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# Empirical Evidence on Industrial Policy using State Aid Data

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ABSTRACT *This paper provides evidence of the evolution of industrial policy in European countries through a detailed analysis of state aid data. We show the emergence of a new phase of industrial policy in the years 2000–2004. The two previous phases were respectively an 'interventionist' phase, whereby national champions were directly and strongly supported, and a 'liberal' phase where industrial policy meant providing the conditions for the competitiveness of industry, in the sense of only defining the rules of the competitive game. The new phase can be called 'pragmatic'. The reason for such a term is that industrial policy implemented today is somewhere in between the two extremes constituted by the previous two phases, the rules of the game still being emphasised but some vertical industrial policy measures being envisaged where necessary. In other words, stress is still on horizontal policy measures but some vertical policy measures are adopted to meet the specific needs of the various sectors of the economy. The approach is pragmatic in that it focuses on the results rather than on ideology.*

KEY WORDS: State aid; industrial policy; comparative country study; open and knowledge-based economy.

JEL CLASSIFICATION: L50, O57, 014

## Introduction

Empirical studies of industrial policies tend to be based on qualitative information, namely description of the various measures and programmes adopted by one or more governments, in specific years or in specific periods of time. Quantitative studies of industrial policies are more difficult to find, except for some of its aspects such as technology policy (public reserch and development (R&D) spending, relationships between firms and universities, characteristics and performance of science parks, and so on) or trade policy (for instance, degree of trade opening or foreign direct investment (FDI) attraction). Estimates of governments' effort to support industrial development (restructuring of declining industries or support to the development of new sectors) do not exist, or only very partially.

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There are various reasons for such a shortage. First, there has been a prevailing suspicion about industrial policy since the mid 1980's. Both mainstream economic theory (neoclassical) and the liberal governments prefer leaving market forces to freely operate rather than intervening to support economic restructuring and industrial development, mainly because government intervention might create other distortions that are worse than the possible failures of the market. The 1980s and 1990s experienced a prevalence of liberal ideas (lead initially by Reagan and Thatcher) so much so that industrial policy became a 'heretic' matter. Second, there is no universal definition of industrial policy and definitions range from restrictive to broad. Industrial policy in its restrictive definition means government action to support a specific activity or industry. This type of policy, which means generally picking winners and supporting national champions, prevailed until the 1970s, after which this 'interventionist' policy started to show weaknesses. The lack of effectiveness of old-type (restrictive) industrial policy contributed to the growing animosity towards industrial policy. In addition, given that it favours certain firms at the expense of others it creates distortions to international competition and trade. In the European Union (EU), it represents state aid that has been prohibited since the beginning of the European integration process. The (mainstream) economic literature also shows that such economic policy creates distortions and suboptimal results (see Martin & Valbonesi, 2006, for a review). As a result, in the 1990s the term was even banned from official circles such as the European institutions. When measures aimed at supporting industrial development (especially the development of new sectors using the new technologies) were mentioned, the term competitiveness policy was preferred. Third, when industrial policy is taken in its broad conception, namely all policies that influence industry (Donges, 1980) or all measures or sets of measures used to promote industrial structural change (Curzon Price, 1980), evaluation is extremely difficult because industrial policy comprises so many measures: subsidies, grants, tax exemption, public orders, supply of technology and services; in so many fields: technological, training, trade, infrastructure policies and many others. Hence, measuring the extent of industrial policy is difficult. In addition, measuring the impact of industrial policy is even more difficult (for instance, see Chang, 2001, for a discussion concerning the debate on the effectiveness of industrial policy in East Asia).

However, systematic data on industrial policy would be useful to make the analysis of industrial policy more robust.

Why care about industrial policy when the term has disappeared from official circles and mainstream economic theory argues that it is useless?

The main reason is that the term has reappeared in these early years of the 21st century. Some European Heads of State of leading countries of the EU have called for industrial policy. The European Commission (EC) has made a series of publications on industrial policy since 2002 (European Commission, 2002, 2003a, 2004, 2005a), where it suggests that some old-type (selective) policy might be useful. The most recent evidence on industrial policy experiences throughout the world (see Bianchi & Labory, 2006) is that industrial policy has continued being implemented in various forms even during the most liberal years and even in the most liberal countries (UK and the USA).

Therefore, the aim of this paper is to provide evidence of the evolution of industrial policy using as systematic data as possible. We first identify three phases of industrial policy since 1945 on the basis of historical evidence on a number of chosen countries: France, Germany, Italy and the UK in Europe and Japan, Korea,

Taiwan and Singapore in Asia. Using information collected from governments and using a literature review, we derive broad lines of industrial policy that have been implemented by the eight countries throughout the period considered. In order to confirm our hypothesis regarding the three phases of industrial policy, we then collect data to measure the extent of industrial policy across time. Given the variety of measures that constitute industrial policy, building a complete indicator of industrial policy is difficult. Hence in a first step we restrict our attention to one part of industrial policy, namely state aid, the old type of industrial policy (financial transfers to business). We restrict our attention to the EU because it is the only region where state aid data is systematically collected and/or made available. We analyse state aid data focusing on the four European countries mentioned above, which we compare with the EU average. We show that industrial policy has continued being implemented even in the 'liberal' phase and we confirm the hypothesis of a new phase of industrial policy since the beginning of the 21st century.

Our paper is structured as follows. We define industrial policy and analyse its historical evolution since 1945 in eight countries in the next section. This leads us to outline three phases of industrial policy since the Second World War. We then provide quantitative evidence on the shift to the new phase using state aid data in the EU. The overall evidence is discussed in the penultimate section (especially in terms of robustness of the results), together with the characteristics of the actual phase of industrial policy. The last section concludes.

## The Evolution of Industrial Policy Since 1945

Given the variety of definitions of industrial policy used in the literature, we start by making our definition clear. In this paper, we consider industrial policy to be all measures aimed at supporting industrial development, including the restructuring of declining industries and the development of new sectors. It is therefore aimed at orientating a country's pattern of industrial specialisation. For instance evidence is that Europe is still widely specialising in low technology and labour intensive sectors, while high technology sectors are not as developed as in the USA and Japan. This problem has been made clear since the 1980s and European countries have been taking measures to orientate industrial specialisation towards new sectors.

As shown by Labory (2006) the measures that constitute industrial policy are numerous. She suggests a taxonomy of industrial policy measures, grouping them into framework measures, horizontal measures and vertical measures. Framework measures are aimed at guaranteeing the rules of the competitive game (essentially antitrust, regulation of product, of labour, etc.; company and contract law), while horizontal and vertical measures are aimed at promoting the participation in the competitive game by firms and entrepreneurs: technology policy, small and medium enterprises' (SME) policy, training, public orders and so on. The latter measures are horizontal when they apply to all firms and all sectors without discrimination and are vertical when they are specific to sectors or even firms (as for example when 'national champions' are favoured). The liberal tendency of the 1980s and 1990s has led governments, especially in the EU, to favour horizontal measures.

In order to show the evolution of industrial policy, we start by analysing the measures taken in a number of countries since 1945. We focus on eight countries, over the period 1945 to 2004, on the basis of our own 'field' study (information available on the government and ministries' web sites), as well as a review of the

literature (Bianchi & Labory, 2006; Labory, 2006). The countries chosen are: France, Germany, Italy and the UK in the EU and Japan, Korea, Singapore and Taiwan in Asia. The reasons for such a choice are as follows. The four European countries chosen are interesting because they have adopted different approaches to industrial policy while coordinating the economic integration process. The Asian countries are interesting because they too have followed varied approaches and all have experienced rapid economic development in the period.

Labory (2006) provides a brief description of the various policy measures adopted in each country, on the basis of a taxonomy of industrial policies (measures aimed at influencing industry). In this paper, we focus instead on a number of major policy lines and attempt to characterise their evolution in each country since 1945.

In our opinion industrial policies adopted by the eight chosen countries since 1945 can be classified into 11 main lines that have been used by the different countries with varying intensity at different times over the period of review:

1. Infant industry protection (barriers to import, investment subsidies, etc.);
2. Export promotion (subsidies, rewards to exporting firms, and so on);
3. Nationalisation (state-ownership in the manufacturing sector);
4. Support to large firms (promotion of mergers and acquisitions, public orders to increase the firms' market, etc.);
5. Support to SMEs (entrepreneurship, access to finance and to information, simplification of procedures to start a business, promotion of relationships with other firms and with institutions);
6. Orientation of firms' governance (promotion of the development of capital markets, support to relations between firms and banks);
7. FDI attraction (tax exemptions, subsidies to firms creating subsidiaries or plants in the country, etc.)
8. Scientific and technological research programmes (promotion of university research, R&D subsidies, R&D collaboration for basic research, relationships between firms and research centres, and so on);
9. High skills training (tertiary education level, especially in scientific and engineering fields);
10. Medium skills training (apprenticeship, secondary education level);
11. Strategic industry promotion (definition of the industries or technologies of the future, research programmes specific to these industries or activities).

Tables 1 and 2 summarise the actions of the governments of the eight countries during the period considered. The extent to which governments have adopted the different policy lines is indicated. The evaluation of the use of the various lines by the countries is based on the information collected. Summarising industrial policy in this way is very restrictive but it is, in our opinion, a mean to compare policies across countries. This exercise allows us to show two points. First, policy aimed at orientating the industrial structure of the country is constantly implemented throughout the period, although to various degrees. Second, the broad orientation of policy varies across countries: France, Italy, Japan, Korea and Taiwan appear to be more interventionist, while the UK, Germany and Singapore appear to have more faith in market forces.

In general, approaches vary but some common elements can be identified. Thus all countries tend to be more protectionist and interventionist at earlier stages of development (industrialisation) or in the reconstruction phase with infant industry

**Table 1.** Broad lines of industrial policy in France, Germany, Italy and the UK, 1945 to present

| | Italy | France | Germany | UK |
|---|---|---|---|---|
| Infant industry protection | Very strong | Very strong | Very strong | Strong |
| Export promotion | Strong | Strong | Strong | Strong |
| State ownership | Strong | Very strong and durable | Strong | Strong |
| Support to large firms in the private sector | Some cases (e.g. FIAT) | strong | None | None |
| Support to SMEs | Strong from the 1980s onwards | Strong from the 1980s onwards | Strong from the 1980s onwards | Strong from the 1980s onwards |
| Governance of private firms | Low involvement | Strong involvement | Low involvement | Low involvement |
| FDI attraction | Marginal | marginal | Marginal | Promoted in a selective manner |
| R&D programmes | Guided by public sector | Guided by public sector | Guided by public sector | Guided by public sector |
| Training of highly skilled labour force | Strong | Strong | Strong | Strong |
| Training of medium skilled labour force | Weak | Strong | Strong | Weak |
| Strategic industry promotion | Weak | Strong | Strong | Strong |

**Table 2.** Broad lines of industrial policy in Japan, Korea, Taiwan and Singapore, 1945 to present

| | Japan | Korea | Taiwan | Singapore |
|---|---|---|---|---|
| Infant industry protection | Very strong | Very strong | Very strong | None |
| Export promotion | Strong | Very strong | Very strong | Strong |
| State ownership | None | Used in come industries | Strong | Used in some industries (capital intensive) |
| Support to large firms in the private sector | Very strong (large groups) | Very strong (large groups) | Weak (most large firms are state owned) | None |
| Support to SMEs | Weak (from the 1980s) | Weak (from the 1980s) | Strong | Weak (from the 1980s) |
| Governance of private firms | Weak involvement | Strong involvement | Strong involvement | Weak involvement |
| FDI attraction | Not encouraged | Not encouraged (except few specific sectors) | Not encouraged (except some sectors) | Encouraged in particular sectors (high tech) |
| R&D programmes | Guided by private sector | Guided by private sector | Guided by public sector | Guided by public sector |
| Training of highly skilled labour force | Strong | Strong | Strong | Strong |
| Training of medium skilled labour force | Strong | Strong | Strong | Strong |
| Strategic industry promotion | Strong | Strong | Strong | Weak |

*Source*: Based on Lall (2006, p. 86) and Chang (2006, p. 199) regarding Asian Countries.

protection especially in so-called 'strategic' sectors such as heavy industry at earlier stages and high tech industries later on. When the country reaches a certain level of development, industrial policy is less interventionist and market forces are relied upon more. (All countries adopted liberal measures from the 1980s onwards, even Taiwan and Korea.)

Overall, all the four Asian countries have implemented industrial policies in the period 1945–2004. Three phases of such implementation can be identified: interventionism is particularly strong in the period 1945 to end of the 1970s (infant industry protection, export promotion, state ownership, and so on); some liberal elements are introduced in the 1980s and 1990s (liberalisation of trade in particular); and the focus shifts strongly to the promotion of new sectors in the last 10 years or so; that is, high tech sectors, the technology of which is being developed and improved, characterised by high R&D costs and strong potential benefits and spillovers in the future.

In Europe, industrial policy essentially remains a competence of national governments, although some rules are common and policies have to be coordinated to a certain degree in order to avoid creating obstacles on the internal market. The four countries have been interventionists in the post-war reconstruction phase and have subsequently adopted measures more focused on competition conditions and horizontal aspects, even if the shift occurred to different degrees according to the country.

Labory (2006) analyses the various countries in more details. She identifies three phases of industrial policy. Until the 1970s, European industrial policy (essentially national but with some European action too, in the European Coal and Steel Community (ECSC)) is focused on the support to declining industries. From the 1980s onward the globalisation process accelerates and leads to the definition of a new approach to industrial policy (Bangemann Memorandum, European Commission, 1990) that is formalised in the Maastricht Treaty (art. 130, Treaty of the EC). The approach consists of providing the conditions for industrial development, guaranteeing competition on markets. However, as stressed by Commissioner Bangemann, public authorities have also a role to play as pioneers and catalysts of industrial development, by identifying and supporting, with the help of R&D programmes and training, strategic technologies and industries.

This report represents a first step towards the formulation of new industrial policy at European level. However, in the 1990s the idea of creating the conditions for competitiveness is interpreted as ensuring competition rules with minimum intervention, that is, only some horizontal measures to support strategic technologies. Horizontal policies have therefore been implemented in Europe in the 1990s up to the beginning of the period 2000–2004. However, as we will see below, such measures tend to result in a 'sprinkling' of resources on a large number of actors and areas, without significant effects. Hence at the end of the 1990s and beginning of the period 2000–2004 the idea that some vertical measures might be necessary for industrial policy to be effective appears again. Thus in the various Communications of the EC on industrial policy (European Commission, 2002, 2003a, 2004, 2005a), the aim of industrial policy to provide an environment favourable to industry competitiveness and the use of horizontal measures as a priority is always stressed. However, it is also recognised that sectors have specificities and policy should accommodate these specificities. In other words, some vertical policy is useful to meet the specific needs of the various sectors.

Before analysing this change in more details, we provide more systematic evidence based on an analysis of state aid data in the next section.

**Measuring the Extent of Industrial Policy**

The evidence we have so far provided on the evolution of industrial policy is rather qualitative, based on a historical review of the measures taken by governments since 1945. In this section, we attempt to provide quantitative evidence on industrial policy.

As outlined in the introduction, measuring the extent of industrial policy is not easy. Even if one restricts the concept to old-type industrial policy, namely selective intervention of governments in firms and industries or state aid, the measurement difficulty remains. First, governments do not appear to systematically collect data on state aid, especially at the various levels of governments. Aid is indeed provided at all levels of governments, local, regional and national, and can take various forms: financial and non-financial, and among financial aid, subsidy, tax exemption, credit guarantee, and so on. Even taking aid in its most restrictive form, that is, a subsidy, there is no universal definition of a subsidy and definitions differ across countries (see Biggar, 2004, for a discussion). Second, state aid is not accepted internationally, in the EU or in the World Trade Organization (WTO): as outlined in the introduction, the vertical measures that distort competition, i.e. what is generally defined as state aid, are generally prohibited. Hence governments are surely not keen on publishing data on the aid they provide to business.

State aid in the form of financial assistance to firms can take many forms, such as direct transfers to the firm, low-interest loans, the sale of inputs at below market prices, the purchase of output at above market price or government guarantees of the firm's credit. Financial assistance can also take the form of reductions of taxes, including tax deferments, tax credits or tax holidays. The objectives of such assistance also varies to a great extent. The aim can be:

- the support of the development of economic activities in particular regions, such as tax relieves for firms locating there;
- public good provision, such as support to firms that provide certain goods and services in remote areas;
- help to declining industries, in order to cushion the social impact of the firms's crises;
- correct market failures (aid aimed at sustaining R&D or SMEs);
- increase employment;
- expand the market share of some firms at the expense of their competitors.

Of course, the latter type of objective is prohibited by international rules such as those of the EC Treaty in the EU and the WTO concerning world trade.

The first step in our analysis was to check data sources on state aid worldwide, focusing on the major Organization for Economic Cooperation and Development (OECD) countries first. The OECD has some data but the latest report we found rather old (1998). The OECD noted in the report (OECD, 1998) that there was a lack of information on sub-national programmes.

In Canada and the USA, some incomplete data can be found. Generally, data taken at subnational levels are lacking there too. In the USA, the federal government has the objective of reducing subsidies and tax advantages to business especially in interstate commerce. However, no official report on the amount of state

aid to business appears to exist. At federal level one can use the budget data: the section n.40 regarding grants and fixed charges, of which number 41 is grants, subsidies and contributions. However, no distinction is made according to the precise destination of these grants, subsidies and contributions. The total estimated in 2004 is about 6% of US gross domestic product (GDP), of which firms receive a part. To this, one must add the aid provided to business by the individual States, which is not systematically collected at federal level. The National Association of State Development Agencies collects some data and, according to Martin & Valbonesi (2006), the budget of the state economic development agencies was US$6.3 billion in 2001, about 0.9% of US GDP, of which a large but unknown part goes to business. There is no explicit legislation on state aid to business in the USA. Only antitrust law can be used (as shown in Martin & Valbonesi, 2006). However, antitrust law does not mention subsidies provided by the different levels of government. States appear to have therefore a large amount of freedom in implementing state aid to business.

The best data appear to be from the EC (Biggar, 2004; Martin & Valbonesi, 2006), although the state aid each member state reports on does not include all possible forms of aid. The EC Treaty considers state aid in a limited definition: only financial assistance provided to firms in the same country is considered, not financial assistance to firms in the same market; other forms of aid, such as regulatory policy and public good provision that may favour domestic firms at the expense of foreign competitors, are not considered. Article 87 of the EC Treaty rules that 'State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, insofar as it affects trade between member states, be incompatible with the common market'. Some mandatory exceptions (Art 87(2)) are allowed (in case of social problems or natural disaster), as well as discretionary exceptions (Art. 87(3)), that permits the Commission to allow aid of overriding EU interest such as regional aid, to combat unemployment, to advance important EU goals, to specific economic activities, to deal with serious economic disturbances and other aid, with the authorisation of the Council.

A distinction is made between state aid and general measures. General measures do not constitute aid and are not controlled by Article 87(1) of the EC Treaty. General measures are measures that apply to all firms in a country. They do not constitute aid when:

- there is no specificity in terms of sector, region or category;
- the eligibility of the aid is based on objective criteria, without any discretionary power of the authorities;
- the measure is in principle not limited in time or by a predetermined budget.
- General measures in any case apply to national firms and not to competitors located in other Member States; hence they potentially distort competition.

Article 88 and 89 empower the Commission to determine whether a particular aid is compatible with the Treaty and to make regulations setting out the procedures for making this determination and categories of aid which are exempted from the procedure.

We therefore use the state aid data available on the web site of DG Competition of the EC, broken down by countries and by sectors (manufacturing, services, fisheries and agriculture; horizontal objectives). We use this data to analyse the trends in state aid since 1992 in the four European countries we have chosen to focus

upon. We also examined the various reports published by the EC on the topic since 1997 (European Commission, 1997–2001, 2003b, 2005b, 2006); we use this information here and there, but only use data of the online scoreboard for the period 1992–2004, because the data is not comparable across surveys. Historical data has been regularly updated by the EC to take account of not only new members, but also reimbursement of incompatible aid and aid that was not initially notified by the Member States to the Commission. We focus on the four European countries that we have analysed in the previous section, namely France, Germany, Italy and the UK, with data for the entire EU as a benchmark.

Figure 1 shows the volume of aid to industry and services (total aid minus transport, fisheries and agriculture) given in the four European countries we have chosen to focus on. The general tendency is a reduction in the 1990s and an increase (although slight) in the period 2000–2004. The reduction in the 1990s is particularly significant for Germany and Italy, where total aid to industry and services was €25.8 and 16.3 billion respectively in Germany and Italy in 1992, against €15.5 and 4.7 billion in 1999. For Germany, this represented 1.4% of GDP in 1992 and 0.7% of GDP in 1999. For Italy, it represented 1.4% of GDP in 1992 and 0.4% of GDP in 1999. Over the period 1999–2004, state aid to manufacturing and services as a percentage of GDP remained at the same level for the two countries, while the volume decreased slightly for Germany (€15.5–15.1 billion) and increases for Italy (€4.7–5.4 billion). Overall, state aid to industry and services remained constant over the period 1999–2004, except for some years of slight increase (in 2002 and 2003). France and the UK experienced an increase in the volume of state aid to industry and services from 1992 to 2004: in France, the volume was €5.3 billion in 1992 and 6.3 billion in 2004 (0.4% of GDP in the two years); in the UK, the volume was €1.7 billion in 1992 and €4.2 billion in 2004 (0.2% of GDP in the two years). In the 1990s, state aid increased in volume in France (to 6.1 billion in 1999) and remained at 0.4% of GDP; in the UK, during the same decade, state aid to industry and services slightly reduced in volume, from 1.7 to 1.6 billion, and increased in terms of percentage of GDP (0.1–0.2%).

Hence Figure 2 shows aid to industry and services as a percentage of GDP. The two phases are confirmed. Aid as a percentage of GDP tend to reduce over the decade of the 1990s, while the downward trend stops in the early years of the 21st century, where the tendency is stability or slight increase.

Table 3 shows the details of the data in the years 1999–2004. It shows the stability of state aid to industry and services over these years, especially in terms of percentage of GDP: the percentage remains at the same level in all the years, except for one or two years. The volume of aid tends to increase from 2000 to 2004 in all four countries, except for Germany, where the volume decreases slightly (from €15.3 to 15.1 billion) from 2000 to 2004. From 2000 to 2004, state aid to industry and services increases by €0.7 billion in France, €0.3 billion in Italy and €2.2 billion in the UK.

Although industry might be defined as all productive activities and include both manufacturing and services, especially nowadays given that services are increasingly bundled with goods and given that the growth of the service sector is driven by the growth in services to business, a more narrow definition of industrial policy would exclude services. Hence we distinguish aid to manufacturing, computing it according to the definition of the EC. The EC defines aid to manufacturing as comprising aid with horizontal objectives, aid to manufacturing sectors, aid to coal and aid to other non-manufacturing sectors (European Commission,

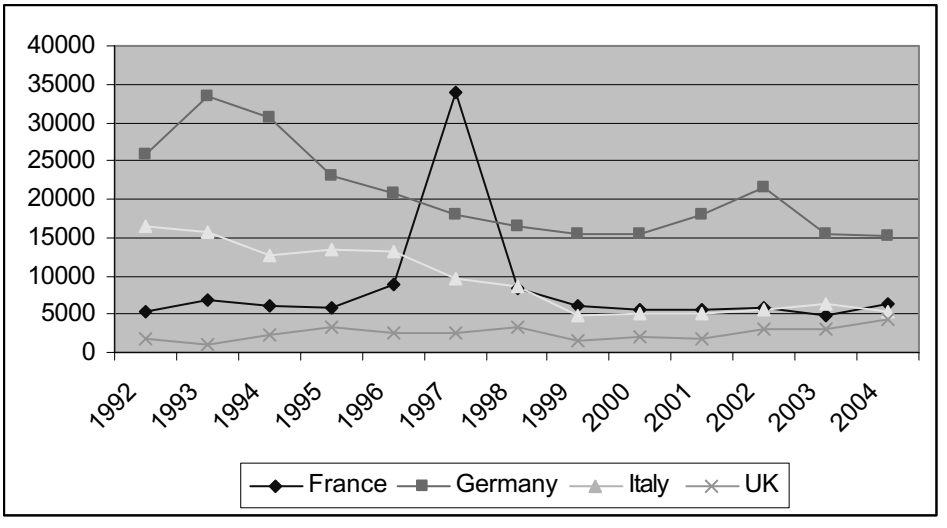


**Figure 1.** Volume of aid to industry and services, million, 1992–2004. *Source*: Authors' elaboration of European Commission data (On-line State Aid scoreboard, last updated 20 Decemeber 2005). This is state aid minus agriculture, fishery and transport.

2005, p. 12). We compute aid to manufacturing using country state aid data broken down by sectors.

The manufacturing industry received the largest part of the aid: over the period 1992–2004, Germany gave about 84% of total aid to the manufacturing sector, Italy about 78%, the UK about 64% white it was only about 52% in France, due to the importance of aid to agriculture. In addition, the importance of the manufacturing

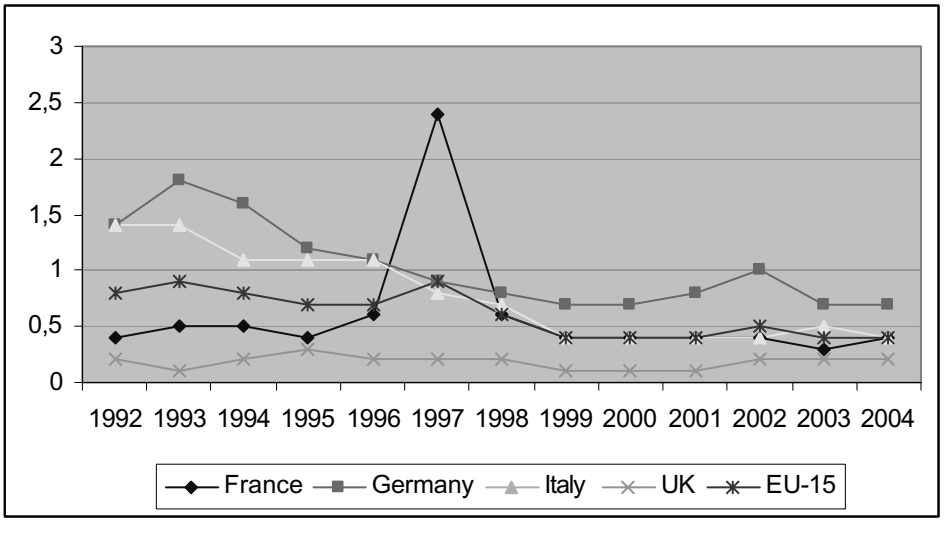


**Figure 2.** Aid to industry and services as a percentage of GDP. *Source*: On-line State Aid scoreboard (last updated 20 December 2005), European Commission, DG Competition. This is state aid minus agriculture, fishery and transport.

**Table 3.** Aid to manufacturing and services, France, Germany, Italy and the UK, 1999–2004

| | 1999 | | 2000 | | 2001 | | 2002 | | 2003 | | 2004 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | € bn | %GDP | € bn | %GDP | € bn | %GDP | € bn | %GDP | € bn | %GDP | € bn | %GDP |
| France | 6.1 | 0.4 | 5.6 | 0.4 | 5.6 | 0.4 | 5.9 | 0.4 | 4.9 | 0.3 | 6.3 | 0.4 |
| Germany | 15.5 | 0.7 | 15.3 | 0.7 | 18.1 | 0.8 | 21.6 | 1.0 | 15.3 | 0.7 | 15.1 | 0.7 |
| Italy | 4.7 | 0.4 | 5.1 | 0.4 | 5.1 | 0.4 | 5.6 | 0.4 | 6.3 | 0.5 | 5.4 | 0.4 |
| UK | 1.6 | 0.1 | 2.0 | 0.1 | 1.9 | 0.1 | 3.0 | 0.2 | 3.1 | 0.2 | 4.2 | 0.2 |
| EU-15 | 38.5 | 0.4 | 40.9 | 0.4 | 42.5 | 0.4 | 46.8 | 0.5 | 39.4 | 0.4 | 42.0 | 0.4 |

*Source*: On-line state aid scoreboard (last updated 20 December 2005), European Commission, DG Competition. These are state aids minus agriculture, fishery and transport.

sector as a recipient of aid increases from one decade to the next: the average percentage of aid that goes to manufacturing in the early years of the 21st century (up to 2004) was higher than the average of aid to manufacturing in the 1990s in France and the UK, while in Germany and Italy it reduced slightly but mainly because of particular years in which aid to manufacturing was substantially reduced (2002 in Italy and Germany).

Last, a useful distinction is between horizontal and vertical aid. The EC distinguishes between the sector or objectives of aid. Aid is classified as either part of horizontal objectives or of aid to particular sectors. Horizontal objectives include R&D, environment and energy saving, SMEs, commerce, employment aid, regional aid and other objectives. Particular sectors are manufacturing, services, coal mining, other non-manufacturing and transport (airlines, inland waterways, road and combined). However, the two types of aid, namely aid with horizontal objectives and aid to particular sectors, do not exclude each other. Aid is by definition specific to some firms or some industries (otherwise, the aid falls into the

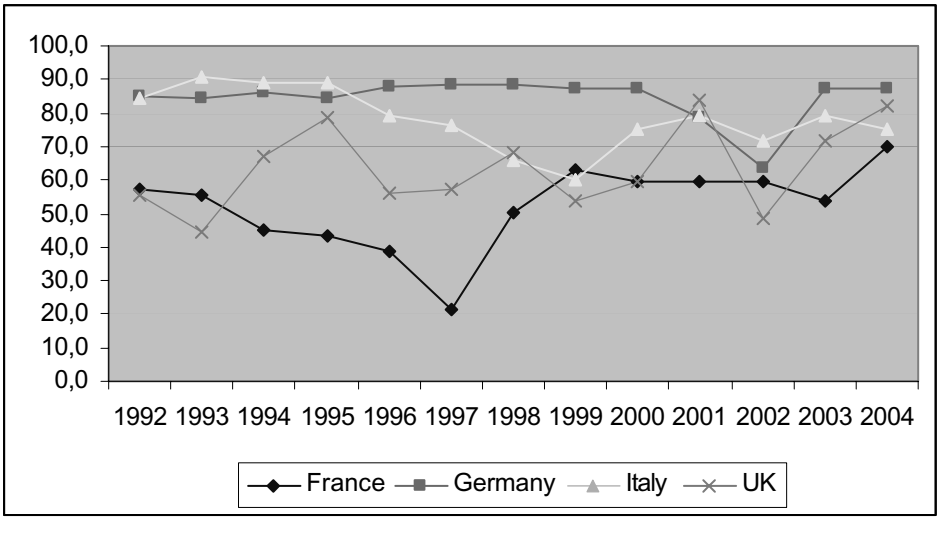


**Figure 3.** Aid to manufacturing as a percentage of total aid, 1992–2004.

category of 'general measures', which is not prohibited state aid). Hence an aid could have the objective of sustaining R&D and being implemented in a specific sector. How does the EC classify the latter aid? This does not appear clearly in the EC's publications. Given the repeatedly declared importance of horizontal objectives in the European Council's and Commission's publications (at the Stockholm Council of 2001 for instance), it might be that Commission's officials (or national officials reporting on aid, because aid with horizontal objectives is not prohibited) would favour classifying in horizontal objectives although it could be classified into particular sectors.

Hence it is likely that data on horizontal objectives are distorted upwards, in the sense that aid to horizontal objectives is overestimated. However, Figure 4 shows the large increase in that type of aid.

Aid with horizontal objectives tend to take increasing importance over other types of aid in all European countries, especially, among the four we consider, namely France, Germany, Italy and the UK. This type of aid has represented about 100% of aid in Italy since the end of the 1990s. Germany saw this type of aid increasing constantly over the period 1992–2004. The UK pattern is more irregular, years where only (or almost) this type of aid was used (1992, 1993, 1999, 2002–2004) alternating with years in which aid to specific sectors was preferred (1994, 1995, 1998, 2001). France is peculiar in that the share of aid with horizontal objectives roughly remains around two-thirds over the whole period (1992–2004).

Figure 5 shows that the distribution of aid with horizontal objectives widely differs across the four countries. In France, most aid with horizontal objectives goes to SMEs and R&D, while most horizontal aid is for energy and the environment in Germany. The greatest share goes to SMEs and regional aid in Italy, while aid is more evenly distributed among energy and environment, R&D, regional aid and SMEs in the UK. R&D never represents the most important horizontal objective in terms of allocated resources.

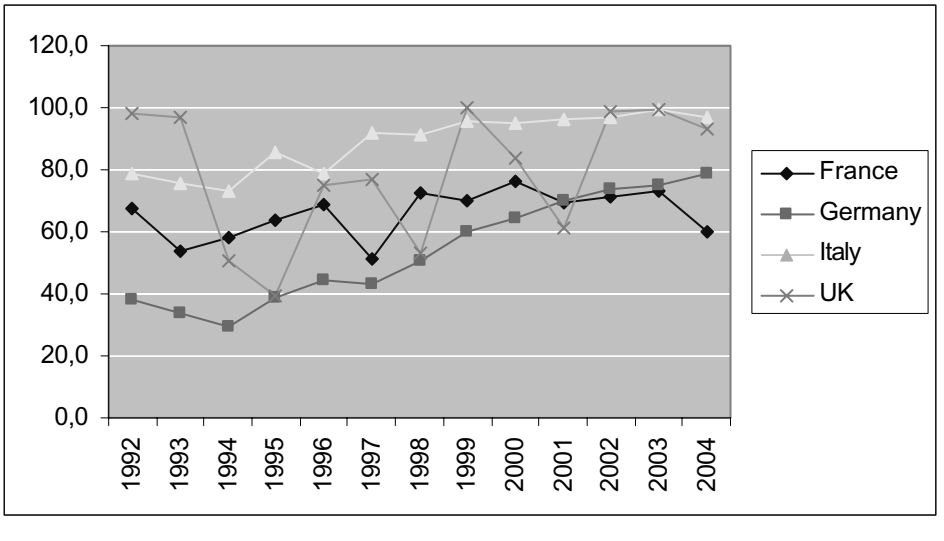


**Figure 4.** State aid with horizontal objectives as a percentage of total manufacturing aid, 1992–2004. *Source*: Authors' elaboration of European Commission data (On-line State Aid scoreboard). This is state aid minus agriculture, fishery and transport.

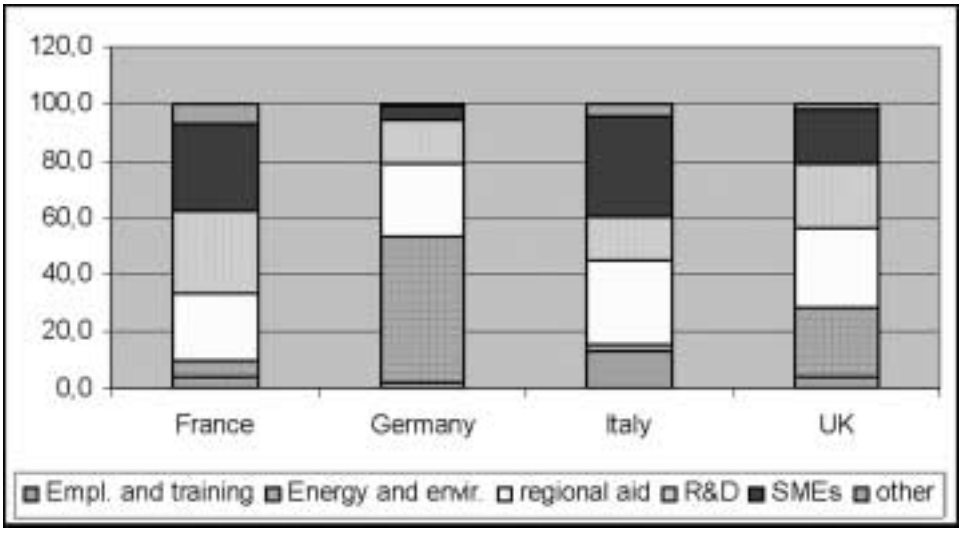


**Figure 5.** Distribution of aid with horizontal objectives (%), average 2002–2004.

We interpret this analysis of the patterns of state aid in France, Germany, Italy and the UK as an illustration of the shift from the second phase to the third phase of industrial policy that we outlined in the previous section: in the second (liberal) phase, state aid reduced, while in the third phase they started increasing, when structural action in favour of new industry was emphasised again. This was even true for the UK, a country with a rather strong liberal tendency. Table 4 characterises the different phases since 1945.

In the interventionist phase, national champions are supported with various measures, often including state-ownership. The link between government and industry is very strong. Competition policy when existing is weakly implemented. In the liberal phase, the objective of industrial policy is to create the condition for competitiveness, that is, guarantee the rules of the game (strong competition policy) while avoiding public intervention in industries (even in the case of natural monopolies that are regulated by independent regulators). The approach of regulation is to provide incentives so that economic actors adopt the right behaviour rather than directly impose the behaviour; in other words, the approach is incentive- instead of command- and control-based.

**Table 4.** The three phases of industrial policy

| | Phases | | |
|---|---|---|---|
| Main policy elements | Interventionist (1945–1970s) | Liberal (1980s and 1990s) | Pragmatic (2000–2004) |
| *Rules* | Weak enforcement | Strong enforcement | Strong enforcement |
| Competition policy | *Command-and-control* | *Incentive-based* | *Incentive-based* |
| Regulation | Government as regulator | Independent regulator | Independent regulator |
| *Capabilities* | Strong (emphasis on | Medium (horizontal | Strong (both vertical and |
| Industry specialisation | vertical measures) | measures) | horizontal measures) |

*Source*: Labory (2006).

Some public support to industry is implemented but essentially with horizontal measures.

In the pragmatic phase, the rules of the game are still emphasised but the action in favour of firms' competitiveness, particularly in new sectors, is emphasised again. Industrial policy is still defined as aiming to create the conditions for business to prosper, but this means not only providing the rules of the game, but also implementing some vertical policy if necessary. As we will see in the next section, vertical action is primarily targeted toward the orientation of industry towards new sectors.

**Characteristics of Industrial Policy in the years 2000–2004**

A first point to note is that the tendency observed over the period 2000–2004 regarding state aid might not be confirmed in the coming years. State aid in volume and in percentage of GDP stopped declining or increased slightly over the period 1999–2004, but this might be a short stable phase preceding a new declining phase. However, several reasons lead us to confirm our interpretation of a new phase of industrial policy (as short as it might turn out to be).

First, even if the tendency changes in the future, the evidence provided by state aid data is that industrial policy has continued being implemented, despite the dominant liberal stance of countries for which it is better leaving market forces freely to play and despite the result of mainstream economic theory that industrial policy is not useful. The term 'industrial policy' even disappeared from the EC's publications and from officials' discourse. There has been a reduction in state aid to industry and services over the 1990s and the years 2000–2004, but the decrease has been much lower than economic theory and liberal political forces would have suggested.

Second, the term 'industrial policy' has reappeared both in official and academic publications. As already mentioned, the EC has published four communications on the topic since 2002 (European Commission, 2002, 2003a, 2004, 2005a); in academia, even scholars publishing in the *American Economic Review* have had publications on the topic (for instance, Rodrik, 2004; Rodrik & Wacziag, 2005; Muskand & Rodrik, 2005).

Third, horizontal policies do not seem to have generated the expected benefits because the EU (the four countries considered here at least) does not appear to have developed significant comparative advantages in the new sectors. Over the last 10–15 years, state aid to specific sectors have decreased, while state aid with horizontal objectives has taken the lion's share of aid to the manufacturing industry. However, the EU has not developed significant competitive advantage in new sectors. Hence, the spreading of effort over a large number of actors and actions does not seem to have produced significant effects. The EC recognises this, claiming that sectors have specificities that have to be taken into account when formulating policies and might make vertical measures necessary (European Commission, 2005a).

Fourth, state aid only constitutes a small part of industrial policy. In the EU, state aid comprises only financial transfers to business. Many other measures exist: the supply of services such as managerial or other consultancy; technology transfers; public orders; R&D contracts; R&D collaboration between firms and public research institutions (universities or other research centres), promotion and defence of common interests, and so on. The (qualitative) evidence is that these

forms of industrial policy, which are different from state aid, have taken on growing importance in the last 10 years (see for instance the contributions in Bianchi & Labory, 2006).

In particular, indirect government actions such as the promotion of collaboration between governments, universities and business, especially at territorial level are particularly stressed in many countries (Bianchi & Labory, 2006; Labory, 2006). In a knowledge-based economy knowledge flows and collective knowledge creation take key importance. Parallel to the consolidation of the knowledge-based economy industrial policy has increasingly taken the form of local programmes aimed at putting together complementary competence in a geographically limited area, so that proximity allows better knowledge flows and collective knowledge creation processes. A certain degree of 'decentralisation' of policy-making and/or implementation has also been observed (the diffusion of 'bottom–up' approaches).

A new orientation of industrial policy can be observed towards industrial policy in the form of programmes including objectives, strategies and main measures, that are mainly indirect (provision of public goods in a local area that favours the agglomeration and the collaboration of firms locally; promotion of collaboration between firms, governments and universities, and so on) but also direct (provision of financial aid in the form of aid with horizontal objectives). For example, the development of an activity in a new (high tech) sector in a territory is supported by aid in the form of R&D subsidy or SME policy. Firms in difficulty in a sector that is facing competition from emerging countries (e.g. made in Italy) are supported with programmes aiming at helping their move to higher quality segments of the market and/or their internationalisation, which comprise aid that can be classified into aid with the horizontal objectives of SME support or regional aid, although the aid is to specific sectors in specific localities.

Fifth, our observation of industrial policies adopted throughout the world (Bianchi & Labory, 2006) shows a renewed focus in recent years on new sectors. When competition is global and new countries are emerging in the competition, challenging market positions first in lower tech sectors, specialisation in new (high tech) sectors takes increasing importance. The problem of lack of development of new sectors in the EU (the technology gap with the USA) is not new and has existed since the 1980s. However, the horizontal measures do not seem to be enough to resolve the problem. As an illustration, Figure 6 shows the contribution of high tech sectors in the economy's value added in the eight countries considered earlier in the paper, excluding Taiwan and Singapore for which data was not available, and including the USA, since it is the leading country in terms of high tech sectors' development, over the period 1980–2000. The two countries with the most drastic shift to aid with horizontal objectives, that is, Italy and Germany, are the only countries that have experiences a downward trend in the contribution of high tech sectors to their economies' value added between 1980 and 2000. In the other two European countries on which focus is made here, namely France and the UK, the importance of high tech sectors in terms of contribution to their economies' value added falls in the UK between 1990 and 2000 but it remains in 2000 at the highest level among the four European countries, while it increases in France in the same period and is more or less stable during 1980–2000. The contribution of high tech sectors to the economy's value added becomes higher in France than in Germany in the year 2000 (which might be explained by German reunification). The European countries are not only all behind Japan and the USA, but also Korea, in terms of contribution of high tech sectors to their economies' value added.

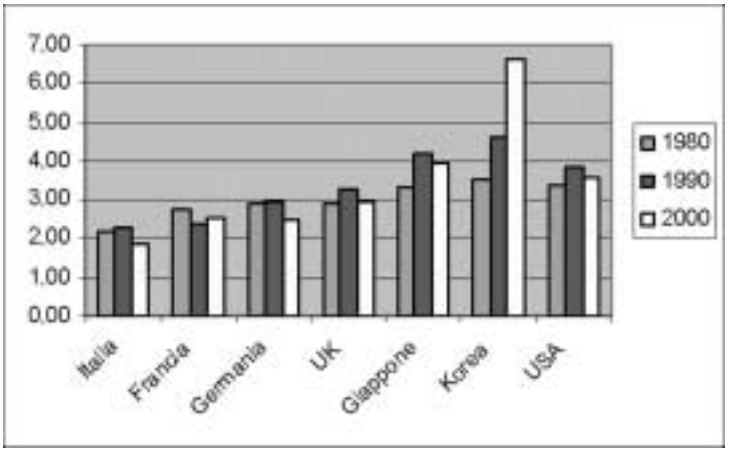


**Figure 6.** Contribution of high technology sectors to the economy's value added (%), 1980–2000.
*Source*: Authors' elaboration using OECD's STAN data (freely downloadable from www.oecd.org).

The result has been the recent call of the EC for the adoption of some vertical measures (European Commission, 2002, 2003a, 2004, 2005a). The Commission stresses the importance of horizontal measures that do not create distortions on the internal market, but it also suggests that the various sectors of the economy have specific characteristics that should be taken into account in formulating policy. Hence some kind of specific measures should be taken in order to meet these specificities and allow the policy to be more efficient and effective. The European Commission (2005a) stresses today the necessity to define more integrated industrial policies, meaning a concentration of efforts on specific objectives. The Commission claims that 'a new approach to industrial policy is required aimed at achieving better designed policies, that are more relevant, integrated and consensual' (2005a, p. 4). For this purpose, the EC has conducted an analysis of 27 industrial sectors in order to identify sector-specific problems and particular measures specific to these problems. The EC is thus proposing vertical industrial policy, i.e. specific actions to orientate European industrial specialisation.

It is important to note that the countries where specialisation in high tech sectors is high, especially Japan and the USA, have been implementing active industrial policy to support this specialisation (Labory, 2006) since the 1990s. In the USA, the government has invested heavily in R&D and has supported, in particular, the transformation of basic research into industrial applications (in the implementation of the Clinton Technology Policy Initiative, 1993). In Japan, R&D has been conducted mainly by firms although the government has played an important role in coordinating and catalysing efforts towards some industries. Industrial policy has been implemented via 'big projects', that is, research projects on specific technologies characterised by the collaboration of businesses, universities and the government. Labory (2006) concludes in her analysis of industrial policy recently implemented in France, Japan and the USA that the main elements of industrial policy in the new 'pragmatic' phase are: an emphasis on applied research; collaboration and concerted action between firms, universities and government; the financing of long term projects with strong monitoring and evaluation (in order to avoid government failures and to provide appropriate incentives to firms); and the collaboration between various areas and various levels of government.

The third phase of industrial policy can thus be called 'pragmatic'. It is pragmatic because it represents a mix of approaches: it is both interventionist, because some vertical measures can be implemented when necessary, and it is also liberal, because the importance of guaranteeing competition on the market is also stressed. It is pragmatic because it goes beyond ideology and rather focuses on results, especially in terms of orientating the structure of industrial specialisation of the country and ensuring the competitiveness of the country in global competition.

The risk of such an approach is that everything is possible. Hence strong monitoring and evaluation is needed to avoid inefficiencies and ineffectiveness. Monitoring and evaluation is therefore underlined both by governments themselves and by international organisations.

## Conclusions

This paper has provided evidence of a shift to a new phase of industrial policy in the years 2000–2004 on the basis of an analysis of state aid data. Historical evidence of the various measures taken by countries throughout the world since 1945 leads to the conclusion that industrial policy has experienced three distinct phases during the period 1945–2004: an interventionist phase, broadly from 1945 to the end of the 1970s; a liberal phase in the 1980s and 1990s; and what we call a 'pragmatic' phase in the early years of the 21st century. Industrial policy is defined as actions aimed at creating an environment favourable to business competitiveness. In the 1990s, this definition was interpreted as meaning only guaranteeing the rules of the game, i.e. ensuring the proper functioning of market forces (especially with antitrust legislation). In the years 2000–2004, this definition still means providing the framework rules, but it also means specific interventions to orientate the structure of industry specialisation. The particular concern of governments appears to be that of developing new sectors (based on new science and new technologies).

Restricting attention to the EU, owing to a lack of data on other countries, we show two points. First, old-type industrial policy as measured by state aid continued being implemented even in the 'liberal' years and in the most liberal countries (such as the UK). Second, the declining trend in state aid of the 1990s stops in the years 2000–2004. Both in absolute and relative terms, state aid experienced a slightly increasing trend from 1999 to 2004. We interpret this as a confirmation of the third phase of industrial policy.

We argue that in the knowledge-based economy this evolution makes sense. Industrial policy is needed especially to support the development of competitive advantage in the new sectors. In the knowledge-based economy, these sectors take increasing importance in terms of contribution to a country's wealth because their products have a high knowledge content (research, innovation, and so on). In addition, in a 'globalised' world where Western countries face the competition of emerging countries such as India and China, developing comparative advantage in the new sectors, where the emerging countries are not yet as competitive, is even more important.

However, state aid is only a part of industrial policy. State aid is defined as financial transfers to business that take many forms such as subsidies, grants, tax exemptions, etc., but does not comprise all forms of industrial policy. Rather, state aid gives an idea of direct, 'interventionist' industrial policy, namely old-type industrial policy. Evidence in the literature (see the various contributions in Bianchi & Labory, 2006; also Rodrik, 2004; Cowling *et al*., 1999; Bianchi *et al*., 1998) is that

indirect industrial policy measures have taken on a growing importance in recent years over direct measures such as state aid and that these measures have increasingly focused on the development of new sectors. Indirect measures include bottom–up approaches where industrial development is favoured at territorial level, with various measures such as, for instance, the promotion of government, business and university collaboration, the attraction of skills, and the provision of public goods and services.

Industrial policy is today very different from the past. In the first phase we identify from 1945 to the 1970s, industrial policy was very interventionist and made of direct interventions. Governments aimed at replacing the market. In the second phase, in the 1980s and 1990s, industrial policy was reduced to a minimum in an ideological reaction against that of the first phase. Industrial policy aimed at leaving market forces freely play and was made of minimum intervention, namely measures aimed at guaranteeing competition without abuse. In the third phase, industrial policy is made of a large set of possible measures. All measures are considered in order to define the most effective policy, beyond ideology. The most important thing is the result, in terms of development of comparative advantage in new sectors that ensure the country's competitiveness in global competition. The third phase is therefore pragmatic, both because it goes beyond ideology in the choice of measures and because it is orientated primarily towards the results.

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