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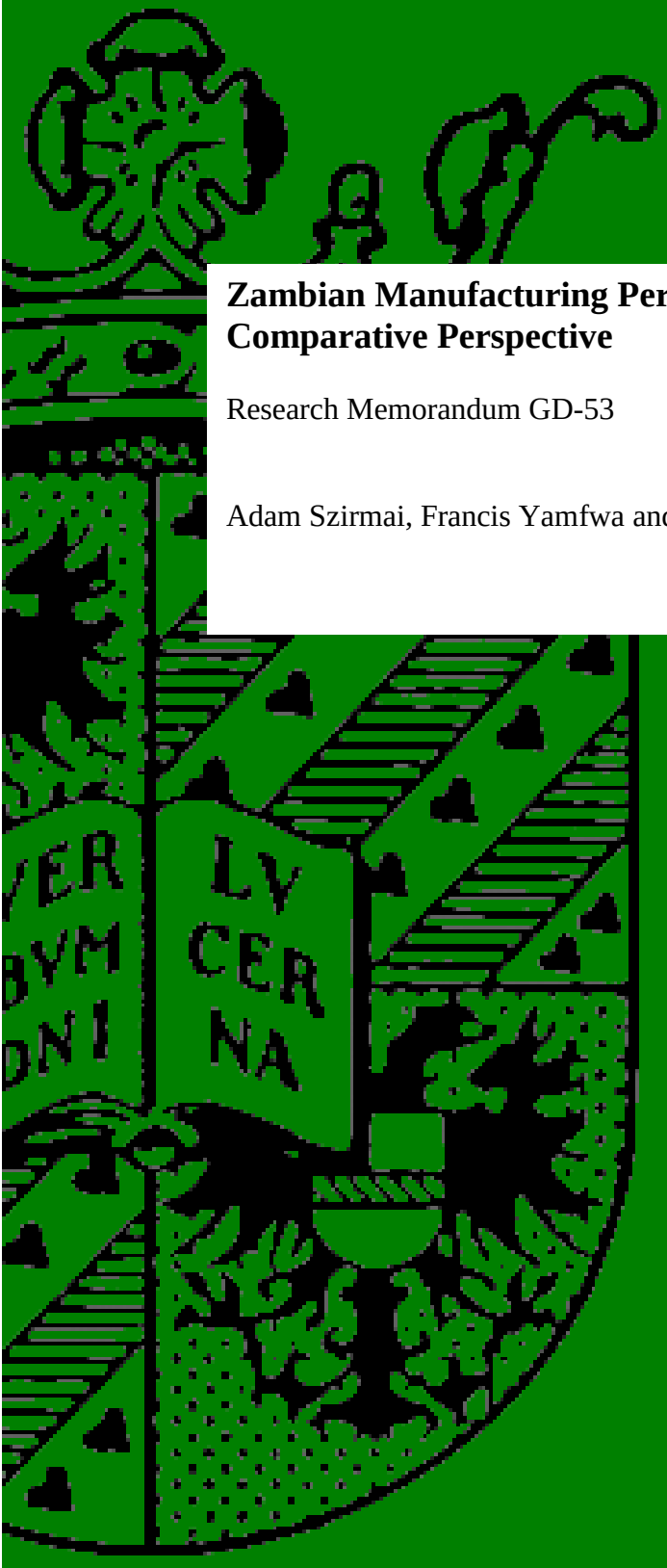

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Research Memorandum GD-53

Adam Szirmai, Francis Yamfwa and Chibwe Lwamba

RESEARCH MEMORANDUM

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Zambian Manufacturing Performance in Comparative Perspective*

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Abstract

This paper presents an analysis of Zambian manufacturing performance since 1964. It presents new estimates of labour productivity growth and total factor productivity growth. After a period of growth and labour productivity improvement till 1974, Zambian manufacturing suffered from increasing inefficiencies in an import substituting and interventionist environment. Growth of output slowed down, labour productivity and investment declined, though TFP showed some fluctuation. In the period of liberalisation between 1991-95, output shrank dramatically, TFP collapsed and labour productivity continued to decline. After 1995 indicators of performance point to a modest recovery.

Following an industry-of-origin approach to international comparisons, the Zambian estimates are placed in comparative perspective in a binary comparison with the USA. In 1990, labour productivity in Zambia stood at 5.9 percent of the US level, while relative total factor productivity stood at 16.7 percent. Over time comparative labour productivity has been declining, indicating an increasing technology gap relative to the world frontier. By 1998, comparative labour productivity stood at 3.2 percent of the US level.

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1. Introduction

Aggregate economic performance in sub-Saharan Africa remains weak in comparison with other developing regions. For example, since the 1980s per capita income in Africa declined by around 1 percent per annum. 32 countries are now poorer than in 1980 (Collier and Gunning, 1999a, b). Growth rates are well below the average for all low-income developing countries (e.g. Ndulu and O'Connell, 1999). Per capita GDP growth in sub-Saharan Africa between 1988 and 98 stood at –0.6 percent per year (for the whole of Africa at –0.2 percent per year)[1]. Slow growth in manufacturing, generally considered to be the most dynamic sector within industry, mirrored aggregate economic performance. The growth rate of manufacturing GDP for sub-Saharan Africa was 1.2 percent per year between 1990 and 1996, down from 2.1 percent per year between 1980-90 (1.5 percent per year, down from 4.2 percent per year for the whole of Africa for the same respective periods)[2]. In the nineties, many countries experienced a process of deindustrialisation in the wake of liberalisation. In 1998 manufacturing's share in GDP stood at 19 percent for the whole of sub-Saharan Africa.[3]

There is a wealth of studies in the development literature on sub-Saharan Africa providing empirical evidence of the unfavourable impact on industrial development of both domestic policies and circumstances, and external factors (Calamitsis *et al.*, 1999; Collier and Gunning, 1999a,b; Hadjimichael *et al.*, 1995; Lall, 1990; Meier and Steel, 1989; Riddell and Coughlin, 1990; Wangwe, 1995).

This paper focuses on one of the sub-Saharan African countries: Zambia. It has a dual purpose: to present a quantitative analysis of productivity trends in Zambian manufacturing and to put Zambian performance into comparative international perspective by making benchmark comparisons of levels of real productivity. Using a growth accounting framework, growth trends in total manufacturing and thirteen branches of manufacturing are analysed for the period 1964-1998. The paper also presents a benchmark comparison of levels of real output and productivity in manufacturing for 1990 between Zambia and the USA, the world productivity leader. The benchmark comparisons provide empirical estimates of the size of the productivity and technology gaps between Zambia and the world productivity frontier. Benchmark comparisons and trend analysis are combined to provide estimates of relative productivity performance over time. The analysis of absolute and comparative productivity trends is intended to provide some insight into the mechanics of relative manufacturing stagnation. The main aim of this paper is to come up with new empirical estimates of comparative productivity performance.

1 Source: World Bank African Development Indicators 2000, table 1-1.
2 Source: UNIDO International Yearbook of Industrial Statistics 1999, table 1.3.
3 Source: World Development Report, 1999/2000, table 12.

The benchmark study is part of a larger project on international comparisons of output and productivity (ICOP) being carried out at the Universities of Groningen and Eindhoven in the Netherlands and associated research groups elsewhere.[4] Along with Tanzania (Szirmai, Prins and Schulte, 2001) and South Africa (van Dijk and Szirmai, in press), Zambia is among the first countries from sub-Saharan Africa to be included in the comparative study. The study serves not only to put the Zambian manufacturing performance in comparative perspective with the world productivity leader, the USA, but it can also be used to make indirect comparisons of the manufacturing performance of the Zambian economy with other economies in the ICOP project. As the benchmark comparison is the most novel part of the paper, it will receive the most emphasis in the discussion.

2. The Development of the Manufacturing Sector in Zambia

The development of manufacturing in pre-independence Zambia (then known as Northern Rhodesia) was greatly affected by the country's relationship with Zimbabwe (Southern Rhodesia) and South Africa, the exploitation of copper deposits and the landlocked nature of the economy (Fincham, 1980; Seshamani, 1989; Seshamani and Samanta, 1985; Young, 1973). Compared to both South Africa and Zimbabwe, Zambia had a relatively smaller population of white settlers and did not have much power to influence the decisions and policies of the colonial government. Instead, Zambia basically provided a market for manufactured goods produced in the other two countries. The landlockedness of Zambia meant that all raw materials and other inputs that could not be obtained locally, had to be transported over long distances at substantial expense. This provided negative incentives to the development of manufacturing in Zambia. Serious exploration of the copper deposits, around which the early manufacturing base was to be formed, only began in the 1920s.

Manufacturing development in post-independent Zambia can be divided into three main periods: a period of expansion 1964-74, a period of slowdown, 1974-1991 and a period of adjustment, liberalisation and de-industrialisation, 1991-1998.[5] The subdivision reflects external shocks (i.e. oil crises, copper price shocks, and domestic policy changes). Soon after independence in 1964, the manufacturing sector in Zambia became one of the country's fast-growing sectors. From 1964 to 1974, it achieved an annual average growth rate of 12.6 percent (see Table 1). This, however, was followed by a period of near stagnation and, thereafter, a decline. Between 1964 and 1974, the share of manufacturing in total GDP (at factor cost) rose from 6.3 percent in 1964 to 13 percent. After 1974, the share of manufacturing continued to grow, reaching a peak of 26.6 percent in 1991. In the nine years after that, the manufacturing share shrank, reaching 13.6 percent by 1998.

Between 1964-74, manufacturing output growth was particularly high in textiles, chemical products, rubber and plastic products, electrical machinery and equipment, and leather products and

[4] For manufacturing the ICOP project by now covers over thirty-five economies in Eastern and Western Europe, North and South America and Asia.
[5] The period 1974-1991 is further subdivided into a period before and after the debt crisis of 1982. The reform period is divided into a period of collapse 1991 and a short period with some signs of recovery after 1995.

footwear, ranging between 27.1 percent and 32.9 percent per year. These were branches heavily promoted through public investment.

The early development of manufacturing took place against a background of high copper export earnings. In 1964, copper mining accounted for about 45 percent of total GDP (at factor cost) and it still provides almost all of Zambia's foreign exchange (CSO National Accounts 1964-65; Ministry of Finance and Economic Development, 1998). In 1964, about 94 percent of foreign exchange earnings derived from copper mining (Copper Industries Service Bureau, 1964). In 1997 copper contributed over 75 percent of foreign exchange earnings even though the share of copper mining in total GDP (at factor cost) was not more than 10 percent.

The strong relationship between mining and manufacturing still exists. Mining has had a dual influence on the development of manufacturing in Zambia: provision of foreign exchange and market demand. For instance, in 1991, the manufacturing sector imported 60 percent of its raw materials, while supplying over 90 percent of its total output to the domestic market. For the provision of foreign exchange it depended on copper export earnings. Directly and indirectly mining is a major consumer of industrial outputs. This is reflected in the regional distribution of manufacturing activities. In 1994, 46 percent of manufacturing establishments and about 50 percent of persons engaged in manufacturing were located in the mining province (also known as Copperbelt province) (Fincham, 1980; Census of Industrial Production, 1964, 1975, 1980 and 1994). These establishments provide intermediate inputs and services to mining. The remaining establishments were spread over the other eight provinces. The consequence of the double dependence on mining is that declines in copper production and export earnings directly translate into input shortages and low levels of capacity utilisation of manufacturing.

Since independence in 1964, industrial policy focused on import substitution and protection (ILO-JASPA, 1981; Ministry of Commerce, Trade and Industry, 1994; Turok, 1979). In the early, easy, stages of import substitution up to 1974, the manufacturing sector grew rather rapidly. After 1974, the highly import-dependent manufacturing sector stagnated in the face of a foreign exchange crisis and input constraints, following the 1973 hike in oil prices, sharp drops in copper prices in 1975 and steadily declining copper output volumes after 1977.[6] High rates of effective protection and the absence of competition, reinforced by decreasing capacity utilisation, resulted in decreasing efficiency and increasing costs.

Following economic reforms in 1968-70, parastatals were assigned an important role, under the principle of state participation in manufacturing. From 1973 onwards, the expansion of the state sector accelerated. By the end of the 1980s the parastatal sector controlled 90 percent of the country's industrial and commercial activities, accounting for 35 percent of total GDP, 13 percent of the total country's external debt, 60 percent of total investment, and about 45 percent of total formal sector employment (Ministry of Commerce, Trade and Industry, 1994). In 1992 the holding company for

manufacturing parastatals, INDECO[7], accounted for over 80 percent of non-mining industrial production. Parastatal management was dominated by political appointments. It was weak and had to balance conflicting objectives of profitability on the one hand, and employment creation and low consumer prices on the other.

In 1991, the Zambian government started the implementation of liberalisation policies. Under these policies, there was an initiative to open up the domestic market in order to allow competitive trade and to encourage active participation of private entrepreneurs in all sectors of the economy (de Bruin and Tambatamba, 1995). Other aspects of the new industrial policy included (a) a progressive reduction of all subsidies; (b) de-regulation of foreign exchange, interest rate and price controls; and (c) encouragement of private investment through privatisation of most parastatal firms. On 3rd July 1992, an Act of Parliament was passed providing for the privatisation and commercialisation of state-owned enterprises.

The first five years of this so-called policy of "sustainable industrial growth" witnessed an unprecedented decline of manufacturing GDP and employment due to massive labour retrenchments and establishment closures. There are still cries and pleas for maintaining or reinstating limited protection and state subsidies at the moment. Nevertheless, it is envisaged that in time the sector will adjust to the new economic realities and will start growing again. This finds some support in post-1995 data.

In Table 1, we have entered figures for the share of manufacturing into total GDP at the beginning and end of periods, and the contribution of the manufacturing output growth to growth in the total real GDP. The shares at the beginning and end of periods are more interesting than averages, and the contributions provide a good view on the importance of the growth dynamics.

[6] By 1998 copper output was only 43 percent of its 1964 level (national accounts, various issues).
[7] INDECO stands for the Industrial Development Corporation.

Table 1

Growth of total GDP, growth of total GDP/capita, growth of manufacturing GDP, growth of manufacturing GDP/worker, contribution of manufacturing sector to growth in total real GDP and its share in total GDP, 1964-98 (in %)

	Expansion (1964-74)		Slowdown (1974-91)				Adjustment (1991-98)			
			Post copper price shock (1974-82)		Debt crisis (1982-91)		Collapse (1991-95)		Slight recovery (1995-98)	
Growth in total GDP	3.4		-0.5		1.1		-1.2		2.1	
Growth GDP/capita	0.7		-3.7		-2.0		-4.4		-1.1	
Growth in manufacturing GDP	12.6		0.0		2.0		-23.6		2.9	
Growth in manufacturing GDP/worker	3.1		-0.2		-1.5		-16.0		11.3	
Contribution of manufacturing growth to growth in total real GDP	0.8		0.0		0.4		-1.5		0.4	
Share of manufacturing in total GDP	1964	1974	1975	1982	1983	1991	1992	1995	1996	1998
	6.3	13.0	17.5	20.2	19.0	26.6	18.2	11.7	13.4	13.6

Sources for raw data: GDP, population and manufacturing share from National Accounts, Manufacturing statistics (10+) from the database of the Central Statistical Office (CSO) and Census of Industrial Production, various issues. Manufacturing data have been deflated using Index Numbers of Wholesale Prices 1966=100. See Annex Tables I.1 and I.2.

Equality is used to estimate the contribution of the manufacturing sector to the growth of the total economy (Timmer, 2000). The GDP in the total economy (Y) is generated in the manufacturing sector (m), and the non-manufacturing sector (nm). For any given period, the growth per year of the total economy (∂Y) can be decomposed into the growth of the manufacturing sector (∂Y_m) and growth of the non-manufacturing sector (∂Y_{nm}), each weighted by their share in the total economy GDP (S_m and S_{nm}) at the beginning of the period, i.e. $\partial Y = S_m \partial Y_m + S_{nm} \partial Y_{nm}$.

3. Productivity Trends in Zambian Manufacturing

In this section, the results of the real output and productivity analysis of manufacturing (10+) in Zambia in national currency are briefly presented, based on data for establishments with ten or more persons employed. A growth accounting framework (Solow, 1957; Ghura, 1997; Timmer, 2000) is used to compute the growth and productivity levels. For the capital stock estimates, three types of assets were distinguished: buildings, machinery and equipment, and vehicles and other fixed assets. Data on investment flows for the three types of assets were obtained from the census records as far back 1941 as (see Annex Table I.3). We assumed life times of 30 years for buildings, 10 years for machinery and 5 years for vehicles and other fixed assets. The need to meet the requirements of a fully-fledged

perpetual inventory method (Goldsmith, 1955; Ward, 1976) meant that the capital stock estimates and total factor productivity estimates could only be estimated for the period between 1970 and 1998.

Since information on rental prices of the different capital assets (see Jorgenson *et al.* 1987) was not available, we relied on the stock measures. It was assumed that annual capital services, the input of capital into production, were proportional to the aggregate capital stock. Current values of value added at factor cost were deflated to constant values at 1990 prices (1990 being our base year) using producer' price deflators from the Zambian Central Statistical Office's national accounts. Labour input was obtained from census data on employment in thirteen branches of manufacturing.[8] TFP growth is defined as the difference between value added growth and the weighted growth of factor inputs. TFP is calculated using a translog function. Annual sectoral factor shares were used to weight capital and labour growth. These are averages of shares in year t and t-1.

Table 2 presents the mixed fortunes of labour productivity growth in Zambian manufacturing. Zambian productivity rose quite significantly soon after independence in 1964. It reached a peak in 1972 and levelled off after this year (except for a deep in 1975). From 1979 to 1995 productivity declined very substantially, followed by some recovery after 1995.[9] During the period 1964-74, Zambian productivity growth averaged 3.1 percent per year. This was followed by a real decline in productivity (-0.2 percent per year between 1974 and 1982, -1.5 percent per year between 1982 and 1991). This was followed by a further decline between 1991 and 1995 (-16.0 percent per year). After 1995 the decline eased off and manufacturing productivity increased by an average rate 11.3 percent from 1995 to 1998. However, since this improvement in manufacturing productivity is recent, its effect on growth remains largely prospective.

A breakdown of labour productivity trends by branch between 1964 and 1998 indicates that growth was highest in textiles and wearing apparel. Other branches with net gains over the whole period were food manufacturing and wood products. All other branches showed absolute declines relative to 1964 levels, most markedly in chemicals, non-metallic minerals and paper products. Branches with higher initial levels of absolute labour productivity (such as machinery, chemicals and non-metallic minerals) had a clear tendency to stagnate over time. The relationship is especially marked after 1980. Higher levels of productivity in 1980 are negatively correlated with productivity growth, 1980-98. For the whole period the growth rate of the real GDP manufacturing per person engaged in manufacturing is -0.4 percent per year (1964-98). In 1998, labour productivity stood at 86.5 percent of its 1964 level and 57.9 percent of its 1972 level.

[8] The fifteen branches of Manufacturing distinguished in the ICOP project consist of one or more ISIC three-digit major sectors. In three instances – i.e. wood products, paper products and non-metallic mineral products – a branch coincides with a two-digit ISIC division. For the time series food, beverages and tobacco have been combined into a single branch food manufacturing.

[9] There is a sharp upward jump in employment from 1984 to 1985 (Annex table I.2). As the number of firms in Zambia is small the entry of a few firms can make a major differences to employment and output. If the jump were due to changes in coverage of the statistics, the effect on productivity is mitigated by the simultaneous jump in the output figures (Annex table 1.1).

Table 2

Labour Productivity Levels by Manufacturing Branch, 1964-98 (1990=100)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1964	86.9	34.4	69.7	195.5	122.9	107.8	138.0	42.0	90.0	120.4	32.6	28.1	161.5	82.9
1965	69.4	30.4	64.2	95.1	105.8	101.0	92.3	49.1	110.6	121.2	83.5	38.8	153.4	78.7
1966	73.3	24.9	59.2	157.8	144.6	105.4	80.3	30.7	88.2	128.4	64.8	45.5	113.4	78.1
1967	72.9	34.6	88.4	160.0	152.4	146.3	129.1	44.4	100.4	144.6	99.0	37.9	125.8	93.0
1968	62.7	41.5	78.7	124.5	186.1	224.2	159.3	73.5	127.8	224.4	99.2	46.2	91.5	111.4
1969	67.9	55.5	111.7	77.8	157.1	109.7	149.4	137.4	131.9	197.2	137.8	94.2	144.0	106.4
1970	72.8	35.0	127.1	65.1	141.8	142.5	96.6	98.4	134.5	187.3	142.5	76.0	131.4	101.9
1971	83.1	42.4	121.1	69.7	138.8	147.3	108.8	134.2	138.7	170.5	118.9	88.5	141.6	108.1
1972	87.3	49.7	143.7	120.8	127.9	195.2	174.2	123.2	175.1	155.9	147.6	113.0	124.8	123.8
1973	75.9	63.6	116.8	129.4	163.1	175.8	180.3	130.5	152.9	157.0	151.9	97.2	151.2	120.5
1974	60.4	59.1	117.2	145.5	188.7	168.4	153.8	97.2	173.6	149.0	156.3	118.8	148.0	113.1
1975	50.7	52.8	93.5	122.2	151.8	130.0	168.7	91.4	162.4	112.6	194.3	72.2	138.4	101.4
1976	81.9	97.4	131.6	148.8	193.4	137.0	231.6	117.3	101.1	69.0	219.4	110.3	167.2	120.9
1977	80.7	103.1	130.4	132.8	223.9	137.1	220.6	93.0	88.7	75.9	170.3	96.9	153.9	118.4
1978	81.7	104.3	133.4	155.6	214.2	158.8	219.9	89.7	116.0	89.3	157.9	96.7	148.4	125.7
1979	86.4	140.9	137.1	162.8	276.9	133.7	240.7	103.0	105.3	95.3	128.1	59.4	128.0	126.4
1980	52.9	124.1	127.0	133.6	229.1	98.0	169.4	75.4	139.5	85.5	128.2	62.3	207.9	97.9
1981	103.9	126.2	69.9	139.0	179.3	76.8	128.6	63.0	152.2	125.1	136.4	67.3	206.7	110.0
1982	110.8	133.2	72.1	113.8	158.7	63.1	99.3	46.6	145.5	157.0	149.3	74.7	186.3	111.4
1983	113.7	104.7	58.6	140.8	163.5	54.9	90.8	50.2	168.1	112.4	153.7	78.4	157.5	104.7
1984	118.7	96.3	56.7	80.7	149.2	51.2	38.1	37.6	75.6	177.9	125.7	83.0	262.3	97.7
1985	69.4	74.7	48.4	83.7	132.7	50.2	61.2	61.1	130.8	165.9	141.4	82.3	135.5	85.7
1986	72.3	62.7	44.2	67.1	128.3	63.0	61.5	61.4	102.5	189.9	145.3	108.2	138.4	88.6
1987	77.4	65.8	50.6	68.4	112.5	96.7	59.1	59.0	19.5	143.5	196.4	134.3	137.2	86.1
1988	87.6	67.1	56.3	68.4	105.0	103.3	56.9	56.9	63.4	144.4	188.7	131.2	137.5	91.7
1989	92.0	72.5	72.6	79.9	115.2	105.7	74.1	80.5	91.6	90.0	168.3	116.9	128.2	91.9
1990	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1991	115.5	61.6	63.0	124.6	115.4	92.2	86.0	50.2	44.3	128.5	94.7	99.5	111.3	97.0
1992	103.0	84.3	88.4	124.9	115.7	104.0	25.3	13.9	36.3	167.5	122.5	123.2	102.4	92.6
1993	59.9	56.6	61.2	119.6	105.8	46.5	106.2	57.6	21.4	76.9	77.4	72.9	54.9	68.4
1994	50.0	47.3	53.2	109.9	113.6	23.8	80.7	44.0	15.3	136.5	72.5	63.7	74.8	64.1
1995	71.1	51.7	66.9	115.0	119.0	16.0	25.8	14.2	13.9	79.5	31.0	15.9	38.1	51.1
1996	89.6	70.2	92.0	120.0	123.4	18.0	38.9	21.7	15.8	77.6	31.5	16.0	43.2	61.5
1997	95.0	89.7	95.7	124.3	130.1	24.9	36.7	20.9	11.8	98.2	30.8	15.1	40.2	67.0
1998	107.1	98.0	125.7	132.9	139.4	28.4	28.7	19.6	14.7	107.3	32.5	15.3	51.2	71.7

Note: Food includes beverages and tobacco, pap stands for paper, printing and publishing, rub stands for rubber and plastic products, mine stands for non-metallic mineral products, met stands for basic and fabricated metal products, mach stands for machinery and transport equipment, oth stands for other manufacturing products (& precision). See Annex Table V.1 for full Branch names.
Sources: Annex Tables I.1 and I.2.

Table 3 gives estimated rates of growth of output, input and TFP in manufacturing for five sub-periods, as well as their contributions to growth in percentage points. The average annual growth rate of TFP from 1970 to 1998 was –0.1 percent. A closer look at the sub-periods reveals striking differences. TFP growth was positive from 1970 till 1991, reaching a respectable 3.5 percent per year from 1982 to 1991. Between 1991 and 1995 TFP collapsed, declining by no less than 17.3 percent per year. This was followed by an equally sudden upturn after 1995. While labour and capital inputs continued to shrink between 1995 and 1998 (at –8.4 percent per year and -1.6 percent per year respectively), TFP improved by 7.4 percent per year.

At branch level (see Annex Table I.7) there is considerable variation in productivity performance. In branches such as food products, textiles, leather products, and other manufacturing, the average annual growth in TFP was positive from 1970-1998, ranging from 3.6 to 9.0 percent. On the other hand, branches like rubber and plastic products, paper products, and non-metallic mineral products had extremely weak productivity performance. In these branches, growth in TFP was between –5.2 and –9.5 percent per year.

Growth in value added was highest in the first sub-period, 1970-74, primarily driven by rapid growth of capital. There was a minor positive contribution of TFP. After 1974, the capital stock started to decline, pointing to a process of net disinvestment in manufacturing that continued all the way up to 1998. Output growth was nil from 1974-82, sluggishly positive between 1982 and 1991, primarily due to improved total factor productivity. Between, 1991 and 1995 manufacturing output literally collapsed, shrinking at 23.6 percent per year, with negative contributions of labour, capital, as well as TFP.

Table 3.

Growth of Factor Inputs, Value Added and TFP, 1970-98

Sub-period	Average growth rates and contributions to growth						
	Value added	Labour		Capital		TFP	
		growth	*contrib.*	*growth*	*contrib.*	*growth*	*contrib.*
1970-74	9.5	6.9	2.8	8.5	5.1	1.6	1.6
1974-82	0.0	0.2	0.1	-1.0	-0.6	0.9	0.5
1982-91	2.0	3.5	1.4	-4.2	-2.6	3.5	3.2
1991-95	-23.6	-7.6	-3.2	-5.5	-3.2	-17.3	-17.2
1995-98	2.9	-8.4	-3.5	-1.6	-0.9	7.4	7.4
1970-98	-1.1	0.2	0.1	-1.4	-0.8	-0.1	-0.3

Note: Contribution refers percentage points of value added growth accounted for by growth of labour, capital or TFP.
Sources: Annex Tables I.1, I.2, I.5, I.6 and I.7.

The very slow growth of TFP between 1970 and 1982 would seem to be related to the rapid accumulation of capital in the post-independence period. The efficiency of new investment was low and the manufacturing sector had considerable difficulties in assimilating new technologies embodied in imported new equipment.[10] Conversely, TFP growth accelerated in 1982-91, when growth of capital was negative, capital intensity declined and existing resources were used more intensively. 1991-95 was a transitional period of great uncertainty, company closures, declines in rates of utilisation and liquidations and changes in ownership. It was also a period of labour retrenchment. It is not impossible that closures resulted in premature scrapping of capital. We have not been able to quantify this. If this were the case, the contraction of the capital stock would have been even more rapid, while the negative contribution of TFP would have been somewhat less high. Between 1995 and 1998, most manufacturing units earmarked for privatisation had been privatised. Although the decline in labour and capital input continued, output started growing again. As the surviving enterprises, especially the privatised ones, adopted and implemented programmes directed towards improving the efficiency of

[10] On an annual basis, TFP growth was highly negative in 1973, 74, 75, 76 though this does not show in the period averages in Table 4-5.

labour and capital, TFP also started growing again. Taken over the whole period, output declined by 1.1 percent per year.

4. Methodology for the 1990 Level Comparison

International comparisons face two major challenges. Firstly, they require adequate conversion factors to express the value of each country's output (i.e. gross output or value added) in the currency of the other country. Secondly, the use consistent sources and the application of consistent concepts in obtaining the basic figures for employment and output is an important challenge. Comparisons at official exchange rate do not necessarily reflect the purchasing power parities of the currencies involved and may considerably underestimate the levels of national income and product of these countries. Exchange rates fluctuate tremendously from year to year. They are highly sensitive to the national policy measures and to the capital flows. In addition to the above, exchange rates, by and large, reflect the purchasing power of currencies in terms of internationally traded goods and services, neglecting nontradables.

Purchasing power parities (PPPs) are more realistic converters than exchange rates. There are two main approaches to the derivation of purchasing power parities - the expenditure and the industry-of-origin approaches. In the expenditure approach, a common set of international expenditure price weights is used to price a standard set of final goods and services in different countries in the comparison of economic welfare. The expenditure based PPPs are, therefore, useful for the analysis of macro-economic performance and the comparison of standards of living between two or more countries. Expenditure based PPPs are, however, not suitable for sectoral analysis of an economy because they refer only to final goods and services, irrespective of the sectoral content of these final goods and services (Szirmai and Pilat, 1990; and Timmer, 1998).

The industry-of-origin approach, on the other hand, uses the output value at producer prices together with output quantities in order to derive unit value ratios (UVRs). Output quantities are then priced at common sets of unit values in order to make real output comparisons between countries (Maddison and van Ark, 1988; Szirmai and Pilat, 1990; van Ark, 1993). The industry-of-origin UVRs are, therefore, preferred to the expenditure based PPPs for the purpose of comparisons by branch of manufacturing sectors of an economy. The industry-of-origin methodology used in this study has been described in several publications of the ICOP project (see e.g. van Ark, 1993; Maddison and van Ark, 1988, 1994; Szirmai and Pilat, 1990; and Timmer, 1996, 1998). Here, only a brief outline of methods used is provided.

The primary sources used for industry-of-origin manufacturing comparisons are industrial censuses. These sources provide information on product quantities and corresponding gross output values, making it possible to derive unit values for products or product groups for sectors of manufacturing for both economies.

The basic approach is to make matches of comparable products or groups of products from the two censuses and to calculate unit value ratios for each of the matches. The matches of broadly defined products are made in sample industries. These sample industries are made out of comparable industries selected from the US census and the Zambian quarterly returns. For Zambia, the information on commodity quantity and output value for the 1990 Zambian Quarterly Returns of Industrial Production is only available in unpublished form. This information was rearranged into one or more ISIC four-digit industries (1968 version, see UN, 1968) and combined with one or more ISIC four-digit industries from the US census (1990 version, see UN, 1990).

The unit values are used to calculate UVRs in a number of steps. The basic assumption is that the UVRs found for the matched sample industries equal UVRs of entire industry.

(a) The initial unit value ratios for commodity matches combine 1990 Zambian unit values with 1987 US unit value because no census data are available for 1990 for the USA.

(b) In order to put the resulting UVRs on a 1990 basis, the US 1987-1990 price movements for each product group (US Bureau of Labour Statistics, 1998) are used for each product group. The 1990/1990 unit value ratios then obtained are used in subsequent calculations.

(c) The unit value ratios for comparable products in the two countries are aggregated into UVRs at sample industry level using the output quantities of each country as weights.

$$UVR_j^{XU(X)} = \frac{\sum_{i=1}^{s}(Q_{ij}^X * P_{ij}^X)}{\sum_{i=1}^{s}(Q_{ij}^X * P_{ij}^U)} \qquad UVR_j^{XU(U)} = \frac{\sum_{i=1}^{s}(Q_{ij}^U * P_{ij}^X)}{\sum_{i=1}^{s}(Q_{ij}^U * P_{ij}^U)} \qquad (1)$$

where

$UVR_j^{XU(X)}$ is the unit value ratios of the Zambian Kwacha against the US dollar in sample industry j, at quantity weights for Zambia;

$UVR_j^{XU(U)}$ is the unit value ratios of the Zambian Kwacha against the US dollar in sample industry j, at quantity weights for the USA;

P_{ij} is the price of item i in sample industry j;

Q_{ij} is the quantity of item i in sample industry j;

$i=1.....s$ is the sample of matched items.

(d) The sample industry UVRs are aggregated at manufacturing branch level (as in food manufacturing) by taking their weighted average, using 1990 gross output values as weights.[11]

$$UVR_k^{XU(X)} = \frac{\sum_{j=1}^{o} GO_j^{X(X)}}{\sum_{j=1}^{o} [GO_j^{X(X)} / UVR_j^{XU(X)}]} \qquad UVR_k^{XU(U)} = \frac{\sum_{j=1}^{o} [GO_j^{U(U)} * UVR_j^{XU(U)}]}{\sum_{j=1}^{o} GO_j^{U(U)}} \quad (2)$$

where

$GO_j^{X(X)}$ is gross output value in Zambian sample industry j in Zambian Kwacha;

$GO_j^{U(U)}$ is gross output value in US sample industry j in dollars;

k is a branch of industry;

$j=1.....o$ represents the sample industries belonging to branch k.

(e) The UVR for total manufacturing can be calculated as a weighted average of the branch UVRs using branch gross output weights according to equation (2).[12]

Throughout all these steps the weighting procedures ensure that unit value ratios in large sample industries and branches receive heavier weights than those in small ones (van Ark, 1993).

(f) At each level of aggregation, say sample industry, branch or total manufacturing, the UVRs derived can be used to transform value added into the currency of the other country in order to calculate the real value added relatives. So far, the real output ratios obtained refer to the gross value of the output. In theory, it would be preferable to calculate UVRs for both inputs and outputs, thus achieving double deflated value added in international comparisons. In practice, detailed information on quantities and values of inputs is seldom available. Therefore, ICOP studies have generally applied output UVRs to value added.

[11] The reliability of the estimated branch UVRs is affected by the extent of coverage of the products and the degree of variability of unit value ratios within a given sample industry. There are, however, instances of low sample industry coverage and high variance of price relatives that create biases and variance in the estimation of the indices. Should the reliability of the UVR (defined as the ratio of its standard deviation and its mean) for a given sample industry be too low, we use – following Timmer (1996) – the summed gross value of output of the matched items within the sample industry as the sample industry weight in equation (2), rather than the sample industry's gross output.

[12] However, if the branch UVR's reliability is too low, we use the sum of gross output of the sample industries in the branch as branch weight for step (e), instead of the branch gross output.

In binary comparisons, one gets two UVRs at every level of aggregation, one at quantity weights of country A, the other at quantity weights of country B. In the case of the Zambia/USA comparison, it is clear that the two UVRs will differ substantially as the production structures are very different. We use the Fisher geometric average of the two UVRs as a summary measure.

This benchmark analysis is subsequently integrated with the real labour productivity and total factor productivity time series for the manufacturing sectors of both countries to allow interspacial productivity performance comparisons from 1964 to 1998 as well. This is achieved by extrapolating with national accounts time series of gross value added, the number of persons engaged and capital stock.

5. Data Sources for the Bench Mark Comparison

The branch UVRs derived from matched samples of products from industrial censuses, can be applied to convert value added figures for branches derived either from industrial censuses or from national accounts. The comparisons in this paper are based on census data. The data sources for Zambia and the USA are discussed in this section. Special attention is also paid to the difficulties encountered with some data from Zambia and how some of these data limitations have been overcome.

1990 was chosen as the benchmark year for two main reasons. It was a relatively normal business year in Zambia and was used as a base year in national statistical data. Moreover, after 1990 the response to the census surveys by manufacturing establishments greatly declined as the pace of economic liberalisation accelerated.

5.1 Zambia

The principal sources of Zambian data in our study are the *1990 Census of Industrial Production* and unpublished data files underlying the *Quarterly Returns of Industrial Production* for 1990.

The *Zambian Census of Industrial Production* is, in principle, held every year in the second quarter of the year. It covers all manufacturing establishments in the country with 10 or more employees. The census data are collected on a calendar year basis with few exceptions where data supplied is on a financial year basis. The financial year runs from 1st April to 31st March. Employment figures refer to the total number of persons employed on the last pay-day or last working day of the year. The Census classifies industries and branches of industry according to the 1968 United Nations International Standard Industrial Classification (ISIC). Each industry is basically defined in terms of its principal product(s) or service(s). The census report provides information on major characteristics of

industries at two, three and four-digit ISIC levels. It does not list products or groups of products per se, and shows fewer details than the US census.

Our second source is the *Zambian Quarterly Returns of Industrial Production.* This is held every quarter of the year and covers a representative sample of 50 plus enterprises. The product class estimates in the *1990 Zambian Quarterly Returns of Industrial Production* are based on reports from a sample of about 290 manufacturing establishments, representing about 79 percent of the total gross value output of 10 plus enterprises.

5.1.1 Product Listing

In part eight of the census survey questionnaire, establishments are requested to supply information on goods produced. This information includes a description of at most eight principal products, their units of measurement, quantities produced and their values at producer's prices. Product information is normally not published in the census report. Examination of the original census questionnaire forms revealed that most establishments had not provided the required information on their products.

Detailed information on individual products, their quantities and their output values was obtained from the unpublished establishment data files of the *1990 Zambian Quarterly Returns of Industrial Production*. In using unit values derived from the quarterly returns data, we assumed that they were representative for unit values for all establishments included in the census. Where possible, this assumption was checked and was found to be justified. Where unit values could be calculated from the census survey questionnaires, they were generally consistent with unit values calculated from the Quarterly Returns. Therefore, we felt justified in using the Zambia/US UVRs derived from the quarterly surveys on the Zambian side, to convert total value added and output in the benchmark comparisons.

The *1990 Zambian Quarterly Returns of Industrial Production* data files are organised on an establishment basis. They include data on about 290 manufacturing establishments. The results are published in such a way that the actual establishments cannot be identified. The information requested from manufacturing establishments is basically limited to employment, sales and production. The data files provide information on employment and payroll, and on production and sales for the four major products, during the quarter. The information on products includes a rough product description, units of measurement, quantities of output produced, the quantities and values of sales at producers' prices, and maximum quarterly production capacity. To obtain the value of output, production quantities were multiplied by the corresponding unit value derived from the sales data.

The product information was rearranged into one or more ISIC four-digit industries (1968 version, see UN, 1968) and combined with one or more ISIC four-digit industries from the US census (1990 version, see UN, 1990). The 1968 ISIC version was used as our working version in this study.

Some products were reclassified to different ISIC categories in our listing because they were being produced as a secondary product by an establishment in another ISIC category.

Prior to using the unpublished quarterly returns product data, they were subjected to an extensive data screening process, involving a careful check of the raw data and of the unit value ranges of all product items. It turned out that the product lists are not always consistent from one year to another. The description of items is often vague and provides insufficient details for the matching with US products. The information on product quantity is often in terms of numbers with no specification of size, weight or quality. In some cases unconventional specifications (such as 'dozens of glycerine') are used. Comparison of establishment unit values for the same products revealed that sometimes values and quantities were expressed in the wrong units (Kwacha instead of thousands of Kwacha, in tons instead of kilograms). To improve the data, establishment data from the quarterly returns for 1990 were compared with those from other years, and where possible with census data as well. For some products, visits to local markets or producers were undertaken to improve on product descriptions. Consistency of data items was also checked by checking entered data against quarterly returns questionnaires and against census questionnaires (where such product details were available in the census questionnaires).

There were a few instances of establishments where quantities of output were available, but where unit values could not be calculated, because either the value of sales or the quantity of products sold was missing. In such instances, we used the average unit values of the same products produced by other establishments in the same industry, to compute the product gross value of output. If there was only one establishment in an industry, this establishment was eliminated in case of incomplete information. Other cases where establishments were eliminated from the study were instances of implausible fluctuations in gross output value from one quarter to another, unless it was possible to check these fluctuations back with the establishments concerned. Some entries were simply dropped because they were considered to contain erroneous or imputed data.

Quarterly output quantities of individual products and their output values were summed up to obtain annual output quantities and output values. First, annual product values per establishment were obtained by summing quarterly gross output values at current prices. Next, annual quantities and output values of establishments were summed, to get quantities and values per product.

In cases of establishments reporting production quantities for less than four quarters, further clarifications were also sought from the quarterly survey questionnaire forms and CSO on the production pattern of such establishments. The last part of the quarterly survey questionnaire the CSO specifically requests establishments to provide reasons for major changes in production from one quarter to another. Instances of major machine breakdowns, lack of raw materials, lack of foreign exchange were often attributed to lack of production in a given quarter - reasons that are acceptable to CSO. In such a quarter no sales or production were usually reported. Therefore, establishments that reported sales for less than four quarters and gave reasons for major changes in production from one

quarter to another had their annual sales and production computed on the basis of reported quarterly sales and production.

In some cases CSO contacted the original establishments for clarifications with regards to the units and descriptions of products that were used in the survey questionnaires. Where available, additional product information from the census questionnaires was also used to improve product descriptions in the quarterly returns data. This process of checking and cross-checking both with the census data and with information from outside the census resulted in a highly improved and realistic listing of products, their values, quantities and unit values. From the establishment data files a list of 558 products and product groups was constructed using information from all four quarters of the year.

5.2.2 Employment, Gross Output and Value Added

The data on gross output value, value added, employment and numbers of establishments by industry are derived from the *1990 Census of Industrial Production*. The output data refers to gross value of output at producers' price and includes indirect taxes and subsidies, while the US census data is at factor cost.

For the comparison between the Zambian census and the US census, the gross value of output in the Zambian census was adjusted to factor cost by excluding indirect taxes and subsidies. Since the gross value of output in the Zambian product listings also included indirect taxes and subsidies, the unit value ratios of the sample industries were also adjusted using sample industry proportions to exclude the effects of indirect taxes and subsidies. The Zambia census does not list the indirect taxes and subsidies separately, but it provides at four-digit industry level what is referred to as net indirect taxes. These are indirect taxes less subsidies.

With the help of more detailed information taken from the *1990 Zambian Census of Industrial Production*, it was possible to calculate a "US census concept" of value added (column 4 in Table 4). (The US Census value added is defined as the gross value of output at factor cost minus all intermediate inputs, except intermediate service inputs from outside the industrial sector. These service inputs include: bank charges and insurance costs, transport costs, communication services and cost accountancy, management and other professional services.)
The basic data for Zambia on gross output, gross value-added and employment are presented in Table 4. Employment figures per industry in the Zambian census include all persons who work under the control of the establishment and receive pay (including owners and members of the owners' family if paid a definite wage or salary). They also include salaried managers and directors of incorporated enterprises, except when paid solely for their attendance at board meetings. Employment figures refer to the total number of persons employed on the last pay-day or last working day of the year.

Table 4 also gives the level of productivity in national currency. Food, beverages, tobacco and textiles products account for 51 percent of the total manufacturing value added and 47 percent of manufacturing employment. The combined productivity of food, beverages, tobacco and textiles products is above that of total manufacturing (ZK 225,271 per person). The Zambian manufacturing sector has 434 manufacturing establishments with an average number of 178 employees per establishment.

Table 4

Basic Data on Output, Employment and Productivity for Zambia, 1990 (Establishments with 10 or more persons engaged)

	Number of Establish-ments (1)	Gross Value of Output at factor cost (mill. ZK) (2)	Gross Value Added at factor cost (National Accounts concept) (mill. ZK) (3)	Gross Value Added at factor cost (US Census concept) (a) (mill. ZK) (4)	Gross Value Added in Branch as % of Total (5)	Employment (b) (persons) (6)	Employment Share in Branch as % of Total (7)	Gross value added per person employed (US Census concept) (ZK per person) (8)
1 Food Manufacturing (311/12)	105	8,510.8	3,397.3	3,995.2	23.00	21,213	27.51	188,337
2 Beverages (313)	15	2,031.7	162.4	1,267.4	7.30	3,926	5.09	322,816
3 Tobacco Products (314)	3	2,072.0	1,534.7	1,648.2	9.49	1,282	1.66	1,285,615
4 Textile Mill Products (321)	31	3,459.5	1,677.5	1,867.4	10.75	9,451	12.26	197,585
5 Wearing Apparel (322)	34	817.1	265.6	275.4	1.59	4,188	5.43	65,769
6 Leather Products and Footwear (323/324)	4	52.2	36.6	38.2	0.22	1,260	1.63	30,278
7 Wood Products, Furniture & Fixtures (331/2)	24	827.1	432.8	444.4	2.56	6,576	8.53	67,574
8 Paper Products, Printing & Publishing (341/2)	35	1,948.6	1,025.4	1,127.0	6.49	4,700	6.10	239,778
9 Chemicals Products (351-53)	38	6,699.2	1,883.2	2,019.4	11.63	6,208	8.05	325,286
10 Rubber and Plastic Products (355/6)	17	1,197.9	475.4	643.9	3.71	2,331	3.02	276,249
11 Non-metallic Mineral Products (361-69)	17	2,247.0	693.0	1,213.0	6.98	3,584	4.65	338,448
12 Basic & Fabricated Metal Products (371-81)	74	2,854.6	1,505.1	1,601.9	9.22	8,093	10.50	197,936
13 Machinery & Transport Equipment (382/4)	17	804.5	442.6	462.1	2.66	2,365	3.07	195,411
14 Electrical Machinery & Equipment (383)	12	1,480.8	699.2	708.8	4.08	1,540	2.00	460,244
15 Other Manufacturing Industries (385-90)	8	106.7	54.2	56.3	0.32	383	0.50	146,930
Total Manufacturing	434	35,109.6	14,285.0	17,368.4	100.00	77,100	100.00	225,271

Source for raw data: The 1990 Zambia Census of Industrial Production, tables 1, 6 and 7.
Notes:
(a) The gross value added for Zambia in table 5-1 is according to the US Census concept of value added at factor cost. The US Census value added is defined as the Gross value of output at factor cost minus all intermediate inputs, except intermediate service inputs from outside the industrial sector. These include: bank charges and insurance costs, transport costs, communication services and cost accountancy, management and other professional services (codes 408-411 from questionnaire).
(b) Total number of employees has been adjusted to include working proprietors and family workers obtained from National Accounts Statistical Bulletin No. 5 and the CSO unpublished report of Labour Trends from 1964 to 1998.

5.2 The USA

In the case of the USA, the *1987 and 1992 Censuses of Manufactures* (US Department of Commerce, 1990 and 1996) together with the *1990 Annual Survey of Manufactures* (US Department of Commerce, 1991) form the primary sources of data. The US Census of Manufactures is carried out on a quinquennial basis and gives detailed and comprehensive tabulation of economic activity in the manufacturing sector. The Annual Survey of Manufactures, on the other hand, is conducted in intervening years using a probability-based sample drawn from the census panel. The 1987 Census of Manufactures categorizes approximately 11,000 products according to the Standard

Industrial Classification. For most products, the 1987 US census provides both the quantity and value information.

The matching of products from sample industries are based on the 1987 census. The resulting 1990/1987 UVRs are put on a 1990/1990 basis by dividing them by a 1987/1990 US price ratio for each product category from the Bureau of Labour Statistics (1998). In the subsequent calculations the 1990/1990 UVRs are used.

The *1990 Annual Survey of Manufactures* provides data on gross value of output, gross value added and employment by industry, in 1990. The product class estimates in the *Annual Survey of Manufactures* are based on reports from a representative sample of about 55,000 manufacturing establishments. The total manufacturing establishments with one or more paid employees is about 380,000. Since the Zambian census refers to establishments with 10 or more persons engaged, the US data requires adjustment to 10 plus basis. For this, we used proportions of 10 plus to gross output, gross value added and employment figures from the general summary of the 1992 census to adjust the US data to a 10 plus basis (tables 1-1b and 1-4 of the General Summary of the 1992 Census of Manufactures). Capital stock was not adjusted to a 10+ basis. An adjustment based on a constant capital output ratio would underestimate US capital intensity, as most small firms are far less capital intensive than larger ones. The absence of an adjustment means that US capital intensity is slightly overstated. In the US census employment figures per industry exclude head office and auxiliary employment. US employment figures at branch level can, however, be readjusted to include head office and auxiliary employment using figures from the General Summary of the 1992 census.

The basic data for the USA are summarised in Table 5. In contrast to the Zambian manufacturing sector, the value added share of the 'traditional industries' (food, beverage, tobacco and textiles) is only 15 percent with an employment share of 13 percent. In the USA these branches combined have a productivity level 14 percent above that of total manufacturing (in Zambia this relative standing is at 9 percent above total manufacturing). An average US establishment has only about 90 employees, representing 50.5 percent of the Zambian average employment per establishment.

Table 5

Basic Data on Output, Employment and Productivity for the United States, 1990 (Establishments with 10 or more persons engaged) (a)

		Annual Survey of Manufactures					
	Number of Establish-ments	Gross Value of Output	Gross Value Added	Gross Value Added in Branch as % of Total	Employment	Employment Share in Branch as % of Total	GVA / Person
	(a)	(b) (mill. US$)	(b) (mill. US$)		(c) (persons)		(US$ per person)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 Food Manufacturing	10,917	327,050	114,400	9.26	1,298,331	8.23	88,113.2
2 Beverages	1,228	51,386	24,605	1.99	143,262	0.91	171,750.5
3 Tobacco Products	83	29,904	22,556	1.83	40,792	0.26	552,952.5
4 Textile Mill Products	3,932	65,379	26,298	2.13	625,625	3.96	42,034.9
5 Wearing Apparel	11,999	51,025	26,218	2.12	781,986	4.96	33,527.6
6 Leather Products and Footwear	1,037	9,624	4,473	0.36	113,568	0.72	39,389.0
7 Wood Products, Furniture & Fixtures	17,783	106,847	46,414	3.76	1,077,411	6.83	43,079.2
8 Paper Products, Printing & Publishing	26,671	277,022	155,961	12.62	2,009,032	12.73	77,630.0
9 Chemicals, incl. petrol. refining	7,947	453,492	176,982	14.32	941,947	5.97	187,889.6
10 Rubber and Plastic Products	10,518	99,486	48,966	3.96	850,715	5.39	57,558.9
11 Non-metallic Mineral Products	7,882	59,692	32,322	2.62	477,498	3.03	67,690.9
12 Basic & Fabricated Metal Products	24,686	293,631	125,360	10.14	1,980,307	12.55	63,303.4
13 Machinery & Transport Equipment	29,318	614,146	273,212	22.11	3,517,572	22.29	77,670.6
14 Electrical Machinery & Equipment	9,999	108,561	60,038	4.86	673,768	4.27	89,108.0
15 Other Manufacturing Industries	11,772	153,899	97,894	7.92	1,249,410	7.92	78,352.2
Total Manufacturing (incl. oil refining)	175,772.0	2,701,143.8	1,235,701.1	100.00	15,781,224	100.00	78,302.0

Source for raw data: U.S. Department of Commerce, Bureau of the Census, Annual Survey of Manufactures, 1991.
Notes:
(a) The number of establishments with 10 or more persons engaged is based on the 1992 Census of Manufactures, General Summary, table 1-4 and table 4 from the 1992 Beverages Industry Series.
(b) Ratio of 10 plus to total was obtained from 1992 Census of Manufactures, General Summary, table 1-4 and for Beverages branch from 1992 Beverages Industry Series, table 4. We applied the ratio of 10 plus employment from the 1992 Census of Manufactures (table 1-4 in the General Summary and table 4 in the Beverages Industry Series to 1990 data on gross output, value added and employment). In case of employment we assume that all Head Office and auxiliary employment can be found in establishments with ten or more persons engaged.
(c) including head office and auxiliary employment.

5.3 Summary of Conceptual and Data Problems

This section summarises the conceptual problems and data adjustments involved in the comparison between the Zambian census and the US census.

1. Adjustment of Zambian data to US census concept of value added

The US census concept of gross value added does not deduct the cost of services received from outside the manufacturing sector. The Zambian census value added has been adjusted to include the cost of non-industrial services received. After this adjustment and the adjustment for indirect taxes and subsidies under (3), the two value added concepts are consistent.

2. Adjustment of 1987/1990 UVRs to a 1990/1990 basis

The original unit value ratios are calculated using the 1987 US census data and the 1990 Zambian census and survey data. To put them onto a 1990-1990 basis, 1987-1990 US producer price indices are used to adjust each product UVR. Price indices by product category for the USA were obtained from the US Bureau of Labour Statistics (1998).

3. Adjustment of Zambian data to factor cost

The gross value of output in the Zambian product listing includes indirect taxes and subsidies, while the US product listing is at factor cost. This means that the unadjusted UVRs are biased upwards. The Zambian census, however, provides information on indirect taxes and subsidies at four-digit industry level. Using the sample industry proportions, sample industry UVRs have been readjusted in order to exclude the effects of indirect taxes and subsidies.

4. Adjustment of coverage of US data to 10+ establishments

The Zambian census data used in this study cover all establishments with ten or more persons engaged. The US employment and output data for 1990 have been adjusted to a ten plus basis, using proportions from the 1992 census. US employment figures at branch level have been readjusted to include head office and auxiliary employment using figures from the General Summary of the (1992) census. After these adjustments the employment concepts are consistent. As explained in the previous paragraph, the US capital stock has not been adjusted to a 10+ basis. Therefore, comparative Zambian capital intensity will be slightly understated.

5. Lack of data on small scale and informal sector

The Zambian census data do not include the small scale and informal sector. In most developing economies the small scale and informal sector is typically more labour intensive than the formal sector and its inclusion would most likely lower the productivity of the total Zambian manufacturing. However, given high levels of overmanning in the Zambian formal sector, one cannot be certain whether inclusion of the small-scale informal sector would substantially lower the comparative productivity level of total Zambian manufacturing.

6. The quality issue

The quality issue is important in comparing products between a developing and an advanced economy. The quality of both more homogeneous intermediate products (such as basic chemicals) and consumer goods in Zambia is generally lower than that in the USA. Where possible we have tried to account for quality differences by matching the Zambian products with the lower quality segments of the US product listing. However, usually the Zambian product descriptions did not always allow for such adjustments. Often, a few roughly described Zambian products had to be matched with a cluster containing large numbers of specific US products. For example, in the grain milling industry, 26 kinds of US prepared feeds were matched with one type of Zambian stock feed. We may safely assume, therefore, that the UVRs are biased downwards. Conversely, this implies that the productivity comparisons reported in this study are an upper bound.

5.4 Number of Matches and Coverage

The total number of sample industries within which matches have been made is 23, representing 12 out of 15 major branches of manufacturing. The most important Zambian manufacturing branch, food manufacturing, is represented by 8 sample industries. All the other branches had one sample industry, except for beverages and chemicals. No matches were made in rubber and plastic products, electrical machinery and equipment, and other manufacturing industries. For these branches, we used the calculated UVRs for total manufacturing based on the 12 branches for which there were sample industries.

In total, 91 product matches have been made equalling 15.5 percent of the US gross output value and 42.4 percent of the Zambian gross output value. For Zambia, this coverage is calculated as the ratio of matched gross output value obtained from the quarterly returns to the census gross output value in 1990. The US coverage ratio is comparable with that found in previous ICOP studies (e.g. van Ark, 1990; Kouwenhoven, 1996; Timmer, 1998). The lower coverage on the US side can be attributed to the fact that the comparison is between a very large and highly diversified industrial sector and a small one. Zambian manufacturing also suggests a bias towards traditional manufacturing industries in the sample industries.

Although no matches could be made in some branches (such as rubber and plastic products and other manufacturing), ICOP studies indicate that the results for manufacturing as a whole are rather robust and do not vary substantially with the inclusion of further matches when a large number of matches has already been made (Szirmai, 1994).
Notwithstanding the data limitations discussed above, the study yields useful first estimates of Zambian manufacturing performance in comparison with the USA. It can also be regarded as a further step in what may be considered as an ongoing process in understanding the manufacturing dynamics in sub-Saharan Africa.

6. Results

6.1 Unit Value Ratios

The conversion factors used in this study are based on a sample of unit values for value of gross outputs of comparable products and product groups between Zambian and the USA.

Table 6 presents the resulting unit value ratios. The aggregate Fisher UVR for total manufacturing is ZK 49.15 to the US dollar, somewhat lower than the exchange rate of 50.00[13]. The relative price level is 0.98.

Of greater interest are variations in relative price levels across branches. The aggregate UVR conceals great differences from branch to branch. On average, the UVRs for the branches for which product matchings were achieved differed by about 24 percent from the average UVR for total manufacturing.[14] The highest UVRs are in chemicals, petroleum and coal products (94.42) and in paper, printing and publishing (75.79). Here relative price levels are far above the exchange rate, indicating considerable lack of competitiveness in these sectors. The lowest UVRs are in wearing apparel (21.68) and in beverages (26.40), far below the exchange rate, indicating potential price competitiveness in these sectors.

[13] In international publications (such as the world tables published by the World Bank) the Zambian Kwacha is highly valued against the US $ than in national publications.

[14] The average percentage deviation of branch UVRs from the total manufacturing UVR is computed by weighting the percentage difference for each branch by the gross value added in Zambia and by gross value added in the USA when Zambian and US quantity weights were used respectively.

Table 6

Unit Value Ratios and Price Levels by Major Manufacturing Branch Zambia/USA (ZK to US$), 1990

		UVR (ZK/US$)		Relative
	at US Quantity Weights	at Zambian Quantity Weights	Geometric Average	Price Level Zambia (USA = 100)
1 Food Manufacturing	46.25	28.29	36.17	0.72
2 Beverages	28.61	24.35	26.40	0.53
3 Tobacco	37.05	37.89	37.47	0.75
4 Textile Mill Products	51.12	26.71	36.95	0.74
5 Wearing Apparel	31.48	14.94	21.68	0.43
6 Leather Products and Footwear	37.16	37.16	37.16	0.74
7 Wood Products, Furnitures and Fixtures	49.26	20.50	31.78	0.64
8 Paper, Printing and Publishing	102.59	55.99	75.79	1.52
9 Chemicals, Petroleum and Coal Products	106.91	83.39	94.42	1.89
10 Non-Metallic Mineral Products	78.64	68.52	73.41	1.47
11 Basic & Fabricated Metal Products	97.48	28.52	52.73	1.05
12 Machinery & Transport Equipment	58.00	54.15	56.04	1.12
13 Rubber and Plastic Products (a)	56.63	33.87	43.79	0.88
14 Electrical Machinery & Equipment (a)	56.63	33.87	43.79	0.88
15 Other Manufacturing Industries (a)	56.63	33.87	43.79	0.88
Total Manufacturing, Census Weights (b)	56.63	33.87	43.79	0.88
Total manufacturing, implicit UVRs (c)	71.78	33.65	49.15	0.98
Exchange Rate	50.00	50.00	50.00	

Sources:
Sample industry UVRs from Annex Table IV.2. The UVR for food manufacturing is the weighted average of the UVRs for meat products, dairy products, fats and oils, grainmill products, bakery products, sugar, confectionery and food n.e.c. and preserved vegetables, fruits and fish.
Exchange rate: derived from Report on the 1994 Census of Industrial Production, page 8, (Project XA/ZAM/94/631:"National Industrial Statistics Programme (NISP) Plus." prepared in collaboration with UNIDO)
Notes:
(a) No sample industries for this branch. We used the UVR calculated for the total of branches with sample industries.
(b) The UVR for total manufacturing is the gross output weighted average of branch or sample industry UVRs (see Timmer, 1997)
(c) Implicit UVRs calculated from the summed branch value added totals. Due to index number problems, the implicit UVRs deviate from the UVRs calculated for total manufacturing. Choosing for the lowest level of aggregation, these implicit UVRs may be preferred to the calculated ones.

The UVRs at Zambian quantity weights are lower than the UVRs at US quantity weights. This is an example of the familiar Gerschenkron effect (Gerschenkron, 1962), which operates when

comparing a low-income economy to a high-income economy. The differences in industrial structure account for the divergence in UVRs.[15]

Table 7 shows levels of gross value added using the US census definition and UVRs as converters. The gross value added data in national currencies are obtained from Tables 4 and 5 and converters from Table 6. The gross value added level of Zambia manufacturing sector is as little as 0.029 percent of that of the USA (geometric average). There is, however, a sharp contrast with the relative size of employment. The Zambian manufacturing employment level is 0.49 percent of the US level. The 'traditional industries' have a significantly high level of gross value added relative to the USA, whereas the 'skill and technology-intensive' industries are almost absent.

Table 7

Gross Value Added (US Census Concept), by Major Manufacturing Branch, Zambia and the USA, 1990 (Establishments with 10 or more persons engaged)

	|----- at Zambian prices ----|			|--------- at US prices ---------|			Geometric Average
	Zambia	USA	Zambia/ USA	Zambia	USA	Zambia/ USA	Zambia/ USA (%)
	(in million ZK.)		(%)	(in million US$)		(%)	
1 Food Manufacturing	3,995.2	5,291,530.1	0.076	141.2	114,400.1	0.123	0.097
2 Beverages	1,267.4	703,965.1	0.180	52.0	24,605.3	0.212	0.195
3 Tobacco	1,648.2	835,802.1	0.197	43.5	22,556.2	0.193	0.195
4 Textile Mill Products	1,867.4	1,344,254.9	0.139	69.9	26,298.1	0.266	0.192
5 Wearing Apparel	275.4	825,262.7	0.033	18.4	26,218.1	0.070	0.048
6 Leather Products and Footwear	38.2	166,237.4	0.023	1.0	4,473.3	0.023	0.023
7 Wood Products, Furnitures and Fixtures	444.4	2,286,483.3	0.019	21.7	46,414.0	0.047	0.030
8 Paper, Printing and Publishing	1,127.0	16,000,447.4	0.007	20.1	155,961.2	0.013	0.010
9 Chemicals, Petroleum and Coal Products	2,019.4	18,921,646.9	0.011	24.2	176,982.1	0.014	0.012
10 Non-Metallic Mineral Products	1,213.0	2,541,875.1	0.048	17.7	32,322.3	0.055	0.051
11 Basic & Fabricated Metal Products	1,601.9	12,219,490.8	0.013	56.2	125,360.2	0.045	0.024
12 Machinery & Transport Equipment	462.1	15,846,290.4	0.003	8.5	273,211.9	0.003	0.003
13 Rubber and Plastic Products	643.9	2,772,746.3	0.023	19.0	48,966.3	0.039	0.030
14 Electrical Machinery & Equipment	708.8	3,399,694.9	0.021	20.9	60,038.1	0.035	0.027
15 Other Manufacturing Industries	56.3	5,543,311.2	0.001	1.7	97,894.0	0.002	0.001
Total Manufacturing	17,368.4	88,699,038.6	0.020	516.2	1,235,701.1	0.042	0.029

Sources: Census value added in national currency from Tables 4 and 5; converted with UVRs from Table 6. Totals are summed branch figures.

6.2 Productivity Comparisons

The converted branch value added from Table 7 and employment data in Tables 4 and 5 have been used to derive labour productivity comparisons in Table 8. Table 8, thus, presents the estimates of both comparative and absolute levels of productivity for manufacturing branches. Absolute productivity

[15] The products that are relatively cheap and common in a high-income country such as the USA are likely to be expensive and rare in Zambia. On the other hand, products that are cheap and common in Zambia are likely to be rare in the USA. The net effect of this is that matches with high unit value ratios will have high quantity

refers to the average gross value added per person engaged, while the comparative productivity measures the ratio of labour productivity of the economies in the binary study. The first column of Table 8 presents Zambian gross value added per person employed in Kwacha for 15 manufacturing branches in 1990. It is converted to US dollars using the UVRs at Zambian quantity weights (column 4). In a similar fashion, US gross value added per employee in column 5 is converted to Zambian Kwacha on the basis of UVRs at US quantity weights (column 2). At Zambian prices the gross value added per person engaged is 4.0 percent of that in the USA, and at US prices it is 8.5 percent of the USA. The last column of Table 8 shows the geometric average of the productivity ratios at Zambian and at US price weights per person engaged. The aggregate productivity in Zambian 10+ manufacturing is 5.9 percent of the US level.

There are striking differences in the levels of comparative labour productivity across branches. The lowest labour productivity is found in Zambian chemical products (1.8 percent of the US level), leather products and footwear (2.1 percent), followed by paper and printing products (4.1 percent), and other manufacturing industries (4.3 percent). In Zambia, the extremely low relative productivity in chemical products, leather products and footwear can be explained by the high level of manning of production processes in combination with low mechanisation. Highest productivity is found in textiles.[16]

weights in the US and low quantity weights in Zambia. Matches with low unit value ratios will, however, receive low weights in the USA and high weights in Zambia.

16 The relatively high level of productivity in electrical machinery and equipment, and rubber and plastic products needs to be interpreted with caution since the reliability of their unit value ratios is not very robust.

Table 8

Gross Value Added (US Census Concept) per Person, Zambia and the USA, 1990 (Establishments with 10 or more persons engaged)

	|-- at Zambian Prices --|		|--- at US Prices ---|		Geometric Average
	Zambia	USA	Zambia/ USA	Zambia	USA	Zambia/ USA	Zambia/ USA (%)
		(in ZK.)	(%)		(in US$)	(%)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 Food Manufacturing	188,337	4,075,641	4.6	6,658	88,113	7.6	5.9
2 Beverages	322,816	4,913,836	6.6	13,255	171,750	7.7	7.1
3 Tobacco	1,285,615	20,489,178	6.3	33,927	552,952	6.1	6.2
4 Textile Mill Products	197,585	2,148,659	9.2	7,397	42,035	17.6	12.7
5 Wearing Apparel	65,769	1,055,343	6.2	4,403	33,528	13.1	9.0
6 Leather Products and Footwear	30,278	1,463,770	2.1	815	39,389	2.1	2.1
7 Wood Products, Furnitures and Fixtures	67,574	2,122,201	3.2	3,296	43,079	7.7	4.9
8 Paper, Printing and Publishing	239,778	7,964,258	3.0	4,283	77,630	5.5	4.1
9 Chemicals, Petroleum and Coal Products	325,286	20,087,804	1.6	3,901	187,890	2.1	1.8
10 Non-Metallic Mineral Products	338,448	5,323,316	6.4	4,939	67,691	7.3	6.8
11 Basic & Fabricated Metal Products	197,936	6,170,503	3.2	6,939	63,303	11.0	5.9
12 Machinery & Transport Equipment	195,411	4,504,894	4.3	3,609	77,671	4.6	4.5
13 Rubber and Plastic Products	276,249	3,259,311	8.5	8,157	57,559	14.2	11.0
14 Electrical Machinery & Equipment	460,244	5,045,798	9.1	13,590	89,108	15.3	11.8
15 Other Manufacturing Industries	146,930	4,436,742	3.3	4,339	78,352	5.5	4.3
Total Manufacturing	225,271	5,620,542	4.0	6,695	78,302	8.5	5.9

Sources: Gross value added from Table 7, employment from Tables 4 and 5.

In theory, part of the aggregate productivity gap between Zambia and the USA might be explained by relatively low employment shares of Zambian manufacturing in activities with higher absolute productivity levels, such as electrical machinery and equipment, and rubber and plastic products. Following Timmer and Szirmai's approach (1999), we investigated the structure effects on the relative productivity level by decomposing the difference in labour productivity level at aggregate level for the benchmark year into that due to structural differences between Zambia and the US and that due to simply intra-branch productivity differences. For 1990, it was found that almost all of the aggregate productivity gap between Zambia and the USA is explained by intra-branch productivity differentials rather than structure effects. The intra-branch productivity differentials explain 100.5 percent of the difference between Zambia and the USA, while the remainder (-0.5 percent) is explained by their employment structure. In sum, the difference in the structure of employment between Zambia and the USA, relative to intra-branch differences, is unimportant in explaining the labour productivity gap between the countries.

A further investigation into the sources of the productivity gap focuses on differences in capital intensity, using total factor productivity analysis. We assume a Cobb-Douglas production function. In line with the method used to construct national TFP growth series (Solow, 1957), benchmark estimates of TFP can be constructed to show the impact of the differences in capital intensity on labour productivity differences. For the benchmark year, the relative level of gross value added per person for Zambia (ZA) and the USA (US) for establishments with 10 or more persons is given by the relation (Timmer, 2000)

$$\ln\left(\frac{Y_{ZA}/L_{ZA}}{Y_{US}/L_{US}}\right) = (1-\bar{g}_{ZAUS})\ln\left(\frac{K_{ZA}/L_{ZA}}{K_{US}/L_{US}}\right) + \ln\left(\frac{A_{ZA}}{A_{US}}\right) \qquad (3)$$

where *Y* is the gross value added, L is the number of persons engaged, K is the gross fixed capital stock, A is the total factor productivity level and $\bar{\gamma}$ is the unweighted average of the labour share in gross value added in Zambia and the USA. From the above equation it can be seen that the relative TFP level is in fact the difference between the relative labour productivity level and the relative capital intensity level multiplied by the average capital share in value added.

The relative capital intensities in equation (3) have been estimated by converting the capital inputs of both countries into international dollars, using purchasing power parities for domestic capital formation from the Penn-World Tables Mark 5.6 (Summers and Heston 1991; Timmer, 2000). The capital inputs for Zambia derive from our capital stock estimates in section 3, the sources for US capital inputs are stock estimates by Ark and Pilat (1993), Ark (1999), Timmer (2000) and the OECD National Accounts.

In 1990, relative capital intensity in Zambia is 8.0 percent of the US level and relative TFP is 16.7 percent of the US level (Table 9). Thus, Zambian capital intensity is extremely low. The relative TFP level is one seventh of the US level, which though low is somewhat higher than expected. Given the value of $\bar{\gamma}$ is of 0.58, differences in capital intensity explain 37 per cent of the labour productivity gap (Table 10). 63 per cent is due to differences in output per unit of input, indicating among others differences in efficiency of the use of factor inputs and differences in technological levels. Efficiency of input use is determined by a variety of factors, many of them external to manufacturing, such as availability of infrastructure, intermediate inputs and foreign exchange. These external factors affect TFP primarily via capacity utilisation.

Table 9

Comparative Capital Intensity and TFP, Zambia and the USA, 1990 (Establishments with 10 or more persons engaged)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
Capital per worker as % of USA	3.8	5.6	20.1	5.1	6.9	6.9	8.4	24.0	30.5	7.1	7.1	5.3	1.4	8.0
TFP level as % of USA	39.9	40.1	17.8	8.3	20.3	15.3	6.4	25.3	11.8	17.2	12.3	30.1	29.8	16.7

Sources: Gross value added from Table 7, employment from Tables 4 and 5, labour share and capital in national currency converted into international dollars for 1990 from Annex Tables I.5, I.6, I.10 and I.11. Relative TFP levels have been calculated using a translog production function as given in equation (3).

7. Comparative Productivity Trends

The benchmark estimates of comparative labour productivity and comparative capital intensity are extrapolated with national time series in constant prices of gross value added, capital stocks and the number of persons engaged. In theory, deflating the nominal value added series by an output price index is valid if the price of material inputs relative to the price of output is more or less constant for the period of analysis. For Zambia, the combination of the lack of separate output and material input deflators and the high sensitivity of the double deflation procedure to measurement errors (Hill, 1971; Timmer, 2000) lead to the use of the more reliable single deflation method. Comparative TFP trends are estimated using shifting annual factor shares of the two countries. As in equation (3), relative capital intensities have been weighted by the average of US and Zambian capital shares. Here, however, each year's capital intensities are weighted by that year's average capital shares.

The capital intensive nature of the Zambian industrialisation drive of the sixties and seventies is illustrated by the high relative capital intensities found prior to 1977. After that year capital intensity declined dramatically. Figure 1 indicates that the Zambian economy is at a very low level in terms of both relative labour productivity and TFP. Relative labour productivity rose to its highest level in 1968 and 1972 and thereafter declined to its lowest level in 1995. The TFP level has remained well below 20 percent of the US level. Between 1982 and 1991 the comparative TFP level first declined then recovered, fluctuating between 14.9 and 18.1 percent. Labour productivity showed a net decline. The movement in TFP is associated with the long-run decline in both absolute and relative capital intensity in Zambia, since 1976/7. Investment in equipment and machinery was particularly low in the 1980s. As a result, there was more intensive use of existing resources during this period, manifesting itself in some improvement in comparative TFP performance in the second half of the eighties. After 1991, the TFP level collapsed. This collapse coincides with the privatisation of manufacturing units in Zambia.

It should be remembered that during the period of expansion (i.e. between 1968 and 1970) the Zambian government implemented industrial policies the essence of which was to encourage industrial development mainly through mining and manufacturing with the parastatals performing a central role under the principle of state participation in these sectors. As a consequence of these policies, by 1992, ZIMCO[17] and INDECO (units for state participation and control in major industries), as holding companies for manufacturing parastatals, accounted for 90 percent of non-mining industrial production. On 3rd July 1992, an Act of Parliament was passed to provide for the privatisation and commercialisation of state-owned enterprises, in order to redress the problem of poor performance of these companies that lived off the huge financial subsidy outlays that went to support them. By that time, the industrial sector itself was characterised by underinvestment in capital assets. Investment in equipment and machinery was particularly low in the 1980s. Improvement of labour productivity and sustained TFP growth, however, requires fresh investment into assets, and improved industrial and financial viability of the sector. So, after 1991, real productivity continued to go down steeply. It should also be noted that in the nineties the productivity performance in the US improved markedly under the impact of new technologies, further increasing the relative productivity gap.

With the relaxation of the regime of trade and payments, the freeing of exchange and interest rates, the reduction in the extent and coverage of commodities covered by price controls, and the increased domestic and foreign private sector competition from 1992 onwards, several inefficient companies closed down. TFP plummeted between 1992 and 1995, both in absolute and relative terms. A slight pick up in both TFP and real productivity is evident between 1995 and 1997 as investment in capital assets also improves and GDP starts growing again.

There are two striking features of Zambia's comparative productivity performance. First, the level of productivity in Zambia is significantly lower than that for the US. Secondly, the productivity differential has increased over more than two decades.

Annex Table III.1 provides sectoral detail on comparative productivity trends. It shows that labour productivity is very low compared to the USA in all Zambian industries. Relatively higher productivity is found in electrical machinery and equipment and textiles. Zambian manufacturing is dominated by traditional industries with low productivity. Food, beverages, tobacco and textiles products account for 51 percent of the total manufacturing value added. When Zambian industries are matched with US, factors like comparative levels of capital stock per engaged person, labour and management quality, economies of scale both at firm level and industry level, and ownership types are plausible explanations for the comparative low productivity.

Over the whole period, Zambian manufacturing is marked by a pattern of relative stagnation and declining labour productivity. In this respect it differs markedly from economies in South and East Asia prior to the Asian crisis. These economies either experienced rapid productivity catch up, such as

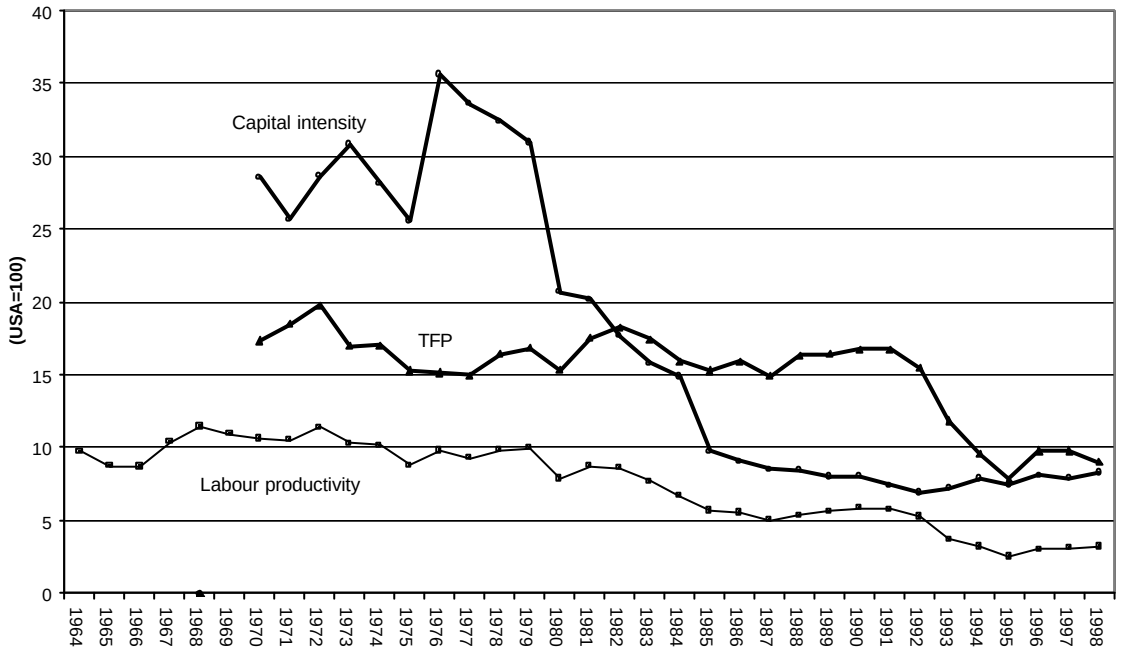
[17] ZIMCO stands for the Zambia Industrial and Mining Company.

Taiwan and South Korea, or experienced long periods of productivity growth at the same rate as the US, followed by some relative improvement in the nineties, as was the case in India, Indonesia and China (Timmer and Szirmai, 1999).

Finally, it should be emphasized that declining labour productivity is to be expected when labour surplus economies start producing more labour intensively in line with their comparative advantage. From an economic perspective, there is nothing intrinsically wrong with low labour productivity in the short run. In the long run, however, increasing standards of living directly depend on the capacity to improve output per worker.

Figure 1

Relative Labour Productivity, TFP and Capital IntensityZambia/USA, 1964-98 (10+ establishments)(USA=100)



Source: Annex Tables III.1, III.2 and III.3.

8. Conclusion

This study set out to determine the economic performance of the Zambian manufacturing sector in comparative perspective. Labour productivity is used as the main performance indicator to assess the performance gap between Zambian manufacturing and that of the USA. The estimates in this study show aggregate real labour productivity in manufacturing sector in Zambia to be 5.9 percent that of the USA, in 1990. However, considerable relative productivity variations can be noted between branches. The chemical products branch has 1.8 percent of the US level (the lowest) while electrical machinery and equipment has 11.8 percent, and textiles 12.7 percent.

The results confirm the existence of an enormous technology gap between Zambia and the world productivity leader, the USA. The low level of manufacturing productivity in Zambia is entirely due to the low levels of relative labour productivity within the branches of manufacturing, rather than to differences in structure of manufacturing between Zambia and the USA. The productivity gaps are explained by low capital intensity and a relatively inefficient use of factor inputs.

The ratio of real output per worker in the Zambian manufacturing sector is significantly lower than that of Asian developing economies such as India, China and Indonesia (Timmer, 2000), though marginally higher than the labour productivity in the Tanzanian manufacturing sector (Szirmai, Prins and Schulte, 2001). Interestingly, (comparing with Timmer, 2000) the results for Zambia's performance were above the results for China, India, and Indonesia before 1973. The trend in comparative Zambian labour productivity points to an increase in the technology gap over time. While comparative productivity in Asian economies was stable or improved, comparative productivity in Zambia since 1973, declined substantially.

Although considerable efforts were made to improve data quality and coverage, there are still some limitations to this study. The present comparison of the two countries' economic performance is based on a small sample of UVRs that were used to convert output to common currency. The relative productivity levels obtained in the study are an upper bound. It is likely that adjustments for quality differences would likely lead to even lower outcomes in terms of relative productivity performance.

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Zambia

Annex Table I.1: Gross Domestic Product in Zambian Manufacturing (10+) at constant 1990 prices, 1964-98 (ZK million)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1964	1,003.5	19.6	51.0	1.8	217.2	275.7	125.6	26.0	606.3	736.0	122.3	22.8	7.5	3,215.1
1965	963.6	40.5	110.0	4.0	292.3	306.1	255.8	33.8	784.1	832.2	128.8	49.0	21.9	3,822.1
1966	1,083.6	53.0	160.2	9.4	339.7	361.3	405.2	29.7	749.3	1,060.9	145.4	124.0	33.6	4,555.2
1967	1,159.6	76.4	260.5	11.9	303.9	513.1	815.8	46.5	797.9	1,176.2	345.0	154.3	55.6	5,716.8
1968	1,091.6	105.3	227.3	9.3	350.6	768.4	923.3	61.9	964.6	1,809.2	356.8	166.5	40.3	6,875.2
1969	1,606.4	155.0	318.6	8.8	298.8	642.7	1,016.4	197.2	879.9	1,442.0	410.8	302.1	48.3	7,327.1
1970	1,749.9	175.2	369.3	9.4	314.4	745.1	921.5	225.1	948.8	1,648.9	384.0	230.7	37.0	7,759.5
1971	2,108.9	239.9	349.2	10.2	302.0	764.1	1,052.0	316.2	997.7	1,755.4	404.1	419.2	44.1	8,763.0
1972	2,269.4	288.5	423.4	19.4	284.2	925.4	1,694.4	334.1	1,123.8	1,869.7	603.8	477.1	27.4	10,340.6
1973	2,306.5	324.2	360.2	25.3	314.7	938.7	2,043.7	378.8	1,098.6	1,799.3	633.9	458.4	44.1	10,726.5
1974	1,883.0	309.7	460.5	34.9	474.5	980.4	2,052.4	388.5	1,413.8	1,906.8	761.3	614.9	67.1	11,347.8
1975	1,572.3	316.5	369.5	35.0	404.2	811.9	2,424.7	303.1	1,230.0	1,653.9	919.4	377.4	64.5	10,482.3
1976	1,939.1	486.7	388.1	32.5	384.0	677.6	2,723.6	315.9	607.4	747.5	811.5	468.9	64.2	9,646.9
1977	2,000.4	592.9	391.9	30.4	453.2	739.8	2,931.7	281.4	582.3	826.1	678.2	462.2	66.5	10,037.0
1978	2,003.5	655.2	383.2	35.2	414.5	887.1	3,134.9	288.9	789.3	911.6	641.3	491.9	69.3	10,705.9
1979	2,214.0	775.0	415.6	34.1	411.9	697.0	3,007.8	334.2	721.0	866.8	537.0	450.5	67.1	10,531.8
1980	2,079.6	947.1	475.9	38.1	514.2	572.8	2,728.7	307.3	954.3	994.2	540.2	486.2	46.5	10,685.1
1981	3,383.5	1,090.0	257.0	41.2	522.8	431.1	1,845.1	228.5	978.1	1,445.7	559.2	503.2	48.3	11,333.8
1982	3,498.2	1,208.4	244.1	32.9	459.9	388.6	1,398.2	166.0	959.1	1,789.8	588.7	529.7	46.7	11,310.3
1983	3,606.8	1,062.3	196.2	42.7	447.5	386.8	1,304.2	182.2	1,138.6	1,289.9	596.5	536.8	43.5	10,833.7
1984	3,782.9	1,051.7	184.6	25.5	425.1	349.0	548.1	138.2	472.8	2,122.2	495.9	524.0	48.3	10,168.3
1985	3,533.6	1,028.7	174.8	30.8	491.8	455.5	1,206.1	304.3	1,015.8	2,496.0	689.0	687.0	58.3	12,171.8
1986	3,624.9	891.2	148.1	24.3	485.6	579.1	1,182.1	298.3	765.3	2,813.0	683.0	857.2	62.1	12,414.1
1987	3,815.9	959.2	156.7	24.3	432.6	897.3	1,105.6	279.0	139.6	2,089.8	889.6	1,009.3	63.5	11,862.6
1988	4,321.9	1,017.4	164.1	24.3	416.5	981.7	1,055.7	266.5	444.1	2,103.5	838.7	951.5	66.8	12,652.5
1989	4,575.6	1,149.1	200.7	28.6	474.0	1,036.6	1,373.3	377.2	633.3	1,322.1	740.7	826.0	65.5	12,802.6
1990	5,094.4	1,677.5	265.6	36.6	432.8	1,025.4	1,883.2	475.4	693.0	1,505.1	442.6	699.2	54.2	14,285.0

Annex Table I.1 (continued)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1991	5,658.1	995.3	157.9	47.4	501.7	927.2	1,636.6	237.0	310.8	1,895.7	405.5	715.8	60.5	13,549.5
1992	4,833.6	1,304.6	207.1	49.5	506.2	1,023.7	488.2	65.2	258.7	2,420.5	505.3	914.1	56.1	12,632.8
1993	2,521.6	787.1	125.0	46.7	439.9	421.2	1,957.8	253.0	146.0	1,023.8	288.9	528.5	28.7	8,568.2
1994	1,729.9	541.3	86.0	39.1	414.3	183.1	1,314.7	166.9	92.7	1,540.5	226.4	416.8	34.3	6,786.1
1995	2,328.9	584.7	92.9	40.0	428.1	119.2	403.6	51.4	80.3	856.4	94.7	171.0	17.2	5,268.3
1996	2,438.1	672.9	97.2	37.5	392.9	115.6	533.9	68.0	80.1	712.0	81.9	151.1	17.4	5,398.7
1997	2,498.0	850.7	87.1	41.0	428.8	160.4	516.5	65.8	61.1	897.9	79.7	146.8	16.7	5,850.6
1998	2,504.8	849.9	87.0	42.9	441.8	170.3	385.9	57.6	72.4	903.0	77.1	141.9	20.7	5,755.4

Note: See Annex Table V.1 for full branch names.

Sources for current values:

Census of Production, 1964, tables 3, 4 and 7; Census of Production, 1965 and 1966, tables III, IV and V; Census of Production, 1967, tables III, IV and V; Census Production, 1968, tables III, IV and V; Census of Industrial Production, 1969, table 7; Census of Industrial Production, 1970, table 7; Census of Industrial Production, 1971, table 7; Census of Industrial Production, 1972, table 4; Census of Industrial Production, 1973, table 4; Census of Industrial Production, 1974, table 4; Census of Industrial Production, 1975, table 4; Census of Industrial Production, 1980, table 4; Census of Industrial Production, 1990, tables 6 and 7; Census of Industrial Production, 1994, tables 3.2, 4.1 and 6.1; Monthly Digest of Statistics vol.XVIII nos.7 to 9, July/September 1982, table 52; Monthly Digest of Statistics vol.XXI nos.2 to 3, February/March 1985, table 50; National Accounts Statistics Bulletin no.2, January 1988, table 2.0; National Accounts Statistics Bulletin no.3, January 1990, table 2.0; National Accounts Statistics Bulletin no.4, June 1992, table 1.0; National Accounts Statistics Bulletin no.5, August 1995, table 1.0; CSO database on GDP and Gross fixed capital formation from 1990 to 1998 in current prices and at 1994 prices; Economic Report 1998, table 2.2.

Sources for deflators:

CSO database on Index Numbers of Wholesale Prices 1966=100 (by Industrial Activities); Monthly Digest of Statistics, July-October 1991, table 47.

Annex Table I.2: Employment in Zambian Manufacturing (10+), 1964-98 (persons)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1964	5,991	321	1,154	31	2,686	1,172	300	303	3,483	3,286	179	2,001	33	20,940
1965	7,205	752	2,701	145	4,198	1,389	914	337	3,668	3,691	278	824	101	26,203
1966	7,668	1,202	4,269	206	3,569	1,572	1,663	474	4,396	4,442	601	1,198	209	31,469
1967	8,244	1,246	4,646	255	3,030	1,608	2,083	514	4,108	4,373	898	1,863	312	33,180
1968	9,034	1,428	4,556	258	2,863	1,571	1,911	413	3,904	4,335	794	1,921	311	33,299
1969	12,277	1,574	4,498	390	2,889	2,685	2,243	704	3,449	3,931	706	1,593	237	37,176
1970	12,460	2,821	4,584	498	3,369	2,397	3,144	1,122	3,648	4,733	669	1,440	199	41,084
1971	13,163	3,189	4,547	505	3,305	2,377	3,186	1,155	3,720	5,535	1,043	1,816	220	43,761
1972	13,486	3,268	4,646	553	3,377	2,173	3,206	1,330	3,320	6,447	930	2,186	155	45,077
1973	15,760	2,872	4,863	674	2,932	2,447	3,736	1,423	3,716	6,162	1,039	2,230	206	48,060
1974	16,169	2,952	6,199	826	3,821	2,668	4,399	1,960	4,213	6,879	1,140	2,602	320	54,148
1975	16,077	3,376	6,234	987	4,045	2,864	4,737	1,626	3,918	7,897	1,152	2,528	329	55,770
1976	12,272	2,815	4,649	753	3,017	2,267	3,876	1,321	3,106	5,821	936	1,976	271	43,080
1977	12,863	3,240	4,738	789	3,075	2,474	4,380	1,483	3,395	5,849	1,051	2,128	305	45,770
1978	12,720	3,540	4,530	780	2,940	2,560	4,700	1,580	3,520	5,490	1,120	2,170	330	45,980
1979	13,290	3,100	4,780	720	2,260	2,390	4,120	1,590	3,540	4,890	1,670	2,240	370	44,960
1980	20,399	4,299	5,910	983	3,410	2,680	5,311	1,999	3,539	6,250	1,719	2,252	158	58,909
1981	16,882	4,867	5,801	1,022	4,430	2,572	4,728	1,779	3,324	6,214	1,647	2,190	165	55,621
1982	16,367	5,111	5,337	996	4,402	2,821	4,641	1,746	3,410	6,131	1,561	2,107	177	54,807
1983	16,445	5,719	5,278	1,043	4,158	3,232	4,733	1,780	3,503	6,170	1,509	2,074	195	55,839
1984	16,534	6,150	5,133	1,088	4,329	3,122	4,746	1,803	3,235	6,414	1,390	2,107	130	56,181
1985	26,404	7,754	5,695	1,265	5,631	4,162	6,496	2,442	4,017	8,088	1,838	2,604	304	76,700
1986	25,999	8,002	5,280	1,245	5,749	4,214	6,333	2,380	3,861	7,964	1,745	2,511	317	75,600
1987	25,562	8,210	4,886	1,222	5,842	4,252	6,168	2,318	3,708	7,830	1,655	2,420	327	74,400
1988	25,573	8,540	4,597	1,222	6,026	4,357	6,114	2,297	3,625	7,833	1,598	2,375	343	74,500
1989	25,790	8,926	4,356	1,231	6,252	4,494	6,112	2,296	3,575	7,900	1,556	2,351	361	75,200
1990	26,421	9,451	4,188	1,260	6,576	4,700	6,208	2,331	3,584	8,093	1,540	2,365	383	77,100

Annex Table I.2 (continued)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1991	25,415	9,099	3,952	1,309	6,607	4,608	6,274	2,315	3,631	7,934	1,585	2,287	384	75,400
1992	24,333	8,720	3,696	1,364	6,646	4,512	6,351	2,299	3,685	7,768	1,635	2,204	387	73,600
1993	21,843	7,837	3,223	1,344	6,315	4,155	6,076	2,153	3,536	7,158	1,596	1,994	370	67,600
1994	17,942	6,447	2,550	1,226	5,542	3,522	5,372	1,860	3,136	6,068	1,442	1,669	324	57,100
1995	16,999	6,366	2,190	1,196	5,464	3,415	5,149	1,777	2,985	5,790	2,371	1,633	319	55,654
1996	14,120	5,398	1,666	1,077	4,836	2,938	4,521	1,533	2,616	4,937	2,083	1,390	285	47,400
1997	13,640	5,341	1,435	1,136	5,009	2,952	4,645	1,546	2,681	4,915	2,143	1,381	294	47,118
1998	12,128	4,884	1,091	1,112	4,814	2,748	4,426	1,445	2,549	4,525	2,044	1,269	285	43,320

Note: See Annex Table V.1 for full branch names.

Employment figures were adjusted using additional sources to include working proprietors and family workers.

Sources:

Census of Production, 1964, table 2; Census of Production, 1965 and 1966, table II; Census of Production, 1967, table II; Census of Production, 1968, table II; Census of Industrial Production, 1969, table 3.1; Census of Industrial Production, 1970, table 3.1; Census of Industrial Production, 1971, table 3.1; Census of Industrial Production, 1972, table 1.1; Census of Industrial Production, 1973, table 1.1; Census of Industrial Production, 1974, table 1.1; Census of Industrial Production 1975, table 1.1; Census of Industrial Production, 1980, table 1.1; Census of Industrial Production,1990, table 1; Census of Industrial Production, 1994, table 0.1; Monthly Digest of Statistics, July- October 1991, table 17; Report on Employment and Earnings 1978, CSO, January 1981, table 7; Report on Employment and Earnings 1979, CSO, February 1982, tables 1.1, 1.2, 7.0 and 7.1;Employment Trends 1985 to 1993, CSO, 9 September 1994, table 14; Monthly Digest of Statistics Supplement vol.XVIII nos.7 to 9, July/September 1982, table 11; Monthly Digest of Statistics Supplement vol.XXI nos.2 to 3, February/March 1985, table 11; Monthly Digest of Statistics Supplement vol.XXII nos. 1 to 4, January/April 1986, table 11; National Accounts Bulletin No. 5, August 1995, table 7.0; CSO unpublished report of Labour Trends from 1964 to 1998; Economic Report 1998, table 2.4.

Annex Table I.3: Investment in Fixed Assets in Zambian Manufacturing (10+), in current prices, 1941-98 (ZK 000)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1941*	20.0	0.1	0.3	0.0	1.4	0.6	3.0	0.0	6.7	3.0	94.3	0.0	1.0	130.5
1942*	21.0	0.2	0.3	0.0	2.1	0.7	3.3	0.0	7.2	3.4	100.2	0.0	1.1	139.4
1943*	24.0	0.2	0.4	0.0	1.6	1.1	3.5	0.0	9.1	3.6	120.3	0.0	1.2	164.9
1944*	26.5	0.2	0.4	0.0	2.5	1.4	4.1	0.1	10.2	5.0	135.3	0.0	1.2	186.9
1945	70.7	0.6	1.0	0.0	3.5	3.7	5.0	0.1	37.1	14.0	200.0	0.0	2.1	337.9
1946	109.7	1.0	1.6	0.1	5.5	5.7	7.8	0.1	57.6	21.8	412.0	0.0	3.2	626.0
1947	457.8	4.0	6.5	0.3	23.0	23.6	32.5	0.5	240.5	90.8	664.0	0.0	13.4	1556.9
1948	224.2	2.0	3.2	0.2	11.3	11.6	15.9	0.2	117.8	44.5	706.0	0.0	6.6	1143.4
1949	221.3	1.9	3.1	0.2	11.1	11.4	15.7	0.2	116.3	43.9	1172.0	0.0	6.5	1603.6
1950	305.1	2.7	4.3	0.2	15.3	15.7	21.6	0.3	160.3	60.5	1344.0	0.0	9.0	1939.0
1951	303.5	2.6	4.3	0.2	15.2	15.7	21.5	0.3	159.4	60.2	1354.0	0.0	8.9	1946.0
1952	476.3	4.2	6.7	0.3	23.9	24.6	33.8	0.5	250.2	94.5	1794.0	0.0	14.0	2723.0
1953	484.8	4.2	6.9	0.3	24.3	25.0	34.4	0.5	254.7	96.2	1900.0	0.0	14.2	2845.7
1954	1266.4	11.0	17.9	0.9	63.6	65.4	89.8	1.3	665.3	251.3	290.8	0.0	37.2	2760.8
1955	1146.0	31.8	51.6	2.6	228.0	60.0	82.6	1.2	428.0	328.0	282.0	0.1	34.1	2676.0
1956	2558.0	5.2	8.4	0.4	40.0	192.0	54.6	0.8	1976.0	320.0	412.0	0.1	22.5	5590.0
1957	1674.0	9.6	15.6	0.8	76.0	104.0	264.6	3.8	956.0	492.0	586.0	0.0	109.6	4292.0
1958	934.0	12.6	20.4	1.0	42.0	30.0	170.8	2.4	428.0	230.0	442.0	0.0	70.8	2384.0
1959	2094.0	14.1	22.8	1.1	36.0	48.0	23.8	0.3	628.0	298.0	208.0	0.0	9.9	3384.0
1960	1728.0	27.4	44.4	2.2	130.0	102.0	64.4	32.0	266.0	332.0	622.0	12.0	27.6	3390.0
1961	524.0	21.5	34.8	1.7	266.0	120.0	56.0	46.0	20.0	490.0	464.0	18.0	24.0	2086.0
1962	902.0	11.1	18.0	0.9	120.0	49.0	25.2	32.0	144.0	286.0	122.0	20.0	10.8	1741.0
1963	1646.0	17.0	27.6	1.4	94.0	184.0	56.0	48.0	356.0	460.0	158.0	6.0	24.0	3078.0
1964	2580.0	95.5	154.8	7.7	132.0	216.0	79.8	42.0	668.0	772.0	86.0	36.0	34.2	4904.0
1965	2166.0	586.0	468.0	68.0	754.0	434.0	2494.0	228.0	1082.0	1552.0	1096.0	76.0	20.0	11024.0
1966	2488.0	282.0	482.0	234.0	424.0	574.0	1418.0	138.0	842.0	1008.0	1016.0	432.0	64.0	9402.0
1967	4322.0	344.0	775.0	415.0	557.0	1075.0	1642.0	331.0	4811.0	1554.0	1671.0	389.0	317.0	18203.0

Annex Table I.3 (continued)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1968	6146.0	2495.0	673.0	134.0	1078.0	1721.0	16456.0	3291.0	7059.0	2427.0	688.0	694.0	8.0	42870.0
1969	5607.0	5852.0	509.0	75.0	922.0	1818.0	2547.0	1061.0	1448.0	1429.0	620.0	2570.0	114.0	24572.0
1970	8061.0	3123.0	590.0	105.0	879.0	1142.0	20395.0	642.0	689.0	1924.0	322.0	2234.0	187.0	40293.0
1971	8827.0	1016.0	581.0	70.0	726.0	938.0	1490.0	451.0	1392.0	4759.0	2538.0	685.0	48.0	23521.0
1972	12214.0	212.0	715.0	412.0	745.0	900.0	20897.0	1141.0	7045.0	4037.0	1824.0	459.0	8.0	50609.0
1973	12203.0	-732.0	544.0	223.0	1322.0	614.0	2981.0	1045.0	27411.0	2024.0	644.0	781.0	26.0	49086.0
1974	12585.0	2345.0	2011.0	1661.0	3771.0	1629.0	4882.0	2265.0	8274.0	3177.0	1004.0	666.0	218.0	44488.0
1975	17455.0	5387.0	1779.0	410.0	3113.0	1016.0	18464.0	1672.0	3927.0	4906.0	1673.0	897.0	172.0	60871.0
1976	26180.0	7539.0	3115.0	556.1	4112.7	2282.4	29708.9	3371.5	4889.8	6995.7	2666.8	1308.4	249.3	92975.6
1977	23778.9	6401.2	3198.0	456.5	3276.2	2699.1	28647.6	3775.1	3615.9	6054.8	2552.3	1157.9	219.4	85833.2
1978	22799.3	5746.9	3388.9	395.2	2739.4	3135.8	28923.1	4243.4	2744.6	5543.5	2561.0	1083.6	204.1	83509.0
1979	22180.9	5242.9	3584.6	346.6	2306.9	3539.1	29436.3	4684.4	2026.3	5159.7	2593.0	1030.4	193.0	82324.1
1980	21840.0	4847.0	3790.0	307.0	1947.0	3927.0	30159.0	5116.0	1412.0	4869.0	2645.0	993.0	185.0	82037.0
1981	24697.9	7692.5	1866.0	49.6	5035.4	7630.4	24904.1	6788.9	25362.3	9277.3	2391.3	3987.2	45.4	119728.3
1982	25753.0	8220.0	1728.0	25.0	5505.5	8243.3	25140.1	7169.2	28583.9	10012.9	2439.5	4415.2	32.6	127268.2
1983	24523.4	7898.2	1568.2	14.3	5333.1	7951.6	23645.9	6858.9	27978.2	9655.3	2303.9	4295.9	25.8	122052.8
1984	25519.5	8257.4	1589.9	9.7	5598.9	8330.0	24446.5	7154.9	29527.4	10112.9	2387.1	4520.2	24.0	127478.4
1985	33077.6	10733.6	2027.2	8.5	7296.4	10841.2	31559.6	9287.9	38601.3	13160.3	3085.7	5898.5	28.8	165606.7
1986	62588.3	20348.9	3793.0	10.7	13856.2	20569.9	59552.8	17592.0	73461.1	24968.2	5828.1	11211.7	51.6	313832.6
1987	91137.8	29672.2	5478.1	10.1	20229.4	30012.2	86546.4	25635.3	107412.8	36427.6	8475.4	16379.3	72.2	457488.8
1988	149905.5	48856.8	8954.5	9.7	33339.4	49438.5	142140.4	42188.7	177225.2	60004.3	13926.7	27007.4	114.9	753112.0
1989	264770.4	86363.9	15738.5	7.6	58976.3	87422.8	250761.0	74547.9	313784.1	106103.2	24578.8	47793.3	197.7	1331045.5
1990	1178239.0	384576.0	69760.0	0.0	262771.0	389400.0	1114844.0	331856.0	1399071.0	472595.0	109308.0	213010.0	861.0	5926291.0
1991	739897.4	241546.7	43757.9	-6.0	165069.6	244595.9	699900.3	208415.6	879056.2	296851.6	68629.8	133821.9	537.4	3722074.3
1992	1615742.3	527525.1	95500.7	-20.0	360533.4	534206.1	1528189.4	455148.0	1920169.8	648332.1	149855.9	292297.2	1169.7	8128649.8
1993	5141620.3	1678820.1	303762.7	-80.8	1147454.3	1700136.9	4862477.2	1448431.6	6111745.1	2063342.6	476837.3	930314.7	3712.8	25868574.8
1994	4946169.8	1615102.9	292105.7	-91.2	1103964.4	1635653.8	4677219.8	1393417.4	5880496.5	1985079.3	458683.9	895080.4	3564.2	24886446.7

Annex Table I.3 (continued)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1995	7363277.6	2404500.2	434716.6	-152.6	1643612.2	2435149.0	6962378.7	2074412.9	8755530.9	2955365.4	682801.0	1332651.9	5296.7	37049540.6
1996	10329856.7	3373393.0	609697.4	-233.9	2305993.5	3416455.0	9766826.5	2910236.7	12284617.9	4146299.4	957853.6	1869752.9	7419.8	51978168.5
1997	16471453.1	5379238.6	971971.5	-400.1	3677275.5	5447992.2	15572836.5	4640603.7	19590577.9	6611817.2	1527288.9	2981671.8	11816.3	82884143.1
1998	16293892.4	5321423.3	961305.0	-419.0	3637855.8	5389512.1	15404245.1	4590656.6	19381246.8	6540836.5	1510778.1	2949753.0	11676.1	81992761.8

Note: *See Annex Table V.1 for full branch names.*

** Data in 1941-44 includes only investment in buildings.*

Assume that building investment between 1941-44 grew as fast as the average investment growth in 1945-47. This assumption is also supported by evidence in growth in value added in both Northern Rhodesia and Southern Rhodesia.

Sources:

Census of Industrial Production, 1947, table 1; Census of Production, 1962 (with comparisons back to 1955), table 3; Census of Production, 1963 (with comparisons back to 1955), table 3; Census of Production, 1964, table 8; Census of Production, 1965 and 1966, table VIII (A); Census of Production, 1967, table VIII (A); Census of Production, 1968, table VIII (A); Census of Industrial Production, 1969, table 10; Census of Industrial Production, 1970, table 10; Census of Industrial Production, 1971, table 10; Census of Industrial Production, 1972, table 6.1; Census of Industrial Production, 1973, table 6.1; Census of Industrial Production, 1974, table 6.1; Census of Industrial Production, 1975, table 6.1; Census of Industrial Production, 1980, table 6.1; Census of Industrial Production, 1990, tables 8 and 9; Southern Rhodesia Eleventh Report on the Census of Industrial Production 1938- 51, The Central African Statistical Office, Salisbury; The National Income and Social Accounts of Northern Rhodesia, 1945-1953, tables III and 21; National Accounts and Input-Output Table 1973 table 5.13; National Accounts and Input-Output Table, 1980, table 1.3; National Accounts Statistics Bulletin no.2, January 1988, table 4.0; National Accounts Statistics Bulletin no.3, January 1990, table 4.0; National Accounts Statistics Bulletin no.4, June 1992, table 4.0; National Accounts Statistics Bulletin no.6, October 1996, table Account:1.0; National Accounts Statistical Bulletin no.7, December 1998, table 10; CSO data base on GDP and Gross fixed capital formation from 1990 to 1998 in current prices and at 1994 prices.

Annex Table I.4: Investment in Fixed Assets in Zambian Manufacturing (10+) at constant 1990 prices, 1941-98 (ZK 000)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1941*	4445.6	26.7	55.6	2.7	318.1	135.1	669.1	7.6	1495.1	669.1	20970.2	0.3	222.3	29017.3
1942*	4576.5	34.9	54.5	3.3	457.6	228.8	719.2	9.9	1567.6	732.7	21846.4	0.3	231.7	30463.2
1943*	5151.5	42.9	79.4	3.9	350.3	152.1	751.3	8.8	1946.8	764.7	25830.7	0.3	247.5	35330.2
1944*	5688.1	51.5	85.9	4.3	543.5	302.5	869.3	10.8	2187.9	1072.6	29041.1	0.3	258.3	40116.0
1945	19499.9	165.2	267.9	13.4	928.2	1136.3	1243.0	17.8	11265.1	3760.8	48550.1	0.4	514.6	87362.5
1946	30253.7	256.3	415.7	20.8	1440.1	1762.9	1928.5	27.6	17477.6	5834.8	100013.1	0.6	798.4	160230.0
1947	126246.1	1069.6	1734.6	86.7	6009.6	7356.5	8047.5	115.0	72932.5	24348.1	161186.2	2.4	3331.6	412466.4
1948	61836.9	523.9	849.6	42.5	2943.6	3603.3	3941.8	56.3	35723.2	11926.0	171381.7	1.2	1631.9	294461.9
1949	61026.4	517.1	838.5	41.9	2905.0	3556.1	3890.1	55.6	35255.0	11769.7	284503.4	1.2	1610.5	405970.3
1950	84124.1	712.8	1155.8	57.8	4004.5	4902.0	5362.5	76.6	48598.5	16224.4	326256.4	1.6	2220.0	493696.9
1951	83700.5	709.2	1150.0	57.5	3984.3	4877.3	5335.5	76.2	48353.8	16142.7	328683.9	1.6	2208.8	495281.4
1952	131349.3	1112.9	1804.7	90.2	6252.5	7653.8	8372.8	119.6	75880.6	25332.4	435494.0	2.5	3466.3	696931.5
1953	133704.9	1132.8	1837.0	91.9	6364.6	7791.1	8523.0	121.8	77241.4	25786.7	461225.6	2.5	3528.4	727351.8
1954	349227.8	2958.9	4798.2	239.9	16624.0	20349.8	22261.4	318.0	201749.1	67353.0	70581.7	6.6	9216.0	765684.3
1955	309193.7	8176.5	13259.2	663.0	54580.5	19832.2	18079.6	258.3	116562.9	88290.5	65334.6	25.8	7464.3	701721.0
1956	676610.4	1305.6	2117.2	105.9	11165.0	53248.2	12396.2	177.1	667060.8	85287.6	110109.1	17.7	5117.9	1624718.5
1957	443982.9	2687.1	4357.5	217.9	20575.7	35383.0	66186.8	945.5	277584.0	123905.9	132607.1	0.0	27420.3	1135853.8
1958	245438.5	3345.4	5425.0	271.2	12397.2	9759.7	42578.3	608.3	119631.8	62546.8	106624.0	0.0	17639.6	626265.8
1959	617652.1	3983.6	6459.9	323.0	11419.4	16281.6	6505.6	92.9	148851.0	82586.2	46016.6	0.0	2695.2	942867.1
1960	429382.5	8509.8	13799.6	690.0	42872.2	34355.8	17638.2	10943.4	67919.1	97212.2	192932.4	2656.6	7559.2	926470.9
1961	157380.1	6258.5	10149.0	507.4	82992.4	40127.6	16547.2	13851.5	-2174.7	140422.6	135801.6	4394.3	7091.7	613349.2
1962	256819.1	3190.4	5173.6	258.7	29005.2	15949.4	8045.4	10122.2	39207.5	91761.7	39746.9	5362.0	3448.0	508090.0
1963	441606.2	4563.8	7400.8	370.0	25566.9	55740.0	18033.5	14391.6	94142.1	135025.5	54484.2	1566.2	7728.6	860619.5
1964	710119.1	27501.6	44597.2	2229.9	41307.8	73178.6	20782.3	11853.4	165239.0	206976.7	28993.7	11205.8	8906.7	1352892.0
1965	566977.7	165322.8	126444.8	17063.6	173630.2	112313.2	717608.6	69805.0	285522.7	429461.5	276468.6	24426.4	6398.2	2971443.1
1966	618066.8	75436.1	135530.5	62682.5	108483.7	182055.7	409240.3	39020.9	218456.3	267138.9	267839.2	105882.9	19445.3	2509279.1
1967	1129966.3	92884.7	199607.0	91010.8	126756.3	258887.4	409624.7	84680.3	1329861.7	367746.2	398849.6	86173.6	96383.9	4672432.5

Annex Table I.4 (continued)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1968	1603972.0	547404.3	154689.9	27288.0	314913.7	381510.2	3512966.9	712546.4	1891937.5	599906.2	154281.4	164626.2	2610.8	10068653.6
1969	1390480.8	1571763.0	124653.4	19587.8	240767.3	492263.2	600977.1	307770.1	347363.8	384189.6	147198.3	666771.5	31206.5	6324992.3
1970	1799769.8	789876.2	132764.5	22350.2	192709.9	264875.2	5582432.5	166778.8	157321.4	495963.9	80466.5	565361.6	50185.8	10300856.4
1971	1868245.1	243571.3	120613.8	13690.7	143161.5	200959.1	300162.6	107794.1	324260.4	934495.9	536046.6	153114.1	11150.3	4957265.7
1972	2544679.7	43944.6	135930.3	77021.7	84573.1	161326.6	2975572.4	249093.7	1568084.6	863502.5	371272.5	79482.7	2124.2	9156608.7
1973	2131586.0	-188002.1	87921.5	50155.6	235541.5	128461.2	486078.4	247658.5	5351130.7	363771.6	127437.2	142276.9	6449.7	9170466.7
1974	2177441.5	429261.5	339040.2	280581.1	574407.8	279553.3	965631.0	374315.2	1858162.0	540063.3	172814.7	121935.7	43991.3	8157198.5
1975	2442066.5	702752.6	227340.4	55808.3	308723.8	145803.8	3070023.0	224568.4	573825.1	650810.6	214483.8	126268.6	27897.2	8770372.0
1976	2819528.1	788831.9	317139.0	58873.7	338772.4	237570.0	3795914.4	341006.8	664244.4	722880.5	272209.7	141711.9	30044.9	10528727.7
1977	2034644.4	559227.5	264579.7	38679.2	223820.5	219668.4	2934606.8	302931.0	468054.6	505111.7	213316.8	100829.1	20377.9	7885847.7
1978	1557539.1	414285.1	227411.7	27064.1	159407.1	203142.1	2329199.3	272746.7	332230.4	373484.8	174487.7	75956.7	14639.4	6161594.1
1979	1294148.4	334254.9	207456.5	20457.2	118786.0	195463.4	2028187.8	257481.8	261424.3	299730.4	153217.0	62299.3	11550.8	5244457.8
1980	1135065.9	286271.7	196789.3	16319.5	92027.4	192551.7	1869139.4	250023.1	224124.2	254107.8	141111.8	54133.1	9654.7	4721319.8
1981	1159945.1	380009.5	76203.5	2369.3	247688.2	311795.9	1067462.6	357789.2	1246665.0	391331.6	103502.2	199798.9	2149.1	5546710.0
1982	1059728.8	353545.7	60867.8	1043.8	238230.1	297066.0	922301.0	334097.4	1223274.6	372793.8	91931.4	193680.9	1358.6	5149920.0
1983	908759.9	319168.7	50392.3	542.2	221056.5	246388.5	813599.4	328306.1	1196163.5	339435.1	74771.3	182262.7	1018.0	4681864.2
1984	661869.9	218066.7	41077.7	252.7	148904.1	211544.3	638584.5	196793.2	797049.4	264568.0	60787.1	120813.9	632.4	3360943.9
1985	621500.5	204789.6	44957.3	158.6	140826.4	218878.1	698818.1	183469.7	801441.6	283607.3	60437.3	114311.0	560.9	3373756.4
1986	537426.3	170483.6	51455.1	90.0	116677.6	232032.7	782388.7	137754.5	732718.9	304094.8	60372.8	93778.7	461.4	3219735.3
1987	391239.3	124380.0	44797.7	41.9	85857.3	189825.3	681668.5	99631.6	591389.4	259233.4	47620.9	69105.3	329.5	2585120.2
1988	640457.7	210251.5	60583.7	40.9	145917.8	270821.9	941927.0	182476.9	934091.7	368598.1	70087.0	118493.7	516.7	3944264.6
1989	608815.4	204612.6	41211.1	17.7	142043.8	208802.9	661780.3	188534.2	810422.2	274368.8	57359.2	116026.6	469.4	3314464.2
1990	1178239.0	384576.0	69760.0	0.0	262771.0	389400.0	1114844.0	331856.0	1399071.0	472595.0	109308.0	213010.0	861.0	5926291.0
1991	382888.7	124535.1	25470.1	-3.1	85189.5	134835.8	403699.2	106114.0	471703.4	167282.7	37046.7	69006.8	279.5	2008048.6
1992	385697.2	130542.4	22171.3	-4.8	90636.9	121208.5	363264.2	122321.1	493754.4	155849.8	34200.9	74165.7	286.0	1994093.7
1993	622861.1	211410.1	24035.2	-10.0	146023.6	162719.3	411547.3	200873.8	716035.7	193644.8	49217.5	119526.3	452.9	2858337.6
1994	337197.6	110673.1	15851.2	-6.3	75500.2	99719.4	258964.0	97222.6	375872.6	115585.2	29092.5	61279.8	240.9	1577192.9

Annex Table I.4 (continued)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1995	316405.3	111341.2	18458.3	-6.7	78650.7	96073.3	309466.0	112782.6	444140.4	133216.8	27040.5	64960.3	239.9	1712768.8
1996	402438.8	142028.5	22746.5	-9.3	100396.4	119800.8	383419.4	144755.1	563177.8	166214.1	33919.2	82973.8	304.8	2162165.8
1997	587137.1	207734.9	32456.3	-14.6	146945.1	172289.3	549410.2	212818.8	820902.1	239388.9	48983.6	121511.9	444.3	3140007.7
1998	535368.5	189828.6	29063.9	-14.1	134362.7	155257.5	493764.0	195326.7	748246.1	216051.5	44290.9	111160.1	404.9	2853111.1

Note: *See Annex Table V.1 for full branch names.*

** Data in 1941-44 includes only investment in buildings.*

Assume that building investment between 1941-44 grew as fast as the average investment growth in 1945-47. This assumption is also supported by evidence in growth in value added in both Northern Rhodesia and Southern Rhodesia.

Source for investments:
Annex Table I.3.
Sources for deflators:
CSO database on Index Numbers of Wholesale Prices 1966=100 (by Industrial Activities); Monthly Digest of Statistics, July-October 1991, tables 48, 49(a) and (b).
We used implicit price indices for GDP in construction, machinery and vehicles.

Annex Table I.5: Capital Stock Estimates for Zambian Manufacturing (10+) at constant 1990 prices, 1970-98, midyear (ZK million)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1970	6,222.6	2,624.0	588.8	157.7	828.9	1,313.0	9,096.8	1,040.1	3,111.6	2,030.6	1,450.7	1,318.9	165.1	29,948.9
1971	7,134.8	2,562.7	612.9	150.8	839.2	1,339.5	8,387.8	1,013.0	2,975.1	2,623.5	1,762.4	1,321.3	148.9	30,871.8
1972	8,548.9	2,298.6	647.2	203.6	799.2	1,321.2	10,246.3	1,107.7	3,972.7	3,089.7	1,897.6	1,247.7	125.4	35,505.7
1973	9,432.4	1,838.0	633.0	225.8	890.5	1,266.3	9,650.4	1,194.8	8,348.7	3,042.9	1,789.0	1,229.4	106.3	39,647.5
1974	10,213.5	1,959.2	849.0	456.7	1,266.1	1,348.5	9,445.7	1,375.8	9,004.5	3,141.1	1,713.3	1,180.8	122.0	42,076.4
1975	11,073.9	2,312.9	942.5	458.2	1,352.4	1,292.4	11,110.7	1,394.9	8,333.4	3,324.1	1,676.1	1,129.0	121.2	44,521.6
1976	12,074.6	2,692.4	1,107.6	460.8	1,446.5	1,326.2	13,162.0	1,503.3	7,686.7	3,541.5	1,692.2	1,085.0	121.7	47,900.6
1977	12,179.8	2,799.8	1,208.3	442.5	1,408.7	1,335.4	14,090.3	1,555.7	6,880.2	3,518.9	1,654.2	994.4	118.7	48,186.7
1978	11,793.4	2,748.3	1,258.9	410.2	1,328.4	1,329.7	14,366.3	1,588.0	6,028.0	3,381.1	1,572.8	880.1	108.6	46,793.8
1979	11,170.4	2,710.0	1,280.1	370.7	1,244.4	1,341.7	14,179.3	1,619.2	5,157.5	3,181.1	1,475.6	797.7	97.5	44,625.1
1980	10,440.5	2,653.7	1,286.3	327.3	1,159.0	1,351.0	14,119.0	1,638.1	4,241.4	2,961.0	1,367.3	742.4	88.1	42,375.3
1981	9,770.0	2,661.6	1,182.8	273.1	1,232.1	1,452.0	13,197.8	1,741.1	4,282.0	2,902.3	1,251.4	819.8	72.6	40,838.4
1982	9,088.6	2,601.1	1,075.0	223.9	1,279.1	1,508.9	12,091.1	1,808.5	4,329.3	2,866.0	1,149.8	872.5	57.0	38,950.9
1983	8,294.7	2,448.7	963.5	180.8	1,306.0	1,496.6	10,842.3	1,863.6	4,628.5	2,795.3	1,044.0	903.5	42.3	36,809.8
1984	7,356.0	2,202.9	868.7	158.2	1,277.0	1,445.5	9,472.1	1,793.6	4,655.6	2,672.1	933.7	870.4	31.5	33,737.3
1985	6,500.7	1,966.2	793.9	141.0	1,232.6	1,391.2	8,414.7	1,710.1	4,672.6	2,595.8	834.4	829.9	23.5	31,106.6
1986	5,798.0	1,756.7	743.8	127.5	1,171.0	1,377.8	7,774.8	1,594.9	4,649.5	2,581.7	757.6	780.0	18.0	29,131.3
1987	5,147.0	1,555.4	702.6	116.1	1,088.7	1,352.9	7,298.4	1,456.1	4,519.4	2,555.1	690.6	716.4	14.4	27,213.0
1988	4,838.4	1,466.2	688.9	106.1	1,064.4	1,419.4	7,268.1	1,401.7	4,722.5	2,648.5	659.1	702.1	12.2	26,997.6
1989	4,563.3	1,389.9	666.9	96.9	1,031.8	1,432.3	7,122.7	1,351.8	4,790.1	2,655.1	624.9	682.7	10.7	26,419.1
1990	4,811.6	1,480.6	681.6	88.4	1,097.4	1,605.6	7,547.4	1,426.9	5,374.7	2,845.9	642.9	743.1	10.2	28,356.1
1991	4,318.7	1,331.7	654.1	79.9	998.3	1,531.4	7,297.9	1,298.2	5,094.0	2,743.0	592.4	670.1	9.3	26,618.9
1992	3,858.1	1,201.6	624.1	71.5	913.4	1,445.1	7,027.2	1,203.5	4,885.4	2,635.5	540.3	609.9	8.4	25,024.0
1993	3,658.3	1,161.0	596.5	63.1	889.7	1,401.8	6,815.4	1,198.5	4,930.2	2,570.7	504.1	600.2	7.8	24,397.2
1994	3,221.9	1,032.9	561.5	54.8	803.8	1,304.7	6,461.0	1,099.4	4,663.9	2,435.8	451.1	538.7	7.0	22,636.7
1995	2,901.0	940.7	532.0	46.5	743.5	1,241.2	6,182.8	1,027.4	4,501.9	2,336.6	410.4	495.6	6.4	21,366.0
1996	2,674.3	879.5	506.8	38.8	704.9	1,201.6	5,972.1	984.8	4,447.9	2,269.3	378.5	471.0	5.8	20,535.3
1997	2,605.1	872.4	491.5	32.6	705.0	1,209.6	5,907.5	997.8	4,613.0	2,267.6	363.3	478.9	5.5	20,549.8
1998	2,507.2	856.7	473.9	26.8	693.6	1,209.4	5,830.3	1,000.8	4,704.6	2,244.9	346.3	478.3	5.1	20,377.9

Note: See Annex Table V.1 for full branch names.

Sources:

PIM estimate for 3 asset types on 1970 bench mark with rectangular scrapping after service lives (30 years for buildings, 10 years for machinery and equipment, 5 years for vehicles and others, also see Maddison, 1993, and Timmer, 2000). For method, see main text of chapter 3. Real investment data from Annex Table I.4.

Annex Table I.6: Shares of Labour in current manufacturing value added (10+), Zambia, 1970-98

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1970	0.36	0.46	0.42	0.28	0.30	0.37	0.35	0.34	0.41	0.43	0.42	0.43	0.47	0.44
1971	0.34	0.46	0.47	0.31	0.22	0.37	0.36	0.31	0.42	0.45	0.44	0.43	0.44	0.42
1972	0.29	0.47	0.44	0.38	0.32	0.35	0.36	0.33	0.36	0.50	0.40	0.37	0.54	0.37
1973	0.34	0.44	0.43	0.39	0.34	0.35	0.33	0.29	0.58	0.47	0.42	0.35	0.32	0.40
1974	0.35	0.44	0.41	0.40	0.40	0.34	0.33	0.32	0.43	0.45	0.36	0.33	0.40	0.39
1975	0.41	0.47	0.42	0.39	0.43	0.39	0.31	0.32	0.42	0.55	0.33	0.43	0.40	0.43
1976	0.34	0.45	0.39	0.34	0.26	0.42	0.40	0.35	0.44	0.49	0.46	0.47	0.37	0.40
1977	0.33	0.32	0.30	0.37	0.38	0.38	0.33	0.43	0.42	0.39	0.41	0.43	0.37	0.37
1978	0.36	0.33	0.35	0.38	0.30	0.37	0.45	0.44	0.41	0.43	0.42	0.43	0.41	0.33
1979	0.34	0.39	0.37	0.31	0.22	0.37	0.46	0.31	0.42	0.45	0.44	0.43	0.44	0.31
1980	0.30	0.26	0.41	0.26	0.30	0.41	0.34	0.34	0.43	0.40	0.43	0.42	0.41	0.35
1981	0.29	0.36	0.38	0.31	0.26	0.35	0.21	0.23	0.35	0.45	0.45	0.33	0.40	0.33
1982	0.35	0.22	0.32	0.38	0.28	0.38	0.36	0.25	0.34	0.41	0.43	0.37	0.44	0.32
1983	0.36	0.31	0.33	0.39	0.35	0.37	0.36	0.37	0.38	0.35	0.38	0.35	0.36	0.33
1984	0.30	0.32	0.32	0.22	0.32	0.38	0.44	0.36	0.42	0.45	0.41	0.47	0.37	0.33
1985	0.34	0.48	0.39	0.24	0.26	0.34	0.40	0.35	0.44	0.49	0.46	0.47	0.37	0.38
1986	0.34	0.39	0.37	0.31	0.22	0.31	0.46	0.31	0.42	0.45	0.44	0.43	0.34	0.37
1987	0.29	0.41	0.44	0.38	0.22	0.35	0.36	0.33	0.36	0.40	0.40	0.37	0.35	0.38
1988	0.34	0.44	0.33	0.39	0.23	0.35	0.29	0.29	0.38	0.41	0.42	0.39	0.32	0.38
1989	0.39	0.44	0.31	0.40	0.24	0.34	0.29	0.32	0.43	0.45	0.36	0.37	0.40	0.43
1990	0.34	0.42	0.37	0.29	0.24	0.31	0.43	0.27	0.37	0.44	0.42	0.55	0.40	0.44
1991	0.40	0.26	0.41	0.26	0.23	0.35	0.34	0.34	0.25	0.40	0.24	0.17	0.39	0.45
1992	0.39	0.36	0.38	0.31	0.25	0.41	0.21	0.35	0.35	0.45	0.45	0.33	0.41	0.46
1993	0.35	0.42	0.32	0.38	0.27	0.38	0.36	0.35	0.34	0.41	0.43	0.37	0.38	0.38
1994	0.39	0.50	0.31	0.40	0.32	0.35	0.29	0.39	0.81	0.54	0.59	0.41	0.29	0.43

Annex Table I.6 (continued)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1995	0.39	0.36	0.38	0.31	0.33	0.35	0.21	0.35	0.35	0.45	0.45	0.33	0.47	0.44
1996	0.37	0.32	0.32	0.35	0.36	0.38	0.26	0.25	0.34	0.40	0.39	0.37	0.44	0.38
1997	0.36	0.49	0.33	0.32	0.37	0.37	0.26	0.27	0.38	0.46	0.38	0.51	0.42	0.41
1998	0.38	0.52	0.42	0.22	0.36	0.38	0.44	0.26	0.42	0.49	0.42	0.47	0.47	0.46

Note: See Annex Table V.1 for full branch names.

Sources:

Census of Industrial Production, 1970, table 3.2; Census of Industrial Production, 1971, table 3.2; Census of Industrial Production, 1972, table 1.2; Census of Industrial Production, 1973, table 1.2; Census of Industrial Production, 1974, table 1.2; Census of Industrial Production, 1975, table 1.2; Census of Industrial Production, 1980, table 1.2; Census of Industrial Production, 1990, table 2; Census of Industrial Production, 1994, table 0.1; Monthly Digest of Statistics, July-October 1991, table 16; Report on Employment and Earnings 1966-68, CSO, tables 2 and 10.2; Report on Employment and Earnings 1972-74, CSO, tables 2.0, 2.1 and 2.2; Report on Employment and Earnings 1978, CSO, tables 2.0 and 3.2; Report on Employment and Earnings 1979, CSO, tables 2.0 and 3.1; Quarterly Employment and Earnings Statistics, June 1992, tables 1 and 5; CSO database on GDP and Gross fixed capital formation from 1990 to 1998 in current prices and at 1994 prices.

Annex Table I.7: Total factor productivity levels by Zambian manufacturing branch (10+), 1970-98 (1990=100)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1970	36.4	11.1	144.1	22.3	101.4	104.7	57.2	76.4	186.0	163.1	67.3	34.4	15.2	63.3
1971	39.4	14.5	133.7	24.9	97.0	106.4	68.4	108.2	199.2	140.4	57.3	51.6	18.3	68.3
1972	37.1	18.3	155.8	37.7	94.0	134.2	96.7	102.9	196.7	127.6	75.9	63.6	14.7	73.3
1973	33.6	24.7	131.6	42.8	101.4	134.3	115.1	108.4	123.1	126.6	81.8	59.3	23.1	69.3
1974	25.8	22.5	128.2	35.5	111.1	130.6	111.1	91.4	143.3	125.3	94.9	79.1	27.4	67.5
1975	20.5	19.7	96.5	33.1	88.9	108.3	114.8	75.0	134.4	98.6	117.5	49.7	26.2	59.6
1976	26.5	30.4	103.6	33.8	89.3	97.8	124.3	79.8	76.8	50.7	113.5	69.4	28.0	58.4
1977	26.8	34.2	98.2	31.9	106.7	102.7	122.6	66.5	75.5	56.1	93.1	68.1	28.2	59.1
1978	27.5	37.2	94.8	38.9	103.0	121.9	126.0	65.7	108.9	65.1	89.9	75.6	30.1	64.2
1979	31.0	46.6	99.8	41.3	115.0	97.7	129.3	74.9	108.6	67.3	77.0	61.7	29.6	65.7
1980	26.5	52.0	104.9	46.3	135.8	76.4	106.4	63.4	161.0	72.6	80.7	68.6	31.2	63.1
1981	47.9	57.4	60.0	56.3	122.8	55.9	78.0	46.7	168.1	107.1	88.9	67.8	35.7	69.9
1982	52.5	63.8	62.5	51.7	105.3	47.5	63.2	33.1	162.2	134.3	99.8	69.9	38.6	72.4
1983	57.3	56.9	54.2	75.0	102.8	45.2	62.8	35.4	182.7	98.1	107.8	70.1	41.4	71.6
1984	65.0	59.3	55.3	48.6	97.8	42.2	28.6	27.4	78.0	163.2	95.3	72.3	64.2	71.1
1985	56.7	56.6	53.5	61.9	107.7	50.9	59.0	55.8	152.5	174.8	128.7	85.2	68.1	80.4
1986	63.1	51.6	48.5	52.8	110.0	64.9	61.2	57.8	117.2	199.0	136.7	112.7	84.9	85.9
1987	72.4	59.1	54.8	56.5	103.3	101.5	60.0	58.0	22.1	149.8	190.8	142.6	99.4	86.2
1988	85.5	63.8	59.5	59.8	100.5	106.7	57.7	57.0	68.9	147.6	186.3	137.9	114.7	92.4
1989	93.7	72.8	75.6	74.1	116.2	110.8	76.1	82.8	98.0	92.3	170.6	123.1	120.1	94.3
1990	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1991	120.6	64.5	62.4	137.7	124.5	93.9	88.4	53.3	46.4	129.8	97.8	108.2	118.2	99.2
1992	112.2	91.9	86.4	154.0	134.2	108.4	27.0	15.5	39.5	171.1	131.1	147.2	115.7	96.7
1993	63.0	59.0	56.3	158.4	120.5	46.9	112.1	61.5	22.5	76.0	81.5	86.7	63.3	69.0
1994	50.3	47.3	43.4	150.1	126.7	22.7	81.2	45.3	15.7	127.3	73.8	76.0	84.5	61.2
1995	73.8	54.2	51.2	171.9	138.6	15.4	26.0	14.8	14.2	74.0	32.7	27.4	45.4	49.6
1996	87.2	69.0	60.9	188.9	137.4	16.1	36.5	21.1	14.9	66.9	31.7	26.1	50.9	55.6
1997	91.9	88.0	58.4	227.8	148.0	22.2	35.3	20.1	11.0	84.6	31.7	24.8	49.7	60.4
1998	98.7	92.8	66.2	276.9	156.3	24.3	27.1	17.9	13.2	88.9	32.6	24.6	64.5	61.9

Note: See Annex Table V.1 for full branch names.

Sources:

Calculated with translog production function with value added, labour and capital input, and labour share in value added from Annex Tables I.1, I.2, I.5 and I.6.

Annex Table I.8: Gross Domestic Product in US Manufacturing at constant 1982 prices, 1964-98 (million US dollars)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1964	45,453	9,879	13,755	4,765	19,380	42,893	40,985	9,425	17,779	84,292	107,854	23,571	17,181	437,213
1965	47,010	10,833	15,099	5,046	21,711	44,476	44,117	10,230	18,425	92,077	119,624	28,073	19,052	475,772
1966	49,340	11,769	16,336	5,315	21,855	47,046	46,191	11,119	18,546	99,306	131,808	32,418	21,201	512,249
1967	48,958	11,425	15,982	4,789	21,793	46,806	47,027	11,137	18,012	97,547	131,749	33,671	21,692	510,587
1968	49,937	11,992	16,767	5,003	22,902	49,575	51,604	12,630	18,700	99,639	139,691	35,226	23,470	537,135
1969	51,821	12,269	16,765	4,782	23,203	52,927	52,219	13,870	19,767	102,593	139,065	37,703	25,546	552,529
1970	52,910	12,962	15,639	4,347	22,320	49,797	55,336	12,358	18,957	93,729	124,164	34,794	23,407	520,721
1971	54,747	13,430	15,829	4,349	23,148	51,015	58,616	13,365	19,274	90,550	126,564	34,856	24,136	529,879
1972	57,850	14,370	18,531	4,487	26,871	54,843	61,536	15,259	21,165	98,401	138,761	38,764	26,969	577,806
1973	62,169	14,124	19,997	4,855	28,211	60,282	67,589	17,641	23,505	113,279	155,492	44,404	28,450	639,999
1974	57,133	12,650	18,874	4,672	27,156	57,800	62,561	16,359	22,073	109,561	150,371	41,372	28,465	609,046
1975	58,598	11,882	18,704	4,469	24,861	53,929	61,522	14,794	19,981	88,426	138,928	38,033	28,966	563,092
1976	61,643	14,513	20,123	4,994	27,982	58,908	69,867	15,386	22,279	95,925	154,034	41,971	31,052	618,677
1977	61,240	17,632	20,834	4,754	29,489	62,686	76,413	17,884	22,650	99,353	167,642	50,111	34,102	664,790
1978	66,543	16,630	21,535	4,853	30,493	65,086	77,712	18,983	23,249	106,150	173,843	56,213	33,306	694,595
1979	69,444	17,031	21,335	4,160	32,698	65,785	81,507	19,683	23,448	108,649	173,655	60,214	34,410	712,018
1980	69,444	16,430	21,135	4,259	31,795	62,783	72,816	18,584	21,253	101,852	158,682	63,314	31,613	673,959
1981	68,844	15,829	20,333	4,358	26,782	64,081	75,715	20,782	20,156	103,551	157,479	64,915	35,912	678,736
1982	70,343	14,827	18,931	4,061	25,578	65,082	79,609	19,283	18,160	81,562	141,686	61,814	33,712	634,648
1983	70,742	16,230	20,133	3,764	29,289	68,582	89,395	21,581	19,657	77,664	160,178	64,615	32,615	674,444
1984	69,941	16,029	20,433	3,566	32,599	70,282	98,776	24,678	21,253	88,160	194,267	73,517	38,911	752,412
1985	71,040	15,628	20,133	3,170	31,998	72,681	98,377	26,577	22,151	88,859	216,965	74,317	37,211	779,105
1986	72,641	17,031	21,034	2,674	33,401	74,681	105,569	26,676	22,850	86,960	225,877	74,117	39,711	803,224
1987	71,939	17,432	22,036	2,971	37,914	78,381	114,360	29,474	21,952	93,657	238,586	82,919	40,610	852,230
1988	77,611	17,195	23,125	3,030	37,450	81,206	117,317	31,167	22,859	99,523	268,357	93,360	47,872	920,074
1989	73,384	17,432	23,460	3,088	36,309	80,456	114,343	34,254	24,180	95,865	269,738	101,959	45,692	920,159
1990	73,481	17,984	22,874	3,030	34,435	78,868	110,978	33,855	24,262	93,735	267,136	105,338	46,475	912,451

Annex Table I.8 (continued)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1991	74,195	17,984	22,623	3,030	31,816	77,501	105,705	34,951	22,117	88,965	246,108	111,633	44,932	881,560
1992	73,563	20,192	23,209	3,030	31,922	77,927	109,295	37,739	24,427	90,768	256,664	112,555	42,733	904,024
1993	75,543	20,429	23,125	2,855	31,697	78,913	109,670	41,025	24,015	97,444	269,202	130,520	40,449	944,887
1994	75,304	21,218	23,796	2,971	32,756	80,213	118,178	44,709	26,408	107,148	290,876	158,621	39,912	1,022,109
1995	89,000	20,508	23,460	3,088	34,429	72,765	126,816	46,800	27,068	109,756	324,653	197,623	39,931	1,115,897
1996	79,442	19,956	22,623	2,447	33,585	74,766	134,948	49,488	27,398	112,490	342,193	235,244	40,775	1,175,356
1997	76,683	19,798	21,785	2,622	34,782	75,223	131,417	53,571	30,782	117,032	391,831	280,081	40,185	1,275,792
1998	75,371	19,246	20,695	2,447	36,791	73,748	123,466	53,372	32,762	121,062	461,080	341,042	40,209	1,401,291

Note: See Annex Table V.1 for full branch names.

Sources:

1987-98: BEA, Selected National Income and Product Account Tables, download from the Internet 28 June 2000.

(http://www.bea.doc.gov/bea/dn1.htm).

Growth rates for 1977-87 from same source are linked in 1987. Breakdown of electrical machinery and precision instruments on basis of series using 1972 SIC.

Growth rates for series for 1947-77 from BEA, National Income and Product Accounts of the United States, 1929-82, Washington DC, linked in 1977.

DataBase on Producer Price Indexes, from Internet http://146.142.4.24/cgi-bin/srgate version d.d. July 1999.

Annex Table I.9: Employment in US Manufacturing, 1964-98 (1000 persons)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1964	1,869	902	1,316	350	1,142	1,629	1,040	480	594	2,513	3,402	1,294	1,011	17,541
1965	1,875	935	1,365	356	1,177	1,669	1,069	516	608	2,659	3,643	1,382	1,069	18,322
1966	1,886	973	1,415	366	1,218	1,730	1,124	561	623	2,820	4,022	1,590	1,161	19,490
1967	1,899	971	1,407	356	1,196	1,775	1,159	566	612	2,847	4,105	1,641	1,190	19,723
1968	1,898	1,005	1,422	361	1,226	1,805	1,194	609	617	2,898	4,162	1,656	1,218	20,071
1969	1,902	1,016	1,431	346	1,264	1,856	1,228	650	638	2,994	4,217	1,700	1,251	20,492
1970	1,888	989	1,382	321	1,222	1,841	1,220	634	622	2,842	3,872	1,603	1,206	19,642
1971	1,850	965	1,359	302	1,237	1,776	1,178	630	612	2,663	3,596	1,482	1,147	18,795
1972	1,824	1,004	1,389	300	1,297	1,793	1,166	681	632	2,718	3,738	1,527	1,200	19,266
1973	1,822	1,036	1,427	299	1,366	1,844	1,196	737	669	2,919	4,056	1,685	1,281	20,336
1974	1,816	990	1,369	281	1,311	1,847	1,220	732	664	2,935	4,136	1,701	1,328	20,329
1975	1,761	872	1,264	250	1,129	1,772	1,216	626	608	2,622	3,809	1,462	1,230	18,620
1976	1,787	921	1,351	270	1,231	1,821	1,247	677	626	2,689	3,906	1,528	1,284	19,338
1977	1,807	915	1,345	266	1,313	1,890	1,284	747	647	2,785	4,106	1,612	1,363	20,081
1978	1,828	919	1,364	270	1,374	1,953	1,309	788	678	2,912	4,389	1,737	1,440	20,962
1979	1,833	895	1,329	257	1,388	2,017	1,327	822	693	2,992	4,640	1,824	1,477	21,494
1980	1,807	858	1,296	242	1,293	2,029	1,325	760	649	2,787	4,450	1,811	1,466	20,774
1981	1,781	833	1,275	250	1,258	2,048	1,332	774	623	2,743	4,458	1,814	1,493	20,683
1982	1,741	758	1,188	230	1,139	2,039	1,291	722	559	2,381	4,056	1,743	1,450	19,298
1983	1,705	754	1,189	215	1,211	2,073	1,247	743	560	2,224	3,831	1,743	1,423	18,917
1984	1,694	760	1,224	198	1,298	2,157	1,239	822	587	2,364	4,153	1,909	1,445	19,849
1985	1,687	713	1,149	175	1,295	2,195	1,228	822	577	2,265	4,227	1,892	1,442	19,667
1986	1,707	715	1,133	157	1,314	2,226	1,196	828	572	2,206	4,130	1,827	1,425	19,436
1987	1,720	737	1,130	152	1,367	2,269	1,195	859	574	2,170	4,116	1,788	1,406	19,483
1988	1,718	739	1,120	152	1,403	2,365	1,227	873	590	2,226	4,200	1,781	1,487	19,881
1989	1,718	730	1,118	150	1,394	2,376	1,235	894	586	2,240	4,236	1,760	1,493	19,930
1990	1,726	702	1,071	140	1,359	2,393	1,254	890	570	2,193	4,142	1,682	1,451	19,573

Annex Table I.9 (continued)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1991	1,745	680	1,047	129	1,264	2,350	1,251	868	539	2,102	3,965	1,604	1,410	18,954
1992	1,726	681	1,040	124	1,278	2,307	1,245	882	531	2,042	3,819	1,535	1,367	18,577
1993	1,748	688	1,026	125	1,327	2,338	1,229	918	535	2,046	3,745	1,547	1,350	18,622
1994	1,747	687	1,020	121	1,380	2,362	1,205	964	551	2,113	3,793	1,591	1,326	18,860
1995	1,746	671	977	113	1,419	2,374	1,191	983	560	2,175	3,899	1,634	1,297	19,039
1996	1,748	638	909	106	1,408	2,339	1,178	987	578	2,185	3,933	1,669	1,316	18,994
1997	1,760	624	857	92	1,434	2,362	1,180	1,003	576	2,216	4,053	1,699	1,336	19,192
1998	1,755	604	802	88	1,482	2,373	1,186	1,020	582	2,253	4,163	1,714	1,340	19,361

Note: See Annex Table V.1 for full branch names.

Sources: 1987-98: BEA, Selected National Income and Product Account Tables, download from the Internet 28 June 2000. (http://www.bea.doc.gov/bea/dn1.htm).

Growth rates for 1977-87 from same source are linked in 1987. Breakdown of electrical machinery and precision instruments on basis of series using 1972 SIC. Growth rates for series for 1947-77 from BEA, National Income and Product Accounts of the United States, 1929-1982, Washington DC, linked in 1977.

Annex Table I.10: Gross fixed capital stock in US Manufacturing at constant 1985 prices, 1970-98, midyear (million US dollars)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1970	106,813.2	39,133.7	10,614.0	3,632.0	36,872.2	115,120.0	183,043.2	28,507.5	48,464.6	173,745.5	172,254.5	50,534.9	25,990.6	994,726.1
1971	108,635.9	39,694.4	11,223.1	3,652.6	38,197.1	118,727.9	190,053.8	30,033.5	49,507.8	178,216.7	176,916.5	53,335.4	27,128.3	1,025,322.8
1972	110,603.4	40,537.2	11,966.1	3,645.5	39,715.5	121,240.6	195,924.5	31,709.3	50,360.9	181,694.4	180,732.5	56,052.0	28,215.1	1,052,396.9
1973	112,580.8	41,591.6	12,713.5	3,638.8	41,433.2	123,324.4	200,911.5	33,940.6	51,200.3	184,908.8	184,858.5	59,436.1	29,546.4	1,080,084.4
1974	114,253.9	42,353.8	13,287.5	3,649.1	43,607.4	126,265.6	207,621.7	36,374.3	52,012.4	188,804.6	190,292.9	63,585.2	31,224.0	1,113,332.4
1975	116,659.9	43,115.8	13,787.7	3,645.6	45,756.9	131,298.0	217,027.1	38,409.6	53,097.2	194,787.0	196,917.1	67,174.7	32,764.3	1,154,440.9
1976	119,883.1	43,980.0	14,307.9	3,647.4	47,337.8	137,455.6	228,490.8	40,090.3	54,243.1	202,224.8	203,619.0	70,020.2	34,209.0	1,199,508.9
1977	123,834.2	44,969.8	15,002.4	3,680.7	49,331.7	144,008.1	240,909.0	41,784.1	55,341.9	209,696.9	211,627.7	73,124.7	35,785.9	1,249,097.1
1978	128,298.5	46,084.6	15,773.7	3,751.1	51,972.3	151,241.1	252,204.0	43,802.7	57,011.0	217,669.9	222,724.5	77,105.6	37,402.9	1,305,041.8
1979	132,601.8	46,987.1	16,335.1	3,832.3	54,685.3	159,294.2	263,107.7	46,139.3	59,007.5	226,401.6	236,490.7	82,381.6	39,259.5	1,366,523.7
1980	136,695.2	47,758.4	16,600.3	3,910.3	57,138.1	167,825.4	274,421.1	48,232.3	61,167.0	234,693.8	250,675.7	88,932.7	41,416.4	1,429,466.6
1981	140,605.7	48,295.0	16,776.1	4,004.2	58,861.1	174,699.5	285,519.2	49,876.2	62,730.8	241,773.0	264,883.3	95,907.0	43,524.0	1,487,455.0
1982	144,199.3	48,190.4	16,924.1	4,043.3	59,507.7	179,092.4	295,810.5	50,869.3	62,997.0	245,000.7	276,139.3	102,555.1	45,428.8	1,530,758.0
1983	147,160.7	47,606.2	16,982.8	4,016.8	59,589.3	181,911.5	303,063.8	51,182.1	62,420.7	243,987.8	281,595.7	108,623.9	47,102.8	1,555,244.2
1984	149,859.8	47,267.1	17,028.1	3,985.3	60,045.6	184,646.1	307,740.1	51,660.2	62,265.1	241,882.0	286,401.0	115,258.7	48,716.1	1,576,755.3
1985	152,949.2	47,209.7	17,032.9	3,925.1	60,788.0	189,467.5	311,487.3	52,841.1	62,663.4	240,215.5	295,063.4	123,308.9	50,619.3	1,607,571.2
1986	155,432.3	46,670.0	16,920.8	3,843.9	61,210.3	194,474.5	313,107.8	53,793.7	62,478.1	237,918.8	304,394.1	130,495.8	52,390.1	1,633,130.3
1987	157,762.1	46,022.9	16,791.6	3,790.5	61,749.1	198,772.3	313,563.8	54,213.2	62,253.4	235,705.9	312,521.5	137,011.9	54,017.3	1,654,175.5
1988	161,164.4	45,713.0	16,717.3	3,756.7	62,560.5	205,522.6	315,703.4	54,774.8	62,461.1	236,039.7	320,838.9	145,033.4	56,096.8	1,686,382.6
1989	165,173.9	45,238.4	16,498.0	3,724.6	63,302.4	216,821.9	320,045.3	55,506.6	62,714.1	238,269.5	330,022.8	153,799.2	58,613.6	1,729,730.3
1990	169,578.5	44,405.6	16,158.2	3,688.5	64,060.3	230,054.8	324,290.9	55,734.9	62,300.4	239,841.0	338,856.4	162,167.0	60,953.4	1,772,089.8
1991	174,477.1	43,314.4	15,712.2	3,636.8	64,010.6	239,411.3	326,705.1	55,367.5	60,955.7	238,203.7	344,623.7	169,097.7	62,881.8	1,798,397.6
1992	179,591.3	42,454.2	15,276.2	3,584.8	63,436.1	244,898.8	327,784.7	55,341.6	59,669.6	234,634.3	349,399.8	175,227.8	64,872.7	1,816,171.9
1993	185,245.3	42,048.8	14,940.3	3,542.1	64,067.9	251,035.7	328,990.5	55,705.8	59,722.7	232,186.7	358,321.0	183,488.0	67,058.5	1,846,353.4
1994	192,746.0	41,686.4	14,443.6	3,498.0	65,481.4	260,057.6	331,281.3	56,544.4	60,858.0	231,623.8	372,736.0	193,198.8	69,204.1	1,893,359.5
1995	202,602.9	41,183.0	13,859.4	3,442.7	67,041.3	270,777.5	335,834.1	57,782.5	61,997.2	232,203.3	390,952.3	203,573.0	71,721.1	1,952,970.2
1996	213,821.9	40,590.4	13,319.1	3,388.5	69,117.1	282,572.4	342,613.0	59,055.1	63,562.0	233,026.8	412,663.3	215,628.1	74,767.1	2,024,124.8
1997	225,348.4	40,048.6	12,796.7	3,321.9	71,618.9	294,699.4	349,830.5	60,750.9	66,582.7	233,733.5	438,337.3	229,064.6	78,341.0	2,104,474.5
1998	225,348.4	40,048.6	12,796.7	3,321.9	71,618.9	294,699.4	349,830.5	60,750.9	66,582.7	233,733.5	438,337.3	229,064.6	78,341.0	2,104,474.5

Note: See Annex Table V.1 for full branch names.

Sources: Timmer, 2000, Annex Table II.21; US Bureau of Labour Statistics, DataBase on Producer Price Indexes, from Internet http://146.142.4.24/cgi-bin/srgate version d.d. July 1999; National Accounts of OECD Countries vol. 2, 1988/1998: Detailed Tables, from http://electrade.gfi.fr/cgi-bin/OECDBookShop.storefront/1969059131/Product/View/302000083E1.

Annex Table I.11: Shares of Labour in current manufacturing value added, USA, 1970-98

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1970	0.58	0.81	0.81	0.81	0.77	0.77	0.66	0.66	0.77	0.82	0.78	0.78	0.77	0.78
1971	0.58	0.82	0.82	0.82	0.75	0.75	0.64	0.64	0.75	0.81	0.74	0.74	0.75	0.75
1972	0.60	0.82	0.82	0.82	0.73	0.73	0.64	0.64	0.73	0.79	0.75	0.75	0.73	0.75
1973	0.62	0.83	0.83	0.83	0.73	0.73	0.62	0.62	0.73	0.79	0.78	0.78	0.73	0.76
1974	0.64	0.83	0.83	0.83	0.76	0.76	0.68	0.68	0.76	0.76	0.86	0.86	0.76	0.80
1975	0.55	0.81	0.81	0.81	0.73	0.73	0.65	0.65	0.73	0.77	0.82	0.82	0.73	0.76
1976	0.60	0.81	0.81	0.81	0.72	0.72	0.63	0.63	0.72	0.78	0.79	0.79	0.72	0.76
1977	0.62	0.77	0.77	0.77	0.72	0.72	0.64	0.64	0.72	0.80	0.76	0.76	0.72	0.75
1978	0.64	0.80	0.80	0.80	0.71	0.71	0.67	0.67	0.71	0.77	0.78	0.78	0.71	0.76
1979	0.65	0.82	0.82	0.82	0.72	0.72	0.69	0.69	0.72	0.77	0.82	0.82	0.72	0.79
1980	0.65	0.81	0.81	0.81	0.74	0.74	0.73	0.73	0.74	0.79	0.86	0.86	0.74	0.81
1981	0.64	0.81	0.81	0.81	0.75	0.75	0.69	0.69	0.75	0.77	0.85	0.85	0.75	0.80
1982	0.63	0.80	0.80	0.80	0.76	0.76	0.68	0.68	0.76	0.86	0.86	0.86	0.76	0.81
1983	0.59	0.79	0.79	0.79	0.75	0.75	0.64	0.64	0.75	0.87	0.81	0.81	0.75	0.78
1984	0.59	0.82	0.82	0.82	0.72	0.72	0.62	0.62	0.72	0.81	0.79	0.79	0.72	0.76
1985	0.60	0.81	0.81	0.81	0.72	0.72	0.63	0.63	0.72	0.81	0.83	0.83	0.72	0.77
1986	0.59	0.78	0.78	0.78	0.71	0.71	0.59	0.59	0.71	0.76	0.82	0.82	0.71	0.75
1987	0.59	0.79	0.79	0.79	0.70	0.70	0.59	0.59	0.70	0.77	0.78	0.78	0.70	0.74
1988	0.59	0.80	0.80	0.80	0.70	0.70	0.52	0.52	0.70	0.75	0.79	0.79	0.70	0.72
1989	0.58	0.78	0.78	0.78	0.68	0.68	0.53	0.53	0.68	0.73	0.79	0.79	0.68	0.72
1990	0.56	0.78	0.78	0.78	0.70	0.70	0.56	0.56	0.70	0.76	0.81	0.81	0.70	0.73
1991	0.56	0.78	0.78	0.78	0.70	0.70	0.56	0.56	0.70	0.76	0.81	0.81	0.70	0.73
1992	0.56	0.78	0.78	0.78	0.70	0.70	0.56	0.56	0.70	0.76	0.81	0.81	0.70	0.73
1993	0.56	0.78	0.78	0.78	0.70	0.70	0.56	0.56	0.70	0.76	0.81	0.81	0.70	0.73
1994	0.57	0.79	0.76	0.77	0.68	0.70	0.53	0.55	0.65	0.72	0.78	0.73	0.74	0.71
1995	0.53	0.79	0.78	0.69	0.66	0.68	0.51	0.55	0.63	0.69	0.77	0.73	0.75	0.69
1996	0.55	0.77	0.76	0.82	0.69	0.68	0.50	0.53	0.64	0.68	0.75	0.73	0.71	0.68
1997	0.57	0.78	0.79	0.75	0.69	0.71	0.51	0.53	0.58	0.68	0.75	0.72	0.72	0.69
1998	0.58	0.78	0.79	0.76	0.69	0.71	0.55	0.53	0.55	0.67	0.76	0.77	0.71	0.70

Note: See Annex Table V.1 for full branch names.

Sources:

Timmer, 2000, Annex Table II.25. National Accounts of OECD Countries vol. 2, 1988/1998: Detailed Tables, from http://electrade.gfi.fr/cgi-bin/OECDBookShop.storefront/1969059131/Product/View/302000083E1. US National Accounts database file, 1987-98.

Annex II: Benchmark Tables

Annex Table II.1: Number of UVRs, Coverage Rates and Reliability

	Number of UVRs	Coverage USA	Coverage Zambia	Reliability UVR at US Quantity Weights	Reliability UVR at Zambian Quantity Weights
1 **Food Manufacturing**	**28**	**35**	**61**	**0.12**	**0.07**
Meat Products	6	49	87	0.32	0.29
Dairy Products	4	47	20	0.16	0.03
Preserved fruits and vegetables and fish	5	17	82	0.38	0.26
Fats and Oils	3	37	31	0.14	0.07
Grain Mill Products	4	52	71	0.12	0.08
Bakery Products	3	40	59	0.23	0.20
Sugar	1	69	95	0.00	0.00
Confectionary and food n.e.c.	2	12	69	0.02	0.01
2 **Beverages (208)**	**2**	**40**	**52**	**0.00**	**0.00**
Malt and Malt beverages	1	83	95	0.00	0.00
Soft Drinks	1	30	54	0.00	0.00
3 **Tobacco Products**	**2**	**90**	**15**	**0.02**	**0.02**
Tobacco Stemming and redrying	2	81	28	0.03	0.02
4 **Textile Mill Products**	**10**	**14**	**41**	**0.09**	**0.22**
Textile Mill Products	10	27	47	0.08	0.21
5 **Wearing Apparel**	**7**	**27**	**48**	**0.21**	**0.69**
Wearing Apparel	7	36	56	0.20	0.63
6 **Leather Products and Footwear**	**1**	**38**	**46**	**0.00**	**0.00**
Leather footwear	1	91	90	0.00	0.00
7 **Wood Products, Furniture & Fixtures**	**5**	**16**	**19**	**0.12**	**0.97**
Wood Products and Furniture	5	33	30	0.10	0.90
8 **Paper Products, Printing & Publishing**	**8**	**10**	**22**	**0.17**	**0.56**
Paper, printing and publishing	8	23	23	0.16	0.56
9 **Chemicals, incl. petrol. refining**	**11**	**4**	**19**	**1.28**	**0.36**
Industrial inorganic chemicals	4	4	34	0.47	2.45
Agricultural Fertilizers	2	30	24	0.04	0.12
Paints	2	67	87	0.06	0.00
Soaps	3	25	35	0.12	0.51
10 **Non-metallic Mineral Products**	**3**	**7**	**40**	**0.11**	**0.01**
Cement and bricks	3	63	80	0.07	0.01
11 **Metallic Mineral Products**	**8**	**8**	**19**	**0.33**	**0.99**
Metallic Mineral Products	8	19	31	0.31	0.91
12 **Machinery & Transport Equipment**	**6**	**14**	**17**	**0.01**	**0.17**
Motor Vehicles	6	40	75	0.01	0.09
13 Rubber and Plastic Products					
14 Electrical Machinery & Equipment					
15 Other Manufacturing Industries					
Total manufacturing	91	15.5	42.4	0.16	0.15

Note: Coverage refers to matched output as percentage of total gross value of output. The measure for reliability is calculated as the variation of unit value ratios/divided by the uvr for a sample industry or branch. The 90 percent confidence interval for sample industry or branch uvrs equals the uvr plus or minus a percentage equal to two times the reliability measure.

Annex Table III.1: Comparative Labour Productivity by Branch of Manufacturing, Zambia/USA, 1964-98 (%)
(Establishments with 10 or more persons engaged)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1964	10.3	10.2	12.9	6.4	9.1	5.5	5.7	8.9	8.7	9.1	3.0	11.4	13.0	9.6
1965	7.9	8.5	11.2	3.0	7.2	5.1	3.6	10.3	10.6	8.9	7.4	14.1	11.8	8.7
1966	9.2	6.7	9.9	4.9	10.1	5.2	3.2	6.5	8.6	9.2	5.7	16.5	8.5	8.6
1967	10.0	9.6	15.0	5.3	10.5	7.5	5.2	9.4	9.9	10.7	8.9	13.6	9.5	10.3
1968	7.7	11.3	12.9	4.0	12.5	11.0	6.0	14.8	12.2	16.5	8.6	16.0	6.5	11.4
1969	7.5	15.0	18.4	2.5	10.7	5.2	5.7	26.9	12.4	14.6	12.1	31.4	9.7	10.8
1970	7.9	8.7	21.7	2.2	9.7	7.1	3.5	21.0	12.8	14.4	12.9	25.9	9.3	10.5
1971	8.3	9.9	20.1	2.2	9.3	6.9	3.6	26.4	12.8	12.7	9.8	27.8	9.2	10.4
1972	8.6	11.3	20.8	3.6	7.7	8.6	5.4	22.9	15.2	10.9	11.5	32.9	7.6	11.3
1973	6.4	15.2	16.1	3.6	9.9	7.2	5.2	22.7	12.6	10.3	11.5	27.2	9.3	10.2
1974	5.8	15.1	16.4	3.9	11.4	7.2	4.9	18.1	15.1	10.1	12.4	36.1	9.5	10.1
1975	4.5	12.6	12.2	3.1	8.6	5.7	5.4	16.1	14.3	8.5	15.4	20.5	8.1	8.7
1976	6.7	20.1	17.1	3.6	10.6	5.7	6.7	21.5	8.2	4.9	16.1	29.7	9.5	9.7
1977	6.6	17.4	16.3	3.3	12.5	5.6	6.0	16.2	7.3	5.4	12.1	23.0	8.4	9.2
1978	6.2	18.8	16.3	3.9	12.1	6.4	6.0	15.5	9.8	6.2	11.5	22.1	8.8	9.8
1979	6.3	24.1	16.5	4.5	14.7	5.5	6.4	17.9	9.0	6.7	9.9	13.3	7.5	9.9
1980	3.8	21.1	15.0	3.4	11.6	4.3	5.0	12.9	12.3	5.9	10.4	13.2	13.2	7.8
1981	6.6	21.6	8.5	3.6	10.5	3.3	3.7	9.8	13.6	8.4	11.2	13.9	11.8	8.7
1982	6.7	22.2	8.7	2.9	8.8	2.7	2.6	7.3	13.0	11.6	12.4	15.6	11.0	8.5
1983	6.8	15.8	6.7	3.6	8.5	2.2	2.1	7.2	13.9	8.2	10.6	15.6	9.4	7.6
1984	7.1	14.9	6.6	2.0	7.4	2.1	0.8	5.2	6.1	12.1	7.8	15.9	13.4	6.6
1985	4.3	11.1	5.3	2.1	6.7	2.0	1.2	7.9	9.9	10.7	8.0	15.5	7.2	5.7
1986	4.3	8.6	4.6	1.8	6.3	2.5	1.1	8.0	7.4	12.2	7.7	19.7	6.8	5.5
1987	4.9	9.1	5.0	1.6	5.1	3.8	1.0	7.2	1.5	8.4	9.8	21.4	6.5	5.0
1988	5.3	9.4	5.3	1.5	4.9	4.0	1.0	6.6	4.7	8.2	8.5	18.5	5.9	5.2
1989	6.4	9.9	6.7	1.7	5.5	4.2	1.3	8.8	6.4	5.3	7.7	14.9	5.7	5.5
1990	6.6	12.7	9.0	2.1	4.9	4.1	1.8	11.0	6.8	5.9	4.5	11.8	4.3	5.9

Annex Table III.1 (continued)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1991	8.2	7.6	5.6	2.4	5.7	3.8	1.7	5.2	3.1	7.7	4.4	10.6	4.8	5.8
1992	7.5	9.3	7.7	2.3	5.8	4.1	0.5	1.4	2.3	9.6	5.3	12.4	4.5	5.3
1993	4.3	6.2	5.2	2.3	5.5	1.8	1.9	5.4	1.4	4.1	3.1	6.4	2.5	3.7
1994	3.5	5.0	4.4	2.0	6.0	0.9	1.3	4.0	0.9	6.8	2.7	4.7	3.4	3.3
1995	4.2	5.5	5.4	1.9	6.1	0.7	0.4	1.2	0.8	4.0	1.1	1.0	1.7	2.6
1996	6.0	7.3	7.1	2.3	6.5	0.8	0.6	1.8	1.0	3.8	1.0	0.8	1.9	3.0
1997	6.7	9.2	7.3	2.0	6.7	1.1	0.5	1.6	0.6	4.7	0.9	0.7	1.8	3.2
1998	7.8	10.0	9.4	2.1	7.0	1.2	0.4	1.6	0.8	5.1	0.8	0.6	2.3	3.2

Note: See Annex Table V.1 for full branch names.

Sources:

Extrapolation of 1990 benchmark from Table 5.5 with national time series from Annex Tables I.1, I.2, I.8, and I.9.

Annex Table III.2: Comparative Capital Intensity by Branch of Manufacturing, 1970-98 (%) (Establishments with 10 or more persons engaged)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1970	18.0	53.4	31.1	53.6	15.8	17.0	34.4	50.6	24.3	15.4	48.7	66.2	83.2	28.5
1971	18.8	44.4	30.4	47.3	16.0	16.4	29.1	45.1	22.0	15.6	42.4	37.3	61.8	25.6
1972	21.3	39.6	30.1	58.0	15.0	17.5	34.0	43.9	33.3	15.8	38.6	38.7	74.4	28.6
1973	19.8	36.2	27.2	52.7	19.4	15.0	27.5	44.7	65.2	17.2	37.9	35.5	48.4	30.8
1974	20.5	35.3	26.3	81.6	19.3	14.4	22.5	34.7	60.6	15.6	30.8	29.3	35.0	28.1
1975	21.2	31.5	25.8	61.0	16.0	11.8	23.5	34.3	54.1	12.5	27.6	22.6	29.9	25.5
1976	29.9	45.5	41.9	86.8	24.2	15.1	33.1	47.2	63.4	17.8	35.3	26.8	36.4	35.5
1977	28.2	40.0	42.5	77.7	23.7	13.8	30.6	46.0	52.6	17.6	32.4	22.1	32.0	33.5
1978	26.9	35.2	44.7	72.5	23.2	13.0	28.3	44.4	45.2	18.1	30.7	18.7	27.4	32.4
1979	23.7	37.9	40.5	66.2	27.1	13.8	31.0	44.5	38.0	18.9	27.8	11.2	21.4	30.9
1980	13.8	25.2	31.6	39.5	14.9	11.8	22.9	31.7	28.2	12.4	23.2	9.3	42.6	20.7
1981	15.0	21.4	28.8	32.0	11.5	12.9	23.2	37.3	28.4	11.7	20.7	10.0	32.6	20.2
1982	13.7	18.2	26.3	24.5	10.8	11.8	20.3	36.1	25.0	10.0	17.2	10.1	22.2	17.7
1983	11.9	15.4	23.8	17.7	12.4	10.3	16.8	37.3	26.3	9.1	14.7	10.2	14.2	15.8
1984	10.3	13.1	22.6	13.8	12.4	10.5	14.4	38.8	30.1	9.0	13.8	11.0	15.5	14.9
1985	5.5	8.7	17.5	9.5	9.1	7.5	9.1	26.7	23.8	6.7	9.9	7.3	4.8	9.8
1986	5.0	7.6	17.6	8.0	8.5	7.3	8.4	25.3	24.5	6.6	8.8	6.6	3.3	9.0
1987	4.5	6.9	18.0	7.3	8.0	7.1	8.1	24.4	25.0	6.6	8.1	6.0	2.5	8.5
1988	4.1	6.3	18.7	6.7	7.7	7.3	8.3	23.9	27.3	7.0	7.8	5.7	2.0	8.4
1989	3.8	5.7	19.3	6.1	7.1	6.8	8.0	23.3	27.8	7.0	7.3	5.3	1.6	8.0
1990	3.8	5.6	20.1	5.1	6.9	6.9	8.4	24.0	30.5	7.1	7.1	5.3	1.4	8.0
1991	3.5	5.2	20.5	4.1	5.8	6.3	8.0	21.6	27.6	6.7	6.4	4.2	1.2	7.4
1992	3.1	5.0	21.4	3.5	5.4	5.9	7.5	20.5	26.2	6.5	5.8	3.5	1.0	6.9
1993	3.2	5.5	23.7	3.2	5.7	6.1	7.5	22.5	27.7	7.0	5.7	3.4	0.9	7.2
1994	3.3	6.0	28.9	3.0	5.9	6.5	7.8	24.7	29.9	8.1	5.9	3.3	0.9	7.8
1995	3.0	5.5	31.9	2.4	5.6	6.2	7.6	24.1	30.3	8.3	5.4	1.8	0.8	7.4
1996	3.2	5.8	38.6	2.2	5.8	6.6	8.1	26.3	34.3	9.5	5.6	1.9	0.8	8.1
1997	3.0	5.8	42.7	1.5	5.5	6.4	7.7	26.1	33.1	9.6	5.2	1.8	0.7	7.9
1998	3.1	5.7	48.4	1.3	5.5	6.7	7.8	27.1	34.0	9.9	5.5	1.8	0.6	8.3

Note: See Annex Table V.1 for full branch names.
Sources:
Extrapolation of 1990 benchmark from Table 5.6 with national time series from Annex Tables I.2, I.5, I.9, and I.10.

Annex Table III.3: Comparative Total Factor Productivity by Branch of Manufacturing, Zambia/USA, 1970-98 (%)
(Establishments with 10 or more persons engaged)

	1 Food	2 Tex	3 Wear	4 Leat	5 Wood	6 Pap	7 Chem	8 Rub	9 Mine	10 Met	11 Mach	12 Elec	13 Oth	Total
1970	19.5	11.0	34.0	2.9	22.9	15.1	5.8	29.5	22.8	29.0	17.2	30.4	10.0	17.2
1971	20.5	13.3	30.7	3.0	23.8	15.3	6.6	40.1	23.9	25.4	13.9	41.9	11.2	18.3
1972	20.4	15.7	32.4	4.5	19.0	19.2	9.2	35.1	25.0	21.0	17.2	49.8	8.5	19.6
1973	15.0	22.0	26.2	4.6	21.2	17.2	10.2	35.2	14.6	19.7	16.9	42.7	13.2	16.8
1974	12.9	22.0	27.4	4.2	22.7	17.3	10.2	30.7	18.6	21.1	19.7	59.4	14.7	16.9
1975	10.2	19.2	20.6	3.7	18.7	14.7	11.5	27.9	18.6	17.1	26.7	35.7	13.7	15.2
1976	12.7	27.0	24.2	3.8	22.0	12.9	11.4	31.6	10.0	9.2	23.8	48.1	15.0	15.0
1977	12.8	26.5	24.2	3.7	23.8	13.5	11.1	23.2	9.7	10.9	19.3	42.4	14.2	14.9
1978	11.9	29.6	23.0	4.4	24.9	16.3	10.4	22.3	13.9	12.3	18.6	42.8	15.6	16.3
1979	13.0	35.4	23.8	5.4	29.3	13.6	10.5	26.9	13.7	12.8	15.9	30.3	14.4	16.7
1980	10.6	40.1	23.6	5.2	29.0	10.5	10.0	21.9	20.9	13.9	17.5	31.0	19.0	15.2
1981	18.3	41.1	14.0	5.9	30.7	8.3	8.2	16.6	24.0	19.4	19.4	35.6	19.0	17.4
1982	18.4	51.1	15.8	5.2	25.8	6.7	5.6	12.5	24.3	26.9	23.1	37.9	20.1	18.1
1983	20.7	36.8	12.6	7.3	21.7	6.1	5.0	11.8	24.9	20.8	23.1	40.7	22.4	17.3
1984	25.2	35.8	12.5	5.2	20.4	5.8	1.9	8.4	10.2	29.5	17.1	36.2	31.2	15.8
1985	19.7	26.5	10.7	6.3	23.0	6.9	3.9	15.4	18.1	27.6	18.2	38.4	28.7	15.2
1986	21.4	25.0	9.6	5.5	23.6	9.1	3.7	17.0	13.7	35.9	18.8	54.7	34.0	15.9
1987	28.2	26.4	9.7	4.7	19.9	13.3	3.8	15.4	2.8	26.0	27.4	70.4	37.5	14.9
1988	29.6	26.8	11.0	4.6	19.3	14.0	4.3	15.6	8.6	24.9	23.3	60.0	39.9	15.9
1989	34.2	30.2	14.2	5.5	23.3	15.6	5.7	20.2	11.4	15.9	23.2	51.2	38.4	16.3
1990	39.9	40.1	17.8	8.3	20.3	15.3	6.4	25.3	11.8	17.2	12.3	30.1	29.8	16.7
1991	46.9	31.4	10.7	10.9	26.3	14.0	6.7	12.1	6.1	24.1	16.2	52.9	36.1	17.0
1992	46.8	33.6	14.6	10.6	27.0	14.7	2.3	3.2	4.3	28.1	15.1	52.4	35.3	15.6
1993	28.4	19.8	10.1	10.0	24.4	6.7	7.9	12.1	2.6	12.3	9.3	25.9	21.5	12.0
1994	20.7	13.5	7.9	8.7	24.7	3.5	6.0	8.3	1.3	17.3	6.7	20.7	33.6	9.8
1995	28.0	19.0	8.7	12.1	26.5	2.7	2.0	2.7	1.5	11.6	3.4	6.4	11.4	8.0
1996	38.6	26.6	11.1	11.5	25.1	2.7	2.6	4.1	1.7	11.3	3.6	5.1	15.1	9.9
1997	43.1	26.1	10.6	13.8	26.3	3.7	2.6	3.7	1.1	12.9	3.3	3.2	15.6	9.9
1998	47.2	27.5	12.6	19.6	27.9	4.2	1.6	3.4	1.3	13.4	2.8	2.6	19.1	9.2

Note: See Annex Table V.1 for full branch names.

Sources:

Extrapolation of 1990 benchmark from Table 5.6 with national time series from Annex Tables III.1 and III.2 and weights from Annex Tables I.6 and I.11.

Annex IV: Matching Tables

Annex Table IV.1: Zambian Product Listings

Industry ISIC code	Industry name	No. of Establ.	Product	Unit	Product Quantities	Product Values (ZK'000)	Unit Values (Zambian) (Kwacha)
3111	Slaughtering, preparing & preserving meat	2	canned meat	can 250g	2105535	26477	12.57
			dressed chicken	'000 kg	634	87396	137.90
			table-eggs	# '000	422	1196	2.83
		3	beef	kilograms	4003814	275,607	68.84
		3	pork	kilograms	891657	28,155	31.58
		2	sausages	kilograms	1858461	64,024	34.45
			ribs	kilograms	6954	97	13.94
3112	Manufacture of dairy products		biscuits	kilograms	23377	1,517	64.89
		4	fresh milk	litres	5038810	89,568	17.78
			softmix	litres	7170	217	30.26
		2	ice cream	litres	36984	2,075	56.11
		3	butter	kilograms	4900.69	1,116	227.72
		2	r/milk(sour milk)	litres	691929	294	0.42
			cheese	kilograms	1299.58	331	254.70
3113	Canning & preserving of fruits & vegetables		canned pineapple	cases	4272	3,130	732.68
			pineapple	litres	3150	116	36.83
			sauce	box/25	5,643.2	3,071	544.19
			chutney	box/40	1,365.6	864	632.69
			marmalade	box/40	2,647.2	1,241	468.80
			jam	kilograms	27,092.7	1,320	48.72
			juices	litres	4,353.2	239	54.90
3114	Canning, preserving & processing of fish, crustacean & similar foods		kapenta	tons	218.4	8,731	39977.11
		2	fish	tons	329.8	21,171	64200.54
3115	Manufacture of vegetable & animal oils & fats	3	cooking oils	tons	15257.667	600,121	39332.42
			soaps	tons	12823.76	364,549	28427.62
			seedcakes	tons	7919.888	105,743	13351.58
			fats	tons	774.39207	102,062	131795.75
			NCDs	tons	7199.392	209,285	29069.82
3116	Grain mill products	9	breakfast meal	tons	135918.04	775264.0	5703.91
		14	roller meal	tons	119812.98	508682.0	4245.63
		3	maize bran	tons	32386.483	28691.6	885.91
		7	stockfeed	tons	33394.81	196522.0	5884.81
		2	flour	tons	4188.76	60414.0	14422.88
			meal samp	tons	1242.9167	4551.0	3661.55
			maize/M	tons	1593.55	1166.0	731.70
			rice	kilograms	75883	1530.0	20.16
			salt	kilograms	8530	2041.4	239.32
3117	Manufacture of bakery products	9	bread	no. of loaves	2383837	160,295	67.24
		9	buns	units	104474326	151,537	1.45
			cake	units	180.00	404	2244.44
			ring doughnut	units	12492.00	54	4.32
			cream doughnut	units	9304	86	9.24
			k/sisters	units	11286.00	52	4.61
		2	corn	units	169861.00	3,000	17.66
		3	biscuits	cartons	396332.00	103,336	260.73
			popcorns	cartons	25716.00	1,853	72.06
			scones	units	47500.00	12	0.25
		2	confectionery	units	349864.00	13,572	38.79
3118	Sugar factories & refineries	2	sugar	tons	80493.024	1792795	22272.68
3119	Manufacture of cocoa, chocolate & sugar confectionery		hardboiled sweets	kilograms	19350	1,495	77.26
			fruitdrop	kilograms	2798.4	317	113.28
			bubble gums	cartons	6739	11,037	1637.78

Annex Table IV.1 (continued)

Industry ISIC code	Industry name	No. of Establ.	Product	Unit	Product Quantities	Product Values (ZK'000)	Unit Values (Zambian) (Kwacha)
3121	Manufacture of food products not elsewhere classified		frozen cans	kilograms	960774	125,209	130.32
			dry goods	kilograms	859305	171,703	199.82
			godials	kilograms	465671	23,174	49.76
			confectionery	cases	31343	38,940	1242.38
			vinegar	cases	13277	3,605	271.52
			extrudes	cases	20202	27,037	1338.33
			peanuts	cases	5200	5,715	1099.04
			cln/beans	kilograms	586367	45114	76.94
			b/beans	can 250g	161330	4,125	25.57
			roast/groundnuts	kilograms	19826	2,657	134.02
		2	tea	kilograms	49943	9,639	193.00
3131	Distilling, rectifying & blending spirits		spirits	cases	130391	303,015	2323.90
3133	Malt liqueurs & malt		beer	hectolitres	667,016	1,143,414	1714.22
			opaque beer-chibuku	hectolitres	204,441	43,976	215.10
3134	Soft drinks & carbonated waters industries		tarino soft drink	dozens	2799808.8	187,761	67.06
			crushjuice-750mls	dozens	87404	23,668	270.79
			crush juice-2.5l	dozens	87776	16,143	183.91
			soft drink	cases	1334560.8	236,989	177.58
			orange crush	000litres	529	14,932	28226.84
			strawberry juice	000litres	274	7,001	25.55
			cream soda	000litres	65.6	2,459	37.48
3140	Tobacco manufactures		cigarettes	#'000	384118	579,186	1.51
			tobacco	kilograms	122315	11,187	91.46
			virginia	tons	5114	388	75.87
			burley	tons	3812	272	71.23
3211	Spinning, weaving & finishing textiles		plain dyed cloth	000metres	2,890	205,676	71.16
			printed cloth	000metres	2,890	270,045	93.45
			loamstate cloth	000metres	3,114	103,340	33.18
			lint	tons	7,416	463,572	62509.71
		2	knitted fabrics	000metres	235	22,168	94.17
			fabrics	000metres	1,252	80,441	64.25
			yarn	kilograms	2,783,157	447,257	160.70
			offcuts	kilograms	23,374	3,909	167.24
			textile	000metres	512	86,906	169.74
			acrylic yarn	kilograms	151,696	65,427	431.30
			sewing threads	tons	45	20,887	466227.68
			wastes	tons	182	495	2725.77
3212	Manufacture of made-up textile goods except wearing apparel	2	tarpaulin	numbers	8291	93,174	11237.97
			vent ducting	numbers	4255	5,317	1249.59
			travelling bag	numbers	35228	7,590	215.45
		2	blankets	each	877,984	303,340	345.50
			tents	numbers	65	2,391	36784.62
			poly propylene bags	numbers	24448940	363,806	14.88
			PE bags	numbers	1283930	8,218	6.40
			jute/kenaf products	tons	10	603	60300.00
3213	Knitting mills	2	mutton cloth	kilograms	120100	11,363	94.61
		2	fabrics	sq.metres	6,912	437	63.22
		2	general knitting	numbers	2275900	42,632	18.73
			poly knitted fabrics	metres	157,406	15,267	96.99
			polyester	metres	140179	24,230	172.85
			nylon	metres	148025	4,459	30.12
			cotton	metres	166202	1,486	8.94
			clothing	kilograms	116448	3,740	32.12
			knitting	kilograms	29940	477	15.93
			material	kilograms	15092	997	66.06
3215	Cordage, rope & twine industries		fish nets	kilograms	28,705	2,888.0	100.61
			twine	kilograms	53,636	9,376.0	174.81
			ropes	kilograms	32,005	1,232.0	38.49

Annex Table IV.1 (continued)

Industry ISIC code	Industry name	No. of Establ.	Product	Unit	Product Quantities	Product Values (ZK'000)	Unit Values (Zambian) (Kwacha)
3220	Manufacture of wearing apparel, except footwear	2	overalls	numbers	96,954	86,845.0	895.73
		2	dustcoats	numbers	18,027	14,484.0	803.46
		3	uniforms	numbers	60,899	43,727.0	718.02
			lady pants	numbers	152,608	8,005.0	52.45
		8	trousers	numbers	302,753	116,177.0	383.73
			rain wear/coat	numbers	87,637	40,200.0	458.71
		2	shirts	numbers	105,841	30,375.0	286.99
		3	suits	numbers	45,476	64,881.0	1426.71
		2	garments	numbers	289,528	34,062.0	117.65
			pvc cloths	numbers	33,448	9,602.4	287.09
		3	safari suits	numbers	36,827	40,572.0	1101.70
			jackets	numbers	3,100	4,979.0	1606.13
		2	shorts	numbers	13,220	2,304.0	174.28
			pants	dozens	10,251	7,597.0	741.10
			T-shirts	numbers	20,225	3,900.0	192.83
			socks	dozens	270,995	23,793.0	87.80
		6	dresses	pieces	178,482	54,735.0	306.67
3240	Manufacture of footwear, except vulcanized or moulded rubber or plastic footwear		foot wear	pairs	39,206	41,420	1056.48
			shoes	pairs	8,030	5,509	686.02
			wet blue export	#'000	143	3,978	27.82
			wet blue galaun	#'000	227	2,217	9.77
3311	Sawmills, planing & other wood mills	5	sawn timber	cubic metres	30,205	190,795	6316.77
			poles	cubic metres	12111	16,057	1325.82
		2	joinery	#'000	20307	25,173	1.24
			baulks	cubic metres	1074	653	608.01
			parquet tiles	boxes	9276	8,091	872.25
			doors	pieces	110	524	4781.02
			black boards	sheet	21542	19,939	925.59
			plywood	sheet	5760	4,859	843.58
			pine	cubic metres	18585	99,450	5351.09
			eucalyptus	cubic metres	13744	35,822	2606.37
			round poles	pieces	118152	28,210	238.76
3319	Manufacture of wood & cork product not elsewhere classified		pick handle	numbers	30000	900	30.00
			ring hole handle	numbers	15000	450	30.00
3320	Manufacture of furniture & fixtures, except primarily of metal	3	lounge suits	sets	577	10,138	17570.19
		4	chairs	numbers	3,171	6,624	2088.80
		3	beds	numbers	1,126	6,550	5819.12
			furnitures	numbers	55	252	4581.82
			lounge suits			39,196	
			polythene	tons	265	76,807	289837.74
3412	Manufacture of containers & boxes of paper and paperboard		lithographic	tons	658	55,977	85071.43
			corrugated cardboard	tons	213.0	21,554.0	101192.49
			tissue rolls	tons	213.6	20,026.0	93754.68
			paper boards	tons	409.6	25,468.0	62177.73
			paper bags/sacks	tons	301.3	19,903.0	66050.37
		2	printing	tons	1,131.0	92,395.72	81690.94
			paper bags	tons	265	45,094	170166.04
		2	toilet tissues	tons	1,111.3	33,412	30067.04
			packaging papers	tons	1261	40,238	31909.60
			l.g.pty	tons	304	13,278	43677.63
3419	Manufacture of pulp, paper & paperboard articles not elsewhere classified		paper egg trays	numbers	84835	523	6.16
			egg trays	numbers	69512	445	6.40
			stationery	tons	1221	48,370	39615.07
			plastics	tons	734	111,587	152025.89
			paper products	tons	92	24,220	263260.87
		2	tissue papers	tons	238.4	36,922	154874.16
			paper bags	tons	52.8	3,126	59204.55
			other products		38	813	21400.00
3420	Printing, publishing & allied industries		books	kilograms	29712	17,264	581.04
			stationary	dozens	29538	27,537	932.26
			textbooks	numbers	1171367	70,864	60.50
			exercise books	numbers	17009242	34,872	2.05

Annex Table IV.1 (continued)

Industry ISIC code	Industry name	No. of Establ.	Product	Unit	Product Quantities	Product Values (ZK'000)	Unit Values (Zambian) (Kwacha)
3511	Manufacture of basic industrial chemicals, except fertilizers		aluminium Sulphate	tons	1563	29,240	18707.61
			zinc oxide	tons	171.2	12,479	72891.36
		2	oxygen Gas	000m-3	1447	115,342	79.71
			acetylene Gas	000m-3	290	54,700	188.62
3512	Manufacture of fertilizers & pesticides		d/dip	litres	6190	4,110	663.97
			triaxdip	litres	26370	9,866	374.14
			fly killer	can 150g	380508	17,632	46.34
			reskott	litres	20600	8,138	395.05
			fertilizers	tons	32,995.8	366,317	11101.91
			explosives	tons	14,193.9	245,115	17269.01
			teepol 26	tons	391	18,149	46416.88
			teepol 53	tons	26	1,570	60384.62
			liquid thinners	tons	37	3,779	102135.14
3521	Manufacture of paints, vanishes & lacquers	3	paints	litres	772096	154,842	200.55
			alkyd paints	litres	25821	13,851	536.42
			adhesive	litres	908.1	424	466.91
3522	Manufacture of drugs & medicines		fluids	bag millilitres	589410	22,912	38.87
			oral rehydration salt	sachet 30g	1057934	1,563	1.48
		2	tablets	each	21875665	53,369	2.44
			liquid/m	litres	65490	9,742	148.76
		2	toiletries	litres	143119	28,657	200.23
		2	a/cafenol	tab 1*200	154735	24,942	161.19
		2	norolon	tab 1*200	11741	2,818	240.02
			panadol	tab 1*200	34542	2,216	64.15
			skin conditioner	tube dozens	46984	10,420	221.78
3523	Manufacture of soap & cleaning preparations, perfumes, cosmetics & other toilet preparations		pt	dozens	501764	174,144	347.06
			vicl	dozens	50728	26,032	513.17
			vht	dozens	9304	3,124	335.77
			dynamo	tons	3195	133,329	41730.52
			choice	tons	1409	146,907	104300.32
			cold power	tons	1018	53,620	52677.08
			s/pads	dozens	20898	16,836	805.63
			toiletries	numbers	46778	29,671	634.29
			hospital	numbers	67599	27,764	410.72
			glycerine	dozens	14080	3,260	231.53
			petroleum/jelly	dozens	4080	624	152.94
			defegen	case/25	888	472	531.53
			polishers	kilograms	651092	81,439	125.08
			aerosols	kilograms	115886	35,820	309.10
			toiletries	kilograms	41823	11,870	283.82
			soaps	cases	405378	106,534	262.80
			vegetable oils	drums	13716	94,404	6882.53
3529	Manufacture of chemical products not elsewhere classified		inks	kilograms	69560	36,644	526.80
			coatings	kilograms	28623	11,714	409.25
			explosive	tons	9475	501,490	52927.70
			ANFO	tons	14670	292,927	19967.76
			fuses led	000 units	7350	200,897	27.33
			matches	000 units	73	94,482	1294.27
3530	Petroleum refineries		auto oils	m-3	7660	500,994	65403.92
			ind. oils	m-3	3986	227,603	57100.60
			grease	tons	216	16,961	78523.15
			zephyr	kilograms	15175	1,148	75.65
			333	litres	24757	1,665	67.25
			worrior	litres	2421	191	78.89
			gasolines	tons	139991	1,707,400	12196.50
			kerosines	tons	95039	856,146	9008.36
			gasoils	tons	270653	1,874,466	6925.72
			blacks	tons	102115	531,134	5201.33
3551	Tyre & tube industries	2	retreads	numbers	6282	838,997	133555.71
			r/tyres	numbers	18099	71,039	3925.02
			rubber/l	kilograms	5436	30,055	5528.51
			batteries	numbers	2726	6,999	2567.50
			rubber pro	tons	3652	897,057	245634.45

Annex Table IV.1 (continued)

Industry ISIC code	Industry name	No. of Establ.	Product	Unit	Product Quantities	Product Values (ZK'000)	Unit Values (Zambian) (Kwacha)
3559	Manufacture of rubber products not elsewhere cl		n/ rubber	tons	279	127,388	456587.81
3560	Manufacture of plastic products not	2	plastics	kilograms	739674	72,424	97.91
	elsewhere classified	2	plastics	numbers	1075524	28,798	26.78
			buckets	#'000	202	1,717	8.50
			lids	#'000	1837	4,409	2.40
			container	#'000	1485	5,229	3.52
			pipes	tons	66	5,785	87651.52
			conduits	tons	122	7,994	65524.59
			b/castings	tons	183	14,208	77744.15
			fittings		540	441	816.67
			bags	tons	397	45,530	114685.14
			polythene	tons	680	61,167	89951.47
			potato bags	tons	45	7,450	165555.56
3610	Manufacture of pottery, china & earthware		table ware	#'000	767	35,508	46.31
			sanitary	pieces	14458	31,220	2159.36
3620	Manufacture of glass & glass products		bottles	tons	14918	314,161	21059.19
3691	Manufacture of structural clay products		bricks	numbers	763382.4	9,535	12.49
			tiles	pieces	318132.8	8,324	26.17
3692	Manufacture of cement, lime & plaster		cement	tons	80981.6	321,210	3966.46
			porland cement	tons	126457.6	451,570	3570.92
			limestone	tons	78437.6	98,935	1261.32
			q/lime	tons	32724.8	354,354	10828.30
			h/lime	tons	9223.2	23,835	2584.24
3699	Manufacture of non-metallic mineral products		sleepers	numbers	59686	52,284	875.98
	not elsewhere classified		c/blocks	numbers	214893	3,212	14.95
3710	Iron & steel basic industries		mill balls	tons	10608	146,639	13823.44
			castings	tons	3022.4	212,162	70196.53
			man-hole covers		x	2,650	
3720	Non-ferrous metal basic industries		cast iron	kilograms	61745.6	7,104	115.05
			bronze	kilograms	23263.2	4,420	190.00
		2	aluminium	kilograms	88568.8	32,811	370.46
			castings	tons	256.8	26,366	102671.34
			white metals	tons	19	8,832	464842.11
			n.f.seams	tons	47	13,645	290319.15
3811	Manufacture of cutlery, hand tools & general		steel	tons	374	39,700	106149.73
	hardware		enamel	dozens	61970	28,263	456.08
3813	Manufacture structural metal products		wheel barrows	numbers	246	912	3707.32
			dust bins	numbers	6858	5,986	872.85
			ventpipes	numbers	86	235	2732.56
		7	steel fabrication	tons	829.92932	22,984	27693.92
			wire products	tons	380.8	30,412	79863.45
			steel wire	tons	28	4,343	155107.14
			l/eng	#'000		191,280	
			h/eng	#'000		187,497	
			frames	each	29763	61,728	2073.98
			geysers	each	3304	42,741	12936.14
			wire mesh	tons	617.6	41,839	67744.49
			steel	kilograms	298616.53	12,005	40.20
3819	Manufacture of fabricated metal products						
	except machinery & equipment not		water tanks	numbers	106	3,413	32198.11
	elsewhere specified		door frames	numbers	333	876	2630.63
			reconditioning			9,398	
			engineering	tons	82.4	10,391	126101.63
			iron sheet	tons	1338.4	128,210	95793.48
			locks	numbers	41426	113,851	2748.30
			blocks	each	13	866	66615.38
			mixers	each	31	4,493	144935.48
			mowers	each	84	433	5164.34
			copper ware	tons	10	537	53700.00
		3	steel installation	tons	42401.38	63,203	1490.59
			extension	each	7155	36,063	5040.25
			integral	each	10175	50,206	4934.19
			d/mesh	roll	856	2,530	2955.61

Annex Table IV.1 (continued)

Industry ISIC code	Industry name	No. of Establ.	Product	Unit	Product Quantities	Product Values (ZK'000)	Unit Values (Zambian) (Kwacha)
			b/bars	roll	109	1,458	13376.15
3822	Manufacture of agricultural machinery & equipment		oxdrawn	numbers	7803	15,788	2023.32
			gratings	numbers	1180	9,163	7765.25
			wheel barrows	numbers	2802	6,060	2162.74
			wheel barrows	numbers	971	2,950	3038.11
3824	Manufacture of special industrial machinery & equipment except metal & wood working machinery		d/drilling	each	4560	25,080	5500.00
			c/drilling	each	31700	46,474	1466.06
			steel	kilograms	467888	18,149	38.79
3831	Manufacture of electrical industrial machinery & apparatus		boards	numbers	11	2,608	237090.91
			b/gulley	numbers	98	3,476	35469.39
			starters	numbers	225	7,544	33528.89
3832	Manufacture of radio, television & communication equipment & apparatus		1 LPs	each	103580	2,244	21.66
			12 SP	each	12183	188	15.43
			cassettes	each	32558	600	18.43
3839	Manufacture of electrical apparatus & supplies not elsewhere classified		batteries	numbers	39540	94,976	2402.02
			mpbatteries	numbers	3092	14,828	4795.60
			r20 hd	#'000	10873	121,143	11.14
			metals	tons	830	21,269	25625.30
			rewind	jobs	274	12,107	44186.13
			coils	jobs	93	1,004	10795.70
			armoured	tons	782	112,509	143873.40
			bare/stnd	tons	7566	203,705	26923.74
			bldg wire	tons	2958	112,714	38101.59
3842	Manufacture of railroad equipment		turnout	each	624	12,825	20552.88
			c/screw	kilograms	16923	3,303	195.18
			r/fitting	kilograms	48778	14,359	294.37
3843	Manufacture of motor vehicles		trailers	numbers	12	12,973.0	1118362.07
			bus bodies	numbers	15	13,976.0	944324.32
			bus vehicles	units	20	31,366.0	1568300.00
			fiat cars	numbers	18	9,042.0	502333.33
			peugeot	numbers	9	9,031.3	1050151.16
			benz truck	numbers	14	12,433.5	888107.14
			mazda 323	numbers	6	4,220.0	703333.33
			land rover assembly	each	18	8,532.0	463695.65
			l/rover recond	each	40	19,430.0	490656.57
			toyota	each	15	19,989.0	1350608.11
			brake shoes	each	3,854	3,375	875.80
			clutch bond	each	335	408	1217.18
			disc pads	numbers	355	74	208.33
3844	Manufacture of motorcycles & bicycles		bicycles	numbers	33611	104,291	3102.88
			mopeds	numbers	75	3,436	45813.33

Source:

Zambia Central Statistical Office DataBase for 1990 Quarterly Returns of Industrial Production (unpublished); Returns for 1990 Census of Industrial Production.

Annex Table IV.2: Unit Values for Matched Products, by Sample Industry, Zambia/USA, 1990

SIC Code	USA Product Item	Unit	USA Quantity (sales)	USA Dollar Value (mill. $)	USA Dollar Unit Value	USA Quantity valued at Zambian Unit Values (mill. ZK.)	PPP ZK./$ USA Quantity Weights	ISIC Code	Zambian Product Item	Unit	Zambian Quantity	Zambian Kwacha Value (000' ZK.)	Zambian Kwacha Unit Value	Zambian Quantity valued at USA. unit Values (1000 $)	PPP ZK./$ Zambian Quantity Weights
	FOOD PRODUCTS														
	Sample Industry Meat Products														
20117/37	Sausage and similar products (not canned),	000 kg.	729,387.3	2,476.9	3.40	25,126.4	10	3111	Sausages	000 kg.	1,859	64,024	34.45	6,311.3	10
20114	Pork, not canned or made into sausage	000 kg.	4,356,130.0	8,038.9	1.85	137,549.3	17	3111	Pork	000 kg.	892	28,155	31.58	1,645.5	17
20118/38	Canned meats (except dog & cat food and baby)	000 kg.	508,888.6	1,312.1	2.58	25,597.0	20	3111	Canned meat	000 kg.	526	26,477	50.30	1,357.2	20
20111	Beef, not canned or made into sausage	000 kg.	7,112,999.6	18,441.9	2.59	489,631.3	27	3111	Beef	000 kg.	4,004	275,607	68.84	10,380.7	27
20151/2	Total chickens	000 kg.	6,315,639.4	7,155.3	1.13	870,931.6	122	3111	Dressed chicken	000 kg.	634	87,396	137.90	718.0	122
20159	Liquid, dried and frozen eggs	000 kg.	245,931.8	338.7	1.38	11,616.7	34	3111	Table eggs	000 kg.	25	1,196	47.24	34.9	34
										000 kg.					
	Sample Industry Dairy Products														
20210	Creamery butter	mill.tons	490.6	1,544.3	3.15	111,719.2	72.3	3112	Butter	ton	5	1,116	227.72	15.4	72
20240	Ice cream	mill.lts	3,892.9	3,269.5	0.84	218,410.9	66.8	3112	Ice cream	ltrs	37	2,075	56.11	31.1	67
20262	Milk	mill.tons	24,205.8	10,349.3	0.43	430,273.9	42	3112	Milk	ton	5,039	89,568	17.78	2,154.4	42
20223 00	Natural cheese	mill.tons	2,179.9	6,414.5	2.94	555,222.6	87	3112	Cheese	ton	1	331	254.70	3.8	87
	Preserved fruits and vegetables														
2033614	Catsup and other tomato sauce, paste	mill. kg.	260.7	215.1	0.83	14,186.2	66	3113	Sauce	000 kg.	56	3,071	54.42	46.6	66
20336 65	Tomato paste	mill. kg.	575.9	411.8	0.72	20,242.5	49	3113	Tomato paste	000 kg.	25	864	35.15	17.6	49
20338 11	Jams jellies and preserves	mill.kg.	1,174.0	327.4	0.28	37,564.0	115	3113	Jams	000 kg.	80	2,561	32.00	22.3	115
2033A25	Fruit Juices	mill. lts	4,331.2	3,277.0	0.76	237,792.0	73	3117	Juice	000 ltrs	4	239	54.90	3.3	73
20922-6	Canned fish	mill. kg.	797.3	3,815.8	4.79	43,493.1	11	3114	Fish	000 kg.	548	29,902	54.55	2,623.4	11
	Sample Industry Fats and Oils														
20741/51/62	Edible oils	mill. kg.	7,390.4	3,077.8	0.42	290,683.9	94	3115	Cooking oil	000 kg.	15,258	600,121	39.33	6,354.2	94
20744 14	Cottonseed cake and meal	mill. kg.	1,262.4	178.8	0.14	16,854.5	94	3115	Cotton Seed Cake	000 kg.	7,920	105,743	13.35	1,121.8	94
20791	Baking or frying fats	mill. kg.	3,975.5	3,053.5	0.77	523,947.6	172	3115	Fats	000 kg.	774	102,062	131.80	594.8	172
	Sample Industry Grain Mill Products														
20411 11	Flour	ton	14,893,861.2	3,085.9	207.19	214,812.4	70	3116	Wheat flour	ton	4,189	60,414	14.42	867.9	70
20413 15	Degermed cornmeal	ton	1,482,460.1	335.9	226.58	7,443.0	22	3116	Maize Flour	ton	255,731	1,283,946	5.02	57,944.3	22
20440 11	Rice milling	mill. kg.	4,284.3	1,070.1	249.77	86,382.5	81	3116	Rice	000 kg.	76	1,530	20.16	19.0	81
2048---	Prepared feed	mill. tons	53.2	7,898.6	148.41	313,188.9	40	3116	Stock feeds	ton	33,395	196,522	5.88	4,956.3	40

Annex Table IV.2 (continued)

SIC Code	USA Product Item	Unit	USA Quantity (sales)	USA Dollar Value (mill. $)	USA Dollar Unit Value	USA Quantity valued at Zambian Unit Values (mill. ZK.)	PPP ZK./$ USA Quantity Weights	ISIC Code	Zambian Product Item	Unit	Zambian Quantity	Zambian Kwacha Value (000' ZK.)	Zambian Kwacha Unit Value	Zambian Quantity valued at USA. unit Values (1000 $)	PPP ZK./$ Zambian Quantity Weights
	Sample Industry Bakery Products														
20511--	Bread	000 tons	5,279.7	5,695.8	1.08	230,881.4	41	3117	Bread	ton	7,131	311,832	43.73	7,692.8	41
20517--	Doughnuts (cake type)	000 tons	163.1	399.7	2.45	18,847.4	47	3117	Cream doughnut	ton	1	86	115.54	1.8	47
20521--	Crackers, pretzels, biscuits, and related products	000 tons	1,036.5	2,383.4	2.30	245,686.1	103	3117	Biscuits	ton	436	103,336	237.03	1,002.5	103
	Sample Industry Sugar														
20620 --	Cane sugar refining	000 tons	4,552.3	2425.9	532.89	101,392.4	42	3118	Sugar	ton	80,493	1,792,795	22,272.68	42,894.1	42
	Sample Industry Confectionery and food n.e.c.														
20649 --	Other confectionery-type products	mill. kg	35.0	104.6	2.98	3,970.3	38	3119	fruitdrop	000 kg.	3	317	113.28	8.4	38
20680 13	Peanuts, shipped separately	mill. kg.	457.1	1,526.5	3.34	44,658.3	29	3119	peanuts	000 kg.	59	5,715	97.69	195.3	29
	BEVERAGES														
	Malt and Malt beverages														
2082	Malt beverages	mill. lts	20,653.1	13,008.8	0.63	281,405.3	22	3133	Beer	hlts	871,456	1,187,390	13.63	54,890.6	22
	Soft drinks														
20863/4	Bottled & canned carbonated soft drinks	mill. lts	15,531.1	6,608.9	0.43	305,443.6	46	3134	Soft drinks	000 ltrs	21,723	427,209	19.67	9,243.5	46
	TOBACCO														
	Tobacco Stemming and Redrying														
21110	Filter & non-filter tips	millions	636,352.0	16,746.2	26.32	959,512.9	57	3140	Cigarettes	thousand	384,118	579,186	1,507.83	10,108.4	57
2141- --	Tobacco Stemming and redrying	ton	429,257.0	1,992.3	4,641.28	39,260.1	20	3140	Tobacco	ton	122	11,187	91,460.57	567.7	20
	TEXTILE MILL PRODUCTS														
	Textile Mill Products														
22811 --	Cotton Yarn	ton	915,264.0	3,144.2	3,435.29	147,084.1	47	3211	yarn	ton	2,783	447,257	160,701.33	9,561.0	47
22823 --	Thrown filament yarns, except textured	ton	18,523.2	90.6	4,891.16	398.0	4	3211	offcuts	ton	205	4,404	21,485.69	1,002.6	4
22690	Finished yarn, etc. (a)	ton	14,800.4	104.3	7,047.11	6,383.5	61	3211	acrylic yarn	ton	152	65,427	431,303.40	1,069.0	61
22840	Cotton thread	ton	78,178.8	581.2	7,434.24	36,449.1	63	3211	sewing threads	ton	45	20,887	466,227.68	333.1	63
2211F --	Finished cotton broadwoven fabrics	m2	449,253.0	809.9	1,802.77	31,806.8	39	3211	plain dyed cloth	000 m2.	9,406	665,967	70,799.35	16,957.6	39
2211B --	Plain weave fabrics, except pile (grey goods)	000 m2	2,990,622.8	3,283.3	1,097.86	214,220.2	65	3211	knitted fabrics	000 m2.	1,652	118,313	71,630.63	1,813.4	65
2211H 65	Blanket sheet type	mill.	0.7	20.8	29.71	241.8	12	3212	blankets	each	877,984	303,340	345.50	26,088.7	12

Annex Table IV.2 (continued)

SIC Code	USA Product Item	Unit	USA Quantity (sales)	USA Dollar Value (mill. $)	USA Dollar Unit Value	USA Quantity valued at Zambian Unit Values (mill. ZK.)	PPP ZK./$ USA Quantity Weights	ISIC Code	Zambian Product Item	Unit	Zambian Quantity	Zambian Kwacha Value (000' ZK.)	Zambian Kwacha Unit Value	Zambian Quantity valued at USA. unit Values (1000 $)	PPP ZK./$ Zambian Quantity Weights
2298 --	Cordage and Twine	ton	35,866.0	147.9	4,123.68	1,380.6	9	3215	ropes	ton	32	1,232	38,494.23	132.0	9
22982 28	Soft fiber cordage and twine, except cotton	ton	73,911.2	118.1	1,597.86	12,920.3	109	3215	twine	ton	54	9,376	174,807.96	85.7	109
22982 03	Fish net and fish netting, commercial	ton	3,087.2	28.2	9,134.49	310.6	11	3215	fish nets	ton	29	2,888	100,610.35	262.2	11
	WEARING APPAREL														
	Wearing Apparel														
23111 00	Men's tailored suits, incl. uniform	thousand	10,474.0	1,219.0	116.38	10,911.3	9	3220	Suits/Uniforms	thousand	143	149,180	1,041.75	16,666.3	9
23252 10	Trousers	thousand	295,921.0	3,682.0	12.44	113,555.2	31	3220	Trouser	thousand	303	116,177	383.73	3,767.0	31
23216 10	Total Men's woven dress and shirts	thousand	317,796.0	2,328.8	7.33	91,203.3	39	3220	Shirt	thousand	106	30,375	286.99	775.6	39
23213 20	T-shirts	thousand	477,180.0	1,004.7	2.11	92,014.9	92	3220	T-shirt	thousand	20	3,900	192.83	42.6	92
23112 00	Men's overcoats, topcoats, and tailored	thousand	23,038.0	348.7	15.14	37,002.0	106	3220	Overcoat	thousand	3	4,979	1,606.13	46.9	106
23353 00	Dresses (original)	thousand	135,271.0	3,320.7	24.55	41,483.5	12	3220	Ladies Dresses	thousand	178	54,735	306.67	4,381.5	12
23262 10	Workpants, overalls	thousand	57,252.0	599.1	10.46	50,454.3	84	3220	Industrial garments, dust coats	thousand	115	101,329	881.27	1,203.2	84
	LEATHER PRODUCTS AND FOOTWEAR														
	Leather footwear														
3143/44	Footwear (Men's and Women's)	mill. pair	138.3	3,101.1	22.42	137,401.1	44	3240	Shoes, footwear	000 pairs	47	46,929	993.50	1,059.2	44
	WOOD PRODUCTS FURNITURE AND FIXTURES														
	Wood Products and Furniture														
24212 35	Total Lumber	000 m3	101,351.0	12,330.8	121.66	640,210.5	52	3311	Sawn timber	000 m3	30	190,795	6,316.77	3,674.8	52
24314 33	Wood doors, interior and exterior	000 pcs	33,321.5	1,402.2	42.08	159,310.8	114	3311	Doors	pcs	110	524	4,781.02	4.6	114
2491214	Wood poles, piles, and posts	pcs	4,590,200.0	152.3	33.18	1,096.0	7	3311	Poles	pcs	185,404	44,267	238.76	6,151.6	7
25115 11	Beds	000 pcs	1,023.9	214.8	209.79	5,958.2	28	3320	Beds	pcs	1,126	6,550	5,819.12	236.1	28
25120 35	Chairs	000 pcs	8,665.1	1,576.0	181.88	18,099.7	11	3320	Chairs	pcs	3,171	6,624	2,088.80	576.8	11
	PAPER PRINTING AND PUBLISHING														
	Paper, Printing and publishing														
2621A 60	Tissue paper products	000 tons	4,387.3	4,534.9	1,033.63	679,485.7	150	3419	Tissue paper	ton	238	36,922	154.87	246.4	150
26764 45	Toilet tissue	000 tons	2,350.4	3,895.9	1,657.55	94,803.7	24	3412	Toilet Paper	ton	1,325	53,438	40.34	2,196.0	24
26217 --	Unbleached kraft packaging	000 tons	2,822.2	1,473.1	521.96	112,569.9	76	3412	Packaging papers	ton	1,009	40,238	39.89	526.6	76
26741 --	Grocer's bags & sacks & variety & shopping bags,	000 tons	1,416.6	1,083.9	765.17	241,231.2	223	3412	Millinery Paper Bags	ton	265	45,094	170.29	202.6	223
26742 12	Multiwall (three plies or more)	000 tons	714.3	792.9	1,110.10	47,177.3	59	3412	Multiwall Sacks	ton	301	19,903	66.05	334.5	59

Annex Table IV.2 (continued)

SIC Code	USA Product Item	Unit	USA Quantity (sales)	USA Dollar Value (mill. $)	USA Dollar Unit Value	USA Quantity valued at Zambian Unit Values (mill. ZK.)	PPP ZK./$ USA Quantity Weights	ISIC Code	Zambian Product Item	Unit	Zambian Quantity	Zambian Kwacha Value (000' ZK.)	Zambian Kwacha Unit Value	Zambian Quantity valued at USA. unit Values (1000 $)	PPP ZK./$ Zambian Quantity Weights
2631- --	Paperboard	000 tons	20,732.2	8,890.0	428.80	1,289,081.6	145	3412	Pulp paperboard	ton	410	25,468	62.18	175.6	145
26211 00	Newsprint	000 tons	5,289.1	2,736.5	517.39	438,645.9	160	3411	News Print	ton	1,789	148,373	82.93	925.6	160
2731A 00	Mass market paperbound books, rack size	mill.nos.	411.9	836.6	2.03	31,148.3	37	3420	Printed Books	numbers	937,094	70,864	75.62	1,903.3	37
	CHEMICALS, PETROLEUM AND COAL PRODUCTS														
	Industrial inorganic chemicals														
28136 11	Oxygen gas	000 m3	8,320,200.0	405.6	48.75	663,212.5	1,635	3511	Oxygen Gas	000 m3	1,447	115,342	79,711.13	70.5	1,635
28196 51	Aluminium Sulphate	ton	1,209,847.3	143.7	118.78	22,632.8	158	3511	Aluminium Sulphate	ton	1,563	29,240	18,707.13	185.7	158
28199 86	Zinc Compounds	ton	78,546.2	68.8	875.92	5,725.3	83	3511	Zinc Oxide	ton	171	12,479	72,891.36	150.0	83
28132	Acetylene	000 m3	87,730.0	121.4	1,383.79	16,547.7	136	3511	Acetylene Gas	000 m3	290	54,700	188,620.69	401.3	136
	Agricultural Fertilizers														
28731 30	Total Fertilizers	000 tons	16,179.2	1,999.3	123.57	179,619.6	90	3512	Fertilizers	ton	32,996	366,317	11,101.91	4,077.4	90
28731 53	Explosive and other uses	000 tons	1,275.4	145.2	113.84	22,025.3	152	3512	Explosives	ton	14,194	245,115	17,269.01	1,615.9	152
	Paints														
28511 --	Coatings and paints	mill. lts	3,656.7	7,552.9	2.07	773,085.1	102	3521	paints	000 lts	798	168,693	211.42	1,648.1	102
28515 98	Other miscellaneous allied paint products	mill. lts	194.9	280.5	1.44	91,013.4	324	3521	adhesive	000 lts	1	424	466.91	1.3	324
	Soaps														
28412 07	Aerosol and spray type household detergents	mill. kg	60.6	67.3	1.11	18,718.9	278	3523	aerosols	000 kg	116	35,820	309.10	128.8	278
28413 11	Toilet Soap: Bars	000 tons	427.2	1,193.5	2.79	44,553.8	37	3523	Toilet soap	ton	1,409	146,907	104,300.32	3,935.3	37
28412 24	Toilet soaps	000 tons	1,828.6	2,241.5	1.23	81,145.7	36	3523	Laundry soap	ton	4,213	186,949	44,375.37	5,164.1	36
	NON-METALLIC MINERAL PRODUCTS														
	Cement and bricks														
32410	Portland cement	mill.tons	47.3	2,491.9	52.63	176,377.4	71	3692	Portland Cement	ton	207,439	772,780	3.73	10,918.0	71
32740 --	Lime	1000 tons	11,714.2	664.3	56.71	46,426.8	70	3692	Lime	ton	120,386	477,124	3.96	6,827.0	70
32510 --	Brick and structural clay tile:	mill. of brick eq.	7,302	1,078	0.15	120,580.8	112	3691	Bricks	brick eq.	1,081,515	17,859	16.51	159.6	112

Annex Table IV.2 (continued)

SIC Code	USA Product Item	Unit	USA Quantity (sales)	USA Dollar Value (mill. $)	USA Dollar Unit Value	USA Quantity valued at Zambian Unit Values (mill. ZK.)	PPP ZK./$ USA Quantity Weights	ISIC Code	Zambian Product Item	Unit	Zambian Quantity	Zambian Kwacha Value (000' ZK.)	Zambian Kwacha Unit Value	Zambian Quantity valued at USA. unit Values (1000 $)	PPP ZK./$ Zambian Quantity Weights
	METALLIC MINERAL PRODUCTS														
	Metallic Mineral Products														
33122 13	Blooms, billets, slabs, sheet	000 tons	4,367.6	1,577.5	361.19	122,824.4	78	3710	castings	ton	13,949	392,271	28,121.91	5,038.1	78
33348/418/541	Primary, secondary and extruded aluminium	000 tons	2,081.1	4,463.2	2,144.62	770,963.9	173	3720	aluminium products	ton	89	32,811	370,457.77	189.9	173
33511/3	Copper & copper-base alloy wire, bare & tinned	000 tons	485.3	939.4	1,935.57	92,213.6	98	3720	bronze products	ton	23	4,420	189,999.66	45.0	98
33124 16	Structural shapes (heavy)	000 tons	15,906.8	6,120.6	384.78	39,603.5	6	3819	steel fabrication	ton	43,612	108,583	2,489.73	16,781.1	6
33123	Carbon steel sheets and strips	000 tons	8,827.3	5,466.6	619.28	845,596.6	155	3819	iron sheet	ton	1,338	128,210	95,793.48	828.9	155
33155	Carbon steel wire	000 tons	1,483.8	904.1	609.33	230,142.0	255	3813	steel wire	ton	28	4,343	155,107.14	17.1	255
33151/2/9	Carbon steel wire strand and wire products	000 tons	1,127.2	1,102.1	977.72	90,023.6	82	3813	wire products	ton	381	30,412	79,863.45	372.3	82
33157 71	Woven wire netting	000 tons	59.1	61.9	1,046.73	4,006.2	65	3813	wire mesh	ton	618	41,839	67,744.49	646.5	65
	MOTOR VEHICLES														
	Motor Vehicles														
37111 --	Passenger Cars and Car Chassis	000 units	7258.3	79835.3	10,999.17	4,963,541.7	62	3843	Passenger cars	unit	33	22,293	683,843.56	358.6	62
37131 01	Bus bodies	000 units	29	316.6	10,917.24	27,385.4	86	3843	Bus bodies	unit	15	13,976	944,324.32	161.6	86
37132	Vans with unit body-cab:	000 units	2.3	20.6	8,956.52	1,600.1	78	3843	Truck	unit	87	60,385	695,673.96	777.4	78
37152 --	Truck trailers and chassis, axle ratings	000 units	14.5	126.7	8,737.93	16,216.3	128	3843	Trailers	unit	12	12,973	1,118,362.07	101.4	128
37148 15	Brake shoes (with or without lining),	000 units	24.5	151.8	6.20	20,077.1	132	3843	Brake shoes and disc pads	unit	4,209	3,449	819.47	26.1	132
37113	Buses, including military:	000 units	21.8	1066.4	48,917.43	34,188.9	32	3843	Bus vehicles	unit	20	31,366	1,568,300.00	978.3	32

Sources:

See Statistical references.

Annex V: Reference Table

Annex Table V.1: ICOP branch classification and corresponding International Standard Industrial Classification (ISIC), revision 2

	ICOP branch abbreviation	ICOP branch long description	ISIC, revision 2 code
1	Food	Food, beverages and tobacco	31
2	Tex	Textile mill products	321
3	Wear	Wearing apparel	322
4	Leat	Leather products	323 and 324
5	Wood	Wood products	33
6	Pap	Paper, printing and publishing	34
7	Chem	Chemicals products	351, 352, 353 and 354
8	Rub	Rubber and plactic products	355 and 356
9	Mine	Non-metallic mineral products	36
10	Met	Basic and fabricated metal products	37 and 381
11	Mach	Machinery and transport equipment	382 and 384
12	Elec	Electrical machinery and equipment	384
13	Oth	Other manufacturing	385 and 39

Source:

Szirmai and Pilat, 1990, Appendix I.

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