

# Linking Technological and Institutional Change to Industrial Transformation in Greece

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## Introduction

In this article industrial policy is considered as a key tool for achieving post-crisis growth in Greece. The aim of this paper is to examine how industrial policy could contribute to overturn the crisis in Greece.

Our main argument is that in order to achieve recovery in Greece structural and institutional change is required to enable technological development and induce the generation of competitive high added value activities.

Analysis of the recent economic crisis has persistently focused on macro-economic issues although endogenous structural factors and the weaknesses of the real economy were also significant determinants of the macro imbalances. In fact, during the present crisis, recovery was expected to result from consolidation, austerity and deregulation policies.

The move into post-crisis cannot be but gradual and evolutionary and depends not only on successful macro-economic management but on structural transformation during the exit phase as well. The relationship between structural and macroeconomic policy is nor linear nor unidirectional. It is true that conditions under which industrial policy should be implemented are very contradictory and to a large extent policy initiatives could be counteracted by other priorities, especially austerity and adjustment priorities.

Macroeconomic constraints today could be resumed in the following three points:

- The restriction of financial resources to push investment. From 2010 to nowadays the credit expansion has displayed negative rates (Bank of Greece, 2017).
- Macroeconomic policies until now focus on expanding taxes, cutting public investment, and thus further repressing national income.
- In addition macroeconomic policies implemented in the context of the lenders' prerequisites (wage cuts, labour market reforms, fiscal consolidation) resulted to painful income repression, recession, pauperisation and high unemployment.
- The economic situation can no more use demand pull solutions to leverage economic growth. Besides, high consumption as a growth factor has been for a long time misleading and resulted to a deviation from long-term objectives of knowledge exploitation, innovation capability building and productive transformation.

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To focus on industrial policy is in contrast to the dominating policy paradigm in the country in many ways. It implies the shift of the focus from the financial sector to the real economy, from profits and particularly financial profits and rent-seeking to investment, employment and labour remuneration, and from macro- to micro-policy regarding the organisation, the structural features and the specialisation of firms. It means also moving from excessive short-termism to long-sighting policies, replacing high consumption as a growth factor by the drivers of modern growth (innovation, knowledge, appropriate governance). It entails rethinking the relations between the external sector, the private economy and the State. Foremost, the notion of structural change should be delinked from the neo-liberal agenda and brought back to its original conceptual context: development theory and policy.

After all the failure to enhance and/or transform its productive basis was a crucial explanation of why Greece was severely hit by the crisis. In fact, the twin imbalances –fiscal and trade-linked to Greece’s crisis were triggered not only by failed macroeconomic management or political faults with huge negative impact. These policies led or were interrelated (to some extent even caused) to many structural weaknesses of the real economy: weak and deteriorating competitiveness, low long-term growth rates, negative total factor productivity rates. The high trade deficits complemented the high fiscal deficits and were reduced after 2009 mainly because of the significant shrink in consumption and investment.

This paper argues that the challenge of an industrial policy to be successful is to accelerate a catching-up process and reverse two distinct but interrelated cumulative trends:

- the long-lasting productive and technological gaps vis-à-vis other advanced economies and
- the loss of production capacity after 2008, the consequent erosion of know-how and capabilities and in general the erosion of what is called ‘industrial commons’.

### **Theoretical considerations**

Nowadays industrial policy relates to a different content than interventionist and discretionary policies of the past. It rather implies a systemic approach to industrial development and relates to restructuring and industrial transformation (Rodrik, 2004 and 2007, Bianchi & Labori, 2011, Lall, 2004, Aiginger, 2012).

Industrial development for lagging behind economies is a catching up process, a process of productive transformation encompassing diversification and deepening of production, technological upgrading, creation of new jobs and rising income (Nübler, 2014). Its essential components are the accumulation of productive capacities, the process of capability building at the national level and the institutional framework, the latter encompassing also a structure of incentives for investment and production (Lall, 1992). The dynamic interplay of these components reflects to the evolution of productivity, growth, trade performance (competitiveness) and employment (Lall, 1992, UNIDO, 2013, Nübler, 2014). Productive capacities encompass the country’s endowments in physical and human capital but capabilities determine the feasible scope for productive transformation (Nübler, 2014).

Investment in production capacities does not mechanistically result to growth. Capabilities are a key determinant of catching up as it relates to how technological progress and knowledge generation will create growth. Capability building at the national level concerns the process of technological and organisational change that shapes the options of an economy for productive

transformation. Accordingly, Bell and Pavitt (1995: 78) have distinguished between productive capacity and technological capabilities, the former incorporating “the resources used to produce industrial goods at given levels of efficiency and given input combinations” whereas the latter are the ones “needed to generate and manage technical change” including managerial, technical and linkage skills and technological effort. The above considerations link the question of country’s development and international performance to micro structures along with meso-structures that foster synergies and collective learning as technical progress is based on a learning process that takes place at the individual or firm level on one hand but more importantly at an inter-organisational level.

Productive capacities and technological capabilities should be embedded in an overall coherent system (von Tunzelmann, 2010), characterized by an appropriate structure of incentives for investment and production, minimizing systemic failures and an institutional framework supporting industrial activities<sup>2</sup> and triggering, accelerating and sustaining learning processes (Lall, 1992, Bianchi and Labori, 2011).

The question of coherence implies among other things the importance of addressing systemic failures, which can be dealt in the context of industrial policy. Systemic failures encompass a variety of factors; the lack of interconnections and effective relationships among actors in the national system of innovation; the misalignment between public initiatives and private actions and real constraints that private actors face which may nullify the effects of interventions in favour of industrial development. Sometimes, the development of profitable new industries depends on upstream and downstream investments, on large scale investments or on demand side conditions and coordination is required. Systemic failures are also referring to the lack of coherence of different economic policies (e.g. budget constraints at the macro level dictate restrictive policies, whereas technological development calls for investment in education, R&D etc.).

The system of incentives can align actors’ interests and objectives with a long-term strategic vision for productive transformation. Institutions and especially those that affect industrial structures and capabilities (legal, fiscal and tax regulations, property rights, organizational arrangements for small firms support or promotion of inter-organisational linkages, educational system etc.) determine the effectiveness of any efforts to increase industrial performance.

The revival of interest to industrial policy in the recent years in Europe, especially after the financial crisis is mainly related to the recognition of a divide between economies whose growth was export and innovation-led and medium-sized or less industrialised economies, the so called North / South divide (Boyer, 2014). The crisis was linked to shortcomings in the real economy. Southern European economies are characterised by weak structural competitiveness and their weak productive base proved to be inefficient or unable to deal with the financial crisis. These countries found themselves in a position of catching-up and need for convergence. Economic literature so far has underlined the importance of absorptive capacity at the macro and micro level and related it to the convergence of economies and the transition of national economies from lower to higher levels of growth and development. The main emphasis has been put on the capability building and transformation process and on the factors that operationalize such process. These factors are countries’ level of human capital,

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<sup>2</sup> By industrial activities we are not referring only to the manufacturing sector but to the entire supply side, including agricultural activities and services, as there are strong interdependencies and complementarities among these productive domains.

their openness to the international economy, their industrial specialization patterns (Nelson and Phelps, 1966; Verspagen, 1991) as well as countries' R&D and innovation and imitation activities (Howitt and Mayer-Foulkes, 2005; Acemoglu et al., 2006).

One of the challenges today for economies severely hit by the economic crisis is to establish both a sustainable macroeconomic management and a sustainable industrial development path, to increase industrial competitiveness by strengthening their productive base and climbing up the technological ladder and value chain. Industrial policy can boost this process by adopting a systemic approach, targeting to structural and productive transformation, focusing to the essential components of this process as described above (Rodrik, 2004 and 2007, Lall, 1992, 2003, Bianchi & Labori, 2011, Aiginger, 2012, UNIDO 2013). Countries that are technology followers, not on the frontier line, falling behind also because of the economic crisis conditions, should succeed nevertheless to build new capabilities and competitive advantages in areas in which many other actors may be leaders (Giannitsis, Kager, 2009). Absorptive capacity, in the sense of building upon existing knowledge to expand towards new solutions that respond to a demand characterized by high-income elasticity, may become a crucial target for industrial policy counteracting to neo-liberal policies. The latter are not neutral to such processes. On the contrary they may block and/or erode any 'creative accumulation' process.

Industrial policy may prove ineffective if there are inconsistencies with other policies and actions such as macroeconomic or trade policies (e.g. budget constraints at the macro level dictate restrictive policies, whereas technological development calls for investment in education, R&D etc.). It will be ineffective as well if in times of crisis it doesn't align with priorities such as creation and re-distribution of productivity gains and reduction of unemployment.

### **From the macro-economic management of the crisis to the need for a policy targeting the real economy**

After more than eight years of recession and having achieved the rebalancing of the fiscal and external deficits, the policy agenda should focus on the productive system and the development of the productive and technological capabilities in order to reverse a downward loop.

However, before entering to the core of this discussion, we would like to make some introductory remarks. Firstly, as Greece entered in a severe economic crisis since 2009, with serious socio-political implications, any discussion on industrial policy should be mitigated by the imperative of overcoming severe destabilizing political and social conflicts within the country and between the creditors and the Greek government. The second remark has to do with the monotone reference to reforms that have been considered as the tools to solve imbalances and shortcomings of the Greek economy during the last eight years. These reforms are continuously and stubbornly focusing in consolidation and internal devaluation leading to new recession and social and political destabilization. Little attention has been given to reforms such as the structure and functions of the State, the judiciary, corruption, inefficiency, inequalities, productivity increase, which impact on growth and employment. Third remark, many of these reforms (according to OECD estimations Greece is one of the top countries in introducing reforms during the last years regarding the pension system, the

labour market and the public sector wage structure) have been decided but were hardly implemented save income cuts and the liberalisation of the labour market.

After eight years of political debates, conflicts and efforts to overturn the crisis, losses of GDP reached 26%, and many significant indicators such as investment and private consumption continue their downward trend.

However, exports increased after 2014, partly as a result of improved cost competitiveness and partly because faced with internal recession, medium sized firms decided to expand into the export market, and after some years of adjustment the result seems to have been positive. Nevertheless, persistence to wage cuts and liberalisation of the labour market might create disincentives to invest to knowledge and knowledge intensive activities, where Greece is lagging behind. They could result to a short-term improvement of competitiveness but there is always a risk of low wage specialisation trap and the divergence from a quality and productivity improvement pattern in the long-run.

As a result divergences within the EU became stronger and Greek GDP has fallen at levels below those of 1970.

**Table 1: Trends in significant indicators**

	% change 2016** over 2008
GDP	-26,17
private final consumption (households and NPISH)	-24,44
final consumption	-23,91
gross fixed capital formation	-63,16
nominal unit labour cost - total economy (2015/2008)	-18,39
nominal unit wage cost – manufacturing (2015/2008)	-13,28
exports of tradable goods and services*	9,7

\*: oil and ships excluded, tourism included.

\*\*: provisional data.

Source: European Commission, Bank of Greece.

**Table 2: Falling behind: Divergence processes during the crisis**

GDP at current market prices per capita as a percentage of the average in the E.U.15, in the beginning of the crisis and in 2015 (PPS)

	Greece	Cyprus	Spain	Portugal	Italy
2009 (%)	85,1	95,4	91,8	73,3	94,8
2016 (%)	63,7	76,6	85,4	71,3	87,4
Change (in percentage points)	-25,1	-19,7	-7	-2,7	-7,8
Fall back to the year:	<1970	1996	<2002	2008	1960

Source: European Commission, Statistical Annex of European Economy. Spring 2016.

In the following sections we will focus on the main weaknesses relative to the production system, namely structural and technological ones, in order to underline the relevance of industrial policy as a leverage to overcome the crisis. We then present the implications of such elements to the ‘long-tail’ of recession, contending that industrial policy could, under other conditions being satisfied, reverse the decline of production capacity. Finally, we develop some policy propositions for a catching-up process. Such a process should aim at reversing the long-lasting productive and technological gaps vis-à-vis other advanced economies and the loss of production capacity after 2008, the consequent erosion of know-how and capabilities and in general the erosion of what is called ‘industrial commons’.

### **Productive, technological and institutional drawbacks. A loop for recovery.**

If we analyse the three components that could support a catching up process in Greece, namely production capacities, technological and organisational capabilities and institutions, we realize that both productive and technological transformation were slow over the years and the crisis found the economy falling behind vis-à-vis even other European peripheral countries (Giannitsis et al., 2009). After the crisis, previous hindrances to industrial transformation became the loop for recovery and implemented austerity policies have disregarded the significance of investment and technological development in order to return to growth. In addition, the shrinking of domestic demand has not been counterbalanced by an expansion of exports, notwithstanding the improvement of cost competitiveness.

For the Greek economy to recover, apart from macroeconomic policies to tackle with macro-imbalances, there is need to trigger transformation of the productive system and look at micro and meso structures that foster synergies, learning processes and competitiveness of the real economy, in short to design and implement industrial policy.

However, in order to define what should be the priorities, we focus in what in our view are the main shortcomings that prevent the economy from recovering. We group these drawbacks under three main categories: productive, technological and institutional.

These drawbacks relate to the slow productive transformation towards higher added value and dynamic categories of products with stronger interdependencies, the low technological complexity and lack of technological deepening and upgrading of production and systemic and coordination failures. They reflect on low and decreasing productivity and weak international performance.

**Table 3: Main shortcomings of the Greek industrial system**

<b>Productive</b>	<b>Technological</b>	<b>Institutional</b>
Low and decreasing contribution of manufacturing to GDP	Low contribution of MHT and HT sectors to production and exports	Hindrances rooted in an ineffective public administration and public management (the lowest ranking in EU according to the ease of doing business indicator)
Weak export orientation ( $\approx 10\%$ exports of goods/GDP 2008-2014 average and $\approx 22\%$ of tradable goods & services/GDP)	Low level of R&D expenditure in the public and private sector and weak innovative performance	Unstable tax regulations and ineffective tax evasion monitoring
Small size of firms (97% < 9 employees)	(0.27% BERD/GDP, 0.50% GOVERD/GDP)	Inadequate framework for new funding schemes (crowdfunding, business angels etc.)
Service sector dominated by commercial and low skilled activities of very small size, directed to final consumption	Weak interlinkages among economic actors in technological activities	Risk avert entrepreneurial behavior (rent seeking attitude, low activity of venture capital etc.)
Limited digitization of industrial activities (low digital skills and ICT adoption compared to EU average)	Limited internal demand for research and knowledge-based activities from the private sector	Lack of coherence of different economic policies and misalignment of public and private initiatives
High import dependency of production		Limited demand-side measures (e.g. no specific measures addressing public procurement for innovation)



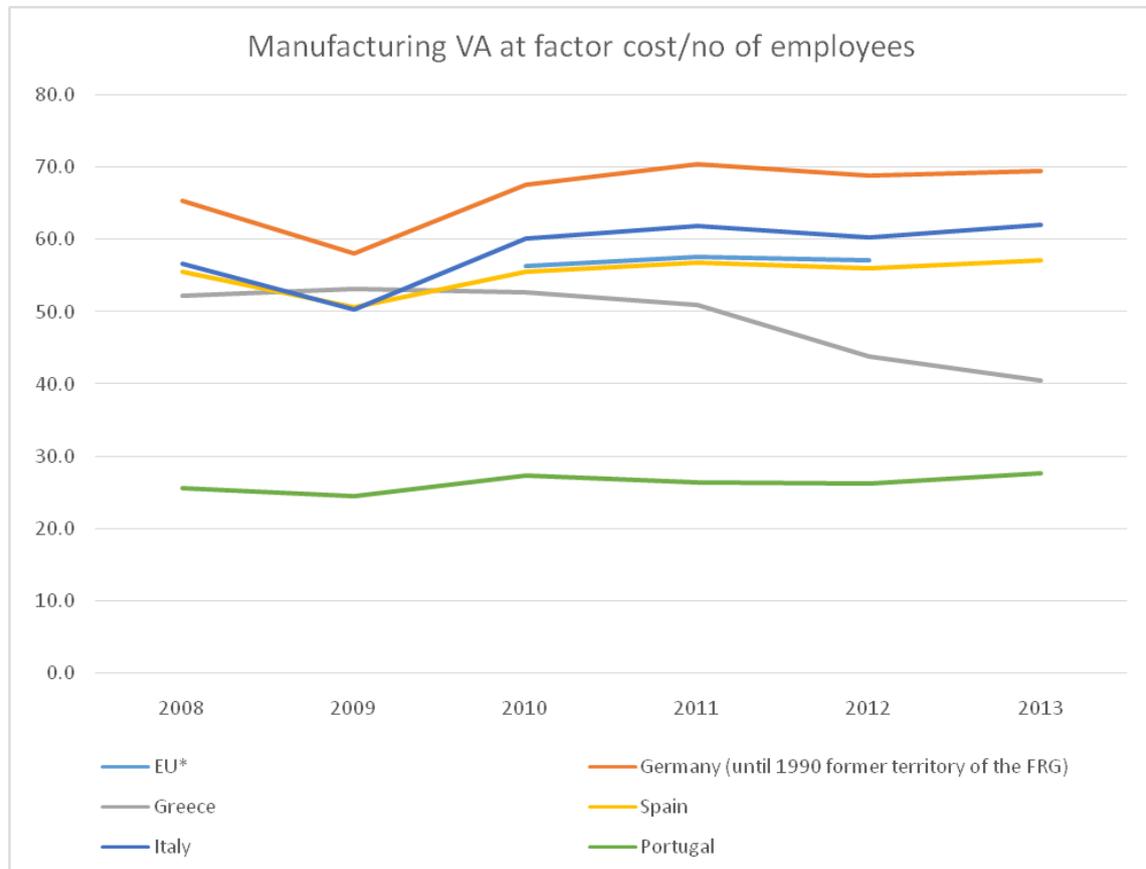
Slow productive transformation towards higher added value and dynamic categories of products with stronger interdependencies	Low technological complexity and lack of technological deepening and upgrading of production	Institutional and governance inefficiencies
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Low and decreasing productivity and competitiveness

Productivity growth has slowed down over a long period following a general trend (OECD, 2015) but especially during the crisis this trend has been accentuated.

**Figure 1: Productivity in EU members**



Source: Eurostat

Furthermore total factor productivity, a structural factor mainly showing the impact of knowledge, innovation, technological change, high skilled human resources and organisational learning, on the annual growth rate, has been historically weaker and has deteriorated in a more prominent way than in other European countries.

**Table 4: Total Factor Productivity Growth**

	Greece	Cyprus	Portugal	Spain	Gemany	France
1990-2013*	-1,104	1,232	-0,388	-0,476	0,791	0,066
1990-2007	-0,136	1,332	-0,149	0,424	1,247	0,332
2008-2013*	-4,001	-0,55	-1,232	-0,564	-0,242	-0,734

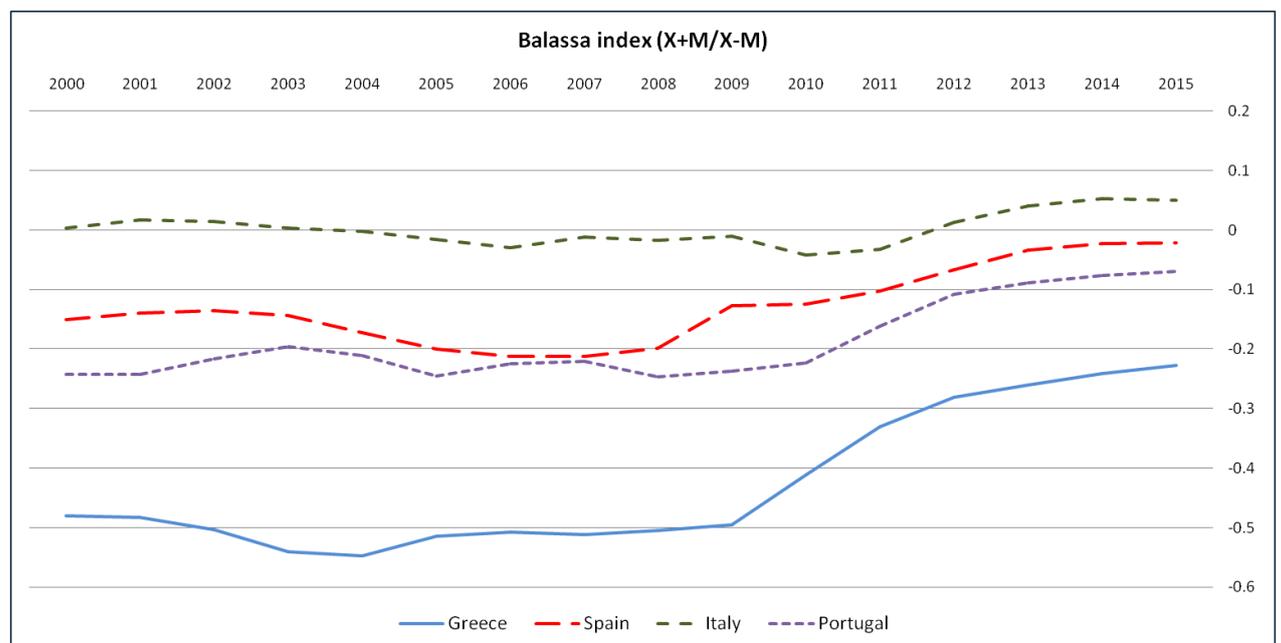
Source: UNCTAD

Negative total factor productivity rates, despite growing labour productivity and high overall investment rates in the years before the crisis, relate to concentration of fixed investment in non tradable goods (e.g. housing, construction), significant black economy and tax evasion or

tax exemptions and privileges, unskilled and low labour cost specialisation, particularly enhanced by the massive immigration after 1990 till the crisis.

Competitiveness as measured by the Balassa index in all technological categories of products is negative. The improvement during the crisis is due mainly to the decrease of imports<sup>3</sup> and to some extent the increase of exports. The Revealed Comparative Advantage, which focuses in the positive side of specialisation, i.e. exports, displays a comparative disadvantage for Greece vis-à-vis other Southern European reference countries in dynamic categories of products. A weakening is apparent even in those categories where there was a comparative advantage and the picture didn't change despite the improvement of the unit labour cost during the crisis. Interestingly, a weak but positive improvement is apparent in the MHT and HT products, a sign for further consideration. This is a sign that the Greek economy could expect an improvement in its position in the international division of labour by specialising in higher technological intensity goods.

**Figure 2: Balassa index (X+M/X-M), 2000-2015.**



Source: Processed data from OECD.

<sup>3</sup> The decrease of imports results from the dramatic drop in investment, the reduction of production that depended heavily on imports, the important decline of imported fuels and the severe contraction of incomes and demand for imported goods.

**Table 5: RCA-Revealed Comparative Advantage of Greece vis-à-vis Italy, Portugal & Spain by technological category, 1995-2013.**

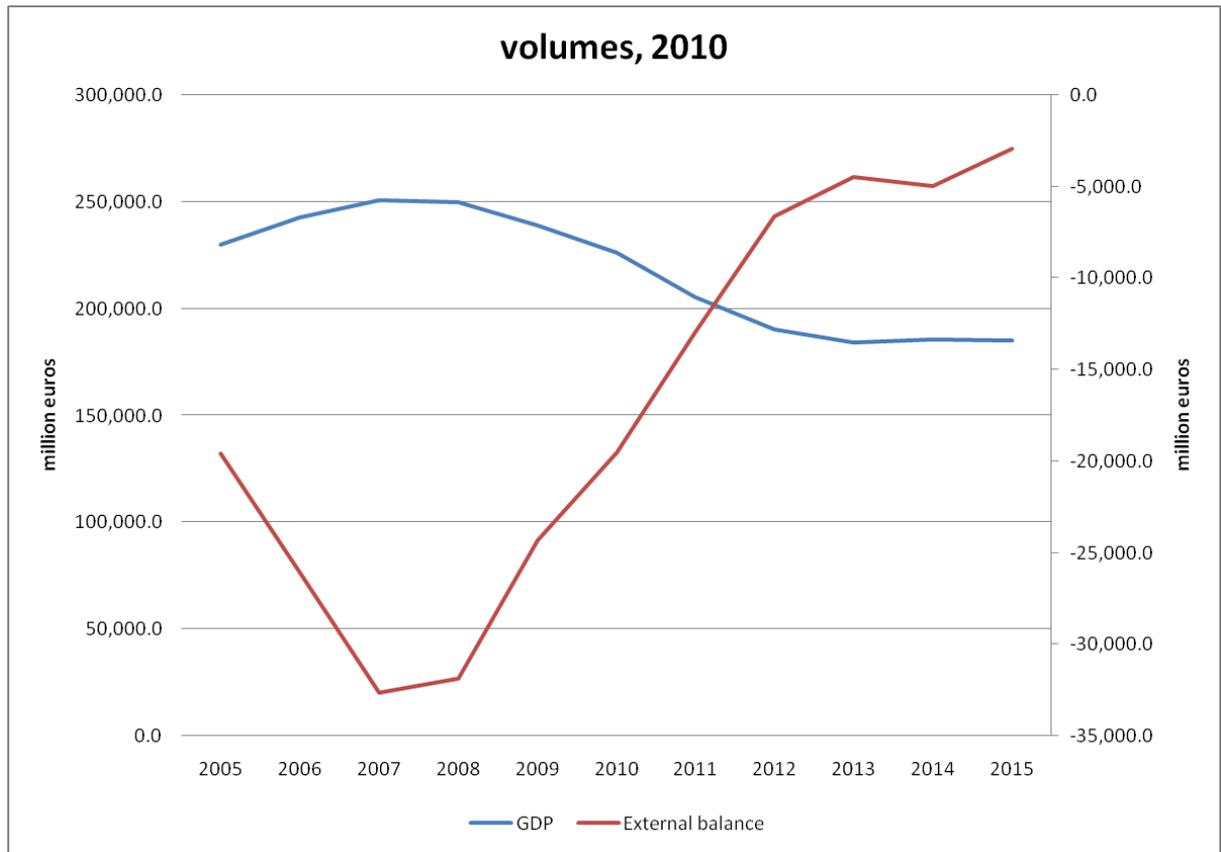
Revealed Comparative Advantage, 1995-2013		IT	PT	ES
agricultural products-raw materials	1995-01	3.26	2.72	1.72
	2002-08	2.97	2.06	1.64
	2009-13	2.91	1.86	1.63
low-tech products	1995-01	1.77	1.51	1.60
	2002-08	1.53	1.20	1.38
	2009-13	1.67	1.14	1.49
low to medium tech products	1995-01	1.18	1.00	1.74
	2002-08	1.17	1.11	1.58
	2009-13	1.06	1.01	1.29
medium to high tech products	1995-01	0.37	0.31	0.17
	2002-08	0.47	0.38	0.22
	2009-13	0.48	0.39	0.25
high-tech products	1995-01	0.36	0.59	0.60
	2002-08	0.56	0.87	0.94
	2009-13	0.54	0.98	0.89

Source: Processed data from OECD.

*The deepening of accumulated drawbacks*

After seven years of accumulated recession, the previously acknowledged deficiencies have been deepened as no alternative plan on how to boost economic activity has yet been implemented. Adjustments in external imbalances have been implemented through shrinking demand for consumption and investment goods due to recession.

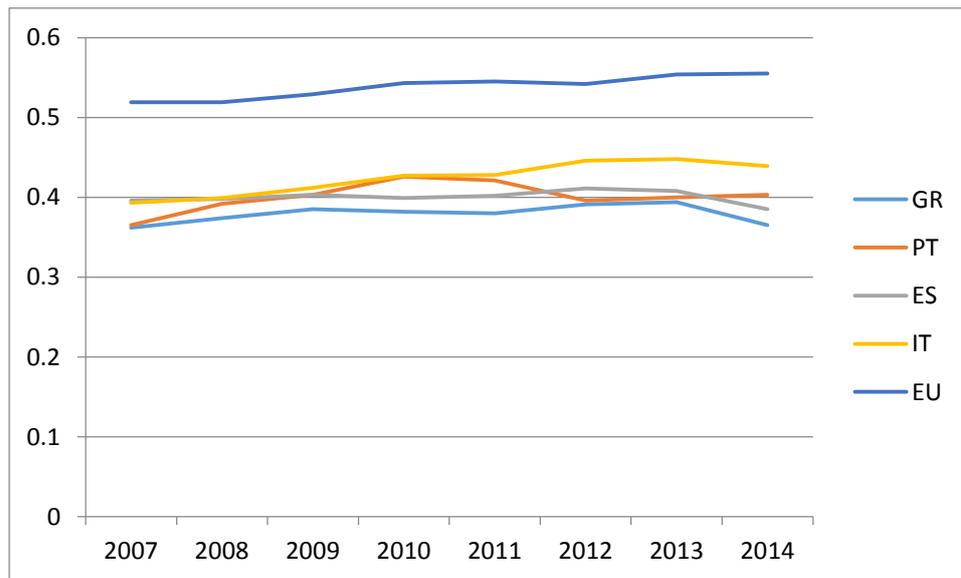
**Figure 3: Evolution of GDP and current account balance**



Source: Eurostat

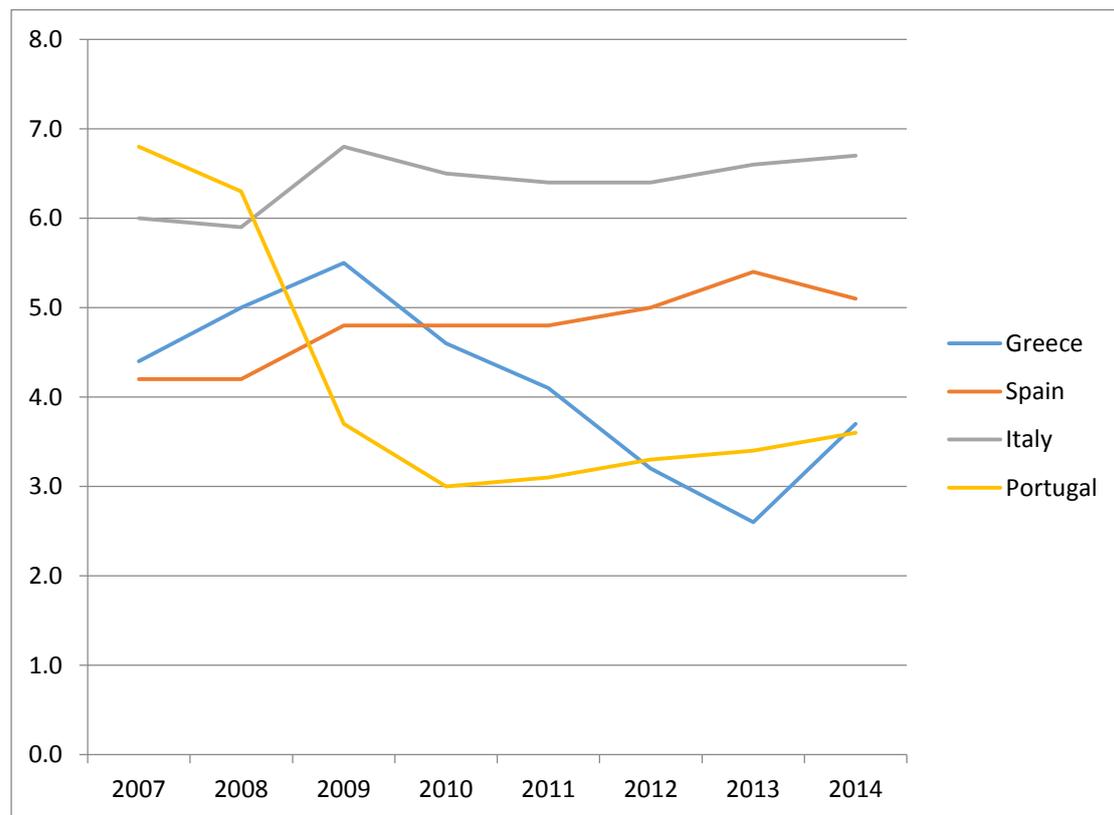
The economic crisis and the unilateral focus on macro-economic imbalances and deficits, on price-cost aspects and on austerity and liberalisation policies, interrupted any previous improvement of important aspects of industrial dynamics.

**Figure 4: Evolution of Innovation Scoreboard index**



Source: Eurostat

**Figure 5: Exports of HT products as % of total exports**



Source: Eurostat

#### *Constraints for the implementation of industrial policy*

The impact of the crisis on Greek society has been so deep that any significant economic policy cannot be conceived outside the social and political upheaval which unravelled the country during the crisis years. We underline this dimension, because the strictly economic base of our argumentation could give the impression that the fall into a deep crisis and the exit from it could be regarded just as a question of economic policy. Such a narrow perspective would lead to narrow or wrong policy perceptions and would dissociate public failures, which in the case of Greece cover both national and European policy failures, before and after the onset of the crisis.

The question of growth is not solely a question of resources, technological and innovative capability, education, and performance reflected to strictly economic indicators. It entails various non-economic parameters such as trust, political vision and efficacy, the societal value system and degree of tolerance to corruption, which form a complex framework with multiple interconnections.

The above considerations relate also to the element of time and emphasise the importance of a meso and macro vision of challenges.

To analyse industrial or growth policies in the presence of such extensive phenomena could be considered as a contradiction to itself and lead to a feeling of futility. Yet, sustainable and satisfactory growth is an absolute precondition for the years to come and the reference to the above social and political factors underlines the complexity and the multiplicity of aspects

which shape policy and social behaviour in the country and the reasons why a typical economic analysis could fail to lead to pragmatic policy proposals.

### **Implementation of a catching-up process**

The main challenge for industrial policy is to succeed its design and implementation in the context of such extraordinary conditions with adverse effects. There is need for coordinated actions, meaning that plans for redressing industrial activity should be aligned with other economic policies such as macro-economic, labour, educational, competition etc.

Coordination failures very often prevent success of initiatives for structural and technological transformation. Historical experience, especially from Japan and East Asian countries, has shown that coordination is a very important policy element and perhaps some market distorting mechanisms could help in that direction. But today other experience has also shown that flexibility and more 'soft measures' to promote upscaling and upgrading through networking and cooperation can generate positive results. Besides, in the context of the dominant policy agenda of market and trade liberalization, there is more space for intervening at this level (Wade, 2012).

In the following section we propose how an overturn could be implemented. We group industrial policy interventions under three main blocks: interventions targeting structural transformation and production capabilities, more specifically those targeting technological development and initiatives for institutional change.

#### Structural transformation and production capacity

To generate a catching-up effect based on structural change, we should focus in four relevant issues:

1) The expansion of the productive base in the aim to enrich it with new competitive products and services and to enhance existing productive structures. In the context of global competition and division of labour it is preferable to develop, enlarge or keep the more upstream components of the production and innovation cycle. To this end the existence of relatively skilled human resources could support this process of re-industrialisation., but brain drain and human capital depreciation might jeopardise any attempt to return to growth and undermine social cohesion and solidarity. The development of more complex activities should consider the role of the manufacturing sector in generating strong multiplicative effects inducing structural change within the sector but also altering the service sector towards knowledge-intensive service activities. In addition, Further (?) efforts should consider whether there is space for substituting a range of imported products and/or services with domestically produced, in areas with accumulated experience and existing capabilities and through systematic restructuring of the production base to address the national demand in the direction of scaling up existing firms or creation of new firms.

2) In addition to the expansion of production capacity, the raise of productivity is a second area of priority. In order to achieve an increase in productivity there is need for investment in physical and human capital. The change of production processes towards digitisation and the increase in firm size to exploit economies of scale are of major importance. Clustering is one possible solution to this end while integration of firms to global value chains is another. Incentives and facilitation of both could be part of the industrial policy. It should be

underlined that industrial widening (diversification and product differentiation) should be coupled to technological deepening and upgrading. Both processes are needed in order to develop productive capabilities and achieve a more efficient labour utilisation but also to achieve higher levels of employment.

The two points above – expansion of production capacity and raise of productivity – deal also with one important structural weakness of the Greek productive system which is i) the particular small number of medium and larger size companies, their comparatively low absolute size, their low value added in the industrial activities, the low degree of their networking, the weak integration of most of these firms in the global value chain, the very weak level of R&D and innovation activities, their weak management structures and ii) the vast presence of small and very small firms in the productive system with a low survival capability.

3) The export orientation of the productive system, namely the extent of business openness to international markets and the type of markets addressed is at the same time a crucial determinant and an outcome of the process of structural change. The more the openness the more changes are induced but competitiveness could not reach sustainable levels without shifting production to more attractive and high demand segments. In this respect, higher quality production standards should be adopted, networking and promotion of the Greek production should be supported and especially at the present situation of extremely tight and adverse liquidity conditions, export oriented firms should be facilitated with guarantees.

4) Such process cannot be put in place without investment. However, during all these years there are no positive signs of industrial investment in the above directions. Actually net investment (gross fixed capital investment minus depreciations) in total economy is negative by 2,3 billion euros (1,1 billion in manufacturing) and no replacement or new formation of capital stock takes place, at the aggregate level (SEV, 2016). There are three policy tools that realistically could support such objectives, EU funds, foreign direct investment and public investment. These tools could push for re-industrialisation under condition of well-designed national priorities with multilevel coordinated actions attracting greenfield foreign investments, targeting redirection of European inflows to productive investment.

### Technological development

The development of technological capabilities is not disconnected from what was already presented. On the contrary it goes hand in hand with structural and productive transformation. We will not be able to achieve a level of higher technological complexity and capability to absorb and exploit knowledge generated in more advanced economic systems without accomplishing the necessary structural change. At the same time incorporation of technological achievements and upgrading of the knowledge and scientific base can foster the shift towards higher added value activities and more efficient productive and economic processes both in the private and public sector.

In line with a high added value production strategy, it is very important to establish processes of accumulation. Hence, technological development should focus in two main directions: to foster the ability to absorb and exploit technological progress generated externally and the capability of the industrial system to respond to a demand which is characterised by high income elasticities and thus offering attractive products that are in high demand at home and

abroad (both capabilities have been labeled by Fagerberg et al., 2004 as ‘capacity’ and ‘demand’ competitiveness respectively).

The important issue is for the productive system and its constituent parts to build upon bits and pieces of knowledge for the continuous improvement of products, processes or systems. The dynamic process of learning and creation of knowledge relies on interactions at different organizational levels and combination of existing knowledge bases to induce new better solutions to existing problems and/or creation of new needs and solutions to them.

In this context, the important elements that could support technological upgrading of the Greek productive system relate to human resources, educational and training processes, established productive routines and research activities and collective organizational memory and practices. In the case of Greece as a starting point we should not expect spectacular results in very advanced fields but policy choices should support expansion, development and transformation in areas where a critical base of competences and experience exists and upon which policy and business could build. These areas might very well be in traditional activities where transformation processes could result in higher productivity and higher non-cost competitiveness.

Complementarities with other policies obviously occur. For example rethinking educational policy could lead to upgrading analytical and creative capabilities and spur critical transformations in Universities enhancing their contribution in domestic research activities and their linkages with the productive system.

However, under the present circumstances, it is rather difficult for firms and other organisations to ensure the establishment and sustainability of such a dynamic process of ‘creative accumulation’.

Taking into consideration the above, the following initiatives could be implemented:

- 1) More selective policy initiatives supporting high impact new firms (in terms of exports, job creation etc). A set of incentives is needed to engage in new economic activities embodying knowledge and technology. These activities spread to all industrial sectors from high tech to low tech, from agriculture to services upgrading the value to users. Example of measures in that direction could be a reduction of social security contributions for each new qualified job created or tax credits for generated or incorporated research results and innovation expenditures.
- 2) Promotion of knowledge sharing by facilitating cooperation between various complementary actors can add to existing capabilities of individual actors and create synergies that might have multiplicative effects. The results from R&D efforts are spread within a group of different organisations and the creation of research networks can nurture ‘industrial commons’ making the leverage of resources more feasible. In this context tax and subsidy incentives should privilege productive investment in shared innovation activities and facilitate the exploitation of research results generated in the academic and scientific system.
- 3) Public procurement could be used as a tool for raising demand of innovative solutions, fostering the development of specific activities and capabilities helping to move down quickly the learning curve and reap dynamic economies of scale.
- 4) An investment plan for research and innovation sponsoring joint activities of Universities and Research Centres with the business sector in at least one important area of long-term challenge Greece is facing, such as environmental and energy challenge. Such transformative

investment is required anyway but in the current circumstances it could definitely contribute to the increase of aggregate demand, couple research to real business needs and attract international players to invest in Greece. This could also be part of strengthening the repatriation of qualified scientists and engineers to return home.

There is however a strong uncertainty and high risk of failure regarding effectiveness of industrial policy. This issue relates with questions of institutional change and governance, which are discussed in the following section.

### Institutional change and Governance

As already acknowledged in the first section, productive capacities and technological capabilities should be embedded in an overall coherent system of incentives and institutions. Weak public institutions raise the effective cost of doing business, and in particular, the cost of engaging in export activities.

At first, a major challenge for Greece is that existing institutional framework should be effectively applied instead of being bypassed. In addition, in many cases regulations and laws are circumvented because they are out-of-date, complicated and contradictory.

Then, many existing institutions need to be renewed and new ones to be developed along the following lines:

- 1) The legal and tax framework for business activities was always one of the most adverse factors regarding investment and business activities. This means a more simple, stable and efficient framework would raise efficiency and state of confidence of all economic actors and attract foreign investors.
- 2) The introduction of new funding schemes such as seed capital, business angels, crowdfunding, which are not well developed in Greece.
- 3) The National Strategic Reference Framework (the main development tool of the national government, primarily funded by the European Structural Funds) could be redesigned and better adapted to the requirements of industrial recovery, with focus in productive investments raising productivity, avoiding overlapping actions, time-consuming and high cost administrative burden. It should target incentivisation of innovative firms, creating employment opportunities and scaling-up of existing firms. Such a redesign would require new evaluation and monitoring procedures. A systematic evaluation process would facilitate a redesign of policy initiatives on the basis of the assessed relevance of the different programmes initiated in the past. Experience has shown a poor performance, a mismatch of requirements and real needs and a lack of learning from failures and inefficiencies of the previous funding periods (ELIAMEP, 2012).

The crucial structural non-economic challenge faced by Greece is the governance issue. Problems require coordinated efforts as challenges cross-cut the responsibilities of single actors.

This means that new management skills are required when referring to public management and organisational boundaries and political actions need a new perspective (e.g. unemployment is not an issue to be dealt by one or two ministries under the Troika monitoring).

At the private sector as well, there is space for improving corporate governance structures, an issue that relates also to the size of Greek firms. Small firms often lack the appropriate management and organisational structure to meet the challenges of a globalised economy and of international trade. But even in big firms there is a need to monitor technological development and this could be better addressed by a scientific committee and not in the context of boards that mainly care about financial issues.

Last but not least the governance challenge is linked to a declining trust of society in institutions and politics. Hence this undermines any policy initiatives for institutional and structural change as attempts for change face wariness and very often a strong opposition.

A last point should be stressed before concluding. Although the demand side is today neglected or identified with expansionary practices that led to an increasing dependence of growth from excessive lending processes, it is however of great importance as it strongly relates to systemic failures that prevent structural change. A crucial issue for industrial policy is therefore, to promote productive innovative activities at the same time with creating demand for innovative efforts and solutions (Fagerberg et al., 2015). To some extent this is expected to rely on the external market but it also relates to the development of the business ecosystem, the change in the entrepreneurial mindset and the generation of opportunities for new entrepreneurial activities.

### **Concluding remarks**

The key lesson of the present situation is that in a country with such erosion of the real economy, recovery needs investment. Investment is one key issue for achieving the structural transformation required but the policy framework to implement structural and institutional change is of equal significance. Established beliefs and practices need to change and hindrances to the productive and creative thinking and action to be removed. Hence, a mix of an investment push and institutional and governance change is needed and industrial policy addressing both challenges is a core element to create a path of sustainable growth.

The normal counterargument to the investment imperative, is how this would be financed. The management of the crisis so far both at the national and European level didn't give any reliable answer to such a question.

On one hand, the European political context neglected the question of real economy convergence between the Center and the Southern part of Europe so far. Although there is a resurgence of interest to industrial policy in Europe in the recent years and a discussion for the implementation of a European investment plan, which is to some extent a recognition that the economic crisis is linked to the shortcomings in the real economy, additional efforts are required to respond to the real needs of higher growth.

There is need to change the established policy framework and institutional set up both at the national and European level in order to expand financial resources for productive and technological capability building.

We described an alternative for catching-up of an economy found at a very vulnerable and unprecedented condition. Although to some extent this discussion could seem to be insignificant if the macroeconomic management of the crisis does not succeed, it could be at

least a political recklessness to suggest that any recovery from this landscape of de-industrialisation and return to normality could be achieved without a policy envisaging shortcomings of the real economy.

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