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No Industry, No Future?

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In a context of weak growth, high unemployment, unbalanced public finances and persistent external deficit, we are witnessing the return of a proactive approach to industrial policy and, even in France the return of direct intervention in industry. Sector-focused public intervention is thus once again conceivable, while industry is once more perceived as a reservoir of jobs, exports and growth.

Can there be a future without industry? Answering this question is not considered as obvious in this Note. Reflection appears to be essential with regard to the aim of industrial policy (what is industry and why is it needed?) as well as its methods (does the government have the tools, information and *modus operandi* required for its action?)

The frontier between industry and services has become blurred: services have become an industry; industry buys and sells services; and finally, a proportion of companies classified as services are in reality industrial companies that have split their value chain at the international level. Today, industrial activity consists in designing products, producing them or having them produced, while retaining intellectual property thereof, organising the value chain, controlling brands and consumer access, and finally making returns on investment.

This more modern vision of industry calls for a renewed approach to industrial policy. Beyond the traditional opposition between horizontal policies, aimed at creating a favourable economic environment, and vertical policies, that support certain sectors, public action needs to remedy coordination failures (cluster policies, public financing of

innovative projects) and construct modes of action that take into account the political economy of public action regarding companies.

We argue that industry needs to be redefined and no longer be assimilated to the mere production of goods. This requires an adaptation of the political discourse and a will to encourage restructuring and technological dynamism. Consequently, it is necessary to invest in training and to promote the mobility of resources that can be concentrated in growth centres. The reason why most economic reports conclude with this recommendation is probably that it needs to be prioritised within the economic policy agenda. In a context of non-cooperative national policies, it appears desirable, from a quite pragmatic point of view, for the government to promote investment in research and development through the R&D tax credit, direct aid mechanisms such as the French innovation agency ANVAR (*Agence nationale de valorisation de la recherche*), venture capital and the transfer of technologies. The protection of intellectual property is another important and difficult issue, in which a balance needs to be struck between the stimulation of innovation and the sharing of knowledge, both sources of future technological progress. The last two recommendations concern the *modus operandi* of industrial policy, taking into account the political economy of these interventions and the risks of regulatory capture: it is desirable to combine private venture capital and public financing of projects as well as a strict governance of public intervention notably one that allows projects to be discontinued.

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French industry's difficulty in recovering from the crisis

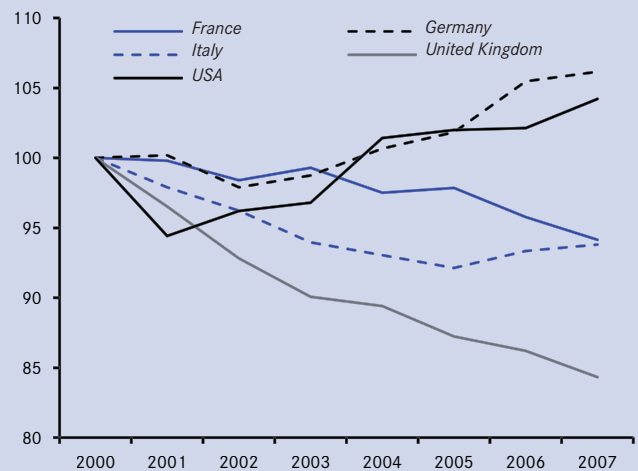
The difficulties encountered by French industry can be summarized by the following vicious circle:

- the recent decrease in the proportion of value-added attributable to industry was more pronounced in France than in comparable countries; it therefore goes beyond the phenomenon of deindustrialisation;
- this decrease is a result of losses of market share at the international level;
- these losses of market share result, in particular, from a deterioration of cost competitiveness, which is partially passed on export prices, with profit margins being adjusted downwards;
- insufficient non-price competitiveness, which does not allow inflated costs to be reflected in prices, is compounded by a lack of investment due to insufficient profit margins.¹

At constant prices, between 2000 and 2007, the proportion of the total value-added attributable to industry fell by 6% in France and Italy, and by 16% in the United Kingdom. At the same time, it increased by 4% in the United States² and by 6% in Germany (Figure 1). Since the onset of the crisis, the differences in development between countries have become even more pronounced (Figure 2). At the lowest level, industrial production in the major European countries declined by between 13% (United Kingdom) and 26% (Spain), as compared with the beginning of 2007. France is among the severely affected countries (– 21%), alongside Germany (– 20%). However, the main difference between the latter two countries is Germany's recovery, which enabled the pre-crisis level to be reached again in 2011. The cases of Italy and Spain correspond to a more dramatic version of the course of events in France.

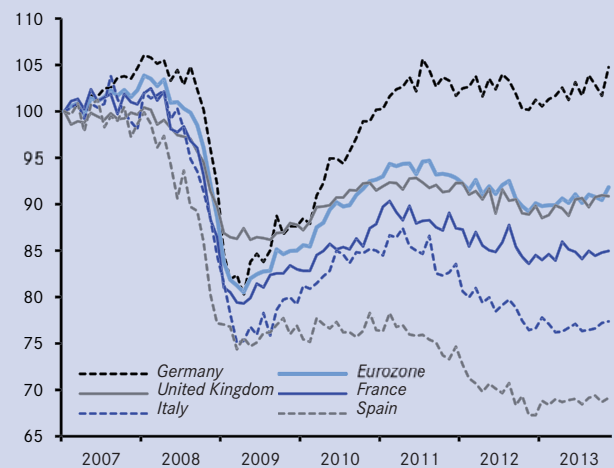
The value of France's share of the global market declined by 15% between 2000 and 2007 and, once again, by 13% between 2007 and 2010. Comparison with other European countries shows that French under-performance was particularly marked before the crisis.³ Conversely, since 2007 the French evolution is in line with that of other European countries. Between 2000 and 2007, neither top-of-the-range nor technological products constituted a safe haven for French exporters. Unit-wage costs (wage cost per unit of value-added) weighed unfavourably in the case of France, in particular as compared to Germany: they have increased by 10% in Germany since 2000, and by three times as much in France.⁴

1. Development of the share of manufacturing industry in the total value-added in volume (2000 = 100)



Source: OCDE-STAN.

2. Production of manufacturing industry Seasonally-adjusted volume (January 2007 = 100)



Source: Eurostat, update 14th February 2014.

The authors would like to thank Jean Beuve for his comments on a preliminary draft.

¹ The Note from the French Treasury (*L'industrie : quels défis pour l'économie française*, February 2014) is a good illustration of this demonstrative model.

² For an analysis of the development of the manufacturing sector in the United States, see Bailey M.N. and B.P. Bosworth (2014): "US Manufacturing: Understanding Its Past and Its Potential Future", *Journal of Economic Perspectives*, vol. 28, no 1, pp. 3-26.

³ See Cheptea A., C. Emlinger, L. Fontagné, G. Orefice, O. Pindyuk and R. Stehrer (2014): The Development of EU and EU Member States, External Competitiveness, *CEPII Working Paper*, no 2014-06.

⁴ Eurostat: Unit cost of labour, economy as a whole.

Observation 1. French industry encounters difficulties in recovering from the crisis, probably due to increasing backwardness in the course of the 2000s, and partly because of diverging labour costs compared to German competitors, for given levels of qualification.

This first observation calls for an essential re-examination of industrial policy regarding its goals (what is industry and why is it needed?) and its means (does the State have the tools, information and *modus operandi* required to implement its action?).

What is industry?

According to the definition given by the French national statistical institute (INSEE: *Institut national de la statistique et des études économiques*), “industry comprises economic activities that combine factors of production (...) in order to produce material goods intended for the market”.⁵ Goods are “physical objects for which demand exists, and with regard to which ownership rights can be established (...)”.

Industry services

Industrial reality barely fits this definition: some manufacturing enterprises also produce services, others mainly produce services, and others no longer produce anything but services. About a quarter of the manufacturing enterprises established in France only sold services in 2007, approximately a third mainly sold services, and 87% also sold services.⁶ In many industries, these proportions reflect the growing weight of services in the sales of companies belonging to the manufacturing sector. Today, consumers are used to buying inseparable goods and services, sold by industrial enterprises, such as extended warranties for cars for instance. Industry and services are also bound to each other by intermediate consumption: the variety and the cost of the services that producers of goods may have access to are an essential element of their competitiveness. With the outsourcing of numerous functions, industry increasingly relies upon services.

This hazy boundary gives rise to difficulties for statisticians: industrial enterprises have focused on their core competen-

cies and outsourced some of their tasks to the service sector, while the latter has simultaneously shifted from goods towards services.

Service industry

Similar changes are occurring in services. Like industry, the production of services, in particular those linked to information technologies, is characterised by value creation based upon economies of scale (presence of fixed costs) and large productivity gains. The most widely-known examples of services produced according to “industrial” methods are those of data centres, search engines and cloud computing, all of which are energy-intensive activities, requiring high levels of fixed assets (server farms, cooling systems, secure sites, etc.), in no way inferior to those of traditional industrial sites, and for which the costs rapidly decrease. While (industrial) factories no longer have chimneys, service producers have taken over: each Google data centre includes hundreds of thousands of servers which need to be cooled. The twenty leading US market capitalisations (as of 11th March 2014) include Apple, Google, Microsoft, IBM, Verizon, Facebook, Oracle and Amazon: are the latter industrial companies or service companies?

Task trading

The international splitting of value-added chains constitutes the latest and most spectacular of these trends, which cross the boundary between industry and services. With task trading,⁷ some of the most high-performance industrial companies have focused their activity upon their competitive advantages in product design, marketing, organisation of the supply chain and creation of homogeneous “systems” combining goods and services, while abandoning all physical production in the process. These are referred to as Factoryless Goods Producers (FGPs). The most frequently cited examples thereof are Apple, Dyson and companies in the semiconductor and clothing sectors.⁸ According to recent calculations,⁹ the reclassification of US wholesale trade companies, which design their products and organise the production thereof, to industry would transfer at least half a million jobs to the latter sector. These changes in the industrial landscape have led statisticians to engage in detailed examinations regarding the classification of enterprises at the international level. Thus, the Conference of European Statisticians¹⁰ considers it necessary to substitute the criterion of intellectual property for

⁵ INSEE website “définitions et méthodes” section.

⁶ See Crozet M. and E. Milet (2014a): “Is Everybody in Services? The Servitization of French Manufacturing Firms” in *The Factory-Free Economy: What Next for the 21st Century?*, Fontagné and Harrison (ed.), forthcoming. The authors have used data on standard real profits (BRN: *bénéfices réels normaux*) collected by the French Tax Directorate to establish their figures.

⁷ See Grossman G.M. and E. Rossi-Hansberg (2008): “Trading Tasks: A Simple Theory of Offshoring”, *American Economic Review*, vol. 98, no 5, pp. 1978-97.

⁸ The US statistical category of “own brand importer-marketer”, which appears in the *Wholesale Trade Survey* typically corresponds to FGPs.

⁹ See Bernard A.B. and T.C. Fort Teresa (2014): “Factoryless Goods Producers in the US” in *The Factory-Free Economy: What Next for the 21st Century?*, Fontagné and Harrison (ed.), forthcoming. The quoted figure corresponds to a reclassification within a sample from the enquiry into the wholesale trade in the United States. Extrapolation to the sector as a whole results in the high-range estimate of 1.9 million jobs in 2007.

¹⁰ Coming under the United Nations Economic Commission for Europe.

the one of ownership of raw materials (the traditional criterion) in the definition of a enterprise's economic boundaries.¹¹

Observation 2. The nature of industry is changing as industry and services are becoming one single entity. The boundaries of companies are changing with the splitting of the value chains. The defining characteristic of an “industrial” company is its involvement in product design, intellectual property and economic risk. The defining characteristic of “industry” is mass production, economies of scale, productivity gains and the application of technical progress.

What is industry for?

Whatever the boundary attributed to industry and services, the important point is, above all, the capacity of new activities to generate income. On the basis of census data concerning 8 million employees in 320 employment areas over a period of 30 years, Moretti (2013) contrasts “brain hubs” –urban areas grouping together highly-qualified high-income employees, each of which give rise to five job creations–, to former industrial capitals, which are declining in terms of jobs and inhabitants.¹² The difference between these two types of areas is not attributable to some putative boundary between industry and services, but to concentration of qualifications. More fundamentally, this raises the question of structural change: since the post-war period, the OECD economies have to a very large extent moved from agriculture and industry to services. Deindustrialisation –statistically speaking– is only one aspect of the process of dematerialisation of growth in our economies.¹³

Economic analysis of structural change

Between the post-war period and 2012, the share of value-added accounted for by agriculture was divided by ten (in value terms) and that of industry was halved, whereas services increased from 48 to 79%. This structural change¹⁴ has been accompanied by strong growth in purchasing power¹⁵

and the creation of more than 6 million jobs since 1954. If productivity grows faster in industry than in services,¹⁶ then relative prices change and expenditure shifts from the former to the latter in value terms. At the same time, since industry produces more value-added with less personnel, it contributes to distributing income into the economy, creating a vast market for marketable services, which in turn create jobs, absorbing the workforce released from industry (since the automation of services proves more difficult).

Moreover, with increases in per capita income, modes of consumption change, in accordance with Engel's law. Just as bread was replaced in household budgets by meat-based food, and then the latter by ready-made food, industrial goods are in turn replaced by services such as leisure, health care and education. Budgetary shares naturally shift towards services, if preferences change with different income brackets. The low level of responsiveness of the demand for industrial goods to increases in incomes, when the latter are already high, means that the volume of demand for these goods grows less quickly than productivity (i.e. revenues).

Industry contributes to the balancing of the current account

A major argument in favour of the maintenance of industry relates to the balancing of the current account. Indeed, goods can be exported, whereas services have to be produced locally, favouring foreign direct investment. If industry is replaced by services, our economy will no longer export and will have to import all of the products that it consumes. Even if a proportion of services cross the border and contribute to exports (e.g. business services), and although the establishment of a presence abroad is often a deliberate choice in order to sell French products on foreign markets, changes in the balance of goods and the balance of services over the last twenty years suggest that goods play a predominant role in the evolution of the current account (Figure 3). France has therefore been unable to offset the deterioration of its foreign trade in goods through sufficient improvement of its trade in services.¹⁷

Nevertheless, industry and services indirectly contribute to rebalancing the current account through net income from foreign direct investment (FDI). The presence of French groups abroad gives rise to profits, which are partly returned

¹¹ United Nations (2013): *Progress Report of the Task Force on Global Production*, no ECE/CES/BUR/2013/FEB/17.

¹² See Moretti E. (2013): *The New Geography of Jobs*, Mariner Books.

¹³ See Imbs J. (2014): “Structural Change in the OECD: Some Facts” in *The Factory-Free Economy: What Next for the 21st Century?*, Fontagné and Harrison (ed.), forthcoming, for analysis of the OECD economies as a whole, and Veugelers R. (2013): “Manufacturing Europe's Future”, *Bruegel Blueprint*, no 21, for an analysis of the situation in the European Union.

¹⁴ Structural change is therefore defined by a change in the sector composition of total expenditure.

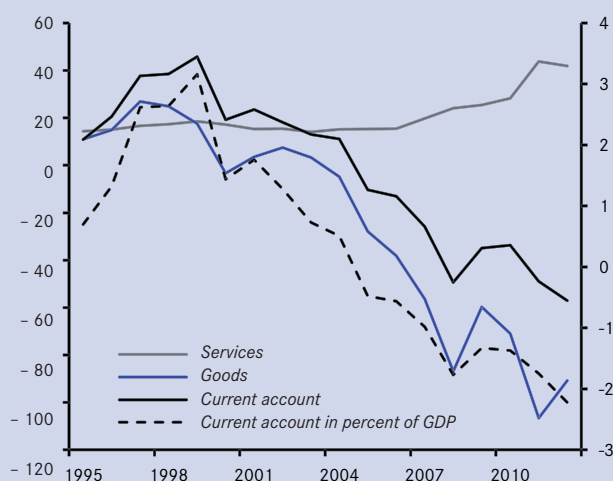
¹⁵ The standard of living precisely doubled in France between 1970 and 2011. Standard of living can be defined as the average income of individuals within households whose income declared to the tax authorities is positive or nil and who are not students (cf. INSEE-DGI).

¹⁶ See Baumol W. (1967): “Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis”, *American Economic Review*, vol. 57, no 3, pp. 415-426.

¹⁷ It should be noted that “exports” (and “imports”) of services include tourism (positive balance of 11 billion euros in 2012 for a total positive balance of 33 billion) (cf. OECD).

to France, partly reinvested locally and partly accounted for by the payment of interest by foreign subsidiaries on loans granted by their parent companies in France. Gross FDI income reached 53 billion euros in 2012,¹⁸ after having virtually reached 60 billion in 2010.¹⁹ The most important trend of the decade of the 2000s was the very strong increase in FDI income: the latter was multiplied by five in ten years.

3. Balance of goods, services, and current account France, 1995-2012



Reading: Left scale: current USD (billion); Right scale: current account in percent of GDP.

Source: OCDE.

Exporting goods means exporting services

As already mentioned, services are to a large extent used as intermediate consumption by industry, due in particular to the outsourcing of service activities by industrial companies. Thus, part of the value-added arising from services is exported through the trading of goods, whereas the local industrial value-added of the same goods is often limited by the import

of intermediate inputs. Calculations of trade in added-value make it possible to take into account the “inter-industrial” relations linking services to industry and to refine the analysis of cost competitiveness.²⁰ In 2011, 39% of the European value-added of exports (outside of Europe) of manufactured products corresponded to inputs of services.²¹ This proportion is increasing (it was at 35% in 1995). We have therefore witnessed a twofold change: the European value added of European exports has been declining (85% in 2011 as compared with 92% in 1995) but a growing proportion of this value added is accounted for by value added in services.

We now consider European countries individually. The proportion of French value-added in French total exports (all sectors, intra- and extra EU) decreased from 80.5% to 71.5% between 1995 and 2001.²² This figure is quite similar to that observed in European countries of comparable size. The share of domestic value-added in the value-added of exports is everywhere greater for services than for goods, even when the service content of exported goods is taken into account, as we do here. Thus, services are of increasing importance for re-balancing the current account.

Industry, a source of externality

The bulk of corporate research is conducted within industry: in 2010, 80% of the domestic expenditure on research and development (R&D) conducted in enterprises in France was concentrated in the industrial sectors, as compared to 18% in services. However, since 2007 R&D has increased by 15.8% in volume per year in services, reflecting, as in other OECD countries, the increasing importance of services at the level of research.²³ Research is considered to be one of the pillars of sustainable growth. Through R&D expenditure, enterprises and government invest in the production of knowledge, generating new products and manufacturing techniques which enable companies to remain competitive in terms of production costs, quality and product diversification. In the long term, this knowledge means productivity gains and increasing welfare.

R&D also generates two types of spillovers: rent spillovers and knowledge spillovers. The former involve increases in rents and turnover in one sector as a result of research conducted in another sector (for example, the appearance of new

¹⁸ For France in 2012 the inbound income of 53 billion represented more value-added than the agri-food and transport equipment industries (cf. OECD).

¹⁹ Foreign companies located in France naturally also pay dividends and interest to their parent companies, but the total amount was limited to 20 billion euros in 2012. A proportion of this sum (7 billion) corresponded to interest paid by French companies to their foreign subsidiaries within the framework of intragroup loans (cf. OECD).

²⁰ See Koopman R., Z. Wang and S.J. Wei (2014): “Tracing Value-Added and Double Counting in Gross Exports”, *American Economic Review*, vol. 104, no 2, pp. 459-494, Stehrer R. (2012): “Trade in Value Added and the Value Added in Trade”, *WIIW Working Paper*, no 81 and Vicard V. and L. Le Saux (2013): “Compétitivité-coût des exportations manufacturières et services incorporés”, *Note Banque de France*, 4th October. The latter show that the services incorporated in manufacturing exports do not worsen the cost competitiveness difference between France and Germany.

²¹ See Cheptea et al., *op.cit.*

²² See Cheptea et al., *op.cit.*

²³ Cf. *ministère de l'Enseignement supérieur et de la Recherche* (2013): *L'état de l'enseignement supérieur et de la recherche en France*, 6th edition.

computers will be reflected in the productivity of the banking sector). Knowledge spillovers are related to transfers of knowledge from one sector to another, for which no payments are made, due to the fact that knowledge is a social good: research in a given sector produces knowledge that is useful for other sectors (for example, progress in information technology led to radical changes in the way research is conducted in the pharmaceutical sector).

Because there are many different channels of knowledge diffusion, it is difficult to assess the beneficiaries of all of these spillovers, above all in the case of those linked to transfers of knowledge. Empirical studies tend to show that these spillovers are in general positive, although the reaping of market shares from competitors that produce substitutes to new products should not be overlooked.²⁴ These spillovers may also be passed on abroad and benefit our trade partners, in the same way as France may benefit from R&D conducted abroad.

Numerous studies have documented the geographical dimension of R&D spillovers, i.e. the fact that the spillover effects of research are greater in its geographical neighbourhood. One of the explanations for this phenomenon apparently lies in the partially tacit character of knowledge. Certain kinds of knowledge are not transmitted in a codified manner (e.g. in computer codes or books) but require face-to-face relations between researchers. When this is the case, the creation of technology clusters may be justified. Knowledge can nevertheless be effectively passed on over long distances.

Industrial decline or structural change?

The observed decline of industry, in the sense of the traditional statistical category, needs to be reconsidered when new forms of industrial organisation are taken into account, that is by favouring the notion of intellectual property rather than the physical dimension of activities and objects, while acknowledging the industrial dimension of the production of certain services. Once these dimensions are incorporated, the nature of industry changes. There is no great difficulty in tracing the reasons for which the proportion of industrial jobs in employment as a whole has sharply declined in the OECD economies and in France. For this purpose we adopt a long-term perspective, from 1970 to 2007:²⁵ we saw above that French industry under-performed between 2000 and 2007 as compared with the European average, and that its capacity for recovery after the low point of the crisis was also below the Eurozone average.

As seen above, the decline of industry can in the first place be explained by a greater rate of productivity growth in industry as compared with services and a consumer saturation effect, consumers allocating an increasing part of their expenditure to services when their standard of living increases. The second contributing factor to deindustrialisation, the outsourcing of services by industrial companies, is purely a statistical artefact. The final contributing factor is industrial competition: because they have a comparative advantage in tasks such as product design, R&D and marketing, high income economies tend to specialise in activities that do not necessarily fall within the statistical category of “industry” (the reflection currently being undertaken with regard to FGPs is aimed at taking this difficulty into account).²⁶

We will illustrate these mechanisms in the case of France, before assessing the respective contributions of the three underlying determinant factors.

The case of France

Here we rely on the STAN Database (OECD). We consider the manufacturing industry (therefore excluding construction and energy). Between 1970 and 2007 the volume of French industrial production doubled, in contrast with the widely publicised vision of an absolute industrial decline.²⁷ However, the total value-added in France increased by almost 160% over the period: the “decline” of the manufacturing industry therefore above all reflects the markedly more rapid increase of value-added in services (Figure 4). For the most part, the relative decline of industry took place between the mid-1970s and the early 1990s. If the analysis is made in terms of industrial jobs, rather than industrial value-added, a very different picture emerges: between 1970 and 2007, the number of hours worked in French industry was halved. Labour productivity (the ratio of the volume of value-added to the number of hours worked) was almost multiplied by four.

At the same time changes occurred in relative prices to the disadvantage of industry: more rapid productivity gains in industry do explain this phenomenon to a large extent, compounded by lower levels of competition in the services sector (services are less exchanged at the international level, and therefore not subject to international competition). The (relative) decline of industry is therefore more marked in terms of value than in terms of volume. It follows to a great extent the decline of the share of industry in the number of hours worked.

²⁴ See Bloom N., M. Schankerman and J. van Reenen (2013): “Identifying Technology Spillovers and Product Market Rivalry”, *Econometrica*, vol. 81, no 4, pp. 1347-1393. According to the authors, due to R&D spillovers the social rate of return on R&D is at least double the private rate of return.

²⁵ The choice to begin the period of study in 1970 was dictated by the desire to properly take into account the effect of the first oil crisis on French industry, which had to undergo far-reaching restructuring. The choice to stop before the crisis of 2007 was dictated by an obvious fact: to avoid incorporating a period into the analysis in which developments were determined by a violent and unprecedented industrial crisis.

²⁶ See Rowthorn R. and R. Ramaswamy (1997): “Deindustrialization. Its Causes and Implications”, *IMF Economic Issues*, no 10.

²⁷ Only the recent crisis has led to a decline in industrial production in absolute terms (*cf. supra*).

Contributions to structural change

Beyond this descriptive approach, it is possible to estimate the respective contributions of the various factors mentioned (outsourcing of services functions, productivity gains, international competition –and competition from low-wage countries) to the observed decline of industrial employment.²⁸ The very rapid productivity gains in industry have played a predominant role in the recent period, in accordance with the abovementioned changes in relative prices. On average, between 1980 and 2007, France lost 71,000 industrial jobs per year, of which 17,000 were attributable to outsourcing and 21,000 to productivity gains. From 2000 onwards, with losses scarcely any lower (65,000 per year), the contribution of productivity began to predominate (42,000 jobs per year), with outsourcing playing only a minor role (3,000). The contribution of international competition over the period as a whole is estimated at 9,000 job losses per year (of which half for the car industry alone) and twice that amount over 2000-2007.²⁹

Observation 3. Deindustrialisation has to be described in relative terms. The volume of industrial production (in the statistical sense) increases less quickly than the production of services. Because of the decrease in relative prices in industry, the difference is even more pronounced in value terms. Proportional employment patterns in the two major sectors correspond to changes in value production.

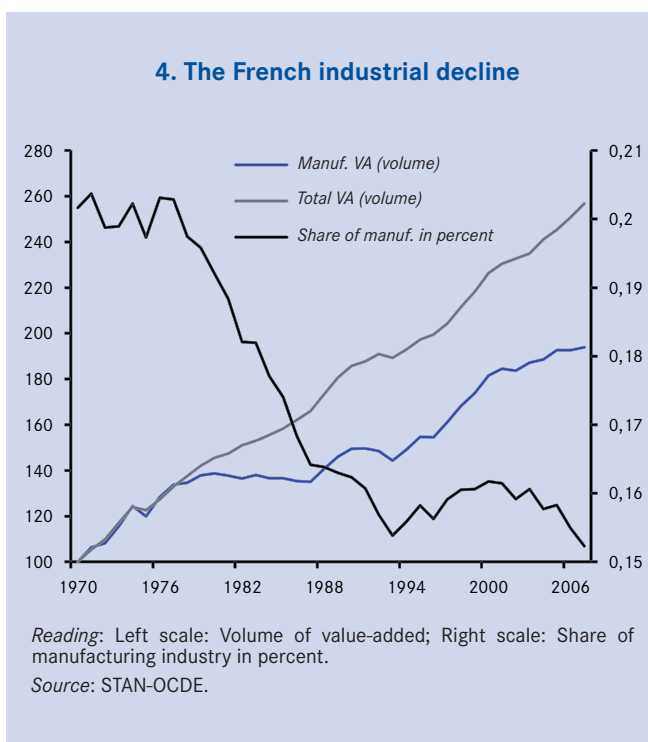
The relative decline of industry is therefore in the first place a result of the development of its productivity as compared to the service sectors and of changes in household expenditure. The nature of jobs and their level of qualification, productivity and therefore pay, is more important than the employment sector (industry or services) and the kinds of tasks carried out. Very productive jobs injecting high incomes into the rest of the economy promote the emergence of growth hubs.

What about economic policy?

In this final section we intend to adopt a new approach to industrial policy, while seeking to identify the coordination problems which need to be resolved and focusing upon the *modus operandi* of policy –that is to say the political economy of the implementation of industrial policy. Our objective is not to set out a list of the instruments used, ranging from competitiveness clusters to sectoral subsidies (car manufacturing), public procurement and the *Banque publique d'investissement* (BPI). Our intention is to illustrate general problems, rather than assessing the existing schemes and the way in which they are used.

A new approach

Industrial policy has long been considered primarily as a distortion of the efficient allocation of resources in a market economy. “Horizontal” policies creating conditions favourable for innovation and the creation of businesses (competition on the goods and input markets, support for research, etc.) were given preference over “vertical” public initiatives supporting priority sectors selected by the authorities (subsidies, public holding of share capital, customs duties and public works contracts). This approach was complemented by correction of the market failure regarding externalities (R&D, training, and access to credit).



²⁸ See Demmou L. (2010): “Le recul de l’emploi industriel en France entre 1980 et 2007. Ampleur et principaux déterminants: un état des lieux”, *Économie et Statistique*, vol. 438, no 1, pp. 73-296.

²⁹ The sum of the contributions of the three factors is not equal to the total job losses, other factors may be involved. Since calculations of employment content of this kind can be criticised for methodological reasons, an econometric approach may be preferred. However, estimates lack precision which leads to divergent assessments. Cf. Demmou (2010) *op.cit.*, Rowthorn R. and R. Ramaswamy (1998): “Growth, Trade and Deindustrialization”, *IMF Working Paper*, no WP/98/60 and Boulhol H. and L. Fontagné (2006): “De-Industrialisation and the Fear of Relocations in the Industry”, *CEPII Working Paper*, no 2006-07.

The European Commission (2010 and 2012), as well as the World Bank (2013) and the OECD (2013), have substantially revised their position in this regard. However, as far as the European Commission is concerned, this reconsideration is a matter of the place of industry in the economy, rather than the modes of public intervention. Indeed, whereas the answer to the question raised by the title of this *Note* is emphasised in the Communication of the Commission,³⁰ the suggested modes of action remain vague since they involve combining vertical and horizontal policies in the same approach.³¹ The Commission's second Communication, issued in 2012, constitutes an even greater change in policy insofar as the sectors are clearly identified in a "vertical" manner: advanced technologies for industries, bio industries, environmentally-friendly construction and materials, clean vehicles and smart grids.³² However, the planned actions are primarily based upon competition within the internal European market, transport infrastructures, training norms and standards, rather than upon vertical actions.

The World Bank and the OECD suggest what appears *a priori* to be a bolder approach. The concept of a "new industrial and innovation policy" elaborated by the World Bank is not aimed at creating a favourable environment (horizontal policy) or supporting certain sectors (vertical policy), but at promoting restructuring and technological dynamism. The other dimension of this new policy is to directly address the economic elements of public intervention in industry. Industrial policy is above all considered as a matter of *modus operandi*.³³ In short, in place of the traditional horizontal/vertical opposition, this new approach centers on the correction of coordination and market failures through public action (cluster policies and public financing of innovative projects)³⁴ and the construction of modes of action that take into account the political economy of public intervention regarding companies (and regions).

What coordination and market failures is industrial policy intended to resolve?

The first coordination failure is the articulation between public and private research, between universities and companies, and between large and small companies. The

clusters policy, under its various forms, addresses this concern: the resolution of a coordination problem between agents. The clusters policy is based upon the premise that economic activities are insufficiently grouped together and of inadequate geographical density. Geographical proximity enables companies to take advantage of the complementarity of their respective skills. The concentration of firms and skills in the same place facilitates the transfer of knowledge, and above all tacit knowledge, and the emergence of knowledge-based externalities. However, empirical studies cast doubt upon the effectiveness of a clusters policy. In the five largest urban areas in Norway, the most innovative companies, in the sense of radical innovations, are those which are connected to several international networks. Too many exclusively local relations hinder innovation because of lack of new ideas.³⁵ In the case of France, although benefits arising from geographical concentration exist, they are limited: doubling employment in one sector and one employment area increases the productivity of local companies by less than 5%.³⁶ The selection of companies and clusters also poses problems. The previous policy of local production systems was aimed at companies in low productivity sectors and locations.³⁷ The new competitiveness clusters policy, on the contrary, is on the whole concerned with more productive companies and locations, independently of their grouping within a cluster.³⁸

A second market failure deals with the failure to take advantage of research externalities. If these externalities are positive, as is shown by empirical studies, too little research is conducted from a social point of view, since private companies do not incorporate these externalities into their economic calculations. Various measures can be implemented in order to stimulate research, such as research tax credits, research grants, transfer of technologies, research centres and public procurement.

A third market failure concerns cross-border mergers and acquisitions. The market is not always able to differentiate between operations that are desirable from a social point of view and those which are not. Public authorities can therefore check the desirability of operations or contribute to

³⁰ "A vibrant and highly competitive EU manufacturing sector can provide the resources and many of the solutions for the societal challenges facing the EU [...]", cf. European Commission (2010): *An Integrated Industrial Policy for the Globalisation Era, Putting Competitiveness and Sustainability at Centre Stage, Communication*, COM (2010) 614, p. 4).

³¹ "All sectors being important, the Commission will continue to apply a targeted approach to all sectors. Some sector-specific initiatives could be taken for certain types of sectors [...]", cf. Commission European (2010), *op.cit.*, p. 28. The sectors in question are the aerospace industry, environmental goods, health, security and energy intensive sectors exposed to international competition.

³² See European Commission (2012): *A Stronger European Industry for Growth and Economic Recovery, Communication*, COM(2012) 582.

³³ See the "New industrial policy" section of the World Bank's Knowledge 4 Development website.

³⁴ The clusters policy is mentioned in the communication of the European Commission, but in relation to its regional policy.

³⁵ See Fitjar R.D. and A. Rodríguez-Pose (2011): When Local Interaction Does Not Suffice: Sources of Firm Innovation in Urban Norway", *Environment and Planning*, no 43, pp. 1248-1267.

³⁶ The sectors refer to the French business nomenclature (*Nomenclature d'activités française*) (rév. 2, 2008), niveau 3 (INSEE).

³⁷ See Duranton G., P. Martin, T. Mayer and F. Mayneris (2010): *The Economics of Clusters, Lessons from the French Experience*, Oxford University Press.

³⁸ See Fontagné L., P. Koenig, F. Mayneris and S. Poncet (2013): Cluster Policies and Firm Selection: Evidence from France", *Journal of Regional Science*, vol. 53, no 5, pp. 354-374.

the organisation thereof, while promoting their own specific objectives (employment, transfer of technology, prestige).

The final market failure has to do with access to finance. Difficult financing for medium-sized businesses, high-risk start-ups and, above all, small and medium enterprises (SMEs) constitutes a recurring problem. With the likely tightening of access to credit as a result of the crisis, this issue is once again at the centre of current policies. The development of private venture capital can substitute for or complement public action. Venture capital invests in research companies not only financially but also through active management for a limited period of time, which limits the moral hazard problems that are typical of financing on the basis of public research grants. However, empirical studies are not unanimous on this issue.³⁹ Whereas most studies on aggregate data find that venture capital has a positive effect on the number of patents awarded, those using firm-level data lead to subtler conclusions, or even conclude that the granting of patents slows down following venture capital investment. This may be explained by investors seeking rapid returns on their investments and being more interested in taking advantage of existing innovative potential in the companies they finance, rather than developing new research projects. It is therefore likely that market failure is not entirely resolved by calling upon private venture capital. As we shall see below, private venture capital can nevertheless play a key role as a complement to public action.

Whatever the failures to be corrected, there is a problem of information. In terms of economic analysis, principals (who subsidise or invest) do not have all of the necessary information in order to make informed decisions, and therefore have to procure it from agents (who receive the funds), who will therefore adopt strategies that do not necessarily guarantee desirable results. In practice, this means that a method of ensuring transmission of information to the authorities needs to be found concerning the companies and laboratories that operate within the clusters and the potential of the territories that host them. As far as credit access is concerned, one needs to determine whether the company concerned by the supposed credit rationing is or is not a “good risk”. With regard to the research tax credit, the question of windfall effects is often raised (tax credit for research which would have been undertaken in any case). We have chosen to look

more closely at the two latter examples in order to illustrate our observations.

In November 2013, the Ministry for Industrial Renewal (*ministère du Redressement productif*) re-launched the Resistance Fund (*Fonds de résistance*).⁴⁰ This decision came along with reinforcing the Interministerial Committee for Industrial Restructuring (CIRI: *Comité interministériel de restructuration industrielle*),⁴¹ increasing social support in case of bankruptcy and emergency amendments to the bankruptcy laws. The Resistance Fund is intended to help medium-sized companies in difficulty by granting loans, subject to certain conditions, to those of them who so request. No subsidies are involved. The project has to be viable (repayment capacity). Changes of management or shareholding are considered and the CIRI is entitled to submit restructuring proposals. This policy illustrates two problems.

First of all, the amount of the fund –300 million euros (Finance Bill for 2014)– scarcely exceeded 0.1% of the outstanding credits granted to non-financial medium-sized companies in October 2013.⁴² Only marginal credit access problems can be dealt with using such limited funds: in the case of major problems, shortages of funds will impose high levels of selectiveness, based upon urgency of action criteria, of which it will be impossible to be properly informed due to the information problems already emphasised.

Furthermore, which market failure justifies this measure? An examination of the data of the OECD, European Commission, INSEE and the Bank of France does not indicate any clear deterioration of credit access and conditions. Between 2008 and 2011, the stock of loans granted to SMEs⁴³ increased by almost 5% per year, with the exception of 2009 (0.3%).⁴⁴ Indeed, SMEs demonstrate a decline in the willingness of banks to grant credit (– 22%).⁴⁵ However, according to the ECB, although the challenge of credit access for French SMEs increased slightly in 2013 (considered by 14.8% of SMEs to be the most urgent challenge), the level of this challenge is below the European average. As far as labour costs are concerned, 19.8% French SMEs placed them foremost amongst their concerns.⁴⁶ For its part, INSEE considers that, contrary to the United States, businesses in France have suffered more from a demand slump than from a credit crunch. This is confirmed by the Bank of France which shows, on the basis

³⁹ See Arque-Castells P. (2012): “How Venture Capitalists Spur Invention in Spain: Evidence from Patent Trajectories”, *Research Policy*, no 41, pp. 897-912.

⁴⁰ Referred to as the Economic and Social Development Fund (*Fonds de développement économique et social*) at the time of its creation in 1948.

⁴¹ Cf. <https://www.tresor.economie.gouv.fr/CIRI>

⁴² The total amount of outstanding credit granted to non-financial medium-sized companies came to 273 billion in October 2013 (cf. Statistical data of the Banque de France).

⁴³ It is recalled that the resistance fund is aimed at medium-sized companies and not SMEs.

⁴⁴ Cf. OECD (2013): “Recent Trends in SME and Entrepreneurship Finance” in *Financing SMEs and Entrepreneurs*, http://www.oecd.org/cfe/smes/Scoreboard_2013_extract_chapter2.pdf

⁴⁵ Cf. European Central Bank (2013): *Survey on the Access to Finance of Small and Medium-Sized Enterprises in the Euro Area*, <http://www.ecb.europa.eu/pub/pdf/other/accesstofinancesmallmediumsizedenterprises201311en.pdf>

⁴⁶ The Bank of France describes the situation with greater contrasts, noting an increase in applications for new credits on the part of medium-sized enterprises and an improvement in their rate of acceptance in 2013, see *Banque de France* (2013): “Enquête trimestrielle auprès des PME et ETI sur leur accès au crédit en France”, *Stat Info*, 3rd quarter.

of a sample of 60,000 SMEs, that in spite of the more restrictive behaviour of banks, French SMEs have not suffered from marked credit restriction between 2008 and 2010. The problem was that of a demand crisis.⁴⁷ Why then do certain SMEs find themselves refused access to credit? The answer lies less in a failure of the credit market than in the fact of their insufficient profitability being sanctioned by the market. The appropriate policy is therefore to restore the profitability of medium-sized enterprises, in particular by focusing upon the issue of labour costs.

We shall now turn to the questions raised by the research tax credit (CIR: *Crédit impôt recherche*). Rather than an overall reduction of taxation, more targeted action can be planned with regard to research, and the research tax credit corresponds perfectly to this objective. Tax credits are moreover less costly to implement than direct research grants. The first difficulty lies in the fact that not all companies necessarily have an adequate level of information at their disposal regarding the practical details and conditions of obtaining indirect aid, above all when frequent policy changes occur in a short space of time, as has been the case in France. Under these conditions, access to such schemes on the part of the smallest high-growth potential companies may give reasons for concern. An enquiry conducted by Ernst & Young, concerning 250 French SMEs reports that 71% of companies consider it difficult to gain access to the aid schemes and 58% consider the preparation of applications to be too complicated.⁴⁸

Empirical studies concerning the effectiveness of such schemes tend to show that research undertaken by companies does not greatly exceed the amount that is subsidised (multiplier effect appears to be minimal).⁴⁹ Furthermore, for larger companies there is a windfall effect: They benefit more than small companies from the system, whereas it is the latter that have a problem in accessing financing for research. Few studies have been devoted to calculating the net social benefit of the scheme: this means including the social benefits linked to the R&D spillovers, the administration costs for the authorities in charge of the policy and the implementation costs for the companies as well as the excess burden of taxation. The recent study by Mulkay and Mairesse (2013) considers that the reform of the R&D tax credit will increase

research capital by 12% in the long term, which corresponds to a ratio of additional R&D expenditure to tax expenditure that is not significantly greater than 1, and does not take the R&D spillovers into account, which many studies have assessed as being beneficial.⁵⁰

The *modus operandi* of public intervention in industry

How can government intervene in practice to correct the coordination and market failures that hinder the harmonious development of industry, broadly understood as incorporating the high value-added services that are linked thereto? As has been pointed out, this is not only a question of creating a favourable environment, and it would be better to avoid supporting certain sectors that government might have plausibly identified as being profitable (government does not have any more information than the private sector in this regard). Horizontal policies, which are often considered to be the sole policies compatible with the rules of competition, are probably not sufficient; vertical policies, for their part, run the risk of encouraging existing setups that are in decline, reproducing what has been done with success elsewhere, or even attributing excessive weight to measures that bolster the image of the political decision-makers (environmentally-friendly growth, electric cars, etc.).

In an economy subject to a highly competitive and changing environment, public policy in favour of industry (in the broad sense) consists of promoting restructuring and technological dynamism. Clusters can be the right level of public intervention, not as a specific form of concentration of activity (when this is the objective, infrastructures and regulatory reforms encouraging mobility are probably more appropriate instruments), but as places of coordination of actors, in cases where coordination problems have been diagnosed. In spite of the criticisms that may be levelled against it in terms of windfall effects recalled above, the R&D tax credit goes in that direction of tapping into high value-added segments in a non-cooperative international environment. Under-pricing of road facilities for carriers is, on the contrary, an example of an undesirable policy, promoting the siting of logistic centres within the territory. Indeed, the aim is to attract high-income jobs with substantial local externalities in terms of expenditure.

⁴⁷ See Cabannes P-Y., V. Cottet, Y. Dubois and M. Sicsic (2013): “*Les ajustements des entreprises françaises pendant la crise de 2008-2009*” in *L'économie française 2013*, INSEE (ed.) and Kremp E. and P. Sevestre (2013): “Did the Crisis Induce Credit Rationing for French SMEs?”, *Document de Travail de la Banque de France*, no 405.

⁴⁸ Ernst & Young (2013): *L'efficacité des aides publiques aux entreprises: quelles priorités pour la compétitivité française*.

⁴⁹ See Ientile D. and J. Mairesse (2009): “A Policy to Boost the R&D: Does the Tax Credit Work?”, *European Investment Bank Paper*, vol. 14, no 1.

⁵⁰ See Mulkay B. and J. Mairesse (2013): “The R&D Tax Credit in France: Assessment and *ex ante* Evaluation of the 2008 Reform”, *NBER Working Paper*, no 19073. The existence of a lower than one multiplier confirms the results obtained for the Netherlands. See Lokshin B. and P. Mohnen (2012): “How Effective are Level-Based R&D Tax Credits? Evidence from the Netherlands”, *Applied Economics*, vol. 44, no 12, pp. 1527-1538 and Mohnen P. and B. Lokshin (2010): “What Does it Take for an R&D Tax Incentive Policy to be Effective?” in *Reforming Rules and Regulations: Laws, Institutions and Implementation*, Vivek Ghosal (ed.), MIT Press, pp. 33-58.

The other dimension of this new policy is to directly address the political economy of public intervention in industry. Firstly, where is the information required to undertake policies to be found? How can market failures be pinpointed? How can strategic value segments be identified? How to identify territories conducive to coordination between actors? How to detect companies that can be usefully assisted by public funds? On the assumption that the government does not have this information, the latter needs to be passed on to decision-making bodies. Action in favour of industry begins with passing on information to decision-makers. A risk of government capture results from the information asymmetry. The problem is not completely resolved by the creation of public agencies and specialised financial institutions, due to the difficulty of ensuring the independent judgement of the latter. This indeed constitutes the primary risk of capture: assisting visible setups because they are in difficulty or sufficiently large or close to the governing elites to support their concerns.⁵¹

Secondly, how should failures be managed? Entrepreneurial activity is inherently subject to high levels of failure. There is therefore a need to know how to bring an end to projects that do not produce the expected results (of which there are necessarily many), in order to be able to focus investment upon the smaller number of projects that are successful, as well as, of course, undertaking new ones. The private sector has this capacity (when it does not, it is sanctioned by the market); this is less the case as far as public decision-makers are concerned, due to local issues which interfere with their decisions (clusters are by definition localised). This corresponds to a secondary risk of government capture: once launched, projects can hardly be stopped.

Observation 4. When the public authorities intervene, in particular with the support of specialised agencies, the primary risk of capture is present: agencies do not have comprehensive information concerning the companies financed. When financing is granted to a project or company, the secondary risk of capture is the difficulty of bringing this support to an end due to the local impact thereof in terms of employment, legitimately defended by local elected representatives.

An exhaustive analysis of the industrial policies implemented in other countries is beyond the scope of this *Note*. The Israeli economy provides an interesting example: Is the visible hand of the government the key to industrial success? Indeed, although Israel is one of the youngest of the industrialised countries, its economy shows an R&D/GDP ratio which is well above the OECD average (4.3% in 2010 as compared with 2.4% for the OECD).⁵² The keys to the success of the Israeli experience are based upon three factors:

- the existence of research projects, resulting from state-of-the-art training, the massive arrival of well-trained immigrants and close cooperation between universities and the private sector;
- governance based upon incubators financed both by public funds for limited periods and private funds, with strong incentive to select promising projects as a result;
- public finance on a venture capital basis, to a large extent fed by taxes and sufficiently flexible to discontinue projects doomed to be failures.

From this example we take the importance of training, of the governance of public interventions and of venture capital as a strategic complement to public intervention.⁵³

Conclusion

Industrialised countries no longer have any, or virtually any, industry: industry sells services; services constitute an industry; countries no longer only exchange goods with one another; multinational companies exchange tasks between their subsidiaries located in different regions of the world; the tremendous productivity gains in factories have shifted value to research, design departments and ideas. Under these conditions, what economic policy should be pursued in order to support what is still referred to as industry, but which actually corresponds to the concentration of growth clusters of high value-added activities, with high levels of externalities, bringing high-incomes into the economy as a whole? Today, wealth is created in clusters of services and industries which are integrated into global value chains. This new reality needs to be accepted, while integrating industrial policy into a mode of governance that incorporates the political economy of public intervention.

⁵¹ In Kramarz F. and D. Thesmar (2013): "Social network In the Boardroom", *Journal of the European Economic Association*, vol. 11, no 4, pp. 780-807, the authors econometrically confirm the role of networks in the appointment of managing teams and the underperformance of organisations that tend to give in to this inclination more frequently.

⁵² Cf. http://www.oecd-ilibrary.org/science-and-technology/gross-domestic-expenditure-on-r-d_2075843x-table 1

⁵³ See Carpentier C. and J-M. Suret (2004): "Création et financement des entreprises technologiques: les leçons du modèle israélien", *Cahier de Recherche CIRANO*, no 2004RP-20.

Recommendations

Recommendation 1

Industry needs to be rethought and should no longer be equated with the production of goods. Political ideas need to be adapted in order to encourage restructuring and technological dynamism. Competitiveness policies need to be rethought by focusing them on productivity and innovation in high value-added areas. The scope of competitiveness clusters therefore needs to be reduced and refocused upon high value-added sectors.

Recommendation 2

Invest in training and promote the mobility of resources that can be concentrated in growth hubs. Re-examination of the bankruptcy law promotes the same end: increasing the “fluidity” of the French economy.

Recommendation 3

In a context of non-cooperative national policies, the government needs to promote investment in research and development through the research tax credit, direct aid schemes such as the ANVAR, venture capital and technology bridges.

Recommendation 4

Strike the right balance between the need to protect intellectual property, in order to stimulate innovation, and maximum sharing of knowledge, which can give rise to future technological progress. At the European level, fight against the use of patents as a strategic weapon, such as unfair use of patent thickets and splitting of patents, and promote strict criteria of patentability avoiding as far as possible the granting of monopoly rights to patents of poor quality.

Recommendation 5

Combine private venture capital and public financing of projects. Avoid public stake holding in private companies whenever there is no sign of a market failure in terms of financing.

Recommendation 6

It is imperative for industrial policy to be accompanied with strict governance notably enabling projects to be discontinued.



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