Among the national dimensions are political with its concomitant government policies, capital and technological constraints. On the international front, the Ghanaian manufacturing industry has remained subservient to its counterparts in the developed world, with the "big fishes" from the industrial world determining their fate in the international business world, thus limiting to some extent, their inability to access the export market.

Not withstanding, the contribution of the manufacturing sector in the face of these challenges, in terms of employment, wages, and contribution to the national output deserves commendation. It is in this regard that, this study examines the manufacturing sector over the sixteen year period in terms of employment, wages, and productivity, across firm sizes and major sectors of the manufacturing industry.

Due to data limitations from the 1987 industrial census with respect to small-sized firms, our analyses focus on only medium and large size firms. Basically, there are three size categories, small, medium and large. Firms engaging 1-9 persons are classified as small; those with 10 to 99 persons are medium, and firms employing 100 or more persons are considered as large.

All financial results are presented in dollars to render the data comparable. Since these are nominal values and does not account for inflation, a further attempt have been made to deflate all the values in the local currency (cedi), thus converting these values into real values in constant prices at the 1991 price levels (see appendices). Indeed the cedi/dollar exchange rate data available indicated over 50-fold depreciation of the cedis between 1987 and 2003.

The paper sets out to examine the industrial structure of Ghana and to what extent it has changed over the period. In the next section we set out the macroeconomic background. This is followed by jobs created and what type and in which sectors of manufacturing. Section 4 looks at wages in the various sectors and what gives higher wages. Productivity measures are also presented. Available data from the Ghana Living Standards Surveys indicate that the proportion of the population below the poverty line has dropped from the 1987 level of 43% to 27% in 2005. As to whether the manufacturing sector contributed to

this decline in one form or the other is an important issue. The final section deals with the implications of job creation and increased wages on poverty.

2. Background

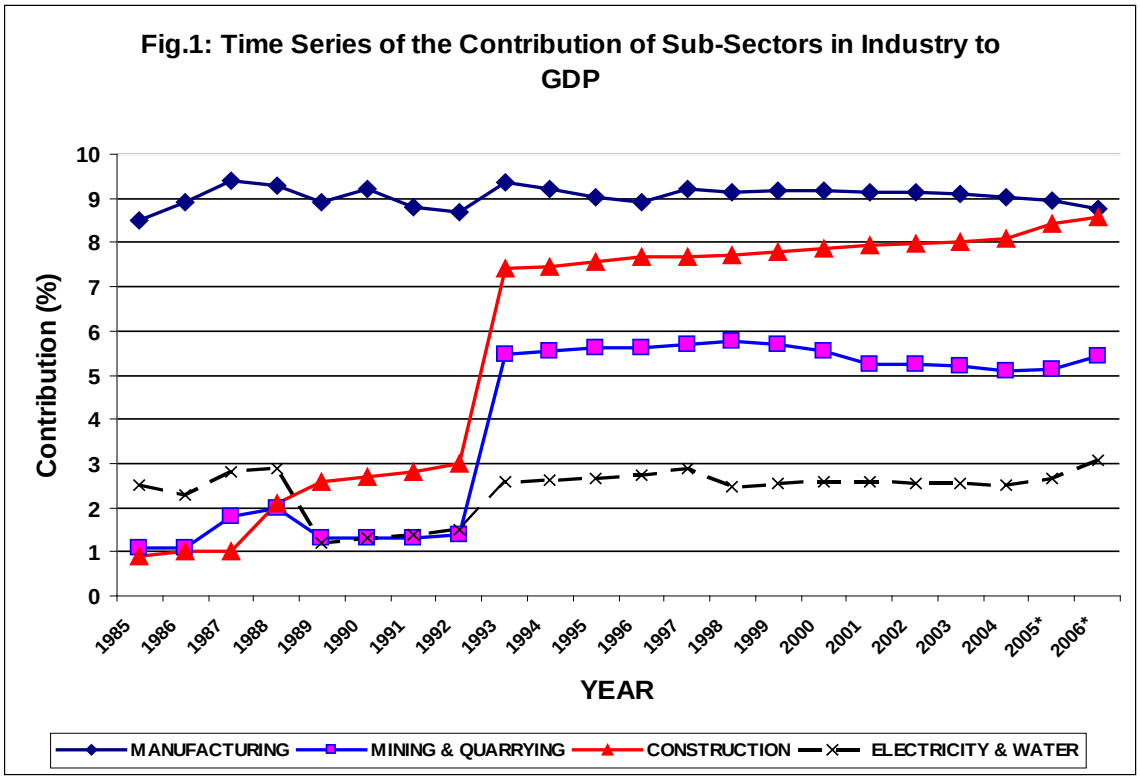
The Ghanaian economy has gone through a number of reforms, all in the bid to shift from a pure command economy in which government was central in industry, to a more market economy allowing the market forces to determine the nature and direction of all markets, in order to boost exports, strengthen financial institutions to promote monetary and fiscal discipline. The reforms included the Economic Recovery Program (1983/86) and the Structural Adjustment Program (1986/90) amongst others. One sector that saw a lot of reforms under Structural Adjustment Program (SAP) is trade. The reform in the trade sector involved reduction in import tariffs and making them more uniform, the abolition of import licensing in 1989, reduction and removal of a variety of export duties and the introduction of corporate tax rebate and 100% retention scheme, to promote exports.

In this section, the macro economic performance is examined in terms of gross domestic product (GDP) for the sub-sectors within industry, namely manufacturing, mining and quarrying, construction and electricity and water, and the three major sectors in the economy (agriculture, industry and services). The discussion is narrowed to the contribution of these sectors and sub-sectors to GDP over the period 1985 to 2006. It is however important to know that between 1985 and 1992, the GDP at purchasers price was estimated at constant 1975 prices, whiles between 1993 and 2006 the GDP at the purchasers value was estimated at constant 1993 prices.

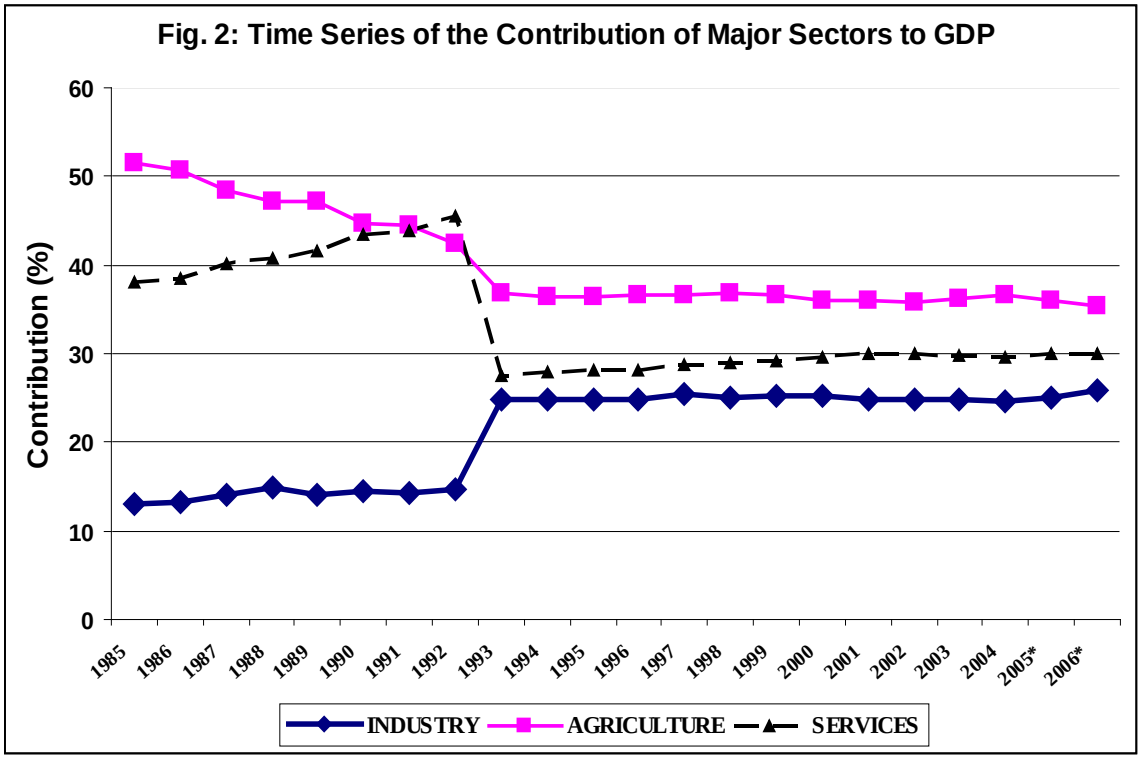
Figure 1 indicates that within the period under study, the contribution of manufacturing sub-sector in industry to total GDP at purchasers' value has remained higher than all the other three sub-sectors of industry. The contribution of the manufacturing sub-sector, even though was far and above that of the other three sub-sectors, has remained around nine percent, a margin most economist perceive as not good enough if the objective to become an industrialised nation is to be achieved.

Figure 2 illustrates how the major sectors in the economy had contributed to the GDP at the purchasers' price within the study period. Agriculture continued to dominate, followed by services and industry in that order. This is because manufacturing which dominates in terms of contribution of sub-sectors in industry to GDP, as illustrated in figure 1, did not show much improvement over the period as it stagnated around 9%. It is, generally, believed that the unbridled trade liberalization policies pursued over the period is believed to have had a negative effect on the manufacturing sector.

If the vision to become an industrialised nation is still the focus of Ghana, then the contribution of industry must not just dominate the major sectors in the economy, but must surely be much higher, may be a doubling or tripling of the current rates.



Source: Ghana Statistical Service, National Accounts Division.



Source: Ghana Statistical Service, National Accounts Division.

2. Employment & Firms

Generally the number of firms increased from 8, 000 in 1987 to 26,000 in 2003. But the increases were more predominant amongst small-sized firms which more than tripled, and medium-sized firms that doubled. Large firms remained about the same in number but firms employing 500 persons and more actually contracted from 52 to 40.

Besides the firm numbers Table 1 also presents the state of employment within the reference period.

Table 1: Persons Engaged in Industry in 1987 and 2003

	1987				2003			
Size	Firms	%	Emp.	%	Firms	%	Emp.	%
1-4	2,884	35	7,400	5	14,352	55	35,834	15
5-9	3,391	41	21,264	14	7,829	30	48,982	20
10-19	1,101	13	14,306	9	2,427	9	30,784	13
20-29	310	4	7,235	5	541	2	12,405	5
30-49	232	3	8,594	5	401	2	14,538	6
50-99	191	2	13,116	8	287	1	18,270	8
100-199	114	1	15,866	10	124	0	16,819	7
200-499	74	1	22,596	14	87	0	26,240	11
500+	52	1	46,707	30	40	0	39,644	16
Total	8,351	100	157,084	100	26,088	100	243,516	100
Ave. Size	19				9			

Source: Ghana Statistical Service, *National Industrial Census 1987, Phase I Report*, and *2005 National Industrial Census Bulletin No. 1.*

Note: Size categories and average size refer to employees per establishment.

In 1987, large firms (>100) accounted for 54 percent of jobs in the manufacturing sector compared to less than 20 percent by small firms (<10). In 2003 large firms and small firms engaged about the same proportion of employees in manufacturing.

However between 1987 and 2003 we observe some dramatic changes. Employment in large firms remained virtually unchanged. Within the large firm category though, employment contracted significantly among firms engaging 500 persons and more over the 16 year period.

In contrast there was nearly three fold increase in employment in small firms, from 28,000 to 85,000. In medium firms (>10 &< 100), we observe some expansion in employment but less dramatic. In essence, most new jobs were created in the small firms.

And more significantly the capacity of the manufacturing sector to absorb labour reduced as average firm size declined from 19 to 9 over the 16 year period.

As expected the majority of workers in large firms are paid employees (Table 2). Of this number, 68 percent are production workers and supervisors/foremen. We observe a minimal use of learners and unpaid workers (less than 1%) in 1987. A similar pattern is noticeable in 2003. Over the period, however, the number of persons employed by large firms fell from 59,000 to 57,000. With the exception of operatives and learners, all type categories displayed the same trend. Although insignificant, the proportion of learners and unpaid workers increased from 0.28 percent to 2.4 percent.

Table 2: Employment by Type and Size in 2003 and 1987

Large Firms>100	**1987**		**2003**	
Description	Total number of people	Percent of total in 1987	Total number of people	Percent of total in 2003
Operatives	40,438	68.09%	42,984	75.78%
Other employees	17,613	29.66%	12,201	21.51%
Total(operatives+other employees)	58,051	97.74%	55,185	97.29%
Working proprietors & active biz. partners	1,174	1.98%	219	0.39%
Learners	54	0.09%	1,319	2.33%
Unpaid workers	114	0.19%	59	0.10%
Total unpaid workers	1,342	2.26%	1,597	2.82%
Total employees+unpaid workers	**59,393**	**100%**	**56,722**	**100%**

Medium Firms>10<100	**1987**		**2003**	
Description	Total number of people	Percent of total in 1987	Total number of people	Percent of total in 2003
Operatives	13,127	52.14%	15,510	39.43%
Other employees	4,849	19.26%	4,396	11.17%
Total(operatives+other employees)	17,976	71.40%	19,906	50.60%
Working proprietors & active biz. partners	1,030	4.09%	2,034	5.17%
Learners	5,556	22.07%	16,151	41.05%
Unpaid workers	615	2.44%	1,249	3.17%
Total unpaid workers	7,201	28.60%	19,434	49.40%
Total employees+unpaid workers	**25,177**	**100%**	**39,340**	**100%**

Table 3: Employment in Sectors of Industry by Size in 2003 and 1987

	Large							
Sector	1987				2003			
	Average Persons Engaged per Firm	Number of Firms	Total Persons engaged	Proportion of Persons Engaged in Sector	Average Persons Engaged per Firm	Number of Firms	Total Persons engaged	Proportion of Persons Engaged in Sector
Basic Metal, Machines, and Equipments	310	16	4952	9%	293	12	3517	6%
Chemical, Rubber and Non-metalic	294	23	6759	12%	312	37	11530	21%
Food and Beverages	386	35	13504	23%	326	34	11077	20%
Textiles and Garments	643	16	10294	18%	551	11	6063	11%
Wood, Furniture, Paper, and Printing	356	62	22084	38%	439	53	23282	42%
Total	**379**	**152**	**57593**	100%	**376**	**147**	**55223**	100%

	Medium							
Sector	1987				2003			
	Average Persons Engaged per Firm	Number of Firms	Total Persons engaged	Proportion of Persons Engaged in Sector	Average Persons Engaged per Firm	Number of Firms	Total Persons engaged	Proportion of Persons Engaged in Sector
Basic Metal, Machines, and Equipments	30	119	3582	14%	23	326	7608	17%
Chemical, Rubber and Non-metalic	33	109	3547	14%	28	161	4534	10%
Food and Beverages	32	127	4076	16%	24	211	5019	11%
Textiles and Garments	21	285	6004	24%	17	781	13428	30%
Wood, Furniture, Paper, and Printing	29	263	7693	31%	22	623	13742	31%
Total	**28**	**903**	**24902**	100%	**21**	**2102**	**44380**	100%

Table 2 shows that medium-sized firms employed more persons than large firms. They created additional 14,000 jobs between 1987 and 2003. Over 10,000 of these jobs were created for the learner category alone. This suggests a growing dependence of medium-sized firms on learners (apprentices) and unpaid family workers. In 1987, this group of workers constituted 25 percent of the workforce in medium-sized firms but this shot up to 44 percent in 2003.

In the case of large firms, wood, furniture, paper and printing, and food and beverages sub groups are the two leading employers in the Ghanaian manufacturing sector. In contrast, larger firms employing the least number of persons are found in the basic metal, machine and equipment subgroup.

Textiles and garments firms recorded the highest average number of employees per firm, well above the industry average but account for less than 20 percent of the workforce in 1987. A similar pattern is observed in 2003. Between 1987 and 2003, only large firms in the wood and chemical sub groups increased their share of employment. Food and beverages, and the textiles groups declined by 3 and 7 percentage points respectively.

As shown in Table 3, medium-sized firms (>10 &< 100) in the wood and furniture, and textiles and garment categories accounted for 31 percent and 24 percent respectively of the total persons engaged in 1987. In 2003, these two sub-sectors together accounted for 61 percent of those employed in medium-sized firms, and thus remained the two main sources of employment this size group. The textiles and garments subgroup follows with 24 percent; the rest engaged roughly the same proportion in 1987. Only the textiles and garments, and the basic metals groups increased their share of employment in 2003. These observations are probably better explained by looking at the wage and productivity levels in these sub-sectors.

3. Wages

It is no doubt that wages are a major source of reward and motivation to labour not only in industrial firms but across all forms of economic activity in the world. Many have also stated that generally, lower wages are a major cause of poverty to households who are engaged in some form of labour in developing countries. In this regard, it is believed that if labour is not adequately rewarded, output per labour would be negatively affected. This raises the old age question of whether wages are low because productivity is low or entrepreneurs deliberately cut back what is due labour because of scarcity of jobs.

Findings from the two censuses indicate that wages in large firms more than doubled for all categories of workers between 1987 and 2003 as illustrated in Table 4. Average wage per employee in large firms rose from $53 per month in 1987 to $139 in 2003.

It is also observed that wages/salaries of administrative, clerical and accounts staff are twice as much as what the production workers (up to the foreman level) receive.

In spite of the remarkable increases in the number of medium-sized firms over the reference period, wages generally increased from an average of $38 in 1987 to $50 in 2003 representing a 32% increase (Table 4). The increases varied across employment categories as production workers benefited by 13.0% compared to 33.0% amongst the administrative, clerical and accounts staff.

It can therefore be deduced that wage wise, it is far better to work in a larger firm than a medium-sized firm. The average large firm worker earns nearly three times more than

his counterpart in a medium-sized firm. Further attempt to re-look at the wages in constant cedi values, by deflating for inflation, by and large confirms the above findings. The real wage values in cedi terms are presented in the appendix.

Table 4: Wage in Manufacturing by type of employment and size, 1987 & 2003 (in dollars)

Large Size Firms (>=100)						
	1987			2003		
Type of Employment	Annual wages (Dollars)	Employment	Average wage **per month** in (Dollars)	Annual wages (Dollars)	Employment	Average wage **per month** (Dollars)
Wages paid to operatives	24,370,162	40,438	50.22	67,822,745	42,984	131.49
Wages paid to other Employees	23,213,356	17,613	109.83	39,296,698	12,201	268.40
Wages paid to all category of Employees	36,810,538	58,051	52.84	92,066,432	55,185	139.03

Medium Size Firms (>10 & <100)						
	1987			2003		
Type of Employment	Annual wages (Dollars)	Employment	Average wage **per month** in (Dollars)	Annual wages (Dollars)	Employment	Average wage **per month** (Dollars)
Wages paid to operatives	6,410,767	13,127	40.70	8,488,447	15,510	45.61
Wages paid to other Employees	3,743,057	4,849	64.33	4,494,257	4,396	85.20
Wages paid to all category of Employees	8,244,288	17,976	38.22	11,920,225	19,906	49.90

Wages across the various manufacturing sub-sectors reveal very interesting trends. Between 1987 and 2003, labour in all the five main sectors studied experienced increases in their wage levels. Generally, almost all the sectors in large size firms experienced dramatic increases in the wage levels than medium-size firms. Among the large size firms, however firms belonging to the chemical, rubber and non-metallic sectors of manufacturing experienced the most dramatic increases of about 380% in their average real wage (in 1991 cedi prices) levels per month, representing an increase in nominal terms from $46 in 1987 to $178 in 2003 per employee per month. In addition, food and beverages, and textiles and garments all experienced increases of 291% and 316% increases in real wages (in 1991 cedi prices), also representing increases in nominal

TABLE 5: Average Wage In Sectors Of Industry By Size In 2003 And 1987 (In Dollars)

Large

Description	1987			2003			1987 -2003
	Average wage per month (Dollars)	Average Real wage per month (in 1991 prices)	Number of firms in average data	Average wage per month (Dollars)	Average Real wage per month (in 1991 prices)	Number of firms in average data	**% Change in Real Wage**
Basic Metal, Machines, and Equipments	92.31	39,571.88	16	147.24	77,909.14	11	96.88
Chemical, Rubber and Non-metallic	45.79	19,631.17	23	178.09	94,233.60	37	380.02
Food and Beverages	57.16	24,503.40	35	181.11	95,830.22	34	291.09
Textiles and Garments	39.85	17,084.33	16	134.51	71,172.69	11	316.60
Wood, Furniture, Paper, and Printing	45.77	19,620.45	61	83.99	44,444.46	53	126.52
Total	52.72	22,599.22	151	139.03	73,563.88	146	225.52

Medium

Description	1987			2003			1987 - 2003
	Average wage per month (Dollars)	Average Real wage per month (in 1991 prices)	Number of firms in average data	Average wage per month (Dollars)	Average Real wage per month (in 1991 prices)	Number of firms in average data	**% Change in Real Wage**
Basic Metal, Machines, and Equipments	42.99	18,431.15	99	68.73	36,365.99	224	97.31
Chemical, Rubber and Non-metallic	49.07	21,037.05	105	64.50	34,130.16	151	62.24
Food and Beverages	32.62	13,985.36	115	45.55	24,100.43	160	72.33
Textiles and Garments	29.11	12,479.59	74	37.37	19,843.44	285	59.01
Wood, Furniture, Paper, and Printing	33.68	14,437.87	217	45.23	23,931.90	458	65.76
Total	37.09	15,899.01	610	49.90	26,425.58	1278	66.21

values of $57 to $181, and $40 to $135 respectively in these sectors. While these three sectors were experiencing almost a tripling real wages increases, the real wages in the basic metal, machines, and equipments, and the wood furniture, paper and printing sector barely doubled, representing an increase in nominal terms of $92 to $147, and from $45 to $84 respectively.

Among the medium-sized firms, in exception of the basic metal, machines and equipment sector of the manufacturing industry which experienced a margin of increase in real wage of 97%, the remaining sectors had increases of at least 50%, with the textiles and garments sector experiencing the least increase in nominal terms from $29 to $37, representing an increase of 59% in real wage. Generally, two out of five sectors had increases in real wages (in 1991 cedi prices) higher than averaged total manufacturing increase of 66%, with only three sectors having wage increases in real terms less than this average manufacturing increase. Among the large size firms however, the increases in real wages for three sectors; chemical, rubber and non-metallic, food and beverages, and textiles and garments were above the increase in total manufacturing industry average of 225%. Whiles the increases in two sectors (basic metal, machines, and equipments, and the wood furniture, paper and printing) were below this size group's average increase in real wages.

In sum, while real wage levels in most sectors in the manufacturing industry among large size firms more than doubled, those in the medium-size firms barely increased by two third. Ironically, whiles firms in the basic metal, machines and equipments sector experienced the least increase among the large size firms, their counterparts in medium-sized firms experienced the highest increase in real wage levels. Generally in dollar terms, average wage per employee per month in the manufacturing industry have increased over the sixteen year period, and it is expected that this development would have impacted positively in the fight against poverty. Ideally, the reward for labour is expected to be positively related to productivity, but whether productivity per employee is the driving force for the increases in wage level is an issue to be explored in the next session.

4. Productivity

Basically the mention of productivity brings to mind the following four commonly known indicators in its measurement; Labour Productivity (LP), Single Factor Productivity (SFP), Multifactor Productivity (MP), and Total Factor Productivity (TFP). This study is focused on using LP, both in terms of output per labour and value added per labour. Productivity in this study is therefore defined as the output or value added per employee, using the concept of labour productivity.

Output in this paper is defined as "total value of sales of goods plus receipts for contract and commission work done for others, plus receipts for repair and installation work for others, plus other receipt for industrial services, plus sales of goods bought and resold in same condition as purchased, plus fixed assets produced for own account, plus stocks of work in progress and goods on hand for sale at the end of the year, less stock of work in progress and goods for sale on hand at the beginning of the year". Whiles value added is defined as "value of output less cost of materials, fuels, supplies and cost of industrial services" (Ghana Statistical Service, 2003). These definitions are industrial census definitions so as to establish the conformity needed to pave way for comparing the results of this paper to the census results.

TABLE 6: Average Output Per Employee In Sectors Of Industry By Size In 2003 And 1987

LARGE FIRM SIZE

SECTOR	1987			2003		
	Average Output per employee per year (Dollars)	Average Output per employee per month (Dollars)	Number of firms in average data	Average Output per employee per year (Dollars)	Average Output per employee per month (Dollars)	Number of firms in average data
Basic Metal, Machines, and Equipments	19,527.45	1,627.29	16	28,270.29	2,355.86	13
Chemical, Rubber and Non-metallic	12,156.83	1,013.07	23	68,265.45	5,688.79	38
Food and Beverages	14,588.80	1,215.73	35	51,926.27	4,327.19	36
Textiles and Garments	5,356.56	446.38	16	15,951.88	1,329.32	11
Wood, Furniture, Paper, and Printing	4,556.98	379.75	61	10,439.19	869.93	53
Total	9,710.83	809.24	151	36,819.17	3,068.26	151

MEDIUM FIRM SIZE

SECTOR	1987			2003		
	Average Output per employee per year (Dollars)	Average Output per employee per month (Dollars)	Number of firms in average data	Average Output per employee per year (Dollars)	Average Output per employee per month (Dollars)	Number of firms in average data
Basic Metal, Machines, and Equipments	4,602.64	383.55	116	23,132.22	1,927.69	293
Chemical, Rubber and Non-metallic	11,414.68	951.22	108	15,658.55	1,304.88	154
Food and Beverages	4,827.04	402.25	126	12,520.07	1,043.34	182
Textiles and Garments	1,145.17	95.43	274	4,596.03	383.00	698
Wood, Furniture, Paper, and Printing	3,011.47	250.96	260	10,129.90	844.16	543
Total	3,927.22	327.27	884	10,789.50	899.13	1,870

Table 7: Average Value Added Per Employee In Sector Of Industry By Size In 2003 And 1987

-	Large					
SECTOR	1987			2003		
	Average Value added per employee per year (Dollars)	Average Value added per employee per month (Dollars)	Number of firms in average data	Average Value added per employee per year (Dollars)	Average Value added per employee per month(Dollars)	Number of firms in average data
Basic Metal, Machines, and Equipments	8,549.23	712.44	16	12,313.18	1,026.10	13
Chemical, Rubber and Non-metallic	5,751.23	479.27	23	20,220.59	1,685.05	38
Food and Beverages	7,086.09	590.51	35	25,687.44	2,140.62	36
Textiles and Garments	2,359.50	196.63	17	7,539.38	628.28	11
Wood, Furniture, Paper, and Printing	2,499.44	208.29	61	6,344.98	528.75	53
Total	4,668.79	389.07	152	15,049.13	1,254.09	151

Medium

SECTOR	1987			2003		
	Average Value added per employee per year (Dollars)	Average Value added per employee per month (Dollars)	Number of firms in average data	Average Value added per employee per year (Dollars)	Average Value added per employee per month(Dollars)	Number of firms in average data
Basic Metal, Machines, and Equipments	1,590.89	132.57	118	10,670.49	889.21	293
Chemical, Rubber and Non-metallic	5,558.62	463.22	109	6,953.16	579.43	154
Food and Beverages	1,366.40	113.87	126	5,061.48	421.79	182
Textiles and Garments	314.72	26.23	276	2,612.56	217.71	698
Wood, Furniture, Paper, and Printing	1,274.18	106.18	262	5,626.68	468.89	543
Total	1,556.10	129.67	891	5,346.14	445.51	1,870

Examining productivity in terms of output, the results from the two censuses indicate that productivity per labour has increased dramatically among all the sectors of the manufacturing industry, and this cuts across both medium and large size firms. The margin of increases in average output per employee in dollar terms varies across sectors and size class of firms. In the large firm size, the total average output per employee in dollar terms quadrupled from $9,710 to $36,819, a jump which was more prominent in the chemical, rubber, and non-metallic; food and beverages; and textiles and garments, than the basic metal, machines and equipments; and wood, furniture, paper and printing sectors of the manufacturing industry. This may be due to the fact that, most firms in the basic metal, machines and equipments, and wood, furniture, paper and printing sectors in the manufacturing industry of Ghana have not yet taken full advantage of technology and the economic of scale that they may be benefiting from. On the other hand, in the chemical, rubber, and non-metallic sector, output per employee increase drastically from $12,156 to $68,265, representing in real terms (in 1991 cedi prices) a 593% jump in output per employee (table 5).

Among the medium-size firms, the total average increase in manufacturing output almost tripled in nominal dollar terms from $3,927 to $10,789, and this increase varied in all the sectors of the manufacturing industry. The basic metal, machines and equipments; and wood, furniture, paper and printing sectors which did not show higher productivity in nominal dollar terms in large size firms, experienced large increases from $4,602 to $23,132, and $3,011 to $10,129 respectively. Allied to these, the textile and garments, and food and beverages also quadrupled from $1,145 to $4,596 and $4,827 to $12,520 respectively. The chemical, rubber, and non-metallic sector in the manufacturing industry which had the highest increase among the large firms had an increase in output per employee from $11,414 to $15,658, representing an increase in real terms of only 69%, a sharp contrast with groups in the large size firms (table 5).

Productivity measured in terms of value added per employee is very important. This is because it is not just enough to know how much each employee contributed to the firm's total production, but it is necessary to know how much each employee contributed to the growth or performance in terms of productivity of the firm. To do this, the estimation of value added per employee is not just necessary but critical.

The results of the 1987 and 2003 industrial census on value added per employee as depicted in table 7 above, shows that the margin of increases in output per employee in all the sectors of the manufacturing industry between 1987 and 2003 examined above did to some extent reflect in margin of increase in the value added per employee, such that even in some cases, the margin of increase was more for the value added per employee than the output per employee. Generally this is expected since the estimates of value added is subjected to cost of production, and the extend to which this can influence the estimates are relative to the sector in question, since the sectors vary in terms of technology and cost structure. Allied to this, the advent of technology was expected to introduce cost effectiveness in production, for this reason it is expected that those sectors that have improved in technology wise, were likely to reduce cost hence all things being equal may benefit by adding much value to their output.

Among large size firms, the total average value added per employee in nominal terms increased from $4,669 and $15,049, an indication that on the average value added among this size of manufacturing firms more than tripled. This was reflected in almost all the sectors in this size class of firm size, in exception of Basic Metal, Machines, and Equipments which experienced an increase in nominal dollar

terms from $8,549 to $12,313, an equivalent of just 78% increase in real terms (in 1991 prices in Cedis) of the value added per employee (appendix 6). On the other hand, in the chemical, rubber and non-metallic, and food and beverages sectors, for instance the value added nearly quadrupled by increasing from $5,751 to $20,220 and from $7086 to 25,686, an equivalent of 334% and 347% in real prices (in 1991 cedis prices) respectively.

Among the medium-size firms in nominal dollar terms the total average value added per employee more than quadrupled from $1,556 to $5,346, in real terms (in1991 prices) it increased by 298% (appendix 6). This was again reflected in some of the sectors, with some experiencing higher increases than others. For instance the value added in the basic metal, machines and equipments, and textiles and garments sectors increased from $1,591 to $10,671, and $315 to $2,613, and in real terms (in 1991 prices) these increased by 728% and 924% respectively (appendix 6). Among this size class of firms, just like the changes in output per employee, the chemical, rubber and non-metallic sector experienced the least increase from $5,589 to $6,935 also representing in real terms (in 1991 prices) an increase in value added per employee by just 54%.

In sum, it is observed that just like the case of output per employee, productivity measured in terms of value added indicates that the chemical, rubber and non-metallic sector experienced a dramatic improvement in performance with large size firms than medium-size firms. On the other hand, the basic metal, machines and equipments sector performed far better with medium-size firms than large size firms. In exception of these two sectors, textile and garments, wood and furniture, and basic metal, machines and equipments sectors in the medium-size firms experienced a dramatic jump in productivity than large size firms. Generally, in absolute terms (both real and nominal) the large size firms across all sectors recorded a substantive increase in productivity levels than the medium-size firms, but in percentage terms the medium-size firms in some sectors performed better (table 5 and 6).

In addition to the analysis based on the two sized groups, we present Tables 7a and 7b which show how productivity of labour- output per employee and value added per employee- from the two censuses varies across some selected firm size groups.

Productivity of firms is very much dependent on firm size as reflected in Table 5 and 6. In both censuses we find that generally productivity increased with size. May be the larger firms have a higher propensity to invest in machinery and capital which eventually facilitate large scale production and the benefits thereof.

Surprisingly we observe that in 2003, firms in the 50-99 size categories upwards saw their output per employee increasing by three folds or more. It may be worth investigating which type of firms fall in the 100-199 size group as they recorded a five fold increase over the period.

Generally, this finding is however not at variance with the general literature on productivity, but regards to specific sectors, the results of some sectors are at variance with this literature, which states that large firms perform better than small ones due to several factors such as economics of scale that large ones benefit from. This is also an indication that, probably the sectors in these large size firms where productivity was lower than medium-size firms, are not taking full advantage in the advancement of technology, which again according to the literature is likely to lead to cost effectiveness and increase productivity. Now whether these sectors in the medium-size firms used much of modern technology to

obtain higher productivity, or whether they intensified their use of labour, which is usually known to be relatively cheap in Ghana in production or not, is yet to be explored. But according to the data one thing which is certain is that, productivity both in absolute and percentage terms have increased dramatically in most sectors across size class of firms.

Table-7a: Mean output per employee for 1987 and 2003 (in Dollars)

	1987	2003
Firm Size Group	**Mean Output per Employee**	**Mean Output per Employee**
10-19	4,278.79	10,266.14
20-29	3,217.24	10,731.11
30-49	5,407.81	10,612.70
50-99	5,941.73	25,098.04
100-199	6,801.73	33,374.54
200-499	10,970.95	36,133.57
500+	12,902.73	42,377.42

The other measure of productivity, value added per employee also confirms the importance of size. With the exception of the 10-19 sub group in 1987 and the 500+ sub-group in 2003, we notice a positive relationship between firm size and value added per employee.

Table 7b: Mean value added per employee for 1987 and 2003 (in Dollars)

	1987	2003
Firm Size Group	**Mean Value Added per Employee**	**Mean Value Added per Employee**
10-19	2,153.25	5,160.20
20-29	1,184.67	5,671.70
30-49	1,314.87	5,321.85
50-99	2,370.27	9,254.78
100-199	2,758.86	13,852.86
200-499	5,617.58	17,999.34
500+	6,617.44	12,356.39

Another revealing fact is that, in sectors where productivity increased dramatically, wage levels also increased in a similar fashion. But whether it is wage levels that drove productivity or it was productivity that drove the direction of wage levels, is subject to a further study. However, one thing which can also be certain is that since higher wage levels are expected to be labour's reward if productivity increases all things being equal, given that entrepreneurs would duly reward labour, thus give to labour her fair share of output, then it would be ideal that, for wages to increase, there must be an increase in productivity. For this reason, if according to the literature, wage levels are inversely related to poverty levels, then one could deduce that an increase in productivity is a necessary evil in the fight against poverty for Ghana.

5. Summary and overview: Implications for Poverty Reduction

We know from the household surveys that poverty fell from 1991 to 2005. While this period is not an exact overlap with the industrial census it is close. What are our main findings?

Employment

- The size distribution of firms has changed dramatically with almost all increases in the number of firms concentrated in the small categories.
- Micro firms - those employing less than 5 - tripled in number.
- Ghana has been much better at creating firms than at creating employment in them.
- Employment in firms >100 people has remained basically unchanged
- Employment among medium firms (11-99) size group has increased as a result of more firms in this category
- Among medium firms there has been a change in composition of the workforce to include more learners and unpaid workers
- Among large firms employment has increased by the most in the chemicals, rubber and non-metallic sector.
- The sectors with the largest increase in employment for medium firms are textiles and garments and wood, furniture, paper and printing

Wages

- Wages and productivity have increased dramatically among large firms in the chemical, rubber and non-metallic sector
- The sectors with the largest increase in employment for medium firms - textiles and garments and wood, furniture, paper and printing – have the lowest wage levels and have experienced the least growth in wages

Productivity

- Both levels and changes in wages are associated with levels and changes in productivity
- Large increases in productivity (measured as output per employee and value-added per employee) among large firms particularly in the chemical, rubber and non-metallic, textile and garments and food and beverages sectors
- There were much lower increases in productivity in the medium firms.

How does this increased number of small and medium-sized firms as well as expansion in employment over the sixteen year period link to poverty reduction? Access to jobs and increased incomes will have played a part in improved welfare levels. The extent of the gain depends on where the new workers in the sector came from. If they were from the rural sector where incomes are lower then there would have been a rise, if they came from the contracting large firms than incomes would be lower.

Clearly understanding how this pattern of firm growth links to income is the next stage of the research.

References

Ghana Statistical Service (2003**), National Industrial Census**
Ghana Statistical Service (1987), **National Industrial Census**
Ghana Statistical Service (2006**), Ghana Living Standard Living Standard Survey**

Appendix

Appendix 3a: Real Average Wage in Manufacturing by type of employment and size, 2003 & 1987(in Cedis)

Large						
	1987			2003		
TYPE OF EMPLOYEE	Total Wages in cedis (in 1991 prices)	Employment	Average Wage per Month cedis (in 1991 prices)	Total Wages in Cedis (in 1991 prices)	Employment	Average Wage per Month in cedis (in 1991 prices)
OPERATIVES	10,447,571,385.12	40,438	21,530.02	35,887,290,019.20	42,984	69,574.90
OTHER EMPLOYEES	9,951,638,080.32	17,613	47,084.72	20,793,212,622.00	12,201	142,018.50
TOTAL (OPERATIVES + OTHER EMPLOYEES)	15,780,797,467.68	58,051	22,653.64	48,715,485,858.00	55,185	73,563.90

Appendix 3b: Real Average Wage in Manufacturing by type of employment and size, 2003 & 1987(in Cedis)

Medium						
	1987			2003		
TYPE OF EMPLOYEE	Total Wages in cedis (in 1991 prices)	Employment	Average Wage per Month cedis (in 1991 prices)	Total Wages in Cedis (in 1991 prices)	Employment	Average Wage per Month in cedis (in 1991 prices)
OPERATIVES	2,748,316,502.28	13,127	17,446.97	4,491,522,288.00	15,510	24,132.40
OTHER EMPLOYEES	1,604,660,949.84	4,849	27,577.18	2,378,065,435.20	4,396	45,080.10
TOTAL (OPERATIVES + OTHER EMPLOYEES)	3,534,352,678.08	17,976	16,384.59	6,307,391,272.80	19,906	26,404.90

Appendix 4: Average Wage (Real) In Sectors Of Industry By Size In 2003 And 1987 (in cedis)

LARGE

Sector	1987		2003		1987 -2003
	Average wage per month (in 1991 prices)	Number of firms in average data	Average wage per month (in 1991 prices)	Number of firms in average data	**% Change in Wage**
Basic Metal, Machines, and Equipments	39,571.88	16	77,909.14	11	96.88
Chemical, Rubber and Non-metalic	19,631.17	23	94,233.60	37	380.02
Food and Beverages	24,503.40	35	95,830.22	34	291.09
Textiles and Garments	17,084.33	16	71,172.69	11	316.60
Wood, Furniture, Paper, and Printing	19,620.45	61	44,444.46	53	126.52
Total	22,599.22	151	73,563.88	146	225.52

MEDIUM

Sector	1987		2003		1987 - 2003
	Average wage per month (in 1991 prices)	Number of firms in average data	Average wage per month (in 1991 prices)	Number of firms in average data	**% Change in Wage**
Basic Metal, Machines, and Equipments	18,431.15	99	36,365.99	224	97.31
Chemical, Rubber and Non-metalic	21,037.05	105	34,130.16	151	62.24
Food and Beverages	13,985.36	115	24,100.43	160	72.33
Textiles and Garments	12,479.59	74	19,843.44	285	59.01
Wood, Furniture, Paper, and Printing	14,437.87	217	23,931.90	458	65.76
Total	15,899.01	610	26,425.58	1278	66.21

Appendix 5: Average Output (Real) per Employee in Sectors of Industry by Size in 2003 and 1987 (in Cedis)

Large

SECTOR	1987			2003			1987 - 2003
	Average Output per employee per year in cedis (in 1991 prices)	Average Output per employee per month in cedis (in 1991 prices)	Number of firms in average data	Average Output per employee per year in cedis (in 1991 prices)	Average Output per employee per month in cedis (in 1991 prices)	Number of firms in average data	Change in Average Output per Employee (%)
Basic Metal, Machines, and Equipments	8,371,482.40	697,623.53	16	14,958,770.00	1,246,564.17	13	78.69
Chemical, Rubber and Non-metalic	5,211,670.90	434,305.91	23	36,121,566.00	3,010,130.50	38	593.09
Food and Beverages	6,254,264.70	521,188.73	35	27,475,952.00	2,289,662.67	36	339.32
Textiles and Garments	2,296,374.10	191,364.51	17	8,440,678.30	703,389.86	11	267.57
Wood, Furniture, Paper, and Printing	1,953,591.60	162,799.30	61	5,523,729.80	460,310.82	53	182.75
Total	4,163,062.80	346,921.90	152	19,482,271.00	1,623,522.58	151	367.98

Medium

SECTOR	1987			2003			1987 - 2003
	Average Output per employee per year in cedis (in 1991 prices)	Average Output per employee per month in cedis (in 1991 prices)	Number of firms in average data	Average Output per employee per year in cedis (in 1991 prices)	Average Output per employee per month in cedis (in 1991 prices)	Number of firms in average data	Change in Average Output per Employee (%)
Basic Metal, Machines, and Equipments	1,973,168.80	164,430.73	118	12,240,042.00	1,020,003.50	293	520.32
Chemical, Rubber and Non-metalic	4,893,509.70	407,792.48	109	8,285,467.60	690,455.63	154	69.32
Food and Beverages	2,069,368.10	172,447.34	126	6,624,792.30	552,066.03	182	220.14
Textiles and Garments	490,939.64	40,911.64	276	2,431,913.30	202,659.44	698	395.36
Wood, Furniture, Paper, and Printing	1,291,028.70	107,585.73	262	5,360,071.50	446,672.63	543	315.18
Total	1,683,610.80	140,300.90	891	5,709,091.30	475,757.61	1,870	239.10

Appendix 6: Average Value Added (Real) per Employee in Sectors of Industry by Size in 2003 and 1987 (in Cedis)

Large

SECTOR	1987			2003			1987 - 2003
	Average Value added per employee per year in cedis (in 1991 prices)	Average Value added per employee per month in cedis (in 1991 prices)	Number of firms in average data	Average Value added per employee per year in cedis (in 1991 prices)	Average Value added per employee per month in cedis (in 1991 prices)	Number of firms in average data	Change in Average Value Added per Employee (%)
Basic Metal, Machines, and Equipments	3,665,081.70	305,423.48	16	6,515,321.50	542,943.46	13	77.77
Chemical, Rubber and Non-metalic	2,465,572.70	205,464.39	23	10,699,400.00	891,616.67	38	333.95
Food and Beverages	3,037,829.20	253,152.43	35	13,592,094.00	1,132,674.50	36	347.43
Textiles and Garments	1,011,525.80	84,293.82	17	3,989,342.10	332,445.18	11	294.39
Wood, Furniture, Paper, and Printing	1,071,519.90	89,293.33	61	3,357,343.10	279,778.59	53	213.33
Total	2,001,527.30	166,793.94	152	7,963,004.70	663,583.73	151	297.85

Medium

SECTOR	1987			2003			1987 - 2003
	Average Value added per employee per year in cedis (in 1991 prices)	Average Value added per employee per month in cedis (in 1991 prices)	Number of firms in average data	Average Value added per employee per year in cedis (in 1991 prices)	Average Value added per employee per month in cedis (in 1991 prices)	Number of firms in average data	Change in Average Value Added per Employee (%)
Basic Metal, Machines, and Equipments	682,020.73	56,835.06	118	5,646,115.90	470,509.66	293	727.85
Chemical, Rubber and Non-metalic	2,382,998.40	198,583.20	109	3,679,150.20	306,595.85	154	54.39
Food and Beverages	585,782.02	48,815.17	126	2,678,201.00	223,183.42	182	357.20
Textiles and Garments	134,922.63	11,243.55	276	1,382,396.70	115,199.73	698	924.58
Wood, Furniture, Paper, and Printing	546,247.03	45,520.59	262	2,977,267.70	248,105.64	543	445.04
Total	667,103.44	55,591.95	891	2,828,825.10	235,735.43	1,870	324.05

Prices used as Deflators

year	rpi95	Export Unit Value of the US expuvus	urbancpi	urbancpi	nationalcpi	ruralcpi	Exchange Rate (Cedis/US$)
1987	12.53624	102.7	35.86122				153.7333
1988	16.46539	109.9	47.54146				202.3458
1989	20.67012	112.8	60.16527				270
1990	28.29593	113.9	83.98875				326.3317
1991	33.40799	114.9	100				367.8308
1992	36.75725	115	109.3477				437.0867
1993	45.92535	115.4	137.6018				649.0608
1994	57.35714	117.9	173.1642				956.7108
1995	100	123.8	280.279				1200.429
1996	134.0408	124.5	431.0203				1637.232
1997	172.4111	122.6	554.4218	100	100	100	2050.167
1998	207.0459	118.8	636.6981	114.84	114.62	114.42	2314.147
1999	223.8257	117.3	719.9007	124.16	128.89	132.9	2669.299
2000	277.1364	119.17	879.0358	158.55	161.27	163.87	5455.056
2001	368.42	118.18	1218.543	210.16	214.39	218.3	7171
2002	420.64	117.06	1303.169	235.05	244.78	253.11	7932
2003	532.67	118	1647.409	299.95	311.81	329	8717
2004	599.93	122.6	1937	344.77	349.1	361.28	9004
2005	698.42	126.3	2194.4	385.7	404.1	444.31	9076
2006				432.9	450.2	520.5	9150
				Accra			
2007				489.1	498.5		
2008				556.34	588.72		