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MANUFACTURING INDUSTRY AS A MAJOR FACTOR OF LONG-TERM SUSTAINABLE ECONOMIC GROWTH

Keywords

Manufacturing, Industry, Economic Growth, Sustainable Economic Growth, Open and Closed Economy, Industrialisation, Economic Policy.

Introduction

In this paper I argue that manufacturing industry is the major factor of long-term sustainable economic growth, especially in countries with limited natural resources and no tradition in so-called „invisible exports"[1]. Therefore, I see future developed societies as *superindustrial* [Toffler 1971] rather than *postindustrial* [Bell 1973].

In Polish and other "continental" literature by "industry" is understood "...extracting of mineral, floral or animal raw materials - and their processing ..."[2]. Such definition comprises what is called in English language literature *mining* (*i.e.* extracting raw materials) and *manufacturing* (*i.e.* processing raw materials and semi-finished products). Terminology is even more confusing, as by "industry" in Anglo-Saxon tradition is understood "any economic activities classified according to the type of product or service provided: for example, the motor car industry, and the insurance industry"[3]. In this paper, the terms manufacturing and alternatively manufacturing industry refer thus to "... the fabrication or assembly of components into a finished product on a

[1] Export of non-material services.
[2] Berezowski [1981 p. 213].
[3] Pass *et al*. [1988 p. 247].

fairly large scale"4.

The scale of production is thus of utmost importance: the same or very similar goods can be produced by either manufacturing industry or by handicraft. It is difficult to establish the border between a small factory and a large workshop, so the same activity can be classified as industrial or artisan. The most important criteria will be therefore scale of production and its organisation: assembly of few hundred luxury motor cars per year (like Jensen in England) is not manufacturing but handicraft, while manually assembling thousands of small spare parts (like brake components) in a small shop is manufacturing because of the scale of production and its organisation.

Large-scale motorcar manufacturing was obviously classified as an industrial activity in Poland as well as in the West, but providing such non-material services as insurance cover was not understood to be an industrial activity in the former Soviet Bloc. It was classified as "non-material services", which were not counted in Net Material Product (NMP)5. Industrial activities, narrowed to what is understood in such countries as Australia as mining and manufacturing, were the major source of NMP in the latter region, while others were agriculture, forestry and fishing, as well as construction and trade. Transport was included into so called "material services" in some Centrally Controlled Economies (CCEs) as a whole, in others only transport of goods was included [Socha & Sztanderska, 1982, *passim*]. The same situation applied to telecommunication. In order to avoid any misunderstanding, only terms "manufacturing" and "manufacturing industry" will be used in this paper. For non-material services, like banking or insurance, the term "industry" will be therefore not applied in order to prevent any possible confusion.

The main reason for excluding non-material goods and services was ideological. Marxian economic theory, and especially its part relating to creation of value *(labour theory of value)*, was interpreted in Poland and other Soviet Bloc countries in such way, that labour, which is done outside the sphere of material production, does not create national income [Lewandowski & Sztyber 1987 pp. 188-191]. As by *national income* was understood a NMP, any comparison of wealth between so called socialist countries and market economies was very difficult due to the different understanding of national income (NMP *versus* GDP or GNP).

In this paper, I will try thus to answer one basic question: *how important is manufacturing industry for long-term sustained economic growth?* To answer this question I will *firstly* consider two models: Marxian for a closed economy, and Keynesian (with neoclassical elements) for an open economy. This rather eclectic approach is explained by the fact, that neither Marxian nor

[4] After ***Encyclopaedia Britannica*** [1984 vol. VI p. 585].
[5] Net Material Product - roughly an equivalent to GDP minus those so-called "non-material services" - see **Comecon Data** 94

mainstream-orthodox (be it Keynesian, neoclassical or monetarist) economic theory is unable to explain all complexities of a real-life economy. As the major strength of Marxian approach is in the sphere of production, a Marxian model will used to describe a (hypothetical) closed economy, which is isolated from the outside word. In such an economy, the sphere of production is relatively more important than the sphere of exchange - thus the Marxian model. An open economy, where trade (sphere of exchange) is of major importance, the model must take the latter activity into consideration - thus Keynesian-neoclassical model. The paper concludes with discussion of statistical data describing relative strength of manufacturing sector and its relation to economic performance of major world economies.

Manufacturing in a Closed Economy

The reason for excluding non-material services in this model can be traced back to the well-known Marxian schemes of reproduction, given in the second volume of his **Das Kapital**6. After Oskar Lange [1978 pp. 214-218] those schemes can be presented by the following equations:

$$y_1 = c_1 + v_1 + m_1 \quad (1)$$
$$y_2 = c_2 + v_2 + m_2 \quad (2)$$
$$y = c + v + m \quad (3)$$

where:
y_1 is total value of output of Department I (which makes means of production),
y_2 is total value of output of Department II (which makes consumption goods),
y is total value of national product (roughly NMP),
c is the value of constant capital,
v is the value of variable capital (value of the labour power engaged) and
m is the surplus value (roughly profit).

Also:

$$c = c_1 + c_2 \quad (4)$$
$$v = v_1 + v_2 \quad (5)$$
$$m = m_1 + m_2 \quad (6)$$

It can be proved [Lange *op. cit.*] that in the case of a *simple reproduction* the following relation must be satisfied:

$$v_1 + m_1 = c_2 \quad (7)$$

[1979 p. 33].

[6] First published in 1867 with other numerous editions – as in Bibliography under Marx [1977].

which symbolises that part of the output of Department I must be retained within this Department for replacement of used up means of production and the remainder transmitted to Department II, while part of output of the latter is transmitted to Department I. As only Department I produces capital goods and it is assumed that they can be made only by manufacturing industry, so output of this Department (manufacturing of investment goods) must be sufficient to replace constant capital used up in both Departments *i.e.*:

$$y_1 = c_1 + c_2 \tag{8}$$

In case of an expanded reproduction, part of the surplus value is accumulated for increasing the total amount of means of production:

$$m = m^k + m^c + m^v \tag{9}$$

where:
m^k is part of the surplus value consumed,
m^c is part of the surplus value used to increase constant capital and
m^v is part of the surplus value used to employ more labour.

Equations 1 to 3 take the following form in *expanded reproduction:*

$$y_1 = c_1 + v1 + m_1^k + m_1^c + m_1^v \tag{10}$$
$$y_2 = c_2 + v_2 + m_2^k + m_2^c + m_2^v \tag{11}$$
$$y = c + v + m^k + m^c + m^v \tag{12}$$

It can be proved again [Lange *op. cit.*] that in order to sustain expanded reproduction the following condition must be met:

$$v_1 + m_1^k + m_1^v = c_2 + m_2^c \tag{13}$$

which symbolises that part of the output of Department I (equal to $c_1 + m_1^c$) must be retained within this Department for replacement of used up means of production and for expansion of the amount of means of production in this department. The remainder (equal to $v_1 + m_1^k + m_1^v$) is transmitted to Department II, while part of output of the latter (equal to $c_2 + m_2^c$) is transmitted to Department I and exchanged for means of production needed for the replacement of the means of production used up in the Second Department and for the expansion of constant capital within this Department. As only the First Department produces investment goods and it is assumed again that they can be made only by the manufacturing industry, output of this department (manufacturing of

investment goods) must be sufficient to replace used up constant capital in both Departments and to deliver capital goods required for the expansion of production; *i.e.* the following equation must be satisfied:

$$y_1 = c_1 + c_2 + m_1^c + m_2^c \qquad (14)$$

Therefore, in a closed economy the manufacturing sector is necessary not only to expand production (14) but also to sustain simple reproduction of the whole economy (8).

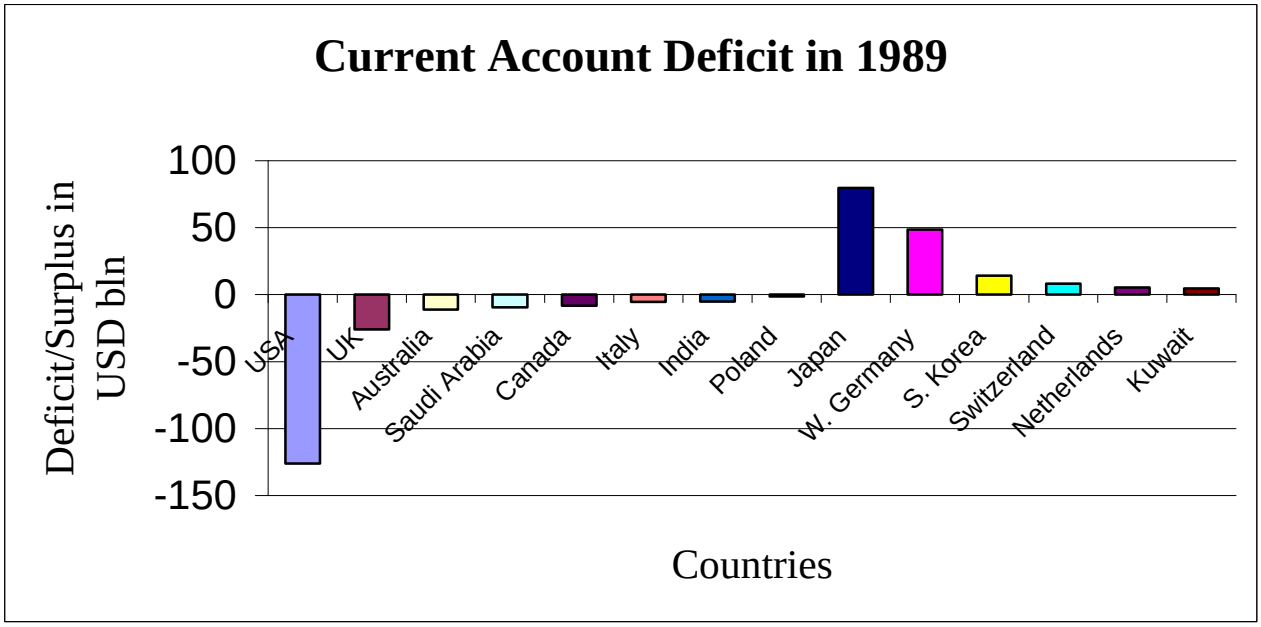
Manufacturing in an Open Economy

The importance of manufacturing industry is linked here to the fact that it is the only producer of investment or capital goods [Domański 1985 p. 114]. In countries with limited natural resources, like the majority of European countries, output of manufacturing is one of the most important factors of economic growth, as investment is not only a function of interest rates (as in classical models) but also of available capital goods, when the import of those goods is limited by the shortage of foreign currency. Such shortages exist not only in present and former Centrally Controlled Economies (CCEs) but also in many developing and some Newly Industrialising Countries (NICs)[7]. Developed countries, with relatively weak or declining manufacturing base (like Australia, Canada, USA and UK), do not have at present shortages of foreign currency *sensu stricto,* because they are (or were) able to finance import of manufacturing goods by exporting raw materials and agricultural products, and by heavy borrowing overseas (as in the case of the US). This borrowing is a major reason for massive current account deficits in those countries - see Figure 1.

In some developed, but resource poor countries, (like UK and especially Italy) the shortage of foreign currency and the current account deficit can be explained by the limited amount of exportable goods and limited foreign demand. Those conditions are also typical for the majority of the former Soviet Bloc (former 'Second World') and the majority of the underdeveloped countries (so-called Third World). The limited amount of potentially exportable goods is usually caused by the necessity to retain some of them in the country, in order to satisfy at least a minimal acceptable level of consumption8 and investment9.

[7] The so-called developing countries are really, at least in their overwhelming majority, underdeveloped, while we can talk about real development and progress only in the case of NICs.

[8] Which is relatively high in some countries of the former Soviet Bloc, but in the majority of the underdeveloped countries



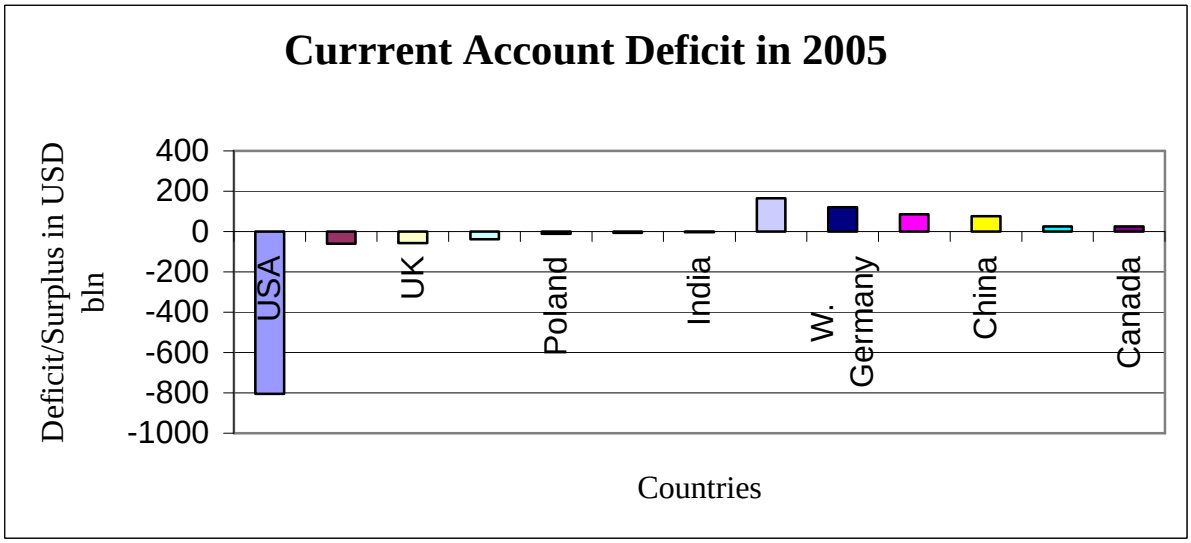


Figure 1. Largest current account surpluses and deficits in 1989 and 2005

Sources:
1. United Nations **Statistical Yearbook** [various years]
2. *The Economist* [1992]
3. GUS **Rocznik Statystyki Międzynarodowej** [2006]

Even if there are huge surpluses of exportable commodities (like coal, ores and wheat in Australia and Canada), the decline in the profitability of commodity trade, caused by cyclical

it is at the level hardly sufficient to even reproduce labour force.

[9] At least at the level of simple reproduction of capital – it must be not forgotten that in many Third World countries one can witness destruction of capital caused by insufficient investment, as too small part of, frequently declining, GDP is invested in order to artificially increase consumption. It is obvious that such a policy leads to even more troubles in the future.

economic recessions, endemic for free-market capitalism, new material saving technologies and changes in the structure of consumer demand, forces at least some proponents of the *laissez faire* approach to economic development to rethink their position. It is no longer claimed by every orthodox economist that even resource rich countries like Australia or Canada have a choice of having a manufacturing industry or not:

> Economic theory no longer sustains the view that free trade will create a world-class manufacturing base sufficient to generate the revenue necessary to replace that lost from commodity trade... A dwindling number of economists and very few policy-makers espouse the traditional free trade arguments as an overall prescription for US trade policy. Instead, a growing number of academic and policy economists are best described as moderate free traders: although they support the free trade ideal, they grudgingly concede that it is a long way off and conclude that unilateral measures to serve the national interest may be justified under some circumstances.10

Ergo, the need for industrial policy, with its objective defined as [Davidson *op. cit*.] "... to improve living standards by determining, collectively, to foster the manufacturing sector of the economy".

Thus take now under the consideration a modification of a simple Classical-Keynesian macroeconomic model [Lange 1938 p. 12, Levačić & Rebman 1989 pp. 18-24, 369-370]:

1. Production

$$y = q(c, i) \quad \text{[Production Function]} \quad (15)$$
$$q'(c) > 0,\ q'(i) > 0$$

2. The Product Market

$$i = i_0 + i(R, k) \quad \text{[Investment Function]} \quad (16)$$
$$i'(R) < 0,\ i'(k) > 0$$

$$k = k_0 + k^e - k^i \quad \text{[Available Capital Goods]} \quad (17)$$

$$k^e = k_1(k_0, k^d) \quad \text{[Exported Capital Goods]} \quad (18)$$
$$k_1'(k_0) > 0,\ k_1'(k^d) > 0$$

$$k^i = k_2(y - c_0 - i_0) \quad \text{[Imported Capital Goods]} \quad (19)$$
$$k_2' > 0$$

$$c = c_0 + c(W/P) \quad \text{[Consumption Function]} \quad (20)$$
$$c' > 0$$

[10] Davidson [1993].

3. Labour Market

$$W = W_0 + w(P) \quad \text{[Nominal Wages Function]} \quad (21)$$
$$w' > 0$$

4. Financial (Money) Market

$$P = p(P/P_{t-1}) \quad \text{[Nominal Prices Function]} \quad (22)$$
$$p' > 0$$

$$R = R_0 + r(M_0) \quad \text{[Nominal Interest Rate]} \quad (23)$$
$$r' > 0 \quad \text{(monetary targets)}$$

(alternative equation)

$$M = M_0 + m(R_0) \quad \text{[Nominal Money]} \quad (24)$$
$$m' < 0 \quad \text{(interest rate targets)}$$

The model has 10 equations, the same as the number of *endogenous* variables:
Y national income (real),
i real investment,
k capital goods (real),
k^e exported capital goods (real),
k^i imported capital goods (real),
c real consumption,
W nominal wages,
P nominal prices,
R nominal interest rate or
M nominal money.

Exogenous variables are:
i_0 minimal investment,
c_0 minimal consumption
k_0 capital goods (real, produced within),
k^d foreign demand for capital goods (real),
W_0 minimal nominal wage,
P_{t-1} previous year nominal prices,
R_0 nominal interest rate (when monetary targets assumed) and
M_0 nominal money (when interest rate targets assumed).

The sole purpose of this model is to show that manufacturing industry, as the only supplier of capital goods, is the major source of wealth under condition of limited availability of imported investment goods. As the majority of European countries (and especially former CCEs) have capabilities to import capital goods limited by the necessity to sustain at least minimal level of capital and labour reproduction (see equation 19), the only way to continue long-term economic

growth is to produce a significant amount of capital goods internally. Thus in the *long term* imports x^i must not be greater than exports x^e:

$$x^i <= x^e \tag{25}$$

However, in the *short term* it is possible that:

$$x^i > x^e \tag{26}$$

This means that surplus imports can be in the short term financed by loans (usually taken abroad). Such loans must be, of course, repaid, ordinarily after no more than 5 years – we must remember her that the inability to service foreign debt was one of the reasons for the Polish crisis of the early 1980s that has had long-standing economic and especially political repercussions. As the export level depends on a minimal level of export x^e_0 (*exogenous*, determined by the necessity to service foreign debt) and current national income:

$$x^e = x^e_0 + x(y) \tag{27}$$
$$x' > 0$$

the only way to increase exports in the long term is, therefore, by increasing national income y. Attempts to increase exports while national income is stagnant or falling cause, in obvious way, reductions in consumption and investment. If this reduction is such that even simple reproduction of capital and labour is impossible, then the whole socio-economic system becomes highly unstable. Such forced expansion of export was pursued, for example, by the Ceauşescu 'communist' regime in Rumania, which was then praised in the West for its alleged 'independence" on the Soviet Union, whilst totally disregarding its brutal character for the great majority of the population of Rumania. The result was pauperisation of almost the whole society and rapid destruction (even in physical terms) of the national wealth as used-up capital was simply not replaced. But even the most totalitarian regime, such as this of Ceauşescu, can be able to force such overexpansion of exports only in the relatively short period. In the relatively rare extreme, falling human and capital resources make it impossible to keep the state apparatus (including police and security forces) running, as was case in several third world countries, like previously in Angola and Mozambique, and today's (2009) Zimbabwe. All it means that there are physical limits to the possible level of export, especially in relatively underdeveloped countries like the former CCEs and especially in the former colonies of the UK, France and Portugal.

Other limits to export are set by the demand for exported capital (see equation 18) or consumption goods. Insufficient demand abroad, especially during the cyclical recessions, means that even quality or cheap goods cannot be exported in the amount desired by the exporting country. During the recession of the early 1990s, makers of luxury motor cars like Mercedes-Benz had similar problems as makers of relatively cheap, popular vehicles like Škoda or Lada: insufficient demand at home and abroad[11]. Internal demand can be stimulated, at least in theory, by fiscal or monetary policy. External demand can be influenced only by reducing prices or, at least in some cases, by improved quality. As prices cannot be (in the long term) reduced below cost, and severe price cuts can lead to charges of dumping, levels of external demand must be assumed to be exogenous and independent of the manufacturer12. Limited export level means, in turn, that import levels are also limited. This limitation applies to capital as well as consumer goods, and cannot be influenced by the given country, unless it is an economic superpower such as in the past the US, and today's China (PRC). As this paper concentrate on the middle size economies such as, for example, Poland, it can be assumed that those countries cannot influence foreign markets13.

If the import of capital goods is limited in the long term by the level of total exports, the only source of those goods, which can be influenced by internal factors, is local manufacturing. There are of course exceptions: some countries are (or were) able to finance imports of capital (and consumption) goods by transfer of funds from abroad. The source of such funds was usually bank deposits (Switzerland), profit from financial services for foreign customers (UK), tourism (Italy, former Yugoslavia) or export of labour14. It is, however, very unlikely that any of the former CCEs could finance large scale imports of capital goods this way[15].

To attract significant bank deposits, a country must have a very stable political system and very stable currency, but none of those conditions is likely to be met in the foreseeable future in any of former CCEs[16]. The same condition applies to profits from rendering financial services. To be

[11] For example during the recession of 2008-9, Toyota, the largest Japanese car manufacturer, used its capacity only in roughly 60%, while such American giants as GM, Ford and Chrysler became virtually bankrupt. In case of GM and Chrysler, poor management was officially blamed, but the real culprit was insufficient demand in relation to their huge output capacity.

[12] If the manufacturer is not a multinational monopoly or semi-monopoly like IBM up to the late 1980s, or, more recently, Microsoft.

[13] A standard "small country" assumption.

[14] Transfers of money from nationals working abroad were an important source of foreign currency in countries like Turkey, Greece, former Yugoslavia and even Italy.

[15] In case of Poland those transfers are not really important, as although it is estimated that after year 2004 (Poland joins the EU) up to 2 million of Poles emigrated to the West, they received, as a rule, very low wages, and even frequently became dependent on social security (especially recently, i.e. in years 2008-9), so the were unable to transfer significant amounts of capital back to Poland.

[16] With few exceptions such as Slovenia and maybe Czech Republic.

internationally competitive in this area, not only an exceedingly stable, but also a highly developed financial and political system is required. As to tourism: none of the former CCEs (with the possible exception of some former Yugoslav republics) is able to attract sufficient funds from foreign tourists. It is not only a question of the material base (hotels, roads *etc.*) and skills of the hospitality "industry" workers, but also a question of having adequate climate, landscape, controlled pollution and degradation of the environment and physical security of the potential visitor. Lack of just one of those factors can significantly limit the income from tourism, even if other conditions are fully met. Export of labour is possible today only for the EU members (such as Poland), and not during the economic downturns, as virtually all OECD countries, which in the past allowed gastarbeiters, suffer today (years 2008-9) high levels of unemployment and not only ban new foreign workers, but are trying to expatriate those admitted in the past (as in case of France, Germany and even Spain).

It is also possible to finance the import of capital goods by export of raw materials, agricultural products and material services like construction, transport or telecommunications. Export of those goods and services is, however, also limited by their internal supply and external demand. In addition, there are additional limits on the level of export of raw materials and agricultural goods (internal demand). The same applies to material services; in the case of transport and telecommunication, geographical location is important. As Central Europe is centrally located only physically17, its location is still not18 a significant source of revenue for the former CCEs of Europe.

The production function (equation 15), as assumed in this paper, relates current level of national income $\boldsymbol{y}$ to current consumption and investment. Current investment is linked to the available capital by equation 17. As, according to the presented arguments, in the *long term* the amount of available capital goods depends on the potential of manufacturing industry (assuming income from the export of non-material services is insignificant), the manufacturing industry is thus the major factor of sustainable (*i.e.* long-term) economic growth.

Statistical Evidence

In this section I present statistical evidence of importance of manufacturing industry. I start with

[17] As the majority of European international exchange of persons, goods and information is within the "old" EU (*i.e.* within its pre-2004 borders).

[18] And is unlikely to be in a foreseeable future.

the relation between the average growth rates of real GDP and manufacturing output *per capita* - see Table 1. For years 1965-2005 there is a strong correlation ($r^2 = 0.88$) between the growth of manufacturing and mining output and the growth of GDP (NMP). As in the presented countries mining (or agriculture in Mongolia and Vietnam) is usually not a great contributor of economic growth (with major exceptions being only China, Canada, Australia, USSR, USA and South Africa) the growth in general output *per head* can be taken as a good estimator of the growth of manufacturing output *per head.*

There is another way to prove the hypothesis that manufacturing industry is the major factor of sustainable economic growth. Since the beginning of modern capitalism, *i.e*. from the late 18th century, only countries with developed manufacturing have recorded long-term consistent economic growth. The examples are Great Britain in 19th century, the US in the first half of 20th century, Western Germany and Japan in the second half of 20th century (until the current recession) and China (PRC) at the turn of 20th and 21st century. The same applies to NICs of Asia (like South Korea, Taiwan or Singapore). On the other hand, countries where manufacturing started to decline, like the UK after the 2nd World War or the US after the Vietnam War, experienced stagnation and relative decline of the national wealth. Standard of living, which was relatively higher in the UK than in Germany, is now lower in Great Britain than in the Western Germany (especially if one takes under consideration the effects of German unification) - See Tables 2, 3 and 4.

With exceptions of Iceland (where the major source of wealth is fishing) and not included Bermuda (23,793 US $ per capita GDP, where major source of wealth is tourism and offshore financial services[19]), table 1 shows a very strong correlation ($r^2 = 0.93$ for 1988) between the size of manufacturing output *per head* and the level of GDP *per head*. The same is true for the former CCEs. With the exception of Cuba (where agriculture and tourism are the most important sectors of economy), this table shows again very strong correlation ($r^2 = 0.97$ for 1998) between the level of industrial output *per head* and the level of GDP *per head*. The next table shows industrial production and GDP per head calculated using Purchase Power Parity (PPP) *i.e.* taking into consideration the cost of living (*via* the price level).

There is again a strong correlation ($r^2 = 0.83$) between the level of industrial production *per head* and the level of GDP *per head* calculated using PPP. Countries with the highest industrial output *per capita* do not necessary have the highest standard of living, but the general tendency is for this standard (measured by PPP) to rise with industrial production: increase of industrial output *(per head)* by 1 unit increases (on average) PPP by approximately 0.37 of the unit. For example,

standard of living in West Germany was approximately 12% higher than in UK, while German industrial output per capita was approximately 51% higher. This smaller difference between PPP than between industrial output is explained by the fact that tertiary and especially quaternary sectors were traditionally better developed in the UK than in continental Europe (with the exception of Switzerland).

Another tendency is that countries, where manufacturing is relatively more important (countries with low "relative industrialisation" ratio in Tables 2 and 3) develop faster than countries where manufacturing is relatively less important. The fastest developing countries (see Table 1) like South Korea, China, Singapore, Taiwan and (in the near past) Japan have relative low relative ratio while countries with high relative ratio (*i.e.* where manufacturing is relatively less important) grew slower - good examples are Canada, New Zealand, Australia and USA. The most notable exception is West Germany, which had slow growth despite relatively low "relative industrialisation" ratio. West German growth was, however, faster than growth of UK (which has significantly higher ratio in Table 2).

There should be now no doubt that manufacturing industry as a major factor of long-term sustainable economic growth. It is also important to note that countries with the strongest manufacturing industry have also the highest trade surplus (such as Japan, West Germany and Taiwan), while countries, where manufacturing is in the relative decline, and therefore are forced to import more processed goods, have the largest trade and current account deficit (such as USA, UK and Australia) - see Fig. 1. The largest current account deficits belong today (early 21st century) to USA, UK and Australia, while the largest surpluses belong to Japan, West Germany, China (PRC) and South Korea - countries with a relatively strong manufacturing sector and high share of processed goods in their export. It must be noted that all abovementioned data relate to years 1988 and 2005, *i.e.* to the period before the current recession of 2008-9.

[19] The latter are based mostly on semi-legal tax avoidance schemes, so are ethically very suspicious.

Table 1. Real GDP (NMP for CCEs), Annual Growth Rate and Manufacturing and Mining Output per Head in Developed Market Economies and Former CCEs 1965-2005

Country	Real GDP average annual growth rate (1965-1988) [%]	Real GDP average annual growth rate (1989-1995) [%]	Real GDP average annual growth rate (1996-2005) [%]	Industrial output annual *per head* growth rate (1965-1988) [%]	Industrial output annual *per head* growth rate (1988-2004) [%]
Australia	3.8	3.0	3.1	1.2	1.3
Austria	3.0	.	.	3.2	.
Belgium	2.7	.	.	3.1	.
Bulgaria	6.0	.	.	7.2	.
Canada	4.2	.	2.2	2.2	.
China	8.9	11.0	8.9	9.2	10.8
Cyprus	5.8	.	X	5.1	X
Czechosl.	4.0	.	.	4.3	.
Denmark	2.4	.	.	1.5	.
Finland	3.6	.	.	3.5	.
France	3.1	.	2.2	2.4	.
Germany	.	2.9	1.2	.	1.3
Germ. (E)	4.4	X	X	5.0	X
Germ. (W)	2.5	X	X	1.9	X
Greece	3.5	.	.	4.1	.
Iceland	2.8	.	.	.	.
Ireland	3.0	.	.	.	.
Israel	4.7	.	.	.	.
Italy	3.0	.	.	2.7	.
Japan	5.2	1.9	-0.6	6.2	0.3
Korea (N)	4.6	.	.	.	.
Korea (S)	9.2	.	5.0	12.6	.
Luxemb.	2.9	.	.	1.3	.
Mongolia	6.2	.	.	6.5	.
Netherl.	2.7	.	.	2.1	.
N. Zealand	4.2	1.9	1.9	.	3.4
Norway	3.5	.	.	4.3	.
Poland	3.2	-0.3	5.2	3.9	3.2
Portugal	3.7	.	.	.	.
Singapore	8.3	.	.	7.2	.
S. Africa	2.8	.	.	.	.
Spain	3.6	.	.	3.2	.
Sweden	2.3	.	.	1.8	.
Switzerl.	1.9	.	.	.	.
Taiwan	8.2	.	.	.	.
UK	2.4	1.0	2.7	1.5	0.2
USA	2.8	1.9	3.6	1.1	2.7
USSR	4.6	.	.	5.3	.
Vietnam	3.2	.	.	-2.2	.
Yugoslavia	3.1	X	X	3.1	X

Notes: 1. OPEC members were omitted. 2. Former (and present) CCEs are in *italics*.

Sources: 1. United Nations. **Statistical Yearbook** [various years] 2. *The Economist* [1992]

Table 2. GDP and Industrial Output Per Head in Developed Market Economies 1988-2005

Country	GDP *per head* in US $ (1988)	GDP *per head* in US $ (2005)	Industrial output *per head* in US $ (1988)	Industrial output *per head* in US $ (2005)	Relative industria-lisation ratio (1988)	Relative industria-lisation ratio (2005)
X	**[1]**	**[2]**	**[3]**	**[4]**	**[1]/[3]*)**	**[2]/[4]*)**
Australia	14,083	35,869	4,394	3,701	3.20	9.70
Austria	16,675	37,524	6,653	6,439	2.51	5.83
Belgium	15,394	34,336	4,726	5,281	3.26	6.50
Canada	18,834	34,028	6,592	3,823	2.86	8.90
Denmark	20,988	47,766	6,002	5,279	3.50	9.05
Finland	21,156	36,842	7,172	6,822	2.95	5.40
France	17,004	35,727	5,458	4,150	3.11	8.61
Germany**)	19,743	34,230	7,838	6,853	2.52	5.00
Greece	5,244	20,310	1,588	1,874	3.30	10.84
Iceland	23,640	53,029	6,520	4,761	3.63	11.14
Ireland	9,181	48,025	3,398	10,863	2.70	4.42
Israel	9,368	18,651	5,451	.	1.72	.
Italy	14,432	30,394	4,979	4,971	2.90	6.11
Japan	23,325	35,877	9,423	7,529	2.47	4.76
Korea (South)	4,081	16,308	1,763	4,129	2.31	3.95
Luxembourg	18,000	75,711	5,919	6,206	3.04	12.20
Netherlands	15,421	38,280	5,182	4,644	2.98	8.24
New Zealand	11,544	26,031	3,520	2,086	3.28	12.45
Norway	21,724	64,089	6,843	4,754	3.17	13.48
Portugal	4,017	17,417	1,591	2,045	2.52	8.52
Singapore	9,019	30,082	3,302	7,213	2.73	4.17
South Africa	2,958	4,507	1,198	843	2.47	5.35
Spain	8,668	25,513	3,242	3,582	2.67	7.12
Sweden	21,155	39,639	8,906	5,847	2.37	6.78
Switzerland	27,748	48,810	9,573	8,204	2.90	5.95
Taiwan	5,975	23,386	2,754	.	2.17	.
UK	14,477	36,525	5,168	4,732	2.80	7.72
USA	19,815	41,882	5,073	5,263	3.91	7.96

*) The greater the ratio, the (relatively) less important is manufacturing.
**) West Germany in 1988.

Note: OPEC members and countries smaller than Luxembourg or Singapore were omitted.

Sources:
1. United Nations. **Statistical Yearbook** [various years]
2. *The Economist* [1992]
3. GUS **Rocznik Statystyki Międzynarodowej** [2006]

Table 3. GDP and Industrial Output Per Head in (Former) Centrally Controlled Economies 1988-2005

Country	GDP *per head* in US $ (1988)	GDP *per head* in US $ (2005)	Industrial output *per head* in US $ (1988)	Industrial output *per head* in US $ (2005)	Relative industriali-sation ratio (1988)	Relative industriali-sation ratio (2005)
X	[1]	[2]	[3]	[4]	[1]/[3]*)	[2]/[4]*)
Albania	1,102	2,912	564	197	1.95	14.78
Bulgaria	2,217	3,137	1,536	554	1.44	5.72
China (PRC)	301	1,283	158	573	1.90	2.24
Cuba	2,509	2,864	1,335	.	1.88	.
*Czechoslovakia***	2,737	10,385	1,932	2,182	1.42	4.76
Germany (East)	5,256	.	3,879	X	1.35	X
Hungary	2,625	10,835	1,247	1,929	2.10	5.62
Korea (North)	858	1,328	.	.	.	.
Mongolia	1,053	1,040	.	23	.	45.22
Poland	1,719	8,023	1,044	1,276	1.65	6.29
Rumania	1,374	3,358	963	944	1.43	3.56
*Russia****)	2,055	5,439	1,151	820	1.78	6.63
Vietnam	154	724	48	130	3.21	5.57
Yugoslavia	2,279	X	1,244	X	1.83	X

*) As in table 2.
**) Czech and Slovak republics in 2005.
***) USSR in 1988.

Notes: 1. Only „core" CCEs were included.
2. Former Soviet Bloc countries are in *italics* (Albania only up to *circa* 1962-68).
3. Present-day CCE are in **bold**.

Sources: 1. United Nations. **Statistical Yearbook** [various years]
2. *The Economist* [1992]

Table 4. GDP (with PPP) and Industrial Output Per Head in Selected Developed Market Economies and Selected Former CCEs 1988-2005

Country	GDP PPP *per head* (% of US level) (1988)	GDP PPP *per head* (% of US level) (2005)	Industrial output *per head* (% of US level) (1988)	Industrial output *per head* (% of US level) (2005)
Australia	71	86	87	70
Austria	66	90	131	122
Belgium	65	82	93	100
Canada	92	81	130	73
China	12	14	3	11
Denmark	74	114	118	100
Finland	69	88	141	130
France	69	85	107	79
Germany (West)	74	82	154	130
Greece	36	48	31	36
Hungary	31	26	25	37
Iceland	79	127	128	90
Ireland	41	115	67	206
Israel	52	44	107	.
Italy	66	72	98	94
Japan	71	86	186	143
Korea (South)	24	39	35	78
Luxembourg	79	181	117	118
Netherlands	68	91	102	88
New Zealand	61	62	69	40
Norway	84	153	135	90
Poland	24	30	21	24
Portugal	34	42	31	39
Singapore	73	72	65	137
South Africa	28	11	24	16
Spain	46	60	64	68
Sweden	77	95	176	111
Switzerland	87	117	189	156
UK	66	87	102	90
USA	100	100	100	100
Yugoslavia	29	X	24	X

Notes: 1. OPEC members were omitted.
2. Former (and present) CCEs are in *italics.*

Sources:
1. United Nations. **Statistical Yearbook** [various years]
2. *The Economist* [1992]
3. GUS **Rocznik Statystyki Międzynarodowej** [2006]

Conclusion

According to some authors [Domański 1985 p. 114] there are other reasons why manufacturing is so important. *First* (and the most important) is the increase in the number of available jobs and therefore reduction of unemployment as a consequence of developing the manufacturing sector. This was also one of the arguments used by the last treasurer of Polish 2nd Republic, Mr Eugeniusz Kwiatkowski, to support industrialisation policies in the years between 1935 and 1939. His arguments were20:

1. Strong and modern army, air force and navy requires a well developed, modern manufacturing sector - *foreign policy and military argument;*
2. The only way to create new jobs in order to reduce unemployment is to build new and extend existing factories - *employment argument;*
3. Developing industry creates new markets for agricultural products - *activation of agriculture argument* and
4. Development of manufacturing should be self-supporting according to Keynesian economics (multiplier effect, positive feedback between growth of output and growth of employment etc.) - *economic argument.*

The above assertions can be somehow opposed, as jobs can also be created in services (*i.e.* in tertiary and quaternary sectors), especially in so-called "post-industrial" phases of the development [Bell 1973]. Another group of opposing arguments is based on an assumption that automatisation, computerisation and robotisation replace human labour. It is then likely that even in the growing manufacturing sector the actual number of jobs will decrease. As to other reasons, like providing consumer goods, it is more important in the closed (or relatively closed) economy. In an open economy it is possible for a given country to specialize in the investment goods and to import the majority of manufactured consumer goods or *vice versa*. It is thus more important to have developed manufacturing than to try to substitute imports, as in the market-oriented economy it should be relatively easy for the manufacturer to switch from one final product to another. As manufacturing is more price elastic than agriculture or mining, it is easier for the manufacturing-based countries to react to changed structure of demand than for agricultural or mining based ones. Manufacturing (secondary sector) is, however, generally less price elastic than tertiary and quaternary sectors.

For medium sized, relatively natural resource poor countries like Poland, well-developed

manufacturing is thus the necessary condition for achieving long-term balanced growth. It is also the major source of national income. Without modern manufacturing Poland would not only become totally dependent on imports of strategic industrial goods, but would also have even more problems with balancing its current account (it was shown earlier that developed manufacturing allows achieving trade and current account surpluses in countries like Japan, Germany, PRC, Taiwan and South Korea). Well-developed manufacturing is in Polish conditions the major source of productive employment and thus the only practical way of reducing unemployment.

Proposals to dismantle up to half of Polish manufacturing industry [*Tygodnik Solidarność* 1989] are fortunately no longer taken seriously. They were based on rather superficial and inaccurate understanding of the concept of postindustrial society [Bell *op. cit.*]. Poland of 1989 was far away from postindustrial phase reached then only by the few most developed world regions (mostly the "core" members of OECD). If instead of term "postindustrial society" a term "superindustrial society" was used [Toffler 1971] than manufacturing industry would not be seen as something outdated and deserving to decline and even die. Relative decline of employment in manufacturing in the most developed countries is not an indicator that manufacturing sector is losing its importance. Quite contrary, in such leading countries as Germany or Japan manufacturing is (and most likely will be in a foreseeable future) a major contributor to sustainable economic growth and national income. Technological progress can limit employment in some branches of manufacturing and rising wages can force some factories to be located in low wage countries, but it is indeed hard to imagine how any larger European country could survive without modern manufacturing industry.

Comprehension check

1. Explain the differences between terms 'industry' and 'manufacturing'.
2. Why non-material services were not included in the national income (NMP)?
3. What is the most important difference between Department I and II in the Marxian model?
4. What is current account deficit and how it differs from the budget deficit?
5. What is the major difference between *exogenous* and *endogenous* variables in economic model?
6. What is the main application of PPP (Purchasing Power Parity)?
7. Why manufacturing industry as a major factor of long-term sustainable economic growth in

[20] Landau & Tomaszewski [1989 pp. 100-101].

countries like Poland?

8. What were the arguments used by Eugeniusz Kwiatkowski in the late 1930s, to support industrialisation policies in Poland?

Recommended reading

- Bell, D. 1973 **The Coming of Post-Industrial Society: Venture in Forecasting** New York: Basic Books
- Davidson 1993 **The Elephant and the Butterfly; or Hysteresis and Post Keynesian Economics** *Journal of Post Keynesian Economics* No. 15
- Landau, Z. & Tomaszewski, J. 1989 **Gospodarka Polski Międzywojennej – Lata interwencjonizmu państwowego** Warszawa: Książka i Wiedza
- Lange, O. 1938 **On the Economic Theory of Socialism** Minneapolis: University of Minnesota
- Levačić, L. & Rebman, A. 1989 **Macroeconomics; an Introduction to Keynesian-Neoclassical Controversies** London: Macmillan
- Toffler, A. 1971 **Future Shock** London: Pan Books

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18. Marks, K. 1977 **Capital. A Critique of Political Economy** New York: Vintage Books (with and introduction by E. Mandel)
19. Pass, C., Lowes, C. & Davies, L. 1988 **Dictionary of Economics** London: Collins
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21. Toffler, A. 1971 **Future Shock** London: Pan Books
22. *Tygodnik Solidarność* 1989
23. United Nations (various years) **Statistical Yearbook**