

What Happened to Manufacturing Sector in Industrial Countries?*

M. Ataman Aksoy

Francis Ng[†]

ABSTRACT

There has been a relative decline in the manufacturing sectors of industrial countries called "deindustrialization" which consists of the decline in manufacturing employment, trade deficits, factory closings and the decline in the share of manufacturing in GDP. This study analyzes the behavior of growth in selected industrial countries, The USA, UK, France, Italy, Spain, Sweden, Japan, and the Republic of Korea, for the period 1970-2015. The findings of the study show that serious decline of manufacturing apply to very few countries and is caused primarily by high technical change leading to lower manufacturing product prices. This leads to lower incomes for labor and capital and distorts the relative share of manufacturing in GDP.

Keywords: manufacturing sectors, manufacturing share decline, deindustrialization, manufacturing growth and production, labor and capital, manufacturing trade and employment, industrial countries.

INTRODUCTION

Recent research on the experience in mostly industrial countries highlights two findings. First, in many industrial countries real manufacturing wages have been stagnant despite high labor productivity growth. Second and probably more important, there has been a significant decline in the manufacturing sector share in GDP and its high wage employment.

These developments are often generalized under the heading of "deindustrialization" of the industrial countries. For "deindustrialization" they point out the decline in manufacturing employment, news of factory closings, manufacturing trade deficits, the decline in the share of manufacturing sector in GDP, and the decline in the share of industrial countries in global manufacturing exports.[‡]

* For more information, especially about the experience of individual countries, see Aksoy and Ng, (2024). Most of the analyses in this paper are derived from this book. (https://www.amazon.com/Revisiting-Deindustrialization-Understanding-Differential-Manufacturing/dp/B0D49X33J8/ref=rvi_d_sccl_24/146-2035393-2358035?pd_rd_w=JHxsv&content-id=amzn1.sym.f5690a4d-f2bb-45d9-9d1b-736fee412437&pf_rd_p=f5690a4d-f2bb-45d9-9d1b-736fee412437&pf_rd_r=DZ09HFK9J71KFC25R6AG&pd_rd_wg=snR9j&pd_rd_r=4a5c63f1-a8d3-491b-9a10-108cc3d1284f&pd_rd_i=B0D49X33J8&pssc=1)

[†] The authors are retired economists from the Development Research Group of World Bank. Correspondence: E-mails – ataman.aksoy@gmail.com; francis.ng2013@gmail.com

[‡] See Bluestone and Harrison, (1982), Lawrence, (2015), Guschanski and Onaran, (2017a, b), Elsby, Hobin, and Sahin, (2013), Autor et al, (2017).

Furthermore, trade liberalizations and the expansion of manufacturing exports from China and other emerging market economies have created an environment where the main cause of the manufacturing employment and output decline in industrial countries is believed to be “unfair trade” from these countries. These perceptions are now leading to trade wars, expanding free trade blocks, preferential trade arrangements, and attempts to reverse the globalization pattern that has developed over the last 50 years.

More important, the political effects of the manufacturing sector decline arguments in industrial countries have fueled populism, anti-immigrant organizations, and support to the right wing extremism. These controversies continue partially because while there are similarities among industrial countries, there are also serious differences. Furthermore, basic causes of the relative decline of manufacturing sector are not fully analyzed.

In this study we focus, among others, on a neglected and important reason for the relative decline of manufacturing in the industrial countries: the fall in manufacturing value added prices vis a vis other sectors in the economy and/or consumer prices, and show that arguments about the decrease in manufacturing sector performance in industrial economies apply to only a few countries. This study documents and analyzes the changes in relative growth in the manufacturing sector in selected industrial countries – the USA, UK, France, Italy, Spain, Sweden, Japan, and the Republic of Korea – that occurred between 1970 and 2015.[§]

The focus is on key political and global economic developments and their impact on growth in manufacturing. The main emphasis is placed on the industrial countries because the reactions to manufacturing sector developments have been more acute and more serious in these countries.**

We present our results in two sections. In the first section, we summarize the physical value added growth levels for the 1970-2015 period for our sample countries. In the second section, we discuss the political and economic developments that effected these growth levels.

Our main findings highlight the key developments that have driven the performance of manufacturing sectors in industrial countries over the last five decades. Here are some important findings:

- The most important negative development that has contributed to all dimensions of the deindustrialization debate is the rapid decline (38 to 55 percent) in manufacturing value added prices compared to the GDP (and CPI) prices caused by faster technical change in manufacturing and the entry of new lower cost producers (Fig. 3). Annual terms of trade losses caused by this relative price decline are equal to about half the rate of technical change and have reduced increases for the value added and the income increases for both labor and capital.

[§] We focused on 1970-2015 period because this is the period when most important policy changes and reversals have taken place.

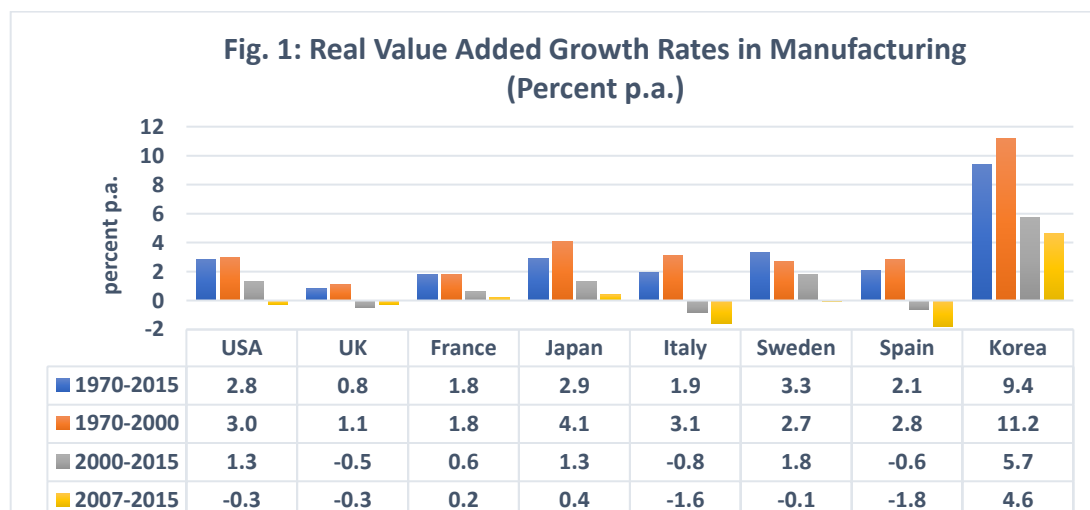
^{**} Germany and China are not included in the case studies despite being major manufacturing powers. The unification in 1991 and the closure of many East German companies brings too much noise to the time series in Germany. For China the data before the late 1990s are almost nonexistent, while data since then is not based on the same methodology as other countries.

- The decline in the manufacturing share in GDP in nominal terms is caused by mainly the relative price decline. In real terms the share declines are very marginal and there are increases in half of our sample countries (Table 1). Only the UK had a serious real manufacturing share decline.
- While import shares had increased in all countries, significant trade deficits are rare. In 8 countries plus Germany, five had trade surpluses in manufacturing trade. Only two countries (the UK and the USA) have significant trade deficits. Their increasing trade deficits was primarily caused by slower growth of exports driven by offshoring and the production of affiliates abroad. Instead of exporting from the home country, they have used the production of their affiliates for exports.

MANUFACTURING GROWTH

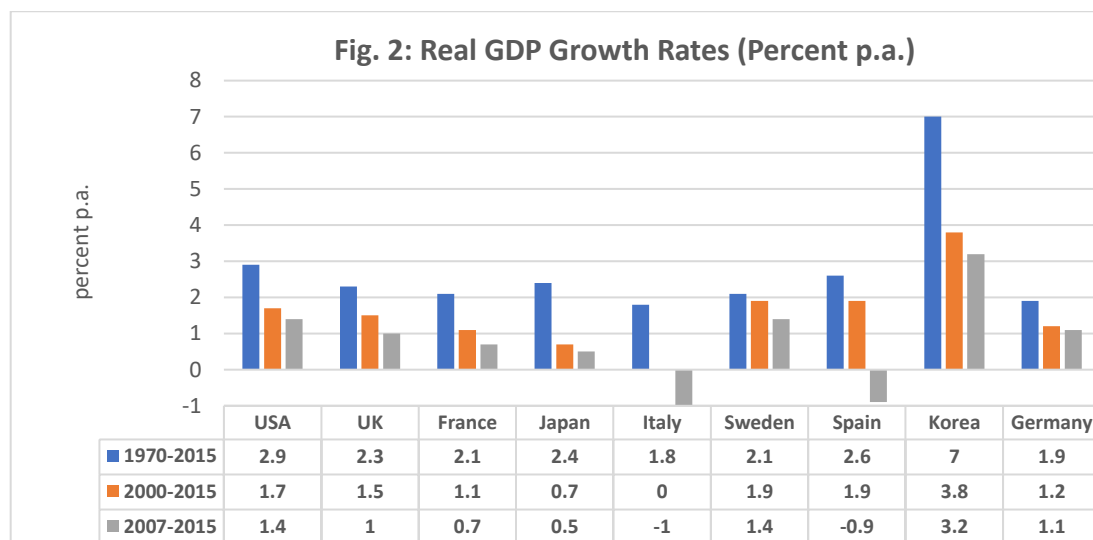
Fig. 1 shows the annual real value added growth rates for the long run (1970-2015 period), for the pre-2000 period, and the two periods for post 2000 period (2000-2015; and 2007-2015). Fig. 1 also highlights the long run behavior of output growth which is positive for all countries. These annual growth rates are all estimated with the least squares method. Despite the literature on how manufacturing has collapsed in industrial countries, in these eight countries manufacturing output has not decreased, but increased. Long term growth rates (1970-2015) are similar with few exceptions. Korea, with very high growth rates, is an outlier because it starts from a much lower base. On the other extreme, UK has the lowest long term growth rates followed by France and Italy. Spain also has somewhat lower growth rates but we are missing their first decade of their data. Among industrial countries Sweden has the highest growth rate, followed by Japan and the USA.

Growth rates are very variable, increasing and decreasing with global business cycles and the magnitude of internal and external shocks. Internal shocks do not happen at the same period in different countries. Depending on the start and end of the cycles by a few years can lead to different growth rates. That is why the approximate average time periods used through this study indicate that there are similarities but not identical timings for individual countries. For more precise timing and the analysis of the individual countries' growth performances the reader is encouraged to refer to the country case studies that include more detailed analyses (For details see Aksoy and Ng, 2024).



The growth rates decelerated further during the post 2008 recession period (2007-2015). All industrial countries' real value added levels in 2015 were lower than they were in 2007 except for Germany and Korea. Germany's value added was marginally higher and Korea's growth rate was halved from its historical average. This period pulled down the long run growth rates for all the countries.

Finally, this deceleration is not limited to the manufacturing sector. These countries' GDP growth rates also declined substantially partly because these developments and crises had a large effect on the economy-wide growth rates (Fig. 2). Thus, this growth slowdown is not a specific manufacturing problem. Especially after 2007 with the great recession, GDP growth rates have declined further. On the other hand, these post 2007 GDP growth rates, despite the deceleration, are above the manufacturing value added growth rates except for Korea and Germany.



Moreover, declining share of manufacturing in GDP is used as an argument in the deindustrialization debates as the proof that manufacturing has suffered due to unfair trade especially from China. For example, the fact that in the USA the nominal share of manufacturing in GDP have declined from 23 percent in 1970 to 12 percent in 2015 has been used in all the discussions.

Table 1: Manufacturing Value Added as Percent of GDP

	Nominal Manufacturing GDP Ratio			Real Manufacturing GDP Ratio		
	1970	2000	2015	1970	2000	2015
USA	22.6	15.0	11.8	12.4	12.6	11.4
UK	27.3	13.0	8.6	17.1	11.3	8.2
France	19.8	14.2	10.0	12.2	10.8	10.2
Japan	34.3	22.6	20.3	16.7	19.5	20.7
Italy	23.9	17.5	14.1	12.6	15.8	14.4
Sweden	22.5	20.3	15.0	10.7	15.2	14.8
Spain	25.1	16.2	12.9	14.7	15.1	12.6
Korea	17.2	26.0	27.1	8.4	22.8	28.5

Sources: OECD Stan database and World Bank WDI database.

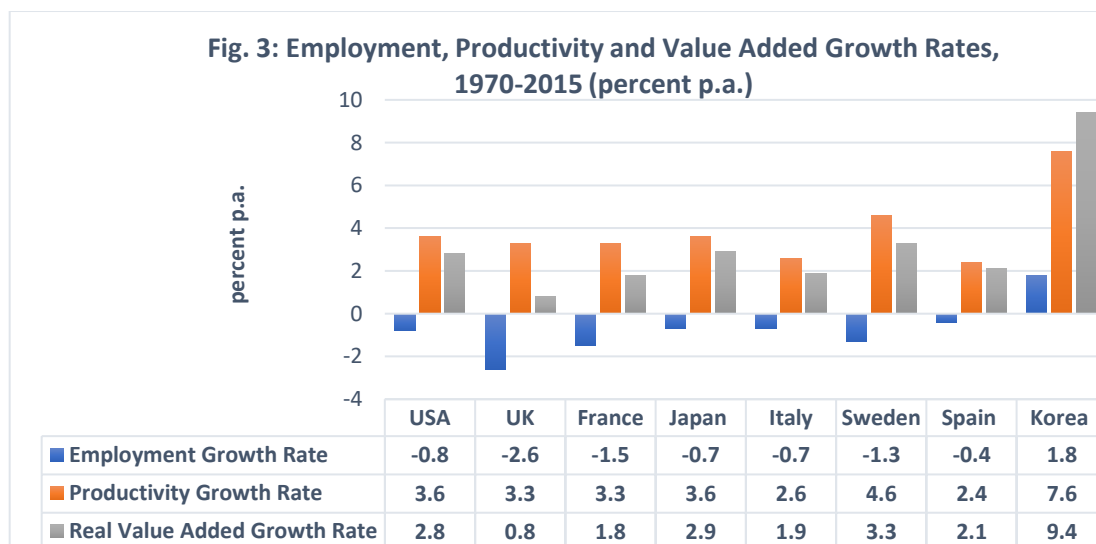
Table 1 shows the share of manufacturing in GDP in nominal and real terms. The results of the two definitions are very different. The important point is not just the absolute levels, but the rate of change of manufacturing shares. In nominal terms, between 1970 and 2015, share of manufacturing has decreased precipitously in all countries except Korea. The lowest decline is in Sweden at 34 percent and the greatest decline is in the UK at 67 percent. In other countries the declines are in the 40 plus range. These are very large declines that have been used to justify the arguments about the collapse of manufacturing in industrial countries.

But when the real shares are analyzed, the declines are very small and, in some countries, manufacturing shares have increased. For example, in the USA the decline in real manufacturing share is only 1 percentage point from 12.4 percent in 1970 to only 11.4 percent 2015. These are for the 46 year period. In four countries, Japan, Italy, Sweden, and Korea, the real manufacturing share has increased between 1970 and 2015. In other countries except the UK, the declines are within 1 to 2 percentage points. The UK is an exception where the real decline is about 10 percentage points (see also Chien and Morris, 2017).

The growth rates for the 2000-2015 period show that more countries experienced declines in real manufacturing shares. There are only two countries, Japan, and Korea that have increases along with Germany. But the declines in other countries except the UK are very small.

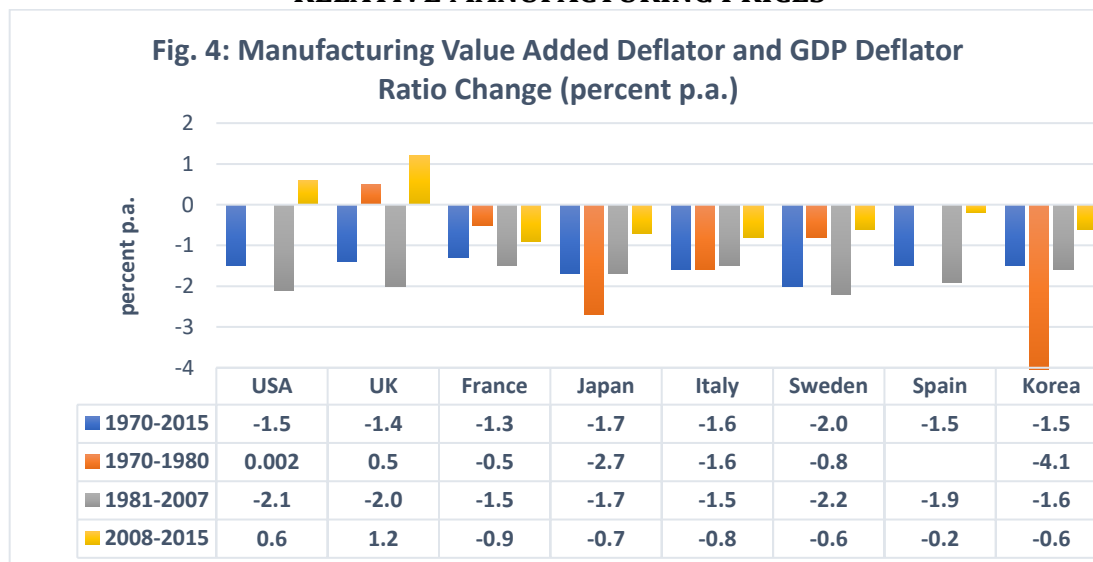
The difference between real and nominal value added shares is caused by the relative decrease of manufacturing value added deflator compared to the deflators of other sectors (Fig. 3). This is the results of faster technical change and excess supply of manufacturing products leading to relative price declines and consumers gaining from these technical changes.

In the following figure (Fig. 3) we show the annual growth rates for labor productivity, employment, and value added for the whole 1970-2015 period. Value added growth rate, by definition, equals the labor productivity growth rate plus the employment growth rate. If the labor productivity increases without significant labor shedding, value added increase turns out to be higher.



As expected, countries that had had faster value added growth rates had less labor shedding given similar productivity increases. Countries like Korea which had very high value added growth rates, added labor, and still had very high productivity rates. The UK is the country that generated its productivity increase basically through labor shedding. The USA and Japan had relatively high productivity growth with little labor shedding and thus have higher growth rates. Italy and Spain have low productivity growth but also low labor shedding generating slightly higher value added growth rates.

RELATIVE MANUFACTURING PRICES



Another reason for the deceleration of manufacturing growth after the late 1990s is the excess supply of manufactured products caused by the liberalization of the trade and foreign investment controls. More specifically, the entry of emerging market economies (especially China) as an additional supplier of manufacturing products and higher rate of technical change in manufacturing have reduced the value added prices of the manufactured products as compared to the consumer prices (CPI) and the GDP deflators in all countries. In all countries manufacturing value added deflator relative to the GDP deflator began to level off around the mid- 1990s and then declined until the 2008 recession. After the 2008 there is an uptick in manufacturing relative prices in some countries but the increase is much smaller than the historical decline. Fig. 4 shows that, while there are some country differences, the behavior is similar for most of the countries. The declines vary between 30 plus percent for the UK to 50 plus percent for Sweden, Japan, and Korea. The other countries' declines are in the 40 plus percent rate. There are similar declines vis a vis the consumer price indices (CPI) and CPI and GDP deflator are highly correlated. These large declines in the relative value added prices imply that part of the income from technical improvements has been transferred to the consumers of manufacturing products. This is a very different outcome than what had been hypothesized by Prebisch during the 1950s. Elimination of controls on trade and investment have converted an oligopolistic structure to a more competitive one.^{††}

^{††} On the other hand, Baily and Bosworth (2014) argue that the rapid growth and productivity increase in the computer and electronics industry distorts the aggregate manufacturing growth and prices. This is not a general

Price reduction and excess supply have also affected the domestic growth rates by allowing the manufacturing firms in industrial countries to move their production and investments to lower wage countries. This is made possible by the relaxation of foreign investment rules in industrial countries but more importantly by the relaxation of foreign investment and profit repatriation laws in the developing countries. This has reduced domestic output growth and increased imports from developing countries (Aksoy and Ng, 2013a; 2013b; 2017).

POLITICAL ECONOMY OF THE GROWTH

The story starts with the commodity price shocks of 1970s. Inputs constitute between 60 to 80 percent of gross output and the total unit cost in manufacturing. Food processing industries are linked to agriculture and metal processing and engineering industries depend on minerals. All depend on energy. That is why in all countries, share of inputs in gross output, or inversely the share of value added in gross output are highly correlated with the international commodity price index. Input price increases, which were not fully passed on as higher output prices, had a bigger impact on wages and profits. In all countries, the share of inputs in gross output increased and the share of value added in gross output decreased. Since value added is composed of returns to labor and capital, its decrease first affected these factor incomes.

The initial impact of the 1970s commodity shocks, was to lower the profit markup and lower the income of capital. This is true in all our sample countries. For example, in Japan the share of labor increased from 39 percent in 1970 to 52 percent in 1975. In France, labor share increased from 64 percent in 1970 to 70 percent in 1975. In Sweden wage share increased from 60 percent in 1970 to 70 percent in 1978. Such large input cost shocks also led to higher inflation where labor and capital tried to maintain their shares by trying to increase their prices. Labor tries to maintain its share by asking for higher wages, capital tries to increase productivity, increase product prices, move to places where labor is cheaper, and even tries to develop anti-union policies and actions. For these events to continue, the state must accommodate the behavior of these groups through higher deficits and/or accommodating monetary policy (Rowthorn, 1977).

Increasing inflation and the attempts to implement wage restraint were followed by strikes and wage increases leading to higher inflation and labor unrest. Also, there was a radicalization of the unions and other labor groups. This radicalization started to attack the basic tenets of the system, and even led to assassinations and other forms of violence. In many countries these radical actions were mixed with other causes; Movements against Vietnam War in USA, Red brigades' assassinations for revolution in Italy, and university systems and fees in France etc.

Against these developments, there was an even stronger push to liberalize the economies, relax the constraints placed by the regulatory systems, reduce trade restrictions etc. In the end, these ideologies and policies were first put into practice by the two conservative parties in the late 1970s and early 1980s in the USA and the UK.

In the USA and the UK, governments started with tight monetary policies leading to higher interest rates and serious recessions. 1980s became the start of the monetarist approach which

manufacturing development. The uptick in manufacturing product prices is caused by the 2003 commodity price increases that contributed to final goods prices.

stopped accommodating the conflict between labor and capital by refusing to expand the money supply. This made it very difficult for firms to pass on the cost increases, and forced layoffs putting pressure on labor. These stabilization programs also included policies that reduced monetary accommodation of price increases through an independent central bank, took actions that liberalized foreign investment policies, reduced regulatory barriers on the behavior of firms, started privatization of public companies, and initiated tariff reductions, etc. These packages were the standard ones advocated by the IMF, other international organizations, and commonly accepted by the economics profession. Countries continued to further liberalize their economies throughout our sample period of 1970-2015.

These policies were also accompanied by attempts to break the labor unions by resisting against the key strikes. Some would argue, that in addition to the loss of income for capital, there was an increasing radicalization of the labor and unions starting with the 1968 French uprisings. Their high wage demands also contributed to labor's share increasing significantly in most countries. This might be another reason why breaking key strikes become so important to reverse the radicalization and excessive wage demands. For example, in the USA the test case was the air traffic controllers' strike, in Italy it was the Fiat strike, in the UK it was the miner's strike, in Sweden Business Confederation walked away from tripartite wage determination forum, and in France the Socialist Government reversed the Grenelle accords which had given greater rights to labor. In all these cases, strikes were resisted and, in the end, labor had to give in. Net results were a loss of union strength and the start of the decline in union membership.

As part of the stabilization programs and trade reforms, the 1980s were also a period with large scale industrial restructuring where many inefficient factories were closed and privatizations were undertaken. It was also the start of moving capital to lower wage countries. While the USA and the UK were the pioneers, almost all other industrial countries, whatever their ideology, implemented similar programs.

Reforms worked in most cases and supported by the declining commodity prices after 1980, inflation ended and growth accelerated in almost all countries. Declining commodity prices, firm restructuring, elimination of excess capacities, and large scale closures of inefficient firms led to rapid increases in productivity and in value added output ratios, creating the possibility of higher growth in the future as well.

So, it was the commodity shocks of the 1970s and their impact on inflation and profitability that triggered and justified these policy changes. Acceleration of growth and productivity in many countries validated these policy packages and helped reluctant countries to implement similar programs. These policies became the core of the liberalization programs throughout our sample period. An important component of these programs was the liberalization of manufacturing trade along with the relaxation of foreign investment rules which led to the expansion of offshore investments and eventually the creation of global supply chains. Import penetration increased dramatically as a part of these trade reforms. However, another result of these policy changes were large scale layoffs, and the gains from faster technical change essentially went to capital. During the 1980s when these policy changes were being implemented, the developments of the 1970s were reversed and the labor share decreased in all the 6 western countries and the gross profit markups increased. Stabilization of the macro environment and an end to the instability required a redistributive adjustment where either

both sides would agree to share the costs, or one side would gain at the expense of the other. What we observe during the early 1980s is a move by both right and left wing governments in 6 countries that effectively carried out the adjustments at the expense of labor. The two exceptions were Japan and Korea which, at that time, ideologically were not part of the western world.

Around the late 1990s positive developments and higher growth rates slowly disappeared as there were a series of developments and crises that affected the manufacturing sectors. These crises were created by very strong belief in the efficiency of the market mechanism without a strong regulatory framework.

First, there were a series of internally created crises because of either premature or misguided liberalizations. Japan, Sweden, and the USA suffered from mismanaged financial liberalization without sufficient regulatory framework and oversight which led to banking crises. Italy, UK, and Spain suffered from exchange rate mismanagement in the process of joining the European Exchange Rate Mechanism (ERM). These internal shocks led to declines in output followed by rebounds when the problems were solved. In some cases, the inability to readjust led to longer declines in growth rates such as in Japan.

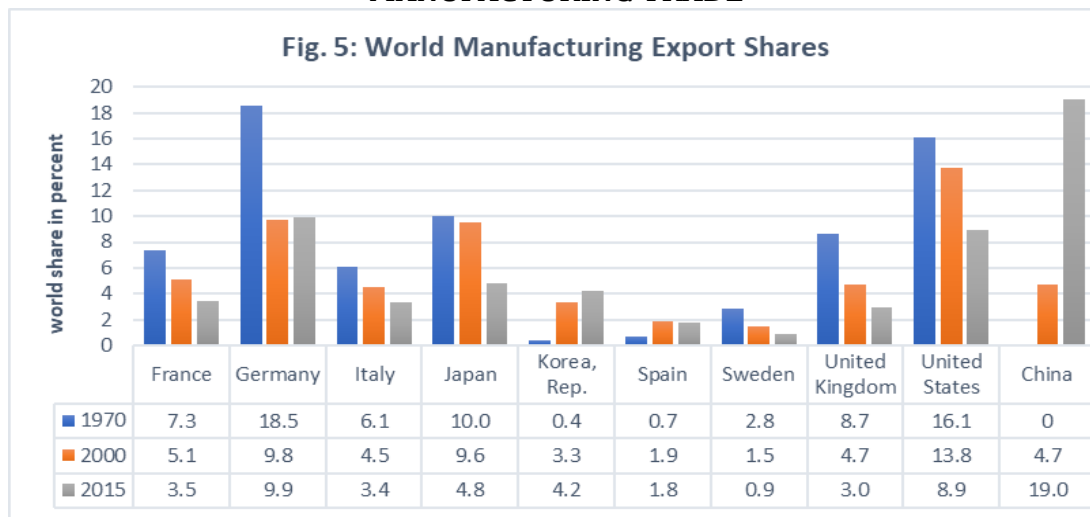
Second, there were serious global crises. The Asian crisis of 1998, dot com crisis of 2000, and the recession of 2008 are some of the important shocks that took place during the last two decades. In all these crises there were large manufacturing real value added declines that lowered the average growth rates in almost all countries. These global crises were also primarily created by mismanaged deregulations. The effects of these shocks have become much more serious after the 1990s because of the global production networks and greater interdependence among countries that amplified the impact of these crises.

Third and probably the most important was the acceleration of the relative manufacturing price (value added deflator) declines compared to the GDP deflator, which is the value added prices for all economic activities. This development reduced the real manufacturing factor incomes vis a vis other economic activities and other goods. The reasons for this development, in addition to faster technological change, is the additional supply created by the entry of new producers, with NAFTA for the USA, entry of Eastern European countries and Turkey into free trade arrangements with the EU and the rapid expansion of Chinese and East Asian production and exports. These new investments and industrial restructuring also accelerated the manufacturing labor productivity growth rates.

Equally important is the industrial countries' firms investing in lower wage countries and expanding production and exports from these countries. Global reforms in both trade and regulatory systems have made much easier to invest in developing countries, export from them rather than the home country, and repatriate their profits. This led to greater trade deficits, and most of these deficits were caused by exports not increasing at the same rates as imports (Aksoy and Ng, 2024). China joined WTO in 2000 and started its rapid export expansion and most countries experienced greater import competition in manufacturing. Except for Korea, all countries in our sample ended up with trade deficits with China. All these developments increased the competitive pressures for manufacturing firms and reduced the prices of

manufactured goods relative to other sectors and thus reduced domestic manufacturing growth rates and the resources available for the income of labor and capital.

MANUFACTURING TRADE

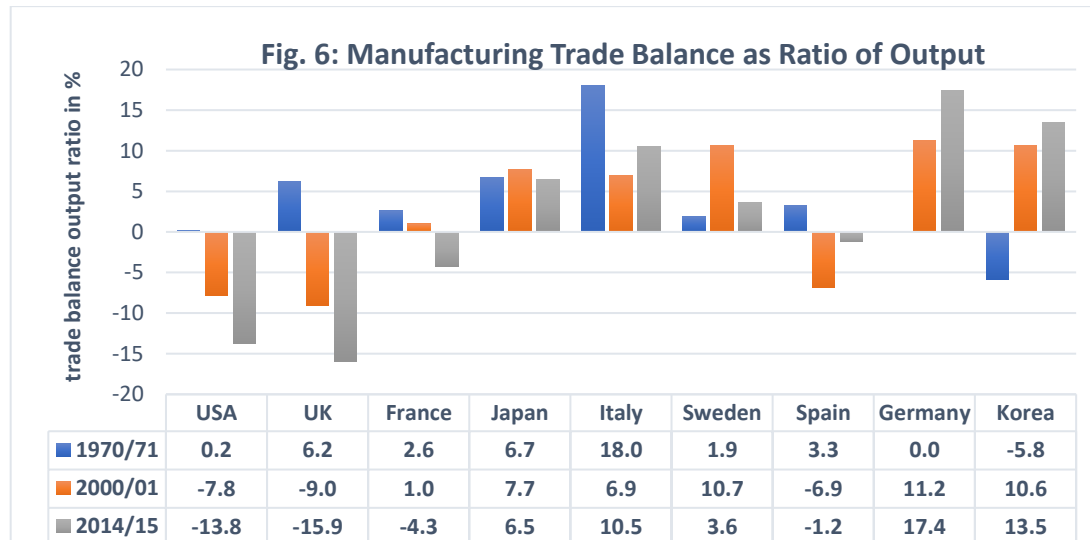


In 1970, our 7 industrial countries plus Germany, accounted for 70 percent of global manufacturing exports and 47 percent of imports (Fig. 5). They had a trade surplus of 23 percent of world exports. These numbers decreased in 2000 to 51 percent of exports and 49 percent of imports, still leaving a trade surplus of 2 percent of exports. By 2015, their share in world trade further decreased to 36 percent of exports and 39 percent imports, leaving them with a small deficit. Global export shares of major industrial exporters all had large declines; the UK export shares declined from 9 percent of global exports in 1970 to 3 percent in 2015; the USA shares declined from 16 percent to 9 percent; Japan from 10 to 4.8 percent, and Germany from 19 percent to 10 percent. Focusing on post 2000 period, Germany, and Spain have maintained their global shares and Korea has increased its share marginally and China has increased its share dramatically. China had negligible exports until 1990s but by 2015, it accounted for 19 percent of global exports and 10 percent of imports. China had a trade surplus of almost 10 percent of global exports. It also had a trade surplus in manufacturing against all our sample countries except Korea.

More generally, from 1970 to 2015 the share of industrial countries in world exports declined by 34 percentage points. 19 percentage points of this loss was taken over by China and another 4 percentage points was gained by Korea. To these if Mexico, Eastern Europe, Taiwan, and the rest of Asia are added, there is a dramatic switching of centers of manufacturing production (Aksoy and Ng, 2017).

Most industrial countries have increased their manufacturing trade deficits or reduced their surpluses (Fig. 6). Not only have their exports not kept pace with the global manufacturing trade growth, their deficits have also increased as a ratio of their gross output. In 1970/71, only Korea had a deficit in its manufacturing trade. In 2000/01, this number had increased to 3 countries, USA, UK, and Spain. In 2014/15, the deficit countries increased to 4 with the addition of France. Fig 6 also shows that there are two types of countries, countries that have trade surpluses throughout our sample period such as Japan, Italy, Sweden, Germany, and Korea

(post 1980). Then there is the USA, UK, Spain and partially France that have deficits. But France and Spain's deficits are much smaller and they fluctuate around the trade balance. The USA and the UK are exceptions to the rest of our sample; they have increasing and huge deficits. Similarly, Germany is the only industrial country that has increased its manufacturing trade surplus.



Finally, it is not clear that the deficit countries have lower value added growth rates than surplus countries. For example, the USA and UK have similar trade deficit rates after 2000 but the USA has much higher growth rate; 1.3 percent p.a. versus a decline of -0.5 percent p.a. for the UK. Italy has a surplus of more than 10 percent of output but a decline in real value added growth of -0.8 percent p.a. after 2000. This suggests that manufacturing trade balances are affected more by the macroeconomic determinants and the saving rates and not just the competitiveness of their manufacturing sector.

CONCLUSIONS

The story of the manufacturing sector growth in these countries needs to be explained by the implementation of policies that increased global competition, the timing and severity of internal and external shocks, the nature of policy responses to these shocks, and the globalization that amplified these shocks.

First, despite the negative beliefs, as we have shown, manufacturing did not collapse in our sample countries. On the positive side, global manufacturing output has expanded, and the consumers of manufacturing products have gained from relatively cheaper manufacturing products. Also, other gainers of these developments have been the capital in industrial countries and labor in developing countries.

While import shares had increased in all countries, significant trade deficits are rare. In 8 countries plus Germany, five had trade surpluses in manufacturing trade. Only two countries (the UK and the USA) have significant trade deficits. Their increasing trade deficits was primarily caused by slower growth of exports driven by offshoring and the production of

affiliates abroad. Instead of exporting from the home country, they have used the production of their affiliates for exports.

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